COMПENDIUM
ON
DELIBERATIONS
OF
ELECTRICAL STANDARDS COMMITTEE
(1935-2014)

ISSUED ON 26-10-2015

BY
ELECTRICAL DIRECTORATE

RESEARCH DESIGNS AND STANDARDS ORGANISATION
MANAK NAGAR, LUCKNOW-226 011
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FOREWORD

Electrical Standards Committee (ESC) is a highest forum for Railway Electrical Engineers to discuss various issues pertaining to Electrical Department for efficient and economical train operation. This compendium will provide a glimpse of the events and technological upgradation over last 80 years since inception of this committee. As very old records were not available easily, efforts have been made to collect as much records for the ESC, particularly for pre-independence period.

Initially separate ESC meetings used to be held for General Services and Traction. From 49th ESC onward, which was held in January’1999 at Pune, a decision was taken to convene a common ESC meeting for all items of Electrical department.

This compendium will be updated regularly so that all the records are available at one place. Moreover, a copy of this compendium is also available on RDSO’s official website.

(Om Prakash Kesari)
Executive Director Standard Electrical(CO-ORD),
Electrical Directorate, RDSO, Lucknow
OBJECTIVE

OF

ELECTRICAL STANDARDS COMMITTEE

From a humble beginning of electric traction in 1925, today the Electrical Department has expanded manifold with TL&AC, TRS, EMU/MEMU and TRD as its branches over the years.

Electrical Standards Committee, the highest forum of Chief Electrical Engineers is conceived to be a “THINK TANK” for free exchange of ideas so as to evolve strategies for Electrical Department on Railways to be able to make maximum contribution towards furthering the corporate objectives of Indian Railways.

The “Role of ESC” as approved by Railway Board vide letter No. 98/Elec(TRS)/138/29 dated 31-3-1999 is given as follows:

i) Policy regarding standardization of electrical assets like locos/EMUs, OHE/PSI, TL & AC, Power Supply etc and equipments thereof.

ii) Adoption of new technologies.

iii) Technical policy matters.

iv) To work as ‘Steering Committee’ for all MSGs.

v) Staff Yardsticks for maintenance and construction.


vii) Standardization of infrastructure pertaining to electrical assets e.g. sheds/shops, traction sub-stations, OHE/PSI depots and training institutions etc.
### DETAILS OF ESC MEETINGS HELD SINCE 1935

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1st ESC/Shimla/1935

1st ELECTRICAL STANDARDS COMMITTEE
MEETING

Members Present

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<td>CEE &amp; Chairman</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>CEE (Member)</td>
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<td>CEE (Member)</td>
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<td>T.G. Creighton</td>
<td>Dy. CCS (Secretary)</td>
<td>Railway Board (SHIMLA)</td>
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1st ESC/Shimla/1935

Subject 1: Cardan Shaft Drive.
(Paragraph 40 of the 15th Report of Carriage and Wagon Standard Committee)

Recommendations & Decision:

Paragraph (1) - The Committee noted -

(a) that the train lighting gear drive supplied by Messrs. Mather & Platt and Company to the Madras and Southern Mahratta Railway has proved a failure and as the firm were unable to guarantee a satisfactory job, the trials have been abandoned;

(b) that after 38,000 miles service, the East Indian Railway found it necessary to renew the rubber pads in the Stones gear. The firm have supplied an improved type of moulded rubber section for the cushion drive and experiments are continuing;

[A. E. S. A equipment has so far completed 7,000 miles satisfactory service.]

(c) that the Stones Cardan Shaft drive equipment had completed approximately 32500 miles on the North Western Railway when it was observed that the gear assembly was slack on the axle and had a diametrical movement of $\frac{1}{4}"$ between gear housing and the axle. On examination uneven displacement of the rubber cushions was found which appeared due to the uneven taper of the I. R. S. axle design. After reference to the suppliers, it was arranged that they would provide new moulded rubber pads together with a complete new torque reaction assembly and this has been fitted to a parallel axle. The coach will shortly be put into service for further trial;

[The A. E. S. A Cardan Shaft Drive equipment will shortly be put on trial.]

(d) The Committee opined that if axles were machined parallel, the application of the Stones gear will be simplified and the initial and recurring costs should be capable of reduction. The machining of parallel axles to accommodate and to facilitate alignment of axle pulleys is being considered at the next meeting of the Carriage and Wagon Standards Committee.

Paragraph (2). - The Electrical Standards Committee, however, express doubt if any form of Cardan Shaft Drive will be financially justifiable due largely to-

(i) enhanced initial cost of the equipment compared with the belt drive; and

(ii) the improved results obtained in recent years with the belt drive.


Recommendations & Decision:

Paragraph (3). - The Committee note that-

(a) Arrangements are in hand on the East Indian Railway and the North Western Railway for six trial sets of each of the water raising apparatus to sketches Nos. 3507 and
3508 to be tried out. Results of these trials will, where possible, be compared with the experience gained up to date with the tap switch control and also the earlier compressed air water raising apparatus.

(b) the new sample I. R. S. bogie third class carriage, now under construction by the Great Indian Peninsula Railway, will be fitted with the type of water raising system shown, vide sketches 3507 and 3508 accompanying the 15th Report of the Carriage and Wagon Standards Committee and will be available for demonstration and inspection in November 1935 at Delhi.

Paragraph (4)- The Electrical Standards Committee are of the opinion that the electrically Driven centrifugal pump system with roof regulating Tank and float control switch will prove to be the most efficient method for water raising in carriages with under slung tanks.

The importance of carrying out the experiments ordered, vide paragraph 45 of 15th Report of the Carriage and Wagon Standards Committee is appreciated and endeavors should be made to expedite these trials and to submit reports as soon as practicable.

Subject 3.-To examine the Sunbeam type of locomotive switchbox.

Recommendations & Decision:

Paragraph (5).- The Committee examined the "Ralco" combined switch and fuse box and recommend that this type be accepted as a permissible I. R. Standard provided that the dimensions and pitches of fixing holes are made in accordance with drawing No. CSL 585.

Subject 4.-To consider draft I. R. S. Specification E-5 for the Inter-vehicle Coupler Cable.

Recommendations & Decision:

Paragraph (6).- The Committee examined the remarks and suggestions of the Indian Stores Department on draft specification E-5. (Vide Chief Controller, Indian Stores Department, letter No. I-46/934 dated 17th September 1935).

Paragraph (7) (a).-It was agreed that the draft I. R. S. Specification E-5 should be amended to provide for copper conductors complying generally with B. S. I. Specification No.7 of 1926 and any subsequent amendment thereto. Accordingly, at the end of paragraph 2 of E-5 it is suggested that the following words be added-

"The copper conductors shall comply with B. S. I. Specification No. 7 of 1926 and any subsequent amendment thereto."

(b) Pure rubber insulation is not required.
(c) In the absence of further information regarding manufacturing practice, the Committee are unable at present to make definite recommendations on the acceptance of the suggestions contained in sub-paragraphs (ii), (iii), (iv) and (v) of Chief Controller, Indian Stores Department letter No. 1-46/934 dated 17th September 1935, and it was arranged to ask the Indian Stores Department to kindly make enquiries from approved cable manufacturers and furnish the Committee with information regarding-

(i) the precise description of the insulation next to the conductor and also subsequent layers and sheathing, in order to ensure that anything inferior to tough rubber insulation shall be excluded; and

(ii) whether copper conductors are tinned or not.

(d) The Committee suggest that the following words be added after the letters “B. S. I.” in paragraph 3 of the draft I. R. S. Specification E-5.

“Specification No. 7 of 1926 and any subsequent amendment thereto for tough rubber sheathed 250 volt grade cable.”

(e) The Committee also suggest that the latter portion of paragraph 5 of the draft specification be reworded as follows-

“A test pressure of 1000 volts for fifteen minutes as laid down in B. S. I. Specification No. 7 of 1926 and any subsequent amendment thereto for tough rubber sheathed cable 250 volt grade.”

(f) With regard to paragraph (vi) of the suggestions contained in Chief Controller, Indian Stores Department, letter No. 1-46/934 dated 17th September 1935, the Committee recommend that the following clause be incorporated as paragraph 6 of the draft specification, the existing paragraph 6 being renumbered as paragraph 7.

“Insulation Test.-The insulation test shall be taken with not less than 300 volts. The insulation resistance of any single conductor in the cable from earth or of any conductor in the cable from the other conductors and earth shall not be less than a minimum of 600 mega ohms per mile.”

Subject 5:- To consider and advise on the most suitable weight of wire, both copper and iron, which may be permitted to be used by the Posts and Telegraphs Department (or private companies) in crossing over railway power transmission lines.

Recommendations & Decision:

Paragraph (8) (a).-With regard to the erection of power lines crossing railways, by authorities operating under the Indian Electrical Act, the Committee adhere to the recommendations contained in page 16 of the 1930 Report of the Committee of Electrical
Engineers “regulations governing placing of electric transmission lines across Railway tracks.”

(b) With regard to communication wires. the Committee consider that the recommendation included under paragraphs IX and X at page 18 of the 1930 report Committee of Electrical Engineers shall be adhered to, except that there should be no restriction as to the cross-section of conductor.

Subject 6:-(i) To consider the adoption for use on railways of certain published I. S. D. specifications for electrical equipment.
(ii) To comment on certain draft I. S. D. electrical specifications with a view to their future adoption for use on railways (File EL/AG).

Recommendations & Decision:

Paragraph (9)(a).- These two subjects were dealt with together and the Committee examined the printed list of published I.S.D. Specifications and the list of those prepared in draft form. It was agreed that the following I.S.D. Specifications for electrical equipment are likely to be of use to railways, subject to certain desirable amendments.

H. 34 A-Insulators, porcelain, pin and shackle type. for overhead transmission lines up to 650 volts working pressure.
H. 50 A-Bridge megger testing sets. (Corrigendum No. 1 of November 1933).
H. 55 F.-Fans. ceiling with regulators (D. C.)
H. 58 B.-Wood casing and capping for electric wiring.
H. 61 D.-Cables electric power, paper insulated, lead covered and double steel tape armoured. (Corrigendum No. 1 of September 1934).
H. 66 C.-Composition insulators. (Corrigendum August 1933).
H. 71 C.-Wire, copper, silk covered.
H. 72 B.-Wire, copper. cotton covered. (Addendum No. 1 of September 1934).
H. 80 A-7-Strand steel wire 450 lbs. per mile.
H. 81 A-Internal wiring of buildings.
H. 82 A-Wood casing and capping for internal wiring of buildings.
P.I. 75 B.-Rotary converters.
P.I. 76 B.-Transformer core type, oil-immersed, self cooled for power and lighting.
P.I. 81 B.-Switch-board-660 volts. direct current-open type.
H. 57 A.-Cable, single core, V. I. R. insulated (250 volts 600 megohm grade).
H. 67 B.-Single core, V. I. R. Flame-Proof and fire-resisting cable (250 volts, 600 megohm grade).
H. 69.-Single core V. I. R. Tropical grade insulated cable (250 volts, 600 megohm grade).
H. 46 C.-250 volts, 600 megohm grade flexible cords or cables, braided, single or twin, insulated with pure and vulcanised India-rubber, glazed cotton, silk or workshop finish.
H. 45.-Poles, Tubular Steel.

(b) The following printed and draft I.S.D. Specifications concern signal and interlocking materials and Electrical Standards Committee suggest that their adoption on railways be referred to the Signalling and Interlocking Standards Committee.
H. 27 A-Cable, electric, dry core, paper insulated, telegraph, multiple, twin telephone and composite.
H. 28 A-Cable, electric, dry core, paper insulated (telephone).
H. 29 A-Copper and bronze jointing sleeves, for telegraph and telephone purposes.
H. 42 A-Condensers, metal cased, 1st grade for telegraphs and telephones.
H. 68 C.-Two and four core, twin and quad twisted, compound-insulated, lead-covered and armoured, telegraph cable; under water type.
H. 73 A.-Four core, rubber-insulated, lead-covered and under water, telegraph cable.
H. 76 B.-Insulators, porcelain, screw pattern.
H. 77 A-Cable, multi core, telephone switch-board (tropical pattern with enamelled conductors).
H. 94.-Glass battery jars.
H. 96 B.-Overhead spanning aerial line cable.
H. 103.-Sack elements for Leclanche Cells.

Paragraph (10) -The Committee then perused I. S. D. Specification H. 55F as an example and it was noted that the temperature rise is omitted from the specification. Its inclusion is very necessary. The Committee expressed their diffidence in departing from B. S. I. specifications which have been found satisfactory in the past, and expressed a desire that future I. R. S. and/or I. S. D. specifications for electrical equipment adopted for use on railways should be based on the appropriate B. S. I. specification suitably amplified to meet Indian conditions.

Paragraph (11)(a)-It was arranged that the following I. S. D. printed specifications prior to their adoption for railways' purchases should be circulated to Electrical Standards Committee Members for their individual comments and suggestions.
H. 34 A-Insulators, porcelain, pin and shackle type, for overhead transmission lines up to 650 volts working pressure.
H. 50 A-Bridge megger testing sets. (Corrigendum No. I of November 1933).
H. 55 F.-Fans, ceiling with regulators (D. C.)
H. 58 B.-Wood casing and capping for electric wiring.
H. 61 D.-Cables electric, power, paper insulated, lead covered and double steel tape, armoured. (Corrigendum No. 1 of September 1934).
H. 80 A-7-strand steel wire 450 lbs. per mile.
H. 81 A-Internal wiring of buildings.
H. 82 A.-Wood casing and capping for internal wiring of buildings.

(b) On receipt of the views of individual Electrical Standards Committee Members, necessary, agreed and accepted alterations will be forwarded to the I.S.D. for consideration and incorporation. After alterations and amendment in the light of the Railway Board and I.S.D. requirements, these specifications will be again placed before the Electrical Standards Committee for final approval before adoption.

Paragraph (12).- The Committee considered additional items of electrical equipment for which specifications (either I. R. S. or I. S. D.) are necessary and recommend that the preparation of specifications for the following items be undertaken and drafts submitted to the Electrical Standards Committee in due course.
1st ESC/Shimla/1935

(a) Motors and control gear.
(b) Arc Welding plant.
(c) Direct electrically driven portable workshop apparatus and tools.
(d) Vacuum exhausters.
(e) Axle pulleys.
(f) Loco. Head light equipment,
(g) Direct driven oil engine generating units for general stationary purposes.
(h) Electric wiring accessories.

Subject 7:-To propose items of electrical equipment which can advantageously be standardized.

Recommendation and Decision:
Paragraph (13).-With the exception of items of electric traction equipment, the Committee can suggest no items of electrical equipment for standardization at the present time. The Committee opine that dimensional standardization of electrical equipment and apparatus (other than loco. headlight and train-lighting equipment) is undesirable due to variations in requirements of electrical plant and equipment at site and the rapid progress in electrical design.

Subject 8:-To consider the draft I. R. S. specification E-6 for the Inter vehicle Coupler.

Paragraph 43 of the 15th Report of the Carriage and Wagon Standards Committee.) Paragraph (14).-The Committee examined the draft specification for E-6 and suggest the following modifications.

(a) The heading to read as follows.
"Indian Railways Standard Specification for 5 wire inter-vehicle electric couplers for B. G. and M. G. coaching vehicles."

(b) Paragraph 1 of the draft specification
For sub-para. (c) read " cable coupler plug,"
For sub-para. (d). read "coupler socket."

(c) Paragraph 2 of the draft specification-
(i) For " contact blocks " read " terminal blocks."
(ii) The panels of the 5-way junction boxes should be non-hygroscopic and made from red vulcanized fibre of the best quality.
(iii) The terminal blocks should be marked for identification as shown on the drawing.
(iv) The cable eye-socket should be so fitted to "the terminal blocks to prevent radial movement and contact with other adjoining cable sockets.

(d) Paragraph 3 of the draft specification –
For "prong connectors" read "pin' connectors as shown on E.S.C. Drawings Nos. 10-11."

(e) Paragraph 4 of the draft specification -
(i) For " non-conducting" read "moulded insulating."
(ii) Omit the words “red vulcanized fibre"
(f) Paragraph 5 of the draft specification.
For "mild steel screws" read "brass screws."

(g) Corresponding corrections to be carried out, where necessary, throughout the draft specification.

Paragraph (15): The Electrical Standard Committee are of the opinion that the accessibility to terminals provided in the Acme junction box is an improvement on the stones pattern and recommend that the pitch and dimensions of fixing holes of the Acme type should be adopted as the I.R. Standard.

Paragraph (16): The Committee also perused the Electrical Standard Committee drawings No.8-12 of the I.R. Standard IVC and recommend their adoption.

Paragraph (17): The Electrical Standard Committee agree that the combined junction and fuse box should continue to be covered by I.R.S Specification E-3.

Subject 9. To consider the proposal of the C.M.E., G. I. P. Railway, that a larger capacity cable 19/064 be used for the auxiliary mains instead of the present cable 7/052 having a 37 amp capacity which is considered unsuitable.

Paragraph (18) The Committee agree that it is necessary to increase the capacity of the negative auxiliary main for new wiring.

They further recommend the auxiliary lighting positive and the auxiliary fan positive mains shall be increased. The following sizes are recommended for adoption:

(a) Auxiliary negative main 19/.044.
(b) Auxiliary lighting positive 7/.052.
(c) Auxiliary fan positive 7/.064.

Subject 10.-Combined junction and fuse box. To consider proposals and sketches submitted by the G. I. P. Railway to redesign the combined junction and fuse box.

Recommendation and decision:
Paragraph (19)(a).--The Committee consider that the existing dimensions of the box should be retained but its location raised approximately 4" for the cable entrance to clear the top rail thus avoiding cutting the latter. The free suspended position of the plug coupler for both the combined box and the junction box must be the same. This will necessitate the length of the combined junction and fuse box coupler cable being about 4" longer than the junction box coupler cable. Inter-changeability of these cables are not important.

(b) The Committee further consider that endeavors should be made to reduce the weight of the combined junction and fuse box. They recommend that the manufacturers be asked to furnish proposals with a view to adopting M. S. or other material.

Subject 11.-To consider the comments of Messrs. Jost Engineering Company, on the draft B. S. specification for Train Lighting Accumulators (Alkaline Type)

Recommendation and decision:
Paragraph (20) *(a).-* The Electrical Standards Committee consider that as the comments of Messrs. Jost Engineering Company on the draft British specification for Train Lighting Accumulators (Alkaline Type) with regard to the manufacturers of Messrs. Thomas Edison Incorporated, New York, concern minor points in construction, the manufacturers may be expected to fall into line with and abide by the B.S. specification.

*(b)* The Committee recommend that a time interval of approximately twelve months should be allowed between the publication of the B. S. specification for Train Lighting Accumulators (Alkaline Type) and its adoption for use on Indian Railways (with suitable amendment to I. R. S. specification E-2/34), in order to enable the Edison Company to arrange for the necessary minor alterations in designs of their accumulators necessitated by the adoption of the B. S. specification, if they so desire.
### 2nd ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name /Shri</th>
<th>Designation</th>
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<tbody>
<tr>
<td>1.</td>
<td>A.F. Wilson</td>
<td>CEE (Chairman)</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>2.</td>
<td>H.J.Darling</td>
<td>CEE (Member)</td>
<td>East Indian Railway</td>
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<td>3.</td>
<td>S.E.Povey</td>
<td>CEE (Member)</td>
<td>Baroda and Central India Railway</td>
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<td>4.</td>
<td>H.J.Allinson</td>
<td>Dy. CME (Member)</td>
<td>Eastern Bengal Railway</td>
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<td>5.</td>
<td>T.S.Rau*</td>
<td>AEE</td>
<td>North Western Railway</td>
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<tr>
<td>6.</td>
<td>T.G.Creighton</td>
<td>Dy. CC</td>
<td>Central Standard Office, RB</td>
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* Reprtsented Mr R. Simpson, CEE/NWR who was unable to attend due to ill health.
Subject 1:- To consider draft I. R. S. Specification No. E-5-36 for Inter-vehicle Coupler Cable.

Recommendation and decision:

The Committee examined the revised draft specification prepared in the Central Standards Office in the light of information received from Cable makers regarding the insulation and tinning of the conductors together with the comments received from railways and recommend the adoption of the revised specification in Appendix A.

Subject 2:- To consider the adoption for use on railways of certain of the following I.S.D. Specifications for electrical equipment.

Recommendation and decision:

2. The Committee considered the following draft I.S.D. Specifications and recommend their adoption on railways as per modified drafts in Appendix "E"

(a) H34-B for insulators, porcelain, pin and shackle type for overhead transmission lines up to 650 volts working pressure.
(b) H50-B for portable electric insulation and resistance testing sets (Bridge meggar testing sets).
(c) H58-C for wood casing and capping accessories for electric wiring.
(d) H61-E for cables, taper insulated, lead covered and armoured for electric supply.
(e) H71-D for wire, copper, silk covered.
(f) H72-C for wire, copper, cotton covered.
(g) HS7-B for cable, single core, pure and V. I. R insulated, taped, braided and compounded 250 volts, 600 megohms grade).
(h) H69-A for cable, single core, V. I. R. insulated, tropical grade, taped. braided and compounded

(J) H46-D for Flexible cords, twin or three core, insulated with pure and vulcanised rubber, braided with glazed cotton or art silk or workshop finish, 250 volts, 600 megohms grade.
(k) H45-A for poles, tubular steel for electric power transmission.
(l) H67-C for cable, single core. V. I. R, flame proof and fire resisting.

3. The Committee considered the following draft I. S. D. Specifications and recommend their adoption on railways as the materials specified therein purchased by railways-

(a) H66-C for composition insulators.
(b) H80-A for 7-strand steel wire, 450 lbs. per mile.

4. The Committee also considered the question of the I S. D. being requested a suitable specification for composition insulators but in view of their limited demand the Committee decided to drop the matter.

5. Committee also considered the N. W. Railway suggestion that the I.S.D be requested to draft a specification for gays and stay wires but decided to drop the matter.
6. Committee note that the following I. S. D. Specifications have been Withdrawn but recommend that the matter dealt with therein be considered in connection with the draft Code of Practice, the preparation of which has been recommended for consideration under subject No. 12:—
(a) H-81A for internal wiring of buildings.
(b) H-82A for wood casing and capping for internal wiring of buildings.

7. The Committee note that the following draft I.S.D. specification will be taken up for consideration at their next meeting. They, however, suggest that the case of specification No. P. I. 76-B the draft may be brought into line with the newly revised B.S.Specification on the subject.

(a) P. I. 76-B for transformer, core type, oil immersed, self-cooled for power and lighting.
(b) P. I. 81-F for switch board 660 volts direct current open type.

8. The Committee note that the following I S.D. Specifications have been adopted for use on railways:—
(a) No. H-55G for fans, ceiling with regulators, direct current.
(b) No. P. I. 75-8 for Rotory Convertors.

9. They recommend that in the I. S. D. Specification No. P. I. 75-B for Rotary Convertors, clauses 3 and 30 be modified as follows:—

Clause 3- The words "shall be in accordance with" be modified to read as "shall not exceed the speeds shown in."

Clause 30-"When required by the purchaser the successful tenderer shall also supply three sets of fully dimensioned "as made" drawings, furnishing complete information regarding size, insulation, section and weight of wire used on all component parts of the machine and switch gear, and full detailed description, type and grade of the material used for all renewable parts of the machine and switch gear.
"A separate price shall be quoted for the 'as made' drawings specified above."
"A pamphlet giving detailed information required to effect the necessary repairs and re-winding shall be supplied."

10. Arising out of this the Committee considered the N. W. Railway suggestion that the I. S. D. be requested to undertake drafting of a specification for rectifiers.

The Committee are of opinion that the development of these rectifiers is not sufficiently standardized to warrant the preparation of a specification and the matter may be dropped.
Subject 3.- To consider draft Specification No. E-8-36 for Vacuum Exhausters.

Recommendation and decision:

11. The Committee considered the re-draft of the above specification as prepared in the Central Standards office and recommend its adoption for use on railways as modified in Appendix B.

Subject 4.-To consider the necessity for a separate specification for motive power for driving vacuum exhausters to be issued along with the draft Specification for Vacuum Exhausters.

Recommendation and decision:

12. The Committee consider that the specification for motive power for driving vacuum exhausters should be dealt with separately as motive power for driving machinery.

Subject 5.-To consider draft Specification No. E-7-36 for Train Lighting Dynamo Axle Pulleys.

Recommendation and decision:

13. The Committee considered the draft specification prepared in Central Standards office for Railways and also the comments received from the various Railways and recommend the adoption of the revised specification in Appendix C.

Subject 6.-To consider draft Specification No. E-9-36 for Locomotive Electric Head Light and Lighting Equipment.

Recommendation and decision:

14. The Committee considered the draft specification prepared in the Central Standards Office and the comments received from the railways and firms, and recommend the adoption of the revised specification in Appendix D.

15. They also suggest that a trial shall be undertaken on the E. I. Railway to determine the relative steam consumption of 500 and 350 Watt machines at various loads and at 160 and 210 lbs. B. W. P.

Subject 7.-To note that I. R. S. Specification No. E-6-36 for 5- wire Inter-vehicle Electric Couplers for Broad Gauge and Metre Gauge Coaching vehicles has been issued and published.

Recommendation and decision:

16. Noted
Subject 8 - To consider the proposed revision of the sizes of auxiliary mains of coaching stock.

Recommendation and decision:

17. The Committee recommend the following sizes for standardization:

(a) Bogie composite I and II Class.
   
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<thead>
<tr>
<th>Lighting</th>
<th>Fan</th>
<th>Negative</th>
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<tr>
<td>7/.064</td>
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<td>19/.044</td>
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(b) Bogie I class.
   
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<td>7/.064</td>
<td>7/.064</td>
<td>19/.044</td>
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(c) Bogie brake and lower class.
   
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<th>Lighting</th>
<th>Fan</th>
<th>Negative</th>
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<td>7/.064</td>
<td>3/.029</td>
<td>7/.064</td>
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18. Arising out of the discussion on this subject, the Committee expressed a desire to have a revised standard wiring arrangement with necessary fuse junction and IS-way junction boxes prepared for the I. R. S. body designs. The C. E. E./M & S. M. Railway promised to prepare diagrams etc. for future consideration by the Committee.

Subject 9:- To reconsider the question of retention of the present rectangular section of fan brushes as standard, as referred to in I. R. S. Specification No. E4-34 for Carriage Fans and Regulators.

Recommendation and decision:

19. The Committee reiterates its opinion that the rectangular 5/16" x 3/8" brush should be the standard as this shape ensures the brush being fitted correctly.

Subject 10:- Cardan Shaft Drive.

(Paragraphs 1 and 2 of the 1st Electrical Standards Committee Report)

Recommendation and decision:

20. The Committee noted the recent experience of the East Indian Railway with trial equipments. The E. I. Railway conclusions are briefly, that no benefit is derived from the use of these drives and they possess the following disadvantages:

(a) High capital cost.
(b) Need of highly skilled maintenance staff.
(c) Expensive lubrication.
Expensive replacement of parts.

21. These conclusions are endorsed by the evidence obtained from the N. W. Railway trials.
22. The Committee reiterates their opinion as expressed in paragraph 2 of Subject No. 1 in their First Report.

**Subject 11.**- Water Raising Apparatus.

*(Paragraphs 3 and 4 of the 1st Report of Electrical Standards Committee. Paragraphs)*

**Recommendation and decision:**

23. The Committee note that experiments are still in hand and await Conclusive results after further service trials.

**Subject 12.**- To consider the desirability of adopting for use on Railways the "Regulations for the Electrical equipment of Buildings (formerly I. E. E. wiring rules)" issued by the Institute of Electrical Engineers or (as an alternative) to consider preparing a suitable code of practice for use on Indian Railways based on the above regulations.

**Recommendation and decision:**

24. The Committee consider that if standardization of methods and practice is found to be desirable, the preparation of a Code of Practice for railways will be preferable to adopting in toto the regulations for Electrical Equipment for buildings issued by the Institution of Electrical Engineers, but consider that relevant principles of the latter should be incorporated in the former.

25. They are not unanimous in considering that the adoption of an I. R. S. Code is necessary or desirable, but they consider that C. S. O. should obtain from individual railways, copies of their current specifications, etc., for internal wiring and codify in draft form there from rules and practice common to all railways. This may then be circulated for comment by individual members.

**Subject 13.**- To adopt as standard the use of conduit wiring inside the coaches of steam stock for train lighting.

**Recommendation and decision:**

26. As the subject is already being dealt with by the Electrical Section, I. R.C. A., for whom the B. B. & C. I. Railway is reporter, it need not at the present juncture be considered by the Electrical Standards Committee.

27. Arising out of the discussion of this subject it appears that a conduit system is suitable for lower class carriage wiring.
Subject 14.-Electrical Part Drawings:- To make recommendations in regard to classification of electrical fittings (other than those used on steam locos, coaching vehicles and interlocking equipment.

Recommendation and decision:

28. The Committee consider that the E classification should cover the future standardization of electrical items (other than those used on steam locos, coaching vehicles and interlocking equipment) e. g., motor and control gear, direct electrically driven portable workshop apparatus and tools, direct driven I. C. engine generating units for general stationary purposes, electric wiring accessories, traction and control equipment for electric locos, rolling-stock, railcars etc.

Subject 15:- To consider the acceptance of the Baldwin 11314 A type headlight as a permissible alternative.

Recommendation and decision:

29. In view of the fact that vide Subject No.6, the Committee do not recommend the use of glass reflectors; the headlight shown on Messrs. Baldwin Locomotive Works' drawing No. 14028 cannot be accepted as a permissible I. R. S. alternative, until the design is modified in accordance with I. R. S. Specification E9-36.

Subject 16.-Dynamo Hanger Suspension W. 5000. To consider a proposal by the Deputy Chief Mechanical Engineer, E. I. Railway, to machine the fitting to the dimensions shown in the ferro in order to facilitate better alignment of the pulleys.

Recommendation and decision:

30. The Committee recommend that the E. I. Railway modification to W. 5000 should be referred back to that railway asking for reasons why difficulty is experienced in obtaining a correct alignment with a taper of 1/16". On the evidence available, 3/16" taper as proposed by the East Indian Railway appears to be excessive.

Subject 17.-Axle Pulley-To consider modification to dimensions to the standard axle pulleys.

Recommendation and decision:

31. The Committee agree to the overall dimensions of the standard M. G. pulley being reduced to 16" diameter on the face.
32. They doubt the advisability of reducing the width of the pulley face between flanges (and corresponding length of axle seat). They also do not desire the depth of the flange to be reduced below 1".
33. Similarly, the Committee do not desire any reduction to be made in the present diameter and Width of face of the standard B. G. pulley, viz. 24 X 10.5”.

Subject 18:- Consumption of bulbs on engines. To suggest a design on the lines of Loco Standards Committee drawing No. 269 or any similar method to obviate the excessive consumption of bulbs on engines.

Recommendation and decision:

34. The Committee await the results of trials in hand with locking arrangements.

35. They are skeptical about establishing financial justification for any locking arrangement and consider that the most effective method of reducing the consumption of bulbs would be for the Operating (Power) Department to initiate a drive against thefts and to enforce rigid discipline in loco. sheds. They also suggest that locomotive lighting fittings be considered as items of equipment to be handed over from crew to crew.

Subject 19:- Electric Wiring Accessories.

(Paragraph 12 item (h) 1st meeting of E. S. C.)

Recommendation and decision:

36. The Committee recommend the adoption of the following B. S. Specifications and consider that no additional I. R. S. or I. S. D. Specifications are necessary at present for electric wiring accessories.


B. S. S. No. 31-1933.- Steel conduits and fittings for electric wiring.

B. S. S. No. 67-1929.- Ceiling roses, two and three-plate.


B. S. S. No. 98-1934.- Edison-type screw lamp caps and lamp-holders.

B. S. S. No. 109-1934.- Air-break knife switches and air-break isolating switches for voltages not exceeding 660 volts.

B. S. S. No. 110-1934.- Air-break circuit-brakers for voltages not exceeding 660 volts.

B. S. S. No. 124-1934.- Totally-enclosed air-break switches for voltages not exceeding 660 volts.

B. S. S. No. 128-1929.- Bare annealed copper wire for electrical machinery and apparatus, Dimensions and Resistances of (Add. April 1930 and November 1935).


B. S. S. No. 216-1926.- Vulcanised fibre for electrical purposes. (Add. February 1927) under revision.


B. S. S. No. 231-1936.- Pressboard for electrical purposes.
B. S. S. No. 279-1932.-Flame-proof type plug and socket heavy duty.
B. S. S. No. 419-1931.- Varnished cloth sheet, strip or tape for electrical purposes.

Subject 20.- To consider the preliminary draft Specification for Train Lighting Belting on Railways forwarded by the Chief Electrical Engineer, North Western Railway.

Recommendation and decision:

37. The Committee are not satisfied that a necessity exists for specifying tolerances on the thickness of train lighting belts. It is significant that the B.S.Specification 351 does not detail limits of thickness. The Committee recommend that enquiry should be made from the British Standards Institution as to the reasons why no tolerances are laid down for thickness in inches or millimeters.

38. In the meantime, the Committee recommend that the I. S. D. adopt a tolerance of ±7.5 per cent on thickness measured against sample, for the purposes of inspection.

Subject 21.-Length of dynamo suspension link on Metre and Broad Gauge when on safety chains.

Recommendation and decision:

39. The report from the E. B. Railway on trial TWg. 13 to check clearances with different length of dynamo suspension links is awaited.

40. The E. B. Railway point out that a B. G. axle pulley seat of 6-5/16” can be obtained when machining the axle parallel.

Subject 22.-To consider a proposal from Messrs. J. Stone & Co. (India) Ltd. to mount the overvoltage relays on the side of the generators.

Recommendation and decision:

41. The Committee favour the mounting of the overvoltage relay on the side of the generator.

Subject 23.-Standardization of generator and battery equipment of B. and M. G. passenger rakes.

Recommendation and decision:

42. (a) The Committee are unanimously of opinion that the present standard capacities of 120 and 80 amp dynamos for broad and metre gauge stock are unnecessarily large for present requirements. They recommend that the Railway Board's orders on paragraphs 69
and 110 (ii) of the 10th and 11th Carriage and Wagon Standards Committee reports respectively to purchase 120 and 80 amp machines for broad gauge and metre gauge upper class composite and brake-vans respectively should be withdrawn.

(b) The Committee further consider that an early re-examination of the subject of standardization of generator and battery equipment is necessary. They are of opinion that this can best be undertaken by sub-committee consisting of Messrs. Darling, Allinson and Povey who should revise the reports published as Appendix B to the 10th Carriage and Wagon Standards Committee report on the broad gauge equipment and Appendix A (Subject No. 21 (a) 1 and 2) of the 11th Carriage and Wagon Standards Committee report on the metre gauge equipment in the light of modern operating conditions and possible future loadings. To enable this to be undertaken the sub-committee require to be furnished by the Railway Board with information regarding the possibilities of:

(i) Electric fans being installed in lower class carriages, and
(ii) water-raising apparatus being found necessary on all broad gauge stock.

Subject 24.-To comment on certain draft I. S. D. Electrical Specifications with a view to their future adoption for use on Railways.

Recommendation and decision:

43. The Committee agree that the following I. S. D. Specifications for electrical equipment are likely to be of use to railways, subject to certain modifications and recommend that they be circulated to Members of the Electrical Standards Committee for their individual comments and suggestions, after which revised drafts may be placed before the Electrical Standards Committee for final approval before adoption.-

(a) P. I. 135-Induction motors.
(b) P. I. 136-Iron clad type starting and control panels for non-reversing A. C. Motors up to 660 volts.
(c) P. I. 82A-D. C. generators 3-wire type and static balancers.
(d) P. I. 77-C-Normal speed revolving field type alternators.
(e) P. I. 74-B-D. C. Motors, D. C. Starters.
(f) H 64-C-Fans, electric desk or pedestal type. D. C.
(g) H 65-C-Fans, electric desk or pedestal type. A. C.
(h) H 85-Cable, pure and V. I. R. insulated taped and tough rubber sheathed, 250 volts. 600 megohms grade.
(j) H 86-Cable, single core, pure and V. I. R. insulated, taped and lead sheathed, 250 volt and 600 megohms grade.
3rd ELECTRICAL STANDARDS COMMITTEE
MEETING

Members Present

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<td>A.F. Wilson</td>
<td>CEE (Chairman)</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>2.</td>
<td>S.Simpson</td>
<td>CEE (Member)</td>
<td>North Western Railway</td>
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<td>3.</td>
<td>H.J. Nash</td>
<td>CEE(Member)</td>
<td>Baroda and Central India Railway</td>
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<td>4.</td>
<td>P.D. Low</td>
<td>Dy.CME (Member)</td>
<td>Eastern Bengal Railway</td>
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<td>5.</td>
<td>H.J. Mulleneux</td>
<td>CEE (Member)</td>
<td>Great Indian Peninsula Railway</td>
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<td>6.</td>
<td>H.J. Darling</td>
<td>CEE (Member)</td>
<td>East Indian Railway</td>
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<td>7.</td>
<td>A.Vasudevan</td>
<td>Asstt Chief Controller (Secretary)</td>
<td>Central Standard Office, RB</td>
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**Subject 1:** To consider the adoption for use on railways of the following draft I. S. D. Specifications for electrical equipment.

**Recommendation and decision:**

(1) The Committee considered the following I. S. D. Specifications and recommend their adoption on railways as per modified drafts in Appendix A.

(a) No. P. I-74D. Generators and motors, industrial type, direct current.

Reference - Electrical Standards Committee Report No.2, Subject No.24.

(b) No. P. I-43L. Engines, internal combustion (using crude oil). Reference Electrical Standards Committee Report No.2, Subject No.4.

(c) No. P. I-76C. Transformers, Core type, oil immersed, self cooled, for power and lighting.

Reference Electrical Standards Committee Report No.2, Subject No. 2,

(d) No. P. I-77d. Alternators, engine driven, revolving field, salient pole, normal speed, with Class A insulation.

Reference:-Electrical Standards Committee Report No.2, Subject No. 24. para. 43, item

(e) No. P. I-81F. Switch-board, direct current, open type, when voltage does not normally exceed 650 volts. Reference Electrical Standards Committee Report No.2, Subject No.2,

(f) No. P.I.-82B. Generators, D. C., three wire and static balancers with Class A insulation.

Reference Electrical Standards Committee Report No.2, Subject No. 24,

(g) No. P. I.-135B. Motors, induction with Class A insulation.

Reference-Electrical Standards Committee Report No.2, Subject No. 24,

(h) No. H-64D. Fans, electric, desk or pedestal type, direct current.

Reference Electrical Standards Committee Report No.2, Subject No. 24,

(i) No. H-65D. Fans, electric, desk or pedestal type, alternating current.

Reference-Electrical Standards Committee Report No.2, Subject No. 24,

(2) The Committee note that the following I. S. D. Specifications will be taken up for final consideration at their next meeting. They also recommend that in the case of I. S. D. Specification No. P. I.-136A for panels, starting and control, iron clad type, for non-reversing alternating current motors up to 660 volts, the I. S. D. be requested to prepare a separate specification for fully interlocked type control gear.

(a) No. P. I.-136A. Panels, starting and control, iron clad type, for non-reversing alternating current motors up to 660 volts.

References Electrical Standards Committee Report No.2, Subject No. 24, para. 43, item

(b) No. H-85. Cable, pure and V. I. R. insulated, tape and tough rubber sheathed, 250 volts, 600 megohms grade.

Reference Electrical Standards Committee Report No.2, Subject No. 24,

(c) No. H-86. Cable, single core, pure and V. I. R. insulated, taped and lead sheathed, 250 volts, 600 megohms grade.
Reference Electrical Standards Committee Report No.2, Subject No.24,

(3) (a) H-120A. Batteries, stationary, lead acid type.

The Committee recommend that the above draft specification should be modified as per draft in Appendix B and forwarded to the Chief Controller of Stores, Indian Stores Department, for consideration and circulation to manufacturers for comment.


Recommendation and decision:

Reference Electrical Standards Committee Report No.2, Subject No.6.

The Committee considered the tabulated statement of the comments offered by the members of the Loco. Standards Committee circulated with Central Standards Office letter No. SS/HLE, dated 4th February 1937 and recommend adoption of the draft I. R. S. Specification No: E9-36 for Locomotive Headlight and Lighting equipment modified as follows for use on Railways:-

(i) At the end of clause 2, insert the following sub-para:-

"Impregnation-windings shall be specially impregnated under vacuum to withstand Indian climatic conditions."

(ii) Clause 3-

Sub-para. 1, line 8.-For the words "14" diameter reflector "substitute "14" or "18" diameter reflector as specified by Purchaser."

(iii) Clause 3-

Sub-para 2-Casing.-After second sentence, insert the following sentence:-

"The glass shall be reinforced in such a manner that it shall not develop discoloration whilst in service."

(iv) Clause 3-

Sub-para. 3-Reflector, lines 1 and 2.-For the words "chromium or silver-plated" read "chromium plated."

(v) After clause 6, insert the following new clause as clause 7 and renumber the subsequent clauses:-

"Interchangeability."-"When several sets of the same type and make are ordered, all corresponding parts shall be interchangeable."

(2) As the 350 watt turbo generator is not procurable, no trial could be undertaken. In the circumstances, the Committee are of opinion that the 500 watt turbo generator should be retained as standard. They are also of opinion that the efficiency of the 500 watt turbo generator can be improved under average service conditions by the provision of a steam nozzle designed to give maximum efficiency at a load of 300 watts consistent with the boiler pressures stated in clause 2 of the Specification.

Subject 3.-To consider Tender notice, Specification, etc. for electrical wiring of Railway buildings.

Reference: Electrical Standards Committee Report No.2, Subject No. 12.
Recommendation and decision:

(i) The Committee recommend standardization of the draft tender form and draft I. R. S. Specification No. A 6-37, vide Appendix C.

(ii) They, however, consider that the details of the draft I. R. S. Specification No. E 11-37 and the comments thereon received from railways can best be dealt with by the Secretary in consultation with the Chief Electrical Engineer, North Western Railway, and they recommend that this officer prepare a revised draft which may be circulated to members with a view to obtaining their final approval.

Subject 4:- Train Lighting belting on Railways.
Reference Electrical Standards Committee Report No.2, Subject No. 20.

Recommendation and decision:

(a) The Committee note that a reply from the British Standards Institution regarding tolerances for thickness of belts is awaited by the Central Standards Office.
(b) The Committee recommend that the following Sizes of belting may be standardized.
   - 3” width for dynamos up to 75 amps. capacity.
   - 4” width for dynamos up to 80 amps. Capacity and over.

They also recommend that all- belting should be 4 ply, (3/16”), in thickness

Subject 5.- To consider the modification to I.R.S. Specification No. E1-34 for Dynamos for train lighting suggested by Chief Electrical Engineer, North Western Railway in his letter No. TL/19/23/I1 dated 9th April 1937.

Recommendation and decision:

The Committee consider that the I.R.S. Specification No. E1-34 should be revised as per modifications suggested in Appendix D.

Subject 6.- To consider revision of I. R. S. Specification No. E2-34 for batteries for train lighting.

Recommendation and decision:

The Committee recommend that separate specifications should be drafted for train lighting & batteries-(1) Alkaline type and (2) lead acid type, as per drafts in Appendix E, and recommend their adoption.

Subject 7.- To consider modification to I. R. S. Specification No. E6-36 for Inter vehicle Electric Couplers as suggested by Messrs Stone & Co. in paras. 2 to 5 of their letter No. LON/34/36, dated 9th March 1937(Extract at Appendix F).
Recommendation and decision:

The Committee agree with the modifications suggested by Messrs. J. Stone & Co. (India) Limited, in paras. 2 to 5 of their letter quoted above and recommend that I. R.S. Specification E6-36 for Inter vehicle couplers should be modified accordingly.

Subject 8.-To consider standardization of carbon brushes for dynamos and fans.

Recommendation and decision:

(i) The Committee consider that standardization of carbon brushes for dynamos and fans is not feasible.
(ii) The Committee recommend that B. S. S. No. 96-1922 may be accepted for general purposes.

Subject 9.-To consider the standardization of electrical bells.

Recommendation and decision:

The Committee consider that standardization of electrical bells is not Practicable.

Subject 10.-To consider the adoption of B. S. Specification No. 698-1936 for paper, unvarnished, for electrical purposes.

Recommendation and decision:

The Committee recommend that B. S. S. No. 698-1936 be adopted for use on railways.

Subject 11: To consider the standardization of Electrical recording instruments.

Recommendation and decision:

The Committee consider that B. S. Specification dealing with this class of apparatus may be adopted. The apparatus does not lend itself to standardization.

Subject 12.-To consider standardization of cables, V. I. R. for railway carriages.

Recommendation and decision:

The Committee consider that I.S.D. Specification No. H67-C for cable, single core, V. I. R., flame proof and fire resisting, can be used for carriage wiring. Sizes of the Coaching mains have already been standardized, vide Subject No.8 of the 2nd Electrical Standards Committee meeting.
Subject 13:- To consider the offer by Messrs. Amplilux Lighting and Illumination Co. Ltd., of two sample prismatic rings for test on 100 and 60 watt lamps for lighting railway carriages, workshops and other buildings.

Recommendation and decision:

The Committee recommend that the firm may be asked to send further particulars including the names of the Indian agents and samples to the Deputy Chief Mechanical Engineer (Electrical) E. B. Railway for trial purposes. The Committee note that the Chief Electrical Engineer, M. & S. M. Railway, has already made arrangements with the firm to obtain similar information and samples.

Subject 14:- To consider the extent to which standardization of electrical fittings on railway carriages covered by 'C' part drawings should stand.

Recommendation and decision:

The Committee endorse the recommendations of the 19th Carriage and Wagon Standards Committee in Appendix C, except in the case of item CA. 662 fixing plate for combined junction and fuse box, which is found to be unsuitable. The Committee note that the G. I. P. have submitted alternative proposals for this item.

Subject 15.: Water raising apparatus. To consider results of trials.
Reference:-- Electrical Standards Committee Report No.2, Subject No. 11, para. 23
Trial No. TCd. 31.

Recommendation and decision:

The Committee have noted the defects so far experienced during the trials carried out by the G. I. P. and N. W. Railways and await the results of further trials with existing and modified equipments.

Subject 16.-Fitting of 15 way link junction box at opposite end of coach from 24 way junction fuse box.

Reference:--Electrical Standards Committee Report No.2, Subject No.8, paras. 17 and 18.

Recommendation and decision:

The committee recommend acceptance. of the arrangement of the 15 way link junction box shown on M. S. M. Railway drawings ED. 1561/36 and ED. 1523/36.

Subject 17.-To consider the acceptance of Baldwin 11314-A type headlight as a permissible alternative.

**Recommendation and decision:**

The Committee note that the Loco Standards Committee at their 19th meeting have endorsed the remarks made by the Electrical Standards Committee their Second Report, Subject No. 15, para. 29.

**Subject 18.-**Dynamo Hanger Suspension W. 5000.
Reference-Electrical Standards Committee Report No.2, Subject No. 16, para. 30.

**Recommendation and decision:**

The Committee note that the M. & S. M. proposal shown in Sketch No. 3713 appended to the 18th Report of the Carriage and Wagon Standards Committee has been approved by the Board.

**Subject 19.-**Axle pulley for dynamos-Metre Gauge.
Reference- Electrical Standards Committee Report No.2, Subject No. 17, paras. 31 and 32. Trial No. TWg. 15.

**Recommendation and decision:**

The Committee note that Eastern Bengal and Bengal and North Western Railways are carrying out trials with 7" wide pulleys and that their trial reports are awaited by the Central Standards Office.

**Subject 20.-**Axle pulley for Dynamos-Broad Gauge.
Reference- Electrical Standards Committee Report No.2, Subject No. 17, para. 33.

**Recommendation and decision:**

The Committee accept the recommendation of the Carriage and Wagon J Standards Committee that pulleys 20" and 24" diameter and 7" wide with 4" maximum belt width should be standardized.

**Subject 21.-**Consumption of bulbs on engines. To investigate the subject of locking arrangement for cab light bulbs and submit a specific recommendation supported by analyses of replacements and costs.
Reference-Electrical Standards Committee Report No.2, paras. 34-35.

**Recommendation and decision:**
The Committee recommend the adoption of bayonet caps for cab light bulbs and the use of lamp locks.

**Subject 22:-To consider certain discrepancies in C.S.E. Drawings Nos. 8, 10, 11 and 12.**

**Recommendation and decision:**

The Committee recommend that the length of B. G. Inter-vehicle coupler cable for standard stock should be 6'-7" for combined fuse and junction box and 6'-2" for terminal box. The length of inter-vehicle coupler cable for M. G. stock is recommended to be 5'-4".

The Committee recommend that C. S.E. Drawing No. 10 be amended to show the groove for the set screw to be on, the PM side.

The Committee recommend that the bore of the plug shown on C. S. E. Drawing No. 10 be machined to the tolerances specified.

The Committee recommend that the dimensions stated by Messrs. Stone & Co. for the rubber block be accepted and that C. S. E. Drawing No. 12 be amended accordingly. The drawing should also show the casting recessed to accommodate the rubber block.

**Subject No. 23:-Length of dynamo-suspension link on Metre and Broad Gauge when on safety chains.**

Reference:- Electrical Standards Committee Report No.2, Subject No. 21, paras. 39 and 40.

**Recommendation and decision:**

The Committee await the results of trials on the Eastern Bengal Railway.

**Subject 24.-Standardization of generator and battery equipment of Broad and Metre Gauge passenger rakes.**

Reference:- Electrical Standards Committee Report No.2, Subject No. 23, para. 42 (b).

**Recommendation and decision:**

(i) The Committee have considered the Sub-Committee's interim report by Messrs. Darling, Allinson and Nash (Appendix G) and are in general agreement with the conclusions contained therein. In view of the conditions prevailing on certain railways arising from the alkaline battery now under investigation and until the results of the present review of rake formation and coaching stock standards of accommodation are known the Committee are not able to submit any final recommendation at this stage.

(ii) The Committee await the further report of the Sub-Committee in regard to the standardization of generator and battery equipments on Metre Gauge stock.
Subject 25.-To record approval of the use of non-flame proof cables in steel conduits in steel motor vans.

Recommendation and decision:

The Committee record their approval.

Subject 26.-To consider standards for electrical equipments used on railways, which would prevent electrical interference to broad-cast reception.

Recommendation and decision:

The Committee are asked to state whether Government departments could forthwith arrange that all electrical machinery existing as well as to be obtained for their use in future is suitable protected. The Committee are of opinion that any action taken by railways would be of little or no value without similar action being undertaken by all users of electrical appliances which are admittedly likely to cause interference with radio reception. As to the scheduling of appliances likely to cause interference such appliances have been detailed in an issue CE (EL) 2954 of the Institution of Electrical Engineers.

In the meantime it is understood that the I. S. D. will make enquiries as to the extra cost likely to be involved on such appliances (a) if fitted at the time of purchase and (b) if fitted to the existing machinery.

The Committee would emphasize that a great deal of interference can be ameliorated by attention to the aerial including the down lead and the wireless receiver.

The Committee are of the opinion that to make radio broadcast reception generally satisfactory, recourse to legislation will be necessary to enforce the provision of suppression apparatus on all appliances likely to cause interference.

Subject 27.-Internal Lighting of coaching stock.

Recommendation and decision:

The Committee discussed the subject and agreed that each member should in the first instance conduct an investigation into the possibility of improving the general lighting of coaching stock. The Committee anticipate being in a position to record progress at their next melting.
4th ELECTRICAL STANDARDS COMMITTEE MEETING

Members Present

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<tr>
<th>S. No.</th>
<th>Name/ Shri</th>
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<td>1.</td>
<td>A.F. Clay</td>
<td>CEE (Chairman)</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>2.</td>
<td>H.J. Darling</td>
<td>CEE (Member)</td>
<td>East Indian Railway</td>
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<td>H.J. Allinson</td>
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<td>North Western Railway</td>
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<td>4.</td>
<td>G.E. Martin</td>
<td>ACEE (Member)</td>
<td>Bombay, Baroda and Central India Railway</td>
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<td>5.</td>
<td>H.J. Mulleneux</td>
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<td>Great Indian Peninsula Railway</td>
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<td>Dy.CME (Member)</td>
<td>Eastern Bengal Railway</td>
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<td>7.</td>
<td>R.G. Burt</td>
<td>OFFICER ON SPECIAL DUTY(Secretary)</td>
<td>Central Standard Office, RB</td>
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Subject 1.-To consider the adoption for use on railways, of the following draft I.S. D Specifications for electrical equipment.

Recommendation and decision:

(a) No. H-85 (Revised July 1937) for Cable, vulcanized rubber insulated and tough rubber sheathed 250 volt and 660 volt grades.
Reference:-E.S. C. Report No.3, Subject No.1, para. 2, item (b).

1. The Committee considered the above draft I. S. D. Specification and recommend its adoption for use on railways as per the modified draft in Appendix -I, (Page 22).

(b) No. H-86 (Revised July 1937) for Cable, vulcanized rubber insulated, and lead alloy sheathed, 250 volt and 660 volt grades.
Reference:-E.S. C. Report No.3, Subject No.1, para. No.2, item (c).

2. The Committee considered the above draft I.S.D. Specification and recommend its adoption for use on railways as per the modified draft in Appendix II, (Page 31).

3. They also recommend that sub-para 2 of the modified draft under clause 17 may be referred to Cable Makers' Association by the Indian Stores Department for comments, if any. The matter may then be referred to the Central Standards Office for necessary action.

(c) No. H120-A for Stationary batteries, lead acid type.
Reference- E. S. C. Report No.3, Subject No.1, para. 3 (a).

4. The Committee note that the replies from the manufacturers and Accumulator Makers' Association are still awaited. The matter may be brought up before the next meeting of the Electrical Standards Committee.

(d) No. H-126 (Revised January 1936) for Asbestos tape for Electrical purposes.

5. The Committee considered the above draft I. S. D. Specification and recommend its adoption for use on railways as per modified draft in Appendix III, (Page 42).

6. The Committee also recommend that the revised Clause 2 (a) of the modified draft be referred to the manufacturers by the Indian Store Department for comments before final adoption. The matter may then be referred to the Central Standards Office for necessary action.

(e) No. P. 1-136 B (Revised November 1937) for Starting and Control gear manually-operated type for non-reversing alternating current, poly phase motors up to 650 volts.

Reference:-E.S. C. Report No.3, Subject No.1, para. 2, item (a).
7. The Committee considered the above draft I. S. D. Specification and recommend that the modified draft specification as shown in Appendix IV (page 44) be circulated by the Indian Stores Department to the manufacturers for comments, if any, and the result communicated to the Central Standards Office for necessary action.

(f) No. P.I.-142 (January 1938) for Starting and Control gear, manually operated fully interlocked type, for non-reversing alternating current, poly phase motors up to 650 volts.

8. The Committee considered the above draft I. S. D. Specification and recommend that the modified draft specification as shown in Appendix- V (page 52) be circulated by the Indian Stores Department to the manufacturers for comments, if any, and the result communicated to the Central Standards Office for necessary action.

(g) No. P.I.-140 (Revised September 1937) for Starting and Control Panels, Iron clad type for D. C. motors up to 650 volts.
Reference:-E.S. C. Report No. I, Subject No.6, para. 12, item (a).

9. The Committee note that the revised draft Specification is awaited from the Indian Stores Department.

Subject 2.- Arc Welding Sets.
Reference:-E.S. C. Report No 1, Subject No.6, para. 12, item (b).

Recommendation and decision:

10. The Committee note that the draft I. S. D. Specification for D. C. Electric Arc Welding plant and equipment is still under preparation by the Indian Stores Department. This may be carried over to the next meeting.

Subject 3.-Electrical Wiring of Railway Buildings-To consider the revised draft I. R. S. Specification No. E. 11-38.
Reference:-E. S. C. Report No.3, Subject No.3.

11. The necessity for a Specification covering the technical details for the electrical wiring of railway buildings was discussed in great detail.

Recommendation and decision:

Owing to the wide variations in climatic conditions throughout India, the Committee are of opinion that it is impracticable to cover in one specification all the variables necessary to meet the different local conditions throughout India unless the specification becomes unwieldy.
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As the various materials to be used in the electrical wiring of railway buildings are already covered by I.S.D. Standard, I.R.S. and British Standard Specifications, it is only necessary to specify the method of installing the material to suit local conditions.

The Committee, therefore, recommend that the Indian Railway Standard Conditions of Contract No. A 6-37 should be accepted by all railways and used in conjunction with their own technical wiring specification designed to meet local conditions and systems, with due regard to the principles laid down in the Regulations for the Electrical Equipment of Buildings published by The Institution of Electrical Engineers of Great Britain, the local Fire and Insurance Regulations and the Indian Electricity Act and Rules. They further suggest that with a view to obtaining uniformity in the application of wiring systems, railways should interchange their Technical specifications.

Subject 4:-Dynamos for train lighting-To consider the modification of I. R. S. Specification. No. E 1-37.
Reference:-E. S. C. Report No.3, Subject No. 5.

Recommendation and decision:

12. Load Adjustment-Clause 17.
The following may be substituted for the last sentence in Clause 17 of I. R. S. Specification No. E1-37:
The output adjustment device shall be provided in a weather-proof box on the outside of the frame of the dynamo to facilitate inspection. A hinged lid with the standard train lighting lock shall be provided.

13. Fuses are acceptable as "current limiting devices"

It is felt that Clause 24 (a)-Temperature Rise Test-is not conclusive in so far as temperature rise under service operating conditions is concerned. The Electrical Standards Committee are investigating the necessity for the revision of this clause. In the meantime a reply to this question is deferred.
Line 1-Substitute the following:-
The following shall be quoted as an extra and shall be supplied as required by the Purchaser".
(a) Substitute the following for the existing heading :
Tracings on linen of the following drawings.
The Committee considered the letter from Messrs. Mather & Platt, Ltd., and observe as follows:-

The information to be furnished against Appendix "A" for item (d) of Clause 24 shall be plotted against train speed with 20" and 24" axle pulleys when driving dynamos fitted with pulleys in accordance with Clause 13.

Where dynamos are of fabricated construction they may be provided with a fabricated boss provided that this is fitted with a renewable bush continuous throughout its length.

Delete the third sentence "The extent by notice of the Purchaser" and add the following sentence at the end of the clause:-

"Should the manufacturers be unable to comply with the conditions expressed in the preceding sentences, the extent by which the Dynamos will infringe moving dimensions, when freely suspended on safety chains shall be brought to the notice of the Purchaser."

Subject 5.- Alkaline Batteries for Train Lighting-To consider' the suggestions of the Chief Electrical Engineer, North Western Railway, in his D.O. letter No. TL/15/13-III, dated the 13th December 1937 to Mr. Mathur of the Indian Stores Department in regard to the maintenance of alkaline batteries and reduced electrolyte costs.

Recommendation and decision:

19. This subject was discussed at the 11th Meeting of the Electrical Section I.R.C.A held in July 1938, and after discussion, the Committee endorse the action proposed at that meeting.

Subject 6.- Train Lighting Belting for Railways.

(a) To note that a reply from the British Standards Institution regarding tolerances for thickness of belts is still awaited by the Central Standards Office.
(b) To consider the inclusion of "Flying Scotsman" Belts in the approved list of Train Lighting Belts for Indian State Railways.
(c) Standardization of Train Lighting belt fasteners.

Reference:- E.S. C. Report No.3, Subject No.4.

Recommendation and decision:

20. With regard to (a), the Committee recommend that the draft Specification forwarded by the Chief Electrical Engineer, North Western Railway and considered under Subject No. 20 at the Second Meeting (1936) of the Electrical Standards Committee be circulated to railways and manufacturers for comments.
21. Regarding (b), the Committee endorse the recommendations of the Electrical Section of the I. R. C. A., held in July 1938, Subject E 174 viz., that the under-mentioned belts may be included in the approved list:

<table>
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<tr>
<th>Belts</th>
<th>Manufacturers</th>
<th>Suppliers</th>
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<tr>
<td>Mercury</td>
<td>Messrs. Fleming Birkbv &amp; Goodall.</td>
<td>Messrs. Fleming Birkbv &amp; Goodall</td>
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22. Regarding (c), the Committee considered the proposal of the North Western Railway that Walker type belt fasteners should be standardized for use on train lighting equipment and are of opinion that as the recommendations of the I. R. C. A. Electrical Section Meeting No.6, Resolution No. E/91, were accepted by the Indian Railway Conference Association at their Thirtieth Conference, the Walker type belt fasteners may be accepted as standard and the Committee accept the modifications shown on North Western Railway Drawing No. 917/TL.

Subject 7.- Amplilux Prismatic Rings- To consider the results of trial carried out by the Dy. Chief Mechanical Engineer (Electrical), E. B. Railway.

Recommendation and decision:

23. The reports of E. B. and G. I. P. Railways on Amplilux Prismatic Rings have been noted.

Subject 8.- Programme for production of Specifications for electrical equipment.

Recommendation and decision:

24. The Committee recommend that Specifications for the following electrical equipments be prepared. Items grouped under head ‘A’ below may be taken up first for standardization in the order given, and the item under group ‘C’ may be deferred for the present :-

(1) Lightning Arresters up to 650 volts, A.C. and D. C.
(2) Refrigerators, electrically operated, domestic type, for use in coaching stock.
(3) Static condensers for power factor correction.
(4) Fire extinguishers for electrical purposes.
(5) Flood light projectors for lighting of railway yards.
(6) Push button operated starting and control gear for A.C. motors up to 650 volts.
(7) Push button operated starting and control gear for D. C. motors up to 650 volts 'C'.

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(1) Weatherproof cables for outdoor use.

**Subject 9.-** To note the view of the Loco. Standards Committee that silvered glass headlight reflectors should be adopted as standard in place of chromium plated reflectors, and to consider whether the specification for locomotive headlights should be modified in the light of results of tests with reflectors carried out by the E. I. Railway.

Reference: -
E S C. Report No.3, Subject No.2, Item No.4.

**Recommendation and decision:**

25. The Committee recommend that I. R. S. Specification No E 9-37, Clause 3, sub-para. 3 should be amended to read as follows:-

“The reflector shall be silvered glass, or chromium plate on sheet copper, or silver plate on sheet copper. It shall be suitably housed within the casing to ensure a perfectly true seating.”

**Subject 10.-** Electrical Wiring for Locos and Tenders.

(a) To consider N. W. Railway's proposal to standardize the system.

(b) To consider the Consulting Engineers revised draft I. S. R. Standard Specification for Locomotive Engines and Tenders as far as Lighting Equipment is concerned.

**Recommendation and decision:**

26. With regard to (a), the Committee consider that the standardization of the layout of conduit for wiring on locomotives is unnecessary,

27. Regarding (b), the Committee recommend that the Consulting Engineers' revised draft I. S. R Standard Specification for Locomotive Engines and Tenders (in so far as Lighting Equipment is concerned), modified as shown in Appendix VI (Page 60) be accepted for incorporation in I. R S. Specification No. E 9-37.

28. As there is divergence in the practice adopted on various railways, the Committee further recommend that I. R S. Specification No. E 9-37, modified as above, be submitted to the Loco. Standards Committee at their next meeting for confirmation that it meets their requirements, particularly as regards Clauses 5 and 6.

**Subject 11.-** To consider extracts from Minutes of the Meeting between the representatives of the State-worked Railways, Central Standards Office and the Indian Stores Department held in the office of the Chief Controller of Stores, on the 29th November 1937 and the extent to which demands for lubricants for Electrical Departments could be brought into line with those of the Mechanical Departments with respect to description and cost.
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Recommendation and decision:

The Committee recommend:-
29. That the demands for lubricant for Electrical Departments could be brought into line with those of the Mechanical Departments in cases where the lubricants are required for plant of a similar nature.

30. That before attending the meeting of State-worked Railway; Central Standard Office and the Indian Stores Department, the representative of the railway should consult the Electrical Department of his railway to ensure that their special requirements receive due consideration.

Subject 12.-To consider the G.I.P. design of tail light for application to the inter vehicle coupler as shown on sketch No. 3719 accompanying the 18th Carriage and Wagon Standards Committee Report.

31. The G. I. P. Railway design of taillight for application to the inter vehicle coupler is considered suitable for adoption by railways.

Recommendation and decision:

Subject 13.- (a) 15-way junction box-To record C. S. E. Drawing No. 23 relating to 15-way junction box approved vide para. 102 of the 20th Carriage and Wagon Standards Committee Report.
(b) 24-way junction and fuse box -To record sketch No. 3806 approved vide para. 101 of the 20th Carriage and Wagon Standards Committee Report.
Reference:-E. S. C. Report No.3, Subject No. 16.

Recommendation and decision:

32. (a)-Recorded.
33. (b)-The adoption of the arrangement for fixing the 24-way junction and fuse box shown in Sketch No. 3806 as standard by the 20th Carriage and Wagon Standards Committee is recorded.

Subject 14.-Internal Dimensions of Battery boxes for 68'-0" 56'-6" and 27'-6" under frames-C. S. E. Drawings 20 and 21- To consider the desirability of providing some ventilation arrangements for battery boxes in order to limit excessive temperature rise on cells.

Recommendation and decision:

34. In view of Resolution on Subject E 121 passed at the 8th Meeting of the Electrical Section, I. R. C. A., the Committee do not consider that any steps need be taken to provide ventilation arrangements for battery boxes as a standard practice.
Subject 15.-Standardization of generator and battery equipment on B. G. and M. G. Passenger rakes.

Recommendation and decision:

35. The committee having given further consideration to reports on broad and metre gauge equipment submitted under Subject 24 at the 1937 Electrical Standards Committee meeting, and Subject No. 15 of the J938 Electrical Standards Committee meeting, are of opinion that the following sizes of dynamo may be accepted as standard to meet load conditions within the terms of reference:

Broad Gauge 80 amperes with 220/250 Ampere hour batteries.
Metre Gauge 60 amperes with 175/210 Ampere hour batteries.

36. In view of the investigations recommended under Subject No. 16 of the Fourth Electrical Standards Committee (1938) in connection with improvement to lighting of coaching stock, the Committee are of opinion that the above-mentioned standard for the generator and battery equipment may require revision.

Subject 16.-Internal Lighting of Coaching Stock.
Reference:-E.S. C. Report No.3, Subject No. 27.

Recommendation and decision:

37. The Committee recommend that railways be asked to investigate and report on the effect of introducing the under mentioned average minimum standards of illumination:

- For First Class Compartments 2 Foot Candles
- For Second Class Compartments J'5 Foot Candles
- For Inter. Class Compartments 1 Foot Candle
- For Third Class Compartments '75 Foot Candle

When measured at a plane 33" above floor level

The effect is to be considered from the point of view of:
(i) Loading.
(ii) Additional cost (Initial and Recurring).

The Committee further recommend that the Chief Electrical Engineer, G. I. P. Railway be detailed to co-ordinate and report to the Electrical Standards Committee the results of the investigations carried out by the various railways. Reports of individual railways on the progress made may be seen in Appendix IX, (Page 74).

Subject 17.-Water raising apparatus-To consider results of trial.
Reference:-E.S. C. Report No.3, Subject No. 15.
Recommendation and decision:

38. The Committee consider that the results so far obtained indicate that it is worth proceeding further with the matter. The reports of further trials may be awaited.

Subject 18.-Axle Pulley for Dynamos-Metre Gauge.
Reference:-E.S. C. Report No.3, Subject No. 19.

Recommendation and decision:

39. Trial reports are awaited.

Subject 19.-Length of Dynamo Suspension Link on Metre and Broad Gauge when on safety chains.
Reference:-E.S. C Report No.3, Subject No. 23.

Recommendation and decision:

40. The results of investigations in Central Standards Office are awaited.

Subject 20.-Electrical interference to broadcast reception- Provision of suppression apparatus on an appliances likely to cause interference.
Reference-

Recommendation and decision:

41. Noted
### 5th ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
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<tr>
<td>1.</td>
<td>S. Simpson</td>
<td>CEE (Chairman)</td>
<td>North Western Railway</td>
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<tr>
<td>2.</td>
<td>H. J. Allinson</td>
<td>Dy.CME (Electrical) (Member)</td>
<td>Eastern Bengal Railway</td>
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<td>H. W. Puttick</td>
<td>CEE(Member)</td>
<td>East Indian Railway</td>
</tr>
<tr>
<td>4.</td>
<td>H. J. Nash,</td>
<td>CEE (Member)</td>
<td>Bombay, Baroda and Central India Railway</td>
</tr>
<tr>
<td>5.</td>
<td>H. Holt-Keene</td>
<td>CEE (Member)</td>
<td>Great Indian Peninsula Railway</td>
</tr>
<tr>
<td>6.</td>
<td>L. A. H. Nash</td>
<td>District Electrical Engineer (Member)</td>
<td>Madras &amp; Southern Mahratta Railway</td>
</tr>
<tr>
<td>7.</td>
<td>P. S. Venkata Raman</td>
<td>Asstt. Chief Controller/Specifications (Secretary)</td>
<td>Central Standard Office, Railway Board</td>
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</table>
Subject 1.- I.S.D. Specifications for Electrical Equipment.

(a) To consider the following revised draft I.S.D. Specifications for electrical equipment with a view to their adoption for use on Railways.

Recommendation and decision:

(i) No. H-46D (Revised June 1939) for cords, flexible, twin or three-core, vulcanized rubber insulated, braided with glace cotton or artificial silk or Workshop finish and twin, three and four-core tough rubber sheathed, 250 volts Grade.

1. The Committee considered the Specification and recommends its adoption for use on Railways subject to the following modifications:
   (i) Clause 4, Line 5.-After the words "other joint," add "and not more than five joints shall be permitted in 100 yards length."
   (ii) Appendix A.-A test for moist heat is to be included.
   Note.-The Committee also desire that the Specification should be compared with the revised B. S. No. 7-1939 before final issue.
   (iii) No. H-57C (Revised June 1939) for cable, single core, vulcanized rubber insulated, taped, braided and compounded, 250 volt and 660 volt grades.
Reference:-

2. The Committee recommends the adoption of the Specification for use on Railways subject to the following modifications-
   (i) Clause 22.-Delete "The cable shall be packed on reels... exceeds 1.5 cwts." and substitute the following:
   The type of the packing shall be as follows:-
   (a) Cables of sizes 1/036" to 7/.064" shall be packed in 50 or 100 yards lengths wound on reels.
   (b) Cables of sizes 19/.044"and 19/.052" shall be packed in 50 or 100 yards lengths wound on reels or coiled and wrapped with hessian tape.
   (c) Coils of sizes 19/.064" to 127/.103".
   (i) where the nett weight does not exceed 2.5 cwts. Shall be coiled and wrapped with hessian tape.
   (ii) where the nett weight exceeds 2.5 cwts shall be packed on suitable drums.
   (iii) Appendix A.-A test for moist heat is to be included.

3. The Committee further suggests that the recommendations made under 2(i) above may be referred to the Cable Makers' Association by the Indian Stores Department for adjustment as to any other minor modifications.

(iii) No. H-67D (Revised June 1939) for cable, single core, vulcanized rubber insulated, taped, flame retarding or fire resisting, 250 volt and 660 volt grades.
4. The Committee recommends adoption of the Specification as modified and reproduced as Appendix I to this Report.
   (iv) No. I-I-121B (Revised May 1939) for stay sets for poles.
5. The Committee recommends adoption of the Specification as modified and printed as Appendix II to this Report.
   (v) No. H-126 (Revised March 1939) for asbestos woven tape for electrical purposes.
6. The Committee recommends adoption of this Specification for use on Railways, subject to the following modifications-
   (i) Clause 2(b) - Delete the concluding sub-paragraph, and add the following: -
       "The method of test shall be as specified in Clause 2(a)."
   (ii) Clause 4 - Delete "Iron" and substitute "Metallic substances."

7. The Committee recommends that the amendments suggested under Clause 2 of the Specification should be referred to the Government Test House, Alipore, by the Indian Stores Department. The Committee, however, wishes to emphasize that the Methods of Tests specified before heating and after heating should be uniform.
   (vi) No. P. I. 141 (January 1939) for electric arc welding plant and equipment.

Reference:
E. S. C. Report No.4, Subject No.2.

8. The Committee recommends adoption of the Specification for use on Railways as modified and reproduced as Appendix III to this Report.

Subject 1(b).-To note that revised Draft Specifications for the following

Recommendation and decision:

(i) No. P. I. 136 B for starting and control gear, manually operated type, for non-reversing alternating current, polyphase motors up to 650 volts.
Reference: E.S.C. Report No.4, Subject No.1, Paragraph 7, item (e).

9. The Committee notes that the revised Draft Specification is not available.
   (ii) No. P. I. 140 for starting and control panels, ironclad type for D. C. Motors up to 650 volts.

10. The Committee notes that the revised Draft Specification is not available.
   (iii) No. P. I. 142 for starting and control gear, manually operated fully interlocked type, for non-reversing alternating current, polyphase motors up to 650 volts.
Reference: Fourth E. S. C. Report, Subject No.1, Paragraph 8, Item (f).

11. The Committee notes that the revised Draft Specification is not available.

Subject 2:-I. R. S. Specifications.
   (a) To consider comments on the following Draft I. R. S. Specifications and make final recommendations regarding their standardization.
Recommendation and decision:

(i) No. E11-39 for push button operated starting and control gear for A. C. Motors up to 650 volts.
Reference: Fourth E. S. C. Report, Subject No.8,

12. The Committee recommends issuing this Specification as an I. R. S. Specification as modified and printed as Appendix IV to this Report.

13. The Committee recommends issuing the Specification as an Indian Railway Standard Specification as modified and printed as Appendix V to this Report.

(iii) No. E13-39 for static condensers for the improvement of power factor.
14. The Committee recommends issuing the Specification as an Indian Railway Standard Specification as modified and printed as Appendix VI to this Report.

(iv) Push button operated starting and control gear for D. C. Motors up to 650 volts.

15. The Committee recommends issuing the Specification as an Indian Railway Standard Specification as modified and printed as Appendix VII to this Report.
(h) Lightning arrestors up to 650 volts, A.C. and D.C.
To consider replies from Railways to the circular issued in connection with the preparation of a Specification for the above item and to decide whether there is a necessity for an I. R. S. Specification for the same.
Reference: Fourth E. S. C. Report, Subject No. 8, Paragraph 24, List A,

16. The Committee is of the opinion that no useful purpose will be served by having a standard specification at this stage.
The Committee also notes that there are in existence designs which have specific application for local areas and conditions.
(c) Fire extinguishers for electrical purposes.
To consider B. S. No. 740 for portable chemical fire extinguishers, foam and carbon tetrachloride type with a view to its adoption for use on railways for fire extinguishers for electrical purposes.
17. The Committee recommends adoption of B. S. No. 740 for use on Railways for portable fire extinguishers for electrical purposes.

Note.-The foam type extinguisher has been found suitable for use all installations up to 500 volts. For large installations where considerable quantities of oil are liable to be released under fire conditions, special precautions must be taken to prevent the spread of such oil. Installations of a permanent nature to provide for a system of blanketing are required to meet these conditions.
**Subject 3.-** Internal lighting of coaching stock—To consider reports from Railways on the effect of introducing the average minimum standards of illumination recommended at the Fourth E. S. Committee Meeting (if received in time). Reference Fourth E. S. C. Report, Subject No. 16, Paragraph 37.

**Recommendation and decision:**

18. The Committee recommends that C. E. E., G. I. P. Railway's report, reproduced as Appendix VIII to this Report, be recorded and the following standards be adopted:

<table>
<thead>
<tr>
<th>Class of Coach</th>
<th>Foot Candles</th>
<th>Watts/sq. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First class</td>
<td>2.5</td>
<td>1.20</td>
</tr>
<tr>
<td>Second class</td>
<td>2</td>
<td>0.95</td>
</tr>
<tr>
<td>Inter class</td>
<td>1.5</td>
<td>0.72</td>
</tr>
<tr>
<td>Third class</td>
<td>1</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Note.—The above allowance in watt/sq. ft. is empirical only and assumed for a minimum voltage at the lamps of 22 and will be subject to variation according to the arrangement of the lighting points. This value is further more exclusive of individual berth light points which should be so arranged to give the lighting values indicated above. The values given above are based upon the best reflecting finish at present obtaining.

19. The Committee further recommends that the attention of the Carriage and Wagon Standard Committee be drawn to the desirability of giving the closest attention to the colour scheme generally and particularly as regards the ceiling, and if possible down to the waist-rail, since there is a variation in the light absorption of as much as 30 per cent of the illumination between light and dark finishes and involving correspondingly higher wattage provision than that indicated in No.1 above.

20. The Committee notes that the maintenance of the above standard of lighting is dependent on the depreciation rate in the lumens value of the lamps in use.

21. The Committee also notes that the above standards have already been obtained by improved planning in new coaching stock on certain Railways without material increase on loading and additional cost.

**Subject 4.-** Electric Lamps for Railway Signalling—To note item No. 8 of the 13th Signalling and Interlocking Standards Committee Report and to make recommendations regarding the adoption of B. S. No. 469-1939.

**Recommendation and decision:**

22. The Committee recommends that B. S. No. 469 (latest edition) be accepted and adhered to for use on Railways.
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Subject 5.-Dynamos for Train Lighting-To consider results of tests carried out by the N.W and E. B. Railways on temperature rise under test and operating conditions with a view to modify Clause 16 of I. R. S. Specification No. E1-37 (Corrigendum.1 of November 1938), if necessary.
Reference: Fourth E. S. C. Report, Subject No.4.

Recommendation and decision:

23. The Committee recommends that in I. R. S. Specification No. E.1-37, the length between the centre line of dynamo suspension boss and the centre line of the dynamo shaft should be specified.
24. The Committee further recommends that this size be standardized for both Broad and Metre Gauge at 12.25” and the existing I. R. S. drawings amended accordingly. For this purpose, the N. W. Railway have submitted a drawing regarding Broad Gauge and the E. B. Railway will submit one for the Metre Gauge.
25. The Committee recommends that Clause 16, on page 5 should be modified as under-

(i) For the existing table substitute the following table

<table>
<thead>
<tr>
<th>Class</th>
<th>Insulation</th>
<th>Maximum Observable Temperature</th>
<th>Maximum Observable Rise in Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td>under normal working conditions</td>
<td>90 degrees C</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>under normal working conditions</td>
<td>110 degrees C</td>
</tr>
</tbody>
</table>

(ii) Add the following-

Note.-In the determination of maximum observable temperature, the Bench Test results shall be corrected by an allowance of 10 degrees C. to correct for running conditions, viz., the equivalent temperature when running shall be taken as observed temperature rise minus 10 degrees C. plus actual ambient.

(iii) Add the following additional sub-paragraph 16(b) other things being equal, regard will be given to comparative weights and temperature rises guaranteed as given in Appendix 'A.'

Subject 6.-Length of dynamo suspension link on Metre and Broad Gauge when on safety chains-To consider the recommendation of the 21st C. & W. S. Committee (paragraph 84), to examine proposals shown on Drawings CSCW.434 and 435 and to suggest alternative proposals if those shown on the above drawings are not acceptable.
Reference Fourth E. S. C. Report, Subject No. 19, Paragraph 40.

Recommendation and decision:

26. It would appear that the adoption of a standard 8" link for both M. G. and B. G. under frames is feasible but the Committee recommends that E. B. R. Drawing No. E. TLj493 be
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circulated to all M. G. Railways and their confirmation of this proposal be obtained and CSCW Drawings Nos. 434 and 435 amended accordingly.

**Subject 7.-**Axle pulley for dynamos-Metre Gauge-To note that trial reports are still awaited.

**Recommendation and decision:**

27. The Committee notes that trials are still proceeding.
28. The Committee is, however, of the opinion that if 1’-5.5” diameter is to be taken as the maximum over flange diameter, the drive diameter will necessarily become 15 inches since the Committee does not consider a 3/4”flange satisfactory.

**Subject 8.-**Length of cable for combined fuse and Junction box-To consider comments received on G. I. P. Railway's suggestion to increase the length of cable from 6’-7” to 6’-9”and make final recommendations.

**Recommendation and decision:**

29. It is recommended that CSE Drawing No.8 be amended to indicate the dimension-
(a) from the horizontal centre line of the combined fuse and Junction box (or terminal box) to the bottom face of the coupler Plug.
(b) from the centre line of the Junction box to the bottom face of the coupler plug.
*Note:* It is presumed that the additional length required by the G. I. P. would be accommodated in the Junction box and net lower the coupler plug in the free position so as to foul the buffer.

**Subject 9: Five-core flexible cable for inter-vehicle couplers-To record alterations 6 and 4 to CSE Drawings Nos. 8 and 10,respectively.**

**Recommendation and decision:**

30. The Committee notes that the necessary corrections have been made in CSE Drawings Nos. 8 and 10.

**Subject 10.-Train Lighting belting for Railways.**
(a) To make final recommendations regarding provision of the alternative size of stud in the N. W. R. Drawing No. 1135/TL.
(b) To consider comments on draft Specification for Train Lighting belting and make final recommendations with a view to issuing it as a standard specification.
(c) To note that a reply is still awaited from the British Standards Institution regarding tolerances on thickness of Train Lighting Belts.
Reference-Fourth E. S. C. Report, Subject No.6, Paragraph 20.
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Recommendation and decision:

31. (a) The Committee recommends adoption of N. W. Railway Drawing No. 1135/TL.
(b) The Committee recommends issuing the Specification as an Indian Railway Standard Specification as modified and printed as Appendix IX to this Report.
(c) Noted.

Subject 11:- Water raising apparatus
(a) To note that trials on the G. I. P. and the N. W. Railways with the apparatus to Sketch Nos. 3507 and 3508 have proved unsatisfactory.
(b) To note that trials with water raising apparatus of the semi-pressure system to G. I. P. Sketch No. 2644 are now being carried out by the G. I. P. and the N. W. Railways.

Recommendation and decision:

32. The Committee notes that trials are in progress. It should be noted, however, that the pressure tank instead of being placed on the under frame is inserted as a roof tank and it is understood not to G. I. P. Sketch No. 2644 which otherwise would defeat the purpose in view.

Subject 12:- Alkaline and lead acid batteries for Train Lighting.-To note that I.R.S. Specifications Nos. E2 and E2A-37 have been revised and re-issued as Nos. E2 and E2A-39.

Recommendation and decision:

33. The Committee notes that these specifications have been brought up to date in the light of comments received.

Subject. 13.- Carriage Fans-To consider letter No. 1-46/621 dated 3rd August 1939 from the Chief Controller of Stores, Indian Stores Department and make recommendations regarding the modifications, if any, to I. R. S. Specification No. E.4-34.

Recommendation and decision:

34. The Committee recommends the following modifications to I.R.S. Specification No. E.4-34 for carriage fans and regulators (5'-6" and Metre Gauge)-

(i) Clause 2.- To be reworded as follows" The fans shall be so designed that the motor unit may be removed from the fan carcass with facility. Alternatively, the fan may be of a design not having the demountable feature."

(ii) Clause 9.- Delete the sentence "Fans provided with unit is removed."
The Committee is of the opinion that the close mesh guard should be made a permissible alternative to the open type guards and recommends that a type drawing similar to N. W.
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R. Sketch No. 1127/TL should be got out for this purpose and the Specification amended accordingly, where necessary.

(iii) Clause 13.-It is further recommended that Clause 13 (fan regulators) should be suitably modified to provide for a smaller dimension of regulator than at present permitted in the Specification with variable resistance tappings to permit of their use with various types and sizes of fans on the lines of N. W. Railway Drawing No. 1150/TL.
6th ELECTRICAL STANDARDS COMMITTEE MEETING

Members Present

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<td>Asstt. Chief Controller/Specifications (Secretary)</td>
<td>Central Standard Office, Railway Board</td>
</tr>
</tbody>
</table>
Subject 1:-I.S.D. Specifications for Electrical Equipment. To consider the comments made by the manufacturers on the following draft specifications and make final recommendations regarding their adoption:-

(a) P.I.-136 B for starting and control gear, manually operated type for non-reversing A. C. polyphase motors up to 650 volts.
Reference: Fourth E. S. C. report, subject No. 1, para. 7, item (e).

Recommendation and decision:

1. The committee, having considered the comments of the manufacturers and various Railways on the above specification, recommend that the Specification as modified and reproduced as Appendix "I" to this report, be adopted.
2. The Committee have further to make the following observations:-
  Clause 4 (b)-Star-delta starters.- The Committee do not recommend the acceptance of manufacturers' suggestion that the final para of this clause should be omitted but point out that the clause calls for a device, this term being sufficiently broad to meet criticism.

Clause 20-Erection.- To be deleted, and the suggestion made by the manufacturers to include this item in the "Schedule of requirements be accepted.
(b) Pl.-142 B for starting and control gear, manually operated, fully interlocked for non-reversing A. C. polyphase motors up to 650 volts.
Reference. IV E. S. C. report, subject No.1, para. 8, item (f) and Appendix V.

3. I. S. D. representative stated that the revision of Specification P I. 142-B for starting and control gear, manually operated, fully interlocked for non-reversing A. C. polyphase motors up to 650 volts, will be redrafted to follow the present decisions in regard to Specification No. P. I. 136-B, and issued.
The Committee agree that the procedure may be adopted to save time.
(c) To consider G. 1. P. Railway's comments on 1. S. D. S. Specification, No. H-126 (Issued January 1940) for Asbestos woven Tape for Electrical Purposes and make recommendations.
Reference. - E. S. C. Report No.4, Subject No, .1 (d), paras. 5 and 6 and Appendix III. E. S. C. Report No.5, Paras. 6 and 7.

4. The Committee having considered the suggestions made by the G. I. P. Railway regarding Specification No. H-126 for "Asbestos Woven Tape for electrical purposes" are of the opinion that practical experience has shown that the tape bought against this specification is suitable for general purposes in India.

5. The Committee suggest that if the standard of quality is not sufficiently high to meet the special requirements of traction operating conditions, where higher voltages are utilized, such railways as are concerned may issue their own specification.
Subject 2.-Train Lighting Dynamos.

(a) To consider the proposal of the Dy. C. M. E. (Electrical) E. B. Railway, to include an additional stipulation under Clause 18 (b) of I. R S. Specification No. E 1-37 as follows:-

"The over-voltage relay shall be supplied as a separate unit for mounting on solebar, and the dynamo provided with sufficient length of trailing cable for connection to the relay."

Recommendation and decision:

6. The Committee recommend that the suggested stipulation should be modified to read as under:
Unless otherwise specified the over-voltage relay shall be supplied as a separate unit suitable for external mounting and the dynamo shall be provided with sufficient length of trailing cable for connection to the relay.

(b) To reconsider recommendations made under para. 24 of the Fifth Electrical Standards Committee Report in the light of investigations carried out in C. S. O. and included under paragraph 83 of the XXII Carriage and Wagon Standards Committee Report. Also, to recommend a maximum diameter for dynamo shells.

Recommendation and decision:

Broad Gauge Vehicles.

7. The Committee having considered the full implications arising out of paragraph 83 of the XXII Carriage and Wagon Standards Committee Report are of the opinion that to overcome difficulties and to provide for the use of 100 ampere dynamos on broad gauge stock, the following steps should be taken :-

(i) The suspension link should be redesigned with 6.75” centres.
(ii) For the sake of Standardization, the dimension between the dynamo suspension boss and shaft centre should be retained at 12.25”.
(iii) The axle pulley of all new I. R S. Stock should be of standard width but of 20” diameter.
(iv) Dynamo driving pulley should be of 5.5” diameter, so that the existing drive ratio is maintained.

8. The conclusions drawn from the examination of suspension heights, etc. indicate that standard clearances can be maintained with a dynamo having a maximum diameter of 17” provided that the drive is modified as outlined above.

9. Arising out of the above, it will probably be necessary to reconsider the advisability of continuing the use of 4” wide 4-ply belting for dynamos rated at 100 amperes and above. It is understood that the Eastern Bengal Railway have tried a 5” belt for this purpose and have reported beneficial results.

Metre Gauge Vehicles.
10. Similar considerations in regard to dynamo drives on metre gauge vehicles suggest the following conclusions:-
(i) That the standard dimensions of the suspension bracket may be adhered to.
(ii) That the suspension link centres may be maintained at 8".
(iii) For the sake of Standardisation, the dimension between the dynamo suspension boss and shaft centre should be retained at 12.25".
(iv) That the axle pulley should be Standardized as recommended under Subject No.8.
(v) That the dynamo pulley should be of 5.5" diameter.
11. If the above are adopted, standard clearances can be maintained provided that the dynamo shell diameter does not exceed 15".

12. The above conclusions are based on the assumption that dynamos having a capacity of 80 amperes will meet the maximum requirements of metre gauge coaching stock.

13. The Committee wish to emphasize that if the above proposals are adopted, a standard suspension height will be retained for all future dynamos which will ensure interchangeability between Broad and Metre Gauges.

(c) To note resolution E/202 of the 13th Meeting of the Electrical Section of the I.R.C.A. and to suggest suitable modifications to I. R. S. Specification E 1-37 for train lighting dynamos.

14. The Committee having considered the above Specification E 1-37, suggest the following modifications thereof :

Clause 12.-Delete in line 2, “on the top of” and substitute “above the horizontal centre”.

Clause 18 (a) *Over current-Change* the first line to read as follows:
"With the dynamo there shall be provided a current........".

Clause 18.- Insert the following notes at the end of this clause :-
(i) Preference will be given to designs in which the current limiting device is in the form of a cartridge fuse unit suitable for independent mounting.
(ii) Dynamos in the design of which provision is made for the independent mounting of all field control and protective features will be preferred.

Subject 3.-Length of Dynamo Suspension Link for M. G.
To consider replies received from M. G. Railways to the proposal to adopt 8" link as standard and para. 83 of XXII Carriage and Wagon Standards Committee report and make final recommendations.
Reference-Para. 26 of V Electrical Standards Committee Report.

**Recommendation and decision:**

15. The Committee having considered the replies from the various Railways are of the opinion that for all new stock purchased against I. R. S. Drawings, the 8" dynamo suspension link may be standardized provided the dynamo shell diameter does not exceed IS" when supported by a suspension boss having a dimension of 12.25" between the drive and suspension boss centres. The 80 ampere rated dynamos available and purchased against recent tenders have all a shell diameter of less than 15".
Subject 4.-Machining of Axles for Dynamo Pulley Seating: To note recommendations contained in paragraphs 81 and 82 of the XXII C. & W. Standards Committee Report and record C. S. E. Drawing No. 25.

Recommendation and decision:

16. The contents of paragraph 81 are noted.
17. The contents of paragraph 82 have also been noted by the Committee who wish to invite attention to the necessity for checking the suspension bracket transverse vertical centre line relative to under frame centre. They further suggest that the Central Standards Office should determine whether the new suspension centre will provide adjustment limits within which the existing types of dynamos may be operated.

Subject 5.-Switchgear for Train Lighting.: To note resolution E/202 of the 13th meeting of the Electrical Section of the Indian Railway Conference Association and to suggest suitable modifications to I. R. S. Specification No. E 3-38 and C. S. E. Drawings Nos. 1, 2, 3 and 4.

Recommendation and decision:

18. The Committee having considered the above proposals suggest that they be adopted and CSE. Drawings Nos. 1, 2, 3 and 4 be corrected accordingly.
19. They are further of the opinion that no modification is necessary to I. R. S. Specification No. E 3-38 for Switchgear for Train Lighting, on this account, Drawing No. CSE. 2.
20. The note reading as under."
Lamp resistance is completely short-circuited when the cut-in switch is in the "OFF" position" is correct only in the case of certain modern switchgears, They, therefore, suggest that this be redrafted to read:--
"With modern contactor type switchgear the lamp resistance is completely short-circuited when the cut-in switch is in the "OFF" position"
21. The Committee note that fuse links are shown on the wiring diagram and suggest that the note should be changed to read "cartridge fuses ". In the same diagram it is necessary that cartridge fuses in both poles of the dynamo should be indicated.
22. The Committee are of the opinion that consideration should be given to the connecting of side and tail lights on an independent circuit under control of the guard and independent of the guard control arrangements of the train. This independent control shall incorporate a switch fuse unit.

Subject 6.-Electric Arc Welding.
To note proposal E 201/1 of the 13th Meeting of the Electrical Section of the I. R. C. A. and make recommendations.
Recommendation and decision:

23. The Committee having considered the report under Subject No. E-201 of Meeting No. 13 (Electrical Section), I.R.C.A. have extracted therefrom items which in their opinion, can with advantage, be embodied in the Specifications P.I.-141 which has been modified and reproduced as Appendix II to this Report.

Subject 7:- Water Raising Apparatus.
To note that trials with water raising apparatus of the semipressure system have proved satisfactory and that trials have been dosed.

Recommendation and decision:


Subject 8.- Dynamo Axle Pulley for Metre Gauge.
To note that trials with pulleys 15" diameter with flanges 1.25" deep have proved satisfactory so far on the E. B. and B. & N. W. Railways and that the trial has not proved satisfactory on the B. B. & C. I. Railway due to the drive centres being shorter than the I. R. Standard. Trials are still in force on E. B. and B. & N.W.

Recommendation and decision:

25. The Committee note the comments submitted by the railways on this subject.
26. The B. B. & C. I. Railway representative, however, pointed out that although the diameter of the pulley is satisfactory, the 7" wide face had proved of insufficient width to minimise belt losses.

Subject 9.- To record the issue of the following I.R.S. Drawings for electrical equipment-
(i) CSE. Drawing No. 27-Close Mesh Fan Guards.
(ii) CA. 667.- Resistance box for Fan Regulator.
Item (i)- Close Mesh Fan Guards.

Recommendation and decision:

27. Recorded.
### 7th ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

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<td>Joint Director/Research, (CO-Opted Member)</td>
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<td>S. R. Woodmere</td>
<td>Asstt. Chief Controller of Standardization (Secretary)</td>
<td>Central Standard Office, Railway Board</td>
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<td>13.</td>
<td>O. R. Tucker</td>
<td>Chief Controller of Standardization</td>
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Compendium of ESC 1935-2014
Subject 1.-: Electrical Equipment Body. Air-conditioning Coaching Stock.

To discuss resolution E/236 of the 14th Elec. Section, IRCA, with a view to adopting one of the systems of air-conditioning recommended as the future standard for B.G. air conditioning Coaching Stock and to confirm the resolution with regard to M.G. Stock.

Recommendations:
1. The Committee recommend that as both ice activated and electro-mechanical systems of air-conditioning have proved satisfactory on Indian Railways, both may be adopted as the future standard. Individual railways may adopt either type to suit their particular service conditions, The Committee confirm the IRCA Resolution that the unit type of conditioners are suitable for M.G. Stock.
2. During recent years, considerable developments have taken place in America with direct mechanical types of air-conditioning the compressor being driven either from the carriage axle or by a Diesel engine, A combination of the ice activated system with an axle driven compressor, would offer many advantages, It is therefore, recommended that trials be carried out with these equipments to gain experience in considering their suitability for use in this country.
3. Senior Electrical Engineer, E. P. Railway will act as a co-coordinating Officer,

Decision

Paragraph 1. The question of selection of a standard type of air-conditioning equipment may pend until it is decided to what extent air-conditioning is to be introduced.

Paragraph 2. Recommended trials may be carried out as opportunity offers.


Subject 2.- Refrigerator for Vans. To consider the resolution made against Subject E/236 of the14th Meeting of Elec. Section, IRCA relative to refrigerator Vans, with a view to drawing up a list of essential features for incorporation in an IRS design of ice activated Refrigerator Van (Elec. Pumps, Circulating Fan and in Coolers, etc.).

Recommendations:
4. The Committee are of the opinion that the recommendation made in Resolution No. E/236 of the 14th Meeting referred to the "straight ice" system, i.e. the use of wet ice only, without any equipment for pumping cold melt age, as in the case of the ice activated system employed on Air- conditioned coaches.
5(a) The Committee consider that the "straight ice" system is best suited for the transport of fruit, vegetables and similar commodities and that any future standard de-sign of Refrigerator Van should be based on this arrangement.
5b) This system is, however, unsuitable for transporting frozen meat, fish, etc. which require a much lower sustained inside temperature. Such temperature can only be obtained and maintained throughout the run by the provision of direct mechanical or full electromechanical types of refrigerating equipment, with automatic temperature control.

**Decision:**


Paragraph 5 (a), Approved. Central Standards Office to base any future designs accordingly,

Paragraph 5(b). Noted.

**Subject 3.-** Air conditioning plants (Domestic Type) Electrically operated for office rooms, buildings, hospitals, etc.

To consider the desirability of drawing up a Specification for Domestic Type air conditioning Equipment with a view to securing the standardization of essential features.

**Recommendations:**

6. The Committee consider that when purchasing domestic type air-conditioning plants the open or semi-sealed types are to be preferred owing to the difficulty in carrying out repairs to sealed units in this country.

7. The Committee consider that water-cooled units are to be preferred to air-cooled units and as far as possible air-conditioners having a separate compressor which can be mounted at some distance from the cabinet containing the cooling coil, are to be preferred.

8. In the case of the air-conditioning of operating theatres of hospitals, special precautions are necessary when using domestic type air-conditioners. The Committee are of the opinion that the re-circulation of conditioned air should as far as possible, be avoided.

**Decision:**

Paragraphs 6, 7 and 8. Noted.

Railways to specify accordingly in any future orders.

**Subject 4.-** To consider the desirability of drawing up a specification for domestic Type Refrigerators particularly for operation in Railway Coaching Stocks.

**Recommendations:**

9. The Committee consider that the following essential features should be incorporated in any future demands for Refrigerators required to operate in coaching vehicles-

(a) The refrigerator should be of the open or semi-sealed type and not a sealed unit, so as to facilitate repairs in this country.
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(b) The refrigerant used must be non-toxic, non-irritant, non-inflammable and non-explosive.
(c) The motor must be suitable for operation under voltage variations from 20 to 32 Volts D. C. An under-voltage release should be provided to prevent burning out of the motor at low voltage.
(d) The condensing unit should be of ample capacity for operation at an ambient temperature of 120°F, often encountered inside carriages.
(e) All parts should be sufficiently robust to withstand severe vibration during train movement.

10 The Committee consider that the "Electrolux" type of refrigerator fitted with electric resistance heaters is not suitable for use in coaching stock

Decision:

Paragraph 9. Noted; Railways to specify accordingly in any future orders.


Subject 5: To review the information already available from the 14th and 15th meeting of the IRCA Elec. Section in connection with the adoption of the single battery system for train lighting purposes, with a view to determining whether anything is to be gained from the continuance of the existing trials, and if not to recommend that the double battery system be retained as the future railway standard

Recommendations:

11. The Committee consider that the single battery system should be adopted as the future standard on Indian Railways, in order to simplify the present system, and to meet the higher standard of lighting in all classes and the increased load due to the provision of fans in the lower classes. For this purpose, each coach, both B. G. or M. G. should be equipped with the following minimum equipment-
(a) A shunt dynamo with a voltage regulator and
(b) Single battery, preferably lead-acid type.
12. The Committee recommend that a Sub-committee composed of the Chief Electrical Engineers, B. R & C. I. E. P. and G. I. P. Railways, be appointed to draft a standard specification for dynamos, switchgear and wiring layout for use with Single Battery System of train lighting.

Decision:

Paragraph 11. Approved.

Paragraph 12. Approved. This should be done as soon as possible.
Subject 6.- To consider modifications to the standard Coach Wiring Diagram CSE-2 to:
(i) Prevent fires in stock due to short circuits. (ii) To provide facility in operation.

Recommendations:

The Committee consider, bearing in mind their recommendation at subject No. 5, paragraph 12, that this subject could best be dealt with by the proposed Sub-Committee set up to draft standard specifications for use with the Single Battery System and should be referred to them.

Decision:

Paragraph 13. Approved. This should be done as soon as possible.

Subject No. 7: To consider the preparation of an up-to-date Load Schedule for the Electric Equipment of Coaching Stock on the lines of those prepared at the 10th meeting of CWSC (E1ec. members) Subject 7 (a).

Recommendations:

14. Lighting. The Committee consider that the following lighting standards laid down should be accepted as a minimum standard for B.G. and M.G. stock –

Foot candles at 33" above floor level.

Class I .................. 4*
Class II ................. 2
Class III ...............1.5
Lavatories ...........1.5
Latrines .............. 1

*Berth lights should be provided as conditions permit.

Every effort should, however, be made to install lighting up to the following standard-
Compartment Foot candles

Class I .................. 6
Class II ................. 4
Class III ...............3
Lavatory Class I ......4
Lavatory Class II ......2
Latrines Class III..... 2

The capacity of the dynamo and battery shall be calculated on the higher standard recommended.
15. As the interior finish of the coach has a very large influence on the energy required to give "definite standard of lighting, it is essential that durable light-coloured interior finish for coaches be standardized as soon as possible by the C. W. S. C. as the lighting load can be affected up to 30% by the colour and finish of the interior decoration. In view of the foregoing, the Committee regret their inability to prepare an accurate load schedule due to the overriding influence of the standard of interior finish on the illumination obtained with a given lamp wattage.

16. Fannage-The Committee are of the opinion that the provision of fannage on the recommended lines, as detailed below, is generally adequate with the exception of fans in all B. G. Class I compartments where it is felt that four fans should be installed as heretofore and 2 fans in Class I M. G. compartments due to constructional limitations.

Decision:

Approved

Subject 8.- To consider whether any modification is necessary to the Standards Battery Box arrangement as shown On Drg. No.1020/71 to prevent the lodgement of cinders, which cause battery boxes to catch fire.

Recommendations:
The Committee recommend that the protective arrangements shown on CSE Drg. No. 28, should be incorporated in the standard design of Battery Box drg. No. 1020/71.

Decision: C. S. O. to alter Drg. No.1020/71 accordingly.

Subject 9: To consider the revision of I.R.S. specification No. E. 6/37 to include a test clause both for contact resistance and high voltage.

Recommendations:

18. The Committee' consider that the proposed test is not satisfactory and recommend that the following test be incorporated in the specification "Each contact shall be tested by passing a current of 100 amperes through the assembled male and female coupler from a suitable source. With this current the voltage drop from the shoulder of one contact to the shoulder of its mating contact shall not exceed 100 milli-volts."

19. The Committee consider that as I. R. S. Specification E-6 was last revised in 1937, it should be circulated to the Electrical Engineers of all Class I Railways for comment to ensure improvements in the quality of couplers now being supplied to Railways.

Decision:


Subject 10.- To record CSE Drg. No. 24 for Electric Tail Lamps.

Recommendations:
20. Recorded. The Committee, however, recommend that consideration should be given to the following points-
(a) A revision of Rule 145/1 of the General and Subsidiary Rules, 1934. As it stands at present the rule only provides for the application of oil lamps and
(b) A locking arrangement would be of advantage.

Decision:

(a) This should be referred to Director Traffic for examination.

(b) C.S.O to get out a design for consideration of the next meeting

Subject 11.- To consider the application of Fluorescent Lighting to Coaching Stock, particularly with regard to method of application and details of equipment etc.

Recommendations:
21. The Committee consider that it is not possible at this stage to recommend any particular type of fluorescent lighting equipment for adoption as a standard, as experience to-date on Indian Railways is very limited, and different types of equipment are not at present available in the country for trials. Further, the opinions expressed by various railways outside India on the advantages and disadvantages of the different types and systems of fluorescent lighting are at variance.

22. The Committee recommend that extended trials with various types of equipment should be carried out by class I Railways, with a view to determining which particular system would best suit Indian conditions.

23. The Committee, therefore, recommend that Class I Railways make arrangements to procure equipments of different types with a view to carrying out trials. Before placing further orders, railways should get in touch with each other and agree among themselves which particular equipments are to be obtained, so that as many different types of equipments can be tried out as possible. C. E.E., E. I. Railway will act as co-ordinating officer.

24. The equipments should be tried out for at least one year, when the results will be again discussed at this meeting.

25. In view of the above, the Committee is not at present in a position to recommend any particular system of fluorescent lighting as a standard, and that the provision of fluorescent lights in the new 11'-8" B. G. and 9'-4" M. G. stock may have topend for the present.
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Decision:

Paragraph 21: Noted.

Paragraph 22: Approved.

Paragraph 23: Approved. C. S. O. to be kept informed of progress.

Paragraph 24: Noted.

Paragraph 25: Noted.

Subject 12.- To consider the preparation of an I.R.S. or all India Specification for Fluorescent Lighting fittings for use in offices, Station Platforms and approach roads, &c.

Recommendations:

26. The Committee feel that as the development of fluorescent lighting and allied fittings are in a very fluid state, the time is not opportune to lay down hard and fast specifications for the use of such fittings for railway purposes.

Decision:

Paragraph 26.

Noted.

Subject 13.- To consider the question of trying opt shaft driven Train Lighting Dynamos on coaching vehicles.

Recommendations:

27. The Committee consider that with the smaller size of dynamo the adoption of a cardan shaft drive could not be justified in view of its disproportionate cost. Where exceptionally high dynamo loads are encountered, a cardan shaft drive is the only suitable type of drive. The C.E.E, GIP Rly will, however, carry out further experiments on the 10 sets of cardan shaft cushion drive dynamo on order at present and submit a report on their behaviour in service for further consideration at the next meeting.

28. The Committee recommend that trials should also be carried out with V belt driven dynamo mounted on-the bogie frame, as this appears to be the most promising solution to the dynamo drive problem. It is recommended that the C.E.Es. EP, MSM and SI Rlys. be authorized to carry out such trials on a limited number of coaches, and submit reports for the information of this Committee in due course.

Decision:

Paragraph 27. Noted. CEE/GIP to report on the behaviour of the 20 sets now on order

Paragraph 28: Approved. A report to be submitted in due course.
Subject 14.- To consider the advisability of setting up an organization on Rlys. to facilitate the manufacture of Train Lighting spare parts by Indigenous Manufacture

Recommendations:
The Committee strongly recommend that a central organization for the manufacture of train lighting spare parts and engine turbo-generator spare parts and any other maintenance parts required by other departments be set up providing an efficient organization with adequate machinery. Can be evolved, as the supplies available from indigenous sources from open market are not up to the high standard of quality required for efficient railway maintenance.

Decision:
Paragraph 29: Noted. This matter will be considered in connection with the proposed carriage Building Shop.

Subject 15.- To consider whether the existing types of Train Lighting Belt fasteners are satisfactory and if not recommend alternative and eliminate any unsatisfactory types.

Recommendations:
30. The Committee consider that "Walker" or "Dixit" type fasteners, whether indigenous or imported, are satisfactory provided they strictly conform to the dimensions and details shown on CSE Drg. No. 26, and that they are manufactured of the correct material.

31. For the type of indigenous belting now being received, e.g. Bengal Belting, it is suggested that a fabric-bakelite tyre of fasteners, like the "Railco" fasteners may be given a trial on the BB&CI and GIP Railways.

Decision:

Paragraph 31. Approved. C. E. E.s., BB&CI and GIP to submit reports in due course.

Subject 16.- To consider whether the present supplies of train lighting belting, mostly being supplied from indigenous sources are giving satisfactory service and if not to make recommendations in connection with the policy to be followed for the purchase of this belting, pending manufacture of a suitable quality belting by the indigenous industries.

Recommendations:
32. The Committee is of the opinion that the insufficiently vulcanized, solid woven, single ply cotton belting as supplied at present is not satisfactory for train lighting purposes.
33. The Committee consider that I. R. S. Specification No. E14-39 is satisfactory except that copper stitching is not essential.
34. The Committee recommend that future purchases should conform to I.R.S. Specification No. E14-39 with the modification suggested above.
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Decision:

Paragraph 32. Noted I & S. Deptt should be advised.
Paragraph 33. Approved C.S.O. to correct the Specification,
Paragraph 34. Noted.

Subject 17.- To consider the advisability of setting up an organization on RLvs. to facilitate the manufacture of spare parts for locomotive turbogenerators by either Rly. Workshops or by the Indigenous Industry.

Recommendations:
35. In this connection, reference is invited to the committee's recommendation at paragraph 29 Subject No. 14, wherein it has been recommended that a central manufacturing organization should be set up to cater for the manufacture of such spare parts.

Decision:
Paragraph 35. Noted. See Remarks against paragraph 29.

Subject 18.- To consider the revision of the temperature rise clause in I.R.S./I.S.D. (I & S.) Specifications as far as Motors and Transformers are concerned, in terms of CEE/EI Rly.'s note, attached as Appendix 'D.'

Recommendations:
36. The Committee do not consider that there is sufficient justification for modification to the existing temperature rise clause in any of the existing I.R.S./I.S.D. Specifications.

Decision:

Subject 19.- To consider comments made by the CEE/GIP, (attached as Appendix 'E.') on I.S. D. specification Nos. PI-136-C and PI-142 and make recommendations for the modification of the specifications, if considered necessary.

Recommendations:
37. The Committee recommend that the C.E.E. G IP Rly., be asked to suggest suitable modifications to L S. D. Specifications Nos. PI-136-C and PI-142 and submit them to the Central Standards Office for transmission to the J. & S. Department, recommending that they should consider modifying their specifications accordingly.

Decision:
Paragraph 37: Approved. CEE/GIP to submit his recommendations.

Subject 20.- To record a list of accepted permissible alternatives for Train Lighting Equipment on BG and MG Coaching Stock.
Recommendations:

38. The Committee consider that in the absence of accumulated data and statistics on the numerous proprietary articles of train lighting equipment used on the Indian Railways, the only satisfactory course is for railways to furnish test results where available or carry out tests of the various equipments in use, and being offered to them against demands. The results to be circulated as confidential reports.

39. The Committee recommend that these reports should be collected and discussed at the next meeting when it will be possible to draw up a list of items which will form the basis of a "permissible alternative" list.

Decision:

Paragraph 38. Noted.

8th ELECTRICAL STANDARDS COMMITTEE
MEETING

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Subject 1.- Air-conditioning Coaching stock: To consider the results of trials conducted with the direct mechanical types of air conditioning equipment and a combination of the ice activated cum-mechanical system, and make recommendations as to which system should be adopted as the future Indian Standard for BG coaches.

Recommendations:
1. The committee examined the report submitted by the Senior Electrical Engineer, E. P. Railway. Since the last meeting, no opportunity has offered for the installation of fresh air-conditioning equipment on coaching stock, and the Committee feel that until some definite programme has been laid down for the construction of air-conditioned coaches, little progress can be made with the trials proposed in paragraph 2 of the 7th meeting,

2. In view of the present financial stringency and the fact that there are over 35 sets, of air-conditioned equipment available with Railways at present, the Committee feel that it is not an opportune time to embark upon new trials for the purpose of determining a standardized system for BG coaches.

Decision
1. Noted
2. Noted

Subject 2.- To consider the application of fluorescent lighting to coaching stock, particularly with regard to the method of application and, details of equipment, etc., and with this end in view to record results of trials recommended by the VII Electrical Standards Committee.

Recommendations:
3. The Committee places on record that trials are being carried out by the B. B. & C. I., E. I., E. P. and G. I. P. Railways with Stone's 50 and 60 cycle equipment. The M. S. M. Railway are trying out a BTH 400 cycle equipment. Further trial on other railways will be put in hand as and when other types of equipment become available.

4. Trials have not been in progress long enough to record any definite views, but it is generally felt that, very satisfactory lighting up to the standard recommended. In paragraph 14 of the 7th Report for class I and II compartments can be provided within the capacity of the generating and storage equipment now being provided.

5. The C.E.E., E. I. Railway, will continue as the co-ordinating officer.

Decision
5. Noted. Progress a trials to be reported when results are available.

Subject 3.- To consider and if approved, adopt the Sub-Committee's report of 24th January, 1950 and the draft specifications for Single Battery Dynmos and Switch Gear prepared by the Sub-Committee appointed at the VII E.S.C. meeting to draw up the specification.

Recommendations:
6. The Committee considered the Sub-Committee's report dated 24th January 1950 and the report as modified and accepted by the Committee, is attached as Appendix 'A.'

7. Of the three draft specifications submitted by the Sub Committee, viz.-
   (a) for dynamos for single battery system,
   (b) for switch gear for operation with single battery system.
   (c) for the proposed amendment to IRS Specification No. E-2A.

Items (a) and (b) have been finalized by the Committee and may now be issued as IRS Specifications and applied to all single battery equipment. The Committee do not recommend any modifications to the existing IRS Specification E-2A for Lead Acid Batteries.

8. The Committee recommends that:

(a) all stock to be constructed hereafter should be equipped with single battery equipment;

(b) any single battery equipped coaches, which have to be introduced into the existing parallel block system, should be equipped with a small resistance in the common negative to prevent interchange of current, if this is found necessary.

Decision:
7. Noted: Specifications relating to (a) and (b) should be sent to Press, as soon as possible, after the clauses relative to dynamo cut-in speeds and dynamo pulley sizes have been examined in CSO.
   (a) (i) In view of the financial and practical implications of the wholesale change over and the limited experience with single battery equipment, which has not yet been subjected to intensive service under various condition in India, implication of this recommendation, for the present, should be confined to new lightweight stock and such other stock as will operate in set rakes with this lightweight stock.

   (ii) With regard to all other coaches that have to be electrically equipped and which cannot be assigned for operation in set rakes, these should continue to be equipped, for the present, with the existing standard parallel-block double battery system.

(b) CSO will initiate controlled trials on Railways to ascertain the practicability of operating coaches equipped with the single battery regulated system in conjunction with
the double battery parallel-block system. Railways should not conduct such trials independently as it is essential to plan for standardization of equipment from the very beginning.

**Subject 4.**
To consider the preparation of an up-to-date load schedule for coaching stock on the lines of those prepared at the X C.W.S.C. meeting of the Elec. Members Subject 7(a).

**Recommendations:**
9. The Committee note that further action is to be taken with regard to the preparation of a load Schedule pending the receipt of the new all-metal light-weight prototype coaches from Switzerland.

10. The Committee, however, recommend that pending the trials to be carried out on the new light weight coaches that the load schedules drawn up by the Sub-Committee appointed against Subject No.5 of the 7th Report be implemented as far as possible when equipping new coaches either in India or elsewhere. A copy of these load schedules forms the appendix to Subject No. 3 of this meeting.

**Decision**
9. Noted
10. Accepted

**Subject 5.** To consider the revised coach wiring Diagram for the single battery system, prepared by the Sub Committee (GIP Elec. Branch Drg. No. 3561) and if approved, record the drawing as the future standard at the same time to record whether any modifications are required to the present double battery wiring diagrams Drg. No. CSE-1 and 2.

**Recommendations:**
11. The Committee considered the standard conch wiring Drg. No. CSE-1 and 2 and recommend that the following modifications be made:

(a) all 5 through wires, viz light positive, paralleling main, off, on and negative, should be run in steel conduit on the sale bar or the under frame from the 24-way fuse box to the 15-way junction box. Necessary drain holes should be provided at the lowest point,
(b) the coach internal wiring, positive and negative, should be run separately in grooved wooden casing. All light and fan circuits should be adequately protected by fuse cut-outs as near the tapping point as possible,
(c) switches controlling lights and fans may be connected either on the positive or negative leads as the case may be to avoid unnecessary crossing of wires of opposite polarity.
(d) the 15 way junction box should be constructed similar to 24-way fuse box and provided on one end of the coach for through wiring. This will do away with the existing 5-way junction box,
(e) only one push button control switch should be pro-vided on each coach.
(f) no individual fuses on light fittings or switches will be necessary in view of the, sub circuits being adequately fused.

12. Drawing Nos. CSE 1 and 2 (double battery coaches) will be reconstructed embodying the above modifications by the Chief Electrical Engineer, G. I. P. Railway, for circulation to Railways.
13. G. I. P. Drawing No. 3561 (single battery system coaches) as modified by the decision taken under Subject 3 of this meeting will be similarly modified and circulated by the Chief Electrical Engineer G. I.P. Railway.

Decision:
11.
  a) Approved
  (b) Approved.
  (c) Approved,
  (d) Approved.
  (e) Approved.
  (f) Noted.
12. Approved. The drawing should be pre- pared as soon as possible and forwarded to CSO for circulation to Railways.
13. Approved. The drawing after modification should be forwarded to CSO for circulation to Railway.

Subject 6.-
To consider clauses 14 to 20 of resolution M/440 of the 21st Mechanical Section IRCA (given at Appendix 'B') which apply to the wiring of coaching stock and to make recommendations for their implementation in the existing and new wiring diagrams.

Recommendations:
14. The Committee consider that the additions and alterations recommended to the wiring diagram Drg. No. CSE1-2 under Subject No.5 of this meeting will minimize the risk of fire in passenger trains.
15. The following notes are recorded relative to the points raised in Appendix B':
   Item 14.-Has been dealt with under Subject No. 5(b).
   Item 15. Dealt with under Subject No. 5(b). The introduction of cartridge fuses is not recommended.
   Item 16.-The Committee agree that the fan regulator and resistance box should be separate units. They, however, do not agree that the resistance box should be mounted on the under frame. The present practice of mounting the fan resistance box under the bunk or in the bathroom is considered satisfactory. The protection of fan circuits has been disposed of under Subject No. 5(b).
   Item 17.-All VIR cables used for coach wiring are of flame-proof quality. In regard to PVC cables. The Committee feel that, in the absence of sufficient experience with this type of
insulation and protection, they would not be justified in adopting this as a permissible alternative standard. The little experience so far gained with this type of cable indicates that the insulation and protection is susceptible to damage as a result of vibration and temperature conditions met with in service.

Item 18.-This subject has been dealt with under Subject No.5, items a and b.

Item 19.-Megger tests are invariably carried out on all coaches passing through workshops for repair.

Item 20.-This subject has been dealt with under Subject No.5, items a and d.

Decision


15. Noted.

Item 14.-Noted

Item 15.Approved.

Item 16.Approved.

Item 17. Noted. Trials with flame-proof PVC cables of indigenous manufacture should be conducted on a limited scale and reports of experience gained on one or two selected Railways should be submitted for consideration at the next meeting.

Item 18. Noted.


Item 20.-Noted.

Note.-CSO will communicate these decisions to the IRCA.

Subject 7.- To consider the revised draft of IRS Specification No. E.6 and, if approved, recommend the printing of same.

Recommendations:

16. The Committee considered the proposed revised draft of IRS Specification E. 6, and with the exception of a slight modification in connection with the reference to the 5-way junction box approved of the draft. As the 5-way junction box will no longer form part of the new standard coach wiring layout, as recommended in item (d) of Subject5, the Specification should clearly state that the provision of a 5-way junction box is not required on stock to be equipped from 1950 onwards.
Decision

Approved, The Specification should be suitably modified.

Subject 8.- To record the progress made with the fitment and trail of the two types of dynamo-drives viz. cardan shaft drive and ‘V’ belt driven dynamo mounted on the bogie frame

Recommendations:
17. The report receive from the Chief Electrical Engineer, G.I.P. Railway, indicates that no progress has been made with regard to the trail of cardan shaft drives due to the non-receipt of the equipments on order. Trials will be put in hand as soon the equipment is received.
18. The Committee note that the two prototype coaches to be received from Switzerland will be fitted with dynamos mounted on the bogie sole plates and driven by means of a cardon shaft from the journal end through a level or hypoid gear. The reports received from the Swiss Railways and tabled at the meeting were noted by the Committee with interest.
19. The Chief Electrical Engineers, E. P. and S. I. Railways' reported that they had experience with 'V' belt drives. The E. P. Railway have one coach fitted with this form of drive to a dynamo mounted on the bogie head stock. The belts are of the jointed Fenner type and have only run 9000 miles to date and given no trouble. The S. I. Railway have carried out preliminary exploratory tests on a test bench and as result of the experience gained, a dynamo is being fitted up with this drive on one coach. The dynamo is mounted on the bogie head stock using endless 'V' belts fitted on over the wheel prior to assembly of the bogie. The coach will be put into service shortly.
20. The M. S. M, Railway reported that no progress has so far been made with the fitting up of a 'V' belt driven dynamo.

Decision

17. Noted
18. Noted
19. Noted Trials should continue.
20. Noted. Trials should be undertaken without further delay.

Subject 9.- To record the progress made on the trial of the "Railco" belt fastener and if satisfactory consider its adoption as a permissible alternative, particularly relative to indigenous train lighting belting.

Recommendations:
21. Reports received from the Chief Electrical Engineers, B B & C I and G I Railways indicate that the "Railco" belt fasteners are not available from indigenous sources and are at present on order through the I & S Dept. Trials will be put in hand when the belt fasteners are received.

Decision
Noted.

Subject 10.- To record a list of permissible alternatives for train lighting equipment for use on B.G. and M.G coaching stock.

Recommendations: 22. The Committee note that no reports have been submitted for consideration. The attention of members was drawn to the resolution recorded in paragraph 39 of the 7th meeting with a view to collecting reports for consideration at the next meeting.

Decision
Railways should circulate test results as recommended in paragraph 38 of the 7th Electrical Standards Committee report.

Subject 11.- To consider and make recommendations as to the most economical way of satisfactorily lighting platforms at stations, with particular reference to island platforms having trees.

Recommendations: 23. The Committee examined the various typical layouts placed before them and are of the opinion that in view of the varying circumstances prevailing at stations it is not possible to lay down any standard and it is left to individual railways to adopt the most economical method consistent with the lighting intensity standard decided at the 5th Meeting of the IRCA Electrical Section under Subject E/58.

Decision
Noted. The decision should be communicated to the IRCA.

Subject 12.- To consider, and if approved make recommendations for the reintroduction of external embarkation lights on all future coaching stock, to augment platform lighting at wayside stations, provide safeguard against trespass in ladies compartments and to assist in prevention of train robberies and off side trespass.

Recommendations: 24. The Committee recommended that the external embarkation lights be provided for new stock on the basis of CSO Drg. No. CSE-29 (at Appendix. 'C') i.e. 4 lights per side in the region of the doorways. The intensity of the individual light should be upto 30 Watts. The battery load imposed by this refinement has already been taken into account in Statement I
to Appendix A of Subject No.3 and amounts to 240 Watts per coach. The control of these embarkation lights should be attained by providing an additional contact to the cut-in and, cut-out switch, and the current supply should be taken where possible, from the common light positive which will be under the control of the guard.

**Decision**

Noted.
## 9th ELECTRICAL STANDARDS COMMITTEE
### MEETING

**Members Present**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name /Shri</th>
<th>Designation</th>
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<tr>
<td>1.</td>
<td>P. P. Kulkarni</td>
<td>CEE (Chairman)</td>
<td>East Indian Railway</td>
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<td>2.</td>
<td>K. B. Patel</td>
<td>CEE (Member)</td>
<td>Great Indian Peninsula Railway</td>
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<td>3.</td>
<td>N. C. Sabikhi</td>
<td>CEE (Member)</td>
<td>Bombay, Baroda and Central India Railway</td>
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<td>4.</td>
<td>R. D. Walter</td>
<td>Dy.CME (Member)</td>
<td>South Indian Railway</td>
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<td>5.</td>
<td>T. S. Rao</td>
<td>CEE (Member)</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>H. R. Dogra</td>
<td>Sr.EE</td>
<td>Madras &amp; Southern Mahratta Railway</td>
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<td>R. C. Sen</td>
<td>Sup./EB</td>
<td>Bengal Nagpur Railway</td>
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<td>A. C. Naha</td>
<td>EE (Member)</td>
<td>Assam Railway</td>
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<td>P. C. Bahree</td>
<td>EE (Member)</td>
<td>Oudh Tirhut Railway</td>
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<td>G. Narsimloo</td>
<td>EE (Member)</td>
<td>Nizam State Railway</td>
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<td>C. A. Rubb</td>
<td>EE (Member)</td>
<td>Mysore State Railway</td>
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<td>K. Harnath Singh</td>
<td>CME (Member)</td>
<td>Jodhpur Railway</td>
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<td>13.</td>
<td>M. J. Bhatt</td>
<td>Officiating D.L.O. (Member)</td>
<td>Saurashtra Railway</td>
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<td>14.</td>
<td>S. R. Woodmore</td>
<td>ACC (Secretary)</td>
<td>Central Standard Office, Railway Board</td>
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Subject 1.- To consider the application of fluorescent lighting to coaching stock, particularly with regard to the method of application and details of equipment, and with this end in view the record results of trials being carried out on railways.

Recommendations:
1. The report submitted by the CEE/EI, is attached as Appendix "A".
2. The Committee consider, that in the view of the fact that this system of lighting is very expensive and the majority of the equipment has to be imported, there is nothing to be gained by an extension of the trials now in progress.
3. The Committee recommend that no additional commitments should be made in connection with the trials in progress at present and that the subject be considered as closed. The equipment at present under trial may however be allowed to remain in service at the discretion of their respective C. E, Es.

Decision
1. Noted.
2. Approved.
3. Approved.

Subject 2.- To review (i) the minutes of a Sub-committee meeting held in CSO on 7th July 1950 as a result of the minutes of the last meeting (minutes Appendix "B")

(ii) the memorandum on parallel operation of single battery externally regulated equipment in double battery, inherently regulated block rakes drawn up by Messrs. J. Stone & Co. and notes on this memorandum by D. D. Tele (Mr. Mathur). (Appendix "C" & "D").

Recommendations:
4. The Committee have reviewed the recommendations made at the 7th and 8th meetings in the light of information since available. They have also read with interest the memorandum on the bench tests carried out by Messrs. J. Stone & Co. (Appendix 'C'). In order to facilitate early implementation and smooth changeover from the existing Double Battery system, the Committee recommend-
(i) that a Sub-committee consisting of the Chief Electrical Engineers of the E. I., G. I. P. and the Southern Group of Railways be appointed to record and submit a comprehensive report-in collaboration with the Mechanical Committee, where necessary on all aspects of the performance of the single battery equipments which are being provided on the new Schlieren light weight stock, shortly to be delivered in this country. The Subcommittee will, if necessary, co-opt as an additional member, the C. E. E. of the railway to which the coaches are allotted. A separate report will be framed in respect of the equipment supplied by each maker. 
(ii) that trials be carried out by the E. I., G. I. P., the Southern Group of Railways and the O. T. Railway, each with twelve standard single battery equipments comprising shunt wound dynamos and voltage regulators designed and supplied by the following makers, each supplying three equipments-
(a) Brown Boveri.
(b) J. Stone & Co.
(c) E. V. R.
(d) A. E. I.

These equipments shall be operated in parallel with inherently regulated double battery equipments on the existing parallel block system. The trials shall be carried out under actual service conditions and the railway concerned will be free to select the type of battery to be used in conjunction with the dynamo. It is desirable to subject the equipment to the most severe conditions that are normally likely to arise in actual practice. A report on the trials shall be submitted separately in respect of each type of equipment on a pro forma which will be drawn up by the C. S. O. for the consideration of the Committee in due course.

(iii) that when ordering the next batch of 50 Single Battery equipment, provision be made by the Railway Board for the ordering of six sets each from the following firms:
(a) E. V. R. (M/S. L’Éclairage Des Vehicles Sur Rail).
(b) A. E. I. (M/S. The Associated Electrical Industries (India), Ltd.) The equipment shall be in accordance with the Maker's standard and the dynamo arranged for belt or cardan shaft drive, the former being given preference, unless it is incapable of adoption of light weight stock.

Decision

Subject 3.- To consider and, if approved, record drawings Nos. CSE 1 and 2, showing the wiring layout of Broad Gauge stock, as modified in accordance with paragraph 11 of the 8th meeting, and at the Same time consider the preparation of similar drawings for Metre Gauge stock.

Recommendations:

5. The Committee considered that drawings Nos. CSE 1 and 2 (Appendices 'E' & 'F') were satisfactory and should be recorded. The only modification which might be introduced into these drawings is the provision of blue/green night lights, as have been incorporated in the new light weight stock now under construction in Switzerland. On these coaches, blue/green light have been provided on the following scale (1) All Upper class compartments.
(2) All ladies compartments Inter and III class.- These lights in the Ladies Inter and III class compartments have been so arranged that when the main lights are switched 'Off', the night lights automatically get 'On'.
6. The Committee recommend, in this connection, that no change should be made to Drg. Nos. CSE 1 and 2 at this stage, but that the reaction of the travelling public, particularly ladies in the Inter and III class compartments, should be collected, when the new light-weight coaches have been in service for some time.
7. In connection with the preparation of drawings similar to SE 1 and 2 for Metre Gauge stock, the Committee consider that as all C. E. E.'s of Metre Gauge' Railways have not had sufficient time to study this matter, they submit their existing drawings; to E. E./O. T. Railway, who after analyzing the drawings will prepare a master drawing for circulation.
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to all Metre Gauge Railways for comment. On receipt of comments, the C. E. E./O. T. Railway will prepare a final drawing which will be sent to the C. S. O. for issue. This matter should be treated as urgent, in view of the fact that new orders are about to be placed for Metre Gauge coaches against 1951-52 Programme.

Decision
5. Noted.

6. Approved.

7. Approved

Subject 4.- Prevention of fire in passenger trains.
To consider the trial reports submitted by the C. E. E.'s E. I., G. I. P. and M. S. M. Railways on PVC cable and, if satisfactory, make recommendation for the use of this type of cable as a permissible alternative to VIRI cable, as used at present.

Recommendations:

8. From the information gathered by the C. E. E.'s. E. I., G. I. P. and M. S. M. Railways, and from certain exploratory trials carried out, it is apparent that there is nothing to be gained in pursuing trials of P. V. C. cables for use in lieu of the present V. I. R. cables.

9. The Committee, therefore, recommend that, as far as coach wiring is concerned, trials as recommended at the last meeting on the basis of the IRCA recommendations, need not be proceeded with Cardan Shaft Drive

Decision: Approved

Subject 5.- To record the progress made with the fitment and trial of the two types of dynamo drives, viz., cardan shaft and 'V' belt driven dynamos, mounted on the bogie frame.

Recommendations:

10. The CEE/G. I. P. Railway reported that the Cardan shaft equipments had only just been received, and arrangements were being made to fit them up. He hopes to make a detailed report at the next meeting.

11. The C. E. E.'s. of Railways, to whom the new Schlieren coaches (to be delivered this year) will be apportioned, are requested to watch the performance of the Cardan shaft drive of the dynamos on these coaches, particularly from the maintenance point of view including costs, and report results at the next meeting. 'V' Belt Drive.

12. 'V' belt driven dynamos are on trial on the E. P., M. S.M., E. I. and S. I. Railways. The M. S. M. Railway has only just fitted up a dynamo mounted on the bogie headstock, and will report progress at the next meeting.
13. The SEE/E. P. Railway reported that he had three headstock mounted dynamos on trial; one driven by an imported flat belt and two driven by 'V' belts, one set of 'V' belts being endless and the other with a link joints. The flat imported belt ran 40,250 miles before it was lost in service. The conditions under which it was lost are not known. The link jointed 'V' belts had so far run 30,000 miles; at the end of this milage, one of the belts was found missing. The endless 'V' belts have so far only run 1,250 miles.

14. Deputy Chief Mechanical Engineer (Electrical), S. I. Railway, reported that he had two head-stock mounted dynamos driven by V belts in service. One dynamo was equipped with four 'V' belts- size 21/32"X 7/16"x130" and the other with two 'V' belts- size 7/8"X5/8"X130". All the belts were of the endless type. The four belt machine had so far run 9,700 miles, and the two belts driven machine 13,000 miles and they have both so far given very efficient and satisfactory service.

15. Further progress will be re-: ported by all railways at the next meeting.

Decision

Noted. The results of these trials should be reviewed at the next meeting of the committee.

Subject 6.- To consider (1) in the light of experience gained since the last, meeting, whether any amplification is necessary to the recommendation made at the last meeting (Paragraph24) with regard to the fitting of embarkation lights on B.G.Coaching Stock; (2) to lay down similar standards for M. G. stock; (3) whether it is desirable to provide embarkation lights on trailer coaches, if so to lay down operating arrangements for such light.,

Recommendations:

16. The Committee consider that the following amplifications are necessary to the recommendations made at the last meeting in regard to B. G. stock

(1) all fully equipped coaches in service should be fitted with external embarkation lights as opportunity offers.
(2) all future new builds which are fully equipped, should be fitted with external embarkation lights.
(3) no unequipped coaches should be fitted with embarkation lights pending experience gained with the new 250 Metre Gauge coaches, 50 percent of which are ordered to be with embarkation lights.
(4) standard drawings should be prepared by C.S.O. for the embarkation light.

17. The Committee recommend that no steps be taken to lay down standards for the Metre Gauge railways pending experience with the equipment fitted to the new Metre Gauge stock. Until this experience is gained, Metre Gauge railways should equip their stock on similar lines to those employed on the new stock at present order. Drawings showing the location and type of lights fitted to this new stock should be circulated by the C. S. O.
Decision
Approved.; All fully equipped new metre gauge stock should be provided with embarkation lights as a standard practice on the lines of drawing to be supplied by C. S. O.

Subject 7.- To consider in the light of progress made in the manufacturing processes for train lighting Switch gear suitable modifications to IRS Specification No.E3-50 and IRS Drg. No. 1020173.

Recommendations:
18. The Committee record that no modifications are considered necessary to the existing IRS Specification No. E3-50 at present, except that IRS Drg. No. 1020/73 for the mounting plate needs rectifying. The C. E. E./M. S. M. Railway will supply to the C. S. O. a revised drawing suitable for all types of Switch gear.

Decision
Noted

Subject 8.- To consider whether the existing provision for 3”, 4” and 5” wide belting, in Clause 4 of IRS Specification needs revision in view of it having been pointed out that the 5”, 5-ply of belt is too stiff for existing diameters of dynamo pulley.

Recommendations:
19. The Committee recommend that Clause 4 of IRS Specification No. E-14 should be amended to show only four plies for all sizes of T. L. belting and nor five plies for the 4” and 5- widths as shown at present.

20. In passing the Committee will again draw attention to the recommendation made against subject 16 of the 7th meeting and is of the opinion that the insufficiently vulcanized cotton, belting as supplied by the Bengal Belting Co. does not comply with IRS Specification E-14 and is, therefore, not satisfactory of train lighting purposes.

Decision
19: Approved
20: The Board is aware of the shortcoming of the indigenous Bengal belting. And the I and S Ministry has already been advised that this brand of belting as produced at present is not satisfactory for train "lighting purposes.

Subject 9.- To record the progress made on the trial of the "Railco" belt fastener, and if satisfactory consider its adoption as a permissible alternative, particularly relative to indigenous train lighting belting.

Recommendations:
21. The tests results obtained on trials by the B.B. & C. I. Railway were noted, the committee recommend that the trails by the B.B. & C.I. and G.I.P. Railways should
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continue. Other railways should also carry out trials of “Railco” fasteners wherever possible, on both indigenous and imported belting.

Decision

Approved

Subject 10.- To record the revision of IRS Specification No. E6-50, and the E Series-part drawings, prepared from original B. N. Railway drawing in this connection.

Recommendations:

22. The drawings prepared by the Central Standards Office, may be recorded. The C.E.E., M. S, M. Railway, however, suggested certain modifications to take the strain of the conductors where they enter the coupler, and to lessen the hazard of the cable kinking at its point of entrance. The sample exhibited was approved and the C. E. E., M.S. M. Railway, was requested to send a copy of the drawings embodying the modifications to the C. S. O., for inclusion in the drawing set.

23. The Committee recommend that Clause 7 of the revised specification should be modified to embody all the requirements of the parent clause in the original specifications, when next revised.

Decision:

22. Noted

23. Approved.

Subject 11.- To consider, and make recommendations in the light of the suggestions put forward by the Central Electricity Commission, (Appendix "E"), on wind pressure and temperature standards whether-

(1) the standards followed by Indian Railways are uniform throughout the country;
(2) the existing standards are too stringent;

Recommendations:

24. The Committee discussed this matter at length and came to the conclusion that it was not possible within the time available to come to a decision on the points raised. The Committee, therefore, recommend that a Subcommittee composed of Messrs. N. C. Sabikhi, C.E.E., B. B. & C. I. Railway, P. P.Kulkarni, C. E. E., E. I. Railway and T. S. Rao, C. E. E., M. S. M. Railway, be appointed to go into this matter and make recommendations at an early date; Mr. Kulkarni to be the convener. (In this connection, also see recommendation recorded against Subject Nos. 15 and 17).
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**Decision:** Approved

**Subject 12.-** To consider the preparation of standard Railway Specification covering the installation terms and conditions of contract, etc. for electric signs on Railways.

**Recommendations:**
25. The C.E.E., M.S.M. Railway, submitted a draft specification, which is printed as Appendix “F” the committee recommend that this matter be postponed to the next meeting, so that members will have an opportunity of studying the draft specification along with any relevant instructions available on other railways and come prepared to finalise the specification at the next meeting.

**Decision:** Approved

**Subject 13.-** To record a list of permissible alternatives for train lighting equipment for use on B. G. and M. G coaching stock.

**Recommendations:**
26. A list of permissible alternatives of T. L. components and Head Light generators, Switch gear, &c. as drawn up by the Committee is attached as Appendix "G". This list has been drawn up showing accepted makers and types of material which have been used in the past and have given satisfactory and efficient service.

27. The Committee consider that the list should not be used as an authority for purchase against the brands shown without the prior reference and concurrence of the indentors but purchases must be restricted within the limits of this list unless required for trial purposes.

28. The Committee endeavored to include in the list, details of spare parts required for electric turbo generators but failed to arrive at any decision with regard to these spares as the experience of the various railways had been very unfortunate, particularly with regard to the indigenous purchase of the more complicated and specialized items. The Committee recommend that in regard to spare parts for electric turbo headlight generators that these be purchased from the makers of the original equipment, and in stead of piecemeal purchases being made bulk indents be prepared and placed on these manufacturers annually. The Committee consider that in the present circumstances, the efficient maintenance of headlight equipment is a most essential item, and that in the interest of public safety only genuine spares should be in-dented for, so that a maximum number of headlight equipment can be kept in operation on railways.

29. This subject will be retained on the agenda of each ensuing meeting and the list will be revised in the light of experience gained over the 12months elapsing between each meeting.

**Decision:**

27. There are practical difficulties in adopting the first part of this recommendation. The second part is accepted.

28. In practice it may be difficult and uneconomical to follow this recommendation. It should be possible to specify standard fittings that are satisfactory. C.S. O. to examine further.

29. Noted.

**Subject 14:**
To consider, and if approved, recommend reprinting of IRS Specification No. E-4 for carriage fans on the basis of the revised draft submitted by CEE/GIP Railway.

**Recommendations:**
30. The Committee recommend that a Sub committee composed of the C. E. E.’s, G. I. P. and M. S M. Railways and the E. E., O. T. Railway, be appointed to investigate this matter on the basis of the specification already circulated and the drawing got out by the C. E. E., G.I.P. Railway and make final recommendations as to what details should be standardized on carriage fans throughout the Indian Railways.

31. The report of the Committee will be considered at the next meeting. The C. E. E., G. I. P. Railway, to be the convener.

**Decision:**
Approved. The subcommittee should submit their report as early as possible.

**Subject 15.** To examine the clearances specified in Report of the Railway Electrical Engineers (1932) pages 14-17 and, if considered necessary, on the basis of a note submitted by the CEE/ MSM Rly. (Appendix ‘H’), re-draft the relevant data to fit in with present-day conditions.

**Recommendations:**
32. The recommendations recorded against subject No. 11 may be seen in this connection. The Committee recommend that the Sub-committee suggested in Subject No. 11 should also deal with this matter jointly as the two subjects are of an allied nature.

**Decision**
Approved.

**Subject 16.** To consider, and if approved, recommend that the amenity standard for lighting and fanning as laid down at the VII meeting for Second class compartments be also made applicable to the re-introduced Inter class compartments.
9th ESC/Bombay VT/1951

Recommendations:

33. The Committee recommend that in view of the changes made in the classification of compartments with effect from 1st July 1950, viz., I, II, Inter and Third, the minimum standard lighting for Inter class compartments be 2 ft. candles at 33 in. from floor level. The scales of fans for Inter class compartments shall be 1 fan for 4 passengers, where practicable.

34. The Committee recommend the following lighting standards be followed in view of the recommendation made for the discontinuance of fluorescent lighting trials under Subject No. 1
First class .. ...............4 ft. candles at 33 in. above floor level.
Second class............ 3 foot candles.
Inter class................. 2 foot candles.
Third class.............. 1.5 foot candles.
Lavatories(upper class). 1.5 foot candles.
Latrines (lower class)….1.0 foot candles.

35. This recommendation is in supersession of that made vide Subject 7 of the VII meeting.

Decision

33. Approved.

34. Approved.

35. Noted.

Subject 17.- To consider the points raised by the G. I. P. Railway in connection with the IRCA Reso. E/223 (vide correspondence attached Appendix '1') arid make further recommendations for consideration being given to the matter.

Recommendations:

36. The Committee recommend that this matter be taken up by the Sub- committee appointed under Subjects 11 and 15, with a view to altering the desired requirements under the Indian Electricity Rules and Act.

Decision

Approved.
10th ELECTRICAL STANDARDS COMMITTEE MEETING

Members Present

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<td>1</td>
<td>N.C. Sabikhi,</td>
<td>CEE (Chairman)</td>
<td>Western Railway</td>
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<td>P.C. Bahree,</td>
<td>Superintendent/Elect. Branch (Member)</td>
<td>Bengal and Nagpur Railway</td>
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<td>T.S. Rao</td>
<td>Dstt. Electrical Engineer (Member)</td>
<td>Southern Railway</td>
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<td>8</td>
<td>S.R. Woodmore</td>
<td>Asst.Chief Controller of Standardization(Spec &amp; records) (Secretary)</td>
<td>Central Standard Office, Railway Board</td>
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<td>I.C. Bhatt</td>
<td>Dy. Director/Tel-comm.</td>
<td>Railway Board</td>
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<td>10</td>
<td>V.Venugopalan</td>
<td>Sr.Project Officer</td>
<td>Central Water and Power Commission, NDLS</td>
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**Subject 1.- Single Battery System:** To receive reports from the EI, Central, Southern and OT Railways in connection with the fitting up of four single battery equipments manufactured by four different manufactures and to consider the proforma drawn up by the central standards office for the submission of reports, both in connection with the above equipment and for equipment fitted to the new schlieren coaches are about to arrive in the country.

**Recommendations:**
1. The only equipment, received so far in connection with the trials to be carried out, is an AEI set, by the East Indian Railway. This set is being fitted up and will be put into service shortly.
2. With regard to the finalization of the proforma, the committee recommended that a sub-committee composed of the Chief Electrical Engineers of the Central and Southern Railways, and the Electrical Engineers of the O.T. Railway, meet and finalize the proforma to be used in connection with the trials. The Chief Electrical Engineer of the Central Railway to be the convener.
3. The committee should meet in the very near future and send their proforma to the Chairman for final approval, after which it will be sent to the Central Standards Office and to the four railways, concerned with the trials for implementations.

**Decision:**
1, 2 & 3 approved. The sub-committee’s report should be sent direct to CSO.

**Subject 2.- Train lighting (Coach wiring diagram-Drawing No. CSE2(Revised 1950)):** To consider in the light of recommendations made by the Chief Electrical Engineer of the Central Railway whether any further modifications are required to CSE Drg No.2 (1950) to conserve battery capacity due to lights being switched “ON” on the whole rake, for loading and unloading of parcels in luggage compartments.

**Recommendations:**
4. The committee recommends that Drawing No. CSE2 (Revised 1950) should be modified to provide for independent wiring of the luggage compartment on the “LB” circuit with a separate switch so that the luggage van can be isolated from the remainder of the train, while standing at terminal stations, to facilitate the loading and unloading of parcel vans, and at the same time conserve battery capacity.

5. The Chief Electrical Engineer of the Central Railway will arrange to modify the wiring diagram Drg.No. CSE2 to provide for this arrangement, on luggage vans.

6. The committee recommend that on coaches fitted with alkaline cells, instructions be issued to disconnect the B2 lead from the B2 terminal in the Double ‘D’ Magnetic switch and similar switches to facilitate the alternative charging of the two batteries and thus provide adequate charging capacity on the run to keep batteries in a charged condition.
Decision:

4, 5 & 6 approved. A note should be added to Drg.No. CSE2 accordingly.

Subject 3.- Train lighting (Coach wiring M.G.) To consider and if approved record the drawings prepared by the Electrical Engineer/OTR showing the proposed wiring layout of MG stock and to make recommendations for a standard end arrangement for kent couplers.

Recommendations:

7. The committee recommended that Drg No. CB 41, submitted by the Elec.Engineer OTR, be adopted as the basis for a standard drawing, with the following modifications –

i) the embarkation lights on all equipped coaches should be fed from a separate auxiliary wire, instead of from the “ON” wire.

ii) in the case of trailer coaches, the embarkation lights should be connected to the “LB” circuit, between the light wire and negative, these lights will remain burning throughout the night,

iii) a census should be taken of all the metre-gage coaches on all railways in regard to the position and types of coupler fitting. Based on the largest number in use, the position of the Kent coupler should be finalized for adoption on railways as a common standard and

iv) fuses should be provided in the light positive and paralleling mains going into the inter-vehicular coupler in the junction box.

8. The Electrical Engineer, OTR, will arrange to modify the drawing accordingly, on receipt of information in connection with the census, referred to I para.7(iii) above.

9. The committee considered the article appearing at page 176 of Quarterly Technical Bulletin No. 103, dated October 1951, in connection with the wiring of metre-gauge coaches, Drg.No.CB 41, as approved vide the minutes above, only provides for one junction box instead of two, as assumed by the author. The elimination of this junction box, with connected expenditure, will be the order of Rs.50, so that the saving of Rs.76, as proposed by the author, will be considerably reduced. The author suggests that the under frame wiring should be brought up centrally in the coach but the committee do not consider this a satisfactory arrangement in view of the difficulty of satisfactorily locating the junction box where it cannot be interfered with. The end mounting of this box, as shown on the above mentioned drawing, is considered more satisfactory. In the circumstance, the committee feel that the suggestion put forward by the author are no improvement over the arrangement proposed by them above.

Decision:

7.(i) Approved, ii) Noted. The recommendations should be examined by the central standards office. iii) & iv) also approved , 8. & 9. noted.
Subject 4.- Train lighting belting (Losses of belt in service) To review report from Railways on the incidence of, and reasons for, train lighting belting losses in service and to suggest remedial measures.

Recommendations:
10. The committees have perused the statement of belt losses submitted by the various railways and note with concern the high percentage of losses attributed to theft. Various efforts have been made by individual railways to reduce this source of loss and reports have been made to the respective watch and ward authorities, But the results have not been effective so far.

11. It is the opinion of the committee that this problem is a general one of law and order and improvements can only be realized by tightening up the organization to apprehend and punish the thieves.

12. The committee recommend that individual railways should tighten up on this matter and also ensure that no belts are put on the trains unless they are branded; no unserviceable belts should be sold to outsiders as scrap; they should be destroyed and made unfit for use.

13. Clause 16 of IRS Specification No. E-14 should be amplified to include a more suitable branding clause.

Decision:
10. Noted. The incidence of pilferage of belts should be brought to the notice of General Managers. 11. & 12. Approved, instructions should be issued to all railways. Record should be kept of belt replacements for examination at the next ESC. Meeting to see whether there is any improvement in the incidence of belt losses. 13. CSO should modify this specification, in consultation with suppliers, if necessary.

Subject 5.- Belt fasteners –Train lighting dynamos: To record the progress made on the trial of the “RAILCO” belt fastener and if satisfactory consider its adoption as a permissible alternative particularly relative to indigenous train lighting belting.

Recommendations:
14. The committees note from the results of trials carried out on the central and western railways, that there is some advantage in using the railco fasteners as better belt mileages are obtained with them than with the standard walker type belt fasteners.

15. The committee recommended that this brand of belt fastener be adopted as a permissible alternative, and should be included on the list under item No.16

Decision:
Subject 6.- Dynamos Train lighting: To record the progress made with the fitment and trial of the two types of dynamo drives viz Cardan Shaft and ‘V’ and flat belt driven dynamos, the later mounted on the bogie frame.

Recommendations:

16 Carden Shaft Drive: The Chief Electrical Engineer, Central Railway, reported that although it was reported at the last meeting that 10 sets of cardan shaft equipment had been received, it was subsequently found that certain parts of this equipment had not been supplied. These missing parts are now to hand and steps are being taken to fit up this equipment. The Chief Electrical Engineer, Central Railway, hopes to be in a position to submit the first service report on the performance of this equipment at the next meeting.

17 With regard to the Schlieren coaches, two of these have been received in the country but have not yet been put into regular service. A report on the running of this equipment will be submitted in due course.

18 ‘V’ Belt Drive: The Sr. Electrical Engineer, Eastern Punjab Railway reported –
(a) That the headstock mounted dynamo, driven by an imported flat belt a, had again been put on trial with a new belt and ran 30000 miles before the belt was lost. It is not possible to state whether the belt broke in service or whether it was stolen;
(b) That the Bramer link jointed belts, which had run 40,250 miles up to the last meeting, were replaced by new belts of the same type and brand. These were fitted on 24th May 1951 and after running 4,000 miles two of the belts were found missing. These two belts were replaced and the set ran a further 1800 miles when two further belts were found missing. These were replaced on 18th October 1951 and have so far run a further 18,900 miles and are still in service.
(c) The Fenner type endless ‘V’ belts, which had run 1,250 miles up to the last meeting, have so far completed 49,500 miles. After running 40,000 miles, one belt was found missing and two cracked. The coach continued to run with the missing belt and completed a further 9,500 miles, when two further belts were found cracked and the trial was discontinued, as no further belts were available in stock.

19. The Chief Electrical Engineer, Southern Railway, reported that the 4 belt headstock mounted machine had so far completed 11,700 miles and the two belt machine had so far run 50,890 miles. Both these machines are still in service and further progress will be reported at the next meeting.

20. As additional coach has been added to the trial. This, coach is equipped with Branner type ‘V’ link belt and had run 47,158 miles, up to 19th December 1951, and is still in
service. No difficulties have been experienced with the running of any of these three machines.

**Decision:**

16, 17, 18 (a), (b), (c), 19, & 20 Noted

**Subject 7.-** Train lighting batteries (Lead Acid Versus Alkaline Cells); To consider whether alkaline types of batteries should be retained as a permissible alternative for Indian railway train lighting equipment. In view of the fact that lead acid cells are manufacture indigenously.

**Recommendations:**

21. The committee has given careful consideration to this question. The following types of batteries are at present in use on the Indian Railways –

(a) Alkaline Batteries – Nickel Iron and Nickel Cadmium types
(b) Lead Acid Batteries – Plain Exide Iron Clad and Shednought type.

22. The Committee considers that the Alkaline type batteries are particularly capable of being subjected to severe overcharge and undercharge without detriment and of retaining their capacity for long periods. These batteries also require much less attention in service. They are therefore suitable for operation with the unregulated parallel block, double battery system and for irregular and infrequent services net with in coaches, such as reserved saloons.

23. The Lead Acid batteries are particularly suitable for operation with single battery equipment fitted with voltage regulators which closely control the charging to the batteries throughout the charging period, thereby eliminating the possibility of charging at excessive current or prolonged charging at normal current. The life of Lead Acid Batteries is however less than half that of Alkaline batteries.

24. The indigenous makes of Lead Acid batteries have not been in service for sufficiently long periods, or in sufficient quantity, to enable the committee to assess their merits, as compared with imported Lead Acid type batteries.

25. The Committee recommends that extensive trials be carried out with indigenous makes of Lead Acid batteries over a period of years before they can be considered for adoption as a standard, to the exclusion of imported Alkaline and Lead Acid type batteries.

26. The Committee further recommend that the technical guarantees, as specified in the Railway Liaison Officer, Minister of Railways, Railway Board, New Delhi, letter No. 50/363/2/S, dated 21st/24th September 1951, and accepted by M/s Standard Batteries,
should be insisted upon in the case of all batteries, purchased from indigenous sources. A copy of the Guarantee clause appears at Appendix A.

**Decision:**

21, 22, 23, 24, 25 Approved. Trials should be carried out on indigenous batteries and reports submitted to CSO.

26. Approved. The DGS&D should be asked to implement this recommendation.

**Subject 8.- Train lighting batteries (Trial of Varley-Dry-Accumulators);** To receive reports from the EIR, BNR and Central Railways on the trials so far carried out on varly dry train lighting accumulators fitted to coaching stock.

**Recommendations:**

27. One double set of 24 batteries (300 Amp/hr. capacity) was originally put on trial on the EIR and worked satisfactorily for a couple of months after which some batteries cracked and others leaked and were changed by the firm.

28. The batteries were then put on trial for three months on mail service when it was found that the cell temperature was very high and charging used to vary and the cells bulge at the sides.

29. The entire set of cells were removed and replaced by the firm and this new set had been running on express train service since November 1951, and performance of the cells has so far been satisfactory. This period of service is, however, too short to draw any conclusions.

30. Although the work of taking the specific gravity reading is eliminated on this type of cell this saving in time is more than made up by the extra time spent in filling up the cells with distilled water and siphoning off the residue.

31. Five double sets of these batteries have been in service on the BNR for the past five months two of 250 Amp/hr capacity and three of 300 Amp/hr capacity, on mail and express trains.

32. The performance of the batteries has so far been satisfactory, but the period of trial is much too short to express a definite opinion.

33. These batteries have been working in conjunction with both nickel iron and lead acid batteries, on the EIR, and with lead acid batteries on the BNR.

34. The committee recommend, in view of the foregoing, that the trials be continued on the Railways which have already installed these batteries, but that no further
10th ESC/Bangalore/1952

extensions of the trial should be undertaken on any other railway until conclusive
data on the behavior of these batteries in service is available.

Decision:

32 noted, 34 approved

Subject 9.- Train lighting (Switch Gear): To consider, in the light of progress made in the
manufacturing processes for train lighting switch gear suitable modifications to IRS Drg
No. 1020/73.

Recommendations:

35. The committee recommended that IRS Drg. No. 1020/73 be reconstituted in terms of

36. The layout of the switch gear of this drawing will overcome the difficulties reported by
the Railways Technical Advisor to the High Commissioner of India, in London.

Decision:

35 approved.
36. The DG, ISD/London should be advised accordingly and a copy of the drawing
supplied to him for guidance.

Subject 10: Train lighting (Dynamo and battery capacity –metre-gauge stock): To review
the possible loading characteristics of metre-gauge rakes with a view to making
recommendations for dynamo and battery capacity on the existing double battery system.

Recommendations:

37. In accordance with the latest figures furnished by the CSO, the load of an equipped or
unequipped coach would vary from 37 to 42 amps. This is actually the case for the 250
third class MG coaches built by M/s Jessop & Co. Ltd. 50% of these coaches are
provided with 60 amps. Dynamo and 200 amp./hr battery equipment.
38. It is not possible on metre-gauge stock to accommodate dynamo capacity larger than
60 amps and battery capacity of more than 200 amp/hr.
39. In order to meet the loading conditions as given by the CSO, it would ultimately be
necessary to provide each coach with dynamo and battery equipment. However, in order
to meet the immediate present requirements, the committee recommend that the ration of
equipped to non-equipped coaches of MG rakes should be of the order of 3 to 1.

Decision:
39. A committee consisting of CEEs of Easter and Western Railways and Dy.Chief Controller of Standardization (C&W) should examine the electrical loads on passenger stock of all gauges (BG, MG, 2’-6’ and 2’0’) and submit recommendations including the following –
(a) Standard lighting and fannage layout for equipped coaches and trailers,
(b) Dynamo capacity,
(c) Battery capacity
(d) Proportion of equipped, coaches to trailers and
(e) Standard wiring diagrams
(f) Standard interior colour schemes for lower class.

Subject 11.- Train lighting (External Embarkation Lights); To examine drawings for embarkation light prepared by CSO with a view to adopting one or more of the design as the future standard for both BG and MG coaching stock.

Recommendations:

40. The committee have examined CSO Drg. No. CSE 32 and the modified HAL design Drg. No. 407-21109 as well as the design of fittings provided on the Schlieren coaches (M/s Stone’s Drg.No. L.C. 1004). The Committee is not satisfied that any of these fittings will provide effective general illumination although they may satisfactorily serve as embarkation lights.

41. The committee recommended that individual railways should design suitable fittings and carry out trials so as to develop a fitting which would give good exterior lighting without interfering with the visibility of the side lamp provided on the brake van to indicate to the driver the last vehicle. The results of these experiments may be reported by the end of September 1952 so as to enable the CSO to finalize the most suitable design of fitting for adoption as a standard.

42. The committee is also of the opinion that two external lights on each side of the coach would be adequate for providing general external illumination. In this connection, reference is also invited to this committee’s recommendations at item 3, paragraph 7(ii).

43. The lights should be called ‘external lights’ and not ‘embarkation lights’ to avoid any confusion in regard to the purpose of the fitting.

Decision:

41. A suitable design should be developed by CSO in consultation with CEEs.
43. approved. CSO should alter specification and drawings and advise manufactures.
**Subject 12.-** Train lighting (Electrical equipment on HAL coaches); To consider the defects pointed out by the CEE/Western Railway vide his letter appendix ‘B’ and suggest remedies which should be communicated to the builders and the CEE/S.Railway for immediate rectification.

**Recommendations:**

44. The points raised by the CEE/Western Railway were considered by the committee and also discussed with the Chief Engineer/Hindustan Aircraft Ltd during an inspection of the coach factory on 20th March 1952 and the following decisions were arrived at in seriatim –

(1) As the sole bar is not exposed, it is not possible to fit the ammeter link box, as suggested. The terminals of the ammeter link box should, however, be fitted with spring washers.

(2) The existing contacts on CDB switches should be replaced by contacts rated for the full load current of 10 amps. This matter should be taken up by the CSO with the HAL.

(3) The panel covering up the wiring could be removed without difficulty, after the removal of the alarm chain plate. The existing arrangement is considered satisfactory.

(4) The light fitting are now being mounted on the roof panels, and the new arrangement does not interfere with the mounting of the water tank.

(5) The panel of the embarkation light fitting has been permanently riveted so as to eliminate any possibility of the fitting being removed by unauthorized persons. Access to the wiring can be had by removing the window shutter. The key grooves of the embarkation fitting should be symmetrical and of the same size on all fittings. The builders should arrange for this to be done.

(6) The overcharge current relay of the ROB switch is of the self-resetting type. It is not, therefore possible to observe the frequency of its operation in service.

There is, therefore, no technical objection to its retention on all railway.

(7) The provision of switches in the embarkation light circuit, is not recommended, as this would enable unauthorized persons interfering with these lights.

In addition to the above, the following recommendation are made –

(a) The Chief Engineer HAL should provide additional cleats at certain places to make the wiring more rigid; and
(b) Substitute for the existing open type of fuses for light and fans, similar to fuse cut-outs stone’s No. Z-33.

**Decision:**
44 approved. The HAL and CEE/Southern Railway should be advised accordingly.

**Subject 13:** Train lighting dynamos (IRS specifications No. E-1); To consider the recommendation made by the Chief Electrical Engineer/Central Railway to include a clause in IRS Specification No. E1 to provide for future suppliers of T.L Dynamos for operation with voltage regulations when required.

**Recommendations:**

45. The committee recommended that under Clause 2 of Specification No. E1-48, the following should be added –

The Dynamo shall be of such a design that it can be easily converted into a shunt dynamo without major alterations, and work satisfactorily with any automatic voltage regulator introduced on the Indian Railways.

**Decision:**
45. This recommendation should be circulated to manufacturers inviting their reactions before any revision of the existing specification is made.

**Subject 14:** KENT COUPLERS; To consider modifications to the test clause 9(a) of IRS specification E-6/50 with regard to the Voltage drop test.

**Recommendations:**

46. The committee recommended the proposal of Director General of Inspection, and recommend that both sub-clauses (a) and (b) of clause 9 should be combined and a voltage drop, not exceeding 35 milli-volts, should be specified when a current of 100 amps is passed between the shoulders of the corresponding connectors and between the conical plug and plug connector.

**Decision:**
46 approved.

**Subject 15:** Carriage fans (Modifications to IRS Specification E-4/49); To consider and, if approved, recommend the re-printing of IRS specification No.E-4 for carriage fans on the basis of the recommendation made by the sub-committee appointed vide paragraphs 30 and 31 of the ix report, and recommendations made by fan manufacturers on the draft specification.

**Recommendations:**
47. The committee considered the report of the sub-committee as well as the further comments received from certain firms and individual railways.
48. The committee recommend that these comments be referred back to the sub-committee for final revision of the draft specification. When this has been done the sub-committee should forward the revised draft, through the chairman of this committee, to the central standards office for railways for issue.

**Decision:**
48 approved. The sub-committee’s recommendations should be forwarded to the CSO;

**Subject 16.- Permissible alternatives (Electrical Equipment Coaching Stock);**
To make recommendations for the extension of the list of permissible alternatives for train lighting equipment for use on BG and MG coaching stock, as drawn up at the ix meeting.

**Recommendations:**
49. The committee recommended that the addition be made to the list of permissible alternatives, appearing at Appendix ‘G’ to subject No. 13 of the ninth report page 44.

**Decision:**
49 approved. The DG/S&D should be informed accordingly.

**Subject 17.- Electric signs (Luminous discharge neon and filament lamp advertisement signs.);** To consider the preparation of standard railway specification covering the installation, terms and conditions of contract, & C. for electric signs on railways.

**Recommendations:**
50. The technical provisions for the installation and display of Electric Signs are embodied in B.S. specification No. 559-1938 and under section 8 of the regulations for the electrical equipment of buildings, 12th Edition, 1950.
51. The draft specification submitted by ex M&SM railway, appearing as Appendix ‘F’ to subject 12 of the ix report generally embodies all the technical provisions included in the specifications referred to above.
52. The committee have considered the above 3 specifications and recommend that individual railways should draft their own specification, using the above specifications for general guidance.

**Decision:**
52. The committee’s recommendation is noted but the Board wish to be advised of the reason why a standard specification for all railways could not be approved.
Subject 18.- Manufacture of electrical train lighting equipment and locomotive headlight and turbo generator spare parts; To consider the list of spare parts prepared by the Chief Electrical Engineers for Electrical Train lighting Equipment and Locomotive Headlights and Turbo Generators with a view to deciding what items should be recommended for manufacture within the capacity to provided in the Integral Coach Factory at Perambure in accordance with the recommendations made by the committee under subjects 14 and 17 of the 7th meeting and make final recommendations in this connection.

Recommendations:
53. Lists showing the estimated annual requirements for items for which manufacturing capacity should be provided in the coach building factory at Perambur, have been submitted by individual railways. These may be record. (Appendix ‘C’
54. With regard to the preparation of technical particulars, drawings, sketches, specifications & C, the committee recommend that, if the scheme is approved, these should be undertaken by the coach building factory, based on samples to be supplied by railways.

Decision:
53 This recommendation should be examined by the Mechanical Directorate.
54 Same as above;

Subject 19.- Indian Electricity Rules and Act. (Rule 23 Exemption); To consider the points raised by the GIP in connection with IRCA resolution No. E/223 and make further recommendations for consideration being given to this matter.

Recommendations:
55. The committee recommend the recommendations of the sub-committee may be accepted. See item 20 below.

Decision:
55. Noted.

Subject 20.- Indian Electricity Act. (Regulations governing the placing of transmission lines); To consider the report submitted by the sub-committee appointed at the ix meeting to examine the overhead clearances specified in the report of the railway electrical engineers (1932) pages 14, 17, and make recommendations for any modifications considered necessary.

Recommendations:
55. The committee considered the points explained by ms Venugupalan of the central water and power commission and recommend that the sub committee's report vide Appendix ‘D’ be accepted.

56. The committee recommend that the recommendations of the sub-committee be incorporated in the “Regulations governing the placing of electric transmission lines across railway tracks” printed on pages 16 to 19 of the report of the committee of electrical engineers, February 1930. When this has been done, the revised regulations should be forwarded to the central water and power commission, for consideration and printing.

Decision:
56 approved.
57 approved. The CWINC should be informed of this decision.

Subject 21.- Overhead transmission (wind pressure and temperature variations);
To consider in the light of the suggestions put forward by the central electricity commission on wind pressure and temperature standards whether.

i) The standards followed by Indian railway are uniform throughout the country; and

ii) The existing standards are too stringent and make recommendations.

Recommendations:
57. See the committee’s recommendations against item No. 20 above.

Decision:
58 Noted

Subject 22: Running of air-conditioned coaches (Eradication of teething defects); To review the defects which have occurred in service on the new stones carrier equipped air-conditioned coaches recently put into service and to make recommendations for the pooling of experience with regard to teething troubles carrying of spare parts and tools and the training of staff & C with a view to keeping these air-conditioned cars in service.

Recommendations:
59. The committee have considered the teething troubles experienced on these coaches as reported by the BNR, Central, EI and Southern Railways and are of the opinion that most of the remedial measures already taken to eliminate these troubles cannot be finally assessed until the carriage have successfully operated though the for the coming summer season.

60. Apart from the above, the committee recommend that for the satisfactory maintenance of these AC coaches adequate trained staff, spares and spare AC coaches should be arranged for at the terminal and or intermediate stations by each railway.
61. The committee recommend that a sub-committee, comprising the CEE’s of BNR, Central and EI railways, should be appointed to go into the question of preparing the lists of spare parts tools, staff and relief AC coaches to be provided. The su-committee should also make recommendations for giving adequate training to the staff for maintaining these air-conditioned coaches. The CEE central railway to be the convener.

**Decision:**

59, 60 Approved
61 Approved; The Sub-committee should consist CEE/E.R, CEE/CR & CEE/NR
**11th ELECTRICAL STANDARDS COMMITTEE MEETING**

**Members Present**

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Subject 1.- Single Battery System: To consider the pro forma proposed for adoption in connection with the trials of the single battery system and to report progress on the receipt of the four single battery equipped for trial with double battery equipped stock.

Recommendations:
1. The secretary placed before the meeting a record note of discussion held in the D.M.E.’s office on 5th March 1953 with Railway Board’s decision thereon which was recorded and appears as Appendix “A” of this report.
2. In view of the Railway Board’s recent decision to retain the Double Battery parallel block system as standard, the Committee considers that it is no longer necessary to conduct any investigation on the suitability of the Single Battery system for parallel operation with the Double Battery system. The Committee, therefore recommends that the trials already ordered should be abandoned and the equipment should be suitable utilized.

Decision:
1. Noted
2. Approved.

Subject 2.- Electrical Equipment-Standardization of voltages on the air conditioned coaches: To consider and, if approved, record recommendations for the standardization of voltages for air conditioned equipment on Broad & Metre Gauge air-conditioned coaching stock.

Recommendations
1. The Committee recommends the following voltages-
   B.G. (fully air-conditioned) 110V DC
   B.G. (partially air-conditioned) 48V DC
   M.G. (fully air-conditioned) 24V DC
   M.G. (partially air-conditioned) 24V DC

2. The Committee recommends that there should be two 12” ceiling fans per compartment in the air-conditioned coaches and these should be wired to the 110-volt system.

Decision:
1. This recommendation examined by C.S.O. in consultation with suppliers of air-conditioning equipments.
2. One 12” ceiling fan should be provided in each coupe compartment and two 12” ceiling fans in each 4 berth compartment with independent regulator, in fully air-conditioned coaches and wired to the electrical system of coach itself.
Subject No. 3.- Electrical Equipment-Eradication of teething defects on air-conditioned coaches: To review the defects which have occurred in service on the new Stones-carrier equipped air-conditioned coaches recently put into service and to make recommendations for the pooling of experience, with regard to teething troubles, carrying of spare parts and tools and the training of staff & c., with a view to keeping these air-conditioned cars in service.

Recommendations
The Committee recommends the acceptance of the Sub-Committee’s report appearing as Appendix “B”.

Decision
Approved.

Subject No. 4: Electrical Equipment-Running of coaching stock on electrified sections- To consider the designs of all coaching stock which run in the electrified sections with a view to bonding the superstructure of such coaches to give a direct path to fault current.

Recommendations
1. The Committee recommends that the Western and Central Railways should investigate and report on the measures necessary to prevent damage to rolling-stock under accidental electrical contact of the carriage roof with the overhead live system.
2. The Committee further recommends that the experience of foreign railways should be obtained in the incidence of such failures and steps by them to overcome such accidents.

Decision
1. Approved.
2. C.S.O. should make a reference in this connection to foreign railways with extensive electrified sections.

Subject 5.- Train Lighting- Incandescent lamps- To consider the standardization of wattage of incandescent lamps for train lighting purposes.

Recommendations
The Committee recommends the adoption of the type and sizes of lamps as shown in Appendix “C” as standard.

Decision
Approved.

Subject 6.- Train Lighting- Coach wiring diagram-Drg. No. CSE-2(Revised 1950). To consider the decision arrived at the last ESC meeting regarding the revision of Drawing No. CSE-2.
Recommendations

1. The Committee recommends that lamps in the luggage and guard’s compartments should be wired on an independent circuit connected to the D2 lead in the magnetic switch and controlled from an independent switch in guard’s compartment.
2. The Committee considers that the use of conduits for wiring to junction box is unnecessary.
3. For Broad – Gauge vehicles, the Committee recommends the provision of fuses in the light positive and paralleling –mains going into the inter-vehicular coupler, as has been adopted for the Metro-Gauge.

Decision

1. Approved.
2. Noted.
3. Approved.

Subject 7: Train Lighting- External lights: To examine the design developed by CSO as a result of trials conducted on Railways, with various suitable fittings, with a view to its adoption as the future standard.

Recommendations

The Committee examined several samples of the indigenously produced external light fittings and selected the sample from North Eastern Railway and recommends that the Chief Electrical Engineers of the North Eastern and Northern Railways should fit one rake with this type of fittings for trial and make a joint report on the suitability of the fitting.

Decision:

Approved.

Subject 8.- Miscellaneous- Water-coolers.: To consider the standardization of cooling equipment provided at the Railway stations for supplying cold water to the travelling public.

Recommendations

The Committee considers that it is at present premature to standardize water-coolers provided on Railway station platforms.

Decision

Noted.

Subject 9: Train Lighting- Dynamos battery capacity-(BG, MG & NG): To record the minutes of the meeting of the Sub-Committee appointed to examine the electrical loads on BG & MG passenger stock and to consider the electrical loads on N.G. passenger stock.

Recommendations:

1. The Committee recommends acceptance of last three recommendations made by the Sub-Committee. As regards first three recommendations of the Sub-Committee,
the Committee considers that for the next 2 or 3 years, it would be expedient to equip all new build with dynamos and batteries to improve the ration of equipped to non-equipped coaches.

2. Regarding the Narrow Gauge stock, the Committee recommends that 40 amps. Dynamos and 120 A.H. batteries should be adopted as standard.

3. The Committee notes that on some railways the number of equipped carriages is extremely inadequate and considers that special measures are necessary to have a larger number of equipped carriages as soon as possible. The Committee recommends that a Sub-Committee consisting of the Chief Electrical Engineers of Northern, North Eastern and Eastern Railways examine this question and submit proposals. The Chief Electrical Engineer, Northern Railway, will be the Convener of the Sub-Committee.

Decision:
1. (a) Approved. All new coaching stock placed in service up to March 1957, should be equipped with dynamos and batteries and the position should be reviewed before the expiry of this period.
   (b) Railways should take opportunity during ‘shopping’ to improve the ration of equipped to non-equipped coaches.
2. Approved.
3. Each Railway Administration should satisfy itself that the number of equipped coaches is adequate to meet the electrical load on all rakes and there is no need for a Committee of Chief Electrical Engineers for this purpose.

Subject 10.- Train Lighting Dynamos-(i) Carden shaft drive (ii) ‘V’ & flat belt drive
To record the progress made with the fitment and trial of the two types of dynamo drives, viz., Carden shaft and ‘V’ Belt, the later mounted on the bogie frame.

Recommendations:
1. The Central Railway have not yet gained sufficient experience to be able to report on trial with carden shaft cushion drive.
2. The Chief Electrical Engineers, Northern and Southern Railways, reported that they were not in a position to provide conclusive reports on trial with ‘V’ belt drive.
3. The Committee recommends that this subject be deferred to the next Electrical Standard Committee meeting.

Decision
1. Noted.
2. Noted.

Subject No. 11: Train Lighting- Dynamos, M.G: To consider the proposal to reduce the angle of repose to $27^0$ and employ spring tensioning with suitable stops to prevent the dynamo on M.G. stock swinging down in the free condition with a view to overcome infringements of the minimum clearance as shown on I.R.S. Drg. No. 1300/67.
Recommendations
The Committee recommends that the Northern Railway should fit one Meter Gauge coach with modified dynamo suspension arrangement as shown on Drawing No. GD-183, and report.

Decision
Approved.

Subject 12.- Train Lighting- Coach wiring M.G. To make recommendations with regard to the location of kent couplers on the ends of metre-gauge coaching stock in accordance with the recommendations of the committee at paragraph 7 of the 10th Report.

Recommendations:
The Committee recommends that the arrangement of kent couplers on the majority number of vehicles should be standardized for all Metro Gauge stock and that the existing stock on the railways not conforming to this standard should be altered, if necessary, as it passes through shop.

Decision:
This recommendation should be examined further by the C.S.O.

Subject 13.- Compilation of data by I.R.C.A.
(i) The generating stations on Indian Railways, and
(ii) Maintenance and repair costs of the train lighting equipment.

To consider whether the compilation of the data of different generating stations and the annual returns of maintenance and repair costs of train lighting equipment should continue.

Recommendations:
The Committee recommends that the compilation of the data of different generating stations and the annual returns of maintenance and repair costs of train lighting equipment may be continued.

Decision:
Approved.

Subject 14.- Electric Signs- Luminous discharge Neon and filament lamp advertising signs.

To consider the preparation of a standard railway specification covering the installation, terms and conditions of contract & c., for electric signs on Railways.

Recommendations:
The Committee recommends adoption of a standard specification for all railways, embodying technical clauses of the draft specification prepared by the ex. MSM Railway.

Decision
Approved.

**Recommendations**
The Committee recommends following amendments to the I.R.S. Specification E5-47:-
Minimum elongation at break-400 per cent.
Maximum sub-permanent set-300 per cent.

**Decision**
Approved.

Subject 16: Permissible Alternatives- Electrical Equipment Coaching Stock.:To make recommendations for extension of the list of Permissible Alternatives for train lighting equipment used on B.G. & M.G. coaching stock, as drawn up at the 9th Report.

**Recommendations:**
The Committee has no additions to make to the list.

**Decision:**
Noted.

Subject 17.- Train Lighting Dynamos-IRS Specification No.E-1.:To consider the replies received from the manufacturers regarding inclusion of a Clause in I.R.S. Specification No. E-1 to provide for future supplies of T.L. Dynamos for operation with the double battery system to be capable of easy conversion to shunt dynamos for operation with voltage regulators when required.

**Recommendations**
In view of Railway Board’s decision to continue the Double parallel block system, consideration of this subject was abandoned.

**Decision**
Noted.

Subject 18.- Train Lighting Belting-Losses of belts in service: To review the record kept by Railways of Belt replacements.

**Recommendations**
1. All Railways reported that the incidence of loss of train lighting belts and other electrical fittings on rolling stock has increased and has now assumed, menacing proportions.
2. The Committee considers that the provision of ordinary mechanical devices against pilferage will not prove effective against persistent and organized thefts. The Committee reiterates their earlier recommendation made in the last Report, viz.-
“It is the opinion of the Committee that this problem is a general one of law and order and improvements can only be realized by tightening up the organization to apprehend and punish the thieves.”

3. The Chairman, Railway Board’s note dated 16th February 1953 was tabled at the meeting by the Secretary. The Committee has to make the following observations—
   (a) The ‘Bengal’ belting still suffers from excessive elongation, fraying at the edges, failure of the belt at the fastener and peeling of rubber coating.
   (b) The Committee considers that this brand of belting is definitely inferior to other approved brands.

Decision:
1 & 2. The Board note with concern the increase in the incidence of loss of train lighting belts. This subject should be followed up by the Mechanical Directorate.
3(a). Noted
3(b). Noted.

Subject 19.- Manufacturing of Electrical Train Lighting Equipment and locomotive headlight and turbo-generator spare parts: Provision of manufacturing capacity in the coach building factory at Perambur for spare parts for electrical train lighting equipment and locomotive headlight and turbo-generators.

Recommendations:
The Committee scrutinized the revised list of spares as prepared by the Chief Electrical Engineer, Western Railway (the previous Chairman of E.S.C.). The Committee is of the opinion that this list requires some modification and amplification, as the condition have changed since this Item was first taken up and the authorizes the Chairman to address the Board in this connection. He may also form a Sub-Committee if it becomes necessary.

Decision
Noted.

Subject 20.- Lighting of Washing Sidings. To consider and make recommendations as to the most economical way of adequately lighting washing sidings and pits.

Recommendations:
1. The Committee considers that as conditions vary from station to station and railway to railway, each railway may decide on the most suitable form of providing lighting in washing siding and pits for cleaning the carriages to suit local conditions.
2. The Committee recommends that the storage batteries of coaching stocks should not be used for the purpose, as far as possible, 24-volt lamps should be used.

Decision:
1. Approved.
2. Approved.
**Subject. 21.**- Train Lighting Batteries-Trial of Varley –Dry-Accumulators. To review the reports received from the Eastern Railway on the trials in progress on Varley dry train lighting accumulators fitted to coaching stock.

**Recommendations:**
1. The Chief Electrical Engineer, Eastern Railway, reported that the cells continue to behave I the same was as stated in the last report. The trial is continuing and further sets of batteries are being purchased to extend the trial under instruction from the Railway Board.
2. The Committee recommends that consideration of this subject be deferred to the next meeting.

**Decision:**
1. Noted.
2. ,

**Subject 22.**- Train Lighting Batteries- Trial of Lead Acid cells of indigenous manufacture. To consider the trial reports submitted by Railways on indigenous makes of lead acid T.L. batteries.

**Recommendations:**
Reports received from all the Railways indicate that indigenous lead acid batteries in question have only recently been put into service and the trials are in progress. The Committee recommends that consideration of this item be deferred to the next meeting.

**Decision:**
Noted.

**Subject 23.**- Standing Orders- Preparation of Standing Orders for the Electrical Department: To consider the proposal of CEE/Northern Railway, for the drafting out of rules in connection with preparation of a book of standing orders for the Electrical Department of Railways.

**Recommendations**
1. It is understood from the Chief Electrical Engineer, Western Railway, that an officer has been placed on special duty for the preparation of a Manual for the Electrical Department and that is expected to be ready in about 6 months’ time.
2. The Committee recommends that, when the Manual is ready, a Sub-Committee consisting of the Chief Electrical Engineers of Central, Northern and Eastern Railways be appointed to examine it and make any modifications necessary to make the Manual applicable to all the Railways.

**Decision**
1. Noted.
2. Approved.
Subject 24.- Electrical Equipment- Machining of Axles for Dynamos Pulley Seating.
To consider the cancellation of CSE Drg. No. 25 and record the modifications incorporated in CSE Drg. No. 15 in light of the recommendations made by the CWSC at paragraph 49 of their 31st Report.

Recommendations
The Committee considers that parallel machining of the axles to take pulleys in accordance with Drawing No. CSE 25 is necessary for a positive seating of the axle pulleys and to maintain satisfactory alignment. The Committee, therefore, recommends that parallel machining of the axles should be continued.

Decision
This recommendation should be examined in the C.S.O. in the light of the recommendation made in para.49 of 31st Carriage & Wagon Standards Committee Report.
12th ESC/Calcutta/1954

12th ELECTRICAL STANDARDS COMMITTEE
MEETING

Members Present

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<td>R. Rajagopalan</td>
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<td>Shanti Nath</td>
<td>Sectional off.(C)</td>
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Subject 1.-Electrical Equipment- Running of Coaching Stock on Electrified Sections.
To consider bonding the superstructure of coaches to give a direct path to faulty currents when operating on electrified section.

Recommendations:

1. The Committee notes that the modified design of roof tank filler caps, made of insulated material to C.S.O. sketch No. 54005, has been recommended for trials on the Central Railway, under Item 57 of the minutes of the 33rd Carriage & Wagons Standards Committee meeting. The Committee recommends that for these trials, the pipe connection between the tank and the roof filler should also be made of a suitable insulating material.

Decision:
This recommendation should be examined in the C.S.O.

Subject 2.- Train Lighting – Dynamo, Battery Capacity – (B.G., M.G. & N.G.)
To review the position in respect of the unequipped coaching stock and the ratio in which these have been equipped with dynamos and batteries during the year 1953-54.

Recommendations:
The Committee recommends that the statistical information from the various Railways tabulated and included as an Appendix to the proceedings of this meeting. The Committee notes that Railways are endeavouring to improve the ration of equipped to non-equipped coaches expeditiously as possible.

Decision:
The Chairman of the Committee should act as the reporter for this subject obtaining full particulars from all railways which should be tabled for review at the next meeting. It is noted that the members of the Committee had not collected the necessary information for proper consideration of this subject at the last meeting.

Subject 3: Train Lighting Dynamos-(i) Cardan Shaft Drive (ii) ‘V’ and flat belt drive.
To record the progress made with the fitment and trial of the two types of dynamo drives, viz. Cardan Shaft and "V" Belt, the dynamos mounted on the bogie frame.

Recommendations
1. The results of trials with cardan shaft drive and ‘V’ belt drive for train lighting generators are not yet conclusive and the Committee recommends that trials be continued.
2. In view of the encouraging mileage results with the ‘V’ belt drive, the Committee further recommends that trials with ‘V’ belts be made on a larger scale and extended to all the Railway, particular attention being given to trails on such sections where incidences of theft is high and consequently actual average life of flat belts has been found to be as low as 10,000 miles. The Committee understands that indigenous manufacture of ‘V’ belts is now developing in the country.
3. It is further recommended that a standard design for ‘V’ belt drive should be evolved by the Central Standards Office in consultation with the Northern and North-Eastern Railways.

**Decision:**

1. Noted.
2. Approved. Each Railway should fit 12 – 100amp dynamos with ‘V’ belting, for trial and report to C.S.O. If available, belting of indigenous manufacture should be used for these trials.
3. Approved.

**Subject 4:** Train Lighting – Dynamos M.G.: To consider the proposal for a modified suspension for dynamos on Metre Gauge stock and also certain provisions of the I.R.S. Specifications No. EI-48 relating to dynamos.

**Recommendations**

1. The Committee recommends that Clause 5(b) of the I.R.S. Specification No. E.1-48 be revised suitably to ensure the requisite minimum clearances, leaving the actual dimensions of the dynamo to the manufacture.
2. The Committee further recommends that the Central Standards Office should examine the existing standard dynamo suspension arrangement for meter gauge coaches with a view to evolve a design which will get over the present difficulties. The Chief Electrical Engineer, North Eastern Railway, reported that an existing non-standard drive on some of the coaches of that Railway is giving very satisfactory results. C.S.O. should take this into consideration before finalising the design.
3. The Committee recommends that as an interim measure the modifications shown in Messrs. J. Stone’s Drawing No. GD-183 be accepted.

**Decision:**

1&2. C.S.O. should examine these proposals and report to the Board.
3. Approved for the 60 amp. dynamo.

**Subject 5:** Train Lighting – Lighting Switches. To consider provision of modified tonum single magnetic switches in Schlieren coaches fitted with single battery system but also provided with through wiring and Kent couplers, as per Eastern Railway drawing No. 13614/TL, with a view to enable the Guard to control lights of these coaches as on the rest of the rake on parallel block system.

**Recommendations**

The Committee recommends that the proposal of the Eastern Railway, vide their Drawing No. 13614/TL (CSO Drawing No. CSE 33) be accepted.
Decision
Approved.

Subject 6.- Train Lighting – External Lights. To examine the report of the Northern and North Eastern Railways on the external light fitting exhibited at the 11th Meeting with a view to its adoption as standard and to consider fitting of external lights to existing Metre Gauge coaching stock.

Recommendations:
1. The Committee considered the report of the Northern and North –Eastern Railways and recommends that the external light fitting tried out by these Railways be adopted as standard, with modifications to prevent ingress of water at the top hinge and to provide holes for ventilation.
2. The Committee also recommends that all existing equipped meter-gauge coaches be fitted with external lights as they pass through shops.

Decision
1. Approved, the C.S.O. should prepare standard drawing for use by all railways in collaboration with Northern Railway.
2. Approved.

Subject 7.- Electrical Equipment- Standardization of voltages on the air-conditioned coaches. Standardization of voltages for Air-Conditioned equipment on Broad and Metre Gauge Air-Conditioned Coaching Stock.

Recommendations
1. A recommendation in regard to the standardization of voltages of air-conditioned coaches has already been made under Item 2, Paragraph 3 of the 11th E.S.C. Report.
2. The Chief Electrical Engineer, Northern Railway reported that experience with a 24 volts air –conditioning equipment on B.G. saloon indicated that the generating capacity of the dynamo for this equipment was not adequate. The Committee notes that 36 sets of 2½ ton capacity 24 volts equipment have been ordered for use on Meter Gauge and Broad Gauge partially air-conditioned coaches under construction. It is recommended that in the light of the experience which the Railway will be gaining with the operation of these sets , the question of standardization of voltages might be considered at a later stage.

Decision
1. Noted.
2. The ordering of equipment for meter gauge A.C. coaches can not be postponed and an interim specification should be prepared by the Chairman of the Committee, if necessary in consultation with other members of the Committee. The C.S.O. should progress this matter.
12th ESC/Calcutta/1954

Subject 8.-  Train Lighting Equipment.
To consider the provision of manufacturing capacity in the Integral Coach Factory at Perambur for spare parts for electrical train lighting equipment and locomotive headlights and turbo-generators.

Recommendations:
1. The Committee notes the development of indigenous manufacturing capacity for a large number of train lighting spare parts as well as for complete train lighting equipment and feels that it may not be necessary for the Integral Coach Factory, Perambur, to undertake the manufacture of spare parts. In the meantime, it is recommended that the list of spare parts should be finalised so that as and when the Integral Coach Factory comes into full production, this question can be reviewed if necessary.
2. In this connection, the Committee notes the general experience of Railways with the poor quality of some of the indigenous supplies of spare parts and recommends that D.G.S. & D. Inspectorate be requested to take necessary steps in this matter.

Decision:
1. The R.E. Directorate should progress this subject.
2. Particular complaints should be brought to the notice of D.G.S.&D. directly by the Railways and also reported to the Director Railway Equipment.

Subject 9.-  Train Lighting Batteries- Trail of Varley Dry Accumulators: To review the reports received from the Eastern Railway on the trials on Varley dry train lighting accumulators fitted to Broad Gauge coaching Stock.

Recommendations
1. Eastern Railway reported that as a result of the cell containers cracking, the manufacturers are endeavouring to get better quality composition boxes which will stand up to an operating temperature of 120°F. In the meantime, as an interim measure, they supplied steel jackets for reinforcing the containers. When these were fitted, it was found that 12 cells could not be accommodated in the I.R.S. battery box. When this was brought to the notice of the firm, they have advised using existing containers pending procurement of new ones. These are still awaited.
2. Meanwhile, it is understood that an order has been placed for 20 sets of batteries for trial on the North–Eastern Railway.
3. The Committee recommends that the trials be continued.

Decision
1. Noted.
2. Noted
3. Approved.

Subject 10.-  Train Lighting Batteries-Lead Acid Cells of Indigenous make-Trial of.
To consider the trial reports submitted by Railways on indigenous makes of Lead Acid train lighting batteries.
12th ESC/Calcutta/1954

Recommendations:
The Committee recommends that consideration of this subject be deferred to the next meeting as conclusive results of the trials are not yet available.

Decision:
Approved. Trials to continue.

Subject 11: Train Lighting Batteries- Nickel (Alkaline) Cells:To consider indigenous manufacture of Alkaline cells for train lighting.

Recommendations:
1. Alkaline cells have been extensively used on Indian Railway in the past with good results and the Committee considers that the continued use of this type of cells is to be recommended.
2. It is, however, the experience of this Committee that the life and performance of imported Alkaline cells have widely varied with different makes and before indigenous manufacture of this type of cells is undertaken, it is necessary to ensure that the product would be comparable to the best imported quality.
3. The Committee is, therefore, of the opinion that it is desirable that before venturing on the more difficult manufacture of Alkaline cells, all efforts should be directed to improve the quality of Lead Acid Cells in the manufacture of which, considerable progress has already been made.

Decision:
1. Alkaline cells should remain an approved alternative.
2&3. The C.S.O, should obtain a more detailed particulars of defects and the Committee should make recommendations of the particular features they suggest, should be embodied in the indigenous article.

Subject 12: Train Lighting Belting-Indigenous Manufacture.:To consider trials of indigenous train lighting belting and adoption of solid woven belting for train lighting as a permissible alternative.

Recommendations
The Committee recommends that consideration of this subject be deferred to the next meeting as conclusive reports are yet not available.

Decision
Approved. Trials to continue.

Subject No. 13: Electrical Equipment-Provision of Water Coolers in Air –Conditioned Coaches.To consider the provision of water coolers in Air- Conditioned coaches.
**Recommendations**

In view of the Railway Board’s decision to provide air-conditioned coaches with vestibule and marshall these adjacent to restaurant cars, cold water could be obtained from restaurant cars. The Committee, therefore, does not recommend provision of water coolers in air-conditioned coaches.

**Decision**

Mechanical Directorate should examine this recommendation.

**Subject 14: Electrical Equipment - Permissible Alternatives.** To make recommendations for the extension of the list of permissible alternatives for train lighting equipment used on B.G. and M.G. coaching stock, as drawn up at the 9th E.S.C. Meeting.

**Recommendations**

1. The Committee recommends the following Items to be included as permissible alternatives:

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<thead>
<tr>
<th>Item</th>
<th>Make</th>
<th>Country</th>
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<tr>
<td>Nickel iron cells</td>
<td>Pritchett &amp; Gold</td>
<td>U.K.</td>
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<tr>
<td>Lead acid cells</td>
<td>A.F.A.</td>
<td>Germany</td>
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<tr>
<td>Nickel iron cells</td>
<td>D.E.A.C.</td>
<td>Germany</td>
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<tr>
<td>Nickel cadmium cells</td>
<td>D.E.A.C.</td>
<td>Germany</td>
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2. With regard to the reference from Messrs, India Electrical Works and other manufactures and supplies of train lighting equipment for Items listed below to be accepted as permissible alternatives on Indian Railways, the Committee recommends that a Sub-Committee consisting of the Chief Electrical Engineers, Eastern (convener) and Northern Railways be constituted to investigate and make recommendations in this respect. One sample of each of the Items under reference should be obtained by all Railways for examination and report to the Sub-Committee. The Sub-Committee should also arrange for half –a- dozen sets each of the Items to be obtained and tried out on their Railways before making their recommendations:

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<tr>
<th>Item</th>
<th>Make</th>
<th>Country</th>
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<tr>
<td>C.I. Fuse box</td>
<td>India Electric Works</td>
<td>India</td>
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<tr>
<td>15-Way Link Junction Box</td>
<td>India Electric Works</td>
<td>India</td>
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<tr>
<td>24-Way Link Junction Box</td>
<td>India Electric Works</td>
<td>India</td>
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<tr>
<td>P.B.G.C. Switch</td>
<td>India Electric Works</td>
<td>India</td>
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<tr>
<td>Motoring Terminal</td>
<td>India Electric Works</td>
<td>India</td>
</tr>
<tr>
<td>Inter Vehicle Coupler</td>
<td>India Electric Works</td>
<td>India</td>
</tr>
<tr>
<td>Lamp Resistance</td>
<td>India Electric Works</td>
<td>India</td>
</tr>
<tr>
<td>Single ‘D’ Magnetic Switch</td>
<td>India Electric Works</td>
<td>India</td>
</tr>
</tbody>
</table>
Double ‘D’ Magnetic Switch | India Electric Works | India
Auto Cut-in and out switch | India Electric Works | India
Battery change over switch | India Electric Works | India
Single Magnetic Switch (contactor Type) | India Electric Works | India
C.D.B. Switch 75 amps. | India Electric Works | India
C.D.B. Switch 150amps. | India Electric Works | India
Load Switch Panel(LL80) | India Electric Works | India
Orient Carriage fans | Calcutta Electric Manufacturing Co. | India
Usha Carriage fans | Jay Engineering Co. | India
Carbon brushes | Allianz Electric and Radio Co. | Germany
Commutators | Allianz Electric and Radio Co. | Germany

Decision
1. Approved.
2. Approved.

Subject 15: Standing Orders- Electrical. To examine the draft manual for the Electrical Department as prepared by the Western Railway with a view to its adoption on the Indian Railways.

Recommendations
1. The Chief Electrical Engineer, Western Railway, tabled a draft manual for Electrical Department. This will be circulated to all the Railways for comments.
2. The Committee recommends that a Sub-Committee consisting of the Chief Electrical Engineers, Northern (convener), Eastern and Western Railways be constituted to consider the draft manual along with the comments of other Railways and finalise the same.

Decision
1. Noted.
2. Approved.

Subject 16: Miscellaneous-End On Generation of Electricity on Railway Trains. To consider the suitability of End-on-Generation of electricity on trains of the Indian Railways.

Recommendations
The Committee notes that trials on end-on-generation of electricity on Railway trains are now in progress on the North Eastern and Eastern Railways and recommends that further consideration of this subject be deferred to the next meeting when the results of these trials are expected to be available.

Decision
Approved. The Chief Mechanical Engineers and Chief Operating Superintends of the Eastern and North Eastern Railways should be associated with these trials and joint reports should be submitted to the C.S.O. Trials of this magnitude should not ordinarily be initiated without prior approval of Railway Board.

**Subject 17:** Miscellaneous- Turbo Generators- Revision of IRS Specification No. E.9-49.
To consider proposed modifications to I.R.S. Specification No. E9-49 in respect of maximum temperature rise on turbo-generators.

**Recommendations**
1. The Committee discussed the subject and agreed that the appropriate specification vide Clause 2 of the IRS Specification E.9-53 in reference to permissible temperature rise in case of insulation other than Class ‘A’, is BSS 168-1936.
2. Tests have been carried out by the Central Railway as regard temperature rise on the turbo generators of Pyle National and Sunbeam manufacture. The temperature rise obtained on these machines was within the limits specified. The Committee recommends that further tests should be carried out by the Central and Western Railways with machines of Messrs, Pyle National, Sunbeam and J. Stone & Co., under similar conditions and a decision should be taken in the light of results obtained.

**Decision**
1. C.S.O. should progress this recommendation further.
2. Approved.

**Subject 18:** Train Lighting Equipment-Nickel Iron & Lead Acid Batteries-Relative Cost.
To consider relative annual costs with Nickel Iron and Lead Acid batteries as reported by various Railways.

**Recommendations**
1. With reference to telegram No. 53/731/SR, dated 27th March 1954 received from the Railway Board, Members did not have necessary data with them to enable the disposal of the reference, since above Item was not on the Agenda for the meeting.
2. The Committee therefore, appointed a Sub-Committee consisting of the Chief Electrical Engineers, Eastern (convener), North- Eastern and Western Railways, to investigate this question and submit an urgent report.

**Decision**
1&2.Noted.
13th ESC/Madras/1955

13th Electrical Standards Committee Meeting Held at New Delhi, in March, 1955

Shri S. L. Narayana Iyer, CEE/SR as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Train Lighting – External Lights. To record the standard drawings of the external light fitting for passenger stock.

Recommendations
The Committee recommends the adoption as standard of external light fitting as shown on IRS drawing no. EA-130 subject to the following modifications:
(a) The reflector should be chromium plated.
(b) ½” diameter hole for cable entry should be bushed.
(c) The lock to be shrouded so that it can only be opened by means of the proper key.
(d) The finish should be stove-enameled gulf red outside and white inside.

Decision
Approved. C.S.O. to issue modified drawings.

Subject 2: Train Lighting – Lighting of Inscription of Coaches. To consider the suggestion of the Eastern Railway that the inscription indicating the class of the Carriage be made under the external light.

Recommendations
The Committee considers that it is not advisable under the present load conditions to illuminate inscription marking indicating the class of the carriage. Instead, the Committee recommends the use of fluorescent paint for these marking.

Decision
Experiments with fluorescent paint should first be made in Central and Eastern Railway workshops to ascertain whether it is likely to be successful. Particulars of the additional cost should be prepared and the results intimated to C.S.O.

Subject 3: Train Lighting – Wiring of Schlieren Coaches. Modification to the wiring of Schlieren Coaches to enable their operation in the Standard parallel block system.

Recommendations
1. The Committee recommends the adoption of the modification to the wiring on Schlieren coaches as proposed by the Central Railway in their drawing No. 287/4027 with alteration, viz.: use of single type magnetic switch for the control of lights only in place of double magnetic switch.
2. The control of fans will continue to remain as at present.
3. The Committee also recommend:
   (a) The provision at the end of the Schlieren coaches of push button switches for the control of lights.
   (b) The provision of a triple pole changeover switch in all the existing single battery Schlieren coaches, so that in the event of a failure of its generating and battery equipment, the feed can be taken from the adjoining coaches of the parallel block system.

Decision...
13th ESC/Madras/1955

1 to 3 : Approved.

Subject 4: Train Lighting – Fuse & Junction Boxes in coaching stock.

Recommendations
The Committee considers that a Sub-Committee consisting of CEEs/Western (convener), Central and Northern Railways should examine the proposal of Western Railway and submit their recommendations to Central Standards Office.

Decision
Approved.

Subject 5: Train Lighting – Position regarding equipped coaches.

Recommendations
The Committee has examined the position of equipped and non-equipped coaches on the various railways as shown in Appendix ‘C’. The Committee notes that the ratio of equipped to non-equipped coaches is poor on metre gauge sections of North Eastern and Western Railways, and recommends special drive on these railways to improve the position.

Decision
Noted.

Subject 6: Train Lighting Equipment – Standardization of Dynamo and battery capacities on B.G. & M.G. coaches.

Recommendations
1. The capacities of dynamo and batteries at present being provided are indicated below:-

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Capacity of Dynamo</th>
<th>Capacity of double battery set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad</td>
<td>100 Amps.</td>
<td>270/300 Ah</td>
</tr>
<tr>
<td>Metre</td>
<td>60 Amps.</td>
<td>200 Ah</td>
</tr>
<tr>
<td>Narrow</td>
<td>40 Amps.</td>
<td>120 Ah</td>
</tr>
</tbody>
</table>

2. The Committee recommends that a Sub-Committee consisting of CEEs Northern (convener), North Eastern Railway and Southern Railways should go into the question of reviewing the above figures and submit a report within four months.

Decision
1 & 2. Approved.
Subject 7: Train Lighting – (1) Cardan Shaft Drive (2) ‘V’ Belt Drive. To record the progress made with the fitment and trial of the two types of Dynamo drives Viz., Cardan Shaft and ‘V’ Belt.

Recommendations
1. As conclusive data regarding cardan shaft drive is not available, the Committee recommends that the trials with this drive should continue.
2. Regarding ‘V’ belt drive, the Committee recommends that:
   (i) Trials with ‘V’ belt with suitable fastener should be conducted by North Eastern and Eastern Railways. Belt of indigenous manufacture should be used for these trials.
   (ii) Trials with endless ‘V’ belt need not be pursued in view of the difficulties experienced in the fitting of such belts.

Decision
1. Approved.
2. Approved.


Recommendations
The Committee considers that there is no case for revision of the IRS specification E-9-53 but recommends that tests should be conducted by the R.T.R.C., Lucknow, on the three makes of Turbo-generators (viz. Stones, Sunbeam and Pyle National) to determine the following:
   (i) Maximum Temperature rise
   (ii) Maximum voltage variation from no load to full load under varying boiler pressures.

Decision
Approved. If the R.T.R.C. are not in a position to carry out these trials they should arrange for them to be done by a railway.

Subject 9: Train Lighting – Dynamos Suspension Gear M.G. To consider the proposal for a modified suspension for dynamos on M.G. stock and also revision of the I.R.S. Specification No. E-1-48 relating to dynamos.

Recommendations
1. The Committee is of the opinion that no amendment to IRS Specification E-1-48 is called for at present.
2. The Committee, however, recommends that C.S.O. should explore, in collaboration with the Northern and North Eastern Railways, the possibility of evolving for the Metre Gauge a dynamo suspension gear at the headstock end of the under frame and driven from the outer axle of the bogie. This system has been in extensive use on the North eastern Railway for some years.

Decision
1. Noted
2. Approved.
Subject 10: Train Lighting Belting – Indigenous Manufacture. To consider trails of indigenous train lighting belting.

Recommendations
1. The Committee examined the trial reports received from Railways on the belting manufactured by the following firms:
   - Indigenous
     a) Bengal Belting Works Limited
     b) Good Year Tyre & Rubber Co. Ltd.
     c) Dunlop Rubber Co. Ltd.
     d) Bisheshwar Nath & Co.
   - Foreign
     e) Silvertown
     f) Eagle
2. The Committee notes that Dunlop belting has so far proved as satisfactory as Silvertown belting which is one of the best imported makes of belting.
3. The Committee notes that the performance of other indigenous makes of belting has not so far satisfactory.
4. The Committee, therefore, recommends that these firms may be asked to improve the quality of their products for further trials.

Decision
1 to 3. Noted
4. Approved. The C.S.O. should advise manufacturers of the results of trials giving comparative performance figures.


Recommendations
The Committee notes that no trials have been initiated on the North Eastern Railway on account of non-receipt of batteries from the firm and the trials on Eastern Railway have just been started. The Committee, therefore, recommends that consideration of the subject may be deferred to the next meeting.

Decision
Approved.

Subject No. 12: Train Lighting Batteries– Lead Acid Cells of Indigenous make-
To consider the trail reports submitted by Railways on Indigenous makes of Lead Acid Train Lighting Batteries.

Recommendations
1. The Committee examined the trial reports submitted by various railways and noted the following defects in the case of batteries supplied by Messrs.Standard Batteries:
(i) Abnormal breakage of the grids of positive plates  
(ii) Short life of separators  
(iii) Spilling of electrolyte  
(iv) Excessive shielding of active material  
(v) Growth of positive plates resulting in breakage of containers

2. The Committee recommends that these defects should be brought to the notice of the firm with a view to firm’s taking appropriate steps for their elimination in case of future supplies.

3. The Committee notes that in the agreement with Messrs. Standard Batteries, the firm has been permitted to use separators having a life of 12 months only. Besides the cost involved in the renewal of separators, the attendant difficulties in frequent replacements dislocates normal working. The Committee, therefore, recommends that the firm should be asked to use better type of separators so as to give a minimum satisfactory service of two years.

4. Regarding cells of Messrs. Mysore Electro-Chemical Ltd., the report so far received relates to one set only. The Committee, therefore, recommends that further trials should be carried out on more extensive scale before a final decision is taken.

5. “Amco” Batteries have so far given satisfactory service on Western Railway. As the number of sets on trial is not large, the Committee recommends that further trials should be carried out on more extensive scale before a final decision is taken.

6. Regarding standard technical conditions which should govern supply of batteries not yet on the approved list, the Committee consisting of CEE Central (Convener), Western and Eastern Railways should examine the draft conditions as given in Appendix ‘A’ and submit their recommendations within two months.

Decision

1. Noted.
2. Approved. C.S.O. should advise the manufacturer.
3. This recommendation should be examined and progressed by the Railway Equipment Directorate.
4&5. These recommendations should be examined by the Mechanical Directorate.
6. Approved. This recommendation should be progressed by the C.S.O.

To consider relative annual costs of Nickel Iron and Lead acid Batteries as reported by various Railways.

Recommendations
The Committee is of the opinion that the report of the Sub-Committee (Appendix ‘D’) may be taken as indicating a general picture of the relative costs of the two types of batteries, namely, Lead Acid and Alkaline.

Decision
Noted.

Subject 14: Electrical Equipment – Over Current Relay. To consider the proviso on of Over Charge Relay to coaches equipped with third brush dynamo and lead acid batteries.
Recommendations
The Committee does not recommend the provision of the overcharge relay as a general practice. Individual Railways, however, may provide these relays to meet their special conditions.

Decision
Noted.

Subject 15: Electrical Equipment-Standardization of voltages on the air conditioned coaches for B.G. & M.G. Coaching Stock.

Recommendations
The Committee recommends the following voltages for air-conditioning equipment:

- **BROAD GAUGE**
  - Fully air-Conditioned coach—110 volts.
  - Partially air-conditioned coach—24 volts

- **METRE GAUGE**
  - Fully air-Conditioned coach—24 volts.
  - Partially air-conditioned coach—24 volts

Decision
This recommendation should be examined by C.S.O.

Subject 16: Train Lighting Equipment- Air conditioned coaches. To consider the defects and failures of Air-Conditioned coaches on Broad and Metre Gauge and to make recommendations for overcoming the same.

Recommendations
The Committee notes that the Railways have not experienced any additional serious defects with the air-conditioning equipment during the last year. The equipment has given satisfactory service.

Decision
Noted

Subject 17: Electrical Equipment- Provision of Water Coolers in Dining Cars and air-conditioned coaches.

Recommendations
In view of the existing load conditions, the Committee does not recommend the provision of electrically operated water coolers in A.C. coaches and Dining Cars.

Decision
Approved.

Subject 18: Electrical Equipment- Running of coaching stock on electrified sections. To consider the results of trials with roof tank filler made of insulating material fitted on timber body coaches running on electrified sections.
Recommendations
The Committee considers the modified arrangement, as shown on Western Railway sketch No. CTL-1836, as generally satisfactory. Further consideration of the subject may be deferred till report regarding trials with this arrangement is available.

Decision
Noted.


Recommendations
The Manual from the Western Railway has been received only a few days back. The Sub-Committee appointed last year will now undertake the preparation of a Manual for adoption on all railways.

Decision
Noted.

Subject 20: Miscellaneous-End- On Generation of Electricity on Trains.

Recommendations
1. The Committee recommends that the trials with end-on-generation as at present being undertaken on the North Eastern and Eastern Railways should continue and records of maintenance and capital costs, performance, failures, etc., should be tabled at the next meeting for further consideration of the Committee.
2. The Committee also recommends that the Sub-Committee consisting of the CEEs Northern (Convener), Eastern and North Eastern Railways should examine the possible alternative scheme for supplying the increasing electrical load on trains.

Decision
1 & 2. Existing trials may continue. The Sub-Committee should keep in view Para 76 of the 34th C.W.S.C. Report.


Recommendations
The Committee considers that some modifications to the Brown Boveri dynamo are desirable and, therefore, recommends that a Sub-Committee consisting of the Chief Electrical Engineers, Western and Central Railways should go into the matter and submit the report within three months. The question of putting this make of dynamo on the approved list will be considered on the receipt of report from the Sub-Committee.

Decision
Approved.
Subject 22: Electrical Equipment – Permissible Alternatives. To make recommendations for the extension of the list of permissible alternatives for train lighting equipment used on B.G. and M.G. coaching stock, as drawn up at the E.S.C. meetings.

Recommendations
The Committee recommends the acceptance of the reports submitted by the Sub-Committee as shown in Appendix ‘B’ in regard to these items including the imposition of limit of 25% to 30% in respect of items (vii) to (xi) of para (1) of the report dated 5/6/54. The Chief Electrical Engineers will, however, advise the firms from time to time on the improvements that may be required.

Decision
This recommendation should be examined by C.S.O.

To discuss the question regarding location and number of fans to be provided in the future I & II class compartments and also the practice for providing fan regulators.

Recommendations
The Committee recommends the provision of:
(i) One fan per berth in the reclassified I class compartments, and
(ii) Regulators in case of all fans in the reclassified I & II class compartments.

Decision
These recommendations should be examined by C.S.O.

Subject 24: Train Lighting Equipment – Control of Fans in Trailer Coaches. To consider the provision of single magnetic switches for trailer coaches for the control of fans.

Recommendations
1. The Committee recommends the adoption of manually operated “FAN MAIN SWITCH” for the control of fans in each carriage. This switch will be mounted inside the coach and should be of the iron clad type with suitable arrangement for its operation by an authorized person. In the case of existing coaches provided with magnetically controlled fan circuits, this may continue.
2. The magnetic switch control from the guard’s control switch will be restricted for the operation of “lights” only on new coaches.

Decision
1. Approved.
2. Approved.

Subject No. 25: Electrical Equipment – Plug Point in A.C. Coaches for Tea & Hot Water Service. To consider provision of plug point in air-conditioned coaches (i) In the
attendant’s compartments for tea and hot water service to passengers, (ii) In the individual compartments for use of 110-V DC electric razor.

Recommendations
1. The Committee recommends that fully air-conditioned coach should be provided with a two-pin plug point in the attendant’s compartment for tea and hot water service, when the A.C. coach is not coupled to a dining car with vestibule connection. The kettle to be provided for this purpose should be of not more than 1000 watt and 3 Pint capacity.
2. The Committee also recommends that a notice should be exhibited near the plug point to draw attention of attendant that kettle is to be used only when no dining car with vestibule connection is coupled to the air-conditioned coach.
3. The Committee does not recommend the provision of a 110-volt plug point for the use of electric shavers in each compartment, as this facility is liable to be misused.

Decision
1. Approved.
2. Approved.
3. Approved.
### Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name /Shri</th>
<th>Designation</th>
<th>Railway</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>R. Vanchinathan</td>
<td>CEE (Chairman)</td>
<td>NR</td>
</tr>
<tr>
<td>2.</td>
<td>L.N.Mathur</td>
<td>CEE (Member)</td>
<td>CR</td>
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<td>3.</td>
<td>P. N. Murti</td>
<td>CEE (Member)</td>
<td>ER</td>
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<tr>
<td>4.</td>
<td>S.L. Narayana Iyer</td>
<td>CEE (Member)</td>
<td>NER</td>
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<tr>
<td>5.</td>
<td>H.R. Dogra</td>
<td>CEE (Member)</td>
<td>SER</td>
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<td>6.</td>
<td>S.K. Gopinath</td>
<td>Dy.CEE (Member)</td>
<td>SR</td>
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<td>7.</td>
<td>S.C.B.Mazumdar</td>
<td>CEE (Member)</td>
<td>WR</td>
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<td>8.</td>
<td>P.N. Talwar</td>
<td>ACDE (S)</td>
<td>Central Standard Office</td>
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<td>9.</td>
<td>C.S.Lal</td>
<td>CDE (C&amp;W)</td>
<td>Central Standard Office</td>
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<td>10.</td>
<td>Shanti Nath</td>
<td>Sectional Officer</td>
<td>Central Standard Office</td>
</tr>
<tr>
<td>11.</td>
<td>M.S. Murti</td>
<td>DDSE/R</td>
<td>RTRC</td>
</tr>
</tbody>
</table>
Subject 1: Train lighting- Schemes for meeting increased Electrical load. To Consider whether the existing 24 Volts train lighting system will meet the present day load or requires a change.

Recommendations
The Committee has examined the report of the subcommittee but has been unable to reach unanimous conclusions on the recommendations of the sub-committee. Whereas the members from the Northern, Eastern, North Eastern and South Eastern Railways agree with the recommendations of the sub-committee, the other members, viz., from Southern, Central and Western Railways, do not agree with all the recommendations made by the sub-committee. The views of the members are appearing in Appendix 'D'.

Decision
Instructions have already been issued to fit 6 slow speed train rakes on each Railway with End-on-generation equipment. Pending the results of these trials no other changes as would upset the existing system which has been found satisfactory in service on medium and fast passenger trains need be made at present. CSO may, however, continue the study of various alternatives.

Subject 2: Train lighting- Equipping of Coaches. To review the practice followed at present in respect of "Equipping" New Coaching Stock.

Recommendations
The Committee has reviewed the present practice in respect of equipping the coaches with dynamos and batteries and in view of low percentage of the equipped coaches, recommends that the existing orders of the Railway Board, viz., all new coaches should be equipped, may stand.

Decision
Approved, the position should be reviewed again in 1960.

Subject 3: Train lighting- Position regarding equipped coaches. To review the position In respect of the equipped and unequipped coaching stock.

Recommendations
1. The Committee has reviewed the position in respect of equipped and unequipped coaches on different Railways, Appendix Band considers that further improvement in the ratio of equipped to unequipped is called for. Each railway should take necessary action in this respect.
2. In order that the data received from Railways is comparable, the pro forma as per Appendix 'E' may be used in future.
Decision
1. Approved. The percentage of equipped coaches to the total in service is very low
011 the North Eastern Railway which should take special steps to increase the
proportion.
2. Approved.

Subject 4: Train lighting- Wiring on Schlieren-built coaches.: Modification of the
wiring on Schlieren-built coaches to enable their operation in the Standard Parallel block
system.

Recommendations
Drawing No. CSE-36 is recorded.

Decision
Noted.

Subject 5: Train lighting- Blue Night Lights. To discuss the necessity of providing
blue night lights in second and third class coaches other than sleeper coaches.

Recommendations
The Committee notes that the provision of blue night lights in II and III class coaches other
than sleeper coaches is not being appreciated by the travelling public. In fact there is
evidence that the public opinion is against it, as it provides better scope to miscreants to
carry on their activities as also presents difficulty for ticket checking staff to check tickets.
The Committee, therefore, recommends that provision of blue night lights may be
withdrawn in the coaches mentioned above.

Decision
This recommendation should be examined by Traffic Directorate.

Subject 6: Train lighting Dynamos- Brown Boveri. To discuss the performance of the
‘Brown Boveri’ dynamos.

Recommendations:
The Committee has examined the sub-committee’s report and notes that Messrs. Brown
Boveri & Co. Ltd. have agreed to carry out the modifications suggested in the report. The
Committee, therefore, recommends acceptance of Brown Boveri dynamo after the
modifications referred to above have been incorporated in its design.

Decision:
Preliminary trials with 15 dynamos have proved satisfactory except for some details
commented upon by the Committee. Extensive trial with a total number of 50 dynamos
each on Broad Gauge and Metre- Gauge may now be carried out on different railways after
the proposed modifications have been incorporated.
14th ESC/New Delhi/1956

**Subject 7:** Train lighting Dynamos - Indigenous Manufacture. To consider the performance of train lighting dynamos of indigenous make.

**Recommendations**

1. The Committee notes that Messrs. India Electric Works are manufacturing dynamos of 60 Amps. capacity in the country, and recommends that a Sub-Committee, consisting of C. E. Es., North Eastern, Western (Convener) and Central Railways, should examine the constructional and other features of this make of dynamo to assess its suitability for M. G. service.
2. The cut-in speed of these dynamos is reported to be rather high. The Sub-Committee should examine this and if necessary, carry out requisite tests in collaboration with Railway Testing & Research Centre, Lucknow.

**Decision**

1. Approved. Since the firm is situated in Calcutta, the Sub-Committee shall consist of the Chief Electrical Engineer, Eastern Railway, North Eastern Railway & Western Railway (Convener).
2. Approved.

**Subject 8:** Train lighting -Dynamo Suspension Arrangement, M.G. To examine the suspension arrangement of dynamo on the metre gauge stock.

**Recommendations**

1. The Committee considers that the provision of two safety chains in case of dynamo of 60 Amp. capacity M.G.stock would get over the difficulty in respect of infringement of the minimum clearance from rail of 6” for "unloaded" coach and 4” for "loaded" coach.
2. The Central Standards Office has examined the suspension arrangement of dynamo at the headstock end of certain coaches on North Eastern Railway. In view of the fact that change-over to this arrangement will require major modifications to bogie headstock and brake gear as also the longitudinal of the underframe, the Committee agrees that change from the present suspension arrangement is not called for.

**Decision**

1. Noted.
2. Noted.

**Subject 9:** Train lighting Dynamos –‘V’ Belt Drive. To record the progress made with the fitment and trial of ‘V’ Belt Drive.

**Recommendations**

As the trial with 'V' belt drive with suitable fastener has not yet started on the Eastern Railway, consideration of this subject is deferred to the next meeting.
**Decision**
If preliminary trial is found successful, trials on extensive scale may be carried out with 20 coaches fitted with 'V' belt drive on each railway.

**Subject 10:** Train lighting Dynamos – Cardan Shaft Drive. To record the progress made with the fitment and trial of Carden Shaft Drive.

**Recommendations**
The Committee has examined the trial reports from Central, Western, and Northern Railways, and is of the opinion that Cardan shaft drive has given satisfactory results. However, in view of the fact that this drive is more expensive than the conventional flat belt drive, the adoption of the same is not recommended for low output dynamos.

**Decision**
Approved.

**Subject 11:** Train lighting Batteries – Trial of Varle Dry Accumulators.

**Recommendations**
1. The Committee has examined the interim trial report from the Eastern Railway, and notes that the Central Railway has not yet received these accumulators. The present trials may continue and the reports thereon should be submitted for consideration at the next meeting.
2. The Committee recommends that no further orders for these accumulators may be placed till such time as the results of trial on the existing accumulators have been examined at the next meeting.

**Decision**
1. Noted.
2. Approved.

**Subject 12:** Train lighting Batteries – Lead Acid Cells of Indigenous Make -Trial of.

**Recommendations**
1. The reports from the various Railways indicate that the batteries so far supplied by Messrs. Standard Batteries Ltd. have not proved satisfactory. The Committee notes that the firm has since discontinued the manufacture of this type of battery and have started the manufacture of a new type. The Committee recommends that a trial order to the extent of two battery sets of new type for each Railway may be placed on this firm and that further orders should not be placed till the results of the trial order are to hand.
2. The Committee notes that Amco batteries have been -tried in the past by Northern, Southern and Western Railways, and recommends that the defects noticed in these batteries under service conditions should be intimated to the firm to enable the firm to improve the quality.
3. In order to foster coin petition, the Committee recommends that a trial order to the extent of two battery sets of improved quality per Railway may be placed on Messrs. Amco Batteries.

4. The Committee recommends acceptance of standard technical conditions governing supplies of batteries as finalized by the sub-committee. These conditions may be incorporated in the I.R.S. Specifications E-2 and E-2A for batteries.

5. The Committee recommends that trial results of batteries should be submitted as per Trial Report proforma appearing in Appendix 'C'.

**Decision**

1. Approved
2. Approved. C.S.O. to advise firm.
3. Approved.
4. Approved.
5. Approved.

**Subject 13: Train lighting Batteries – Nickel iron & Lead Acid Batteries-Relative Cost.**

**Recommendations**

1. The Committee considers that the alkaline batteries are definitely superior in performance and more economical than the lead acid batteries, and recommends their exclusive usage for train lighting provided indigenous manufacture of this type of battery is established.

2. The Committee recommends that when train lighting batteries have to be imported on special occasions, such batteries should, as far as possible, be of the alkaline type, in preference to lead acid.

**Decision**

1. Approved. C.S.O. to advise the Ministry of Commerce and Industry (Development Wing).
2. Approved.

**Subject 14: Train lighting Belting – Indigenous Manufacture.** To consider trial of indigenous train lighting belting.

**Recommendations**

From the test reports received from Railways it is seen that most of the tests were inconclusive, due to reasons other than faulty nature of the belts, such as, thefts, trial coaches being put out of commission for P.O.H .&c. In the circumstances, the Committee recommends that belts of different makes to be adopted for use on the Railways should first be tested by the Research Centre, Lucknow, with the object of determining their suitability for train lighting service. For this purpose the Research Centre should collaborate with C.E.E./North Eastern Railway.
**14th ESC/New Delhi/1956**

**Decision**
Existing trials should continue. R.T.R.C. should examine the feasibility to provide bench test simulating actual working conditions.

**Subject 15:** Air-conditioning – Standardization of Voltages on the Air–Conditioned Coaches. Standardization of voltages for air-conditioning equipment for Metre Gauge and Broad Gauge coaches.

**Recommendations**
1. The Committee recommends acceptance of 110 Volts D.C. for air-conditioning equipment to be used in M.G. fully air-conditioned coach.
2. As the experience of some Railways indicates that the existing 24 volts generating equipment is not adequate for partial air-conditioned coaches, the Committee recommends that this matter should be gone into by a sub-committee consisting of C.E.E./Western Railway (Convener), Southern Railway and North Eastern Railway.

**Decision**
1. Approved.
2. Approved.

**Subject 16:** Air-conditioning – Fluorescent lighting in air-conditioned coaches. Provision of Fluorescent lighting in air-conditioned coaches.

**Recommendations**
1. The Committee recommends the use of fluorescent lighting in the air-conditioned coaches.
2. The Committee is in favour of introducing fluorescent lighting in other coaches wherever feasible.

**Decision**
1. Approved.
2. Approved.

**Subject 17:** Air-conditioning – Defects and failures of air-conditioned coaches. To consider the defects and failures of air-conditioning equipment on Broad and Metre Gauge coaches and to make recommendations for overcoming the same.

**Recommendations**
The Committee notes that Railways have generally been satisfied with the performance of 110 volts D.C. equipment on the B.G. fully air-conditioned coaches. Difficulties have, however, been experienced on partially air-conditioned coaches particularly on the M.G. The Committee considers that questions like ‘V’ belt drive, layout of the air-conditioned coach, &c., will require thorough examination and, therefore, recommends that the sub-committee appointed for the purpose of examining the adequacy or otherwise of 24 volts for partially air-conditioned coaches (para. 25 refers) should also go into these questions and submit their report to the C.S.O. for further action.
Subject 18: Electrical Equipment- Housing of Control Gear in Equipped Coaches. Housing of control gear in equipped coaches at the end of the coach body instead of on the under frame as at present.

Recommendations
The Committee does not recommend any change in respect of positioning of control gear.

Decision
Noted.

Subject 19: Electrical Equipment- Standardization of Dynamo & Battery Capacities on coaching stock. To consider the question of standardizing dynamo and battery capacities on coaching stock.

Recommendations
The report of the sub-committee has been received and generally discussed. As the subject is closely linked up with Item No.1, further consideration of the report will be based on Railway Board's decision on that item.

Decision:
Noted

Subject 20: Electrical Equipment-External Lights. To record the revised standard drawings of the external light fitting for passenger stock.

Recommendations
C. S. O. Drawing No. EA·130 and related part drawings are recorded.

Decision
Noted.


Recommendations
The Committee has examined the proposal of using one 16” oscillating fan or two 12” fixed type fans in each bay in standard B. G. third class layout and considers that no change in the practice at present being followed, viz., use of two 16” fans fixed type in case of B. G. and two 12” fixed type fans in case of M. G. per bay need be made.
Decision
Noted.

Subject 22: Electrical Equipment- Fuse and Junction Boxes.

Recommendations
As the report from the sub-committee has not been received, the consideration of this subject is deferred to the next meeting.

Decision
Noted.

Subject 23: Electrical Equipment- Aluminium Conductors. Use of aluminium conductors instead of copper in traction and other overhead works.

Recommendations
1. The Committee suggests that the use of aluminium for traction purposes may be examined by the Traction Advisory Committee.
2. In view of the general shortage of copper, the Committee suggests the use of aluminium conductors for overhead lines (both H.T. and L.T.) in place of copper, Railways may adopt the same as far as practicable, and report on its suitability to the CSO.

Decision
1. Approved.
2. Approved.

Subject 24: Electrical Equipment- List of Approved Suppliers. To review the List of Approved Suppliers for train lighting equipment.

Recommendations
The Committee recommends that the Standing Committee recommended, vide paragraph 37 should review the existing list of approved suppliers and submit its report to the CSO.

Decision
Approved.

Subject 25: Electrical Equipment- List of Approved Suppliers. To make recommendations for the extension or the list of approved supplier, for train lighting equipment.

Recommendations
The Committee recommends that a Standing Sub-Committee, consisting of C. E. Es., Eastern Railway (Convener), Central and Northern Railways, may be appointed for the purpose of considering requests from different firms for inclusion of their names in the list of approved suppliers for different train lighting equipment. The Convener of the
Committee will collect performance reports and other relevant data from the railways and firms, and submit the report of the sub-committee, to the CSO.

**Decision**
Approved.

**Subject 26:** Running of Coaching Stock on Electrified sections. To consider results of trial with insulated roof tank fillers fitted on timber body coaches running on electrified sections.

**Recommendations**
As the test results of the trial with vulcanized rubber mouldings are not available, consideration of this subject is deferred to the next meeting.

**Decision**
Noted.

**Subject 27:** Overhead Electric Cranes. To prepare a standard specification for overhead travelling cranes.

**Recommendations**
The Committee recommends the appointment of a sub-committee, consisting of C.E. Es., South Eastern Railway (Convener), Northern Railway and Eastern Railway, for the purpose of preparing a standard specification for overhead travelling cranes.

**Decision**
Approved.

**Subject 28:** Standing Orders - Electrical. Preparation of manual for the electrical equipment.

**Recommendations**
The Committee has considered the report of the sub-committee and recommends that an Officer on Special Duty may be appointed for the purpose of preparing a Manual for the Electrical Department, applicable to all Railways based on the lines indicated in the report.

**Decision**
This recommendation should be examined by the Mechanical Directorate.

**Subject 29:** Turbo-Generators. Testing of turbo-generators (Sunbeam, Stones and Pyle National) to determine.
(a) Maximum temperature rise
(b) Maximum voltage variation from no load to full load under varying boiler pressures

**Recommendations**
The Committee has examined the draft trial report regarding tests conducted by the Railway Testing and Research Centre on the Turbo Generators of the above three makes with saturated steam, and recommends that-

(i) Messrs. Sunbeam may be asked to use better class of insulation in case of their dynamos to withstand the higher temperature rise.

(ii) Messrs. J. Stone & Co. should be asked to take immediate steps to rectify the very high voltage variation that has been noticed in their dynamos.

**Decision**
Approved.

**Subject 30:** End-on-Generation of Electricity on Trains.

**Recommendations**
The Committee has examined the trial reports from the North Eastern and Eastern Railways and recommends that extensive trials with end-on-generation at 110 Volts on slow speed trains on all railways should be conducted to gain more experience with this system of train lighting.

**Decision**
Approved. Instructions to Railways have already been issued.

**Subject 31:** Alarm Pull. The provision of a light to act as a signal simultaneously by impact of pulling the alarm chain to facilitate detection at night of the coach from which the alarm chain has been pulled.

**Recommendations**

1. The Committee has examined the above proposal and does not recommend its acceptance.

2. The Committee, however, recommends that alarm indicator discs may be painted with Fluorescent paint for quick location by the engine crew during night time.

**Decision**
1. Approved.
2. This recommendation should be examined by CSO.

**Subject 32:** Lighting of Inscription of Carriages. Use of fluorescent paint for the inscription indicating the class of carriage.

**Recommendations**
The Committee notes that no trial with fluorescent paint has yet been conducted by the Central and Eastern Railways on account of non-availability of such paint. The consideration of the subject is therefore deferred to the next meeting.
Decision
This item should in future be dealt with by CWSC, as and when paint is available.

Subject 33: Electrical Equipment- Reflectors for Loco Headlights.:To consider acceptance of metallic reflector as a permissible alternative to glass reflector for loco headlight fitting.

Recommendations
1. The Committee considers that glass reflectors are definitely superior to metallic reflectors and therefore recommends that capacity for manufacture in the country of glass reflectors may be established.
2. In view of the fact that metallic reflectors are manufactured in the country, the Committee recommends their acceptance. The metallic reflectors should be made of copper and plated with either silver or chromium.

Decision
1. Approved. CSO should advise the Ministry of Commerce and Industry (Development wing).
2. Approved.

Subject 34: Appointment of a Sub-Committee to screen the agenda of the Electrical Standards Committee meeting. To consider the desirability of appointing a sub-committee for the purpose scrutinizing the agenda of the electrical standards committee meeting.

Recommendations
1. The Committee recommends that a sub-committee consisting of two members should scrutinize the agenda one month before the main meeting, so as to enable the Committee to complete its deliberations quickly.
2. The Committee, therefore, recommends that a subcommittee consisting of Chief Electrical Engineers, Central and Eastern Railways, may be appointed for scrutinizing the agenda of the next Electrical Standards Committee Meeting.

Decision
1. Approved.
2. Approved.
### Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name /Shri</th>
<th>Designation</th>
<th>Railway</th>
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<tr>
<td>1.</td>
<td>L.N.Mathur</td>
<td>CEE</td>
<td>CR</td>
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<td>2.</td>
<td>S.K. Gopinath</td>
<td>CEE</td>
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<td>3.</td>
<td>R. Vanchinathan</td>
<td>CEE</td>
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<td>4.</td>
<td>S.L. Narayana Iyer</td>
<td>CEE</td>
<td>NER</td>
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<td>5.</td>
<td>G.K. Ambady</td>
<td>CEE</td>
<td>SR</td>
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<td>H.R. Dogra</td>
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<td>S.C.B. Mazumdar</td>
<td>CEE</td>
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<td>8.</td>
<td>Shanti Nath</td>
<td>ACDE (S&amp;R)</td>
<td>C.S.O</td>
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<td>9.</td>
<td>P.N. Talwar</td>
<td>Dy. CDE (C&amp;W)</td>
<td>C.S.O</td>
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<td>10.</td>
<td>M.S. Murti</td>
<td>DDSE/R</td>
<td>RTRC</td>
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Subject 1: End-on –Generation of electricity on trains. To consider the adoption of end-on-generation and Electrical Adviser's letter No. 56/ESC/XV/Elect., dated 22-12-1956, regarding choice of system.

Recommendations
1. The Committee after considering the points raised in Electrical Adviser’s letter, recommends that the standard voltage for End-on-Generation, where adopted, shall be 110 Volts D.C.
2. The proposed trials with End-on-Generation, as already ordered by the Board should be expedited.
3. The Committee also recommends the appointment of a Sub-Committee consisting of the Chief Electrical Engineer, Northern (Convener), Southern, Northern Eastern and Western Railway to go into the question of generation from the axle at 110 volts D.C. for train lighting service and compare its merits and demerits including financial implications with those of:-
   (i) Generation on 110 volts D.C. from a prime-mover and
   (ii) The present 24 volts system, and submit its report within three months.

Decision
1. Approved.
2. R.E. to progress this case.
3. Approved.

Subject 2: Electrical Equipment-Standardization of dynamo battery capacities on coaching stock. To review the question of standardization of dynamo and battery capacities on coaching stock.

Recommendations
The committee recommends that the following capacities of dynamos and batteries, which are being adopted at present, may be accepted as interim standards.

<table>
<thead>
<tr>
<th>GAUGE</th>
<th>Capacity of Dynamo</th>
<th>Capacity of Battery Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad</td>
<td>100 Amps.</td>
<td>300 Amp. hours</td>
</tr>
<tr>
<td>Metre</td>
<td>60 Amps.</td>
<td>200 Amp. hours</td>
</tr>
</tbody>
</table>

Decision
Approved.

Subject 3: Train Lighting Dynamos-"BROWN BOVERI". To discuss the performance of the modified design of "Brown Boveri" dynamo.

Recommendations
The Committee notes the recent decision of Railway Board to include the name of Messrs. Brown Boveri Co., in the list of approved suppliers for train lighting dynamos, as recommended vide para. 7 of the 14th Electrical Standards Committee's Report.
Subject 4: Train Lighting Dynamos – India Electric Works. To consider the performance of train lighting dynamo of "India Electric Works" make.

Recommendations
1. The Committee recommends acceptance of the Sub-Committee's report, particularly, placing of trial orders on the firm to the extent of 8 dynamos per railway. As the firm is making at present dynamos of 60 amps. capacity only, the trials will be confined to metre gauge railways.
2. The dynamos for these trials shall incorporate all the modifications recommended by the Sub-committee except that the requirements in respect of removable shaft and roller bearings may be relaxed for the above trial orders as requested by the firm.
3. The committee recommends that further action regarding implementation of the Sub-committee's report shall be taken by C.S.O. in consultation with its Convener (Chief Electrical Engineer, Western Railway).

Decision
1. Approved.
2. Approved.
3. Approved.

Subject 5: Train Lighting Batteries-"VARLEY" dry accumulators. To consider the trial report on “Varley” dry train lighting accumulators.

Recommendations
1. The committee notes that Directorate General of Supplies and Disposals have not received any response from the firm in regard to invitation to tender for "Varley" Dry Accumulators and that Directorate General of Supplies and Disposals have, therefore, cancelled the indent. In the circumstances, no further trials of these batteries are possible.
2. Eastern Railway have had these batteries under trial for about two years which is not considered to be a sufficiently long period. During this period some of these cells have given very low capacities which are not considered at all to be satisfactory. The Eastern Railway will, however, continue the present trials to finish.

Decision
1. Noted.
2. Noted.

Subject 6: Train Lighting Batteries-"STANDARD" batteries. To consider the trial reports on lead acid train lighting batteries supplied by Messrs. Standard Batteries Ltd.
Recommendations
1. The committee notes that supplies from Messrs. Standard Batteries Ltd., Bombay of their new "RPG" type batteries have been received only very recently and they have not even been put into service by some railways. In the circumstances, consideration of this subject may be deferred to the next meeting.
2. The committee recommends acceptance of the firm's recent proposal of supplying sealed in type cover instead of removable cover for these batteries.

Decision
1. Noted.
2. Noted.

Subject 7: Train Lighting Batteries-"AMCO" batteries. To consider trial reports of lead acid train lighting batteries of “Amco” make.

Recommendations
The committee has examined the Inspection Report by the Chief Electrical Engineer, Southern Railway and recommends placement of trial orders (with suitable financial and technical guarantees) on Messrs. Amco Batteries Ltd.

Decision
Approved.

Subject 8: Train Lighting Batteries-alkaline batteries of indigenous make. To record the progress in respect of establishment of indigenous capacity for alkaline batteries.

Recommendations
The committee notes that in this connection the railways have been asked by the Central Standards Office to furnish their anticipated future requirements of Alkaline Batteries and after further examination of the data received, would be Communicating the required information to the Ministry of Heavy Industries (Development Wing).

Decision
R.D.S.O. should progress this subject.


Recommendations
The committee recommends acceptance of the revised draft* specification for lead acid batteries as finalised by the Sub-committee.
*Since issued as I.R.S. specification E.2A-58

Decision
Approved.
Subject 10: Voltages & Capacities for battery charging sets-Standardization of voltages and capacities of battery charging sets.

Recommendations
The committee is of the view that the railways have so far inadequate experience with the metal rectifiers to undertake standardization and deems it advisable to defer consideration of this subject for sometime.

Decision
Noted. A Sub-committee consisting of CEE/Western Railway Convener and CEE/Central Railway should examine this subject for laying down interim standards.

Subject 11: Train Lighting-Position regarding equipped coaches. To review the position in respect of equipped and unequipped coaching stock.

Recommendations
The committee notes the progress made by railways in increasing the percentage of equipped coaches and recommends that each railway should take adequate steps early to improve the percentage further.

Decision
Approved.

Subject 12: Air-conditioning- Standardization of Voltages on the Air-Conditioned Coaches. Standardization of voltages for air-conditioning equipment for partially air-conditioned coaches.

Recommendations
The Committee has carefully examined the Sub-Committee's report and recommends that the Sub-Committee should review this matter in view of the difficulties reported by the Northern and North-Eastern Railways at the meeting.

Decision
Approved.

Subject 13: Air-conditioning- Defects & Failures of Air –Conditioning Equipment. To consider the defects and failures of air-conditioning equipment on Broad and Metre Gauge coaches and to make recommendations for overcoming the same.

Recommendations
The committee has examined the recommendations of the sub-committee as also comments of Messrs., J. Stone &. Co., on the same and makes the recommendations as at Appendix 'C' for partially Air-conditioned coaches.

Decision
Recommendations contained in Appendix 'C' approved.
Subject 14: Air-conditioner- Sealed and Semi-Sealed type. To consider the use of sealed and/or semi-sealed air-conditioners.

Recommendations
The committee recommends that a sub-committee consisting of Chief Electrical Engineer North-Eastern Railway (Convener) and South-Eastern Railway should examine the proposal, particularly its financial implications and submit the report.

Decision
Approved.

Subject 15: Train Lighting Dynamos-'V' Belt Drive. To consider the trial report of “V” belt drive.

Recommendations
In view of the satisfactory report received from Eastern Railway in respect of preliminary trials on 'V’ belt with fastener, the committee recommends that extensive trials should be conducted on each railway with this type of belting.

Decision
Approved.

Subject 16: Train Lighting Belting. To consider trials of indigenously produced train lighting belting.

Recommendations
1. The committee has examined the trial reports received from railways and is unable to recommend any additional make of belting as approved supplier on account of the tests not being conclusive due to thefts of belts etc.
2. The committee notes that the Railway Testing & Research Centre Lucknow are making arrangements for conducting bench tests.
3. The committee, therefore, recommends that in the circumstances tests with belting of various makes now under trial should be undertaken by R.T.R.C. simulating actual working conditions and the results obtained should be communicated to a Sub-committee consisting of the Chief Electrical Engineers, Central and Western Railways for their consideration. Copies of the trial reports already received by C.S.O. from railways on these belts may be forwarded to R.T.R.C. for their guidance.

Decision
1. Noted.
2. Noted.
3. Approved. The tests should be expedited and results progressed by R.D.S.O.

**Subject 17:** Electrical Equipment- Provision of fans. Schedules for fitting of fans in first class compartments.

**Recommendations**
The committee considers that though the target may remain as one fan per berth for 1st class compartments, this may not be possible to attain in certain cases such as a six berth M.G. compartment and that the railways may be permitted to make necessary relaxation both in respect of the number and size of fans keeping in mind the target.

**Decision**
Approved.

**Subject 18:** Coach Lighting-Blue Night Lights. To discuss the necessity of providing blue night lights in second and third class coaches other than sleeper coaches.

**Recommendations**
The committee notes that the recommendation contained in para. 6 of the 14th Electrical Standards Committee's Report is still under consideration of the Railway Board.

**Decision**
Traffic Directorate should progress this matter.

**Subject 19 & 20:** Electrical Equipment- List of Approved Suppliers. To review the list of approved suppliers for train lighting equipment. To make recommendations for the extension of the list of approved suppliers for train lighting equipment.

**Recommendations**
The committee recommends acceptance of the Sub-committee’s report. (Appendix E).

**Decision**
Approved.

**Subject 21:** Turbo-Generators- Testing.

**Recommendations**
The Committee recommends that:-

(a) the maximum temperature rise of the turbo generator shall be 60° C with class B insulation.

(b) it is not considered necessary to make any change in the existing stipulation regarding calibration of the voltage of the turbo generator at 500 watts.

(c) R.T.R.C. should conduct further tests to determine the maximum permissible voltage variation on the turbo generator for Headlight.

**Decision**
(a) Approved.
Subject 22: Overhead Electric Cranes- To prepare a standard specification for Overhead Electric Cranes.

Recommendations
1. The committee recommends that the C.S.O. should:
   (i) examine the mechanical and the structural features of the draft specification for travelling cranes.
   (ii) obtain the views of the manufacturers on the draft specification.
2. The committee recommends that the Sub-committee should review the draft specification further in the light of the above mentioned examination and submit its report.

Decision
   1. Approved.
   2. Approved.

Subject 23: Refrigerators-Standardization of refrigerators for use in saloons, tourist cars and medical vans, etc.

Recommendations
The committee notes that the essential features for standardization of refrigerators have already been laid down in paras. 9 & 10 of the 7th E.S.C. report. The following correction should, however, be made to para. 9(a) "Refrigerators have necessarily to be of the open type for D.C."

Decision
Noted.

Subject 24: Mobile Generating Sets and Flood Lights. Provision of mobile generating sets and portable food lights in break-down trains.

Recommendations
The Railway Board has already issued instructions vide their letter No. 50/142/26/M, dated 5-9-1951. Consideration of this item is, therefore, not necessary.

Decision
Noted.

Subject 25: Flood Lights Towers- Standardization of Flood Lights Towers.

Recommendations
   1. The committee recommends that the following heights of flood light towers should he standardized
15th ESC/New Delhi/1957

(1) 50 ft. (2) 75 ft. and (3) 90 ft.
2. The committee recommends that the C.S.O. should evolve economically' suitable designs for the above towers.

Decision
1. Approved. Flood light towers should as a rule be installed in junctions and yards where electrification of railways is proposed. This will eliminate the overhead lines necessary for point lighting.
2. Approved.

Subject 26: Running of coaching stock on electrified sections. To consider the results of trials with insulated roof tank fillers fitted on timber body coaches running on electrified sections.

Recommendations
The committee notes that trials in question have yet to be carried out and recommends that consideration of this subject be deferred to the next meeting.

Decision
Approved.

Subject 27: Electrical Material- Aluminium Conductors. To record the progress made in regard to use of aluminium conductor instead of copper in over-head net work.

Recommendations
The committee notes that the Railways are using aluminium conductors progressively for their overhead lines.

Decision
Noted.


Recommendations
The committee notes the Railway Board's decision that on account of shortage of officers in Electrical Department, it is not possible at present to appoint an officer on special duty for the above work.

Decision
The question should be reviewed next year.

Subject 29: Electrical Equipment- Fuse & Junction Boxes.

Recommendations
The Committee recommends acceptance of the Sub-Committee’s report.

Decision
15th ESC/New Delhi/1957

Approved.

Subject 30: Axle Pulley-Machining of axle for fitting of axle pulley required for driving the train lighting dynamo.

Recommendations
1. The committee reiterates the recommendation contained in para. 38 of the 11th Electrical Standards Committee's report in view of frequent cases of axle pulleys becoming loose in service resulting in unsatisfactory lighting in coaches and causing public complaints.
2. The committee notes that C.S.O. has examined the question of parallel machining of axles and that the same is possible in case of Broad Gauge and 12 ton axle only on Metre Gauge.
3. In case of 10 ton axle on Metre Gauge, parallel machining is not considered advisable by the C.S.O. on consideration of strength.
4. The Committee, therefore, recommends that for Broad Gauge and 12 ton axle on Metre Gauge, parallel machining may be resorted to and for 10 ton axle on Metre Gauge skimming of surface of axle to ensure a specified taper for pulley seat be accepted

Decision
39 to 42. RDSO should progress these recommendations in the light of the recommendations made by C.W.S.C. at its 36th meeting vide item 68.

Subject 31: Miscellaneous- Amenities for Narrow Gauge Stock. Schedule of electric fitting in Narrow Gauge stock.

Recommendations
1. The committee recommends the following standard of illumination for the future builds of Narrow Gauge coaching stock.
   - 2 ft. candle in I class compartments.
   - 1 ft. candle in III class compartments.
   - 1 ft. candle in I class lavatories.
   - 0.5 ft. candle in III class lavatories.
2. The provision of fans may be made to the extent feasible and necessary on individual railways.

Decision
1. Approved.
2. Approved.

Subject 32: Miscellaneous- Purchase on Rate Contracts.
To consider the removal of monetary limit in the case of direct purchase by railways of items covered by the D.G. (S. & D.) rate contract.

Recommendations
The committee notes the explanation given by Directorate General of Supplies & Disposals in their letter No. CSIB/209 (61)/IV, dated 14th March, 1957.
Decision
Noted.

Subject 33: Insulation for Head-light wiring of WP Engines.

Recommendations
The committee endorses the recommendation of the Eastern Railway as shown on their sketch No. 1532-54.

Decision
Approved.

Subject 34: Miscellaneous – Election of Sub-Committee Members to screen the agenda of next ESC meeting.

Recommendations
1. The committee nominates Chief Electrical Engineers, Central and Western Railways as members of the sub-committee for screening the agenda of the next meeting.
2. The committee recommends that the 16th meeting of the committee may be held in February, 1958, at Chittaranjan.

Decision
1. Approved.
2. RDSO should keep this recommendation in view when submitting proposal for the next meeting.

Subject 35: Electrical Equipment-Plug point in a.c. coaches. To reconsider provision of plug point in air-conditioned Coaches for use of electric razors.

Recommendations
The committee recommends the provision of a plug point in each lavatory of the fully air conditioned coach.

Decision
Approved. The socket should be marked 110V DC.

Subject 36: Axle Pulley: To consider acceptance of axle pulley of fabricated Design as a permissible alternative to the pressed one.

Recommendations
The committee considers that the fabricated axle pulley at present being supplied is not as satisfactory as the pressed steel one in respect of concentricity and alignment and, therefore, does not recommend the former as a permissible alternative.
Decision
Noted.

Subject 37: Inter-Vehicle Couplers. To consider the revision of IRS ‘E’ series drawings for inter vehicle couplers.

Recommendations
The committee recommends adoption of CSO sketch No. 56095 as standard for kent coupler.

Decision
Approved.

Subject 38: Restriction regarding voltage of the equipment used inside a coach body. To consider use of equipment working on voltage higher than 110 in coach superstructure.

Recommendations
The committee recommends that the voltage of the electrical installation "inside the coach body of Passenger Stock shall not exceed a nominal value of 110volts irrespective of the system adopted. This will, however, not be applicable to cases such as the high tension compartment of EMU stock etc., which is accessible only to authorised persons.

Decision
Approved.

Subject 39: Miscellaneous. To evolve standard practice for initial justification, purchase, erection, maintenance, operation and replacement of the various types of electrical plant and equipment on the Indian Railways general services.

Recommendations
The committee recommends that a Sub-Committee consisting of Chief Electrical I Engineers, Southern (Convener), Northern and Central Railway should examine the proposal and submit its report.

Decision
Approved.

Subject 40: Train Lighting- Tail Lamps in Coaching Stock. To consider the provision of red tail lamp on inspection carriages and tourist cars.

Recommendations
The committee recommends provision of red tail lamp at both ends of Inspection Carriages and Tourist Cars.

Decision
Approved.
### 16th ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

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<td>1.</td>
<td>S.C.B. Mazumdar</td>
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<td>S.K. Gopinath</td>
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<td>5.</td>
<td>S.L. Narayana Iyer</td>
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<td>G.K. Ambady</td>
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<td>R.J. Batliwala</td>
<td>CEE</td>
<td>NEFR</td>
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<td>8.</td>
<td>V.S. Gupta</td>
<td>Dy.CEE</td>
<td>SER</td>
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**RDSO**

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<td>1.</td>
<td>P.N. Talwar</td>
<td>DDSE /S (C&amp;W)</td>
<td>RDSO</td>
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<td>2.</td>
<td>Shanti Nath</td>
<td>ADS (S&amp;R), Secretary</td>
<td>RDSO, New Delhi</td>
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Subject 1: Policy regarding equipping of Coaches. To review the present policy regarding equipping of new builds of coaching stock.

Recommendations
1. The Committee is of the opinion that equipping to the extent of 100% for new builds is necessary for some more time (the actual period will be different for Broad Gauge and Metre Gauge) in order to meet the increased electrical loads necessitated by the present lighting and fannage amenities standards.
2. The Committee, therefore, recommends that the development of indigenous capacity for dynamos, switchgears, etc., should be accelerated so that the entire demands of the Railways are met from the indigenous sources by the end of the Second Five-Year Plan.
3. Considering the present indigenous capacity as also the acute foreign exchange position, the Committee has grouped the new builds under the following three categories as per priority indicated:
   Priority 1.-All-Steel coaches to be built by the established builders, such as Hindustan Aircraft Ltd" Integral Coach Factory and Messrs, Jessops & Co.
   Priority 2.-Coaches to be built by Railways in their own workshops.
   Priority 3.-Coaches to be built by Railways on contract.
4. The Committee recommends that a certain portion (say 15%) of the indigenous capacity should be kept reserved for meeting the replacement demand of the Railways. The balance should be utilised for equipping the new builds as per priority indicated.
5. The Committee also recommends that the new builds which cannot be equipped, should be wired as equipped coaches and the fitting of dynamos, switchgear and batteries be done later when sufficient indigenous capacity is developed.

Decision
1. Noted. In view of the acute foreign exchange position, this matter is under consideration of the Board and further instructions will follow.
2. Approved. RS(D) Branch should progress this recommendation.
4. All dynamos requiring replacement should be reclaimed.
5. Coaches should be wired as through-wired coaches and wiring necessary to make them self equipped coaches should be done at the time dynamos and batteries are fitted.

Subject 2: Train Lighting- Position regarding Equipped Coaches. To review the position in respect of equipped and unequipped coaching stock.

Recommendations
The Committee has reviewed the position of equipped and unequipped coaches as on 1.1.58 (Appendix 'A') and notes the improvement effected in the percentage of equipped coaches during the last year.

Decision
Noted.
Subject 3: Train Lighting Dynamos ‘India Electric Works’ make. To consider the performance of train lighting dynamo of 60 Amps. capacity manufactured by M/s. India Electric Works.

Recommendations
The Committee notes that the supply against the trial orders placed by different Railways has only recently been made or is being made. The Committee recommends that the trials should be expedited and completed as early as possible and that the Railways should submit reports thereon to the R. D. S. O. by the end of October, 1958. The question of placing of this make of dynamos on the approved list will be considered on the merits of the reports received from the different Railways and in consultation with the Chairman (Chief Electrical Engineer, Western Railway).

Decision
Approved. R.D.S.O. to progress expeditiously.

Subject 4: Train Lighting Batteries-"STANDARD" Batteries. To consider trial reports on lead acid train lighting batteries supplied by Messrs. Standard Batteries Ltd.

Recommendations
1. 
   (i) The Committee has reviewed the reports submitted by the various Railways and is of the opinion that the performance of M/s. Standard Batteries Ltd., has not been generally satisfactory.
   (ii) The Committee, therefore, recommends that the manufacturers’ attention should be drawn to the defects so far observed with a view to their taking remedial action.
2. The present trials should continue and reports submitted to R.D.S.O.

Decision
1. (i) Noted. (ii) Approved.
2. Approved.

Subject 5: Train Lighting Batteries-"AMCO" Batteries. To consider trial reports of lead acid train lighting batteries of “AMCO” make.

Recommendations
The Committee notes that an extended trial order has lately been placed on M/s Amco Batteries Ltd., with the guarantee clause as per Appendix 'A' of 14th Electrical Standards Committee's Report.

Decision
Noted.

Subject 6: Train Lighting Batteries-"VARLEY" Dry Accumulators. To consider trial report on -"VARLEY" Dry Train Lighting Accumulators.
Recommendations
The Committee has reviewed the report from Eastern Railway and recommends that no further trial on these accumulators be undertaken.

Decision
Approved.

Subject 7: Voltages and capacities of battery charging sets - Interim Standard for capacities of battery charging sets.

Recommendations
The Committee recommends that the provisional Specifications (appearing at Appendix D) prepared by the Sub-Committee may be adopted for general guidance. Individual Railways, when placing order, may make such changes as are considered necessary to suit their own conditions.

Decision
Approved.

Subject 8: Air-conditioning - Defects and Failures of air-conditioning equipment. To consider defects and failures of Air-Conditioning equipment of Broad and Metre Gauge coaches and to make recommendations for overcoming the same.

Recommendations
The Committee has noted the reaction of M/s. J. Stone & Co. India (Private) Ltd., to the recommendations made in Appendix 'C' of the 15th Electrical Standards Committee's report, but recommends that the replaced parts should be guaranteed for the same period as the original ones.

Decision
Approved.

Subject 9: Air-conditioners – Sealed and Semi-Sealed type. To consider the use of Sealed and/or Semi-Sealed Air-conditioners.

Recommendations
The Committee has considered the report of the Sub-committee. In view of the present policy of the Railway Board not to go in for further air-conditioning of coaches, the Committee recommends that the consideration of this subject may be deferred for the present.

Decision
Approved

Recommendations
In view of the present uncertainty regarding air-conditioning of the coaching stock in future, the Committee suggests that the question of standardization of voltages for air-conditioning equipment may be deferred for the present.

Decision
This matter should be finalized by the next meeting. R. D.S.O. to progress.

Subject 11: Train Lighting- Open Ended “V” Belt. To consider the trial report with open ended “V” belt.

Recommendations
Since the trials have not yet commenced, and are not likely to be completed in the near future, the Committee recommends that this subject may be discussed at the subsequent meeting.

Decision
Approved. Trials to be expedited.

Subject 12: Train Lighting Belting. To consider the trials of indigenously produced train lighting belting.

Recommendations
1. The Committee notes that the belting produced by M/s. Goodyear Tyre and Rubber Co. Ltd., has been found to be generally satisfactory in service. The Committee, therefore, recommends that this make of belting may be placed on the approved list.
2. The Committee notes that M/s. Bengal Belting Co. have intimated that they have discontinued manufacture of the jointless 4-ply train lighting belting.

Decision
1. Approved.
2. Noted.

Subject 13: Electrical Equipment- List of approved suppliers. To make recommendations for the extension of the list of approved suppliers for train lighting equipment.

Recommendations
The Committee recommends the acceptance of the Sub-committee’s report (Appendix E). The revised list of approved suppliers incorporating the recommendations made in the above mentioned report appears as Appendix ‘F’.

Decision
Approved.

Subject 14: Miscellaneous – Means to overcome theft of Equipment. To consider ways and means to avoid loss of electrical equipment from coaching stock due to theft.
Recommendations
The Committee recommends that a Sub-committee consisting of the Chief Electrical Engineers, North-Eastern Railway (Convener), Central and South-Eastern Railways should examine the matter and make suitable recommendations.

Decision
Approved. R.D.S.O. should expedite.

Subject 15:  Train Lighting – Control of lights in Guard’s compartment.

Recommendations
The Committee after considering the views expressed by the Various Railways (*Appendix B) recommends that a red pilot lamp in addition to the existing arrangement be connected to the light positive in the Guard's compartment to draw his attention that the lights of the train are 'ON' so that he can switch the train lights 'OFF' to avoid unnecessary drain on the batteries.

Decision
Approved.

Subject 16:  Train Lighting -Reading lights in Class I compartments. Disturbance to passengers due to reading lights in Class I compartments.

Recommendations
The night light fitting as shown on the Central Railway Drg. No. 587/5035 if adopted as a berth light fitting would eliminate the complaint of disturbance to the passengers. As the present design of this night light fitting is not efficient for adoption as berth light, the Committee recommends that the R. D. S. O. should evolve a suitable design.

Decision
Approved.

Subject 17:  Miscellaneous- To evolve standard practice for initial justification, purchase, erection, maintenance, operation and replacement of the various types of electrical plant and equipment on the Indian Railways-General Services.

Recommendations
This subject will be considered on receipt of the report of the Sub-committee.

Decision
Noted.

Subject 18:  Train Lighting - Schemes for meeting increased electrical load. To consider the adoption of end-on (prime mover) generation and/or axle generation at 110 volt D. C. for train lighting.
Recommendations
1. The Committee recommends acceptance of the Sub-committee's report (Appendix 'C').
2. In addition to trials on Northern Railway and North-Eastern Railway (including North East Frontier Railway) as recommended in the sub-para 2(ii) of the report, other Railways may also initiate these trials if they so desire.

Decision
1. Approved.
2. Approved.

Subject 19: Miscellaneous- Compilation data by I.R.C.A. To consider whether compilation of the data of different generating stations and annual returns of maintenance and repair costs of train lighting equipment should still continue.

Recommendations
The Committee having considered the views expressed by the various railways, recommends that the data should continue to be compiled but the basis should be standardized so that the data becomes comparable.

Decision
Approved. Statistical Branch to standardize the basis.

Subject 20: Emergency lighting equipment to be kept in Brake Van. Lighting equipment to be kept in brake van and used in case of emergency arising out of an accident

Recommendations
1. The Committee has considered the recommendation made by the Govt. Inspector of Railways in his report on the Mahabubnagar accident that occurred on the Central Railway and recommends that the supply for the light to be kept in the brake van for use in an emergency should be taken from the standard kent coupler.
2. The Committee considers that the general illumination necessary for the purpose in view, can be provided by a fitting as shown on Central Railway Drawing Number 487/5009, but is of the opinion that the requirements can be met more economically by providing two electric Hand Inspection Lamps in each brake van with suitable light dispersive type of reflectors.

Decision
1. Noted
2. This recommendation should be examined by Traffic and Electrical Directorates.

Subject 21: Standardization of dynamo and battery capacities on coaching stock. To consider standardization of dynamo and battery capacities for Broad Gauge and Metre Gauge special stock.

Recommendations
The interim standard capacities of dynamos and batteries for general Broad Gauge and Metre Gauge coaches were laid down vide para 4 of the 15th Electrical Standards Committee's Report.
The Committee recommends the adoption of following capacities of dynamos and batteries as standard for the special stock indicated against each :-

<table>
<thead>
<tr>
<th>Stock</th>
<th>Capacity of Dynamo</th>
<th>Capacity of Batteries</th>
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<tbody>
<tr>
<td>(a) B. G. Dining Cars, Tourist Cars and Bogie Inspection Carriages, etc.</td>
<td>120 Amps.</td>
<td>300 AH</td>
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<td>(b) B.G. and M.G. four –wheeler coaching stock.</td>
<td>40 Amps.</td>
<td>200AH</td>
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</table>

**Decision**
1. Approved.
2. Approved.

**Subject 22:** Inter-Vehicle Couplers. To consider provision of duplicate inter-vehicle coupler on M. G. coaching stock similar to B. G stock.

**Recommendations**
The Committee does not favour the provision of duplicate inter-vehicle coupler on Metre Gauge coaching stock.

**Decision**
Noted

**Subject 23:** Wiring in Motor and Parcel Van. To review the necessity for the provision of wiring and lights in motor and parcel vans.

**Recommendations**
The Committee is unable to recommend any change in the existing practice due to divergent views expressed by the operating department of different Railways.

**Decision**
Traffic Directorate to examine.

**Subject 24:** Specification for 110 Volts DC/AC Carriage Fans. To consider adoption of draft I.R.S. specification for 110 volts D.C.A.C. Carriage fans.

**Recommendations**
The Committee recommends the adoption of draft IRS Specification for 110 volts A.C./D.C. carriage fans as appearing in Annexure III of the minutes of Screening Sub-Committee.

**Decision**
Approved.
Subject 25: Miscellaneous- Election of Sub-Committee Members. To elect members of the Sub-Committee to screen the agenda of next ESC Meeting.

Recommendations
The Committee nominates Chief Electrical Engineers, Eastern and Western Railways as members of the sub-committee for screening the agenda of the next meeting.

Decision
Approved.
### 17th ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

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<th>Railway.</th>
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<td>1</td>
<td>S.K. Gopinath</td>
<td>CEE (Chairman)</td>
<td>ER</td>
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<td>2</td>
<td>S.C.B. Mazumdar</td>
<td>CEE</td>
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<td>3</td>
<td>J.D. Malhotra</td>
<td>CEE</td>
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<td>4</td>
<td>H.R. Dogra</td>
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<td>P.C. Bahree</td>
<td>CEE</td>
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<td>S.S. Kochak</td>
<td>CEE</td>
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<td>C.L. Pasricha</td>
<td>Dy. CEE</td>
<td>SR</td>
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<td>8</td>
<td>R.J. Batliwala</td>
<td>CEE</td>
<td>NEFR</td>
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<td>9</td>
<td>P.N. Talwar</td>
<td>DDSE/S(C), Secretary</td>
<td>RDSO</td>
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#### RDSO

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<td>D.Kumar</td>
<td>JDSE (Carr.)</td>
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<td>D.V.K. Sastri</td>
<td>JDSE (Ele.)</td>
<td>RDSO</td>
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<td>3</td>
<td>A.S. Nagra</td>
<td>SO (Ele.)</td>
<td>RDSO</td>
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#### RAILWAY BOARD

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<td>1</td>
<td>L.N. Mathur</td>
<td>DSE</td>
<td>Railway Board</td>
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<tr>
<td>2</td>
<td>Shanti Nath</td>
<td>DDSE</td>
<td>Railway Board</td>
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Recommendations
1. The Committee has considered the main points raised by Battery Manufacturers for revision of I.R.S. Specification for lead acid batteries and does not recommend any change in respect of following stipulations:-
   (i) The basic temperature of 60°F as indicated in sub clause 3 (a).
   (ii) The minimum average voltages during discharge as indicated in sub-clause 3 (b),

2. As regards other clauses, the Committee recommends that:-
   (A) TABLE OF CORRECTION FACTOR FOR TEMPERATURE:- The correction factor for temperature as given in table in sub-clause 3 (a) will be applicable in case of Plante type batteries but for pencil type batteries a separate table of correction factor will have to be stipulated.
   (B) TESTS:-
      (i) Directorate-General (Supplies and Disposals) shall keep an overall quality control check at Maker's works generally on the lines indicated in Director of Inspection, Calcutta's letter No. SP-26/122, dated 14-10-1958 (Appendix "B").
      (ii) The acceptance tests for the supply made through Directorate - General (S&D) or otherwise shall be carried out in dealing railway’s works in consultation with the Maker’s local representative
      (iii) The quantity to be tested as per sub-para. (ii) above shall not exceed 5% with minimum of one set of 12 cells. Should the test on any set of cells prove unsatisfactory, the indenting railway will carry out re-test on double the number of sets originally selected for test. If any cell on re-test gives unsatisfactory result, the entire lot shall be rejected. Directorate-General (S&D) in that event will ask the firm to arrange free replacement of the entire supply.
      (iv) The stipulation regarding initial and service tests may be modified to call for capacity test only in case of sealed-in type of batteries.
   (C) GUARANTEE:-
      (i) The details of guarantee clause shall strictly form a part of the order to be placed by Directorate General (S&D) or individual railways. The specification, however, shall contain the following:-
         "The firm must guarantee satisfactory service of their batteries under terms and conditions stipulated in the Invitation to Tender. In addition, the firm shall provide free 'after sale' service and liaison with railways for free replacement of cells during the guarantee period."

      (ii) The guarantee clause to be included in the Invitation to Tender should be standardized for uniform application to all the manufacturing firms. This clause should be on the following lines:-
17th ESC/Calcutta/1959

"The period of guarantee and free replacement to be 27 months. This period shall commence from the date of commissioning of sets or 9 months from the date of supply, whichever is earlier."

Decision
1. Noted.
2. Approved. R.D.S.O. to finalise very early revision of specification in consultation with Director-General of Supplies & Disposals and Battery manufacturers.

Subject 2: Train Lighting- ‘STANDARD’ batteries. To consider trial reports on lead acid train lighting batteries supplied by Messrs. Standard Batteries Ltd.

Recommendations
The committee has examined the trial results submitted by the railways and notes that a number of complete failures of cells has been reported. These Cases of failures as also other defects reported by the railways should be brought to the notice of the firm for immediate action regarding their elimination in case of future supplies against orders already placed. The existing trials should, however, continue.

Decision
Approved. Trials to be finalised as quickly as possible. R.D.S.O. to submit a comprehensive up to date report at the next meeting of the Electrical Standards Committee.

Subject 3: Train Lighting- ‘AMCO’ batteries. To consider trial reports on lead acid train lighting batteries of "AM CO" make (Type Tuboid B. 10).

Recommendations
The Committee has examined the trial report submitted by the railways and notes that no case of failure of cell has been reported. However, the period for which these trials have continued is too short to come to a conclusion. The defects so far noticed should be brought to the notice of the firm so that they can eliminate the same in case of future supplies. The present trials should continue and trial results reviewed at the next meeting.

Decision
Approved. Railways to finalise trial as quickly as possible. R.D.S.O. to submit a comprehensive up-to-date report at the next meeting of the Electrical Standards Committee.

Subject 4: Train Lighting Dynamos- “India Electric Works” make. To consider the performance of train lighting dynamos of 60 Amps. capacity manufactured by Messrs. India Electric Works.

Recommendations
1. As service trial has only recently been started, the consideration of this subject is deferred to the next meeting. The Committee, however, notes that the firm has lately modified their dynamo which has, on bench test, shown slight improvement.
2. The defects still persisting have been brought to the notice of makers and their proposals for rectification are awaited.

Decision
1. Modifications and further tests should be expedited to decide upon their acceptance or otherwise without further delay.
2. R.D.S.O. to expedite.

Subject 5: Train Lighting – Cut-in Switch Versus Rectifier. To consider the use of rectifier as permissible alternative to cut-in switch.

Recommendations
The Committee notes that North-Eastern Railway is using rectifier in place of the cut-in and cut-out switch for the last two years to meet the special conditions prevalent on that railway due to short supply of the cut-in switches and high incidence of theft. The question of considering rectifier as a permissible alternative to cut-in switch does not arise at present. Further experiments should be continued on the North-Eastern Railway and the Sub-Committee consisting of Chief Electrical Engineer, Northern and North-Eastern Railways should examine results and submit a report.

Decision

Subject 6: End-on–Generation of Electricity on trains. To consider trial reports regarding end-on-generation of electricity on trains.

Recommendations
The Committee notes the trial reports submitted by Eastern and North-Eastern Railways and considers that no conclusive evidence at this stage can be drawn from these reports. In view of the fact that the Special Committee appointed by the Board will examine this subject while considering the future mode of generation for train lighting purpose, the Committee recommends that consideration of the subject should be deferred till the deliberations of the special committee are complete.

Decision
Noted.

Subject 7: Train Lighting- Axle Generation at 110Volt DC. To consider trial reports regarding axle generation at 110 volt. DC.

Recommendations
The Committee recommends that consideration of this subject (along- with item No. 6) should be deferred till the report of the special committee appointed by the Board is made available.
Decision:
Noted.


Recommendations
1. The Committee does not recommend any change in the specification in respect of requirements for service value and minimum air delivery on account of data furnished by Government Test House, Alipore (Appendix "M").
2. The Committee recommends additions of following sub-clause below the existing clause 14 of I.R.S. Specification No. E4-54 :-
   "If so desired by the Purchaser, the fan base, gimbal ring, motor body and regulator box shall be spray-painted with good quality enamel or synthetic paint according to the colour specified by the indentor. The fan blades, complete guard and supports, regulator, base plate (metallic) and lever shall be electroplated as specified by the indentor."
3. The committee notes that M/s Hindustan Aircraft Ltd. have accepted the use of aluminium alloy for carriage fan body and that RDSO has since advised Hindustan Aircraft Ltd., to substitute cast iron for the purpose pending examination of a suitable securing arrangement in case of fan body made of light alloy. The Committee recommends that the matter should be further investigated by RDSO and suitable amendment made in the specification.

Decision
1. Approved.
2. Approved.
3. Approved.

Subject 9: Train Lighting- Coach Wiring. To consider elimination of 37/064 size VIR flame retarding cable for coach wiring.

Recommendations
The Committee recommends that a sub-committee consisting of Chief Electrical Engineers, North-Eastern (Convener), Western and Northern Railways should examine this matter and submit a report.

Decision
Approved.

Subject 10: Reading lights in First Class compartments- To consider adoption of reading light to ROSO's sketch No. 58240 for use in first class compartments.

Recommendations
The Committee has examined the sample reading light fitting and recommends that the same should be improved by Northern Railway in collaboration with R.D.S.O.
Decision
Approved. The Committee will also keep in view suitable modifications are to the existing fittings so that these not scrapped.

Subject 11:  Train Lighting- Position regarding Equipped Coaches. To review the position in respect of equipped and unequipped coaching stock.

Recommendations
The Committee notes with satisfaction the improvement made in the percentage of the equipped coaches.

Decision
Noted

Subject 12:  Axle Pulley. To consider standardization of Axle Pulley as shown on RDSO's drawing No. EA 11 140 (Preliminary) and allied part drawings.

Recommendations
The Committee generally accepts the design of axle pulley as shown on Drawing No. EA-140 (tentative) and recommends that the same should be finalised by R.D.S.O. in consultation with the manufacturers.

Decision
Approved.

Subject 13:  Train Lighting Belting- Open Ended “V” Belt. To consider the trial report with open ended “V” belt.

Recommendations
The Committee recommends that trial with “V” belt should be expedited and results intimated to RDSO for further action.

Decision
Approved.

Subject 14:  Train Lighting Belting. To consider trial reports on train lighting belling manufactured by M/s Oriental Rubber Industries Ltd., Bombay.

Recommendations
The Committee notes that the performance of belting produced by M/s. Orientel Rubber Industries Ltd. is not entirely satisfactory. In order to encourage this firm to effect improvement, Committee recommends that order for limited supply may continue to be placed and their performance watched so that it can be reviewed at the next meeting.
Decision
R.D.S.O. should have further tests finalised as quickly as possible and submit a comprehensive up-to-date report at the next meeting of the E.S.C.

Subject 15: Alteration to I.R.S. Metre–Gauge Coaching Bogies. To consider ways and means of improving the working conditions of train lighting belting in case of Metre Gauge coach.

Recommendations
The Committee recommends that R.D.S.O. should investigate the problem and circulate to Railways its proposals for rectification of the trouble.

Decision
Approved.

Subject 16: Standardization of voltages of the air-conditioned coaches.
To consider standardization of voltage for air-conditioning equipment for partial air-conditioned coaches.

Recommendations
As the report of sub-committee has not been received, the consideration of the subject is deferred till the next meeting.

Decision
Noted.

Subject 17: Electrical Equipment- Plug points in air-conditioned coaches. To record Railway Board's decision regarding provision of plug points in air-conditioned coaches for electric razors.

Recommendations
The Board's decision is recorded. Provision of plug point in each lavatory as per para 49 of XV Electrical Standards Committee's Report may not now be necessary.

Decision
Noted.

Subject 18: Means to overcome theft of equipment. To consider ways and means to avoid loss of electrical equipment from coaching stock due to theft.

Recommendations
The Committee has gone through the sub-committee's report and action suggested should be reviewed by individual railways in consultation with their Chief Security Officers for adoption.
Decision
Railways should pay particular attention to theft prevention measures. R.D.S:O. to prepare suitable design drawings regarding wiring on the under-frame in conduit, locking arrangements for covers, use of ferrous Components where possible etc., in terms of Sub-committee’s report.

Subject 19: Miscellaneous- Normal Life of electrical assets. To consider fixation of “Average Life” for different electrical equipments.

Recommendations
The committee recommends that a sub-committee consisting of Chief Electrical Engineers, North East Frontier, Northern, North Eastern Railways should examine this matter.

Decision
Approved.

Subject 20: Engine Headlight. To consider improvements to be effected in the engine headlights to obtain the increased intensity of illumination.

Recommendations
1. The committee notes that Dr. Thacker of Council for Scientific and Industrial Research, New Delhi has been examining the question of improving the engine headlight in consultation with Railway Board, Further consideration of this matter is, therefore, deferred till the results of investigation made by Dr. Thacker are available.
2. The Committee recommends use of wadding composition for cleaning the reflectors and front glasses.
3. The Committee reiterates its recommendations made in para. 46 of XIV Electrical Standards Committee's report to use glass reflector in preference to metallic reflector. The creation of indigenous capacity for glass reflectors should be expedited.

Decision
1. Noted.
2. Approved.
3. Noted. Railway Stores (Dev.) Branch to take necessary action.

Subject 21: Miscellaneous- Compilation of data by I.R.C.A.
To standardize the basis for compilation of the data of different generating stations and annual returns of maintenance and repair costs of train lighting equipment.

Recommendations
The Committee recommends that a sub-committee consisting of the Chief Electrical Engineers, South Eastern (Convener) and North East Frontier Railways should examine and standardize the basis of compilation.

Decision
Approved. The C.E.E., Northern Railway should be the Convener in place of C.E.E., South-Eastern Railway.
Subject 22: Turbo-Generators.
To consider recommendations made by Messrs J. Stone & Co. Ltd., to overcome high temperature rise and voltage variation in case of their turbo generators.

Recommendations
The Committee is in favour of permitting a higher temperature rise if "H" class insulation is used in case of turbo-generators. The Committee recommends that the question of maximum permissible voltage variation should be examined by the Chief Electrical Engineer, Northern Railway in consultation with R.D.S.O.

Decision
Approved.

Subject 23: Miscellaneous- Election of Sub-Committee Members. To elect members of the Sub-Committee to screen the Agenda of the next E.S.C.Meeting.

Recommendations
The Committee nominates Chief Electrical Engineers of the Eastern and South-Eastern Railways as members of the Sub-Committee for screening the agenda of the next meeting.

Decision
Approved. The sub-committee should associate Joint Director, Standard (Electrical) as Secretary.

Subject 24: Switches for lights and fans. To consider elimination of switches for lights and fans provided for use of passengers in third class coaches.

Recommendations
The Committee notes the Railway Board’s decision regarding withdraw of blue night lights and recommends that no individual switches need be provided for lights inside the compartments of second and third class coaches. As regards fans the present practice of providing individual switches should continue.

Decision
Approved.

Subject 25: External Lights on unequipped coaches. To examine the I.C.F.'s proposal to provide external light in case of unequipped coaches.

Recommendations
The Committee does not recommend any change in the existing practice of not providing external lights in case of unequipped coaches. There is also no need to provide the base ring for subsequent attachment of external light fitting in case of unequipped coaches built at I.C.F.
Decision
Approved but base ring for subsequent attachment of external lights fitting in case of unequipped coaches should be provided to facilitate provision of the fitting latter if required when it is decided to equip a higher percentage of coaches.
18th Electrical Standards Committee Meeting Held at Bangalore, in April, 1960

Shri H. R. Dogra as Chairman, Electrical Standard Committee conducted the Meeting.
18th ESC/Bangalore/1960

**Subject 1:** To consider the report of the special committee appointed by the Railway Board to advise the most suitable mode of generation of electricity and the most suitable voltage for meeting the increased train lighting load on the Indian Railways.

**Recommendations**
The report of the special Committee appointed by the Railway Board was discussed & the Committee recommends its acceptance.

**Decision**
As the existing 24 volts double battery system is still the most suitable, the recommendation is approved.

**Subject 2:** To consider the Trial reports regarding end-on-Generation of Electricity on trains.

**Recommendations**
In view of the recommendation against item 1, further trials on this system may be dropped.

**Decision**
Approved. The rakes that are now running on the railways on the system should continue to run until they are required to be changed and their working kept under observation to record further experience and utility of this system.

**Subject 3:** To consider trial reports regarding Axle Generation at 110 V.DC.

**Recommendations**
In view of the recommendation against Item 1, further trials on this system may be dropped.

**Decision**
Approved.

**Subject 4:** To consider the use of Cardan shaft drive on B.G. & M.G. coaching stock for driving of the train lighting dynamo.

**Recommendations**
In view of the recommendation against Item 1, this item may be dropped.

**Decision**
Approved.

**Subject 5:** To consider the revision of IRS Specification E/2A-58 for lead acid batteries for train lighting purposes.

**Recommendations**
1. The Committee have considered the draft specification prepared by the Sub-committee and recommend the acceptance of the draft specification with the following modifications:-
2. Clause 2(ii) shall be reworded as under:-
"Lead acid cell: A cell in which the electrolyte is diluted sulphuric acid and which is fitted with plates in which the active materials are:
(i) Positive electrodes: Lead peroxide
(ii) Negative electrodes: Spongy lead

3. Clause 2(xxxii) shall be reworded as under:-
"Rating: The ampere-hour capacity of a cell assigned to it by the manufacturer, under the specified conditions of discharge."

4. Reference temperature:
"The reference temperature in the specification may be altered to 27°C (80.6°F). It will be necessary to give two sets of capacities of batteries under Clauses 3 and 4 corresponding to each of the reference temperature of 60°F and 80.6°F. The battery capacity corresponding to the reference temperature of 80.6°F will be 10% higher as compared to the capacity corresponding to 60°F."

5. Clause 3(a) Table-Variation of capacity with temperatures: There shall not be a separate table for "variation of capacity with temperature" in case of batteries, fitted with tubular type of positives.

6. Clause 8(a) shall be reworded as under:
“Box: The cells shall be supplied in moulded composition or wrapped and moulded ebonite or hard rubber boxes which shall be resilient but shall not bulge, buckle or disintegrate under the temperature conditions met with in train lighting service, and shall not contain any impurity which might be abstracted by the electrolyte to the eventual detriment of the plates. Hard rubber containers shall retain their shape under all conditions of service including the range of temperature encountered, viz. 0°C to 60°C.”

7. Clause 25(ii) shall be reworded as under:-
"The acceptance test shall be carried out in the workshop of the indenting railways. The maker's representative may be present at these tests. In the case of supplies made through D.G. S.& D., the representative of the D.G. S.&D.,shall also be present."

8. Clause 25(c) shall be reworded as under:-
"(c) Service tests: On completion of a minimum of one year's actual service commencing from the date of acceptance test a representative sample of the batteries shall be subjected to inspection and test, to satisfy that:

(i) the ampere-hour capacity at 10-hour rate is not less than 100% of the initial tested capacity;
18th ESC/Bangalore/1960

(ii) that there is no appreciable sign of buckling, swelling, corroding or cracking of lid or container.

(d) Final service Test:

On completion of a minimum of two years actual service but not exceeding 27 months commencing from the date of acceptance tests, the said batteries will be subjected to final inspection and test. These batteries should satisfy all requirements given in para.25(c) above, except that the ampere-hour capacity at 10 hour rate shall not be less than 90 percent of initial tested capacity.

If any of the cells fail to comply with the test specified in Clause 25(c) or (d), they shall be replaced free of charge and the indentor shall have the option to test as many other cells of that batch as considered necessary by the indentor."

9. Clause 26 shall be reworded as under:-
“Guarantee: The firm shall guarantee satisfactory service with their batteries for a minimum period of 27 months from the date of acceptance. If any of the cells fail to comply with any of the conditions stated in para 25 above at the time of final test or any time earlier, the firm shall replace free of cost the cells having the capacity below the above-mentioned figures during the 27 months period by new cells.

NOTE: The replacement mentioned above shall be effected within two months of intimation of defects by the Railway and these shall be also similarly guaranteed. The Specification E-2A modified in the light of the above recommendation is attached.

Decision
5 to 13. Approved. R.D.S.O. should revised I .R.S. Specification which should cover only the technical description. Any conditions of contract considered necessary should be listed separately.

Subject 6: To consider (a) the use of Wooden Poles for Carrying Electric Overhead Lines while Crossing Railway Tracks and to consider (b) the regulations for the crossing of Railway Track electrified on 25KV 50 Cycle System.

Recommendations
1. Part (a). The Committee do not recommend the use of wooden poles for carrying overhead power lines for crossing the railway tracks.
2. Part (b). The Committee recommends the appointment of a Sub-Committee consisting of the Chief Electrical Engineers of Eastern & South Eastern Railways to redraft “the regulations governing the placing of electric transmission lines across the railway tracks” in view of the introduction of 25 kV 50 cycles single phase A.C. system on Indian Railways.

Decision
1. Wooden poles shall not be used for carrying overhead power lines while crossing railway tracks.
2. Approved. ENC, Railway Electrification should also be a member of this Sub-Committee.

**Subject 7:** To consider standardization of voltage for conditioning equipment for partially air-conditioned coaches.

**Recommendations**
The Committee accepts that the 24 volt system is too low, particularly for the B.G. partial A.C. coaches as supported by actual experience and heat load calculations during the hottest summer months over some of the railways. The Committee do not, however, recommend any wholesale modification to the existing partial A.C. coaches on account of the following:-

a. Need for importation of special equipment to suit the higher voltage.
b. Space limitations in the case of M.G. coaches for accommodating more cells to suit the higher voltage.
c. Introduction of yet another size and type of A.C. equipment.
d. Unlikelihood of building new partial A.C. coaches over railways.

In view of the above, the Committee recommends the continuance of the existing 24 volt system for partial A.C. coaches both on the Broad and Metre Gauges. The Committee, however, recommends reducing the heat load on the existing partial A.C. coaches to within the capacity of the present plant by providing a corridor on one side in lieu of the existing arrangement of individual compartment doors opening on both sides.

**Decision**
Approved. R.D.S.O. to progress expeditiously the modification of the layout of the partial air-conditioned coaches.

**Subject 8:** To consider the use of two wires of 19/.064 in place of 37/.064 size VIR Flame Retarding Cable for coach wiring on B.G. coaching stock.

**Recommendations**
The Committee recommends the use of two wires of 19/.064 connected in parallel at both ends in place of the following wires standardized for the roof wiring of the B.G. coaches:-

a. Common through negative -37/.064
b. Auxiliary negative -19/.064

decision
Approved.

**Subject 9:** To consider use of rectifier as permissible alternative to cut-in switch.

**Recommendations**
The Committee consider that the selenium rectifier is not a technically sound proposition for use in place of the existing auto cut-in and cut-out switch, but there is no objection to its use as a palliative, under special circumstances, e.g. high incidence of theft.


**Decision**

Noted.

**Subject 10:** To consider fixation of "Average Life" for different electrical equipments.

**Recommendations**

The Committee recommends the acceptance of the Sub Committee's recommendations with the changes in the lives of the following assets as detailed below:-

- Item 8. Rectifier battery charging sets 15 years
- Item 15. Train Lighting Lead Acid batteries 4 years
- Item 20(a) Room Air-conditioners upto 3 tons 5 years
  - (b) Larger central units above 3 tons 10 years
- Item 21. Turbo generators for headlights 20 years
- Item 22. Wiring and fitting in steam locos 3 years

**Decision**

This will be examined separately and Board's orders advised later.

**Subject 11:** To standardize the basis for compilation of (a) the data of different generating stations and (b) the annual return of costs for the maintenance and repair on Train Lighting Equipment, on railways.

**Recommendations**

The Committee recommend the acceptance of the report of the Sub Committee with the following modification to the basic cost per ton of fuel vide item (F):

- Coal Rs. 20 per ton
- Diesel oil Rs. 300 per ton

**Decision**

Approved.

**Subject 12:** To consider a suitable design of the reading lights for use in 1st Class compartments.

**Recommendations**

The Committee recommends the sample fitting developed by the Northern Railway to be adopted as a standard for use on the railways. A suitable fitting should be developed by the R.D.S.O. for use in A.C. coaches.

**Decision**

The approved fitting to be adopted only on new coaches/R.D.S.O. to modify suitably existing berth light fittings in First class & A/C compartments & also to develop a new design for new A.C.coaches.

**Subject 13:** To consider standardization of illumination of all railway premises. Running sheds, yards, Loco Inspection Pits, etc.(excluding Train Lighting).
Recommendations
The Committee recommends the appointment of a Sub Committee consisting of the Chief Electrical Engineer, N.E. Railway (Convener) and N. Railway to go into this and fix minimum standards for illumination of the various railway premises etc.

Decision
Approved.

Subject 14: To consider the voltages, wattage & caps of lamps for use of electric and diesel-electric rolling stock.

Recommendations
The Committee recommends the appointment of a Sub-Committee consisting of Chief Electrical Engineer, SE Rly (Convener), E Rly and C Rly to go into this case and fix the standards for the various lamps needed in the diesel and electric locomotives and E.M.Us.

Decision
Approved.

Subject 15: To consider the performance of Train Lighting Dynamos of 60 Amps. capacity manufactured by Messrs India Electric Works.

Recommendations
The reports on the performance of I.E.W. modified train lighting dynamos having been reviewed, the Committee is of the opinion that the modified dynamos incorporating the latest modifications also have not proved satisfactory in performance; the major shortcomings being:

- Excessive sparking on the carbon brushes;
- Excessive blackening of the commutator; and
- Running out of the solder from the commutator bars.

The Committee recommends that the defects be brought to the notice of the manufacturers to enable them to improve the quality of their supply. The Committee further considers that one prototype dynamo incorporating necessary modifications in the light of the above be submitted to the N Rly for further bench tests.

In view of the above, the Committee recommends that all further supplies of I.E.W. dynamos may pend till the satisfactory bench tests of the modified prototype dynamo by the N Rly are over.

Decision
Noted. R.D.S.O. should bring this to the notice of M/s I.E.W. Ltd. and to D.G.S&D for early action and progress the tests expeditiously.

Subject 16: To consider the performance of Train Lighting Dynamos of 60 and 100Amps. capacity manufactured by M/s Beni Engineering Works Ltd.
18th ESC/Bangalore/1960

Recommendations
The reports on the bench tests on the performance of Beni’s train lighting dynamos were reviewed and found to be generally satisfactory except the minor defect of the armature not being dynamically balanced. The Committee notes that educational orders have been placed on this firm and dynamos are being put under service trials on different railways. Further action on placing this dynamo on the list of "Permissible alternatives" may, therefore, pend the receipt of satisfactory reports on the performance under service conditions. Meanwhile, educational orders may continue to be placed on this firm.

Decision
Noted. The service trials should continue and the firm should be advised to balance dynamically as quickly as possible the future armatures of their dynamos. In view of the defects being minor and their being inadequate indigenous manufacturing capacity there need not be any restriction by way of placing educational orders only.

Subject 17: To consider trial reports of Lead Acid Train Lighting Batteries supplied by M/s Standard Batteries Ltd.

Recommendations
The Committee have examined the trial reports submitted by the railways as summarized in Appendix ‘M’ of the Agenda from which it is clear that there have been a large percentage of premature failures even on their latest modified RPG cells within the first two years of service due to the following:-
   a. Positive tubes buckling and bursting.
   b. Positive, tubes breaking from the busbars.
   c. Negative plates shedding spongy lead.

In view of the unsatisfactory experience, the Committee recommend that the attention of the manufacturers be drawn to the shortcomings in their products and the firm advised that until such time they can improve the quality of their batteries, they cannot be considered for being put on the "Permissible alternative" list. However, despite the above mentioned shortcomings, the Committee, with a view to develop a healthy competition without sacrificing the interest of the railway, recommend that the D.G.S&D and the Railway Board be advised to restrict the placing of annual orders on this firm to not more than 25% of the total annual requirements of the Indian Railways for reasons stated above till these cells are, accepted as "Permissible alternative".

Decision
Approved. Present trials should continue.' The defects observed should be brought to the notice of the manufacturers. The D. G. S&D to be advised to restrict for the present orders for cells of this make to 25% of the total annual requirements of the railways. To develop healthy competition E.S.C. to consider early removal of this restriction in their next meeting in light of further experience during the year. The tests to be pursued vigorously by RDSO in order to finalize the case as early as possible.
Subject 18: To consider trial reports of Lead Acid Train Lighting batteries of "Amco" make (Type Tuboid B-10).

Recommendations
The Committee have examined the trial reports submitted by the Railways as summarised in Appendix 'N' of the agenda. The Committee consider that the new type of Amco tuboid battery has not been in service for a sufficiently long time for any definite opinion being expressed before it can be placed on the list of 'Permissible alternatives'. The Committee, therefore, recommend with a view to develop a healthy competition without undue risk to the interest of the railway, to restrict the placing of annual orders on this firm to not more than 25% of the total annual requirements of Indian Railways and this limit may be reviewed next year in the light of further experience.

Decision
Approved. Trials should be pursued vigorously and the matter finalised as early as possible.

Subject 19: To consider the trial reports on Train Lighting Belting being manufactured by M/s Oriental Rubber. Industries Ltd., Bombay.

Recommendations
The Committee recommends the acceptance of this belt as a "Permissible Alternative". The firm's attention may, however, be drawn to the need of reducing the overall thickness of their 4-ply belt to 3/16th inch with a tolerance of + 7 1/2%.

Decision
Approved. D.G.S&D to be advised.

Subject 20: To consider trial reports of train Lighting Belting manufactured by M/s B.N. Rubber Works, Delhi.

Recommendations
The Committee reviewed the performance reports on the T.L. belts manufactured by Messrs B.N. Rubber Works, Delhi and are of the opinion that it may be accepted as a “Permissible Alternative”.

Decision
Approved. D.G.S&D to be advised.

Subject 21: To consider trial reports with open ended ‘V’ Belt.

Recommendations
The Committee notes that this item be dropped due to the service trials being generally unsatisfactory.

Decision
Noted.
Subject 22: To review the position in respect of equipped and unequipped coaching stock.

Recommendations
The Committee note the position of equipped and unequipped coaches on the railways.

Decision
Noted. The programme for equipping coaches within the funds allotted to be expedited by railways.

Subject 23: To standardize various types of electrical plugs for railway use.

Recommendations
The Committee recommends that, as an improved safety measure, the following types of plugs be provided in all future installations:
- Up to 110 volts - 2 pin
- Up to 230 volts - 3 pin
- Up to 400 to 600 volts - 4 pin (interlocked) or alternatively controlled by a suitably earthed switch

As regards existing installations in buildings, the individual railways will undertake the changeover on a programmed basis.

Decision
Approved.

Subject 24: To consider revision of I.R.S. Specification E-14/53 for Train Lighting Belting.

Recommendations
RDSO will gather the details of the duck used in the manufacture of the various types of T.L. belting that are in use on the railways and investigate what thickness should be mentioned in the I.R.S. Specification.

Decision
Noted. RDSO should progress this.

Subject 25: To consider the performance of the switch-gear manufactured by M/s Brocho & Co. Calcutta for inclusion in the list of approved suppliers.

Recommendations
The Committee do not have the test results based on which the recommendations of the Screening Sub-Committee were made. These may be circulated to railways and this item discussed at the next meeting.

Decision
Noted.
Subject 26: To consider introduction of payment by results system in Railway workshops.

Recommendations
Informally discussed.

Decision
Railways should implement this system early.

Subject 27: To consider the revision of I.R.S. Specification No.E-23/54 for Multicore Flexible Cable for inter-coach couplers of MU stock.

Recommendations
The Committee recommends that a Sub-Committee of the Chief Electrical Engineers of Southern (Convener), Western & Central Railways be formed to revise the specification to meet the Railways requirements.

Decision
Approved.

Subject 28: To consider the use of P.V.C. cables for coaching stock as an alternative to V.I.R. cables.

Recommendations
The Committee considers that individual railways may undertake suitable experiments on P.V.C. cables and submit their experience to the R.D.S.O. for placing it before the next E.S.C.

Decision
Noted.

Subject 29: To elect members of the Sub-Committee to screen the agenda of the next E.S.C. meeting.

Recommendations
The Committee nominates Chief Electrical Engineers of Northern and South Eastern Railways as members of the Sub-Committee for screening the agenda of the next meeting.

Decision
Approved.

Subject 30: Preparation of a Manual for the Electrical Department.

Recommendations
The Committee recommends that an officer may be appointed on special duty to prepare a manual for the Electrical Department.
Decision
This matter will be examined by the Railway Board.

Subject 31: To consider modifications to standard coach wiring diagrams CSE-2 & CSE-35 for Broad & Metre Gauges respectively.

Recommendations
a. The Committee recommends that all under frame wiring should be encased in a trough and that all wiring to switches and dynamos be carried out in flexible conduit.
b. It is noted that various methods were adopted for charging the batteries on the Railways. RDSO will gather the details of these various systems with a view to standardizing the most suitable method for battery charging.
c. The Committee approves the wiring diagram No.CSE-35 for M.G. coaches.

Decision
a. Approved. RDSO should issue modified drawings to all railways.
b. RDSO to examine.
c. Approved.

Subject 32: To consider provision of standby arrangement for Loco Headlights in the event of failure of its own turbo generator.

Recommendations
The Committee discussed the subject in detail and agreed to drop it.

Decision
Noted.

Subject 33: To consider provision of RED tail lamps on both sides of the Inspection Carriages and Tourist Cars.

Recommendations
The Committee note that there is considerable divergence of opinion among the Operating Depts. of different Railways on the issue whether the red tail lamp on Inspection carriages should be of the
a. Portable oil type, or
b. Electric fixed type.
The Committee is therefore of the opinion that this subject be discussed first by the Chief Operating Superintendents of different railways to elicit their opinion before this Committee can come to a decision. In the mean time, no new red tail lamps should be fitted to the Inspection Carriages or Tourist Cars.

Decision
Noted. R.D.S.O. to arrange for this subject to be discussed at the next meeting of the Chief Operating Superintendents and put up their recommendations at the next meeting of the E.S.C.
Subject 34: To consider simplification of lighting arrangements at minor stations based on austerity standards.

Recommendations
Informally discussed.

Decision
Board’s instructions have already been issued.

Subject 35: To consider the use of Flame retarding/Fire resisting cables for coach wiring.

Recommendations
The Committee recommends the use of V.I.R. cables as under:-
Cables “Flame retarding” type for wiring of coaches for train lighting & Cables “Fire resisting” type for wiring of head lights on steam locomotives.

Decision
Approved, provided they are manufactured indigenously.

Subject 36: To consider trial reports on AFA (PA Type) Lead Acid Train Lighting Batteries.

Recommendations
The Committee note that cells of this type are in service on some HAL coaches. The Committee could not come to a decision on this subject as the trial reports were not available. The trial reports should, therefore, be circulated by the R.D.S.O. before the next E.S.C. meeting.

Decision
Noted. RDSO should progress this for purpose of record of comparative performance.
19th ELECTRICAL STANDARDS COMMITTEE
MEETING HELD IN APRIL 1961
(The Proceedings could not be found hence not available in this compendium)

20th ELECTRICAL STANDARDS COMMITTEE
MEETING

Members Present

<table>
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<tr>
<th>S. No.</th>
<th>Name /Shri</th>
<th>Designation</th>
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<tbody>
<tr>
<td>1.</td>
<td>J.D. Malhotra</td>
<td>CEE</td>
<td>CR</td>
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<td>S.S. Kochak</td>
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<td>P.C. Bahree</td>
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<td>C.L. Pasricha</td>
<td>CEE</td>
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<td>5.</td>
<td>R.J. Batliwala</td>
<td>CEE</td>
<td>NFR</td>
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<td>6.</td>
<td>P.N. Murti</td>
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<td>S.P. Tonse</td>
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<td>8.</td>
<td>S.C.B. Mazumdar</td>
<td>CEE</td>
<td>WR</td>
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<tr>
<td>9.</td>
<td>A.S. Nagra</td>
<td>SO (Ele.)</td>
<td>RDSO, Shimla</td>
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RDSO

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<td>2.</td>
<td>D.Kumar</td>
<td>JDSE (Carr.)</td>
<td>RDSO</td>
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RAILWAY BOARD

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<td>JDSE</td>
<td>Railway Board</td>
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<tr>
<td>2.</td>
<td>Shanti Nath</td>
<td>DDSE,RS (Dev.)</td>
<td>Railway Board</td>
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</table>
Subject 1: Standardization of dynamos and battery capacities on Coaching Stock. To revise the existing standards of the train lighting dynamos to be used on the equipped coaches of Broad and Metre Gauge.

Recommendations
The Committee accepted the recommendations made by the Sub-Committee in para 6(a) and 6(b) (i) of their report. It was decided to delete the recommendations made in para 6(b) (ii) of the Sub-Committee's report.

Decision
The following are approved as future standards:

<table>
<thead>
<tr>
<th>Dynamo Amps</th>
<th>Batteries AH</th>
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</thead>
<tbody>
<tr>
<td>(a) All bogie coaching stock such as first, second and third classes etc (BG)</td>
<td>100</td>
</tr>
<tr>
<td>(b) All bogie coaching stock such as first, second and third classes etc. (MG)</td>
<td>60</td>
</tr>
<tr>
<td>(c) 4 Wheeler coaching stock BG and MG</td>
<td>60</td>
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</tbody>
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As regards equipping of coaching stock the following procedure should be adopted:

(i) All new coaches may continue to be equipped as at present.
(ii) For purposes of equipping old coaches the overall percentage of 85/0 for BG and 90/0 for MG coaches may be adopted for the present.
(iii) Existing coaches over 30 years of age or likely to be condemned within 5 years on condition basis should not be equipped.

The position should, however, be reviewed at the end of the III Plan period.

Subject 2: Standards for train lightning equipments for NG Stock. To standardize train lighting equipments as well as the wiring layout etc. on 2 ft and 2 ft 6 inches NG coaching stock.

Recommendations
The Sub-Committee's report tabled at the meeting was discussed and the Committee accepted the recommendations made, with para 3(i) reading as follows:

"Dynamo-40 amps, belt-driven, either directly or with counter shaft; 24/32 volts".

Decision

(i) Dynamo: 40 amps belt driven, either directly or with counter shaft 24/32 volts.
(ii) Battery: 2 sets of 120 AH capacity 24 volts.
(iii) Control of lights and fans: Manual system of control of lights and fan by:- (a) Iron clad switch single or double pole (b) 5 Contact switch
(iv) Inter Coach Coupler: 3 pin coupler between coaches leaving the choice of 4 pins to sections where bell communication arrangement is provided.
(v) Junction box: Standard 15 way junction box.
(vi) Wiring: \[
\begin{align*}
+ve \text{ main} & \quad 7/0.064 \\
-ve \text{ main} & \quad 7/0.064 \\
\text{Lighting main} & \quad 7/0.064 \\
\text{Auxiliaries} & \quad 7/0.029
\end{align*}
\]
(vii) Ratio between wired and equipped coaches. Railways should decide the percentage of equipped coaches bearing in mind the financial commitments involved.

Subject 3: Revision of IRS Specification for Train Lighting Switchgears. To consider the modification of the IRS Specification No. E3-53 for train lighting switchgears.

Recommendations
The Committee recommended that the Chief Electrical Engineer, Northern Railway, in consultation with the RDSO, should prepare a fresh draft specification, based on the latest comments received from the manufacturers and circulate to all the Chief Electrical Engineers for their comments so as to enable the draft to be discussed and finalised at the next ESC meeting.

Decision
Approved. The proposed changeover to aluminium insulated cables should also be taken into consideration while revising the specification.

Subject 4: Provision of battery charging terminals on the underframe.

To consider the provision of separate battery charging terminals on the underframes.

Recommendations
The Committee was of the view that the provision of separate battery charging terminals was most desirable. The sample terminal box made in accordance with the recommendations of the Sub-Committee was exhibited. After discussions, the Committee recommended that further consideration needs to be given for developing a simpler and cheaper design.

Decision
Noted. RDSO' should finalise the design in consultation with the Chairman of the ESC and railways. Railways should carry out the modification as the coaches pass through shops.


Recommendations
The Committee noted that the performance reports on the switchgear as manufactured and supplied by M/s. G. K. Engineering Works to the Central, Eastern and Southern Railways, during the last 2 years, were not satisfactory. In view of the fact that sufficient and adequate
capacity for such switch-gear was now available in the country, the Committee recommended that further trials in the nature of developmental work for this switch-gear was no longer necessary.

**Decision**
Noted. TL switchgear should be obtained to specification (IRS-E.3/53 under revision) and further trials with products of different manufacturers discontinued.

**Subject 6:** Approved Suppliers for Switchgear-M/s Brocho & Co., Calcutta. To consider the performance of the train lighting switchgear manufactured by MJs. Brocho & Co., Calcutta.

**Recommendations**
The Committee noted that the performance report on the switchgear as manufactured and supplied by MJs. Brocho & Co., Calcutta to the Eastern, North Eastern, South Eastern and Western Railways, during the past years, were not satisfactory. In view of the fact that sufficient and adequate capacity for such switch-gear was now available in the country, the committee recommended that further trials in the nature of developmental work for this switch-gear was no longer considered necessary.

**Decision**
Noted. Further trials with products of manufacturers of TL switchgear should be discontinued and supplies obtained to specification No. IRS- E.3/53 (under revision).

**Subject 7:** Reading Light in A.C. Coaches. To consider suitable design of the reading light for use in air-conditioned coaches.

**Recommendations**
1. After examination of the designs put forward by RDSO and Northern Railway, the Committee recommended the adoption of the one made by Northern Railway as the future standard reading light for use in Air-conditioned compartments.
2. The Committee also recommended a similar reading light, but cheaper in construction, for use in 1st class compartments, as an alternative to the design already approved by the ESC.

**Decision**
1. Approved.
2. Noted. RDSO should expeditiously finalise the alternative design in consultation with the C.E.E., Northern Railway in view of the complaints being received from the travelling public.

**Subject 8:** Turn-tables for Locomotives. To consider standardization of a suitable electric drive for Turn-Tables.

**Recommendations**
1. The committee noted that different types of electric drives have been evolved by the various railways for operating locomotive turn-tables.
2. The committee recommended trials of the RDSO design on the Eastern and South Eastern Railways. The Committee also recommended a Sub-Committee consisting of Chief Electrical Engineers of the South Eastern, Southern and Northern Railways to collect the experience gained by the Railways with these drives with a view to evolve a suitable standard design. It was decided that Chief Electrical Engineer, South Eastern Railway would be the convener of this Sub-Committee.

Decision
1. Noted.
2. Approved. Trials should be started forthwith and the Sub-Committee's recommendations should be placed before the next ESC meeting.

Subject 9: Loco Headlights- M/s Beni Ltd. To consider the provision of silver plated copper reflectors as an alternative to glass reflectors for Loco Headlights.

Recommendations
The committee recommended the adoption of the silver-plated copper reflectors for locomotive headlights manufactured by M/s. Beni Ltd., as a permissible alternative to the glass reflector. The committee also noted the efforts being made by the firm to develop anodized aluminium reflectors.

Decision
Approved. Further trials should be conducted with anodized aluminium reflectors as and when these are made available. The assistance of the Central Electro-Chemical Research Institute, Karaikudi, should be enlisted in regard to the production of anodized aluminium reflectors for trials.

Subject 10: Turbo Generators- M/s Beni Limited, Calcutta. To consider the performance of the Turbo-Generators manufactured by M/s Beni Ltd., Calcutta.

Recommendations
1. The committee recommended the turbo generators manufactured by M/s. Beni Ltd., Calcutta, being placed on the permissible alternative list, after discussing the test reports on these generators.
2. The committee in making this recommendation noted the efforts being made by the firm to reduce the voltage variation from full load to no-load which is at present on the high side.

Decision
1&2. Approved. M/s Beni should, however, continue their efforts to reduce the voltage variation from full load to no-load.

Recommendations
1. On account of simplicity in design and reduced maintenance costs, the committee recommended adoption of AC turbo generators as the future standard.
2. In view of this recommendation and the fact that M/s G. K. Engineering Works offered a D.C. generator, the committee does not recommend any further trial with it.

Decision
1. Approved.
2. Approved. This should be brought to the notice of the manufacturer.

Subject 12: Statodyne Equipment. To consider the introduction of "Statodyne" equipment for railway carriages in place of conventional belt driven train lighting dynamos.

Recommendations
1. The committee noted the acceptance by the Railway Board of the offer by M/s J. Stone & Co., to the supply of ten sets of Tonum Inductor train lighting equipment free of cost for trial without obligation and the same number of Statodyne equipment from M/s E.V.R. Ltd., Paris.
2. It was decided that trials be progressed by the RDSO in collaboration with the Central and Northern Railways after the receipt of the equipments. The committee recommended that the Chief Electrical Engineers of all the Railways be kept informed of the progress of the tests, so that they can witness/associate themselves with the tests from time to time.

Decision
1. Noted.
2. Approved. The Board should also be kept informed of these trials.

Subject 13: Cables for Train Lighting. To consider use of PVC Cables in lieu of VIR Cables for train lighting.

Recommendations
1. On account of shortage of VIR cables in the country, the various Railways had already started using PVC cables for train lighting purposes. Eastern and South Eastern Railways had equipped 50 and 242 coaches so far respectively. Central Railway had also equipped some of their coaches while other Railways had recently made a start with these PVC cables.
2. In view of the fact that these PVC cables have been in service for only a short time, the Committee could not report on the actual service performance, but desired that their use for train lighting be continued.

Decision
1. Noted.
2. Approved. RDSO should collect the present experience of various railways, conduct any further trials, if considered necessary and submit their recommendations expeditiously.
Subject 14: Electric Tail Lamp. To consider provision of fixed red tail lamps in the Inspection Carriages and Tourist Cars.

Recommendations
The Committee noted the agreement of the Operating Department to the provision of fixed electric tail lamps on both sides of the inspection carriages and tourist cars, as recommended by the XV ESC meeting.

Decision
Noted.

Subject 15: Train Lighting Dynamos. To consider the provision of modified ammeter terminals for measuring the output of train lighting dynamos.

Recommendations
The Committee noted that the ammeter terminals for testing the train lighting dynamos were standard equipment on the generating coaches. The Committee was of the view that these terminals could be drilled and tapped for 3/8" grub screws permitting the connection and disconnection of an ammeter, while the dynamo is generating.

Decision
Approved. The work should be carried out by railways during POH.

Subject 16: Train Lighting Dynamos. To consider the provision of fixed "Output adjuster" resistance instead of the present "Adjuster" with various tappings.

Recommendations
The Committee recommended modifying the present design of output adjuster to provide for only three terminals instead of the existing five tappings. These three adjustments to be for outputs of 70%, 90% and 100%.

Decision
Approved the provision for addition.

Subject 17: Illumination Standards. To consider standardisation of illumination of all railway premises-Running Sheds, Yards, Locomotive Inspection Pits etc. (excluding train lighting).

Recommendations
The Committee accepted the report of the Sub-Committee and recommended that the standard of illumination laid-down in Resolution No. E/72 of the 5th meeting of the Electrical Section of the IRCA held in 1932 to be continued in so far as the minimum standards of illumination were concerned.

Decision
Approved.

Recommendations
Since the results with the modified relays as supplied by M/s J. Stone & Co., had not so far been conclusive, the committee recommended that trials with these relays be continued.

Decision
Merits of both Beni/Stones overvoltage relays in actual working, may be assessed and the possibility of eventually standardizing on one common type may also be considered by the RDSO.

Subject 19: TL Dynamos. To consider the use of axle-hung, nose suspended, train lighting dynamos actuated by pinion and gear system in place of existing belt driven dynamos.

Recommendations
After discussions, the committee recommended that even though the traction motor type of suspension for train lighting dynamos was fraught with difficulties the coaching wing of the RDSO should examine the matter further in all details.

Decision
Approved.

Subject 20: Battery Box for Air-conditioned Coaches. To consider standardisation of battery boxes for fully air-conditioned coaches.

Recommendations
The Committee recommended the adoption of the following sizes of battery box as a future standard for the batteries for BG AC coaches:

- Length: 2680 mm.
- Height: 630 mm.
- Depth: 520 mm.

Decision
Approved.

Subject 21: Drawing for Spare Parts. To prepare part drawings for spares of loco headlights, train lighting and air-conditioning equipments.

Recommendations
The committee recommended that RDSO should collect drawings from various Railways and manufacturers and review the matter as to which drawings can be issued as standard drawings by the RDSO and which could be issued by the Railways on a pooled basis.
Decision
Approved. RDSO should take necessary action to standardize each component of the switchgear without delay, so that indigenous switchgear would conform to detailed drawings issued by RDSO.

Subject 22: Locomotive Headlights. To consider fixing the location of headlight switchboard in locomotives.

Recommendations
The committee notes that the present location of the headlight switchboards of locomotives is quite satisfactory and no change is justified.

Decision
Noted.

Subject 23: Inter vehicle couplers for coaching stock. To consider standardisation of the length of 5-core flexible cable required for inter vehicle couplers.

Recommendations
The Committee considers that the standardization of the length of Kent coupler cable is not possible due to different types of coaches in use on the Indian Railways. They recommend that individual Railways may purchase the Kent coupler cable in long lengths instead of ordering the complete assembly and regulate the exact length to suit the body overhang.

Decision
Approved. Individual Railways should take necessary action.

Subject 24: IRS Specification E2A-60. To consider the revision of IRS Specification E2A-60 for train lighting Lead Acid Batteries.

Recommendations
The Committee recommended a Sub-Committee of the CEE, Northern Railway (Convener) and North Eastern Railway and RDSO to finalise the specification No. E2A-60 for train lighting lead acid batteries.

Decision
Approved. The finalised specification with RDSO’s comments should be forwarded to the Board early without waiting for the next ESC meeting.

Subject 25: Cable for Wiring Purposes. To consider the substitution of Aluminium in place of copper in various types of cables.

Recommendations
1. In view of the Government of India policy and consequent impending changeover from copper to aluminium conductors from 1-4-62, the Committee discussed the various
techniques of joining aluminium to aluminium and aluminium to copper conductors as being developed by various cable manufacturers in the country.

2. The Committee was informed that M/s B.L.C.C. have already given demonstrations in Bombay and Calcutta and also developed suitable facilities for training of cable jointers.

3. The Committee recommends that each Railway may make suitable arrangements for training of their staff.

**Decision**

1. Noted.
2. Noted.
3. Approved. Expeditious steps should be taken by the Railways.

**Subject 26:** Coaching Stock on Railways. To review the position in respect of equipped and unequipped coaching stock as on 1-1-1962.

**Recommendations**

The Committee noted the position of equipped and unequipped coaching stock on different Railways as on 1-1-1962.

**Decision**

Noted.

**Subject 27:** 21st ESC Meeting. To elect the members of the Sub-Committee to screen the Agenda of the next ESC meeting.

**Recommendations**

The Committee recommended the appointment of a Sub-Committee comprising of CEEs/Central and Southern Railways to screen the agenda of the 21st ESC meeting.

**Decision**

Approved.

**Subject 28:** IRS Specification E-1-48. To consider modification to IRS Specification No. E-1-48 for train lighting dynamos.

**Recommendations**

The Committee recommends that the Specification for train lighting dynamos of all types should be reviewed so as to make them suitable for slow-speed trains.

**Decision**

Approved. RDSO should prepare the draft Specification in consultation with the manufacturers arrange for trials of prototypes.
Subject 29: Regulations for Electric Transmission. To consider the modifications to the regulations governing the placing of electric transmission lines across Railway Tracks.

Recommendations
The Committee noted that it has not been possible for the Sub-Committee to submit its report in time and that convener may, therefore, be requested to finalise the matter before July, 1962 and submit the same to RDSO.

Decision
Noted. The revised specifications may be submitted to the Board early without waiting for the next ESC meeting.
21st Electrical Standards Committee Meeting Held at Baroda in March, 1964

Shri S. S. Kochak, CEE/ER as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Batteries for train lighting. To revise the IRS specification no. E-2A-1939 for train lighting batteries.

Recommendations:
Para 1. The recommendations of the sub-committee appointed vide Item 24 and Para 30 of the 20th ESC meeting, and the final draft specification framed were discussed at the meeting by the members. The recommendations made by the screening committee on 3.3.64 were also taken into consideration.

Para 2. The following are the final modifications recommended by the members regarding IRS specification E-2A-1939:
(i) Clause 24 (ii)- Acceptance test: The tests may be carried out at any Railway workshop nominated for indentor.
(ii) Clause 24 (c) & (d)- Service tests: The capacity after one year service should be 100% of the initial rated capacity.
Note: The members were of the opinion that the capacity demanded at the end of 27 months is 90% of the rated capacity, it is quite reasonable to expect at the end of the year 100% of the rated capacity and not of the initial capacity.
(iii) Clause 9- Separators: Regarding the retention of wooden separators in the specification, the members were of the opinion that this should stand.
(iv) Clause 3- Rating and performance: The members desired that Clause 3 should be amended so that the reference test temperature should be 80.6°F instead of 60°F and all subsequent charts should be amended accordingly.

Decision:
Para 1 & 2. RDSO should revise the specification in the light of recommendations made and issue to all concerns.

Subject 2: Train lighting switch gear. To consider the modification to IRS specification to IRS specification no. E-3-53 for train lighting switch gears.

Recommendations:
Para 3. The draft specification prepared by the sub-committee, appointed vide Item 3 and Para 3 of the 20th ESC meeting, was discussed. The following modifications were recommended by the members:
(i) Dynamo cut-in and out switch: In second line following should be added after the words “contactor type or of an approved alternative design”.
(ii) Lamp resistance:
   (a) In second line insert ‘normally’ before ‘capable’
   (b) In third line ‘8 volts’ should be replaced by ‘6 volts’
   (c) Against current ratings of 10 & 20 amps mentioned add “when specified”
(d) Add the current ratings ’50 amps’

(iii) Clause 12- Type of switch gear: Add the following to this Para:
“The terminals of the switch gear should preferably be accessible for connecting and disconnecting the switch from outside without opening the switch.”

(iv) Appendix A of the specification add ‘ohmic’ resistance and number of turns of the coils under the item details of winding.

**Decision**: Para 3. RDSO should revise the specification in the light of recommendations made and issue to all concerned.

**Subject 3**: Train lighting. To consider the modification to IRS specification to IRS specification no. SS/E-4-1958 for carriage fans.

**Recommendations**:
Para 4 (i). The following modifications to the specification were recommended by the members:
Clause 15- Performance data: The air displacement and service value figures should be modified after tests as per the latest BS specification have been conducted by Northern Railway in conjunction with RDSO on the present approved fans in use under following conditions:
   (a) With fan guards on
   (b) With the guards off
   (c) With the fan guards having different spacing of the wire mesh

Para 4. (ii) The figures to be finally included in the specification should be with the fan guard on and the spacing of the mesh should be specified.

**Decision**: Para 4 (i) & (ii): Tests should be conducted as per Indian standards specification no. 555. Air delivery and service value to be specified in the revised specification shall be on the basis of tests (as per ISS: 555) conducted on approved fans.

**Subject 4**: Battery charging terminals. To consider the provision of separate battery charging terminals on the underframe.

**Recommendations**:
Para 5 (i). The samples of the battery charging terminals manufactured by the various Railways were exhibited, at the meeting including RDSO design.
(i) The committee recommended that design of the battery charging terminals manufactured by the Central Railway more or less is similar to RDSO design and should be tried out by Railways with the following modifications:
(ii) The terminal tightening screws should be such that they could not be removed completely and the top cover should be sealed and should have an opening on the top
for tightening the nuts without opening the cover. The nuts should also have washer forming a part of the nut.

(iii) The modified battery charging terminal should be sent to all CEEs and RDSO for trials by Chief Electrical Engineer, CR.

**Decision**: Para 5 (i) to (ii): RDSO should issue revised design and Railways should conduct trials.

**Subject 5**: Reading light. To consider further improvements in the present design of the reading lights in the 1st class & AC coaches.

**Recommendations:**

Para 6. The various berth light fittings designed and manufactured by different Railways were inspected by the Committee and some of these were tried out in a coach during the night time. The Committee made the following recommendations:

The design of the reading light manufactured by NR should be adopted as standard for the first class coaches, the actual mounting position for the fitting being finally located and adjusted by each Railway to suit the position in the coach.

Para 7. For the AC coaches the NR should try out the use of the same fitting as that recommended for I class coaches making the following modifications:

(a) A 15 watt 110V BC lamp having the same dimensions filament position in 15 watt 24V BC lamp should be used and if necessary a special manufacturing arrangement made through and educational order.

(b) The switch should be eliminated from fitting so as to make it similar and fitting should be nickel plated for use in AC coaches. A separate standard switch suitably mounted should be provided in the AC coaches at a convenient location for each berth light fittings for the passenger’s convenience as done in the case of reading lights in aero-planes.

**Decision**: Para 6. Approved.

Para 7. RDSO should finalize the design of berth lights for AC coaches in consultation with the Chief Electrical Engineer, NR within 3 months issue revised design and Railways should conduct trials.

**Subject 6**: Turn tables for locomotives. To evolve a suitable electric drive for turn tables for locomotives.

**Recommendations:**

Para 8. The report of the Subcommittee appointed vide Para 10 of Item 9 of the 20th ESC was discussed at meeting and the committee made the following recommendations:
The members of Subcommittee should inspect the various systems of electrical drive for the loco turn table installed on the various Railways and submit a specific recommendation on this subject. They should also indicate the capital cost, operating cost and economics of the use of various designs involved, including the foreign exchange element required, if any, in the provision of the type of the turn table recommended.

**Decision**: Para 8. Approved: This should be finalized at the next ESC meeting.

**Subject 7**: Cables for train lighting. To consider the use of PVC cables in lieu of VIR cables for train lighting in coaches.

**Recommendations:**

Para 9. The experience of the railways on the use of PVC cables in coaches was discussed and the Committee recommended the use of PVC cables as permissible alternative for use in lieu of VIR cables restricting the use of PVC cables having fire resisting properties.

Para 10. RDSO should prepare a specification of PVC cables for use in the coaches and circulate it to all the railways and manufacturers for their comments.

**Decision:**

Para 9. PVC cables are approved as permissible alternative to VIR cables for train lighting.

Para 10. RDSO should prepare a specification for circulation to railways taking into consideration the existing Indian Standards specification no. 694 for PVC cables.

**Subject 8**: Train lighting. To consider the use of aluminium conductor cables in place of cables in place of copper conductor cables in coaching stock.

**Recommendations:**

Para 11. The question of having single standard aluminium conductor cables was discussed and the Committee recommended that in view of the fact that Railways will have to switch over to aluminium conductors, PVC single conductor aluminium cables of the sizes equivalent to the following copper conductor sizes should be used by each Railway on about a dozen coaches, for for wiring to try out the use of single standard aluminium cables of lower sizes and report to RDSO their experience after watching their performance:
Para 12. PVC aluminium cables used for this purpose should have fire resisting properties.

**Decision**: Para 11 & 12 Noted, RDSO should follow up the trials.

**Subject 9**: Record not found.

**Subject 10**: Record not found.

**Subject 11**: Record not found.

**Subject 12**: Train lighting. To consider the use of rectifier in place of auto-cut in & out switch.

**Recommendations:**

Para 16. The reports of the various railways on the performance and use of various types of rectifiers of selenium and silicon type in place of auto cut in and out switches were discussed in the meeting and the Committee recommended that the trials with silicon rectifiers should continue as it has better characteristics than selenium rectifiers. RDSO should prepare a specification for silicon rectifiers for this purpose -and circulate to all railways for their comments.

**Decision**: Para 16. RDSO should prepare a specification for circulation to railways.

**Subject 13**: Locomotive wiring. To standardize the light points in the steam locomotive.

**Recommendations:**

Para 17. The number and wattage of light points recommended by the committee are shown below, along with the present number and wattage in vogue:
Provision of light points in steam locos

<table>
<thead>
<tr>
<th>SN</th>
<th>Description of loco</th>
<th>Present lighting provided</th>
<th>Provision of lighting as recommended in 21st ESC</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>Watt</td>
</tr>
<tr>
<td>1.</td>
<td>Head light 250 W</td>
<td>1</td>
<td>250</td>
</tr>
<tr>
<td>2.</td>
<td>Water gauge lights 15 W each</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>3.</td>
<td>Pressure vacuum gauge lights 15 W</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>4.</td>
<td>Lubricator light 15 W</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>5.</td>
<td>Bunker light 15 W</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>6.</td>
<td>Injector light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Link motion light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Name plate light as nominated</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>9.</td>
<td>Plug points underneath side platform</td>
<td>2</td>
<td>--</td>
</tr>
</tbody>
</table>

Total 6 lights & 2 plugs. 325 watt & 2 plugs. 455 watt

Remarks: In items 6, 7 & 8 two portable hand lamps should be provided to be worked from plugs against Item 9 and these will normally be at the injector.

Decision: Para 17. Approved.

Subject 14: Locomotive wiring. To consider the performance of the indigenous brands of slow burning cables for loco headlight wiring.

Recommendations:
Para 18. The experience gained by Eastern and Central Railways of using indigenously produced slow burning cables manufactured by M/s ICC and Heneley was discussed at the meeting and it was recommended that the trials with these cables should continue and in the meantime, to overcome the difficulties in the procurement of suitable cables, the
portion of the cable required to be used in the bullet nose of the WP locomotive be done in either way as shown below:

(i) By using bare copper with insulating beads or

(ii) By covering the existing cable with asbestos tape.

**Decision**: Para 18. RDSO should follow the trials on the indigenously produced slow burning cables.

**Subject 15**: Train lighting. To consider the provision of electric equipment in the crew rest vans.

**Recommendations:**
Para 19. The report from the NR and the views of the members were considered at the meeting and a Subcommittee consisting of Chief Electrical Engineer, ER & NR was appointed to collect all data and investigate the problem in detail and submit recommendations.

**Decision**: Para 19. This should be finalized at the next ESC meeting.

**Subject 16**: Train lighting. To discuss the specification for the batteries for the diesel electric locomotives.

**Recommendations:**
Para 20. The committee recommended that all Railways should send their comments to RDSO for the preparation of a modified specification for consideration which should be examined by a Subcommittee consisting of CEE, CR & SER for further action.
Para 21. Members were of the opinion that the specification already prepared by RDSO for these batteries may in the meantime be worked to.

**Decision**: Para 20. RDSO to prepare final specification after obtaining the views of the various Railways.

**Subject 17**: Miscellaneous. To review the position in respect of equipped and unequipped coaching stock.
Recommendations:

Para 22. The committee recommended that this subject be dropped from the agenda as the proportion of equipped carriages with rakes to unequipped carriages is being brought up to the higher percentage needed for meeting increased loads.

Decision: Para 22. Noted.

Subject 18: Miscellaneous. To discuss the standardization of deficiency record statements:
(a) For engine head lights
(b) For train lighting equipments.

Recommendations:

Para 23. The committee suggested that each Railway may be allowed to continue with the system in vogue which has been instituted in joint consultation with the security and Electrical Departments and standardization of this was not considered necessary.


Subject 19: Miscellaneous. To elect members of the Subcommittee to screen the agenda of the next ESC meeting.

Recommendations:

Para 24. The committee recommended the appointment of the CEE, ER and CEE, SER as the members of the next ESC.


Subject 20: Train lighting. To consider the use of metal battery boxes instead of wooden battery boxes in all coaches.

Recommendations:

Para 25. The committee was of the opinion that wood is the best material for the battery boxes.


Subject 21: Miscellaneous.

Theft of electric copper wires on traction Railways:
To discuss the question of fixing proprietary sizes of copper wires for electric traction on Railways.
Recommendations:
Para 26. The members considered that there would be great advantage if the protection can be given by an act to electric traction wires on the same lines as given to telegraph wires, the members appointed a Subcommittee consisting of the CEEs of ER & SER to go into this question in detail and recommend the suitable sizes of wires for this purpose. After examining all implications and submit a detailed report.

Decision: Para 26. Approved. This should be finalized at the next ESC meeting.
### 22nd ELECTRICAL STANDARDS COMMITTEE
#### MEETING

#### Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name / Shri</th>
<th>Designation</th>
<th>Railway</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>S.P. Tonse (Chairman)</td>
<td>CEE</td>
<td>SER</td>
</tr>
<tr>
<td>2.</td>
<td>V. Seetharaman, S. S. Kochak</td>
<td>CEE CEE (Const.)</td>
<td>CR</td>
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<tr>
<td>3.</td>
<td>J. D. Malhotra</td>
<td>CEE</td>
<td>ER</td>
</tr>
<tr>
<td>4.</td>
<td>V. S Gupta</td>
<td>CEE</td>
<td>NR</td>
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<tr>
<td>5.</td>
<td>C. L. Pasricha</td>
<td>CEE</td>
<td>NER</td>
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<td>6.</td>
<td>D. S. Mehta</td>
<td>CEE</td>
<td>NFR</td>
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<tr>
<td>7.</td>
<td>D. V. K. Sastri</td>
<td>CEE</td>
<td>SR</td>
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<td>8.</td>
<td>T. S. Viswanathan</td>
<td>CEE</td>
<td>WR</td>
</tr>
<tr>
<td>9.</td>
<td>N. Padmanabhan</td>
<td>Engineer in Chief</td>
<td>RE, Calcutta</td>
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**RDSO**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name / Shri</th>
<th>Designation</th>
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<tbody>
<tr>
<td>1.</td>
<td>A. S. Nagra, (Secretary)</td>
<td>Sectional Officer (elect)</td>
<td>RDSO</td>
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<tr>
<td>2.</td>
<td>S. K. Kanjilal</td>
<td>Joint Director Std.(elec)</td>
<td>RDSO</td>
</tr>
<tr>
<td>3.</td>
<td>M. V. Kelkar</td>
<td>Dy Director (Carriage)</td>
<td>RDSO</td>
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**Railway Board**

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<th>Designation</th>
<th>Railway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>P. N. Murti,</td>
<td>DEE</td>
<td>Railway Board</td>
</tr>
<tr>
<td>2.</td>
<td>Shanti Nath</td>
<td>Dy Director</td>
<td>Railway Board</td>
</tr>
</tbody>
</table>
Subject 1: Coach wiring. To consider the use of aluminium conductor cables in place of copper conductor cables in coaching stock.

Recommendations:
Para 1. The Committee recommended the use of only multistrand aluminium conductor cables with a minimum size of copper equivalent 3/.036, for the wiring of the new coaches and rewiring of existing coaches. RDSO should collect necessary data and standardize the sizes which should be given to the Development Wing of the Railway Board to arrange for manufacture of such multistrand cables in the country. The changeover of cables from copper to aluminum is an urgent necessity with a view to conserve foreign exchange.
Para 2. Regarding joints, the Committee recommended that individual Railways should study the techniques circulated by the manufacturers and train the staff suitably. RDSO should also issue necessary directive in this connection very early.
Para 3. The Committee recommended that RDSO should revise the standard coach wiring drawing to show equivalent aluminium conductor cables for various runs.

Decision:
Para 1, 2 & 3. The following are approved.
(a) Use of the multistrand aluminium cables only
(b) The smallest size of aluminium cable should not be smaller than 1/1.80.
(c) RDSO to standardize sizes of various cables required and intimate Development Wing of the Railway Board for necessary action.
(d) For proper jointing of aluminium cables, Railway should train staff and work to the latest technique to be issued by the cable manufacturers and RDSO.
(e) RDSO to revise the standard coach wiring diagram with use of aluminium conductor cables.

Subject 2: Batteries. To discuss specification for batteries for diesel-electric locomotives.

Recommendations:
Para 4. The final draft specification framed by RDSO was discussed and the Committee made following recommendations:
(1) Clause 3: Terminology- full definitions should be incorporated in the specification.
(2) Clause 8-(1.1): The size at which the acceptance tests will be conducted should be indicated for each contract by the Railway in consultation which the CEE of the Railway who will also nominate a representative for the witnessing such tests.
(3) Clause 9-(1): the figure 85% should be modified by RDSO in consultation with the Railways on the basis of actual experience gained on imported batteries.
(4) Clause 9.1 (b): This may be deleted.
(5) The specification required editing by RDSO.

Decision:
Para 4. RDSO to issue a final specification.

Subject 3: Cables for train lighting. To discuss specification for PVC cables.

Recommendations:
Para 5. The members were of the opinion that a separate IRS specification for PVC cables was not necessary in view of the ISI Specification no. 694 already existing for these types of cables. RDSO should collect data for nominated sizes of aluminium conductor cables for train lighting and any special requirements of the Railways should be incorporated in the ISI specification.

Decision:
Para 5. Approved. RDSO to follow.

Subject 4: Reading light. To consider further improvements in the present design of reading lights in AC coaches.

Recommendations:
Para 6. The committee noted that it had not been possible to obtain a suitable 15W 110V lamp so far. The members also considered tapping the coach batteries for the use of 24V lamp in the reading lights not desirable. The committee recommended that the Development Wing of the Railway Board should pursue the matter further and obtain a suitable 15W 110V lamp early. In the interim period each Railway should use reading lights for AC coaches to their own design.

Decision:

Subject 5: Miscellaneous- safety measures. To consider safety measures adopted in ladies’ compartments of passenger trains in case of emergency.

Recommendations:
Para 7. The committee recommended that the trials of the safety measures adopted in ladies’ compartments of passenger trains should continue and the Railways should submit periodical reports on their operation and performances to the Board and RDSO.
Decision:
Para 7. Approved.

Subject 6: TL dynamo capacity. To discuss the existing capacity of TL dynamo on MG coaches.

Recommendations:
Para 8. The committee noted that there was no need to change the standard equipment on MG coaches except in case of new I-class coaches, where 260 Amp dynamos should be provided. RDSO should examine further and prepare necessary design.

Decision:
Para 8. Noted. RDSO should investigate further.

Subject 7: Carriage fans. To consider modification to IRS specification no. E4-54 for Railway carriage fans.

Recommendations:
Para 9. The committee recommended appointment of a subcommittee consisting of CEEs of NER (convener), NR & SER to examine the various aspects of the specification and submit their report to various Railways very early.

Decision:

Subject 8: Train lighting – cut-in switch versus rectifiers.
To consider the use of rectifiers in place of auto-cut-in-and-out switch.

Recommendations:
Para 10. The committee noted that the experience gained on the use of rectifiers was inadequate and it was premature to specify silicon rectifiers as alternative to auto-cut-in-and-out switch as a permanent measure. However, the Railways may use silicon rectifiers in place of auto-cut-in-and-out switch to meet operational difficulties.

Decision:
Para 10. Noted. The trials should continue on all BG and MG Railways.

Subject 9: Loco head lights. To discuss the improved design of loco headlight fitting developed by M/s Beni Limited, with the assistance of CLW.

Recommendations:
Para 11. The committee accepted the improved design of loco headlight fitting developed by M/s Beni Limited, as a permissible alternative. The committee also recommended acceptance of the anodized aluminium reflectors produced by M/s Beni Ltd, as permissible alternative to silver plated copper reflectors.

**Decision:**
Para 11. Approved. Anodised aluminium reflectors are accepted as permissible alternative.

**Subject 10:** Coach wiring. To consider mounting of switch gear inside coaches to prevent pilferage of electric equipment.

**Recommendations:**
Para 13. The committee recommended acceptance of the location finalized by RDSO for positioning of the switch gear inside coaches on all new builds. RDSO should circulate detailed layout drawings to all Railways to enable adoption on the existing coaches also on a programme basis.

**Decision:**
Para 13. This should be adopted for new coaches. The effectiveness of the new layout in reducing pilferage should be watched. The question of modifying the old coaches may be considered later in the light of experience gained.

**Subject 11:** Turn-tables for locomotives. To evolve a suitable electric drive for turn tables for locomotives.

**Recommendations:**
Para 14. The committee recommended that the trials on various electric drives for turn-tables should continue and the subcommittee appointed vide Para 10 of the item 9 of the 20th ESC should expedite their report.

**Decision:**

**Subject 12:** Miscellaneous. To consider the provision of electric equipment in crew rest vans.

**Recommendations:**
Para 15. The committee discussed the report submitted by the subcommittee and considered that the conventional 24 Volts system of train lighting is not suitable for use
on the crew resting vans. It was recommended that CR should carry out trials on alternative designs and submit its report early.

**Decision :**

**Subject 13:** Generating equipment on coaches. To discuss the trial results of the ac generating system (statodyne equipment) for its adoption on the TL system in future.

**Recommendations:**
Para 16. The committee noted that present “statodyne equipment” on trial is superseded by more modern equipments which have been offered for trial by some firms. In view of this, further trials on the existing equipments may be discontinued.

**Decision :**
Para 16. Approved.

**Subject 14:** Reading lights. Schedule of electrical fittings in NG stock reading lights in 1st class compartments of NG stock.

**Recommendations:**
Para 17. The committee recommended that RDSO should collect data of various fittings and equipments being used in the narrow gauge coaches and examine the question of generator and battery capacity to meet the additional load requirements and also decide on the location of reading lights in the various types of narrow gauge 1st class coaches.

**Decision :**
Para 17. RDSO should collect necessary data and put up at the next ESC meeting.

**Subject 15:** Battery charging terminals. To consider the provision of separate battery charging terminals on the underframe.

**Recommendations:**
Para 18. The committee considered that the revised design of the battery charging terminals evolved by the CR as suitable and desired that RDSO should prepare detailed drawing and circulate to the Railways.

**Decision :**
Para 18. Approved. RDSO should prepare detailed drawings and circulate to Railways.

**Subject 16:** Locomotive wiring. To consider the performance of indigenous brands of slow burning cables for loco headlights
Recommendations:
Para 19. The committee considered that the report of the trials so far conducted by the Railways and noted that the trials were not conclusive. The committee recommended large scale trials on the cables of M/s ICC, Henley and Finolex which had given better results. Trials on other indigenous brands of cables should also be carried out on a limited scale.

Decision:
Para 19. Noted. The trials should continue and report be submitted before next ESC meeting.

Subject 17: Train lighting. To consider standardization of toilet engaged light fittings in BG first class corridor type coaches manufactured by ICF.

Recommendations:
Para 20. Sample of the bolt operated switch manufactured by various Railways were exhibited at the meeting. The committee recommended that RDSO should conduct fatigue tests on the sample produced by WR & NFR to assess durability in actual practice and standardize the switch very early.

Decision:
Para 20. Noted. RDSO to conduct fatigue tests and submit report at the next ESC meeting.

Subject 18: Miscellaneous. Evolution of procedure of co-ordination of IRCA Electrical Section Meetings and ESC meetings.

Recommendations:
Para 21. IRCA Electrical Section Meetings should cover complication of data, operating and maintenance problems, various items of economic working, etc, on the Railways and evolve uniform practices and methods of work based on experience. ESC should deal with designs and standards.

Decision:

Subject 19: End-on generation. To consider provision of end-on generation on special rakes like Taj Express.
Recommendations:

Para 22. The committee considered that for the amount of electrical load as it now existed on the Taj Express, the conventional system of train lighting and air conditioning was satisfactory and the adoption of end-on generation was not necessary. However, it might be necessary to provide other forms of generation to meet increased load on special rakes economically. The committee recommended formation of subcommittee consisting of CEE/SR (convener) and CEE/NR to consider other forms of generation for special rakes and circulate a detailed report covering all aspects, including costs, within six months.

Decision :

Para 22. Approved. The committee should submit its report before October 1965.

Subject 20: Coach wiring. To consider the use of conduits for wiring in steel body coaches.

Recommendations:

Para 23. The committee discussed the various aspects of proving conduit wiring for the upper structure and decided that in view of the heavy cost involved, such conduit wiring was not necessary. Instead, the upper structure wiring should be supported by cleats and the positive and negative wires run separately on two sides. RDSO should study the difficulties regarding separating of the wiring and ingress of coal dust in ICF coaches and prepare wiring drawings and circulate early to Railways and the coach builders.

Decision :

Para 23. Noted. RDSO should finalize the drawing early.

Subject 21: Train lighting. To consider the standardization of light points in steam locomotives.

Recommendations:

Para 24. In view of the proposed increase in wattage of the turbo headlight bulb from 250 to 350 watts, the committee considered that trials with 5 watts bulb for illumination of water gauge and lubricators on the locos be carried out in consultation with Mechanical Department of NE, SE and Western Railways and results circulated to Railways early.

Decision :


Subject 22: Rectifiers. Preparation of specification for battery charging silicon rectifiers.

Recommendations:

Para 25. The committee considered that RDSO should prepare a specification for silicon rectifier battery charging sets on similar lines to existing specification for selenium
rectifier battery charging sets and circulate to Railways for early comments and finalization.

Decision:
Para 25. Approved. RDSO should prepare a specification and circulate to Railways.

Subject 23: Train lighting. To consider simplified system of train lighting by use of:
(i) Silicon rectifier blocker in place of auto-cut-in switch gear.
(ii) Iron clad double pole isolating switch in place of magnetic switch.

Recommendations:
Para 26. The committee recommended that an officer on special duty should be appointed under RDSO to go into the present difficulties and problems experienced on the conventional train lighting system. A subcommittee of CEE/SR (convener), CEE/SER & CEE/NR was appointed to draft terms of reference for the officer on special duty.

Decision:
Para 26. The subcommittee should review the problem, make a comparative study of results achieved with alternative systems tried out on SER and other Railways and submit a report to the RDSO for inclusion of the subject in the agenda of the next meeting.

Subject 24: Miscellaneous. To discuss the question of fixing proprietary sizes of copper wires for electric traction on Railways as a preventive measure against theft of traction overhead lines.

Recommendations:
Para 27. The report of the subcommittee on copper wires for 25kV ac traction was tabled at the meeting and the members recommended acceptance of the report. They, however, considered that catenary, contact wires and bonds on 1500 V DC traction system should also be included and the CEE/WR and CEE/CR should advise the sizes to RDSO early. These recommendations should then be processed for fixing proprietary sizes of copper wires and bonds to be covered under the unlawful procession act.

Decision:
Para 27. Approved. RDSO to please collect the necessary data and put up to Board.

Subject 25: Train lighting. To consider increase in percentage of equipped coaches on BG and MG stock.
Recommendations:
Para 28. The committee recommended that in view of the increasing electrical loads in coaches all existing coaches which are likely to continue in service for five years or more should be equipped with generating equipment both on BG and MG coaches.

Decision:
Para 28. Approved.

Subject 26: Electric Traction- 25 kV ac system. To consider standardization of formation of equipment of wiring brake down trains required for the maintenance of overhead equipment.

Recommendations:
Para 29. The committee recommended that the report submitted by the subcommittee be adopted.

Decision:
Para 29. Approved.

Subject 27: EMU stock on Railways. To consider the application of rheostatic braking for EMU stock in place of conventional methods of braking by metallic brakes.

Recommendations:
Para 30. The subject was discussed at the meeting and RDSO stated that further investigations on the various systems of braking were still in progress. Present trials of non-ferrous blocks and high phosphorus content cast iron brake blocks on railways should, however, continue.

Decision:
Para 30. Noted. RDSO should continue investigations on the subject. Trials with other types of brake blocks should continue.

Subject 28: Electrical equipment. To consider standardization of the position of lavatory chutes so as not to interfere with maintenance of the underframe electrical equipments.

Recommendations:
Para 31. The committee considered that this subject should be referred to the Carriage Wing of RDSO.

Decision:
Para 31. Noted. RDSO should follow this up.

Subject 29: Voltage system. To consider the system of voltage of partial air-conditioned coaches in MG stock.
Recommendations:
Para 32. This subject was discussed informally. The committee noted that no charge in the system of voltage of partial air-conditioned coaches in MG stock was necessary, in view of the improvement experienced on the introduction of corridor. As trouble was being experienced mainly in Assam Mail service, it was agreed that CEE/NER and CEE/NFR should go jointly into this problem and take early steps to improve this AC service by providing adequate terminal maintenance facilities.

Decision:
Para 32. Approved.

Subject 30: TL dynamo drive. To discuss the use of cardan shaft drive from the end or centre of axel in place of conventional flat belt drive.

Recommendations:
Para 33. The committee recommended that RDSO should finalize designs and arrange to conduct trials on a few coaches on BG and MG.

Decision:
Para 33. Approved.

Subject 31: Miscellaneous. To elect members of the subcommittee to screen the agenda of the next ESC meeting.

Recommendations:
Para 34. The committee recommended the appointment of a screening committee consisting of CEEs, SER (convener) and NER for the next ESC. It was also recommended that the screening committee meeting should be held in November 1965 and the next ESC meeting should be held in January 1966 at Lucknow.

Decision:
Para 34. Noted.
23rd Electrical Standards Committee Meeting Held at Bombay(WR), in March, 1966
Subject 1: To consider standardization of 110 V DC system in place of existing 24 DC system in train lighting in trains.

Recommendations:
Para 1. The committee after discussion of the subject were of the opinion that as this forms part of the item 23 of the Agenda for last year’s (XXII) ESC meeting which RDSO is already dealing with as directed by the Board, they be requested to expedite the matter and submit the report early.
Para 2. CEE/SER may however, try and convert few existing 24 volt dynamos into 110 volt DC and carry out trials after bench tests.

Decision:
Para 1 & 2. The train lighting system with its present problems and also the system to be adopted in future should be gone into and a report submitted by the RDSO early.

Subject 2: To consider standardization of
(i) Illumination of large Railway marshalling Yards by means of 1000W, HP MV lamps and
(ii) Issue of suitable specification for the same.

Recommendations:
Para 3. Illumination figure obtained by SER at Bandamunda Yard with 1000 HP MV lamps in place of 1000 watt incandescent lamps were discussed. It was found that while HP, MV lamps covered wider area, illumination obtained was between .16 & .02 foot candles. The committee therefore decided that the existing standard of illumination laid down by the ESC vide item 17 of the 20th meeting viz. .025 to .12 foot candles are quite satisfactory and should stand. The Railways however be asked that the illumination in the Yards be improved to bring it up to the standards laid down by changing over to HP MV lamps where necessary after critically examining financial angle, availability of funds and the economy as laid down by the Board vide their letter no. 64/Elect./162/2 dt. 2.12.1964.
Para 4. The committee members also inspected the indigenously manufactured 2 x 400 watt HP MV lamps fitting put up by M/s Bajaj & Co. and found that it when method on 75 ft. tower in the Bombay VT Railway station yard was quite satisfactory. The committee recommended that each Railway should try a few of these fittings in selected yards and report results to RDSO.

Decision:
Para 4. Approved.

Subject 3: To consider the use of “Booster” dynamo of small capacity in the unequipped coaches of slow Passenger trains.
Recommendations:

Para 5. The committee were of the opinion that a “Booster” dynamo on an unequipped coach on slow passenger trains is not likely to be of much help on account of insufficient generation due to low speeds but individual Railways may adopt this arrangement where it suits the working conditions on their Railways.

Decision:

Para 5. This needs to be examined in great detail by the RDSO taking into account the necessity, alternative arrangements possible, according to the operating condition in which such stock has to be worked, financial implications and other considerations. The present instructions regarding the equipping of coaches in MG and NG depending upon the residual life and the effect of these orders will also have to be taken into account.

Subject 4: To consider the simplified system of train lighting by use of:

(i) Silicon rectifier in place of auto cut-in switch gear.
(ii) Iron clad double pole isolating switch in place of magnetic switch.

Recommendations:

Para 6. Difficulties experienced in the maintenance of train lighting service due to heavy thefts of the parts of auto cut-in and load switches were discussed and as these switches even on replacement after attending to deficiencies and defects, continue to provide material for theft, the committee recommended that:

(i) In view of the wide satisfactory experience gained by the Railways with the use of silicon blocking rectifiers in place of auto-cut-in switches, these rectifiers be adopted as permissible alternative.

(ii) For the purpose of controlling lights and fans in coaches, a knife switch or a 5 contact rotary switch preferably the later (which has been found to be less amenable to theft) and individual tumbler switches inside the coach to control lights and fans be used in preference to magnetic load switches as an anti-theft measure. Knife and rotary switches should be mounted on the coaches for arranging operation by guards/Coach attendants/ train running fitters/platform TL fitters as practicable.

Para 7. The committee also recommended that to safeguard against theft of tumbler switches which have already sale in market, RDSO should develop and finalize early a non-standard rotary type switch to replace the tumbler switch inside the coach.

Decision:

Para 6. Pending the review of the present train lighting system by RDSO as per the orders on item1, the following are the Board’s orders on the recommendations:

(i) Board approve the use of silicon rectifiers as a permissible alternative to auto-cut-in switches. Silicon rectifiers should be procured as per proper specification.
(ii) Iron clad switches may be provided for controlling the fans and lights in addition to
the existing magnetic switches, as a temporary measure in coaches running on
sections with heavy incidence of pilferage and thefts. To control the lights, two
switches should be provided in each coach one at either end controlling half of
lights. The iron clad switches provided should only be operated by the Railway staff
including the guard.

Para 7. RDSO should finalize early a nonstandard rotary or other type of switches to
replace the tumbler switches inside the coaches.

**Subject 5:** To consider provision of end-on-generation on special rakes like Taj Express.

**Recommendations:**

Para 8. The committee recommended that special rakes which work as set rakes and have
more than 30 kW load which is difficult to be satisfactorily met with conventional TL
system, can be adopted for end-on generation with 400 V, 3-phase, 50 cycles A.C. as
standard system for generation and 110 V, ac, 50 cycles as standard for consumig
equipment inside the coach.

**Decision:**

Para 8. Board’s order will follow.

**Subject 6:** To consider further improvements in the present design of reading lights in a.c.
coaches and improvement to general lighting.

**Recommendations:**

Para 9. The committee recommended that design put up by the RDSO should be finalized
and sample fitting be provided and tried in air-conditioned coach at Lucknow by RDSO
by 5th April or earlier, if possible, for inspection jointly with CEE/NER and CEE/NR.

**Decision:**

Para 9. Development of 110 V, 15 W lamp should be finalized and the same used in a.c.
coaches in the fitting with swiveling lens which has been standardized for first class
coaches.

**Subject 7:** To consider standardization of drive with AC generator for adoption on future builds
of diesel electric locomotive by DLW.

**Recommendations:**

Para 10. As this subject is under study by RDSO in consultation with Heavy Electrical (I)
Ltd., Bhopal, the committee recommended that RDSO should finalize this early and give
positive recommendation before the next ESC meeting.
Decision:
Para 10. Investigations should be continued by the RDSO and detailed report submitted before the next ESC meeting.

Subject 8: To consider substitution of non-ferrous electrical components by plastic components..

Recommendations:
Para 11. Members appreciated the need of replacement of non-ferrous metal components and parts by ferrous or aluminium alloy or plastic and recommended that the RDSO follow up this matter and evolve for trial by Railways as many components, parts and fittings as possible, particularly those that are liable to theft. The members also noted that the Railways have already initiated changeover of certain parts from non-ferrous to ferrous or aluminium alloy and recommended that information in this respect and results achieved be circulated by them to all Railways and RDSO.
Para 12. Carbon Brushes: as regards carbon brushes considerable quantities of which are used by the Railways including Electric & diesel locomotive involving foreign exchange, the position for which is tight, it was considered absolutely necessary that suitable manufacturing capacity for carbon block be developed in the country.
Para 13. As manufacture of carbon bushes require very specialized knowledge backed by considerable research, the committee felt and recommended that efforts should be made to obtain technical collaboration from suitable manufacturers for setting up a plant for the manufacture of carbon blocks in the country both of electric- graphite & metal graphite grades. The committee also recommended that the development cell of the Railway Board be requested to follow up the matter actively with the Director General, Technical-Development.

Decision:
Para 12 &13. Development Wing of Railway Board to follow up the matter.

Subject 9: To evolve a suitable electric drive for turntable for locomotive.

Recommendations:
Para 14. The committee accepted the recommendations of the Subcommittee appointed vide item 8 of XXth ESC and recommended that RDSO should standardize the designs suggested by the subcommittee and issue necessary drawings to all the Railways.

Decision:
Para 14. Approved. RDSO should standardize the designs and issue drawings to Railways for the use of turntables where considered necessary and justified.
Subject 10: To consider the existing capacity of TL dynamos on MG coaches.

Recommendations:
Para 15. The committee noted that the Railway Board have already approved the recommendations made vide item 6 of the 22nd ESC meeting that in the case of coaches where the electrical loads are high, two 60 amps dynamos be provided. RDSO was requested to send the necessary drawing prepared by them in this regard to all the Railways.

Decision:
Para 15. As already directed by RB vide orders against item 6 of 22nd ESC meeting, RDSO should investigate into this item further.

Subject 11: To consider use of all aluminium standard conductor (19/3.99 mm) in place of hard drawn copper return conductor (37/2.25 mm).

Recommendations:
Para 16. The committee recommended the adoption of alluminium conductors as Engineer-in Chief Railway Electrification explained that aluminium is already being used for this purpose.

Decision:
Para 16. Alluminium conductors can be used as a permissible alternative.

Subject 12: To consider use of ASSR catenary in place of cadmium catenary.

Recommendations:
Para 17. The committee noted the results of the study and experiments mad by Railway Electrification in this matter and recommended that they should collect further results and put them up with their recommendations at the next ESC meeting.

Decision:
Para 17. Noted.

Subject 13: To consider modification to IRS specification E4-54 Railway carriage fans.

Recommendations:
Para 18. The subcommittee appointed vide item 7 of 22nd ESC meeting reported that they hoped to finalize the report in about month time.
The committee recommended that:
(i) The subcommittee should send their report when ready to RDSO and all other members of the committee.
(ii) RDSO who is representing the Railways in the Sectional Committee on this subject at the ISI should bring out the Railways recommendations when discussing the specification with the ISI.

**Decision:**

Para 18 (i). Noted.
Para 18(ii). Approved.

**Subject 14:** To consider standardization of toilet “Engaged” light fitting in BG first class corridor type coaches manufactured by ICF.

**Recommendations:**

Para 19. Switches produced by the WR NFR for operating Toilet “Engaged” light fitting were inspected and also the report of the test conducted on them by NFR were discussed and the committee recommended that:

(i) Switch position only without the bolt of the sample design put up by the NFR be adopted.
(ii) CEE/NFR to send 2 sample switches to each Railway for their guidance in manufacture.
(iii) The bolt portion of the switch be referred to RDSO carriage wing for designing a suitable types of bathrooms ob coaches.

**Decision :**

Para 19 (i). Board’s order will follow.

**Subject 15:** To consider provision of electric equipment in crew rest vans.

**Recommendations:**

Para 20. Committee discussed at length difficulties in the maintenance of the crew rest vans and also inspected the prototype coach fitted with the electrical equipment in this respect put up by the CR. The committee recommended that the CR try out the coach and put up trial results at the next ESC meeting for consideration.

**Decision :**

Para 20. Board’s order will follow.

**Subject 16:** To consider performance of indigenous brands of slow burning cables for loco headlights.
Recommendations:
Para 21. The committee considered the results of trials on slow burning cables of different manufacturers conducted by different Railways and recommended the acceptance as permissible alternatives of cables marketed by M/s Indian cable Ltd., Poona (Finolex brand) and marketed by M/s India cable Co. (ICC brand) as they were found to have been satisfactory in service.
Para 22. The committee also recommended that as trials with the cables marketed by M/s Devendra Brothers/Kanpur have not yet been conclusive, they be continued and similar cables from other firms be also tried out.

Decision:
Para 21 & 22. Board’s order will follow.

Subject 17: To discuss the use of Cardan shaft drive from the end or centre of axle in place of conventional flat belt.

Recommendations:
Para 23. The committee after considering the recommendations made by RDSO that the Cardan shaft drive from the end of the axle of the coach investigated by them is not suitable for adoption in driving existing type train lighting dynamos on the coaches and recommended that the RDSO evolve as alternative drive from the centre of the axle of the coach similar to that adopted on the air-conditioned coaches, committee suggested to RDSO that while designing the arrangement, they should keep in view higher speeds upto 75 miles per hour and higher anticipated electrical loads on the coaches.
Para 24. Gear Box: The committee noted that the RDSO is following up with some firms the manufacture of gear boxes for trial and they await results.

Decision:
Para 23 & 24. This item should be investigated by the RDSO.

Subject 18: To consider the provision of antitheft measures for switchgear on the coaching stock.

Recommendations:
Para 25. This subject refers to the anti-theft measures carried out as trial on a coach by SER as recommended by M/s J. Stone & Co., CEE/SER reported that the coach has been working quite satisfactorily.
Para 26. The committee recommended that the CEE/SER circulate the details in this respect to all the Railways for adopting for trials on some coaches on their Railways.
Decision:
Para 25 & 26. This should be gone into the greater detail by RDSO to assess the suitability particularly from the point of view of the effectiveness, financial implications and practicability from the maintenance angle.

Subject 19: To consider provision of cleating arrangements for underframe and upper structure wiring in coaching stock.

Recommendations:
Para 27. The committee discussed and recommended that for the underframe wiring Board’s orders on Para 40 (a) of recommendation of 18th ESC meeting held in 1960 be followed and RDSO send necessary drawings showing the details of the wiring on the underframe and upper structure to the manufacturers and all Railways.

Decision:
Para 27. Noted. RDSO to issue necessary drawings to Railways early.

Subject 20: To consider modifications to terminal arrangements in “Tonum” type train lighting dynamos.

Recommendations:
Para 28. The committee recommended that the RDSO should follow up with the firm viz. M/s J. Stone & Co. Ltd., the action already initiated by them to overcome this difficulty.

Decision:

Subject 21: To consider standardization of the size of wooden battery boxes for MG stock.

Recommendations:
Para 29. The committee agreed that there was scope for reduction in the size of wooden battery boxes now used on MG stock and recommended that RDSO in consultation with the CEE/NER evolve a suitable design for the battery boxes and circulate it to all the Railways for adoption.

Decision:
Para 29. Approved.

Subject 22: To consider the design of improved guards emergency lighting equipment which is more compact, portable and capable of being handled by one man.
Recommendations:
Para 30. The committee inspected the improved type of the emergency lighting equipment box produced by the CEE/ER and recommended that it be accepted with the following modifications:
(i) The lid to be provided with small inspection aperture 4” x 1-1/2” in size to be covered by glass and wire mesh to enable test of the equipment when handing the box over to the guard without the need to open the box. For this purpose also a two way 2-pin socket to which the plug connected to the light fitting will remain normally inserted, should be fitted inside the box with access from outside through two small holes for connecting the external supply for testing purpose.
(ii) Wing nuts on the telescopic arrangement to be of the type that can be unscrewed but do not come off.
(iii) The sealed beam fittings to have light weight covers at the back for safety against damage.
(iv) The box to be made of thin MS sheet for better strength as the present box made of wood is likely to get damaged in handling.

Decision:
Para 30. Approved.

Subject 23: To elect members of the subcommittee to screen the agenda of the XXIV ESC meeting.

Recommendations:
Para 31. The committee recommended the appointment of a screening subcommittee consisting of CEE/NER (convener) and CEE/NFR for the next ESC. It was also recommended that the subjects for the next ESC meeting be called by RDSO in September and finalized by the end of October latest. The screening subcommittee be convened in November and the next ESC held in January, 1967.

Decision:
Para 31. Approved.
# 24th ELECTRICAL STANDARDS COMMITTEE MEETING

## Members Present

<table>
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<tr>
<th>S. No.</th>
<th>Name of Officer</th>
<th>Designation</th>
<th>Railway</th>
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Subject 1: Train lighting: To consider modifications to the existing train lighting system and adoption of a new system.

Recommendations:
1. Present train lighting system has proved troublesome and unreliable in practice in recent years, due to increase in thefts and unauthorized interference on the one hand, and increase in electrical loads on the other.

2. Time has, therefore, come for an immediate decision on the choice of a new System to overcome the defects and difficulties experienced, and for the changeover to be effected with the least possible delay.

3. The following alternatives were considered:
   (a) End-on generation: (i) with diesel generators (ii) with supply drawn from traction overhead equipment on electrified sections.
   (b) Distributed generation with limited number of large capacity axle driven generators.
   (c) Independent self-contained generation on each coach,

4. End-on generation with diesel generators: The Committee considered that this system has got certain limitations and can be adopted only on certain set rakes. The Committee, therefore, recommend that the adoption of this system should be left to the discretion of the railways based on their local operating conditions and other factors.

5. End-on generation with supply drawn from traction overhead equipment in electrified sections: This system also has a limited sphere of applications restricted to electrified areas. It has not yet been tried out on loco-hauled trains on electrified sections of Indian Railways. The Committee recommend that suitable schemes may be evolved by RDSO, in consultation with the electrified railways.

6. Distributed generation with limited number of large capacity axle-, driven generators: This system afford an attractive alternative to the end on generation with diesel generators for set rakes as it eliminates diesel engines with their problems of operation and maintenance. The Committee recommend trials of this system using gear cardan shaft driven brushless 15 kW alternator with rectifier, IIOV single battery, and suitable static voltage regulator. The Committee recommend that suitable sockets and jumpers, (preferably PVC sheathed flexible mild steel conductors) will be used on coaches as inter-vehicle.

7. Independent' self-contained generation: The existing system requires Inter coach couplers which are prone to heavy theft and pilferage. The Committee, therefore, recommend that inter coach couplers be eliminated and each coach fitted with independent self-contained generating equipment complete with battery, regulator and manual control for lights and fans. This arrangement would be suitable for any type of generation whether ac or dc and can be adopted on existing as well as future coaching stock. Suitable sockets and removable jumpers will, however, be provided to cater for emergencies, if and when the equipment of a coach fails and assistance is required from an adjoining coach.
8. Modification of the existing system: The existing system of generation is 24V de with associated equipment consisting of auto cut-in and cut-out switch, over-voltage and over-charge relay, light and fan magnetic switch, guard control switch for remote operation, kent couplers and double battery. This system suffers from the drawback of having a commutator and carbon brushes on the dynamo, and multiplicity of switch gear which not only require a lot of maintenance but also are prone to thefts; RDSO in their report (Annexure XVII) have suggested the use of blocking rectifiers in place of auto cut-in and cut-out switch and elimination and substitution of these with miniature circuit breakers both for protection and manual switching of lights and fans. The Committee recommend that this simplified de system should be adopted for general application on existing coaches stock as also on new builds from the production units i.e. ICF/BEML.

9. In order to utilise the existing dynamos to the maximum extent the Committee recommend that these be rewound to work as alternators with slip rings and brushes and large scale service trials carried out, preferably with V-belts.

10. Suggested new system: The Committee recommend the early adoption of brushless alternator of 5 kW capacity with a gear cardan shaft drive with a rectifier and suitable static regulator on 24V system, but with a single battery, for each coach for all future builds, additions and replacements. Proto-type trials have already been carried out successfully.

11. To enable implementation of the proposals made in paras 7, 9 and 10 the Committee recommend that specifications of the two new systems of train lighting equipment, viz. 24V and 110V should be prepared by RDSO and tenders invited early.

Decision:
Order’s on the various recommendations contained in RDSO Report on evaluation of TL system have been issued vide Rly Bd’s letter No.67/Elec/495/1 dt 20-3-68.

Subject 2: Train Lighting; To consider performance on modified berth light fittings to IRS Drawings No. EA 160.

Recommendations:

12. Experience gained so far with this fitting had indicated that the design is not quite satisfactory as earlier envisaged. The Committee, therefore, recommend that the fitting should not be standardized, but further improvements looked into.

Decision:
RDSO in consultation with Northern Railway should finalize the modification/improvements to the fittings and also standardize the fittings.

Subject 3: Train lighting; To consider standardization of the size of wooden battery boxes for MG stock.
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mm
end
ations
13. RDSO's sketch No. 67076 was considered and Members felt that no. modification at this
stage are called for.

Decision:
13. Approved.

Subject 4: Train lighting; To consider provision of relay in the Embarkation light circuit on
coaches fitted with silicon rectifier diodes in place of D300/D80.

Recommendations:
14. The Committee recommend that CEE/NF Railway may send samples of the wind operated
relay developed by his staff to other railways for trials, and results should be discussed by the
next Electrical Standards Committee.

Decision:
14. Proposed trials may be dropped.

Subject 5: Train lighting: To consider standardization of the position of lavatory chutes so as not
to interfere with maintenance of the U/F electrical equipment.

Recommendations:
15. In view of the complaints that some of the electrical equipment is getting soiled due to the
angle and location of commode chutes while the train is in motion, the Committee recommend
that the location of commode chutes in relation to electrical equipment should be examined by
RDSO to eliminate the problem.

Decision
15. Approved.

Subject 6: Train lighting: To consider approval of IRS Specification No. E-32-1966 for silicon
rectifiers in place of auto cut-in and cut out switch.

Recommendations:
16. The Committee generally approves of the draft specification. The suggestion of CEE/SER
regarding fuse protection was discussed. The Committee recommend that provision of fuses may
be considered after more experience with silicon rectifiers is gained.

Decision:
16. Approved.

Subject 7: Train lighting: To consider standardization of 110V, 15W lamps for reading light in
air conditioned coaches.
Recommendations
The Committee, therefore, recommend lamps manufactured by M/s. Miniature Lamps Co. Dehra Dun for use on Indian Railways.

Decision:
Approved.

Subject 8: Train lighting: To consider modification to terminal arrangement in tonum type train lighting.

Committee's recommendations
18. In view of CEE/SER's letter No. CEEj55j1j3702/Dynamo, dated 23.9.1967, the subject was dropped.

Decision:
18. Approved.

Subject 9: Diesel electric traction: To consider standardization of reverse current relay on diesel locomotives.

Recommendations
19. The Committee recommend the arrangement proposed for adoption.

Decision:
19. This may be referred to the Jt. Mechanical and Electrical Standards Committee for their consideration.

Subject 10: Diesel electric traction: To consider introduction of silicon rectifiers in place of RC relay on all locomotives.

Recommendations
20. Director Standards Electrical stated that the proposed arrangement was a standard practice on all the locomotives manufactured at DLW. The Committee recommend that this practice should continue.

Decision:
20. Approved.

Subject 11: Diesel electric traction: To consider provision of individual lights for all the 3 wheel slip relays in place of single light as at present.

Recommendations
21. The subject may be referred to the Joint Mechanical and Electrical Standards Committee.
**Decision:**

**Subject 12:** Diesel electric traction: To consider introduction of sanding by connections through normal open interlocks on wheels slip relay instead of sanding manually.

**Recommendations**
22. This subject may be referred to the Joint Mechanical and Electrical Standards Committee.

**Decision:**
22. Approved.

**Subject 13:** Diesel electric traction: To consider standardization of cables and their accessories in diesel electric locomotives and development of indigenous manufacture.

**Recommendations:**
23. The matter was discussed and the Director Standards Electrical stated that indigenous manufacture of the cables is being developed in the country by DLW/RDSO. It was general consensus of the members that all the specifications drafted and issued by RDSO, DLW, ICF and CLW which require to be approved by the ESC should be circulated to the Members of the ESC and a definite time limit of one month for comments and replies. The specification can be issued provisionally but the formal approval of the ESC should be obtained at the next ESC after discussing such deviations which the members may consider necessary. DSE, however, mentioned it would involve considerable amount of work to implement this recommendation, but it was pointed out that this procedure was required only in cases which required approval of ESC.

**Decision:**
23. RDSO may issue specification without any formal approval of ESC. Any suggestion for revision modification should be considered by RDSO and amendments issued.

**Subject 14:** Diesel electric traction: To consider standardization of bands for traction rotating equipment.

**Recommendations:**
24. The Committee approve of the present RDSO practice of using magnetic or non-magnetic steel banding as appropriate instead of glass banding.

**Decision:**
24. Noted. RDSO should however go into the question of glass banding taking into account the financial and technical considerations.
Subject 15: Diesel electric traction; To discuss the performance of voltage regulators on YDM locos as compared to voltage regulators on YDM3 locos.

Recommendations:
25. The Committee decided to drop the subject as it was not important enough.

Decision:
Noted

Subject 16: Diesel electric traction: To discuss the problem of wheel slip relays failures on YDM1 locomotives.

Recommendations:
26. Certain improvements had already been affected to overcome the trouble experienced with the wheel-slip relay after carrying out RDSO modification on the NFR and these have been found to be satisfactory. This subject may be referred to the Joint Mech. and Elec. Standards Committee.

Decision:
26. Approved.

Subject 17: Diesel electric traction: To consider the removal of pedestal fans for drivers by alternating means of ventilation.

Recommendations
27. The suggestion of General Manager/NF Railway was considered and was not found to be feasible. The subject was, therefore, dropped.

Decision:

Subject 18: Diesel electric traction: To discuss the problem of low insulation traction generators and motors of YDM4 locos.

Recommendations
28. The Committee recommend that the problem be studied by RDSO.

Decision:
28. Approved.

Subject 19: Diesel electric traction: To consider the blocking of openings between the commutator risers on YDM4 loco traction generators.

Recommendations
29. The subject was discussed and dropped as the matter was not considered important enough.
Decision:
29. Noted.

Subject 20: Diesel electric traction: To discuss the problem of eddy current clutch failures on YDM4 locos.

Recommendations:
30. The Committee recommend that the eddy-current coil be impregnated in polyester resin.

Decision:
30. Approved.

Subject 21: Diesel electric traction: To consider the chamfering of traction generator commutators on YDM4 locos.

Recommendations:
31. The Committee are of the opinion that chamfering of commutator absolutely necessary to prevent the flash over.

Decision:
31. Noted,

Subject 22: Diesel electric traction: To discuss the problem of deposition of oil on armature of YDM4 traction generators.

Recommendations
32. The subject was dropped.

Decision:
32. Noted.

Subject 23: Diesel electric traction: To consider the replacement of miniature circuit breakers on YDM4 locos with indigenous circuits breaker.

Recommendations
33. Indigenous miniature circuit breakers have been used on electrical locos. The Committee consider that experience gained on these was not yet sufficient to warrant full scale changeover. The performance of existing circuit breakers should be watched.

Decision:
33. Noted.

Subject 24: Diesel electric traction: To discuss Specification No. E-34-1966 for batteries YDM3 and YDM5 diesel electric locos.
Recommendations:
34. The Committee recommend that the performance of batteries on the trial order should be watched before the specification is finalized.

Decision
34. Noted.

Subject 25: Diesel electric traction: To consider preparation of schedule of commissioning test for electrical equipment (by RDSO) for adoption on Indian Railways.

Decision:
35. Noted.

Subject 26: Diesel electric traction: To consider standardization of drive with ac generator for adoption on future builds of diesel electric locomotives by DLW.

Recommendations:
36. The matter was already under consideration by RDSO. The subject was, therefore, dropped.

Decision:
Noted

Subject 27: General: To consider formation of panel of approved. suppliers of class 'H' insulating materials and insulating varnishes etc.

Recommendations:
37. This subject was dropped.

Decision:
37. Noted. The reason for dropping this item is not furnished and sufficient care should be exercised by the screening committee before inclusion of Items for discussion.

Subject 28: Loco head lights: To consider wiring of steam locomotives with Pyrotenax (mineral insulated aluminium sheath) wires.

Recommendations:
38. It was recommended that the performance of the wiring with Pyrotenax cables should be watched and the results reported to the next ESC.

Decision:
38. Noted.
Subject 29: Loco head lights: To consider standardization of head light fitting for steam, diesel & electric locos.

Recommendations:
39. Tonum, Sun-beam and Pyle-National are not now being imported. It was, therefore, recommended that 14 in. fitting available indigenously should be standardized.

Decision:
39. Recommendations not complete. Full specifications and drawings of the proposed fittings should be furnished and this item should be discussed in the Jt. Mechanical and Electrical Standards Committee.

Subject 30: Air-conditioning of coaches: To consider the adequacy of the capacity of the unit cooler for 4 berth compartment during worst weather conditions of the 2t ton stones carrier equipment used on partial air conditioned coaches.

Recommendations:
40. The Committee consider that the present capacity of air conditioning plant was adequate. It also noted that RDSO trials with modified cooling coils had shown improved performance. The Committee recommend that further service trials be carried out and reports submitted by the various railways.

Decision:
Noted

Subject 31: Electric overhead equipment: To consider use of ACSR catenary in place of cadmium copper catenary.

Recommendations:
41. Railway electrification had not been able to conduct any further trials. CEE/C Rly. and Dy. CEE/W Rly. stated that they already had a few spans of ACSR conductors for catenary, which were found to be working satisfactorily. They were requested to circulate full particulars after installation with particular reference to incidence of any corrosion or other problems, with the use of ACSR conductors.

Decision:
41. Noted. This should be considered by the next ESC.

Subject 32: Regulation of electrical crossings guarding arrangements for overhead electric power lines crossing railway tracks.
Recommendations:
42. This subject was dropped.

Decision:
42. Noted. But reasons for dropping this item should be given for the information of the Railway Board.

Subject 33: General: To evolve a suitable drive for turn table for locomotive.

Recommendations:
43. This item should be referred to the Joint Mechanical and Electrical Standards Committee.

Decision:
43. Noted.

Subject 34: General: To consider the trial reports with 2 X 400 W HPMV lamps manufactured by M/s. Bajaj &Co.

Recommendations:
44. Results from all the railways were not available. This item therefore, could not be discussed.

Decision:
44: Noted.

Subject 35: General: To consider preparation of code of practice regarding disposition of light fittings on the ceiling/walls.

Recommendations:
45. This subject was dropped.

Decision:
45. Noted. Reasons for dropping the item should be furnished.

Subject 36: General: To consider the formation of development cell in RDSO for development and standardization of indigenous semi-indigenous carbon brushes for electric traction rotating equipments,

Recommendations:
46. RDSO were already doing work in this connection therefore, dropped.

Decision:
46. Noted.
Subject 37: General: To consider standardization of designs for illumination of loco shed inspection pits and carriage examination pits.

Recommendations:

47. This item should be referred to the Joint Mechanical and Electrical Standards Committee.

Decision:
47. Noted.

Subject 38: Diesel electric traction: To consider hot line maintenance of overhead equipments by RDSO:

Recommendations:

48. The question of hot line maintenance of 25kVac has already been taken up by CEE/CR. It may be further investigated, and development of proper tools in this connection pursued, and a report submitted at the next meeting.

Decision:
48. Noted.

Subject 39: Diesel electric traction:
To consider cooling air supply to the electrical equipments of the EMUs and electric locos.
To consider strength of bogie springs of EMU stock.
To consider design of buffer beams cow catchers and under frames of the locos.
To consider designs for easy maintenance of EMUs and electric locos.

Recommendations:

49. It was recommended that these items should be referred to the Joint Mechanical & Elec. Standards Committee.

Decision:
49. Approved.

Subject 40: Miscellaneous: To elect member of the sub-committee to screen the agenda of first Joint Mechanical and Electrical standards committee.

Recommendations:

50. The Committee recommend the appointment of CEE/SER on the Screening Sub-Committee of the First Joint Mech. &Elec. Standards Committee. CME/SER has already been recommended for appointment by XLV LSC for being appointed as a Member of the Screening Sub-Committee of the First Joint Mechanical & Electrical Standards Committee.

Decision:
Approved.
Subject 41: Miscellaneous: To elect members of the Sub-committee to screen the agenda of the 25th ESC meeting.

Recommendations:

51. The Committee recommended the appointment of a Screening Sub-committee consisting of CEE/RE (Convener) and SCR for the next ESC. It was also recommended that the subjects for next meeting be called by the RDSO in July 1968 and finalized by the end of August, 1968 latest. The Screening Sub-Committee be convened in September, 1968 and the next ESC held November, 1968.

Decision:
As the post of CEE/RE is likely to be abolished in the near future, CEE/ER (convener) may be along with CEE/SCR as member of Screening Committee.
25th ESC/Bhopal/1970

25th Electrical Standards Committee Meeting Held at Bhopal, in 20th to 23rd January, 1970

Shri D. S. Mahta, CEE/NER as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Train lighting.
To consider standardization of wiring diagram for coaches to fall in line with the modified train lighting system and to review the progress of modified train lighting system

Recommendations:
The Committee recommended that a comprehensive specification of modified system of Train Lighting be drawn up by RDSO. The committee further recommends that sub-committee consisting of CEEs South Eastern and Southern Railways. Be appointed to consider the same and suggest modification if any to the specification.

Decision:
Noted. Specification of modified system of train lighting should be finalized early.

Subject 2: To consider use of PVC conduits for wiring in Coaches, EMUs and residential buildings.

Recommendations:
As for the use of PVC conduits in coaching stock only Central Railway has used it on EMUs. Their experience is that the conduits become soft and warped due to heat. The committee recommends that extensive trials be carried out on all Railways on conventional and EMU coaches to gain more service experience.

With regard to the use of PVC conduits in residential and service buildings. The wiring is mostly done on battens and conduits are rarely used. ISI has issued Specification No. IS2509:63 for PVC conduits for low voltage electrical installations. The working temperature limits prescribed are -50°C to 60°C. The Committee recommends that for low voltage electrical installations, PVC conduits may be used according to this specification in place of metallic conduits.

Decision:
Further trails may be conducted on C, W & SE Railways to determine the utility of PVC conduits for wiring of conventional coaches & EMUs.

Subject 3: Locomotive cable. To consider wiring of steam locomotives with mineral insulated aluminum sheath cable (PYROTENAX).

Recommendations:
The aluminium sheath is found to develop cracks at bends and moisture finds way into the insulation. The Railways may send detailed reports to RDSO who will pursue with the firm the question of improvements and modifications to the cable to get over this problem.

Decision: Noted.

Subject 4: Fire in Parcel Van. To consider removal of wiring from parcel vans.
Recommendations:
The wiring in the parcel vans (VPUs and VPs) may be continued. However, to prevent theft of wires, they should be cleated and run in casing as against straight runs in conduit. Where conduits are used, cone fittings should be provided to make the pulling of wires difficult. RDSO may examine details and issue drawings.

Decision: Approved

Subject 5: Misc. To consider use of PVC tape for LT wiring in Coaches EMUs and residential buildings

Recommendations: PVC tapes manufactured by various firms are available. These may be tried on the coaches and EMUs and reports sent to the RDSO who will issue a list of approved manufacturers. ISI may be approached to issue a specification for PVC adhesive tapes for electrical wiring.

Decision: Trials with PVC adhesive tapes on coaches and EMUs approved. Adoption of the existing specification No. IS 2448 Pt.II for adhesive tape for PVC substracts for use on Railways may be examined by RDSO.

Subject 6: Train lighting: To consider the performance reports of Cells supplied by M/s Free India

Recommendations: Replatal cells as well as new cells of 200Ah and 300 Ah capacity of M/s Free India Dry Accumulators have been under trial on Eastern and South Eastern Railways. Majority of the cells have been in use for about 1 ½ years past and performance of large majority of cells has been found satisfactory so far. South Eastern Railway reported that the consumption of electrolyte is less in these cells. The Committee recommends that these cells should be given further extensive trials on all the Railways.

Decision: Extensive trials may be carried out on Central, Eastern, SE and western Railways.

Subject 7: Battery and dynamo capacity: To consider capacities of Dynamo and Batteries for Coaches in modified train lighting system.

Recommendations: The committee recommends that dynamo of 150 and 100A capacities and cells of 540, 400, 300 and 200 Ah capacities be standardized for the modified train lighting system, where 400 Ah cells are required, two of 200Ah batteries in parallel may be used.

Decision: Specific recommendation in respect of the sizes of batteries, ad capacities of dynamos separately for each type of BG, MG and special coaches shall be laid down.

Subject 8: TL Dynamo – Suspension arrangement.
Recommendations:
Under the condition of worn out wheels and full load on the coach, the dynamo safety chain as per ICF drawings. NO. ICF/SK/3015 and ICF/SK/3017 does not prevent fouling of the prescribed moving dimensions when the belt is removed. Also difficulty is experienced in tightening the belt. RDSO is already … of the problem. The Committee recommends that the RDSO may finalise the matter expeditiously.

Decision: Noted. Early action should be taken.

Subject 9: Drive for TL Dynamos. To consider future standard of drive in place of flat belt drive for train lighting dynamos.

Recommendations: The Committee notes that bogie-mounted train lighting dynamo with endless ‘V’ belt is on trial on Northern Railway and RDSO are associated with these trials. The coach has done 25000 km so far and the drive has functioned satisfactorily.

Decision: Noted. Trials should be expedited.

Subject 10: Tumbler Switch in Lavatories. To consider the elimination of tumbler switches in Lavatories by connecting lavatory light with corridor lights.

Recommendations: The committee recommends that no switch be provided in the lavatories/toilets of first class coaches as is already the practice in 3rd class coaches to avoid pilferage.

Decision: Approved

Subject 10: Berth Light Fittings. To consider the improvements to berth light fittings.

Recommendations: S.E. Railway may send their sample fittings with drawings to RDSO to examine the suitability.

Decision: RDSO should develop a suitable design for berth light fitting in consultation with reputed manufacturer/s of light fitting. This should be tackled on priority basis.

Subject 12: Fluorescent Lighting. To consider introduction of fluorescent lights in coaches.

Recommendations: The committee recommend that :-
(i) in 110V fully air-conditioned coaches DC Fluorescent lighting may be adopted.
(ii) in 24 V DC partial air-conditioned and other special coaches, trials with fluorescent light with individual static invertors may be continued.

Decision: (i) Approved
(ii) Noted.
Subject 13: Code of practice for train lighting. To review the usage of code of practice issued by the RDSO.

Recommendations: The committee recommend that RDSO may continue to issue further chapters and revisions of the Code of practice as they are found useful.

Decision: Approved

Subject 14: Illumination in Railway premises. To consider the trial reports with 2x400W HPMV Lamps manufactured by M/s Bajau & Co.

Recommendations: The results of the trials submitted by Southern Railway were noted. Other railways should expeditions furnish their test reports. RDSO will issue a proforma for uniform of trials.

Decision: Noted. ESC should re-examine the possible of using higher wattage lamps.

Subject 15: Cogged ‘V’ Belts. To consider trial report of indigenous cogged ‘V’ belts use on Air Conditioned Coaches.

Recommendations:
M/s Ransal supplied belting manufactured by M/s SGR Industries Pvt. Ltd., Calcutta where the life obtained for these belts was quite comparable to that of imported belting. The firm is now supplying belting manufactured by M/s Bose Industries, Calcutta which is inferior. The Committee recommends that further trials by continued with the belting by M/s SGR. Trials of M/s Greentose belting discontinued in view of their unsatisfactory performance. With regard to belt fasteners, M/s Bose Enterprise Calcutta are now using indigenous alloy steel and quality has improved. The Committee recommends that further trials be continued.

Decision: Noted.

Subject 16: Train lighting Belts. To consider the revision of specification No. E14-63 for train lighting belting.

Recommendations: The Committee recommend adoption of the revised specification with following provision:
(i) The belt thickness be amended from 5mm ± 0.3 mm to 5mm ± 0.7mm
(ii) The Scott Flex Test for testing dynamic adhesion between the plies be incorporated.

The committees further recommend that the drawing of the belt fasteners be suitably modified by RDSO to take up the revised tolerances.

Decision: Revised specification to be issued by RDSO.
Subject 17: Emergency Coupler. To consider the specification NO. E5A 68 for two core flexible cable for inter vehicle emergency coupler.

Recommendations:

The Committee recommend that :-
(i) In clause 9.1, line 4 Core: should be substituted by ‘Cable’
(ii) Conductor to conductor insulation test should be provided for.
(iii) A percentage sampling test be included in the specification. RDSO may incorporate these and finalize the specification.

Decision: Revised specification should be framed by RDSO early.

Subject 18: Lamp Resistance. To consider the specification No. E36-68 for selenium lamp ballast to be used in place of lamp resistance on passenger coaches of railways.

Recommendations: In view of higher cost of selenium lamp ballast and its sensitiveness to high temperatures, the committee does not recommend their use. The conventional lamp resistance may continue to be used.

Decision: Use of selenium lamp ballast approved for special coaches with variable leads as it has definite advantages. RDSO should lay down the types of coaches on which this device should be fitted.

Subject 19: Batteries for Diesel Electric Locomotives. To discuss specification No.E34-1966 for batteries for YDM3, YDM 4 and YDM 5 Diesel Electric Locomotive.

Recommendations: The Committee recommends that RDSO may incorporate the comments of the railways and issue the specification.

Decision: Revised specification be finalized early.

Subject 20: Lamp Resistance cut in relay. To consider the specification No. E-37-68 for lamp resistance cut in relay for use on B.G. and M.G. passenger coaches.

Recommendations:

The Committee recommends that prototype tests and routine tests be specified in the specification.

Decision: Revised specification be finalized early.

Subject 21: Junction Boxes. To consider specification No. E38-69 for junction boxes for modified train lighting system of wiring.
Recommendations: The Committee recommends that the Railways may expedite their comments to the RDSO.

Decision: Revised specification be finalized early.

Subject 22: Train lighting: To review the system of voltage for train lighting in conventional coaching stock.

Recommendations: The Committee felt that the full potentialities and distinct advantages of the 110V system are yet to be properly evaluated. The Committee note that they had also recommended the trial of 110V system for train lighting on Indian Railways (Vide para 6 of the minutes of Item No.1 of the xxiv ESC Meeting). The committee once again strongly recommends to the Board for consideration that trials on 110V axle-driven system should also be undertaken. With a view to try out the system, RDO will work out the details.

Decision: This matter has been under consideration for a very long time. RDSO should expedite the techno-economic report on 110V vis-à-vis 24 V systems of train lighting with AC alternators, to enable ESC to take an early decision in the matter.

Subject 23: Carriage fans: To consider the IRS Specification NO.E4-69 for carriage fans and regulators (24Volts DC).

Recommendations: The committee recommend that the specification be issued provisionally incorporating the following points:
(i) Increase in wattage from 30 to 36 W for 400 mm sweep fans and from 26 to 30 W for 300 mm sweep fans.
(ii) Use of class “E” insulation in case the temperature rises of coils is above 40°C.

Decision: Revised specification E4.70 issued by RDSO is approved.

Subject 24: Class ‘H’ insulating materials. Formation of panel of approved suppliers of class ‘H’ insulating materials and insulating varnishes etc.

Recommendations: The Committee consider that class insulation development in the country has not come yet to a stage as to draw a list of approved suppliers.

Decision: Noted.

Subject 25: Overhead electric power lines crossing railway tracks. Regulation of electrical crossing guarding arrangements for overhead electric power lines crossing railway tracks.

Recommendations: It was not considered necessary to discuss this item as the Regulations for Electrical Grossing of Railway Tracks, 1963 had been issued after due deliberation and after taking into consideration all aspects.

Decision: Noted.

Recommendations: This item was not discussed as the Indian Standards Institution Specification No. IS:732-1963 for Code of Practice for Electrical Wiring Installations already exists.

Decision: Noted.

Subject 27: Electrical Inspectorate Cell. To consider formation of electrical inspectorate cell for Electrical Head quarters’ Office of Zonal Railways.

Recommendations: In view of the vast expansions in the electrical installations and their increasing complicated nature, the committee recommend that an Electrical Inspectorate cell be formed in the Headquarter Office under the charge of an Officer and suitably manned to assist the Chief Electrical Engineer for effective, efficient and independent discharge of the function of the Electrical Inspector to the Government and ensure observance of the provisions of Indian Electricity Act and Rules for the electrical installations on the Railways.

Decision: While the need for such an organization is noted, this may be pursued separately.

Subject 28: 25kV AC overhead fed power car. To consider building a prototype power car fed 25kV over head from line for power supply to the air-conditioning and lighting load on fully air-conditioned trains.

Recommendations: The comments of Railways may be expedited to enable RDSO to finalize the proposal.

Decision: Noted.

Subject 29: General. To elect members of the sub-committee to screen the agenda of the XXVI ESC Meeting.

Recommendations: The committee recommended the appointment of a Screening Sub-Committee consisting of Chief Electrical Engineer, North Eastern Railway (Convenor) and South Easter Railway for the next ESC. It was also recommended that the subjects for the next meeting be called by the RDSO by 15.6.1970 and finalized by the end of August, 1970 latest. The Screening Sub-Committee be convened in September, 1070 and the next ESC held in December, 1070.

Decision: Noted.
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26th Electrical Standards Committee Meeting Held at Calcutta, on 20th, 21st & 22nd December, 1972

Shri V. Seetharaman, CEE/NR as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Trainlighting- Review of the system voltage for lighting of conventional coaching stock.

Recommendations:

1. To meet the growing load of passenger amenities on the coaching stock, the committee consider it necessary that the system voltage of train lighting be raised to 110. The 110V system has the inherent potential to meet the growth of load in the forseeable future. In making this recommendations, the Committee has been guided by the accumulated experience of the operation of 110V systems on air-conditioned and electric multiple unit coaches. This experience is now considered adequate to warrant extension of this system to other coaches.

2. This opportunity of the changeover should be utilized to introduce brushless ac generators as standard.

3. The battery voltage may also be fixed as 110 and necessary rectifying equipment fitted on the coach.

4. The committee also have considered the clear evidence available of the superior performance of ac appliances particularly fans on coaching stock. The Committee, therefore, recommend that while progressing the similar designs of dc distribution at 110V, RDSO should investigate the possibility of developing suitable inverters for establishing an ac distribution system at this voltage.

Decision:

Paras 1.3&4-Though there is justification for increasing the voltage, the question of adoption of 110V system for train lighting should be re-examined by the ESC from the angle of the effect it may have on human lives in case of an accident and also in the context of the widespread tamping and pilfering of equipments and wiring in coaches.

Para2 – This has already been accepted vide Board’s letter No. 67/Elect/495/1 dt.20.3.1968.

Subject 2: Train lighting-Capacities of dynamos and batteries in coaches in modified. Train lighting system.

Recommendations:

1. The Committee note the capacities of dynamos and batteries recommended by RDSO for the various types of coaches based on the criteria indicated in RDSO’s letter No. EL/6.1.1/D4 dt.20.06.1972.

2. In view of the proposal to change over to 110V system as the future standard the Committee consider that on the 24 W system there is no need to change the present practice of using 60 amp. Dynamo end 200 Ah cells on Metro Gauge and 100 amp.
Dy namos and 300 Ah cells on Broad Gauge Coaches. The Committee, however, recommend that the Rlys. Should provide the capacities nearest to those recommended by RDSO wherever warranted by connected load and generation to non-generation ratio making use of the existing standard equipment.

3. The Committee also note that 400 Ah capacity cells and 150 A capacity generators are likely to be available. These are recommended to be used as permissible alternatives wherever their use is considered advantageous.

Decision:

Para 1, noted and paras 2 & 3 approved.

Subject 3: Train lighting—Provisional specification for modified train lighting system and code of practice for wiring of coaching stock.

Recommendations:

The committee generally approve of the amendments to the provisional specification for modified train lighting system and code of practice for wiring in coaching stock as indicated in the supplementary notes to the agenda. They, however, suggest the following further modifications:

i) Selenium lamp ballast may be provided on coaches for extensive prototype field trials only and clauses 2.9, 9.2 etc. of the specification should be modified accordingly.

ii) The generator and battery capacities indicated in the specification may be modified in line with the recommendations made against item 2 of the agenda.

iii) The stipulations in regard to the drive in para 7.3 should be modified to conform to recommendations made in item 5 of the agenda.

iv) External light fittings on coaches may be dispensed with.

The Committee recommend that RDSO may finalise the specification for issue as an Indian Railway Standard for modified train lighting system.

Decision: Paras 1 & 2 approved.

Subject 4: Train lighting—Standardization of system design another details of end-on/mid-on generation for train lighting.

Recommendations:

The committee recommend that the specifications may now be finalised by RDSO taking the above into consideration.

Decision: Paras 1 & 2 approved provided that in the case of trains like Deluxe, Rajdhani Express etc. where two power cars are in service in each rake, the capacity of each power car and not necessarily of each generating set as recommended in para (iv), should be capable
of meeting the full load. However, the capacity of the individual sets should be capable of meeting the normal (as distinct from peak) load singly. The Specification should be finalized and issued early by RDSO.

**Subject 5:** Drive for train lighting-Future standard of drive in place of flat belt drive for train lighting.

**Recommendations:**
1. The Committee note the advice of RDSO that the existing flat belt system cannot transmit more than 3.5 kw, and that substantial changes in the drive arrangements will therefore be necessary if generator capacity is to be increased beyond this limit.
2. The Committee noted that the mounting of dynamo on the ICF all coil bogie has been already developed and trials have been satisfactory.
3. The Committee therefore recommend that RDSO may finalise designs of ‘V’ belt drive for transom mounted machines for wider application as an alternative standard for generators of higher capacity.
4. Committee recommend that arrangements should be made for fitment of at least 50 converted machines with ‘V’ belt drive at the earliest in order to enable railways to acquire experience in the working of the drive.
5. Further studies for development of other types of drives and defining the areas of their adoption may also be continued by RDSO.

**Decision:**
Paras 1 & 2 noted.
Para 3 – ‘V’ belt drive is accepted as an alternative drive for the present, its standardization could be considered after sufficient experience is gained.
Para 4 - accepted. Also, to obtain wider experience, Central, Eastern, Northern, South Central, South Eastern and Western Railways should within 6 months, fit at least 10 coaches each with bogie mounted generators and ‘V’ belt drive.
Para 5- approved.

**Subject 6:** Batteries for train lighting-Performance reports of cells supplied by M/S. Free India Dry Accumulators, Ltd, Calcutta.

**Recommendations:**
1. With the date available in regard to the performance of the lead acid cells supplied by M/S. Free India Dry Accumulators Ltd, the Committee are of the view that the cells are not yet acceptable as a permissible alternative.
2. The Committee have noted the improvements proposed to be carried out by the firm in the design of the cells as indicated by RDSO.
3. The Committee recommend that further trials with these cells should continue and their performance kept under observation.
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Decision:
Paras 1 & 2 noted.
Para 3 Approved.


Recommendations:
1. Reports on the performance of the cogged V belts of M/S. Ransal Rubber industries who have been the primary suppliers of the item indicate that there are wide variations in service kilometerage from belt to belt. M/S. S.G.R. Industries and M/S. Simpson & Munre(Indi) Pvt. Ltd., Whose belts have also been again variations in service kilometerage are observed in the performance of each individual belt.
2. The Committee note that the quality of belt fasteners supplied by M/s. Boss Enterprise, Calcutta has deteriorated due to poor quality of steel.
3. Since belt fasteners play a vital role in the service life of these costly belts, but themselves cost very little, the committee recommend that:
   i) Additional sources for belt fasteners of proper quality may be developed for the cogged V belts.
   ii) Trials with all the three makes of belts be continued and their comparative performance with imported fasteners may be asssed. RDSO should lay down instructions for monitoring the trials for uniformity on all Railways.
   iii) 6 sets of belts and 50 sets of fasteners may be imported for carrying out comparative performance trials using imported fasteners with imported as well as indigenous belts.
   iv) RDSO should develop test procedures for laboratory tests and bench tests to evaluate the quality of these belts.
   v) Eastern Railway may complete the development of a device which would prevent the loss of fallen belt and thus enable the reasons of belt failures to be fully investigated.

Decision:
Paras 1 &2 noted:
Para 3 (i) (iv) and (v) Approved, Railways should make more efforts to obtain indigenous belts and fasteners of quality from manufacturers of repute.
Para 3 (ii) and (iii) - Proposal for the import of belts and fasteners for carrying out comparative performance trials is not accepted.
Subject 8: Reading light fitting – improved design of Reading light Fitting

Recommendations:

1. The Committee note the results of the illumination tests carried out by RDSO with the letter box type reading light fitting mounted at different locations designed to produce maximum illumination with minimum disturbance to passengers on other berths.
2. The committee recommend that the letterbox type reading light fitting may be standardized. The built-in shutter operated switch, however, should be replaced by a standard and robust type of switch mounted either on the body of the fitting or separately.

Decision:

Para 1 & 2 letter box type reading light fitting is approved is an alternative. The design and specification of this fitting should be finalized early by RDSO and issued to the Railways. Concurrently RDSO should issue drawings for the location and mounting arrangements of these fittings inside the coaches.

Subject 9: PVC Conduits – Use of PVC conduits for wiring in coaches and EMUs.

Recommendations:

1. Committee recommend the use of flexible pliable non-metallic conduits at locations where additional protection for wiring is considered necessary or where its use will substantially improve facilities for rewiring.
2. RDSO should suggest the locations where wiring in these conduits will be advisable.
3. RDSO may also lay down the specifications for these conduits to ensure that products of appropriate quality of PVC only are used on coaches.

Decision:

Paras 1, 2 and 3 – The desirability of using flexible non-metallic conduits for coach wiring may be reviewed by the ESC.

Subject 10: Portable Tail Lamp and Fixed Tail Lamp – Need for portable Tail Lamp and Fixed Tail Lamp.

Recommendations:

1. The Committee recommend that fixed electric tail lamps may be provided on nominated coaches.
2. Portable electric tail lamps, if in use on any railway should be discontinued.
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Decision:

Para 1 - This has already been approved by vide their letter No 69/Elect./495/27 dt. 4.2.1974.
Para 2 – regarding the use of portable tail lamps, the present practice as obtaining on various Railways may continue.

Subject 11: Alternating Current Fans - Use of Alternating current fans worked from inverters in direct current EMUs.

Recommendations:

1. As ac supply is advantageous for bulk of the auxiliary loads on EMU viz., lights and fans in coaches and only a small proportion of load viz., battery charging requirements is dc motor alternator sets supplying ac power directly are preferable to either motor generator sets or static inverter rectifier units.
2. The Committee, therefore, recommend:
   i) Development by RDSO of motor alternator sets for providing auxiliary supply on dc EMUs.
   ii) Continuance of trials with inverter sets for 110V dc to 110V ac inversion on a limited number of coaches.

Decision:

Para 1 – Noted.
Para 2 – Approved.

Subject 12: Graphite Strips for Pantographs. - Use of Graphite Strips for Pantographs.

Recommendations: The Committee, therefore, recommend that:

i) RDSO should undertake a detailed research work to find out if materials in use in other counties for pantograph strips can be used with advantage in Indian conditions.
ii) Initially, laboratory tests with suitable devices to simulate conditions of sliding contact between contact wire and pantograph may be carried out to evaluate the relative merits of different types of pantograph strip materials.
iii) Based on the results of those tests field trials in actual service may be considered.

Decision:

Paras i) & ii) noted.
Para iii) As it would be difficult to carry out the proposed field trials under controlled conditions, such as only one type of pantograph strip on any given section and further as graphite strips are not available indigenously, this subject may be reviewed by ESC.
Subject 13: Standardization of Driving Cab- Standardization of Driving Cab layout on Broad Gauge Electric Multiple Units.

Recommendations:
1. RDSO’s note on the “Principles for guidance of designs of driving cab layout of electrical multiple units” was discussed. Based on these discussions the committee suggest that RDSO should prepare cab layout drawings for electric multiple units and electric locomotives laying down exact locations of the essential features in the cab. So that reflexes developed by a motorman or driver are not disturbed while driving different EMUs or locomotives.
2. For preparation of such layouts, RDSO should also conduct studies with regard to during positions i.e. either left or right, taking into account the merits of both.
3. Committee also advise that mock up of the cab layout in accordance with the drawings prepared by RDSO may be used to assess reactions to the changes before the layouts are finalized.

Decision
Paras 1,2 & 3 - Noted.

Subject 14: Cab layout of electric locomotives and driver’s desk - Standardization of Electric locomotive cab layout and driver’s desk.

Recommendations:
Same as in item No. 13

Decision:
Same as in item No. 13

Subject 15: Rheostatic Braking Equipment on Electric Locomotives- Standardisation of norms for provision of Rheostatic Braking equipment on electric locomotives.

Recommendations:
1. The committee felt standardization of norms for providing rheostatic braking on electric locomotives to be a desirable feature. However, the effectiveness would depend on different factors such as gradients, loading pattern, frequency of stops etc. a common solution for all sections is, therefore, not considered practicable. Before, adoption of rheostaticbraking on any particulars section, therefore, a technoeconomic study would be necessary.
2. The Committee recommend that RDSO should undertake studies of the performance of rheostatic braking on electric locomotives running on existing
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electrified sections. For this purpose RDSO should standardize and circulate to the
using railways proforma for compilation of requisite data.

Decision: Paras 1 & 2 Noted.

Subject 16: Anti theft measures for overhead equipment – Anti theft Measures for 25 kV
overhead equipment.

Recommendations:
1. The committee note the comments of RDSO.
2. The committee recommend that the Railways may continue to adopt anti-theft
measures according to prevailing local conditions.
3. The committee do not consider it necessary to standardize these measures at
present especially in view of the efforts being made by RDSO to develop all
aluminum OHE and non-copper bearing fittings.

Decision: Paras 1, 2& 3 Noted.

Subject 17: 25 KV ac Traction – Adoption of short neutral section in 25 KV traction.

Recommendations:
1. The Committee note that the performance of short neutral sections installed on the
S.E. Rly at Ballychuk (with solid core porcelain section insulator) and at
Adityapur (with PTFE insulator) has been satisfactory.
2. The Committee recommend that:
i) S.E. Rly may continue with their trials and observations on the short neutral
sections installed by them. The use of PTFE type neutral section may also
be extended to such of the problem locations like Tikiapara as found
necessary.
ii) Committee also recommend that the possibility of utilizing alternative
materials in place of PTFE may be investigated by RDSO and limited
trials with such alternative materials initiated.

Decision: Paras 1,&2 Noted.

Subject 18: 25 KV ac Traction – Adoption of single unit transformer sub-station for 25 KV
ac Electrification.

Recommendations:
1) Standardisation of single unit transformer sub-station is not desirable at
present.
The question of providing single unit or double unit sub-station may be examined separately for each project in consultation with RDSO taking into consideration all the relevant factors and the sub-station spacing may be such as not to affect train operation.

Decision : Paras 1, & 2 noted.

Subject 19: Maximum demand control – Installation of maximum demand control for traction.

Recommendations:

The committee recommend that:

i) Those electrified railways where tariff is such as to give economic benefits may try out Maximum Demand control as suggested by Eastern and S.E. Rlys at one sub-station.

ii) Repercussions of interruptions which should be rea on the traffic and economy achieved may be carefully assessed in consultation with RDSO and report submitted to the next ESC.

iii) To overcome the objections of signal supply interruption, automatic change over device for changing over signal supply from one OHE to the other may be standardised by RDSO.

Decision : Paras i), ii) & iii approved.

Subject 20: 25 KV Circuit breakers – Adoption of auto reclosing feature for 25 KV circuit breakers.

Recommendations:

1. The committee have noted the satisfactory performance of auto reclosing feature for circuit breakers initiated by S.E. Railway.
2. The committee recommend that the auto-reclosing device may be installed at one sub-station on each electrified railway and the trials may be continued. A report on the performance of the section with this device may be submitted to RDSO.

Decision : Paras 1- Noted.
Para 2 – approved.


Recommendations: The committee recommend that:
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i) The design of emergency portable light fitting finalized by 23rd ESC may be standardized for use on all 24/32 V rakes.

ii) On end-on generation rakes a 110/24 V transformer be provided in power cars along with the portable light fittings, details of which may be standardized by RDSO.

iii) On 48 V and 110 V dc airconditioned coaches provided with axle generation, provision of separate 24 V sockets is not necessary as these coaches are normally run only as part of 24 V rakes.

**Decision:** Paras 1(i) – already approved.
Para (ii) and (iii) – approved.

**Subject 22:** General – To elect the member of Sub-committee to screen the Agenda of 27th ESC meeting.

**Recommendations:**
The committee recommended the appointment of a Screening Sub-committee consisting of Chief Electrical Engineers, Northern Rly. (Convenor) and Eastern Railway for the next ESC. It was also recommended that the subjects for the next meeting be called by the RDSO by 15.6.73 and finalized by the end of August, 1973 latest. The Screening Sub-committee be convened in September 1973 and the next ESC held at Secunderabad in December, 1973.

**Decision:** approved.
27th Electrical Standards Committee Meeting Held at Secunderabad, on 4th, 5th & 6th September, 1974

Shri T. S. Viswanathan, CEE/WR as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Train lighting – Brushless alternator - Review of the development of brushless alternator with flat belt drive.

Recommendation:

The committeenote the progress of the indigenous development of flat belt driven brushless alternators of 3/4.5 KW capacity with electronic regulators. In view of the difficulties experienced with commutator machines and keeping in view the satisfactory performance of brushless alternators, the committee recommend as follows:

(i) Procurement of new commutator machines be limited to the barest minimum and discontinued as early as possible.
(ii) The requirement of the production units should be met by procurement of brushless alternators with electronic control,
(iii) Replacement/ additional requirement of railways may be met by procurement of brushless alternators to the extent production capacity exists for approved marks of brushless alternators,
(iv) RDSO may issue a standard for brushless alternators and undertake development of regulators of types other than electronic as alternatives.
(v) The possibility of obtaining slip ring machines manufactured in the same frame as the existing commutator machine at reasonable cost should also be explored by railways; and
(vi) Railways may also undertake conversion of the existing repairable commutator machines into the slip ring alternators with appropriate types of regulators in consultation with RDSO.

Decision:

The initial machines in field service on Northern Railway have shown teething troubles. Till these are fully sorted out and the performance is stabilized with near 100% availability it is not desirable to proliferate these machines on all the Railways. Procurement of brushless alternators, however, of RDSO approved makes should be made to the extent indigenously available as they do offer a promise. In view of the limited capacity for training of supervisors, staff, as also limited service engineering facilities with the manufacturer/s the brushless alternator should be limited to all new purchases by the Eastern and Northern Railways to start with. These Railways should initially concentrate on using the machines first on important trains running on their own systems and in the second phase fit the on Calcutta – Delhi rakes. Manufacturing units should turn out new coaches with conventional dynamos only for the time being.

Recommendation:

The Committee recommend that the draft specification IRS:E1-74 issued by RDSO be approved and adopted.

Decision: Approved

Subject 3: Slow speed trains – Use of 100 mm Dynamo pulley to improve generation of slow speed Broad Gauge and Metro Gauge trains.

Recommendation:

The committee note the results of the tests and trials carried out by S.C. Railway and the satisfactory performance of the dynamos with 100 mm dynamo pulley on slow speed Broad Gauge and Metro Gauge passenger trains.

2. The committee recommend adoption of 100 mm dynamo pulley on Broad Gauge Trains working at booked speeds up to 45 km/h, provided the coaches of such rakes will remain captive.

3. The Committee recommend adoption of 100 mm dynamo pulley on Metro Gauge passenger trains, wherever warranted by service conditions.

Decisions: Para 2 & 3 Approved.

Subject 4: Belt Fasteners - To consider standardization of belt fasteners of revised design for the flat belt drive for T.L. generators.

Recommendation:

1. The Committee note the results of the trials so far conducted by Southern Railway on the belt fasteners or revised design and recommend that trials may be continued extensively.

2. The Committee also note the infringement of the belt fastener with the equalize beam of the Meter- Gauge coach under frame and recommend that this aspect should be further studied by RDSO.

Decision: Para 2 Approved.

Subject 5:

Junction Boxes location of - To consider standardisation of location of the junction box on end panels of coaches.
Recommendation:

1. The Committee note the difficulties experienced by the railways in the operation of control switches for lights and fans in overcrowded general second class (GS) coaches.

2. Keeping in view the advantages of locating the junction boxes inside the coaches, the Committee recommend that only the light and fan controls may be mounted on the end wall of these coaches.

3. RDSO may finalise the designs in consultation with the production units.

Decision

Para 2 & 3 - Approved.

Subject 6: Fluorescent lighting - To consider introduction of fluorescent lighting in coaches.

Recommendation:

The committee note:

i) The development of suitable inverters for adoption of fluorescent lighting on conventional coaches.

ii) Trials of fluorescent lighting in few coaches on railways.

iii) The provision of fluorescent lighting on one full and one half bogie posal vans at BEML and

iv) The proposal to provide fluorescent lighting in twentyseven Broad Gauge First Chair cars at ICF.

2. The Committee recommend that:

i) Extensive trials may be carried out on railways with approved makes of inverters and results of the trials reported to RDSO: and

ii) The draft IRS specification circulated by RDSO be reviewed in the light of comments made by railways.

Decision

Para 1 & 2 - The Railways should extend trials with fluorescent fittings and extend their use on a rake by rake basis. Use of fluorescent lighting should be resorted to in rakes with mid–on/end–on generation to economies on fuel. Strict compliance of pad-locking of coaches should be introduced to avoid thefts and pilferages of fittings. RDSO should try to establish manufacture of non-standard tubes to discourage theft and pilferage. The supply of such non-standard fittings should preferably be exclusively for the Railways.

The specification issued by RDSO should be as a guide for the procurement of fittings. In view of the need for quick development and large scale application of
these fittings, the specification need not be restrictive and the Chief Electrical Engineer/s should use their discretion in relaxation of the specification for procurement of these fittings during the trial stage to encourage evolution of best possible designs.

Subject 7: End- on – generation - To consider the specification for power generating equipment to be installed in the power cars for the system of end-on generation for train lighting in coaches.

Recommendation:

1. The Committee note Board’s instructions that where two power cars are in service in each rake, the generating capacity in a power car need not be so designed that either of the two sets, in the power car is capable of meeting the full load. The Committee also note that for electrical loads of the Rajdhani Express trains and the Deluxe trains with more than three chair cars, the required generating capacity with 100% standby in each car cannot be provided due to non-availability of suitable diesel engines from indigenous sources. Further, the Committee note that a 100% standby feeder capacity is not available in the present design to meet the load conditions during summer season. Due to these constraints, although reasonable reliability is expected, a 100% reliability of power supply cannot be assured.

2. The Committee strongly feel that provision of spare diesel generating sets at 10% level is grossly inadequate and, therefore, recommend that this should be brought on par with that provided for diesel electric locomotive power packs.

3. After considering the Specification No. EL/ EOG/2-74 for the power car equipment issued by RDSO, and the points raised by the Members in regard to the end-on generation system, the Committee recommend as follows:

i) The design of the electrical system on the Deluxe/ Rajdhani and also future trains with end-on-generator be examined ab-initio as a total system. The specifications for different parts/equipment of the system should be finalized or amended, as the case may be, taking into account the recommendations made in the reports on the recent investigations into the working of power cars.

ii) In all such specifications, the worst site conditions should be catered for and in particular, the specification should provide detailed acceptance tests. In the case of generating equipment these test should specify the full rated electrical
load to be met by the equipment with appropriate adjustment of the permissible coolant temperature rise to cater for the difference between the test conditions and the worst site conditions.

iii) The specifications and test programme should be finalized by RDSO in consultation with Eastern, Southern and Western Railways.

**Decision**

Para 1, 2 & 3 - Approved.

**Subject 8:** Embarkation lights – To consider discontinuation of embarkation lights on coaches.

**Recommendation:**

In view of Board’s orders against item 3 (iv) of the Minutes of the 26th ESC meeting, conveyed vide their letter No. 71/ Ekc/ 135/3 dated 23.3.74, the item is deleted.

**Decision:**

Noted

**Subject 9:** Intercity EMUs - introduction of intercity EMUs.

**Recommendation:**

The Committee note the results of earlier studies on the development of intercity electric train services undertaken so far. The Committee recommend that:

i) RDSO should review the earlier reports and re-examine the economics of such services including intercity electric train services with fully air-conditioned accommodation.

ii) A Prototype rake be built with 3250 mm width conventional stock with available standard electrical and braking equipment now used on electric rolling stock (EMUs and locomotives).

iii) RDSO should issue a detailed specification and key drawings for a prototype intercity train rake to be built at ICF for operating on 25 KV ac system on the Eastern or S.E. Railway and

iv) In the dc electrified section, Central Railway conduct trails with the available equipment and ascertain the possibility of using existing stock for running intercity electric train services between Bombay an Pune.

**Decision**

Pars (i), (ii), (iii) & (iv) – approved.
Subject 10: Overhead transmission and distribution lines - Atmospheric pollution of overhead transmission distribution lines and methods to overcome the same.

Recommendation:

The Committee note that based on the studies undertaken so far on Central, Eastern and Western Railways, a draft report on the subject has been circulated by RDSO suggesting possible long-term and short-term measures to overcome the problem due to pollution.

The committee recommend that:

i) the investigations and studies of the problem be continued further;
ii) the procedure for cleaning and application of protective silicon grease may be evolved by Central, Eastern and Western Railways and RDSO.
iii) service trials with insulators coated with PTFE film may also be carried out by Central, Eastern and Western Railways as suitable locations; and
iv) RDSO may report further progress at the next ESC meeting.

Decision:

Para 2 (i), (ii), (ii) & (iv) - Approved.

Subject 11: Traction sub-stations and switching stations. Development of solid state supervisory remote control equipment for traction sub-stations and switching stations.

Recommendation:

The committee note the progress made on the subject and the performance of the I.T.I. equipment installed at Kharagpur on S.E. Railway and recommend that RDSO should continue to monitor its performance and pursue development of telemetering equipment.

Decision:

- Noted

Subject 12: ODC clearances- Review of ODC clearances.

Recommendations:

The Committee consider that there is no need to revise the present minimum height of contact wire for passage of ODCs. The question can be reviewed by the Committee when a general decision is taken by the appropriate authority in regard to the revision of permissible dimensions for the ODC.

Decision:

- Noted
Subject 13: Clearances for 25 KV overhead equipment - Review of Electrical clearances prescribed for 25,000 volts traction overhead equipment.

Recommendations:

Taking into consideration the studies undertaken by RDSO, the Committee recommend that the existing clearances be continued.

Decision: Noted

Subject 14: Hot line working - Hot line working on OHE, substations, switching stations and transmission lines.

Recommendations:

The Committee note the developments taking place on techniques of hot line working and the studies undertaken by RDSO in consultation with CPWC. The Committee recommend that the hot line working be developed for the specific purpose of cleaning of insulators on 25 KV ac system.

Decision: Approved.

Subject 15: Maintenance of Electric Locos - To consider laying down yardsticks for staff for the maintenance and operation of various classes of electric locos.

Recommendations:

1. The Committee request the members to circulate their comments on the yardstick evolved by Western Railway so that the matter could be discussed in depth.
2. The Committee also take note of the fact that the efficiency Bureau of the Railway Board is engaged on evolving yardsticks for various disciplines of Electrical Department. Strongly urge that the report there of should be put up to Committee, before it is finalised and submitted to the Board.

Decision: Noted

Subject 16: Designations of Artisan Staff - To consider rationalisation of designations of Artisan staff on open line.

Recommendations:

The Committee note the rationalisation achieved by S.C.Railway in the matter of designations of artisan staff. The Committee recommend that each railway may review the position obtaining on its own system and take action.

Decision: Noted
Subject 17: HT Power System - To consider authorisation of nominated skilled staff for executive works on H.T. power systems like isolation fuse replacement and giving shut-downs.

Recommendations:
The Committee recommend that a Sub – Committee consisting of CEE/S.C.Rly. (Traction Installation), RDSO and CEE C. Rly may go into the problem and put up their recommendations. The Committee also recommend that in view of the fact that medium and high voltage apparatus/ installations are being used on an increasing scale on railways, the organisation available to assist the Electrical Inspector should also be reviewed by this Sub- Committee.

Decision: - Noted

Subject 18: Fluorescent lighting – To consider provision of fluorescent lighting in railway quarters.

Recommendations:
The Committee discussed the subject and decided to drop it.

Decision: -

In view of the energy crisis and the directive from the Ministry of energy for the conservation of electrical energy, staff may be encouraged to provide fluorescent lighting in the quarters at their cost subject to these fittings and their fitment conforming to the Railway standards.

Subject 19: System voltage for train lighting – Review of the system voltage for lighting of conventional coaching stock.

Recommendations:
The Committee note Board’s views. The question of safety at any voltage is closely linked to the design of equipment and competence of staff deputed to maintain the equipment. The Committee consider that these two aspects are capable of solution to make 110 V system adequately safe.

2. The Committee, therefore, reiterate their earlier recommendation on the subject.

Decision:
Recommendation to have 110 V system of train lighting in passenger stock is provisionally accepted. Since the main issue under consideration has been the possible hazard to human life, a committee consisting of experts in field of electrical engineering, related medical and safety aspects should be appointed to go into and make recommendations on this specific issue.

Subject 20: PVC conduits - Use of PVC conduits for wiring in coaches and EMUs.
Recommendations:
The Committee note that one coach has been turned out from ICF with branch wiring in corrugated PVC flexible conduit in August 1973 and is working on Western Railway.

2. The Committee felt that more experience will have to be gained in the use of corrugated PVC flexible conduit for branch wiring before the desirability or otherwise can be judged.

3. The Committee, therefore, recommend that 100 BG coaches and 100 MG coaches to be built in the next year or so should be provide with corrugated P.V.C. flexible conduit so that necessary experience can be gained over a period of time.

4. In the meantime, RDSO may explore other solutions to the problems, which are sought to be solved by use of corrugated P.V.C. flexible conduit.

Decision: Approved.

Subject 21: Pantograph - Use of graphite strips for pantographs.

Recommendations:
The Committee note that the RDSO have undertaken studies of the various pantograph strip materials in use in various countries. They also note that the ORE (Report No. 6 of 1971) after conducting comparative studies of various materials have not been able to come to any definite conclusion in regard to use of carbon strips.

2. The Committee recommend that RDSO continue to undertake studies with a view to identifying a suitable pantograph strip material and thereafter, undertake indigenous development of that material and arrange for trials.

Decision: Noted.

Subject 22: General - Board’s orders on recommendations of ESC.

Recommendations:
The Committee consider that it will be desirable if Rly. Board can discuss such of those items, on which they are not in a position to accord their approval, with the Chairman, one member and Director concerned of RDSO before taking decision.

Decision: Noted.

Subject 23: General - To elect members of sub-committee to screen the agenda of XXVIII ESC meeting.
27th ESC/Secundabad/1974

Recommendations:
The Committee recommend the appointment of a screening sub-committee consisting of Chief Electrical Engineers, Eastern Railway (Convenor) and Central Railway for the next ESC. They also recommend that the subjects for the next meeting be called by the RDSO by middle of June 1975 and finalised by the end of August 1975. The Screening Sub-Committee be convened in September 1975 and the next ESC held at Bombay (CR) in the third week of December 1975.

Decision:
Noted.
28th Electrical Standards Committee Meeting Held at Bombay, in 15th, 16th & 17th January, 1976

Shri N. Ramamurthi, CEE/SR as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Train Lighting – Brushless alternators – To review the development of flat belt driven brushless alternator and to consider its adoption.

Recommendations:
After taking into account the recent orders of the Board on the subject and various factors such as satisfactory service experience, technical superiority, production capacity for alternators, the service life of uneconomic commutator machines now being purchased, likely difficulties to be faced by manufacturers and other matters, the Committee recommend –

(a) That at any point of time, country’s production capacity for alternators should be utilised to the fullest extent possible.

(b) That commutator machines be ordered only if the production capacity for alternators is less than the demand for new builds at rail coach building units and replacements on the Railways, keeping in view the contemplated changeover to Mid-on and End-on generation rakes; and

(c) That the priority in distribution be given to the rail coach building units and the railways, where staff are already trained on this equipment, after meeting the demands of the two Railways nominated by the Board.

2. The Committee note that several Railways have already arranged training of staff to maintain alternators in service and have set-up servicing facilities and recommend that all Railways should take further speedy action in this direction.

Decision:
Para 1 (a) & (b) – Approved.
Para 1 (c) – The use of alternators have been further extended to N.E. Railway in addition to Eastern and Northern Railways to utilise full production capacity of the country. Rail Coach Building Units can also procure brushless alternators for use in coach manufactured for these railways.
Para 2 – Noted.

Subject 2: System voltage for lighting of conventional coaching stock – To review the system voltage for lighting of conventional coaching stock.

Recommendations:
The Committee note the contents of Boards letter No. 73/Elect.I/495/31 dated 23.12.75 constituting a Committee to go into various aspects which have bearing on possible hazard to human life or dimension of reasonable safety to passengers that may be involved in the adoption of 110 V train lighting system.

Decision: Approved. The report of the Committee should be expedited early to enable final decision to be taken.

Subject 3: Drive for Train lighting Generator – To consider future standard of drive in place of flat belt drive for trainlighting generators.
Recommendations:

1. The Committee reviewed the performance of the transom-mounted brushless alternators with V-belt on Southern Railway and note that there have been a number of problems connected with the maintenance of the drive like droppages of belts, design defects resulting in working out of alternator pulleys, etc. necessitating running out of bogies for replacements.

2. The Committee also note the potential advantages of the V-belt drive such as lower vulnerability to thefts and better transmission capability.

3. The Committee, therefore, recommend that trials with V-belt drive with transom-mounted alternators should be continued but limited to the extent already authorised by the Board.

Decision:

Para 1 & 2 - noted and para 3 – approved.

Subject 4: Cogged V belts for Airconditioned coaches – To consider approval of suppliers of indigenous cogged V belts for use in air-conditioned coaches.

Recommendations:

1. The Committee note:
   (i) That specifications including laboratory and bench tests for cogged V-belts and fasteners have been laid down by RDSO; and
   (ii) That the results of trials of cogged V-belts and fasteners are widely varying and inconclusive.

2. The Committee, therefore, recommend that different makes of cogged V-belts and fasteners may be approved by RDSO as permissible alternative on the basis of laboratory and bench tests as well as field trials where considered necessary, subject to the usual check of capabilities of manufacturers including their internal quality control and test facilities.

Decision:

Para 1 (i) and (ii) Noted
Para 2 Approved RDSO should study alternative methods of transmission as provision of V belts have proved unsatisfactory and very costly. The report may be submitted to the Board before the next meeting.

Subject 5: Fasteners for train lighting belting - To consider standardisation of belt fasteners of revised design for the flat belt drive for Trainlighting generators.

Recommendations:

The Committee took note of the progress of trials. It was decided that Eastern Railway may continue these trials and report at the next meeting.

Decision: Approved.
Subject 6: Batteries for coaching stock - To consider preparation of an IRS specification for Lead Acid Batteries for air-conditioning services.

Recommendations:
The Committee discussed the proposal and recommend that no separate specification is necessary for batteries of air-conditioned coaches. Specific clauses may be included in the specification No. IRS : E2A-75, as found necessary from time to time.

Decision: Approved.

Subject 7: Trainlighting – ROB Relay - To consider elimination of ROB relays in modified trainlighting system.

Recommendations:
The different Railways reported that ROB relays need simplification. The Committee recommend that RDSO should undertake and review the present position and evolve a simplified design.

Decision: Approved. Battery change over relay in addition to these should be developed and all should be preferably static devices in a single control box as far as possible. Anti-theft aspect should be catered for.

Subject 8: Train lighting dynamo - To consider provision of additional D. M. brush in Tonum dynamo.

Recommendations:
The Committee note that subsequent to the circulation of the agenda, RDSO have carried out a successful bench test of substituting a main brush for a D. M. brush and also duplicating it. This is possible without any major modifications to the dynamo magnet frame.
2. Individual Railways may carry out this modifications, wherever warranted by circumstances. New supplies of ‘Tonum’ Dynamos may incorporate this modification.

Decision:
1. RDSO will further check up in consultation with the manufacturer, M/S. Stone and evolve suitable design for duplicating the DM brush.
2. The finalized design of duplicating the DM brush will be circulated by the RDSO to the Railways for implementation on the dynamos in service and the new supplies of dynamos will also incorporate these modifications.

Subject 9: Aluminium conductor cables - Development of high ductility aluminium wires for wiring of coaches, service buildings and other installations.
Recommendations:
1. The Committee welcome the development reported by RDSO and recommend that the matters be pursued with National Metallurgical Laboratory and I.S.I. to enable issue of a standard/specification, as early as possible.
2. In the meantime, ICF may consider extension of trial to other sizes of cables used in coaching stock and in power wiring.

Decision:
Paras 1 & 2 – approved.

Subject 10: Turbo generator for steam locomotives. - To consider redesigning turbo-generators for steam locomotives to give better reliability and relatively

Recommendations:
The suggestions made by the SC Railway for modifying the existing design of ‘Beni’ Turbo-generator are accepted. Railways can embark on making these modification on machine during POH I shops for use in vulnerable loco sheds.
2. RDSO will take up the incorporation of many of these modifications, including charge-over to grease-lubricated bearings, with M/S. Beni Ltd., Calcutta.
3. In developing a second source of supply for turbo generators, all points made regarding anti-theft measures and design involving least maintenance will be kept in mind by RDSO.

Decision:
Paras 1 & 2 – RDSO will finalise the modifications in design in consultation with South Central Railway and manufacturer, viz. M/S. Beni Ltd. and circulate to the Railways for implementation. The new turbo-generator manufactured by the firm will also incorporate these modifications.
Para 3 – Approved.

Subject 11: Cab-wiring of steam Locomotive - To consider simplification of cab wiring of steam locomotive.

Recommendations:
1. The SC Railway’s suggestion for a simplified system of conduit wiring of steam loco cabs is accepted. The Committee recommend that railways may adopt this system and implement the recommendation whenever convenient, e.g. at POH.
2. Detailed drawings will be finalised by SC Railway in conjunction with RDSO and this will be circulated to all railways by RDSO.

Decision:
Paras 1 & 2 – approved.

Subject 12: Cables for steam locomotives - To consider revision of specification for steam loco head light cable.
Recommendations:
The Committee note the need to revise the existing specification for cable for steam locomotive wiring and recommend that cable of revised specification for aluminium conductor with heat resisting PVC insulation conforming to RDSO’s specification No. F – 13/01 should be tried on S.E. and S.C. Railways extensively before its standardisation.

Decision:
RDSO will issue the revised specification for headlight cable with aluminium conductor and heat resistance PVC insulation conforming to RDSO’s specification No. E/13/01. South Eastern, South Central Railways will procure cable to the revised specification for service trials.

Subject 13: Compendium of approved suppliers - To consider preparation of compendium of approved suppliers for train lighting and General Electrical Engineering service equipment and components.

Recommendations:
1. The Committee welcome the preparation of a Compendium to maintain the standard of service expected.

2. The Committee note that the utility of a Compendium is vitiated by purchases from suppliers not listed by RDSO. The Committee wish to draw the attention of the Board to the importance of a suitable directive on the subject so that the quality of train lighting and air-conditioning of coaching stock service is not jeopardised. The Railways should, however, continue efforts to develop new sources and keep RDSO informed.

Decision:
Para 1 – Noted.
Para 2- Noted. However, development orders may be placed by Railways and Coach Bldg. Units in consultation with RDSO.

Subject 14: Supply of power to train from electric and diesel electric locomotives – To consider the proposal for the supply of power to trains for train-lighting and air-conditioning of coaches from the locomotives – either electric or diesel – electric.

Recommendations:
The Committee recommend that two trial services be nominated for experiment with Head-on supply system for coaches drawing power from the Electric locomotive, without exceeding the capacity of the existing transformer with minor modifications, i.e. keeping the rake load approximately within 120 KVA. It is further recommend that single phase A.C. at a suitable voltage be used for the through feeders and voltage stabilisers/transformer provided on each coach for lights and fans. For Air-conditioned coaches D.C. motors may be used for compressors with the use of rectifiers.
Decision:
Coalfield Express/ Black Diamond Express on Eastern Railway and Rourkela Express on South Eastern Railway which are entirely operating on electrified zone by electric locos may be nominated for conducting this trail. RDSO will prepare the necessary technical report for the guidance of the Railway.

Subject 15: Electric locomotive – To consider reduction in the maintenance and operating cost of electric locomotives.

Recommendations:
1. The Committee discussed the procedures being followed in various railways with regard to booking of expenditure in the operation and maintenance of electric locos and the various equipments provided on them, and note that the practices being followed in the various railways are varying and there is a need to review the same.
2. The Committee therefore, recommend that a Sub-Committee consisting of Chief Electrical Engineers, Eastern and South Eastern Railways should go into this problem associating their Financial Advisors.
3. The terms of reference of the Sub-Committee will be as under:
   i) To review the procedure now being adopted for booking of expenditure on workshop repairs and overhauls, running repairs and operation, etc.
   ii) To evolve a system of booking of expenditure to be maintained for each major assembly.
   iii) To identify equipment contributing to high cost of maintenance and make recommendations for reducing the costs.
   iv) To examine ways and means to reduce staff costs in running sheds and workshops by methods such as staff rationalisation, etc.

Decision:
1. Noted.
2. Approved.
3(i) to (iv) A Sub-committee is already examining issues mentioned in terms 1 & 2 of para 3, vide Board’s letter No. 75ACII/3/6. Datd 4/6.2.76
   A Sub-committee consisting of CEE/Eastern and South Eastern Railways will go into the problems associating their Financial advisers mentioned in item 3 & 4 of para 3.

Subject 16: Electric Locomotive – To consider improvement in the design of auxiliary machines fitted on electric locomotives.

Recommendations:
The Committee note the proposed improvements in the design of the existing auxiliary machines and recommend development of new auxiliary machines incorporating some design features of the imported machines.
2. The Committee stress the need of development of testing facilities for electric insulating materials in the zonal railways and RDSO and recommend that such facilities should be set up expeditiously.

3. The Committee further note that RDSO is to conduct trials, on single phasing prevention system for the auxiliaries on five electric locomotives before standardization of the same.

Decision:
Paras 1 & 2 – approved.
In the development of auxiliary machines to revised RDSO’s specifications the indigenous manufacturers of these machines should be fully associated right from the specification stage and changes should be thoroughly proved to withstand environmental conditions before new designs/improvements are applied on a larger scale.
Each rewinding shop particularly these using classes F & H insulating materials should have facilities for testing the insulating materials before these are used.
Para 3 – Approved.

Subject 17: EMU Trains. To consider introduction of inter-city EMU.

Recommendations:
1. To meet the service requirement for the general public in the early eighties, the committee consider that there is a definite need to undertake straightaway developmental works on intercity trains of the EMU type for long distance and medium distance, complete with sleeper coaches and other coaches.

2. the committee recommend:
(i) That central and western Railways expedite the reports called for by the Board for Bombay Pune and Bombay-Ahmedabad sections respectively: and .
(ii) that RDSO study a similar service under the whole or part of Delhi – Howrah Electrified route.

Decision:
1. Noted
2. (i) Board observe that central Railway was running through EMU services between Bombay and Pune till about end 1948 over the week ends. Central Rly should examine why such a service cannot now be introduced on regular basis basis on the experience of running such a service on central railway, western railway should also finalise their proposals early.
3. RDSO/DR/NR should carry out study for the Delhi- Howrah electrified routes for pair of stations such as Delhi-Kanpur Howrah-Asansol Dhanbad, Gaya-Dhanbad.

Subject 18: Traction Installations: To review the scale of facilities to be provided under electrification projects for maintenance of electrification assets like OHE, Switching stations, traction sub- stations with a view to reduce overall costs of electrification projects.
Recommendations: The committee note that Board have already constituted a committee comprising DTI/RDSO (Convener), DS(S&T)/RDSO, Addl CE(RE)/Allahabad, JDSS(TI)/RDSO and jt Director Elec. Engg./Railway Board (Member Secretary) to go into all aspects of railway electrification with a view to economise in the capital coast.

Decision:
Noted.

Subject 19: Standby diesel generating sets. To consider standardization of standby generating.

Recommendations:

The committee recommend that the following types of diesel engines may be broadly standardized for the application indicated:
(a) Air Cooled – For outputs from 6 KVA to 30 KVA for pumps houses and standby stationary power generation.
(b) Water called – for outputs higher than those mentioned above, for standby stationary power generation.
2. Each Railway may standardize the capacity of the sets for its own application particularly under item (a) which would cover nearly 70 to 80% of the equipments.

Decision:
Accepted. To ensure uniformity on the Railway the RDSO may lay down the standard rating for guidance of the Railway. Preferred ratings of diesel generating sets:

1A-33 phase hand start air oled diesel generating set.
  1) 7.5 KVA
  2) 15.75 KVA.
  3) 20 KVA.
  4) 26.5 KVA

1.0-3 3 phase electric start wear called diesel generating set.
  1) 34 KVA
  2) 50KVA
  3) 60 KVA
  4) 75 KVA
  5) 106KVA
  6) 125 KVA
  7) 160KVA
  8) 200 KVA
  9) 310KVA.

Subject 20: Manual for Electrical Department. To consider preparation of manual for the electrical department.
Recommendations
The committee stress the need for preparation of manual for general electrical engineering service of Indian Railways and recommend that shri S.P. Tonse, Retired Director Electrical Engineering Railway Board, and Shri B.V.S. Rao, Retired chief Electrical engineer be entrusted with its preparation CEEs of central and Southern Railway will assist them in their work.

Decision:
Approved. Officers to be entrusted will be decided separately.

Subject 21: Documentations and review of ESC decisions. To examine the methods of documentation of decisions taken on ESC recommendations and review of the previous decisions.

Recommendations
The committee note that the report on each meeting of the electrical standards committee in the form in which at present printed, will meet the requirements. The committee recommend that a review of the progress of recommendations as regards subjects which are still of importance should be prepared by RDSO and circulated to the members before the next ESC meeting.

Decision:
1. Board desire that each Railway should nominate one officer to coordinator in getting speedy implementation of Board’s decisions taken on ESC Recommendations.
2. RDSO should check that all the items taken up by ESC have been cleared and closed and there is no duplication of item. It will be very useful if RDSO cam prepare a list of the items taken up by ESC from time to time final decision made and action taken.

Subject 22: Train lighting- Fluorescent lighting. To review the introduction of fluorescent lighting in coaches.

Recommendations
The committee discussed the performance of fluorescent fittings conforming to RDSO specification and note that the same is not comparable on various railways. Railways should therefore, analyze the causes of failures in consultation with RDSO and suppliers.

The committee. Therefore, recommend that trails of fluorescent fittings on coaching stock should be continued, by on a limited scale.

The committee reiterate that fluorescent fittings purchased by railways should meet RDSO specifications for performance.

Decision:
Para 1 – Noted.
Parad2 & 3 Approved.
Subject 23 : General : To Elect member of sub-committee to screen the agenda of XXIX ESC meeting.

Recommendations:
The committee recommend the appointment of a screening sub-committee consisting of chief electrical engineers, southern Railway (Convener) and Northeast Frontier Railway for the next electrical standards committee. They also recommend that the subjects for the next meeting be called by the RDSO by middle of October 1976 and finalized by the middle of November 1976 the screening sub-committee be convened in the end of November 1976 and the next ESC halt at madras (Southern Rly) in the third week of January 1977.

Decision:
Approved.
29th Electrical Standards Committee Meeting Held at Madras, in 28th February, 1st & 2nd March, 1977

Shri S. Sarath, CEE/WR as Chairman, Electrical Standard Committee conducted the Meeting.
Subject 1: Electric rolling stock operation. To consider very and means for improving availability of electric locomotive.

Recommendations:
1. The committee sincerely appreciate the very instructive analysis presented by the DEB and his keen interest in exploring ways and means to improve eclectic loco utilization and availability.

2. The committee notes that the through running between Railways is today possible between eastern Railway and contiguous electrified railways. These railways, May evaluate the benefits of such through running and take further action.

3. To improve availability, the committee recommends-
   i) The railways build up adequate stock of essential capital and revenue spares to minimize detention of locomotives waiting for material, and * Director Efficiency Bureau, Railway Board.
   ii) The facilities at outstation sheds may be improved where justified to utilize the lie over period for scheduled inspection of locomotives on passenger links.

4. The committee find that there is not sufficient uniformity in the compilation and presentation of statistics The committee recommend that each railway should pay special attention to this aspect to ensure that statistional figures furnish a reliable guide for action.

Decision:
Paras 1, 3 i) & and 4- Noted.
Para 2- Accepted.

Subject 2: Eclectic locos and EMU’s – shed and facilities. To review optimum holding of locos in shed and scale of repair facilities for locomotives/EMU equipments.

Recommendations:
1. Based on the service and performance experience of various Electric loco sheds functioning different Railways in the last decade and a half, the committee is of the unanimous view that the optimum figure of holding of a shed is 80 locos.
2. The committee recommends that-
   i) The different railways advise within the next two months their views on the required facilities including machinery & plant, taking into consideration the scale already approved by the Board for the model sheds. RDSO will then circulate a draft report of recommended facilities for Electric loco sheds for consideration by the ESC at its next meeting, and.
   ii) a sub_ committee consisting of DSE/RDSO (Convener), CEE/W.Rly and CEE/E.Rly prepare initial recommendations on the subject of schedules holding maintenance facilities etc: in regard to EMUs for consideration of the ESC at its next meeting.

Decisions.
Paras 1 and 2 i)-Accepted.
Subject 3: Traction Motor. To review the basis on which the specification for traction motor has been developed.

Recommendations:
1. The committee consider that the most important aspect in a specification for a traction motor is to indicate as precisely as possible, the severity of service loading conditions. A temperature rise of IEC minus 20°0 is considered adequate for the most severe service conditions specified. It would, however, be necessary that the ageing characteristics of the insulation system used on the traction motor should be indicated by the supplier and tested by the purchaser during type tests, RDSO may incorporate these points in future specifications.

2. The committee also considers that the entire phenomenon of traction motor failures and improvement of specification and construction is a subject of vital importance and therefore merits a thorough study and report by and experienced and senior officer on special duty. This wills coinable further improvement in our specification and maintenance practices, on a fractional and realistic basis.

Decision:
Para 1 - RDSO may take necessary action
Para 2 - Noted.

Subject 4: DC locos & EMUs- Protection in. To consider augmentation of protection systems on DC locos and EMUs.

Recommendations:
1. The committee recommends that RDSO should first investigate the extent of “unprotected zones” existing on all circuits on the Electric Locomotives/EMUs, and evolve methods to reduce the extent of the “unprotected zone” and increase the safety margin on the residual unprotected zone by improving insulation and constructional standards.

2. As regards relay and other developments proposed by the central Railway, the committee recommends that in consolations with central Railway, RDSO may evaluate the experience so far derived and take further steps as found necessary.

3. The committee considers that it is advisable to provide H.S.C.B’S on D.C. Locos.

Decision:
Paras 1,2 & 3 - Accepted.

Subject 5: EMU trains. Topsider introduction of intercity EMU services.

Recommendations:
1. In order to remove any ambiguity that night set-in regarding subsidized fares, etc. The committee recommend that inter- city Motor coach driven electric trains may be called “Electric Train sets (ETS)” instead of EMU’s.

2. The committee are convinced that there is considerable potential for electric train- sets in improving operation on the Indian Railways. While the traffic and commercial evaluation for the sections nominated by the Board are under way, the committee recommends that the technoge
aspects of design of electric train-sets using coaching stock of standard width may the studies by the RDSO. This study should also cover provision of power for air-conditioning of coaches of the train-set from the motor coach transformer.

**Decision:**
Paras 1,& 2- Accepted.

**Subject 6:** Fire in EMU coaches. To consider standardization of code of practice for prevention of fires on EMU stocks.

**Recommendations:**
The Committee recommends that Railways may send their comments on the draft code of practice to RDSO early so that the code may be finalized by RDSO.

**Decision:**
Accepted.

**Subject 7:** Cables for electric rolling stock. To consider standardization for specification cables for electric, diesel electric locomotives and EMUs.

**Recommendations:**
After discussion, the committee recommends that RDSO may re-examine specification EL-13/02 in the light of comments offered by members and indicator to Railways will consider this matter at the next meeting.

**Decision:**
Accepted.

**Subject 8:** Traction overhead equipment. To consider methods to overcome problems arising out of atmospheric pollution of overhead transmission lines.

**Recommendations:**
The committee recommend that SCR may also take up trials with PTFE coated insulators in co-ordination with RDSO.

**Decision:**
Accepted.

**Subject 9:** Traction overhead equipment. To consider adoption of hot line working on OHE substations, switching stations and transmission lines.

**Recommendations:**
The committees note with interest the development of the hot line washing equipment for OHE insulators by the western Railway. The committee recommends that the trials may be progressed further by that railway associateting RDSO to facilitate evaluation and possible standardization.
Decisions:
Accepted.

Subject 10: Traction Installations. To review the scale of facilities to be provided under electrification projects for maintenance of electrification assets like OHE, switching sub-station Traction sub-stations with a view to reducing the overall costs of electrification projects.

Recommendations:
The committee note that the efficiency bureau of the railway Board have finalized study on this subject and recommend this report may be circulated to railways.
2. The committee also recommends that a sub-committee comprising of director traction installations/RDSO (Convener), chief electrical Engineers of south eastern and northern railways may examine all aspects of this question and make their recommendations.

Decision:
Accepted.

Subject 11: Traction overhead equipment. To consider development of lateral adjustment measurement car for facilitating overhead equipment maintenance.

Recommendations:
The committee note with interest the development of lateral adjustment measurement (LAII) car by the eastern railway and suggest that further evaluation and standardization of the design may be progressed by RDSO in close co-ordination with the eastern railway.

Decision:
Accepted:

Subject 12: Traction Installation. To consider adoption of power operated isolators.

Recommendations:
The committee considers it would be worthwhile to diver a 25 kw motor-operated isolator with facility for remote consider RDSO may undertake this development in co-ordination with 8. RDSO may also evaluate the scope of application of such isolator.

Decision:
Accepted.

Subject 13: Train lighting- batteries. To consider capacities of batteries for coaching stock in modified train lighting system.

Recommendations:
After consideration of all aspects, the committee recommends that-
  i) Two sets or batteries have definite operational advantages under service conditions,
  ii) Railways should be free to adopt this system as conditions arise, and.
iii) New builds should invariably be turned out with battery boxes suitable for installing two sets of batteries of adequate capacity.

Decision:
  i) The no of batteries depend very much on the type of service e.g. periods of halt, arrangement etc. normally, therefore, 2 batteries as recommended by ESC should be provided except in services where the railway feels that economy of one battery etc can be achieved without detriment to quality of service. ICF shall provide two batteries.
  ii) RDSO may update the code of practice for battery and dynamo capacity adopting the G/NG ratio as obtainable on various service time taken of the Indian railway and not on the European practice as hitherto.
  iii) The revised draft code of practice with actual tests, observations, theoretical studies on different kinds of trains (High speed trains mail Express, Passenger and branch lines) be circulated by RDSO to ESC members for consideration at the next ESC.

Subject 14: Train lighting- Lamp Resistance. To consider elimination of lamp resistance and lamp resistance cut-in-relay in modified train lighting system.

Recommendations:
Based on the service experience so far, the committee recommends that further development effort is not necessary on selenium ballast except for continued trials on the eastern railway.
2. The committee recommends that the proposal to eliminate the lamp resistance and the out-in relay be investigated further by RDSO in consultation with south central railway.
3. All railways may report to RDSO their observations on voltage at lamp terminals under different service conditions.

Decision
  1. LAMP ballast should be continued to be developed so as to an alternative equivalent of the conventional lamp resistance. The teething troubles as experienced should be debugged.
  2. Can be pursued simultaneously with (1) above.
  3. Accepted.

Subject 15: Train lighting drive. To consider adoption of 50 MM belts for T.L. generator.

Recommendations:
1. The committee took note of the views of the various railway. The committee recommend that though 50 mm vide flat belt is not adequate to continuously drive the dynamos distress conditions prevail.
2. In this connection the committee recommend that RDSO may study whether are stretching of belts can be done at the manufacturing works, and if so includes it in the relevant specification for flat belts for train lighting.

Decision:
1. Railways may arrange supply of only prestretched belts from one or more major depots to areas to be nominated for each major depot by CEEs. The prestretching should as on
interim measure be achieved till RDSO affords in getting prestretching done at manufacturers work succeed by replacing belts on one or more local train services having a round trip of about 500 km or sub-multiples thereof in a day and removing belts at 500 km intervals.

2. The belts thus removed may be cut as necessary and supplied as standard prestretched lengths to the sub-depots for further use.
3. The technique of belt cutting and jointing as approved by RDSO’s instruction leaflets should be simultaneously enforced rigidly.

**Subject 16:** Train lighting ROB Relay. To consider elimination of ROB relays in modified train lighting system.

**Recommendations:**
1. The committee recommends that Railways need not procure ROBs to the existing design.
2. The committee recommends that RDSO expedite finalization and development of over voltage protection device to the new simplified design.

**Decisions:**
1. RDSO may further investigate and give their no marks.
2. Accepted.

**Subject 17:** Scope of ESC. To consider the scope of work of the ESC.

**Recommendations:**
1. The agenda for the meeting of the ESC may include any item that has a bearing on the efficiency and performance of equipment dealt with by its members.
2. The committee also considers that railways should attempt to restrict the number of new items proposed for discussions. New items should preferably be supported by adequate field trials and documentation.

**Decisions:**
Para 1- Accepted: Para 2- Noted.

**Subject 18:** HT power systems. To consider authorization of nominated skilled staff for executive works of IIT power system like isolation, fuse replacement and giving shut down.

**Recommendations:**
1. The committee have considered the report of the sub-committee in this regard and would suggest that paras 8.1 and 8.2 may be reworded as follows-
   "**8.1 33kV and above:**- only supervisors in grade Rs. 25-700(RS) and above should be authorized as competent persons.
   "**8.2 High Voltages below 33 Kv:**- supervisors and staff no below the rank of skilled artisans may be given competency certificates for dealing with these installations.”
2. The committee unanimously endorse the views expressed by the sub-committee in respect of the functions of the chief electrical inspector in para 9.5 and recommend that these proposals be approved by the Board to meet statutory requirements and also in the interests of safety.

**Decisions:-**
1. Authorization for undertaking the works can be issued to highly skilled artisans. For commissioning of new HV and modifications to existing HV installations only supervisors in grade 425-700 (RS) and above can be authorized.

2. Noted.

**Subject 19:** Power distribution system. To consider Segregation of distribution lines and metering thereof.

**Recommendations:**
The committee notes the draft report regarding norms for staff strength in electric loco sheds circulated by the efficiency bureau, railway board. The committee also note that the maintenance study Gr P (MSG) is engaged on a similar study.

The committee therefore, recommend that soon after the MSG report is finalized a sub-committee consisting of CEE/Northern Railway (Convener) CEE/ S.E.Railway and CEE/Central Railway may go into the above two reports and finalize their recommendations, preferably September 1977, for consideration in the next meeting of the ESC.

**Decision:**
Para-1 - Noted.
Para 2- Accepted.

**Subject 21:** XXX ESC Meeting- Screening committee. To consider nomination of the screening committee and venue of the next meeting of electrical standards committee.

**Recommendations:**
The committee recommend that the next meeting of the ESC be held during the last week December 1977 at Calcutta (Eastern Railway, assisted by S.E.Railway and MTP organization).

The committee feels that there is no need to nominator a sub-committee for screening the agenda for the next meeting of the ESC and recommend that the screening be done by DSE/RDSO and DTI/RDSO. The committee further recommends that RDSO call for subjects for the agenda by September 1977 and finalizes it by October 1977.

**Decision:**
Paras 1 & 2 - Noted.
### 30th ELECTRICAL STANDARDS COMMITTEE MEETING

**Members Present**

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Subject 1: Thyristor control for electric loco. To consider adoption of thyristor control for electric locomotives.

Recommendations:
The committees is of the view that thyristor control (Eliminating tap changer control on AC rolling stock and resistanc tapa on DC rolling stock) has many technical advantages. Although initially for certain applications, thyristor control may involve extra costs, this system has considerable potential not only for reduced maintenance costs byt also in the long run for economies in the initial costs also the committee note particularly that thyristor control has made obsolete the conventional tap changer control in all advanced countries. The committee are of the view that Indian railways should adopt thyristor control as a long term policy and towards this end undertake for trials the provision thyrisotr control on following different types of applications.

a) 10 WAM1 locomotives to replace N4O tap changers which are obsolete and beyond repair.
b) 10 WAM2 locomotives to replace N4O tap changers which are obsolete and beyond repair.
c) 10 WAM4 locomotives to be built by CLW.
d) 5 SIG EMUs to replace excisions, contactors, starting resistors etc. which are obsolete and beyond repair.
e) 7 MB AC EMUs for which complete electrical equipments are to be fully imported.
f) 144 BG AC EMUs for which complete electrical equipments are to be fully importer

Decision:
Paras a, b, c, d, e, and f: The over-all techno-economic benefits of electric traction should be borne in mind before larger scale acquisition of thyristors.

Subject 2: Braking for electric locomotive. To consider norms for provision of Rehaustatic braking for WAM4 locomotive.

Recommendations:
The committee note the potentialities and limitations of rheostatic braking and economics of its provision on electric locomotives. The committee recommends that rheostatic braking may be provided for the present only on the following types of electric locomotives for various freight services as indicated against each of them.

i) WAM4-B Locomotives for waltair-kirandul section.
ii) WAG4, WAM4 and WAM4-C locomotives of south Eastern Railway and Igatpuri-Bhusaval section of central railway.

Decision:
Paras i and ii-Accepted.

Subject 3: Battery powered locomotives. To consider design features of battery powered BG locomotives.
Recommendations:

The committee is of the view that there is an urgent need for development of a battery powered BG locomotive for shunting service on electrified section. The availability of such a locomotive will help to reduce railway electrification costs by eliminating the need for electrification of a number of line in yards. For expeditious development that one prototype of such a locomotive be built by Eastern Railway for which necessary design details should be furnished by RDSO making use of readily available traction equipment bogies and under frames.

Decision:

This one of the recommendations of 12/78 Report of the committee by Motive power plan and will be dealt with by the full board alongwith other recommendations of the committee of motive power plan.

Subject 4: Inspection and schedules for electric locomotives. Rationalization of inspection and schedules for electric locomotives.

Recommendations:

1. The committee is of the view that there is an urgent need to review the existing maintenance schedules of electric locomotive in the light of experience gained and with a view not only to increase the reliability of rolling stock ut also to rationalize and minimize the time for scheduled attention.

2. The committee recommend that this review may be undertaken taking into account the actual reliability and the incidence of unscheduled repairs on various equipment of different classes of locomotives. As first step such a review should be taken up on WAM4 locomotives by a sub committee consisting of senior Div1. Elec. Engr.(RS), Bhilai, Sr. Div1. Elec,Engr.(RS), bhusaval with jt Dir. Stds (Electrical)/Rotating Equipment, RDSO as convener. The sub-committee should circulate its report to the members of the ESC by October, 1978 so that the same may be discussed in the next meeting of the ESC

Decision:

Paras 1 & 2- Accepted.

Subject 5: Failure reports on Eclectic locomotives. To consider computerization of failure report on electric locomotives and EMUs.

Recommendations:

The committee welcome the idea of computerization of the analysis of failure reports of electric locomotive and EMUs. Such a step will enable detailed statistical analysis improve the reliability of electric rolling stock.
The committees recommend that RDSO should standardize the forms, evolve the computer programme, lay down detailed instruction with regard to filling up and submission of forums for source data. A suitable training course may also be arranged.

**Decision:**
Paras 1 & 2 - Accepted.

**Subject 6:** Exhauster for electric locomotive. To consider use of single speed exhauster on electric locomotive.

**Recommendations:**
The committee note that all the electrified railways except S.E.Railway are already using nor they & SIM exhausters with only slow speed operation and that this does not have any adverse effect on operation of the locomotives. S.E.Railway have. However found that two speed exhausters are preferred.
The committee recommend that S.E.Railway in association with RDSO may jointly go further into the relative advantages of double and single speed exhausters a detailed study should be made based on actual tests and the report of this study may be circulated to the members by November 1978 to enable the ESC to consider this subject further in the next meeting.

**Decision:**
Paras 1 & 2 - Accepted.

**Subject 7:** Cables for electric rolling stock. To consider Standardisation of specification for cables for electric, diesel-electric locomotives and EMUs.

**Recommendations:**
As the experience gained so far with PVC and HRPVC cables is satisfactory, the committee recommends that HR PVC cables should continue to be used on EMU stock. In view of the need for longer life and other differences in design and working conditions elastomeric cables should continue railways may bring up the subject again for further discussion in case there is ny revision required in this practice based on further service experience.

**Decisions:**
Accepted.

**Subject 8:** Centrallised advance institute for electrical engineers. To consider setting up of centralized advanced institute for electrical engineers and senior subordinates on Indian Railway.

**Recommendations:**
The committee strongly recommends that a centralized advance school be set up for training of (a) electrical supervisory and highly skilled staff engaged in repairs and maintenance of traction machines and (B) the electrical instructors of various training schools attached to loco sheds and...
traction depots. Keeping in view the advantages of locating such a school near a traction repair shop, the committee recommends that the school should be located at Nasik.

**Decision:**
Paras 1 & 2 - Accepted.

**Subject 9:** Generator and battery capacities for coaching stock. To review the generator and battery capacities on coaching stock.

**Recommendations:**
1. The committees note that the standard generator capacity provided on coaches is adequate only for generation to non-generation ratio of two and above. The committee also note that for trains having generation to non-generation ratio of less than two. Adoption of EOG/MOG system is inescapable.
2. The committee recommend that the standards of generator and battery capacities laid down in IRS:E-45 may continue to be adopted.
3. The committee further recommends that RDSO and the railways conduct further study regarding adequacy of battery capacities on the coaching stock and report to the ESC for discussion in the next meeting.

**Decision:**
Paras 1,2 & 3 - Accepted.

**Subject 10:** Future drive for train lighting. To consider future drive for train lighting generator.

**Recommendations:**
1. The committee recommends that the V-belt drive for 18 KB generator of air-conditioned coaches should be continued. The hypoid gear drive should be adopted only after the reliability of this drive on the existing coaches is brought up to an acceptable level.
2. The committee further recommend that the performance of V-belt drive on 4.5.KW alternator should be further monitored by the railways and RDSO. Affords to develop a cogged V-belt should also continue.
3. The committee further recommend that RDSO should examine by carrying out special tests whether flat belt drive could be used by adopting the improved belt fasteners and increasing belt tension.

**Decision:**
Paras 1, 2 & 3 - Accepted

**Subject 11:** Centralised repair shop on railways. To consider setting up of centralized repair shops and training of staff for electronic equipment on the railways.
30th ESC/Calcutta/1978

**Recommendations:**
The committee note the necessity of setting up of centralized repair shop and training of staff for electronic equipment on the railways and recommend that each railway should set up one such repair shop.

**Decision:**
Paras 1, 2 - Accepted

**Subject 12:** Compendium of approved suppliers. To consider preparation of compendium of approved suppliers.

**Recommendations:**
The committee re-iterate their earlier recommendation that the purchases of train lighting and air-conditioning equipment/spares should be confined to the compendium of approved suppliers, prepared by RDSO for ensuring supply of consistently good quality stores for reliable services. The committee recommend that necessary directive to this respect be issued by the Board.

**Decision:**
This recommendation requires examination by stores/ finance directorates. 80% of the requirement being met from approved sources would appear to meet the need for competition and development of new sources.

**Subject 13:** Yardstick for train lighting maintenance staff. Yardstick for train lighting maintenance staff.

**Recommendations:**
The committees are of the opinion that in view of the importance of train lighting maintenance from the point of view of service to the passengers, there is an urgent need to have a approved yardstick for the scale of provision of maintenance staff for train lighting and air-conditioned coach work.

The committee note that the efficiency bureau of the railway board have already made a work-study of the operation involved in the maintenance of train lighting and air-conditioning coach equipments and have formulated norms for the staffing pattern required. The committees recommend that based on this study the efficiency bureau may formulate a yardstick for approval of the railway board and issue to the zonal railways, so that the staff strength at each maintenance depot and station may be adjusted to the level of workload currently obtaining.

**Decisions:**
Paras 1, 2 - Accepted

**Subject 14:** 25 KV traction Installation. To consider adoption of reduced electrical clearance on permanent measure.

**Recommendations:**
The committee noted that the data regarding service experience on this subject available so far is not adequate and recommend that trials to gather further data under controlled conditions be
conducted on Eastern and south eastern railways for which RDSO may formulate a test programme and evaluate the test results.

**Decision:**
Accepted

**Subject 15:** Traction Installation. To consider Way and means to overcome difficult supply position of solid core insulator.

**Recommendations:**
The committee noted that RDSO have given clearance for the adoption of disc insulators in lieu of 9-tonne solid core insulators for several types of application. The committee also noted that eastern railway have developed improvised arrangements to use disc insulators in lieu of stay tube and bracket solid core insulators on an experimental basis. The committees recommend that:
1. Solid core insulators should continue to be the standard to be prescribed.
2. These measures may be treated as permissible alternatives only when solid core insulators are not available.
3. RDSO may arrange to have the improvised arrangements developed by eastern railway subjected to the various tests prescribed for the solid core insulators and evaluated the results.

**Decision:**
Paras 1,2& 3 Accepted

**Subject 16:** 25 KV AC Traction Installation. Adoption of short neutral section with section insulators.

**Recommendations:**
The committee mote that 5 m long neutral sections have advantages specially when made up of PTFE type section insulators- particularly for suburban section and for sections with automatic signaling the committee recommend that pending the indigenous development of PTFE section insulators, which is in progress the railways may sections where these are considered advantageous from operational requirements.

**Decision:**
Accepted

**Subject 17:** Nomination of screening committee for the agenda of XXXI Meeting of the Electrical standards committee. To consider nomination of the screening committee and venue of the next meeting of electrical standards committee.

**Recommendations:**
The committee recommend that the next meeting of the ESC be held in February 1979 at Bombay (Western Railway) assisted by Central Railway and MTP Organization.
The committee recommend that the agenda of the next meeting be screened by a sub-committee consisting of DSE/RDSO. DTI/RDSO ad CEE/W.Rly.it is further recommended that the screening committee may review the minutes of the previous meetings and include all relevant items in the agenda where the final action is pending. In addition to the above RDSO will also call for subjects for the agenda by September, 1978.

Decision:
Accepted
### 31st ELECTRICAL STANDARDS COMMITTEE MEETING
From 10 to 12 July 1979 at Bombay (WR)

#### Members Present

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Subject 1: Adoption of 50 kV single phase system in place of 25 kV single phase system for electric traction on Indian Railways.

Recommendations:-
1. The committee note that with 50 kV system, the cost of OHE will increase by about 10% and that of locomotive by about 2%, whereas the reduction in cost of the substations will be marginal.
2. The committee consider that at this stage, 50 kV system need only be examined for isolated steeply graded sections with heavy traffic. The existing 25 kV system should continue to be the standard system on the Indian Railways.

Decision:
Para i) – Recommendations of ESC noted.
Para ii) – RDSO may reply consider and take a decision.
( Board’s E.B. Dte’s reference to RDSO)

Subject 2: Introduction of Rheostatic braking on d.c. EMUs. Notes by Secretary:

Recommendations:-
1. The committee note the advantages and limitations of rheostatic braking on dc EMUs. The Committee also note that a trial on one motor coach revealed that the traction motor was getting overheated.
2. Keeping in view the advancement made in the field of thyristor/chopper technology, the Committee recommend adoption of chopper control on one dc EMU rake with higher capacity traction motor. Adoption of this will also enable provision of regenerative braking which is considered superior to rheostatic braking.

Decision:
Para i) - Committee’s recommendations is noted.
Para ii) - Possibility of working on this recommendation should be examined separately by RDSO and the Electrical Directorate of the Board, and later submitted for separate consideration of the Board.

Subject 3: Simplified BFB structures for dc OHE- Replacement & additions:

Recommendations:-
The Committee recommends that while designing the structures to replace the old structures which have outlived their life, the following aspects be kept in view.
1) As far as possible, rolled sections be used instead of fabricated sections. Prestressed concrete uprights may also be considered, if economical.
2) The design of the structures will be such that adequate clearances are available for double-deckers as well as 25 ac system.
Decision:
Paras i) & ii) Noted. Prestressed concrete structures are to be evaluated by RDSO and Railways by extended trials before proposing acceptance as permissible alternatives. The Eastern Railway’s experience on Tarakeshwar Branch may provide the initial information for prototype specification.

Subject 4: Self – Generation AC Sleeper coaches. To consider adequacy of stand by Capacity of generating and airconditioning plant in self generation type 2-tier a.c. sleeper coaches.

Recommendations:-
1. The Committee recommend that the existing are-conditioning system capacity should be enhanced so as to provide 50% standby capacity.
2. The Committee recommend that the ducting arrangement in these coaches should also be suitably modified so as to make the air distribution uniform under emergency working conditions.

Decision:
Para i) - Specifications should be re-examined in terms of specified ratings to decide where there is shortfall at present and the matter discussed again at the next E.S.C. meeting.
Para ii) - Accepted.

Subject 5: Traction sub-station control. Provision on traction sub-station control/protection system wiring/cabling.

Recommendations:-
The Committee recommend that for improved reliability in service only copper control wires be specified and used for traction substation and switching stations.

Decision:
Accepted.

Subject 6: Train lighting - Batteries. Lead-acid batteries for train lighting.

Recommendations:-
1. The Committee notes the need of establishing testing facilities for batteries in train Lighting Workshops and also Electric Loco and EMU sheds/shops.
2. The committee recommend that the list of equipment and facilities to be set up by the Railways should be standardised by RDSO

Decision: Paras i) & ii) - Accepted.

Subject 7: Re-winding of traction motors. Norms for re-winding of traction motors and creation of necessary facilities for the same.
Recommendations:-

1. The Committee note the need for fixing criteria for judging the condition of the insulation of traction motor for avoiding failures in service. The committee recommend that RDSO study this aspect in detail and prepare a report covering the criteria, equipment required for measuring various criteria, and their specifications and sources of supply for guidance of the railways.

2. The committee note the importance of proper investigation into failure of the armatures of the traction motors and the need of proper process and workmanship in course of rewinding of the motor. The committee recommend that RDSI based on the study conducted into failures of the traction motor armatures calculate to the railways special maintenance instructions to avoid failures of recurring nature.

3. The committee note the importance of use of rewinding material of good quality and recommend that CLW circulate to the railways the list of approved suppliers. RDSO will also prepare the detailed specifications and test procedures for various rewinding materials and circulate to the railways list of approved suppliers for these items. The railways should restrict procurement of the rewinding material only from approved sources.

4. The committee recommend that the railways send to RDSO the necessary feedback on the parity of supplies from the approved sources so that the list may be kept under constant review.

Decision:
Paras i) – Accepted.
Paras ii) – Accepted.
Paras iii) – Use of rewinding material of good quality and recommend that CLW circulate to the railways the list of approved suppliers. RDSO will also prepare the detailed specifications and test procedures for various rewinding materials and circulate to the Railways list of approved suppliers for these items.
Paras iv) – Accepted.

Subject 8: Traction motors. Development of dully suspended motors and drives.

Recommendations:-

1. The committee note the need for fully suspended traction motors for higher locomotive speeds i.e., above 130km/h.

2. The committees recommend that for fully suspended traction motors, the WN type drive used on WAN2 locos may be adopted along with the development of higher horse power traction motors of 800 to 1000 h.p.

3. The committees also recommend that RDSO may, in the meantime, also adopt the TAO 659 motor to frame mounting to facilitate service trials.
Decision:
Paras i) – Accepted.
Paras ii) – for fully suspended tracting motors, the WN type or similar drive used on WAM2 locos may be adopted along with the development of higher horse power traction motors of 800 to 1000h.p.
Paras iii) – Accepted.

Subject 9: Specification of brushless alternators. Specification of brushless alternator including rectifying and regulating equipment for 24V de tranlighting system used on BG & MG coaches.

Recommendations:-
1. The committee approve draft IRS specification No.E-52-79 for brushless alternators.
2. Keeping in view the need for ease of maintenance of the alternators and regulators on the railways, the committee recommend that the design of the alternator and the associated regulating and rectifying unit should be standardised by RDSO for which detailed design drawings will also be prepared by RDSO and procurement should be made to such detailed designs.

Decision:
Paras i) – Accepted vide Board’s letter No. 78/Elec-1/138/8 dt.6.11.79.
Paras ii) - under consideration.

Subject 10: Fluorescent lighting. Specification for tubular fluorescent lamp fitting complete with inverter for use in railway coaching stock working on 24v dc supply system- IRS E47-78.

Recommendations:-
1. The committee approve the draft specification IRS-E-47-78.
2. The committee recommend that each railway should put in 100 fittings conforming to the above specification on service trial installed on coaches munning within the jurisdiction in service and report to RDSO for modification in the specification, if required, to improve the reliability in service.

Decisions:
Paras i) – Accepted.
Paras i) – Railways may adopt any one rake for observation.


Recommendations:-
The committees recommend that RDSO may finalise the specification of the auxiliary motors, keeping in view the various improvements enumerated.
Decisions:
Accepted.

Subject 12: Rating factors for improving reliability. To consider systematic and detailed study of reliability factors for various rolling stock electrical equipment.

Recommendations:-
The committee note the importance of systematic and detailed study of reliability factors for various rolling stock electrical equipment with a view to improving their reliability in service. The committee recommend that RDSO should study this subject in detail and make complete proposals based on supporting data for consideration of the committee.

Decision:
Noted.

Subject 13: Generator and battery capacities for caching stock. To review the generator and battery capacity on coaching stock.

Recommendations:-
1. The committee recommend that existing criteria for determination of battery capacities for the coaching stock as contained in IRS-E-45 may be continued.
2. The committee, however, note the advantages of use of two sets of batteries and, therefore, recommend that table I of IRS-E-45 may be modified as under:

   i) The recommended battery capacity of 400Ah for Group III coaches may be provided by 2 sets of batteries of 320 Ah for BG and 210 AH for MG.

   ii) The recommended battery capacity of 525 Ah for Group IV coaches may be provided by 2 sets of batteries of 320 Ah for both BG.
3. Keeping in view that the conversion of conventional coaches to MOG system will take some time, the committee recommend that all coaches built by production units should be provided with suspension arrangement for a second generator so that railways may install an extra generator to meet service requirements in slow speed and other trains.

Decision:
Para i) - accepted vide boards letter No. 78/Elec. 1/138/8 dt. 6.11.79
Para ii) - Under consideration.
Para iii) - Under consideration

Subject 14: Inspection and schedules for electric locomotives. Rationalisation of inspection and schedules for electric locomotives.
Recommendations:-
The committee accept the report of the sub-committee and recommend that the railways implement the suggestions made by the sub-committee.

Decision:
Accepted.

Subject 15 : Yard sticks for staff for the maintenance. To review the yard-sticks for staff for maintenance and operation of various classes of electric locos.

Recommendations:-
The committee accept the consider the report of the sub-committee and make suitable recommendations regarding yard stick for staff for electric loco sheds,

Decisions:
Under consideration.

Subject 16 : Lamp resistance cut-in-relay. To view elimination of lamp resistance and lamp resistance cut-in-relay in Modified train lighting system.

Recommendations:-
1. The committee recommend that the provision of lamp resistance and lamp resistance cut-in-relay as per IRS-E-45 should be continued.
2. The committee note the advantages of selenium lamp ballast over conventional wire wound lamp resistance. Development of this item, keeping in view the need of reliability in service and life, may be continued by RDSO. Service trials may be conducted on all railwayys on the ballast cleared in prototype test by RDSO keeping in view the various requirements in service life vibrations, dust, humidity etc.

Decisions:
Para i) & ii) - accepted, so far as initial fitment is concerned, in case of loss or........the Railways may restrict fitment thereafter to cases where service conditions warrant continuance.

Subject 17 : Nomination of Screening committee for the agenda of XXXII Meeting as the Electrical Standards committee. to consider nomination of the screening committee and Venue of the next meeting of the Electrical Standards Committee.
31st ESC/Bombay/1979

Recommendations:-
1. The committee recommend that the next meeting of the electrical standards committee be held in April, 1980 at Calcutta (South Eastern Railway) assisted by Eastern Railway and MTP.
2. The committee recommend that the agenda of the next meeting be screened by a sub-committee consisting of:
   Director Standards (Electrical), RDSO
   Director Traction Installations, RDSO
   Chief Electrical Engineer, South Eastern Railway.

Decisions:
Paras 1) & 2) - Noted.
### 32nd ELECTRICAL STANDARDS COMMITTEE

**MEETING**

on 8<sup>th</sup> and 9<sup>th</sup> July 1981 at Calcutta (SER)

### Members Present

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<td>P.K. Khuller</td>
<td>Addl. DSE</td>
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<td>R.P. Srivastava</td>
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Subject 1 : Compendium of Approved Suppliers. To consider preparation of compendium of approved suppliers for train lighting and air-conditioning equipment and stores.

Committee’s recommendations:-

1. The committee are of the opinion that for complete train lighting equipments as well as for major components, a list of approved suppliers must be maintained. Before a supplier is included in this list, the approval of RDSO shall be taken. At present, complete equipments are normally purchased from the approved suppliers but often components are purchased from other sources – leading to failure in service because of lack of adequate quality control. Considering that the cost of the components purchased by the Railways is only a small proportion of the total expenditure on train lighting and air-conditioned coach equipment, the committee recommend that Railways and Production Units should procure their requirements of vital items exclusively from the approved suppliers. Developmental orders outside the list of approved suppliers may be placed by the individual railways and production units on firms who have the capability and quality control/testing facilities and if their product is found successful after bench tests and monitored service trials, the name of the firm may be recommended to RDSO for inclusion in the approved list.

2. The committee note that while detailed specifications and test protocols are available for complete equipments of train lighting and air-conditioned coaches, such detailed specifications and test protocols are not available for a large number of components which are being purchased by the Railways.

3. The committee recommend that RDSO should take up the work of preparation of test protocols for the more vital components used on train-lighting/air-conditioning service, to serve as guidelines for the inspecting authority. It is also recommended that firms who desire to be put on the approved list, should possess the facilities required for the tests prescribed in such protocols.

4. The committee also note that in their letter No. 81-M(L)/466/2720 dated 28.04.81, the Railway Board have directed that all vital items and components of diesel and electric locomotives should be purchased only from sources approve by the Chief Mechanical Engineer/Chief Electrical Engineer of the railways concerned and no procurement should be permitted from unapproved firms.

5. The committee recommend that a similar directive be issued by the Board that these orders be extended to stores items for all components of train-lighting and air-conditioned coaches. Where for any reason, this is not possible, and an order has to be placed on a firm not on the approved list, such order should be placed only after the concurrence of the Chief Electrical Engineer.

Decision:
Para 1: Accepted.
Para 2: Noted.
Para 3: Accepted.
Para 4: Noted.
Para 5: Instructions have been issued to Railways vide letter No. 75/RS (G)/779/30 dated 25.07.81 that generally orders for full quantity of various spares and components of electrical and diesel rolling stock and train lighting and air-conditioning material should be placed only on approved suppliers including those approved by CME/CEE on the basis of educational orders.

Subject 2: Train-lighting. Standardization of alternator and regulator.

Recommendation:
The committee are of the view that in addition to the development of a common regulator for the different makes of brushless alternators now in service, which is already in progress with M/s. ECIL, RDSO may take up with the manufacturers the feasibility of standardization of the following components and aspects:

a) Alternator Pulleys;
b) Mounting dimensions of the regulator box,
c) Alternator terminals;
d) Regulator terminals;
e) Bearing of alternators;
f) Accessibility of terminals for periodic check and tightening.

Decision:
Accepted.

Subject 3: Battery charging rectifier on air-conditioned coaches. Deletion of 110 V battery charging rectifier from A/C coaches.

Recommendation:
1. The committee consider that it is necessary to continue to provide one battery charger on each self-generating A/C coach, because it is essential that the batteries of such coaches are charged not only in terminal yards but also on the platform at terminal stations and at such intermediate stations, where the halt of the coach is of considerable duration. The number of stationary battery charger which would be necessary in case the coaches are not provided with the battery charger would perhaps be more than the number of such coaches at present in service, and therefore, the provision of an individual battery charger in each coach would not be uneconomical.

2. The Committee, however, suggest that RDSO & ICF may examine whether the design/capacity of the battery charger now being provided can be modified to effect price-reduction.

Decision:
Para 1: Accepted
Para 2: Accepted

Subject 4: Design of Carriage Fans. Standardization of design of carriage fans.
Recommendation:
1. The committee are of the view that the standardization of components already achieved for the trainlighting fans is adequate and standardization of additional components is not required at present.
2. RDSO may pursue further improvements in the fan design with a view to enhancing the service value and maintainability e.g. by the adoption of PVC/plastic blades, self lubricating bearings etc.

Decision:
Para 1 & 2: Accepted.

Subject 5: Spares/Standby for A/C coaches. Norms for (a) Spares/Stand by for maintenance and (b) POH of A/C coaches.

Recommendation:
1. The committee are of the view that it is necessary to provide an adequate number of spare air-conditioned coaches to cover the maintenance requirements of-
   a) POH
   b) IOH
   c) Other scheduled maintenance such as, monthly, quarterly etc.
   d) Unscheduled repairs on Electrical and Mechanical account.

Considering the experience of the Railways on the air-conditioned coaches so far, the ineffective days on each of the above mentioned counts are approximately as follows, (though there are variations from Railway to Railways):-
   a) POH : 60 calendar days
      (including transit & trials) : in a year.
   b) IOH : 15 -do-
   c) Other scheduled maintenance :15 -do-
   d) Unscheduled repairs on electrical/mechanical account :30 -do-

Total : 120 days.

2. Thus the maintenance requirements would be 33% of the total fleet of 50% of the bare requirements for traffic. The bar requirements should also include traffic reserve for running summer specials, special moves etc.

3. The committee note that the above mentioned requirement of spare coaches is rather high and efforts should be made by the mechanical and electrical departments to bring down the time taken for the various scheduled and unscheduled repairs on these coaches.

4. The committee recommend that the possibility of increasing the interval between successive POHs may also be considered. This can possibly be done if special shed facilities exclusively for air-conditioned coaches are provided at terminal stations to undertake intermediate cal and mechanical gear.

5. The committee recommend that the board may nominate a committee consisting of one sr. administrative officer each from electrical and mechanical departments with the
additional director (Electrical), RDSO as member Secretary to study this question and make appropriate recommendations.

**Decision:**
Paras 1 -5: Under consideration..


**Recommendations:**
The committee note that the Railway Board have issued orders vide their letter No. 76/Elec.I/165/30 dated 17.01.1981 directing addl. G.M. (Technical), Western Railway to undertake the preparation of a standard manual for Electrical General Services.

**Decision:**
The matter is under consideration.

**Subject 7:** Electrical Inspectorate. Organization of Electrical Inspectorate Under Indian Electricity Act.

**Recommendation:**
The committee note that the absence of a separate Inspectorate cell under the Chief Electrical Engineer-cum-Electrical Inspector to the Government is a great handicap in the efficient discharge of the responsibilities and statutory obligations developing on the Chief Electrical Engineer in his capacity as the Electrical Inspector. A Sub-committee set-up by the XXVII Electrical Standards committee has done into this question in detail and submitted a report which was considered and unanimously adopted by the XXIX Electrical Standards committee. The committee recommend that each railway may take further action in this matter to create the Inspectorate cell as Sealy as possible.

**Decision:**
Noted.

**Subject 8:** Testing Laboratories. Establishment of testing laboratories for checking quality of electrical materials manufactured/repaired purchase.

**Recommendation:**
1. The Committee note that some limited testing facilities are already existing on certain railways which have been found useful in carrying out tests on the quality of materials received for maintenance of electrical equipments. The committee are of the view that it is necessary for coach railway to develop adequate testing facilities and recommend that a testing laboratory should be set up by each railway where it is not now existing and it should be developed further by others where the facilities are not adequate.
2. These laboratories could not used to carry out sampling tests on supplies received from different manufactures with a view to evolving a quality appreciation of different suppliers to guide in future purchases.
Decisions:
Para 1 : Accepted.
Para 2 : Noted.

Subject 9: Spare parts of air-conditioning and train-lighting equipment. Preparation of part drawings and specifications for components and materials used in the maintenance of train-lighting and air-conditioning.

Recommendation:
The Committee recommend that each Railway may make out a list of items of stores with substantial regular consumption for which part drawings, specifications and test protocols are required to be prepared and send the list to R.D.S.O. R.D.S.O. may then take further action to prepare part drawings etc. with the assistance of the Zonal Railways.

Decisions:
Accepted.

Subject 10: Rating factors for improving reliability. Performance of alternators and proposals for modifications in design details to improve reliability and maintainability.

Recommendation:
1. The committee note with appreciation the efforts made by R.D.S.O. for improvement of reliability of the brushless alternators and regulators.
2. The committee recommend that prototype tests on provisionally approved designs may continue to be done by R.D.S.O. and routine acceptance tests of series production assigned to RITES as per current practice. RITES Inspectors may be requested to send to the Consignee Railways and to R.D.S.O. a copy of the test data sheet in respect of each lot of equipment inspected and accepted by them.
3. The Committee also recommend that RDSO may be authorized to do over-sight inspections of some machines from the series production from time to time with a view to monitoring the quality control and implementation of suggestions given by RDSO in this direction.
4. The Committee note that trial orders are being placed on M/s. ECIL for common regulators for brushless alternators as per RDSO’ Specification No. EL/TL/33. The Specification may be finalized in the light of test results and service experience on the common regulators.

Decisions:
Para 1 : Noted
Para 2 : Accepted. This is essential, with a view to make regular efforts to improve the reliability and performance of the equipment which have been provisionally approved.
Para 3: Accepted.
Para 4: Railways should advise the results of trials and service experience to RDSO for any improvement in the specification EL/TL/33.
Subject 11: Mid-on Generation System for slow speed passenger trains. Review of design and standardization problems regarding MOG system.

**Recommendation:**
1. The committee was informed by RDSO that almost all drawings have been prepared and issued and the drawing for the coupler will be issued shortly.
2. The committee also note that under present market conditions, the use of standard 400V 3-phase diesel generating sets in conjunction with a step-down transformer to 110V-3phase would be more economical and easier to procure than the 3-phase 110 V alternators.
3. The committee recommend that:
   i) Railways may procure standard 400V 3-phase diesel generating sets with step down transformers for the dower cars of MOG rakes.
   ii) Northern Railway may, in consultation with RDSO, undertake the development of 110V 3-phase alternators which would eliminate the need for transformers.

**Decision:**
- Para 1: Noted
- Para 2: Noted
- Para 3 i): Accepted
- Para 3 ii): Accepted

Subject 12: Trainlighting. Review of design and standardization problems regarding 110V DC system.

**Recommendation:**
1. The committee note that an order for 118 cope has working on 110V DC system has been placed on ICF of which 76 coaches have already been turned out and supplied to central and South Eastern Railways in Jun/July 81.
2. The Committee recommend that the performance of these coaches may be kept under observation by the concerned railways and reported to RDSO. the performance may be reviewed by the ESC at the next meeting.

**Decision:**
- Para 1: Noted
- Para 2: Noted

Subject 13: Supply of ‘Hotel Load’ from Locomotives. Review of policy regarding ‘Hotel Load’ supply from locomotives.

**Recommendation:**
1. The committee note that South Eastern Railway has carried out trials for supply of light and fan load of a rake from the locomotive transformer and the trials have been
satisfactory. The Railway board have directed that South Eastern and Eastern Railways may convert Rourkela Express, Coal field Express/Black Diamond Express to operate on this system as a trial. The Railways are taking necessary action and their experience may be reported to RDSO and discussed at the next meeting of the ESC.

2. The Trails so far carried out are confirmed to conventional lighting and ventilation load. The question of enhancing the transformer auxiliary winding capacity on locos for air conditioning and pantry-car loads also may be examined by RDSO and put up to ESC (TE) for consideration.

**Decision:**
Para 1 : Noted
Para 2 : This is a bigger issue which will have to be considered separately. No comments at this stage.

**Subject 14:** Future Drive for Trainlighting. Review of design and Standardization of Endless ‘V’ belt drives.

**Committee’s recommendations:**
1. The Committee consider that the performance of the endless V belt drive standardized for the 18 kW brushless alternator on the BG air-conditioned coaches has been generally satisfactory. The service performance of 10W stretch V belts which have recently been put into service may be continued to be kept under.
2. The Committee are of the view that with the experience of different drives available so far, the flat belt drive should be continued as a general standard for the 3 and 4.5 kW for the time being.
3. The Committee, however, recommend that trials be carried out using (a) flat belts and (b) 10W- stretch endless V belts with deep groove pulleys on transom mounted 4.5/3 kW machines and their relative performance evaluated.
4. RDSO may also study various possible methods to reduce the problems of thefts now experienced with flat belt drive e.g. development of other alternative drives, revising the specification of belts to incorporate special identification marks or patented coloured fabric on the belts to be supplied exclusively to the Railways, etc.

**Decision:**
Para 1 : Accepted
Para 2 : Accepted
Para 3 : Accepted. The trials may be carried out over C., N. & Rlys.
Para 4 : Accepted RDSO should be advised to complete this study as early as possible, say within a period of 3 months.

**Subject 15:** Review of Previous ESCs. Review of progress of important decisions taken in previous ESCs relating to air-conditioned coaches and TL items.
Recommendation:
1. The Committee reiterate that the design of the air-conditioned coaches should provide for two independent sets of air-conditioning equipment per coach which should provide 50% spare capacity over the service requirement. This is to ensure that in the event of the failure of one equipment, a reasonably tolerable condition of comfort can still be provided to the passengers. The committee notes that such conditions are not at present available on most of the coach designs.
2. The Committee recommend that RDSO& ICF may pursue their studies with regard to ways and means of providing the designed spare capacity and also carry out laboratory tests and tests on some trial coaches.
3. The Position may be reported to the Electrical Standards Committee in the next meeting.
4. For other review items, progress was noted by the Committee.

Decision:

Para 1: Noted.
Para 2: Accepted.
Para 3: Noted.
Para 4: Noted.

Subject 16: Nomination of Screening Committee for the agenda of Ist Meeting of the Electrical Standard committee (G). To consider nomination of the Screening Committee and Venus of the first meeting of the Electrical Standards Committee (G).

Recommendation:
1. The Committee recommend that the first meeting of the Electrical Standards Committee (G) may be held in September, 1982 at suitable venue to be chosen by Northern Railway.
2. The Committee recommend that the agenda for the meeting be screened by Sub-committee c consisting of: Chief Electrical Engineer, Northern Rly.; director Standards (Electrical), RDSO

Decision:

Para 1: Accepted.
Para 2: Accepted.
### 33rd ELECTRICAL STANDARDS COMMITTEE

**MEETING**

From 12<sup>th</sup> to 14<sup>th</sup> October 1982 at New Delhi

#### Members Present

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<td>C.P. Gupta, R.S. Anand, P.S. Mittal, G.L. Vaishnavi</td>
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Subject 1: Train Lighting – new Design of Axle Pulley. To consider standardization of axle pulley design for flat belt driven under-frame mounted 3 and 4.5 kw alternator and de dynamos to RDSO drawing SKEL 1476/BG and SKEL 1476/MG in lieu of axle pulleys to RDSO Drawing No. EA 140.

Recommendation:
1. The committee felt that the modified design of axle pulley, which had been made by RDSO SKEL 1476/BG and 1476/MG, was basically sound and had been giving satisfactory service. This design can be finally adopted with the following modifications:
   i) The Grip area between the axle and pulley bore should be increased to over 300 degrees.
   ii) The individual machining of the final bore of the pulley to suit the axle will have to be done in the workshop.
   iii) The quality of the finish and machining tolerances will be as per suggestions given by ICF.

2. RDSO have already issued fastener drawings. The same should be adopted as a standard by adding spring washers in lieu of ordinary washers modifying the quality of bolts as per ICF’s suggestion.

3. RDSO should issue the revised drawings for use as future standard.

Decision:
Para 1: Accepted.
Para 2: Noted.
Para 3: Accepted.

Subject 2: Provision of Lavatory ‘Engaged’ Indicator on coaches. To review the provision of Lavatory ‘Engaged’ indicator on coaches.

Recommendation:
1. The Committee recommends that in consideration of the cost and problems of maintenance, the provision of this facility may be deferred. However, the provision of this item should be continued in I A/C and II A/C sleeper coaches, where these are already provided.

Decision:
Accepted.

Subject 3: Train Lighting. To consider standardization of fluorescent tube lighting for general purpose lighting in all 110V do and ac airconditioned and non-airconditioned coaching-stock.
Recommendation:

The Committee recommends that on coaches working on 110V system in non-airconditioned coaches, fluorescent lighting should be adopted as a standard for all new builds. With regard to the existing 110V non-airconditioned stock, the Railways may change over to fluorescent lighting on a programmed basis. RDSO should assist the Railways with regard to the layouts for changing over the existing stock to fluorescent lighting. RDSO should also develop suitable anti-theft measures to make removal of tubes difficult.

Decision:
Accepted.

Subject 4: Reading Light fitting. To consider adoption of ICF design reading light made of sheet iron as a future standard in lieu of the Reading Light fitting to RDSO Drg. No. SKEL.2056 made of cast aluminium.

Recommendation:

The Committee recommends adoption of sheet metal fitting to ICF design with modifications to the can arrangements and incorporating proper specification and test protocol for micro switches to be used in these fittings, and RDSO should issue a finalized drawing to the Railways.

Decision:
Accepted.

Subject 5: Service Trials. To consider and evolve a suitable system for management and reporting service trials on equipment used on coaching stock.

Recommendation:

The Committee recommends that each trial should have the indications of the trial ordering authority, the year of initiation of trial, trial number, etc. The trial ordering authority should issue trial scheme and reporting proforma. The equipment under trial should have suitable identification. In addition, the coach should have the stenciling done on the end panel indicating the details of the equipment / system undergoing trial on the coach. The progress of the trial should be reviewed periodically in the AC & TL Review Meetings.

Decision:
Accepted in principle. RDSO should issue detailed instructions.

Subject 6: Production unit trainlighting components. To consider the need for setting up of a Railway production Unit for manufacturing train lighting components.

Recommendation:

1. Railways expressed difficulty in procurement of vital trainlighting items of consistent quality in regular flow from the trade.
2. Keeping in view the need of regular flow of train lighting items of acceptable reliability for proper maintenance of trainlighting services. The Committee recommends that Northern Railways should develop a proposal for establishing a Trainlighting components shops. In view of the urgency to get the material, the proposal should be processed expeditiously.

**Decision:**
1. This recommendation is not clear. Obviously the reference is not to items such as lamps, belts, batteries etc.
2. The names of the components which are to be manufactured by the proposed production Unit may please be ascertained by RDSO from all the Chief Electrical Engineers and the RDSO’s recommendation furnished to the Board.

**Subject 7 :** Manual for Electrical General Services. Review the preparation of standard manual for electrical services.

**Recommendation:**

The Committee noted that no progress had been made in the preparation of the manual for General Electrical Services. The Committee also expressed the view that the preparation of the A.C.Traction Manual, which was done on a very short time, was entrusted to the Special Cell. The Committee recommends that similar action may be taken for preparation of the Manual for General Electrical Services.

**Decision:**
Under consideration.

**Subject 8 :** Electrical Inspectorate. Review the establishment of electrical inspectorate.

**Recommendation:**

The Committee expressed urgent need for setting up a separate Inspectorate on each Railway. The Committee also noted that Railways had already noted the unanimous recommendation of the Electrical Standards Committee for setting up this cell as recommended by the Subcommittee of the XXVII ESC. The Committee recommends that the Railways should submit the proposal expeditiously for creation of the Inspectorate Cell.

**Decision:**
Noted.

**Subject 9 :** Spare parts of air-conditioning and Trainlighting equipment. Preparation of spare part drawings for trainlighting and air-conditioning equipment.
Recommendation:
The Committee noted that so far Railways had not given any details of the components for which the spare part drawings are to be prepared. All the railways were advised to give details of items of general use where drawings and specifications are required along with the annual consumption and cost of procurement of the item for examination of RDSO. Railways were also requested to endorse a copy of their list to ICF.

Decision:
Noted. The Railways should take further action and furnish details required to RDSO.


Recommendation:

1. Having noted that performance of 110V de self-generating coaches, of which 118 nos. have so far been manufactured and put on trail, the Committee recommends that a further batch of approximately 200 coaches should be manufactured for use by Railways on captive rakes. For these 200 coaches, after Board’s approval, RDSO will incorporate necessary changes, including fluorescent light, battery design and few other items, based on the experience gained in the first lot of 118 coaches already put in service.

2. The Committee directed RDSO examine that possibility of using nickel cadmium cells of indigenous manufacture for use on 110V system.

Decision:
Not approved. The coaches, already equipped with 110V DC system (5/6 rakes) are adequate to draw out conclusions as to the final adoption of the system.

Subject 1: Compendium of Approved Suppliers. To consider preparation of compendium of approved suppliers for train lighting and air-conditioning equipment and stores.

Recommendation:

1. The committee are of the opinion that for complete train lighting equipments as well as for major components, a list of approved suppliers must be maintained. Before a supplier is included in this list, the approval of RDSO shall be taken. At present, complete equipments are normally purchased from the approved suppliers but often components are purchased from other sources – leading to failure in service because of lack of adequate quality control. Considering that the cost of the components purchased by the Railways is only a small proportion of the total expenditure on train lighting and air-conditioned coach equipment, the committee recommend that Railways and Production Units should procure their requirements of vital items exclusively from the approved suppliers. Developmental orders outside the list of approved suppliers may be placed by the individual railways and production units on firms who have the capability and quality
control/testing facilities and if their product is found successful after bench tests and monitored service trials, the name of the firm may be recommended to RDSO for inclusion in the approved list.

2. The committee note that while detailed specifications and test protocols are available for complete equipments of train lighting and air-conditioned coaches, such detailed specifications and test protocols are not available for a large number of components which are being purchased by the Railways.

3. The committee recommend that RDSO should take up the work of preparation of test protocols for the more vital components used on train-lighting/air-conditioning service, to serve as guidelines for the inspecting authority. It is also recommended that firms who desire to be put on the approved list, should possess the facilities required for the tests prescribed in such protocols.

4. The committee also note that in their letter No. 81-M(L)/466/2720 dated 28.04.81, the Railway Board have directed that all vital items and components of diesel and electric locomotives should be purchased only from sources approve by the Chief Mechanical Engineer/Chief Electrical Engineer of the railways concerned and no procurement should be permitted from unapproved firms.

5. The committee recommend that a similar directive be issued by the Board that these orders be extended to stores items for all components of train-lighting and air-conditioned coaches. Where for any reason, this is not possible, and an order has to be placed on a firm not on the approved list, such order should be placed only after the concurrence of the Chief Electrical Engineer.

**Decision:**

Para 1 : Accepted.
Para 2 : Noted.
Para 3 : Accepted.
Para 4 : Noted.
Para 5 : Instructions have been issued to Railways vide letter No. 75/RS (G)/779/30 dated 25.07.81 that generally orders for full quantity of various spares and components of electrical and diesel rolling stock and train lighting and air-conditioning material should be placed only on approved suppliers including those approved by CME/CEE on the basis of educational orders.

**Subject 2 :** Train-lighting. Standardization of alternator and regulator.
Recommendation:

The committee are of the view that in addition to the development of a common regulator for the different makes of brushless alternators now in service, which is already in progress with M/s. ECIL, RDSO may take up with the manufacturers the feasibility of standardization of the following components and aspects:

g) Alternator Pulleys;
h) Mounting dimensions of the regulator box,
i) Alternator terminals;
j) Regulator terminals;
k) Bearing of alternators;
l) Accessibility of terminals for periodic check and tightening.

Decision:

Accepted.

Subject 3 : Battery charging rectifier on air-conditioned coaches. Deletion of 110 V battery charging rectifier from A/C coaches.

Recommendation:

1. The committee consider that it is necessary to continue to provide one battery charger on each self-generating A/C coach, because it is essential that the batteries of such coaches are charged not only in terminal yards but also on the platform at terminal stations and at such intermediate stations, where the halt of the coach is of considerable duration. The number of stationary battery charger which would be necessary in case the coaches are not provided with the battery charger would perhaps be more than the number of such coaches at present in service, and therefore, the provision of an individual battery charger in each coach would not be uneconomical.

2. The Committee, however, suggest that RDSO & ICF may examine whether the design/capacity of the battery charger now being provided can be modified to effect price-reduction.

Decision:

Para 1 : Accepted
Para 2  : Accepted

Subject 4 : Design of Carriage Fans. Standardization of design of carriage fans.

Recommendation:

1. The committee are of the view that the standardization of components already achieved for the trainlighting fans is adequate and standardization of additional components is not required at present.

2. RDSO may pursue further improvements in the fan design with a view to enhancing the service value and maintainability e.g. by the adoption of PVC/plastic blades, self lubricating bearings etc.
Decision:
Para 1 & 2: Accepted.

Subject 5 : Spares/Standby for A/C coaches. Norms for (a) Spares/Stand by for maintenance and (b) POH of A/C coaches.

Recommendation:
1. The committee are of the view that it is necessary to provide an adequate number of spare air-conditioned coaches to cover the maintenance requirements of-
   a. POH
   b. IOH
   c. Other scheduled maintenance such as, monthly, quarterly etc.
   d. Unscheduled repairs on Electrical and Mechanical account.

2. Considering the experience of the Railways on the air-conditioned coaches so far, the ineffective days on each of the above mentioned counts are approximately as follows, (though there are variations from Railway to Railways):
   a. POH : 60 calendar days
   b. (including transit & trials) : in a year.
   c. IOH : 15 -do-
   d. Other scheduled maintenance :15 -do-
   e. Unscheduled repairs on electrical/mechanical account :30 -do-

   i. Total : 120 days.

3. Thus the maintenance requirements would be 33% of the total fleet of 50% of the bare requirements for traffic. The bar requirements should also include traffic reserve for running summer specials, special moves etc.

4. The committee note that the above mentioned requirement of spare coaches is rather high and efforts should be made by the mechanical and electrical departments to bring down the time taken for the various scheduled and unscheduled repairs on these coaches.

5. The committee recommend that the possibility of increasing the interval between successive POHs may also be considered. This can possibly be done if special shed facilities exclusively for air-conditioned coaches are provided at terminal stations to undertake intermediate cal and mechanical gear.

6. The committee recommend that the board may nominate a committee consisting of one sr. administrative officer each from electrical and mechanical departments with the additional director (Electrical), RDSO as member Secretary to study this question and make appropriate recommendations.

Decision:
Paras 1 -6 : Under consideration..

Recommendations:
The committee note that the Railway Board have issued orders vide their letter No. 76/Elec.I/165/30 dated 17.01.1981 directing addl. G.M. (Technical), Western Railway to undertake the preparation of a standard manual for Electrical General Services.

Decision:
The matter is under consideration.

Subject 7: Electrical Inspectorate. Organization of Electrical Inspectorate Under Indian Electricity Act.

Recommendation:
The committee note that the absence of a separate Inspectorate cell under the Chief Electrical Engineer-cum-Electrical Inspector to the Government is a great handicap in the efficient discharge of the responsibilities and statutory obligations developing on the Chief Electrical Engineer in his capacity as the Electrical Inspector. A Sub-committee set-up by the XXVII Electrical Standards committee has done into this question in detail and submitted a report which was considered and unanimously adopted by the XXIX Electrical Standards committee. The committee recommend that each railway may take further action in this matter to create the Inspectorate cell as Sealy as possible.

Decision:
Noted.

Subject 8: Testing Laboratories. Establishment of testing laboratories for checking quality of electrical materials manufactured/repaired purchase.

Recommendation:
1. The Committee note that some limited testing facilities are already existing on certain railways which have been found useful in carrying out tests on the quality of materials received for maintenance of electrical equipments. The committee are of the view that it is necessary for coach railway to develop adequate testing facilities and recommend that a testing laboratory should be set up by each railway where it is not now existing and it should be developed further by others where the facilities are not adequate.

2. These laboratories could not used to carry out sampling tests on supplies received from different manufactures with a view to evolving a quality appreciation of different suppliers to guide in future purchases.
Decision:
Para 1  : Accepted.
Para 2  : Noted.

Subject 9: Spare parts of air-conditioning and train-lighting equipment. Preparation of part drawings and specifications for components and materials used in the maintenance of train-lighting and air-conditioning.

Recommendation:
The Committee recommend that each Railway may make out a list of items of stores with substantial regular consumption for which part drawings, specifications and test protocols are required to be prepared and send the list to R.D.S.O. R.D.S.O. may then take further action to prepare part drawings etc. with the assistance of the Zonal Railways.

Decision:
Accepted.

Subject 10: Rating factors for improving reliability. Performance of alternators and proposals for modifications in design details to improve reliability and maintainability.

Recommendation:
1. The committee note with appreciation the efforts made by R.D.S.O. for improvement of reliability of the brushless alternators and regulators.
2. The committee recommend that prototype tests on provisionally approved designs may continue to be done by R.D.S.O. and routine acceptance tests of series production assigned to RITES as per current practice. RITES Inspectors may be requested to send to the Consignee Railways and to R.D.S.O. a copy of the test data sheet in respect of each lot of equipment inspected and accepted by them.
3. The Committee also recommend that RDSO may be authorized to do over-sight inspections of some machines from the series production from time to time with a view to monitoring the quality control and implementation of suggestions given by RDSO in this direction.
4. The Committee note that trial orders are being placed on M/s. ECIL for common regulators for brushless alternators as per RDSO’ Specification No. EL/TL/33. The Specification may be finalized in the light of test results and service experience on the common regulators.
**Decision:**

Para 1 : Noted  
Para 2 : Accepted. This is essential, with a view to make regular efforts to improve the reliability and performance of the equipment which have been provisionally approved.  
Para 3 : Accepted.  
Para 4 : Railways should advise the results of trials and service experience to RDSO for any improvement in the specification EL/TL/33.

**Subject 11** : Mid-on Generation System for slow speed passenger trains. Review of design and standardization problems regarding MOG system.

**Recommendation:**

1. The committee was informed by RDSO that almost all drawings have been prepared and issued and the drawing for the coupler will be issued shortly.
2. The committee also note that under present market conditions, the use of standard 400V 3-phase diesel generating sets in conjunction with a step-down transformer to 110V-3phase would be more economical and easier to procure than the 3-phase 110 V alternators.
3. The committee recommend that:
   a. Railways may procure standard 400V 3-phase diesel generating sets with step down transformers for the dower cars of MOG rakes.
   b. Northern Railway may, in consultation with RDSO, undertake the development of 110V 3-phase alternators which would eliminate the need for transformers.

**Decision:**

Para 1 : Noted  
Para 2 : Noted  
Para 3 i) : Accepted  
   iii) : Accepted

**Subject 12** : Trainlighting. Review of design and standardization problems regarding 110V DC system.

**Committee’s recommendations:**

3. The committee note that an order for 118 cope has working on 110V DC system has been placed on ICF of which 76 coaches have already been turned out and supplied to central and South Eastern Railways in Jun/July 81.
4. The Committee recommend that the performance of these coaches may be kept under observation by the concerned railways and reported to RDSO. the performance may be reviewed by the ESC at the next meeting.

**Decision:**

Para 1 : Noted  
Para 2 : Noted
Subject 13: Supply of ‘Hotel Load’ from Locomotives. Review of policy regarding ‘Hotel Load’ supply from locomotives.

Committee’s recommendations:-
3. The committee note that South Eastern Railway has carried out trials for supply of light and fan load of a rake from the locomotive transformer and the trials have been satisfactory. The Railway board have directed that South Eastern and Eastern Railways may convert Rourkela Express, Coal field Express/Black Diamond Express to operate on this system as a trial. The Railways are taking necessary action and their experience may be reported to RDSO and discussed at the next meeting of the ESC.
4. The Trials so far carried out are confirmed to conventional lighting and ventilation load. The question of enhancing the transformer auxiliary winding capacity on locos for air conditioning and pantry-car loads also may be examined by RDSO and put up to ESC (TE) for consideration.

Decision:
Para 1 : Noted
Para 2 : This is a bigger issue which will have to be considered separately.
No comments at this stage.


Committee’s recommendations:-
5. The Committee consider that the performance of the endless V belt drive standardized for the 18 kW brushless alternator on the BG air-conditioned coaches has been generally satisfactory. The service performance of 10W stretch V belts which have recently been put into service may be continued to be kept under.
6. The Committee are of the view that with the experience of different drives available so far, the flat belt drive should be continued as a general standard for the 3 and 4.5 kW for the time being.
7. The Committee, however, recommend that trials be carried out using (a) flat belts and (b) 10W- stretch endless V belts with deep groove pulleys on transom mounted 4.5/3 kW machines and their relative performance evaluated.
8. RDSO may also study various possible methods to reduce the problems of thefts now experienced with flat belt drive e.g. development of other alternative drives, revising the specification of belts to incorporate special identification marks or patented coloured fabric on the belts to be supplied exclusively to the Railways, etc.

Decision:
Para 1 : Accepted
Para 2 : Accepted
Subject 15: Review of Previous ESCs. Review of progress of important decisions taken in previous ESCs relating to air-conditioned coaches and TL items.

Recommendation:
1. The Committee reiterates that the design of the air-conditioned coaches should provide for two independent sets of air-conditioning equipment per coach which should provide 50% spare capacity over the service requirement. This is to ensure that in the event of the failure of one equipment, a reasonably tolerable condition of comfort can still be provided to the passengers. The committee notes that such conditions are not at present available on most of the coach designs.
2. The Committee recommend that RDSO & ICF may pursue their studies with regard to ways and means of providing the designed spare capacity and also carry out laboratory tests and tests on some trial coaches.
3. The Position may be reported to the Electrical Standards Committee in the next meeting.
4. For other review items, progress was noted by the Committee.

Decision:
Para 1: Noted.
Para 2: Accepted.
Para 3: Noted.
Para 4: Noted.

Subject 16: Nomination of Screening Committee for the agenda of Ist Meeting of the Electrical Standard committee (G). To consider nomination of the Screening Committee and Venus of the first meeting of the Electrical Standards Committee (G).

Recommendation:
1. The Committee recommend that the first meeting of the Electrical Standards Committee (G) may be held in September, 1982 at suitable venue to be chosen by Northern Railway.
2. The Committee recommend that the agenda for the meeting be screened by Subcommittee c consisting of: Chief Electrical Engineer, Northern Rly.; director Standards (Electrical), RDSO

Decision:
Para 1: Accepted.
Para 2: Accepted.
Subject 11: Review of previous ESC. Spare plant capacity in air-conditioned coaches.

Recommendation:

1. The Committee reviewed the work done so far by RDSO and ICF and noted the suggestions regarding reduction of window size, use of heat absorbant/heat reflecting grasses and reduction of ventilating air. The Committee felt that reduction in window size should not be tried, but the other methods like heat absorbant/heat reflecting glasses and reduction in ventilating air could be tried in the existing coaches before a final decision regarding these is reached.

2. It was felt by the Committee that more increase in the capacity will not solve the problem as in the A/C sleeper coaches already two plants are available and in case one plant fails, one side the coach becomes quite uncomfortable. The Committee felt that the design problems should be pursued, such as provision of two separate through air duct and split evaporators so that each evaporator has got two independent sections, one fed from each of the plant. The Committee also felt that activated carbon, available indigenously from Hyderabad firm, should also be evaluated for its effectiveness in removing odours.

3. The Committee felt that the decision, already taken in the IXA.C. Review Meeting for provision of oponable windows to be used in emergency, should be tried expeditiously.

4. As these design problems require in-depth study the Committee recommends that ICF and RDSO should study the problem in greater than 1 and initiate field trials on Southern Railway.

Decision:
Accepted.

Subject 12: Supply of hotel loads on the train. Review of Policy regarding ‘Hotel Loads’ on the train from locomotives.

Recommendation:

1. The Committee noted that South Eastern Railway has got the estimate sanctioned and is now taking action to introduce hotel loads on the nominated services. Eastern Railway stated that so far no action had been taken and they would take similar action.

2. The committee requested RDSO to provide necessary design assistance to South Eastern and Eastern Railways.

Decision:
The Eastern and South Eastern Railways should expedite the trials. RDSO should provide necessary design assistance.
Subject 13: Design of carriage fans.

Recommendation:

1. After discussing the subject in great detail, the Committee recommends as under:
   1.1 The Committee noted that as per test results available with RDSO, air delivery will be marginally more with corrugated blades. The corrugated blades, being more rigid than a plain blade, should be adopted as a future standard.
   1.2 The Committee noted what most of the fans with one bush bearing and one ball veering have been received by Eastern and North Eastern Railways. These Railways should furnish to RDSO their service experience with regard to lubricating arrangements for the bush bearing, periodicity of lubrication, etc. the details of the experience of these two Railways be put up by RDSO to the Committee for consideration during the next meeting.
   1.3 The anti-theft devices, as developed by Eastern Railway, be incorporated in the specification for fans as optional item to be provided as demanded by the indenting railway.
   1.4 The Committee recommends provision of a split pin on the armature shaft outside the fan in the space available between the fan blade and fan body, as a standard arrangement for all the fans. Such an arrangement has been found affective on Northern Railway and does not permit withdrawal of the armature form the fan body unless the fan guard has been removed.
   1.5 The Committee feels that the fan spring should be a standard item and only those grades of carbon brushes which are compatible with the spring should be standardized for use. The Committee notes that at present Morganite EGE (3) grade manufactured by M/s Assam Carbon is compatible and, therefore, the carbon brushes should be made only out of Morganite EG 3 (1) manufacturers are in a position to offer carbon brush grades compatible with the spring, the same may also be considered after suitable service trials.
   1.6 The Committee agree with RDSO’s suggestion to modify the carbon brush drawing for provision of condemning mark and contouring brush to conform with the radius of a new commutator. RDSO should also issue ‘Go’ and ‘No’ gauges drawings for checking of carbon brush and brush boxes and also the design of testing ring for the spring.
   1.7 The Committee noted the efforts made by RDSO for evolving a new design of carriage fan rated at 20V. it is also noted that such a fan will give better air delivery at higher operating voltages. RDSO should, however, examine the effect of increased air delivery on the power consumption of the fan and put up details at the next meeting for consideration of the Committee.
Decision:
Accepted. Besides, with regard to item 1.3 of the recommendations dealing with anti-theft devices under the item no. 13, the Board desire that RDSO should furnish specification and drawing to all Railways etc. under advice to them.

Subject 14: Provision of spare/stand by air conditioned coaches. Norms for (a) sparc/stand by for maintenance and (b) POH of Air-conditioned coaches.

Recommendation:
Discussed and dropped in view of the fact that this subject is already under consideration of the Board.

Decision:
Noted.

Subject 15: Testing laboratories. Review the establishment of testing laboratories on railways.

Recommendation:
The Committee again recommend that each railway should set up their own testing laboratory and wherever additional facilities are required to be provided, these be included in the work programme.

Decision:
Accepted in principle. RDSO should issue guidelines on the facilities and equipment to be provided. Certain special and expensive test facilities may be provided on zonal basis.

Subject 16:

Committee’s recommendations:-

The Committee recommends use of standard 415V, 3 phase alternators on MOG coaches along with step down transformers. This recommendation is made taking into account the fact that alternators required for MOG system will not be large enough to justify development and production of new design alternators suitable for generating power at 110V, 3 phase, 50 Hz, required for use with the 415 V alternator system can be procured at economical process.

Decision:
Accepted:

Subject 17: Drive for TL dynamos and alternators. Review for trainlighting dynamos and alternators.

Recommendation:
1. The Committee considered in detail the problem of introduction of ‘V’ belt drive on 3 and 4.5 KW alternators. It was noted that out of 112 coaches already built by ICF with ‘V’ belt drive, most of the coaches were converted back by the Railways to flat belt drive with under frame mounted alternators due to poor quality of belts obtainable and difficulty in replacing the belts and coordinating with the Mechanical Department.

2. In view of the satisfactory performance of endless ‘V’ belt drive on 18 Kw alternators with improved features, such as polyester cord reinforcement, polychloroprene, jacket, deep grooved pulleys, etc., the Committee felt that fresh trials should be under taken for evaluating the performance of endless ‘V’ belt drive on 4.5 Kw alternators to find out whether the belt’s life can be obtained from POH to POH. For this purpose, the Committee recommends that following action should be taken.
   i) All double decker coaches to be built by ICF against future orders should be provided with bogie transom mounted 4.5 Kw alternator driven by endless ‘V’ belts.
   ii) ICF should manufacture 50 sleeper coaches provide with 4.5 Kw bogie transom mounted alternators with ‘V’ belt drive and supply these coaches to Northeast Frontier and South Eastern Railways for Service trails.
   iii) Northeast Frontier Railway should undertake conversion of existing coaches on trains like Tinsukia Mail to endless ‘V’ belts drive and evaluate the performance of the drive.

3. The Committee also noted that central, Western and Southern Railways are able to maintain services on double decker coaches with bogie transom mounted alternators with flat belt drive. This system of drive has the advantage that the quantity of belt required is much less. The Committee desires these Railways to make a careful evaluation of the life of the belts, problems of generation, etc. obtained on these coaches which should be tabled before the Committee for review during the next meeting.

4. The Committee felt that adequate service trials should also be undertaken with bogie transom mounted alternators with flat belt drive even on coaches other than double decker and for this purpose ICF should turn out about 50 coaches with this arrangement for service trials gibing proper information to the concerned Railways.

5. The Committee also felt that the present design of anchoring the spring to the under-frame mounted alternators not satisfactory and most of the coaches are now running without spring. The committee recommends that RDSO should evolve a suitable design by which the belts can be provided by loosening the spring tension and subsequently again adjusting the spring tension to the desire level.

6. The Committee noted ICF’s view that with increased loads almost all 1st class, second class-sleepers and day coaches will require 4.5 Kw alternators and, therefore, 4.5 KW alternators may have to be adopted as a future standard for BG coaches. The Committee
recommends that RDSI should examine the question in greater detail and circulate the findings to the Railways.

**Decision:**

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<td>Accepted. RDSO should evolve the design expeditiously.</td>
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34th ELECTRICAL STANDARDS COMMITTEE
MEETING
on 5th and 6th April 1984 at Secunderabad

Members Present

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Subject 1: Train lighting lamps and lamp holders. Standardization of Edison screw cap lamps and lamp holders on TL system instead of bayonet cap lamps and holders.

Recommendations:
The committee recommended that-

i) Bayonet cap lamps and lamp holders to be continued on 24 V stock.
ii) Edison screw cap lamps and lamp holders be adopted as the future standard for all 110 V stock, including MOG, EOG and air-conditioned coaches. Railways may implement the change-over on existing 110 V stock progressively.
iii) With a view to improving the quality and life of lamps, RDSO may undertake a review of and supplement the provisions in IS 897 for lamps to cater for, amongst other things.
   a) Satisfactory system whereby lamps rejected cannot be offered for acceptance again,
   b) Test to ensure satisfactory and reliable performance under conditions of vibration met with in service.
   The changes proposed to be circulated to the Railway Board and Railways for guidance in procurement.
iv) RDSO may evolve some means whereby Railways could provide distinguishing identification marks on lamps before use, so as to prevent possibility of ‘recycling’ of ‘used’ lamps as ‘new’ and issue suitable guidelines to Railways for implementation in this regard.
v) RDSO may furnish, after careful consideration, a list of recommended suppliers to the Railway Board and Railways for guidance in procurement.

Decision:
Against recommendation No. (i), the Board have observed as under:
On 24 V stock, the present system of bayonet cap lamps may continue but ICF/RDSO may take-up development for future use and tried on Captive Rakes by one of the Railways say Southern Railway.
Recommendations No. (ii), (iii), (iv) & (v) have been approved.

Subject 2: Train lighting DC dynamos. Conversion of existing DC train lighting DC dynamos to AC alternators with provision of suitable regulators.

Recommendations:
The committee recommended that:

i) There is no necessity to consider standardization of conversion of DC train lighting dynamos to AC alternators (of the slip ring type) even in its restricted scope, i.e. while taking up the rewinding of armatures of DC dynamos.
ii) Railways, who have evolved a satisfactory design, may exchange technical information on their respective designs and adopt the design of conversion which they consider satisfactory and convert the machines to the extent considered necessary as an interim measure till they are finally replaced by brushless alternators.
Decision:

i) Board’s observation is as under-

There are large no. of DC dynamos still in service and would remain in service and would remain in service for the next 10 to 15 years. It would be better to convert them to alternators by providing slip ring rings on a programmed basis. The dynamos which have more than 10 years life be tackled first.

ii) RDSO should examine the design and performance of converted machines of different Railways, suggest improvements and circulate the standard design to the railways. Simultaneously, the design of regulator to be standardized and its development be pursued by RDSO in association with Western Railway and South Central Railway.

Subject 3: Lavatory ‘Engaged’ indication light. Elimination of lavatory ‘Engaged’ electrical indication light in 1Ind class AC sleeper coaches.

Recommendations:

The committee recommended that-

i) For the present, the Lavatory ‘Engaged’ indication light may continue to be provided in two tier AC sleeper coaches and AC chair cars in addition to to lst AC coaches, along with Engaged/Vacant(Red/Green) mechanically operated indications on the lavatory doors.

ii) The voltage of operation should be standardized on 110 V DC.

iii) ICF should improve the design of the door latch mechanism and use more reliable switches so that the indication lights function satisfactorily. ICF should circulate details of improved design with drawings to RDSO for standardization and advise to Railways.

iv) Having regard to the possibility that the provision of the “Lavatory engaged” indication lights in coaches other than AC I st class may not be of any practical utility to the passengers on one hand and the initial and recurring costs which will be incurred on their fitment on the other, Rly. Board may examine from the passenger amenities angle the need or otherwise of the continued provision of this facility in such coaches, i.e. AC sleeper and AC chair car coaches and take appropriate decision.

Decision:

Board’s observation is as under-

i) “Lavatory engaged” sign should continue on I-AC coaches. This should also be continued on other air-conditioned coaches, like II-AC Sleepers and Chair- Cars to avoid frequent opening of the corridor doors.

ii) The operating voltage should be 110 V DC.

iii) ICF should improve the design of door latch mechanism and RDSO should standardize it.
Subject 4: Lamp resistance cut-in-relay. To review elimination of lamp resistance and lamp resistance cut-in relays in 24 V train lighting system.

Recommendations:
The committee recommended that:
   i) Lamp resistances and the associated cut-in relays be continued on coaches with conventional DC dynamos.
   ii) Lamp resistances and the associated cut-in relays be eliminated from coaches with Brushless Alternators by fixing the Alternator Regulator output voltage setting at 27 or 28 V DC, the exact setting being determined to suit the local conditions.

Decision:
Recommendations have been accepted.

Subject 5: Fan regulators. Elimination of fan regulators from first class with provision of tumbler switch in lieu and provision of fan regulators in second AC sleeper coaches.

Recommendations:
The committee recommended that:
   i) First-class coaches may continue to be provided with fan regulators.
   ii) II class AC sleeper coaches and AC chair-cars coaches be also provided with fan regulators.
   iii) ICF should pursue efforts for improving the quality of regulators. ICF’s proposals for any revisions in the specifications/designs as well as list of recommended suppliers should be communicated to RDSO for further action regarding standardization and advise to the Railways.

Decision:
Against item No. (i) Board’s observations are as under-
I-AC and First Class coaches may continue to be provided with fan regulator.
Recommendations (ii) and (iii) have been accepted.

Subject 6: Tumbler switches. Elimination of tumbler switch for fan in II Class coaches

Recommendations:
The committee recommended that:
   i) Controlling switches should continue to be provided for fans in all II class coaches including GSs and SLRs.
ii) Toggle switches of the type developed by ICF should be perfected and progressively introduced by ICF on all new builds for all applications where tumbler switches are currently being provided.

iii) Based on ICF’s developmental/design efforts RDSO should finalize specifications/drawings for toggle switches and circulate them to the Railways along with the list of recommended suppliers for guidance in procurement.

**Decision:**
Recommendations have been accepted.

**Subject 7:**
Thermostat settings in AC coaching stock. To review thermostat settings of AC coaches.

**Recommendations:**
The committee recommended that-

i) For AC I class coaches, three settings controlled by thermostats be provided as under:

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>22</td>
<td>24</td>
<td>26°C</td>
</tr>
<tr>
<td>Heating</td>
<td>17</td>
<td>19</td>
<td>21°C</td>
</tr>
</tbody>
</table>

ii) For other AC coaches, i.e., AC sleeper coaches AC chair cars, only two settings may be provided. However, using one more thermostat as standby, the lower temperature settings may be duplicated as under:

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>24</td>
<td>24</td>
<td>26°C</td>
</tr>
<tr>
<td>Heating</td>
<td>19</td>
<td>19</td>
<td>21°C</td>
</tr>
</tbody>
</table>

iii) The above settings will supply to both BG and MG AC coaches.

**Decision:**
Recommendation is as under –

i) For I-AC coaches three settings be provided as under:

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>22°C(72°F)</td>
<td>24°C(75°F)</td>
<td>25.5°C(78°F)</td>
</tr>
<tr>
<td>Heating</td>
<td>17°C(63°F)</td>
<td>19°C(66°F)</td>
<td>20.5°C(69°F)</td>
</tr>
</tbody>
</table>
ii) For AC sleeper & Chair car only two setting be provided with one set of thermostats as:

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>24°C</td>
<td>25.5°C</td>
</tr>
<tr>
<td>Heating</td>
<td>19°C</td>
<td>20.5°C</td>
</tr>
</tbody>
</table>

**Subject 8:** Escorting electrical staff on AC coaching service. Scale of provision of ACC I and ACC A on AC coaching service and their duty roster.

**Recommendations:**

The committee recommended that-

i) A Sub-Committee consisting of Chief Electrical Engineer, Northern Rly. (Convenor), Chief Electrical Engineer, Western Rly. (Member), and Chief Electrical Engineer, Eastern Rly. (Member) should examine all the relevant issues such as scale of deployment of staff, their responsibility, duty rosters, etc. in detail and submit their report before 30.09.84 for consideration of the Committee at a special meeting of the ESC(G) to be convened at the earliest possible date thereafter.

ii) The above Sub-Committee in its report will also cover similar issues connected with the manning of power cars on EOG and MOG rakes.

**Decision:**

Item (i) and (ii) have been approved. The report to be submitted by 31.12.84.

**Subject 9:** Standardization of illumination levels in Railway premises. To review and update illumination levels and type of fittings to be used for lighting in Railway premises, i.e., stations, offices, workshops, colonies, railway yards, level crossings, etc.

**Recommendations:**

The committee recommended that-

i) RDSO may lay down guidelines for minimum and desirable levels of illumination to be provided at -

- Railway yards
- Level Crossings
- Workshops and Loco sheds
- Offices, including drawing offices
- Platforms,

ii) The above work may be undertaken by RDSO assuming priority in the order indicated above,
iii) Southern Railway should extend necessary field support and assistance to RDSO for any trials, tests, studies and investigations that may be required in this connection.

Decision:
Recommendation is as under:

i) Accepted. The order of priority may be as under:
   - Railway yards
   - Platforms, Concourse Halls, Waiting Rooms, Circulating areas, Station Offices
   - Level Crossings
   - Workshops and Loco/EMU sheds.
   - Offices, Drawing Offices.

However, special action is necessary for yard lighting.

ii) RDSO should also lay down the type of fittings, approved list of suppliers and type and voltage of lamps and put up to Board for approval.

iii) Central Railway may assist RDSO.

Subject 10: Electrical provision on accident relief trains. Standardization of HPMV/HP SV lamps for provision on accident relief trains.

Recommendations:
The committee recommended that-

i) A Sub-committee consisting of Chief Electrical Engineer, Northern Rly. (Convenor), Chief Electrical Engineer, Southern Rly. (Member) be constituted to go into all aspects of electrical fittings and equipments to be provided in Accident Relief Trains, including lamps and lighting equipment and submit a Report by 30.09.84, listing the various equipments to be provided, scale of provisions, specification and other relevant details to enable action being taken on a uniform basis.

ii) RDSO should consider the report of the Sub-committee in consultation with Chief Electrical Engineers of the Railways and forward the report to the Railway Board for further action.

Decision:
Accepted. Report to be submitted by 31.12.84.

Subject 11: Provision of fluorescent tube light fittings in Railway quarters.
Recommendations:
The committee recommended that:

i) With a view to providing satisfactory illumination consistent with present day requirements and for conserving electrical energy in the overall interests of national economy, all new staff quarters be provided with tube-light fittings to the scale given below:

<table>
<thead>
<tr>
<th>Type of Qrs.</th>
<th>No. of fittings</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1</td>
<td>Main room</td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>One each in two rooms</td>
</tr>
<tr>
<td>III</td>
<td>3</td>
<td>One each in three rooms</td>
</tr>
<tr>
<td>IV</td>
<td>4</td>
<td>Two in Dinning –cum-Drawing hall, and one each in the two other rooms</td>
</tr>
<tr>
<td>V</td>
<td>6</td>
<td>Two in Dinning –cum-Drawing hall, one each in 3 bed rooms and 1 in study room</td>
</tr>
</tbody>
</table>

NOTE: The distribution between different locations may be varied slightly by the Electrical Engineer in-charge of construction to suit the particular building plan and local requirement.

ii) For existing quarters, the Railways may take action for provision of tubelights as per above scale depending upon the availability of funds.

iii) The maintenance of tubelight fittings including replacement of tubelights and accessories will be the responsibility of occupant.

Decision:
Recommendation is as under:
Railways should not provide fluorescent fittings in quarters. If the occupants want it they may provide at their cost but Railway to assist them in installation. No temporary wiring should be done. Connection should be taken from the lamp holder by an adaptor.

Subject 12: Standardization of scale of Electrical fittings in Railway quarters.

Recommendations:
The committee recommended that the scale of electrical fittings as laid down should be taken as a broad guidelines only and that Zonal Railways may be authorized to make such changes as they may consider necessary so as to suit individual variations in layouts, local conditions and other relevant factors.

**Decision:**
Recommendation is as under:
Accepted with the provision that the approving authority for any deviation shall be the General Manger.

**Subject 13:** Training facilities and training courses for Class III and IV staff. To review the training facilities and laying down norms for creating training facilities and running regular training courses for Class III and IV staff.

**Recommendations:**
The committee recommended that-

i) Each Railway must develop its own full-fledged training facilities for imparting formalized training to all categories of Electrical Supervisors and artisan staff to enable them to acquire and retain proficiency in their skills/trades.

ii) Such training facilities should cover initial courses, pre-promotional courses and refreshers courses.

iii) Passing pre-promotional or other specified courses shall be prescribed as a condition to be fulfilled for determining eligibility for departmental promotions through trade tests/selection board/screening, etc.

iv) Specialized higher levels of training for Supervisors from various Railways should be organized for which a Centralized Training School be set up. Such Centralized Training School should also deal with the training of Instructions who will man the training facilities referred to at (i) above.

v) The railways should avail of the training courses organized by Ministry of Labour and other outside Institutions at various centres, in fields/areas likely to be beneficial to the Railway working.

vi) “Software” for training is important and as a first step, instruction material/book-lets useful for imparting training to artisan staff in specific/limited areas should be compiled. To make a start, the subjects to be covered and the Railways to be entrusted with the preparation of the “Software” are given below:
<table>
<thead>
<tr>
<th></th>
<th>Equipment Description</th>
<th>Railway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Batteries/Battery chargers</td>
<td>S.Rly.</td>
</tr>
<tr>
<td>2</td>
<td>Air-conditioning system, complete for coaches.</td>
<td>ICF</td>
</tr>
<tr>
<td>3</td>
<td>TL Dynamos, alternators with regulators, blockers, flat belts and axle pulleys.</td>
<td>S.C.Rly.</td>
</tr>
<tr>
<td>4</td>
<td>Power car equipment, distribution, including couplers, EOG, Pantry cars etc.</td>
<td>E.Rly.</td>
</tr>
<tr>
<td>5</td>
<td>MOG, 110 V system</td>
<td>N.E.Rly.</td>
</tr>
<tr>
<td>6</td>
<td>Carriage fans, light fittings, wiring/terminations, fire prevention, junction boxes.</td>
<td>S.E.Rly.</td>
</tr>
<tr>
<td>7</td>
<td>Air-conditioning equipment and systems for buildings, Meters and Instruments excluding CRO.</td>
<td>W.Rly.</td>
</tr>
<tr>
<td>8</td>
<td>Headlights including turbo-generators</td>
<td>N.Rly.</td>
</tr>
<tr>
<td>9</td>
<td>Lifts, Cranes, Sub-stations equipment and pump sets.</td>
<td>C.Rly.</td>
</tr>
</tbody>
</table>

**Decision:**
Recommendation No. (i), (ii), (iii), (v) and (vi) approved.
(iv) Centralized training school should be only for Forman Category. For other grades each Zonal Railway should have the required training facilities/courses.
### Members Present

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name/ Shri</th>
<th>Designation</th>
<th>Rly.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>S.D.Shah</td>
<td>CESE</td>
<td>CR</td>
</tr>
<tr>
<td>2.</td>
<td>S.K.Chattopadhya</td>
<td>CESE</td>
<td>WR</td>
</tr>
<tr>
<td>3.</td>
<td>R.K.Srivastava</td>
<td>CEDE</td>
<td>NR</td>
</tr>
<tr>
<td>4.</td>
<td>J.B.Tangri, R.G.Garg</td>
<td>CEE, Dy.CEE/TL</td>
<td>NER</td>
</tr>
<tr>
<td>5.</td>
<td>S.N.Passi</td>
<td>CEE</td>
<td>NEF</td>
</tr>
<tr>
<td>6.</td>
<td>P.Sahoo</td>
<td>CESE</td>
<td>SER</td>
</tr>
<tr>
<td>7.</td>
<td>C.Sathyanarayana</td>
<td>CEE</td>
<td>SCR</td>
</tr>
<tr>
<td>8.</td>
<td>S.S.Narayanan, S.K.Kandasubramanian, R.Natesan</td>
<td>CEE, CESE, ACEE/TL</td>
<td>SR</td>
</tr>
<tr>
<td>10.</td>
<td>Shri.A.K.Mandal</td>
<td>JDEE (Observer)</td>
<td>RAILWAY BOARD</td>
</tr>
<tr>
<td>11.</td>
<td>Shri.V.Janakiraman, Shri.A.K.Jain, Shri.G.S.Bhatia, Shri.I.Srirama, Shri.A.K.Rawal</td>
<td>DSE, JDSE(Secretary), JDSE, JDIE/ICF, DDSE</td>
<td>RDSO</td>
</tr>
</tbody>
</table>
Subject 1: Standardization of TL Belt. Standardization of Belt width for train lighting with revised specification.

Recommendations:
The committee recommended that-

i) 4” size belt shall be used as a standard for train lighting on coaches provided with under frame mounted dynamo/alternators.

ii) Belt specification IS: 6583 needs to be reviewed. Railways will suggest RDSO of any specific changes considered necessary by them for incorporation in the specification.

iii) Inspection procedure to be tightened so that bad quality of supplies are detected during inspection and we obtain belts of consistently good quality conforming to requirements of specification.

Decision:
Item No. 1(i) & 1(ii)  Agreed. Review of Belt specification is to be completed by 30.08.86.
Item No. 1(iii)  Noted.

Subject 2: Train lighting maintenance of rakes. Laying down of minimum time required for maintenance of rakes.

Recommendations:
The committee recommends that-

Minimum time for electrical maintenance of coaches cannot be laid down and, therefore, time requirement for terminal maintenance for any service/rake will have to be studied and dealt with by Railways on merit of individual case.

Decision:
Against recommendation No.2, the Board have observed as under:
Item No. 2  Noted.

Subject 3: Yard sticks for staff for maintenance. Yard sticks for train lightening and air conditioning maintenance staff.

Recommendations:
The committee recommends that-

(i) Pending review by committee of three directors appointed by Railway Board for looking into staff yard-stick, Board may consider and approve Efficiency Bureau study report reg. TL maintenance staff requirements for creation of posts on Railways for additional rakes put into service.

(ii) For maintenance requirement of AC coaches stock, report of special committee appointed by Railway Board vide their reference No. 81/Elec.I/114/2 dated 19.11.81, which is already pending with Railway Board may be issued duly approved by Railway Board for guidance of Railways.
(iii) Railways may give their recommendations/justifications/views in respect of electrical staff yard-stick to the Committee of three directors appointed by Board for consideration in finalization of yard-stick for electrical staff.

**Decision:**

3(i), (ii) & (iii) The report is under consideration of the Board.

As of now, there is lot of under maintenance particularly in AC coaches and in train lighting as new services have been introduced.

**Subject 4:** Standardization of Battery. Standardization of single battery of required capacity instead of double battery of smaller capacities on coaches.

**Recommendations:**

The committee recommends that-

(i) Only “a single battery” should be used on coaches instead of “a double battery” as is presently specified for majority of coaches.

(ii) Size and capacity of battery on coaches where double battery is being specified presently will be gone into by sub-committee consisting of RDSO, ICF and Southern Railway for standardization. In case proposed battery capacity requires a new battery box, it will also be evolved and standardized by this sub-committee.

**Decision:**

4 (i) & (ii) Agreed. But after about 500 such single battery coaches are turned out by ICF, a review has to be made about the functioning of the system as a whole.

**Subject 5:** Standardization of battery charging arrangement for washing line.

**Recommendations:**

The committee recommends that-

Battery charging arrangements with pole mounted dry type transformer-rectifiers to ICF design, provided at distance of every two coach lengths be standardized for coaching lines/washing lines requiring battery charging facility.

**Decision:**

Item No. 5. Agreed. But at the same time, we should prohibit the further purchase of battery chargers of 200 AMP/400 AMP capacity for train lighting purposes.

**Subject 6:**

Standardization of battery boxes for train lighting coaches. Standardization of common design of battery boxes for ICF & BEML coaches.
Recommendations:
The committee recommends that-
New design of battery box provided with fibre-glass tray as developed and used by ICF be standardized for all ICF and BEML coaches.

Decision:
Item No.6 : Agreed.

Subject 7: Provision of hand signal lamp in guard’s compartment. Provision of 6V/24V supply for guard’s hand signal lamp in guard’s compartment.

Recommendations:
The committee recommends that-
Subject can be considered in proper perspective only after receipt of Board’s orders in this respect. In the meantime, individual Railways may try arrangements considered appropriate by them on coaches running on their respective zones so as to form basis for consideration some time later on.

Decision:
Item No.7. This issue requires urgent follow-up and evolving of a workable sound design. The matter is under consideration of Director/Safety and is being coordinated. If required later, question can be remitted to ESC.


Recommendations:
The committee recommends that-
A sub-committee consisting of ICF, Southern Railway and RDSO should go through the available drafts and finalize the trouble shooting directory and operating instructions for A/C coaches for providing required guidelines to ACC-I/ACC-A. The finalized document shall be issued to all Railways by ICF.

Decision:
Item No.8 Agreed.

Subject 9: Standardization of V-Belt drive instead of flat belt for conventional coaches

Recommendations:
The committee recommends that-
‘V’ belt drive with transom mounted alternators be adopted as a future standard on all coaches.
‘C’ section V-belts be standardized for use in this regard.
Decision:
Item No.9: The Railways have been asked to furnish the performance report. Only therefore, this item can be considered for standardization.

Subject 10: Steam loco headlight maintenance work be handover to mechanical department with full responsibility.

Recommendations:
Item dropped.

Decision:
Item No.10 Noted.

Subject 11: Pooled flat rate for electricity consumed by Railway staff in Railway quarters.

Recommendations:
Item dropped.

Decision:
Item No.11 Noted.
### Members Present

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name/Shri</th>
<th>Designation</th>
<th>Railway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Satya Prakash</td>
<td>CEE (Chairman)</td>
<td>NER</td>
</tr>
<tr>
<td>2.</td>
<td>S.K. Chattopadnya</td>
<td>CESE</td>
<td>WR</td>
</tr>
<tr>
<td>3.</td>
<td>S.D. Shah</td>
<td>CESE</td>
<td>CR</td>
</tr>
<tr>
<td>4.</td>
<td>K.N. Vishwanathan</td>
<td>AEE/TL</td>
<td>CR</td>
</tr>
<tr>
<td>5.</td>
<td>S.N. Passi</td>
<td>CESE</td>
<td>NR</td>
</tr>
<tr>
<td>6.</td>
<td>S.V. Mangal</td>
<td>SEE/TL/HQ</td>
<td>NR</td>
</tr>
<tr>
<td>7.</td>
<td>Goverdhan Nath</td>
<td>CESE</td>
<td>NE</td>
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<tr>
<td>8.</td>
<td>R.G. Garg Nath</td>
<td>Dy. CEE/TL</td>
<td>NE</td>
</tr>
<tr>
<td>9.</td>
<td>Singh</td>
<td>Dy. CEE/Blg.</td>
<td>NE</td>
</tr>
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<td>10.</td>
<td>S.P. Kela</td>
<td>CEE</td>
<td>NFR</td>
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<td>V. Santhanam</td>
<td>CESE</td>
<td>ER</td>
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<tr>
<td>12.</td>
<td>H.R. Kamath</td>
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<tr>
<td>13.</td>
<td>V. Venugopal</td>
<td>CEGE</td>
<td>SR</td>
</tr>
<tr>
<td>14.</td>
<td>C. Sreeramulu</td>
<td>CEGE</td>
<td>SCR</td>
</tr>
<tr>
<td>15.</td>
<td>R. Chandrasekaran</td>
<td>Dy. CEE</td>
<td>ICF</td>
</tr>
<tr>
<td>16.</td>
<td>G.A. Norayanan</td>
<td>Dy. CEE</td>
<td>MTP/CC</td>
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<tr>
<td>17.</td>
<td>A.K. Mandal</td>
<td>JDEE</td>
<td>Railway Board</td>
</tr>
<tr>
<td>18.</td>
<td>N.K.P. Thakur</td>
<td>CRSE/MFD</td>
<td>CRSC</td>
</tr>
<tr>
<td>19.</td>
<td>NG.S. Bhatia</td>
<td>JDSE (Secretary)</td>
<td>RDSO</td>
</tr>
</tbody>
</table>
Subject 1: Setting up a unit in RDSO to deal with general power side matters. RDSO should deal with all power side items also so that power items are also standardized.

Recommendations:
The committee recommends that a separate cell under a Jt. Director may be set up in the Electrical Directorate of RDSO for dealing with the standardization of Power Side items and services. Measures for conservation of energy and development of non-conventional sources of energy may also be included in the scope of functions of this cell.

Decision: Accepted.

Subject 2: Standardization of equipment for MOG TL System.

Recommendations:
Railways expressed the views that since MOG system of train lighting is in use on Indian Railways on quite a big scale, it is high time that efforts are put into standardize various equipment for the same. Specifications issued by RDSO should give more details like making of equipments, fixing arrangements, main control gear layout, noise level vibration limits, exhaust system controlled temperature in power car etc. It was also felt that since vast experience is available on the working and maintenance and come up with standardization of all equipment. Need for reduction in engine capacity may also be examined. It may also be seen if one size of engine could be utilized for both MG and BG trains.

Decision: Accepted, RDSO to indicate the target by which their review will be completed.

Subject 3: Standardization of alternator for N.G. Coaches.

Recommendations:
The Committee noted that RDSO is already seized of the problem and they are standardizing the same based on the experience of Railways. No further action is required in this direction by the Committee at present. The item may be considered as closed.

Decision: RDSO is to indicate the target for completion.

Subject 4: Running Room facility for A/C accompanying staff.

Recommendations:
The Committee recommends that:-
(a) The A/C accompanying staff should be entitled to use the existing rest room facilities and if necessary the same should be augmented.
(b) In future construction of A/C Sleeper coaches, the space for storing of linen should be increased even by reducing the number of berths, if necessary.

**Decision:**
Item No. 4(a) & (b): This is under consultation with Traffic and Mechanical Directorates, final observation will follow.

**Subject 5:** Scale of Electrical fittings in Railway Qrs.

**Recommendations:**
The Committee recommends that a sub-committee of CEGE/SE Railway and CESE/E. Railway would review the Scale of Electrical fittings for each type of quarters and submit their report to Railway Board.

**Decision:** Under consideration of the Board.

**Subject 6:** Schedule of Rates for Electrical Work.

**Recommendations:**
The Committee recommends that:
   i) A Zonal contract system should be introduced in the Electrical Department.
   ii) A common Schedule of Rates may be adopted.
   iii) Specific instructions may be issued by Railway Board for introducing this system.
   iv) A Sub-Committee consisting of CEE/N.F. Railway, CESE/Eastern Railway and CESE/Northern Railway should be set up to go into this matter and frame the schedule of Rates.

**Decision:** Accepted.

**Subject 7:** Normal lives of assets (Electrical Equipments) of air-conditioned coaches.

**Recommendations:**
The Committee recommends that normal lives of Electrical equipments of air-conditioned coaches may be fixed same as applicable for stationary air-conditioned plants subject to one change of condenser and evaporator in between. Thus compressors etc. should have codal life of 10 years and condenser and evaporator units should have codal life of 5 years.

**Decision:** Accepted. The compressor should have a codal life of 10 years; condenser and evaporator units should have codal life of 5 years provided that such replacement is on condition basis.
Subject 8: Standardization of Master Water Coolers and norms for passenger amenities items like water coolers, lights and fans on platform, waiting rooms etc.

Recommendations:
The Committee recommends that a sub-committee consisting of CESE/N. Railway may go through the details of water coolers and other amenities to be provided at stations and put up their report before the next meeting of the Committee.

Decision: Accepted.

Subject 9: Standardization of testing facilities for train lighting cables by Railways.

Recommendations:
The Committee recommended that Railways should set-up testing facilities at some convenient location and carry out the desired tests as per instructions.

Decision: Accepted.

Subject 10: Standardization of procedure for giving approval to train lighting belts so that it is time bound with regular quality control inspection.

Recommendations:
The Committee recommends that a system of periodical revision of approved manufacturers of train lighting belts should introduced, clear instruction may be given by Railway Board as to which organization will handle the work.

Decision: RDSO is to do the standardization. Recommendation accepted.

Subject 11: Use of inverter for train lighting fans only.

Recommendations:
ICF may develop and carry out service trial with AC fans, before regular adoption of AC fans is considered.

Decision: Accepted.

Subject 12: Tail lamp for SLR coaches.
Recommendations:
ICF may develop and carry out service trial with AC fans, before regular adoption of AC fans is The Committee recommends that fixed type electrical Tail Lamp developed by RDSO which are already in use on the Railways may be watched further for their performance. RDSO should collect details of failure of such tail lamps and suggested to recommend design to overcome the same. Regarding portable electric tail lamp developed by Traffic Directorate, RDSO, and Electrical Directorate of RDSO should go into all details e.g. mounting arrangements of the tail lamp, electric connection to the tail lamp, reliable power supply and lamps, and finally issue suitable instructions to the Railway for adoption.

Decision: Accepted.

Subject 13: Transom mounted alternator with flat belts.

Recommendations:  
The Committee recommends that no change is called for in the recommendations of last meeting of the Committee. The performance of ‘V’ belt drive should continue to be watched.

Decision : Transom-mounting with V-belt drive alternators in SG coaches has already been approved by Board.

Subject 14: Standardization of maintenance schedule of AC coaches.

Recommendations:  
No specific recommendation by ESC is called for RDSO may note the views as discussed and consider modifying the Schedule issued by them.

Decision : Noted.

Subject 15: Implementations of Board’s latest instructions for escorting duties in A/C Coaches and power cars.

Recommendations:  
The Committee recommends that no change is called for in the extant instructions.

Decision : Noted.
### 37th ELECTRICAL STANDARDS COMMITTEE MEETING

on 5<sup>th</sup> and 6<sup>th</sup> January 1989 at SER Headquarter, Garden Reach, Calcutta

#### Members Present

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Subject 1: Operation of buffer stock of vital items. To decide the creation of buffer stock of vital items at suitable stores depots on each zonal Railway.

Recommendations:
(a) There is no need of creating a buffer stock on Zonal Railways. However, Railways should revise their EAC and ensure timely placement of indents.
(b) Procurement of TL flat belting and 800Ah cells for AC Coaches should also be centralized at Board’s level.

Decision:
(a) Noted.
(b) Board’s decision shall be communicated later on.

Subject 2: Fixing of new illumination level in coaches and various service centres of railway network.

Recommendations:
(a) For 24V second class coaches, the illumination level should be increased from 17/20 lux to 30 lux by providing 30W lamps instead of 20W. This can be done by providing 4.5kW transom mounted V-belt driven alternators in place of underframe mounted alternator where power generated has to be restricted because of flat belt drive.
(b) For the new Second Class Coached being manufactured/converted to 110V system, the illumination level should be fixed at 30 lux.
(c) In first class coaches of 110V system, fluorescent tube light fitting should be standardized.
(d) The colour scheme of all the coaches should be so designed that side panel is of light cream or silver grey colour. Rexeen of the seats also should be of some light colour.
(e) Ceiling light fitting with better reflectivity, developed by ICF should be examined in detail by RDSO and standardized if found suitable.
(f) For berth light fitting in all types of coaches, only 25W lamp should be used.

Decision:
(a), (b) & (c) Accepted
(d) Since Boards decision involves routing through Tech. Dte. the item is dealt separately and final decision will be conveyed to RDSO in due course.
(e) & (f) Accepted.

Subject 3: MCBs in the coaches – fixing arrangement. To devise a suitable fixing arrangement of MCB’s in the junction boxes for facilitating interchange ability of various maxes of MCBs as far as mounting is concerned.

Recommendations:
In view of the above, the Committee recommended that this item should be treated as closed.

Decision: Noted.
Subject 4: Standardization of carriage fan components. To standardize the various components of railway carriage fan so that interchangeability of spare parts is achieved between different makes of fans.

Recommendations:
In view of the above, the Committee was of the opinion that there is no need to standardize the components of carriage fans. Therefore, no specific recommendations are needed from the committee.
Decision: Noted.

Subject 5: Standardization of T.L. alternator. To standardize the various designs of T.L. alternators to permit interchangeability of spare parts.

Recommendations:
Items which can be standardized have already been taken up by RDSO as far as possible. As such, the Committee noted that no specific recommendations were required. The item was treated as closed.
Decision: Noted.

Subject 6: Standardization of spares for A.C. coaches.

Recommendations:
In view of the above, existing practice of procuring spares from OEM should continue. ICF should continue to procure major items of spares for railways as per indents submitted by them including pending indents, if any. Therefore, the spares are not required to be done.
Decision: noted.

Subject 7: Design of 18kw alternator suitable for working in the train with low G/NG ratio. Development of a suitable alternator for A.C. coaches for running in slow speed passenger trains.

Recommendations:
(a) All the Railways should conduct a survey of G/NG ratio obtaining in likely passenger services where AC Coaches are to be introduced by replacement of First Class coaches and send the values of G/NG ratio to RDSO.
(b) RDSO and ICF shall examine the feasibility of redesigning the 18KW alternator with lower cut-in and MFO speed.
Decision: (a) & (b) Accepted.
**Subject 8:** Selection of v belt and pulley for minimum life of 18 months. To increase the life of v-belt so that it lasts from POH to POH.

**Recommendations:**
(a) RDSO shall Endeavour to increase the life of v-Belt by suitable design changes so that it lasts from POH to POH.
(b) For AC coaches, 2 matched sets each consisting of 6 belts of prescribed grading nos. only shall be used.
(c) RDSO shall examine the use of standard chain drive with toothed wheel similar to that of motor cycle for alternators.

**Decision:** (a), (b) & (c) Accepted.

**Subject 9:** Adoption of manganise steel pins & bushes for suspension of 18 kW and 4.5 kW alternators from bogie transom.

**Recommendations:**
(a) ICF shall henceforth turn out A.C. coaches with mananise pins and bushes including bush for the bogie transom.
(b) Based upon the cost and life obtained of these pins and bushes in A.C. coaches, question of using the same for non-A.C. coaches also shall be decided later on.

**Decision:** (a) & (b) Accepted.

**Subject 10:** Thermostat setting for mg ac sleeper coaches. Change of thermostat setting for mg ac sleeper coaches.

**Recommendations:**
For heating mode, setting of thermostat shall be kept at 21°C (70°F) instead of 20°C (68°F) for MG A.C. sleeper coaches. Standby thermostat shall also be retained at 21°C (70°F) setting.

**Decision:** Accepted.

**Subject 11:** Level of illumination in ac coaches.

**Recommendations:**
(a) The translucent cover provided in the fluorescent light fitting should be replaced by a clear acrylic cover.
(b) Air-craft type of berth light fitting having concentrated beam should be developed by RDSO for AC coaches.
(c) Complete redesigning of lighting arrangement of AC coaches should be undertaken by RDSO to provide an uniform level of illumination as far as possible with the ratio of
level of illumination in the least favorable seat to the average level of illumination not to be more than 1:1:3.
(d) The wattage of the lamp of existing reading light fitting should be increased to 25 W, pending development of air-craft type of fitting mentioned in (b) above.

**Decision:** (a), (b), (c) & (d) Accepted.

**Subject 12:** Air-conditioning of operation theatre of medical vans of accident relief train.

**Recommendations:**
It was recommended that S.E. Railway will circulate background paper on the subject indicating the requirement of air-conditioning, power demand, method and possibility of air-conditioning and any other connected point. This subject will be further discussed and decided in the next ESC(G) Meeting after study of S.E, Railway’s paper.

**Decision:** Noted.

**Subject 13:** Standardization of POH facilities for ac coaches.

**Recommendations:**
A Sub-Committee consisting of CESEs Southern and Western Railways and JDSE/RDSO should be formed to study all the aspects connected with standardization of POH facilities including yardstick for creation of posts. The sub-committee should put up its report for consideration.

**Decision:** Accepted.

**Subject 14:** Promotion of non conventional energy sources for energy conservation. To promote the use of Non conventional energy sources on Railways and methods for conservation of conventional energy.

**Recommendations:**
(a) RDSO should study various non-conventional energy sources and issue guide-lines for system design of standardization.
(b) RDSO should also study the various types of time switches available in the market and advise suitable design and specifications.

**Decision:** (a) & (b) Accepted.
Subject 15: Standardization of sub-station layouts and power supply arrangements. To standardize the layouts of ht sub-stations their associated switch gear assembly and power supply arrangements.

Recommendations:
A sub-committee of CESEs, N.E. and S.E. Railways and JDSE/RDSO should be formed which shall go into all the aspects and standardize the layouts of sub-stations including switch gear assemblies and power supply arrangements. The sub-committee may form its own terms of reference and submit the report for consideration.

Decision: Accepted.

Subject 16: Standardization of electronic fan regulator in place of resistance type regulator. To standardize the use of electronic fan regulator as a replacement of resistance type regulator fans.

Recommendations:
(i) Electronic regulator should be provided with fans which generally do not run at full speed like in office premises.
(ii) RDSO should co-ordinate with regulator manufacturers for development of a suitable circuit which shall by-pass the regulator at full speed of the fan.

Decision: (i) & (ii) Accepted.

Subject 17: Provision of helmet as a safety device for lineman. To decide provision of a helmet to lineman.

Recommendations:
(a) Helmet should be provided as standard safety equipment to all the Linemen.
(b) RDSO shall draw the suitable specifications of the helmet to be provided to Linemen.

Decision: (a) & (b) Accepted.
### Members Present

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Subject 1: Escorting electrical staff on AC coaches. To revise the norms for escorting staff of air-conditioned coaches.

Recommendations:
(i) It should be possible to create the posts of the escorting staff for AC Coaches without matching surrender.
(ii) Railways may try to find out the AC services in which ACCA only can be deputed as an escorting staff in the trains involving night journey of less than 12 hrs duration.

Decision:
Creation of posts for manning of new assets including new trains is within the powers of GM by matching surrender as per Board’s letter no. E(G)/84/EC/2-1 dated 5.2.87. Wherever matching surrender is not possible, Railways may send the proposal to the Board with the concurrence of the associated Finance, for consideration.

Subject 2: Norms for provision of lighting on railway crossings. To fix up the norms for provision of lighting on railway crossings.

Recommendations:
The item may be dropped.

Decision: Accepted

Subject 3: Provision of air-conditioning units in railway buildings, rest houses and other service buildings. To decide about the provision of air-conditioning units in railway buildings, rest houses and other service buildings.

Recommendations:
(i) Railway Board’s existing directives for provision of air-conditioners in Railway buildings and areas are considered sufficient. Air-conditioning of those buildings which are not covered by these directives has to be need based and should be decided by Zonal Railways.
(ii) If due to increase in the number of air-conditioning equipments, the maintenance of the plants is likely to suffer for want of maintenance staff the maintenance contracts may be awarded for this purpose.

Decision:
(i) Accepted.
(ii) Accepted. While awarding the maintenance contracts, aspects of availability of staff, relative economics and reliability of services etc may be kept in mind.

Subject 4: Provision of desert coolers in running rooms, rest rooms and subordinate rest houses etc. To decide about the provision of desert coolers in running rooms, rest rooms and subordinate rest houses etc.

Recommendations:
(i) The desert coolers should be provided depending upon the local weather conditions wherever felt necessary by Railways.
(ii) Maintenance or provision and maintenance both should be given on Contract, if it is not possible to maintain the new assets by existing staff strength.

**Decision:** (i) & (ii). Accepted.

**Subject 5:** Increase of plant capacity in 1st class ac coached. To consider the increase of plant capacity in 1st class ac coached.

**Recommendations:**
Nil.

**Decision:**
Accepted. The question of having additional passengers during the day time has arisen from commercial considerations. RDSO should examine the proposal and send report regarding additional plant capacity required in 1st A.C. and A.C. 2 tier sleeper in this regard.

**Subject 6:** B.G. high capacity power car for Rajdhani express. To decide about the layout of BG high capacity power car for Rajdhani express.

**Recommendations:**
(i) The layout of the High Capacity Power Car to Sketch NO.89198 may be approved.
(ii) Out of the 9 power cars programmed to be manufactured during 1990-91 ICF should manufacture at least 3 power cars to the new design.

**Decision:**
(i) The scheme in particular is approved.
(ii) ICF has been asked to manufacture three high capacity power cars as per RDSO’s Specification during the year 1991-92.

**Subject 7:** Deletion of lamp resistance. To consider the deletion of lamp resistance in coaches fitted with dc dynamos.

**Recommendations:**
Lamp resistance should be deleted from the wiring in all the coaches fitted with DC dynamos. (This decision has already been taken for coaches fitted with brushless alternators).

**Decision:** Accepted.

**Subject 8:** Revision of voltage rating of 24V T.L. lamps. To decide about the revision of voltage rating of 24V T. L. lamps.
Recommendations:
(i) RDSO and N. Railway should study the voltage drops in lamp circuit in a number of coaches.
(ii) All the Railways should find out the life of the lamps being obtained presently and should measure the voltage drop in a number of coaches of each type in lamp circuit and send the same to RDSO for evaluation.

Decision:
RDSO should prepare a report in consultation with Railways for consideration in the next meeting.

Subject 9: Use of re-wirable fuses in train lighting in lieu of HRC fuses. To consider the use of re-wirable fuses in train lighting in lieu of HRC fuses in train lighting system.

Recommendations:
This item may be dropped.

Decision: Accepted.

Subject 10: Alternative drive arrangement of alternators for non-ac coaches. To review the provision of endless v-belt drive for alternators for non-ac coaches.

Recommendations:
(i) RDSO should collect data on life of V belts being obtained on Non-AC coaches and should study it further for increasing the life.
(ii) Study should also be made of the flat belt driven transom-mounted alternators working in Central and Western Railways.
(iii) Code of Practice for maintenance of ‘V’ belt drive system for Non-AC coaches should also be issued by RDSO.

Decision:
(i), (ii) & (iii). Accepted. RDSO may give priority to item (i).

Subject 11: Solar heating system. Planning and provision of solar heating system to meet hot water requirement of railway residential buildings.

Recommendations: This item may be dropped.

Decision: Accepted.

Subject 12: Standardization of couplings and base mountings for ac equipments. To consider the standardization of couplings and base mountings for ac equipments.
Recommendations:
ICF should standardize the mountings of all the AC equipments and circulate the details of the systems which ensure interchangeability of equipments, to all the Railways for carrying out necessary modifications.

Decision:
A time frame may be fixed by ICF for standardizing the mounting arrangement of all the AC equipments and the progress discussed in the next ESC meeting.

Subject 13: Standard design of power cars of arts and arms. To standardize the design of power vans of arts and arms.

Recommendations: Nil.

Decision: Accepted.

Subject 14: Introduction of universal type rectifier-cum-regulator unit for 18 kW alternator. To develop universal type rectifier-cum-regulator unit for 18 kW alternator.

Recommendations:
A universal type rectifier-cum-regulator unit for 18kW alternator shall also be developed by RDSO.

Decision:
RDSO should Endeavour to standardize the alternator characteristics and its excitation system so that the regulators automatically become interchangeable.

Subject 15: Change over to copper field coils in 110 V DC carriage fans. To decide about the changeover to copper field coils in 110 V DC carriage fans.

Recommendations: Nil.

Decision:
RDSO may study and the specific recommendation in the matter may be discussed in the next meeting.
### 39th ELECTRICAL STANDARDS COMMITTEE
### MEETING
### on 11\textsuperscript{th} December 1991 at Bombay VT, CR

#### Members Present

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Subject 1: Provision of separate Plan Head for Energy Conservation works.

Recommendations:
Railways felt that for big ‘Works related with Energy Conservation funds are not made available. This situation can be rectified with the creation of a separate plan head for energy conservation works. CEE/W.Railway also mentioned that the creation of a separate plan head will focus more attention on this Non-conventional energy sources (DNES) has a number of schemes supporting energy conservation works. If railways have a separate plan head for these works. It will easier for DNES also to provide us for such works.

Decision:
The funds required for energy conservation works are not likely to be of such a magnitude that a separate plan head for energy conservation works should be provided. It should be possible to organize energy conservation works through the existing plan heads.


Recommendations:
The item was discussed and Railways offered various views on the subject. Finally, it was decided that individual Railways should decide the procedure to be followed by Railways themselves. The item was therefore discussed and dropped.

Decision:
Fluorescent tube light fittings will be provided at the time of allotment and subsequent replacement would be the responsibility of allotted as per instructions communicated. Vide board’s letter No. 79/Elec. 136/1 dt. 26.3.90

Subject 3: Standardization of internal wiring arrangement in service building/staff quarters.

Recommendation:
Railways noted the guidelines issued by RDSO for wiring of railway quarters which provide for concealed PVC conduits for wiring.

Southern and south central railways were in favour of this. But other Railways wanted to provide casing and capping type of wiring, since according to them, conduit wiring was very difficult to maintain, in case a fault develops in the wiring.

Decision:
In administrative buildings and other important service buildings of railways. Concealed PVC conduit wires could be used even though it is difficult to maintain. In case the wiring is of proper quality, no difficulty should arise in maintaining concealed PVC conduit wiring.
Subject 4: Fixation of quota for electricity consumption by staff occupying railway quarters. Fixation of quota for electricity consumption by staff occupying railway quarters.

Recommendation:

Except south central railway. There was unanimity that it is not possible to fix up any quota of electricity consumption. Therefore, this item was discussed and dropped.

Decision:
Accepted.

Subject 5: Standardisation of pumps.

Recommendation:
Railways informed that numerous types and makes of pumps are available in the market for the same application. This results into non-interchangeability of pumps between various pumping installations and leads to holding of huge stock of spares.

The committee, therefore, was unanimous that standardization of pumps in respect of discharge output head and size of the pump and motor should be done.

Decision:
Would be decided after RDSO finalise its recommendations.

Subject 6: Design manual for general power supply installations. To give suggestions/comments on the design manual for general power supply installations.

Recommendation:
Northern Railway suggested to include the subjects of remote control of pumps, optimum utilization of lifts and operator free lifts also in the manual under preparation. But since all the railways had not received the details of the contents in each volume of the design manual it was decided that this subject should be discussed in a separate meeting.

Decision:
1) Noted.
2) Preparation of design manual for general power supply installations has been entrusted to M/s RITES. As regards train lighting and air-conditioning, two chapters viz. train lighting maintenance chapter 6 and AC coach maintenance chapter 9. Have already been written. Printing of these chapters has been entrusted to director, IRIEE who has circulated these chapters amongst various railways.

Subject 7: Residual current device. Provision of residual current device in LT installation.
Recommendation:

All the railways informed that provision of residual current device (RCD) in LT installations is a technical and legal requirement from safety angle. SE railway informed that they are providing RCDs in service buildings and quarters on experimental basis. Railways also wanted to know the safe limit of current setting in a RCD. This has to be studied by RDSO. It was informed by ICF that are already providing RCDs in EOG power cars.

Decision:

1) & 3) Noted.
2) Approved.

Subject 8: Water coolers for providing in coaches. Standardisation of water coolers for providing in railway coaches.

Recommendation:

Railways noted that three types of water coolers for railway coaches are in service:- having direct drive with open compressor DC motor drive with open compressor and three phase AC motor drive with sealed compressor. While water collars with standard sealed compressor are technically the best but till a reliable inverter is developed to work such water coolers on self generating coaches trails of water coolers with DC motor drive and open type compressor have to continue. The water coolers bearings and belts since the drive in this type is taken from the TL alternator shaft.

Decision:

1) & 3) Noted.
2) Approved.

Subject 9: Drip tray pipe in AC coaches. Connection of drip tray pipe with the condenser cooling water pipe in AC coaches.

Recommendation:

The item was discussed and committee was of the view that it was not desirable to introduce the connection of drip tray pipe with the condenser water pipe line since the advantages will be only marginal whereas the new pipe since they would introduce additional piping and bends resulting in choking of the lead pipeline and dirt accumulation with choking of condenser cooling piping. However, committee suggested to RDSO to develop a condenser of higher capacity which does not require water sprinkling.

Decision:

Accepted condenser with higher heat exchange capacity using inner finned copper tube jointly tested by RDSO, ICF and S.E.Railway in the last year. One condenser has been fitted in S.E.Railway coach no. 5760. It will be subjected to trials during current summer. RDSO has also
developed a new source for higher capacity condenser coil, northern railway has been asked to provides 10 nos. for extensive trials during the current simmer RDSO may kindly pursue the same.

Subject 10: Sitting accommodation for the accompanying AC staff in GB AC chair car.

Recommendation:

1) ICF shall be providing a foldable seat like that of AC sleeper coaches in BG AC chair cars from the production programme for 1993-94.
2) For existing coaches, ICF shall prepare a modification sheet including connected drawings and send it ot RDSO. RDSO will study the same and issue it to all the railways.

Decision:

The provision of AC coach attendant in AC chair car has been dispensed with. One AC coach in-charge will be provided upto 4 AC coaches. In most of the trains, AC chair car are being provided in conjunction with AC sleeper coach. There is no need to modify the existing AC chair car for providing a folding seat. However. There is no harm if foldable seat is provided in new AC chair car to be manufactured by ICF.


Recommendation:

The committee was of the view that the benefit to be derived by removing the transformer- rectifier from BG AC coaches is off-set by the additional expenditure which shall have to be incurred for drawing new battery charging lines for AC coaches on plat forms and pit-lines, particularly in view of the high capacity required for charging AC coach batteries. The committee therefore did not agree for removal of the transformer rectifier from these coaches. The item was discussed and dropped.

Decision:
Accepted.

Subject 12: Maintenance facilities at Terminal stations. Standardisation of maintenance facilities at terminal stations.

Recommendation:

It was informed by RDSO that details of standard maintenance trinities required at terminal stations of self generating coaches had already been recommended vide RDSO’s letter no EL/0.7.1 dated 16.8.78. railways were requested to study the same and suggest any modifications
required in this therefore no recommendation was needed at this stage for self- generating coaches.

**Decision:**

1) RDSO to expedite this however it would be necessary to provide only bare minimum facilities to avoid heavy expenditure the roof covering should be restricted to minimum provision should be available for lifting the coaches.

**Subject 13:** Emergency feed terminal in AC coaches. To provide 110V emergency feed terminal in AC coaches.

**Recommendation:**

The committee did not agree for providing emergency feed terminal in AC coaches as existing on non- AC coaches, because the need for connecting emergency feed shall arise only when both the alternators of an AC coach fall. This situation is rare. Even if this situation arises, the emergency feed can be extended from a healthy coach to a sick coach only after shutting down one plant of healthy coach. This can lead to complaints in rather both the coaches. The item was therefore, discussed and dropped.

**Decision:**

Accepted.

**Subject 14:** provision of 800 Ah cells in 1st AC coaches.

**Recommendation:**

The committee observed that from technical point of view provision of 525 Ah capacity battery is adequate for 1st AC coaches. Therefore there is no need of increasing the battery capacity to 800 Ah. The item therefore was discussed and dropped.

**Decision:**

As far as first AC is concerned the capacity of battery is adequate, however RDSO should look into as to how battery capacity can be increased for AC sleeper and AC chair cars.

**Subject 15:** Spare set of ‘V’ belts. Provision of a spare set of ‘V’ belts in coaches.

**Recommendation:**

RDSO informed that the system of providing spare set of belts inside the box mounted on axle pulley in AC coaches not worked satisfactorily in Eastern and south Eastern railways. Which
was corroborated by these railways. However the system of provision of spare set of ‘V’ belts developed by RCF for non-AC coaches has proved useful in Railways.

**Decision:**
Accepted.

**Subject 16:** Sensor for indicating the condition of train lighting alternators.

**Recommendation:**

Central railway explained the working of sensor developed by them for indicating the generating condition of TL alternator on arrival of the train at the platform the system developed by them was also exhibited in the meeting however railways were of the view that the system developed was complicated and needs to be simplified.

**Decision:**
Decision will be taken after RDSO finalises the scheme.

**Subject 17:** 20 Watt single tube fittings. Standardization of 20 watt single tube fittings in AC coaches.

**Recommendation:**

It was pointed out by RDSO that in the AC coach provided with modified fittings having staginess steel reflectors, although the 111 urination level has increased but the degree of uniformity does not conform to specified value of 1.14 apart from this the staginess steel reflectors are also prone to loosening the mirror finish after sometime and require refinishing whereas in the case of stove enameled reflectors, the life is much longer.

It was informed by ICF that for providing the improved version of diffuser developed by RDSO locations of FL fittings are being changed which will also ensure the uniformity of 111 urination. ICF was therefore relocated to conduct the urination test with relocated FL fittings with single light with stove enamel reflectors and clear acrylic covers. The test results shall be furnished by ICF to RDSO’s specific recommendation was required at this stage.

**Decision:**
ICF to complete the study and send their test results for further decision in the matter through RDSO.

**Subject 18:** Head-on-generation in rakes running exclusively in electrified territory. To adopt head-on-generation in rakes running exclusively in electrified territory to reduce TL failure.

**Recommendation:**

Southern Railway informed that they are introducing the head-on-generation system on madras-tirupati express service. The system has not yet been commissioned. The committee was of the
view that southern railway should continue the development and subsequent trials and send the feedback report to RDSO. In the mean time RDSO was asked to identify the captive rakes, where this system can be introduced. No specific recommendation was felt necessary at this stage.

**Decision:**

RDSO should evolve a separate scheme of HOG for mail/Express trains.

**Subject 19:** Fluorescent lights in 11 class sleeper coaches. Provision of fluorescent lights in 11 class sleeper coaches as a policy due non-availability of 110V tungsten filament lamps.

**Recommendation:**

There was unanimity that fluorescent lighting is definitely technically better than incandescent lighting. However Eastern and south eastern railways expressed apprehensions that the FL lamps are prone to theft on some sections and they felt that FL fittings can be introduced only on experimental basis on such sections. Northern railway however did not agree with this and supported the proposal to provide EL lighting in the coaches.

**Decision:**

ICF and RDSO should jointly workout the economy of providing fluorescent lighting via-a-via incandescent lamps in 1 tier sleeper coaches after receipt of the dame the proposal would be considered in consolation with finance directorate.

**Subject 20:** Audio-visual alarm system in coaches. Discarding of audio-visual alarm system in coaches.

**Recommendation:**

In view of Decision issued vide letter no 81/M(C)/202/4 dated 5.6.91 for providing only fixed lamp for visual indication of the affected coach in alarm system, no therefore be treated as closed.

**Decision:**

Closed.

**Subject 21:** Provision of thermostat in the air heater box in AC coaches.

**Recommendation:**

This item was not included in the original agenda and was suggested by N. Railway during the meeting only. N. Railway wanted that a thermostat should be provided in the air heater box for safety reasons.

RDSO mentioned that suitable protection has already been indicated in the modification sheet issued by RDSO incorporating the hooter signal in case of welding of heater contactors, in addition to this ICF has started providing a vane relay which ensures the running of diver before
the supply can be made available to the heater contactors. ICF was requested to furnish the
details of the vane relay along with the sources of supply to RDSO for study.

Decision:
Accepted.

Subject 22: Air conditioning of stationary installations.

Recommendation:

This item was not included in the original agenda did was suggested by S. Railway during the
meeting only. S. Railway mentioned that in the absence of any standard guidelines the provision
of window model air conditioners are being made in the different civil engineering estimates for
construction of different buildings requiring air conditioning it was indicated that the coefficient
of performance of window model air conditioner is very poor as compared to reciprocating and
centrifugal types of systems. Keeping in view the coast of different types of system S. Railway
felt it desirable that suitable guidelines are evolved so that the provision of air conditioning is
most economical other railways also expressed the need for evolving such guidelines.

Decision:

Noted.
### 40th ELECTRICAL STANDARDS COMMITTEE MEETING

#### Members Present

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40th ESC/Bombay/1992

Subject 1: Cast Resin Transformer. Use of dry type distribution transformers upto 500 KVA.

Recommendations:
(i) The Committee decided that RDSO should collect the data on dry type transformers available in the market including costs as well as the service from Electricity Boards and Railways.
(ii) No final recommendation was considered necessary at this stage.

Decision:
RDSO should conduct techno-economic study regarding use of dry type transformer in lieu of existing oil filled transformer for general power supply installations and approach Board in due course.

Subject 2: 3-phase power transformers for general services. Standardisation of 3-phase power transformers for general services in respect of their KVA capacity.

Recommendations:
The committee recommended that the rating preferred in the relevant IS may be adapted by the Railways.

Decision:
Accepted.


Recommendations:
After deliberations, the committee decided that a case study in a workshop should be done. It was further recommended that S.C.Railway should generate data for Vijaywada Electric Loco Shed and furnish a case study report by 31.07.93.

Decision:
Decision will be taken after the case study report is received.

Subject 4: Booking pattern and duty hours of escorting staff in AC Coaches. To revise the duty hours of escorting staff in AC Coaches.

Recommendations:
The Committee recommended that the present system of booking which is functioning satisfactorily till now, may be allowed to continue. The committee further recommended that the escorting skilled staff should be designated as AC mechanic/fitter and they should be utilized for maintenance duty also in rotation so that their technical knowledge is up-to-date.
**Decision:**
These are staff matters. ESC is not a proper forum for this subject.

**Subject 5:** Combining TL & AC group of staff.

**Recommendations:**
The Committee recommended that Combining TL & AC group of staff as a general policy is not necessary. However each Railway may work out their arrangements based upon the local conditions.

**Decision:**
These are staff matters. ESC is not a proper forum for this subject.

**Subject 6:** Energy meters in DG sets of Power Cars. Provision of Energy meters in DG sets fitted in the Power Cars of EOG rakes.

**Recommendations:**
The Committee recommended that the energy meters should be provided in power cars. The details of the meters provided by Southern and N.E.Railways should be collected by ICF and they should provide energy meters in new power cars under manufacture.

**Decision:**
Accepted.

**Subject 7:** Cabling of diesel generating sets in power cars.

**Recommendations:**
After deliberations the Committee agreed that the arrangement made by ICF by partitioning the troughing and putting different voltage grade cables in different troughs is prima-facie acceptable.

**Decision:**
Accepted.

**Subject 8:** Fire retardant elastomeric copper cables for power cars. Use of Fire retardant elastomeric copper cables for power cars.

**Recommendations:**
After deliberations, the committee recommended that RDSO should collect the data on the performance of the power cars with the existing cables. The cost differential for implementing changeover from PVC to elastomeric cables should be furnished by ICF. No recommendation was considered necessary at this stage.
Decision:
Techno-economic study may be conducted and sent to Board for decision.

Subject 9: Diesel oil pipe line in power cars. Use of heavy duty steel pipes by changing the threaded joints to flanged joints having welded flanges to avoid failures of diesel oil pipe line in power cars.

Recommendations:
The Committee recommended that ICF should ensure that the joints at the location pointed out by Railways should either be avoided or it should have flanged joint. It was further recommended that expanded metal covering for the sedimentation tank should be provided to prevent damage due to extraneous reasons.

Decision:
The problem may be studied in depth associating ICF and the user Railways. The solution to the problem of damages to the sedimentation tanks and joints may be evolved and sent to Board for decision.

Subject 10: Maintenance free batteries for Train Lighting/AC Coach Services. Use of maintenance free batteries for Train Lighting/AC Coach Services.

Recommendations:
The committee recommended that RDSO should continue the development of sealed maintenance-free batteries as advised by Railway Board. Based upon the advice of RDSO, the trials by PU’s and other Railways should be undertaken. The Committee further noted that the performance furnished by Southern and South Eastern Railways is for low maintenance batteries supplied by the firms on their own and they did neither conform to any specification framed by RDSO nor type tested. Keeping this in view the Committee recommended that RDSO should finalize the specification and continue the development of pro-type low maintenance batteries so that they can be subjected to field trials by different Railways to obtain adequate service experience.

Decision:
A separate proposal from ICF in this regard has been received and is being dealt with. The item may be closed.

Subject 11: Quality of TL belting. Improvement in quality of train lighting belting.

Recommendations:
The committee recommended that RDSO should update the specification and circulate the same to Railways. The use of alternative material for the flat belts should also be considered by RDSO.
Decision:
Accepted.

Subject 12: Standardization of 110 V train-lighting lamps for conventional stock

Recommendations:
The committee recommended that only two types of lamps (screw cap) of 40 W and 25 W rating should be standardized for 110 V coaches.

Decision:
Accepted.

Subject 13: Standardization of house service meters in Railway quarters.

Recommendations:
The committee recommended that the house service energy meters for type I/II quarters should be of 5-10 Amp and for type III/IV quarters should be 10-20 Amp.

Decision:
The details of the size of wire, used for different type of quarters may be sent for further decision in the matter.

Subject 14:
DG sets for emergency supply. Standardization of DG sets in respect of KVA capacity and norms for provision of DG sets for emergency supply.

Recommendations:
The committee recommended that it should be left to Railways to decide the capacities of the DG sets depending upon the local needs.

Decision:
Accepted.

Subject 15:
Conservation of electrical energy—Energy Audit.

Recommendations:
The committee recommended that the CEEs of the Railways need not furnish any reports to the Electrical Inspectors of the State Govt., since CEEs are Electrical Inspectors themselves for their jurisdiction. If necessary the concerned authorities may be informed that the measures are being taken by Railways for energy conservation and optimum utilization of electrical energy.

Decision:
Accepted.
Subject 16:
Portable Emergency Lighting boxes for operation on 110 V DC coaches.

Recommendations:
The committee recommended that an additional 110 V wire mesh covered hand signal lamp should be provided and RDSO should issue necessary amendment in this connection to all the Railways.

Decision:
The latest samples of various types of emergency lighting box in use may be collected and sent for further decision in the matter.

Subject 17:
Electrification of Flag/halt stations. Policy regarding electrification of Flag/halt stations.

Recommendations:
The committee recommended that being a passenger amenity item the Board’s existing orders on the subject should be followed.

Decision:
Accepted.

Subject 18: Rewiring of Railway Buildings. Policy regarding expenditure to be incurred for rewiring of Railway Buildings.

Recommendations: The committee recommended that the rewiring should be done on condition-cum-codal life basis and the expenditure limit of Rs.10,000/- should be for buildings other than Railway quarters only.

Decision:
Accepted.
41th ESC/Calcutta/1982

41th Electrical Standards Committee Meeting Held at Calcutta, in 1982
Subject (Item 1): Revision of cable specn. No. E-13/03 for EMUs and electric locomotives.

Recommendations:
(i) Elastomeric cables to RDSO specification. No. E-13/03 should be used for locos and EMUs. For lighting and fan circuits HRPVC cables to be used in coaches.
(ii) RDSO should finalize list of recommended suppliers for elastomeric cables.

Status:
RDSO revised specification for cables which are in use presently. Approved list also issued by RDSO to Railways.

Subject (Item 2): Areas of standardization between AC & DC EMUs.

Recommendations:
(i) A standard design of fan should be developed for AC & DC EMUs.
(ii) Motor Generator set on DC EMUs to be replaced by motor-alternator.
(iii) Fluorescent lights to be adopted on all EMUs.
(iv) 3 car unit comprising one motor coach and two trailer coaches to be adopted as standard for AC & DC EMUs.

Status:
(i) Implemented.
(ii) MG sets still in use.
(iii) Implemented partly.
(iv) Implemented.
(Item Closed)

Subject (Item 3): Introduction of Power & Control electronics in Traction.

Recommendations:
The system to be adopted in the rolling stock and traction installation are to comply with Power & Control electronics.

Status:
Implemented. (Item Closed)

Subject (Item 4):
(i) Protection system on DC locomotives and EMUs.
(ii) 110V dc control circuits on dc EMUs earthed versus insulation system.
41th ESC/Calcutta/1982

**Recommendations:**

(i)
(a) The current balance relays based on DCCT principle should be adopted by Railways and Production Units. RDSO will furnish specification and list of suppliers.
(b) RDSO to hold meeting with C. Railway, W. Railway to take decision on adoption of high speed circuit breaker on EMUs and dc locos.

(ii)
(a) The system proposed by RDSO to be tried out on 6 motor coaches (2 rakes) to be manufactured by ICF for Central Railway.
(b) RDSO may also involve CLW to evolve similar scheme on dc locos.

**Status:**

(i) Provision of QCB already implemented. (Item Closed)
(ii) Unearthed system was adopted for 110 V dc control circuit on DC EMUs. (Item Closed)

**Subject (Item 5):** Review of instructions issued by RDSO in Oct.82 regarding rewinding of Aux. motors.

**Recommendations:**

(i) RDSO should pursue the following aspects. (I) Use of glass covered conductors instead of enamelled conductors for Aux. motors.
(ii) Measurement of electrical surges on aux. motors and protection system.

**Status:**

Implemented. (Item Closed)

**Subject (Item 6):** Development and trials with materials other than steel for pantograph strips to reduce wear of wire.

**Recommendations:**

RDSO proposed metallic carbon strips. Bench test to be done at Khargpur Workshop for comparative lives with steel and carbon pan and field trials may be undertaken at WK. Section of S.E. Railway.

**Status:**

Same as item 73. (Item deleted)

**Subject (Item 7):** Adoption of Auto-reclosing feature for 25 KV feeder circuit breakers.

**Recommendations:**

RDSO may study the scheme of S.E. Railway and review its inspection.
Status: Auto re-closing scheme is being followed. (Item closed)

Subject (Item 8): Installation of Maximum demand control for traction.

Recommendations:
S.E. Railway may carry out trials of the system for a period of 3 months and send the report to RDSO for evaluation.

Status:
Max. demand indicators are provided in SCADA for this purpose. (Item closed)

Subject (Item 9): Development of solid state supervisory remote control equipment for traction substations switching stations.

Recommendations:
The microprocessor based supervisory remote control equipment being adopted in the future in place of solid state version of SRC equipment.

Status:
Microprocessor based SCADA system is being used these days. (Item closed)

Subject (Item 10): Adoption of 50 KV single phase system in place of 25 KV single phase system for electric traction.

Recommendations:
RDSO may go ahead with preliminary studies and circulate reports to various railways.

Status:
2x25 KV system already introduced on Bina-Katni - Anuoppur section. (Item closed)

Subject (Item 11): Adoption of short neutral section with section insulators.

Recommendations:
The conventional neutral section of overlap type may be continued for general application. In exceptional cases. The neutral section of section-insulator type may be provided.

Status:
Conventional neutral section in general and short (PTFE) neutral section at critical locations being used. (Item closed)

Subject (Item 12): Development of lateral adjustment measurement car.
Recommendations:
Each railway may convert one of their tower wagons on the basis of Eastern Railway’s Lam car. The provision of recording equipment on the car should be considered by Eastern Railway.

Status:
8 wheeler inspection cars (tower wagon) are equipped with this facility. (Item closed)

Subject (Item 13): Review of electrical clearances.

Recommendations:
Trials may be carried out with the reduced electrical clearances before adopting for general applications.

Status:
Reduced clearances of 250/200 mm can be permitted by EIG. (Item closed)

Subject (Item 14): Problems arising out of atmospheric pollution on the over head traction installation.

Recommendations:
For polluted areas use 1050 mm creepage insulators. Trials may be carried out in non polluted areas with 850 mm creepage insulators.

Status:
1050 mm/850 mm creepage insulators implemented. (Item closed)

Subject (Item 15): Review of maintenance facilities and practices.

Recommendations:
Sub-committee (ACEE/W.Rly., ACEE/S.Rly. & ACEE/E.Rly.) should submit the report by June ‘83.

Status:
Refer Item No.119. (Item closed)

Subject (Item 16): Provision of siding for traction sub-stations.
41\textsuperscript{th} ESC/Calcutta/1982

\textbf{Recommendations:}
Provision of Railway siding is necessary for traction sub-stations. In case of difficulties approach road exists.

\textbf{Status:}
Cross tracks are provided at traction sub-stations. (Item closed)
42\textsuperscript{nd} Electrical Standards Committee Meeting Held at Bombay, 1984
Subject (Item 17): Energy conservation on Indian Railways.

Recommendations:
RDSO will prepare the specification for energy meters to be fitted on ac Loco/EMU and also locate supplies of energy meter for 1500 V dc EMU.

Status
Approved by Board (vide letter No. Elec(TRS)/138/3 dated 25.3.86) (Item closed)

Subject (Item 18): Periodic overhaul and heavy repairs/workshop facilities on zonal railways for electric locos.

Recommendations:
RDSO to evolve a standard POH shop layout and provision of appropriate and adequate facilities including machinery and plant.

Status
As per Railway Board, a standard POH shop layout was not considered essential because shop layout will differ on different locations of Railways.

Subject (Item 19): Manufacture of HS-1050 Traction Motors.

Recommendations:
CLW accelerate their efforts and make out a time bound programme for manufacture HS-1050 Traction motors and simultaneously tepaning off production of TAO-659.

Status
Approved by Bd. vide letter Elec/TRS)/138/3 dt. 25-3-86. (Item closed)

Subject (Item 20): Manufacture of HS-1050 Traction Motors.

Recommendations:
The EMU performance may continue to be reported as per the existing provisions of the statistical manual.

Status
Monthly performance report in standard proforma is being sent by Railways to Railway Board. (Item closed)
Subject (Item 21): Review of the ineffective percentage for electric locos.

Recommendations:
The ineffective percentage should be compiled and separately for current and for the earlier series of locomotives, i.e. WAM1,2,3 & 4 WAG1,2,3, 4 & 5.

Status
Refer item No.77. (Item deleted)

Subject (Item 22): Prevention of fire in electric locomotives.

Recommendations:
- RDSO will prepare specification for “HALON” type extinguishers. CLW to provide fire extinguishers on all new builds of locos.
- RDSO should associate trials with automatic extinguisher fire system in the locos at Northern Railway.
- RDSO should evolve suitable cable layout to reduce chances of incidence of fire.

Status
Approved by Railway Board vide letter No.84/Elec.(TRS)/138/3 dated 25.3.86. RDSO have issued revised fire preventive measures in Aug.’98.

Subject (Item 23): Standardization of unit for POH/IOH out turn of Elect. Locos.

Recommendations:
- WAM4 be taken as standard unit for this purpose.
- Subcommittee of C&E Railway may be convened to go into detail in respect of each of other class of locomotives.

Status
Standardised (Item closed)

Subject (Item 24): Provision of standby transformer at traction sub-station.

Recommendations:
Minimum two transformers should be provided at every sub-station.

Status
One standby transformer is provided. (Item closed)
Subject (Item 25): POH and repair facilities for traction power supply equipment, like TFP etc.

Recommendations:
- The lifting facilities provided at each traction sub-station will continue to be used for inspection of core and winding and initial inspection.
- RDSO should modify the layout and also include a lifting bay for inspection of traction transformer and sending to manufacturer’s works.

Status
Accepted
43rd Electrical Standards Committee Meeting Held at Madras, in 1986
Subject (Item 26): Standardization of layout of EMU shed.

Recommendations: RDSO asked to prepare a standard layout for car shed.

Status:
Accepted vide Railway Board’s letter No.84/Elec.(TRS)/138/3 dtd. 18.2.88. For 30/20/10 brakes. RDSO has sent proposed guidelines to Railway Board.

Subject (Item 27): Review of Maintenance percentages.

Recommendations:
Yardstick for the staff suggested by the Chirmule Committee be adopted on Indian Railways.

Status:
This is a MSG Item (Item closed)

Subject (Item 28): Fitment of energy meters on Locos/EMUs.

Recommendations:
RDSO should re-double their efforts in locating suppliers for energy meters. Submit its proposals for energy conservation cell.

Status:
Accepted vide Railway Board’s letter No.84/Elec.(TRS)/138/3 dt. 18.2.88. (Item closed)

Subject (Item 29): Organization aspects, yardstick for maintenance and ancillary staff, gazette set up for rolling stock organization.

Recommendations:
CEE’s of the railways may send their observations/recommendations on this Subject to the Chairman of the Committee set up for this purpose.

Status:
Subject discussed at length in CEEs and CELEs conference on 16.12.98 at Railway Board, wherein important policy decision have been taken. (Item closed)
Subject (Item 30): POH workshop facilities for electric locomotives on zonal railways.

Recommendations:
The surplus steam locomotive shops could perhaps be better utilized for the POH of coaches and wagons etc. and POH of electric loco be handled at separate shops or in their existing loco sheds through future works programme.

Status:
Refer item No.18. (Item closed)

Subject (Item 31): Standardization of unit for POH/IOH out turn of electric locos.

Recommendations:
WAM4 locomotives should be taken as a standard unit and waitage factor as recommended by Chilmule Committee vide clause 5.1.3.4 in their report should be applied for all other types of electric locos.

Status:
This is MSG item. (Item closed)

Subject (Item 32): Provision of separate traction loco control circuit in the electrical section.

Recommendations: A separate traction control circuit should be provided in the electrical sections.

Status:
Implemented (Item closed)

Subject (Item 33): Design aspects of the locomotive like interchangeability of auxiliaries, electro valves etc.

Recommendations:
Standard technical specification be prepared by RDSO for different auxiliaries and components of electric locos. CLW to procure auxiliaries and components as per RDSO specification.

Status:
Approved by Railway Board’s letter No.84/Elec.(TRS)/138/3 dt. 18.2.88. (Item closed)
Subject (Item 34): Standardization of mobile power-cum-filtration plant for traction substations.

Recommendations:
(i) 100 KVA, 25 KV/230 V single phase aux. transformer may be provided at all substations.
(ii) For above TFP filter plants working on single phase 230 V supply should be purchased for each division upto 10 Nos. of sub-stations.

Status:
Provision of 100 KVA auxiliary transformer has been discontinued. (Item closed)

Subject (Item 35): Eight wheeler OHE inspection car.

Recommendations:
Gadget to measure height of contact wire and stagger procured with each inspection car. Three Nos. of PERMA QUIP make rail track overhead machine transported by road may be imported. One each for C, W., & N. Railways based on experience, other railways should also be provided.

Status:
Approved by Railway Board’s letter No. 85/Elec.(I)/138/3 dt.25.1.89. 8-Wheeler OHE inspection is used. (Item closed)

Subject (Item 36): Deletion of 42 KV line type arrestors from the 25 KV AC traction system.

Recommendations:
(i) Follow the RDSO recommendations.
(ii) Metal oxide gapless type lightening arrestors should be provided on locos for TFP protection.
(iii) Station type metal oxide gapless lightening arrestors should be provided at traction substations and switching stations.

Status:
For AT & BT, line type lightening arrestors discontinued, and station type metal oxide lightening arrestors being provided at TSS and switch. (Item closed)

Subject (Item 37): Maintenance of traction transformers at traction sub-station.

Recommendations:
(i) Each railway should set up a centralized workshop for carrying out minor repairs and maintenance of traction transformer.
(ii) RDSO should workout standards layouts for these workshops on the need basis for the future plans.
(iii) RDSO should also consider additional sub-stations being set up on the existing electrified route. For haulage of 4500 t, 9000 t and possible 13500 /18000 t trains. Assess the workload on the basis as in the AC traction manual.

Status:
RDSO issued guidelines for setting up of zonal repair shop for transformer. Railways mostly getting it done through Trade wherever facility is not created (Item closed)

Subject (Item 38): Formulation of uniform policy for the tariff with different electricity boards.

Recommendations:
(i) The matter to be discussed at Board’s level with the Minister of Energy bring out the unreasonableness of the stand taken by electricity board in order to evolve rational tariff policy.
(ii) The Minister of Railways should negotiate for getting power from the National Grid i.e. NTPC, NHPC.
(iii) Railway should own a few generating stations at vantage locations as practice by Japanese Railway, SNCF etc.

Status:
Approved by Railway Board’s letter No.85/Elec.(I)/138/3 dt. 25.1.89. A committee is nominated to look into the aspect of tariff. (Item closed)

Subject (Item 39): Tapping of power supply from 25 KV ac OHE for colour light signals and other non-traction loads.

Recommendations:
(i) The tapping for the non-traction loads should be restricted to the bare minimum and only where it is inescapable.
(ii) Every extra Aux. transformer means extra power block hours for maintenance.

Status:
Approved by Railway Board’s letter No.85/Elec./138/3 dt. 25.1.89. Implemented. (Item closed)
44th Electrical Standards Committee Meeting Held at Nasik, in 1992
Subject (Item 40): Creation of central control organization at zonal railways headquarters.

Recommendations:
- Zonal railways to monitor the performance and movement of locomotives within the railway itself and for liaisoning with adjoining railways.
- One TLC in each shift and one additional TLC/ATLC in general shift would be adequate.
- Railways should take necessary action for creation of their organization wherever not existing.

Status:
Approved by Railway Board’s letter No.92/Elec.(TRS)/138/5 dt.12.5.93. (Item closed)

Subject (Item 41): Fixation of yardsticks for RSO supervisors and inspectors.

Recommendations:
- The recommendations of the accident enquiry committee - 1978 should be followed by railways for creating the posts of RSO supervisors.
- Board was requested to issue necessary instructions indicating compensation package to the driving staff on becoming a supervisor/inspector at an early date.

Status:
Railway Board revised instructions have been issued in 1998. (Item closed)

Subject (Item 42): Review of maintenance schedules of AC loco.

Recommendations:
- Existing criteria of carrying out POH & IOH after 6 years or 6 lakh km. and 3 years or 3 lakh km. whichever earlier respectively should be maintained.
- The date of POH be maintained separately by railways.
- A subcommittee of S/Shri R.N. Lal, JD/RDSO, C.K. Sharma, Dy.CEE(Loco)/ER and S.K. Agarwal, CWM/BSL be formed to review in detail the contents and periodicity of existing O/H and inspection schedules.

Status:
Decision vide letter No.92/Elec(TRS)/138/5 Pt.I dt. 16.8.95 received for IA, IB, IC & AOH periodicals as 30+3, 60+3,120+5 days and 12 months + 15 days respectively. (Item closed)

Subject (Item 43): Load testing facilities for TM rewinding.
Recommendations:
- This facility be made standard item to be provided at all sheds/shops where rewinding of
  TMs of electric locos or EMUs was being carried out.
- RDSO should examine the specification of testing facilities.
- Railways should procure / upgrade the facilities for each rewinding shop/shed.

Status:
Approved by Railway Board’s vide letter No.92/Elec.(TRS)/138/5 dt.12.5.93. (Item closed)

Subject (Item 44): Standardization of max. load handled by AC locos.

Recommendations:
- Load tables issued by RDSO for different class of locos be strictly followed.
- In case any railway wanted to revise the load table for specific conditions, the matter
  should be referred to RDSO and introduced only after the approval of RDSO.

Status:
RDSO have issued detailed instructions. (Item closed)

Subject (Item 45): Code of practice for fitting new equipment and development of new sources
for supply of electric loco items.

Recommendations:
- The list of approved sources for electric loco items in the railways should be issued after
  the approval of its CEE.
- The items being developed/required to be developed by RDSO & CLW and rest of the
  items would be developed by the railways themselves.
- The railways should send the list of existing approved sources for loco items to RDSO
  for compilation.

Status:
Decision vide their letter dated 30.12.93 to implement the same. Refer item No.109. (Item closed)

Subject (Item 46): Norms about codal life of TRD assets.

Recommendations:
- Sub committee consisting of 3 JA grade officers each from SE, S. Rly and RDSO (TI
  Dte.) be nominated to examine the matter in detail and submit its report. Assistance of
  outside consultants may also be taken.
Only major items peculiar to electric traction should be covered for determination of works.
- Another similar subcommittee be nominated for loco item also.

**Status:**
This has been again suggested by CORE/ALD as new agenda for IXth ESC meeting. (New committee to be formed) (Item to be discussed further)

**Subject (Item 47):** Creation of training facilities for TRD supervisors and officers.

**Recommendations:**
- Railways should set up adequate facilities for the training. However, for the specialized training OHE design SCADA system etc.
- IRIEEN should finalize syllabus course material Assistance of RDSO may be taken, if required.

**Status:**
Implemented (Item closed)

**Subject (Item 48):** Provision of Audio indication at ASM’s room for AT supply failure.

**Recommendations:**
The audio indication in ASM’s room for AT supply failure is not necessary and the existing visual indication is adequate.

**Status:**
No action required. (Item closed)

**Subject (Item 49):** Creation of facilities for centralized microprocessor based data communication system between Head Quarters and RS/RSO/TRD organization.

**Recommendations:**
(i) Microprocessor based data communication system between headquarters and field organizations like sheds, shops, Divisional Headquarters should be provided.
(ii) Hot line facilities between the CTLCs of Headquarter with the Divisional Headquarters and between CTLCs of adjoining railways was absolutely essential for the effective coordination and must be created.
(iii) NR & CR should circulate the details of on line data communication system as available with them to all other railways for necessary action by them.

**Status:**
Implemented. (Item closed)
Subject (Item 50): Passenger alarm system on EMUs.

Recommendations:
Feedback from the zonal railways where this system had been fitted on trial should be obtained by RDSO and decision reviewed in view of the reported failure/maintaining the system.

Status:
No found feasible by railways. (Item treated as closed)

Subject (Item 51): Fitment of microprocessor control in AC locos.

Recommendations:
(i) The provision of microprocessor control in AC locomotives was essential and hence its indigenous development should be pursued.
(ii) IRIEEN/Nasik should procure 25 Nos. of control systems to the design development by them for supply to W.Rly. (10 Nos.), S.Rly. (5 Nos.) & S.E. Rly. (10 Nos.) for extensive service trial.
(iii) In addition 5 Nos. of microprocessor control equipment and 5 Nos. of fault diagnostic equipment being developed by RDSO be procured for trial on Northern Railway.

Status:
Decision vide letter No. 92/Elec.(TRS)/138/5(51) dt.24.5.93. Same as item 115 (Item Deleted)

Subject (Item 52): Training in Electronics.

Recommendations:
- The training in power electronics to officers and staff of electrical engineering department was essential.
- 30 to 40 officers including few trainers should be trained in reputed institutions dealing with power electronics.
- Further training of officers may also be imparted at IRIEEN.
- Director/IRIEEN should prepare an overall training capsule.

Status:
Approved vide Railway Board’s letter No. 92/Elec.(TRS)/138/5(52) dated 19.8.93. Implemented (Item closed)

Subject (Item 53): Codification of failure of electric locomotives.
Recommendations:
Codification of failure for AC electric locomotives circulated by all Railways in maintaining and reporting failure data.

Status:
Approved vide Railway Board’s letter No.92/Elec.(TRS)/138/5(53) dated 12.5.93. Refer item 74. (Item deleted)

Subject (Item 54): Adoption of thyristor on AC electric locos.

Recommendations:
1) Necessary clearance from S&T interference angle for the operation of AC locomotives provided with thyristor be issued to all Railways.
2) Railways to initiate proposals for retrofitting of thyristor equipment on existing WAM4/WAG5 locomotives.

Status:
Railway Board’s letter No. 92/Elect.(TRS)/138/5(54) dated 21.10.93. No further action is required. One WAG5 loco already converted. (Item closed)

Subject (Item 55): Adoption of 17/77 Gear Ratio on WAG5 electric locos fitted with TAO-659 TMs.

Recommendations:
(i) The modified gear ratio of 17/77 be adopted by railways wherever replacement was due.
(ii) CLW should also adopt this gear ratios for future production of WAG5 locomotives fitted with TAO-659 TMs.

Status:
Approved vide Railway Board’s letter No. 93/Elec.(TRS)/138/4(55) dt. 31.3.95. (Item closed)

Subject (Item 56): Role of RDSO in service engineering.

Recommendations:
(i) RDSO should be actively associated with the service engineering functions of electric locos.
(ii) Railways should approach directly for the equipment failed during warranty period under advised to CLW.
(iii) Railways shall periodically advise RDSO the problems solved and problems still unsolved.

**Status:**
Approved vide Railway Board’s letter No. 95/Elec.(TRS) 138/5 dt. 22.3.95. RDSO’s playing action role for service engineering support to railways. (Item closed)

**Subject (Item 57):** Facilities for Aux. Motor Rewinding.

**Recommendations:**
(i) The facilities for rewinding of the auxiliary machines should be developed in each zonal Railway.
(ii) RDSO should circulate list of M&P requirements for this purpose to all railways for procurement.
(iii) All railways should be clubbed for the demand of enamelled wire to IS:4800 part IX to Western Railway for the procurement from the approved source.

**Status:**
Railway Board’s letter No.92/Elec.(TRS)/138/5/57 dated 25.6.93. This is MSG item. (Item deleted)

**Subject (Item 58):** Development of electromechanical OHE inspection car.

**Recommendations:**
(i) The development of electro-mechanical inspection can be actively pursued.
(ii) The cost benefit analysis shall be carried out by RDSO in consultation with the ICF.

**Status:**
8-Wheeler diesel electric OHE inspection car developed. (Item closed)

**Subject (Item 59):** Dispensation of electronic ceramic beaded short neutral section assembly.

**Recommendations:**
(i) Overlap type neutral section should be provided wherever possible.
(ii) However, at critical locations wherever it is not possible to provide overlap type neutral sections. (e.g. opposite feeding posts etc.) Short neutral section assembly may be provided.
Status:
   Implemented (Item closed)

Subject (Item 60): Rating of traction transformer.

Recommendations:
   (i) RDSO will advise the rating of traction transformer to all concerned and whether the ON/AF ratings could be dispensed with.
   (ii) The substation spacing should be based on the traffic pattern and voltage drop.
   (iii) CEE/CORE should send the voltage drop calculations made for DLI-UMB-LDH section to RDSO for study.

Status:
   21.6 MVA rating of ON/AN transformer standardized on I.R. (Item closed)

Subject (Item 61): Execution of electrical works.

Recommendations:
   The committee recommended that to ensure proper quality and standards of electrical construction works, it is necessary that the technical control of electrical works be exercised by CEE of the Railway even though the construction organization is placed under the administrative control at CAO(C).

Status:
   This is an item of CEE’s conference. (Item deleted)

Subject (Item 62): Reliability of TAO-659 traction motor.

Recommendations:
   (i) TAO 659 motor should be phased out within 3 years in new builds by CLW.
   (ii) RDSO should develop a suitable traction motor for passenger locomotives.

Status:
   RDSO have issued set of MS/SMIs. (Item closed)

Subject (Item 63): Reliability of compressor and pneumatic circuit.
Recommendations:
(i) RDSO and CLW should undertake the improvement in design of the ELGI CP.
(ii) Development of additional sources for reliable compressor should be undertaken.
(iii) For pneumatic valves railways should purchase only genuine rubber components from approved sources.

Status:
Approved vide Railway Board’s letter No.93/Elec.(TRS)/138/5(63) dated 12.5.93. Refer item 99. (Item closed)

Subject (Item 64): Development of reliable Rh braking equipment on electric locomotives.

Recommendations: The committee deliberated and recommended that:
(i) The provision of reliable braking equipment is a must on electric locomotives.
(ii) RDSO and CLW should make all out efforts to develop reliable indigenous Rh braking equipment.

Status:
Four sources have been developed by RDSO. Railways to implement (Item closed)

Subject (Item 65): Electric loco shed layout.

Recommendations:
The standard layout for AC electric loco shed be reviewed by RDSO taking into consideration the need of the additional facilities required in a shed.

Status:
Approved vide Railway Board’s letter No. 92/Elec.(TRS)/138/3 dated 12.5.93. RDSO have already issued standard layout. (Item closed)
45th Electrical Standards Committee Meeting held at New Delhi, in 1994
Subject (Item 66): Planning for future development of rolling stock, power supply etc.

Recommendations:
(i) Future designs of electric locomotive/EMUs. Technological up-gradation in EMU/Locomotives may be expedited.
(ii) Design of shunting locomotive may be developed.
(iii) 10 “8” EMU, services may be adopted for future requirement.
(iv) 3-phase locomotive (Freight & Passenger) may be homed at one electric loco shed.

Status:
Refer item 111. (Item closed)

Subject (Item 67): Policy for standards for approval and inspection of equipment.

Recommendations:
(i) Railways and production units shall follow RDSO’s drawings, specification and test programme for critical items already identified by Railway Board. Whenever production unit’s specifications are available for other items, railways shall follow the same.
(ii) Railways shall circulate a list indicating drawings and specifications details for items not included by production units and RDSO to other railways and RDSO. Standardization of components should be aimed at by standardizing the drawings.
(iii) Railways shall continue to do their on inspection by consignee or RITES and may contact RDSO for any specific assistance in respect of prototype testing, inspection of firms and scrutiny of tenders.
(iv) The existing procedure being followed by Railways for procurement from RDSO/Production Units approved sources for components etc. Inspection and assessment of firms for various items except critical items as desired in Para (1) above may continue to be done by Railways, RDSO may be contacted for specific assistance where needed.
(v) As decided in Fourth Meeting list of all approved sources of Railways be sent to RDSO for compilation. RDSO may take up random checks of these firms for their quality assurance.

Status:
System exists. (Item closed)

Subject (Item 68): Ownership of locos and creation of Mother Sheds.

Recommendations: Decision for creation of mother sheds, satellite sheds be tried by developing one new shed to be build up under new electrification projects as mother shed.
(i) The concept of mother shed/satellite shed should not be extended to existing electric loco sheds.
(ii) The loco holding in the existing sheds having locomotives other than only WAG5/WAP1 mix should not be enhanced beyond the designed capacity.

Status:
Idea dropped. (Item closed)

Subject (Item 69): Up-gradation of maintenance facilities.

Recommendations:
Three sub committees may be formed who will review the existing maintenance facilities and suggest augmentation of the same considering the technological changes in the system.

- **For electric locos:**
- **for EMU:**
  Sr.DEE/Tikiyapara & Sr.DEE/TRS/Howrah.
- **for Power Supply system:**
  Sr.DEE/TRD/Madras & Sr.DEE/Vijayawada.

Status:
Committee approved vide Railway Board’s letter No. 93/Elect.(TRS)/138/4(69) dated 13.3.95.

Subject (Item 70): Policy for upgrading the skill of maintenance staff.

Recommendations:
A sub committee consisting of CELE/Southern Railway be formed to review the policy for upgrading the skill of maintenance staff and for finalizing the training syllabus, duration and place(s) of training.

Status:
Approved vide Railway Board’s letter No.93/Elect.(TRS)/138/4(70) dated 13.3.95. (Item closed)

Subject (Item 71): Special repairs to major assemblies provision of funds.

Recommendations:
Re-cabeling, rehabilitation of transformers and traction motor should also be charged to DRF in addition to replacement of capital spares.
Use of inhibited oil for transformer.

Recommendations:
(i) Inhibited oil may be used on loco/EMU transformers during POH and also on traction sub-station transformers whenever replacement is due.
(ii) All new transformers may be procured with inhibited oil.
(iii) RDSO may study the feasibility of adopting air cell in conservation and Nomex insulation for Loco/EMU transformers.

Subject (Item 73): Use of carbon strip for pantograph.

Recommendations:
(i) Use of metalized carbon strips may be tried on all EMUs/Locomotives of meter guage section of Southern Railway. Carbon strip may also be tried on limited number of motor coaches in suburban section of Sealdah division.
(ii) RDSO may study the possibility of using higher diameter contact wire and provision of shorter length contact wire in sections prone to excessive wear.

Subject (Item 74): Computerization of rolling stock manufacture and operational activities.

Recommendations:
(i) Railways may forward the software developed by them to IRIEEN/ RDSO along with back up material. IRIEEN will study the same and standardize the software for various applications already identified by RDSO specification for hardware will also be finalized.
(ii) Railways shall identify software requirements in other areas and advise to IRIEEN/RDSO.
Subject (Item 75): Concept of number of trains in 4 feeding zone instead of one train in each block section.

Recommendations:
Negotiations with State Electricity Board may continue at the Board’s level to adopt single point tariff.

Status:
Refer item No.38. (Item closed)

Subject (Item 76): Efficiency index for traction distribution system.

Recommendations:
A sub-committee consisting of CEDE/ER, CEDE/WR and CEDE/NR shall study and recommended a formula which may be included in the annual statistics. The committee may co-opt a statistical officer of Western Railway. The committee should submit its report within two months.

Status:
Approved vide Railway Board’s letter No.195/Elect./G/138/1 dated 13.3.95. Item of CEDE conference. (Item deleted)
46th Electrical Standards Committee Meeting Held at Madras, in 1995
Subject (Item 77): Utilization of WAG1, WAM1 & WAG2 locomotives.

Recommendations:
(i) No major investment in rehabilitation/maintenance of these locomotives.
(ii) Locos may be preferably used on interior services.
(iii) Zonal railways to process condemnation of these locomotives.

Status:
Approved by Railway Board for phased condemnation (Item closed)

Subject (Item 78): Inter Railway operation of electric locos.

Recommendations:
(i) Date of inspection schedules will be painted on all electric locomotives. Railways will ensure to return of locomotives for attention.
(ii) Railways may introduce the concept of “U” turn and ensure that loco, at terminal point is attached to the train moving towards homing Railways/Shed.

Status:
Item was discussed in CELE’s conference and board has issued guidelines. (Item closed)

Subject (Item 79): Provision of portable telephone as a part of crew’s equipment.

Recommendations:
The portable telephones should form part of crew’s equipment. The portable telephones may be loaded/unloaded at each Railway changing point. Railways may form their modalities to implement the same.

Status:
CELE conference item. Board’s decision exists. (Item deleted)

Subject (Item 80): Rolling back of trains.

Recommendations:
Western, Eastern and South Eastern Railways will implement RDSO’s modification on a few locomotives and advise the results of their trials to RDSO.
Status:
RDSO have issued information to all railways vide letter No. EL/3.2.19 dt. 4.2.98 (Item closed)

Subject (Item 81): Passenger emergency alarm indication system.

Recommendations:
RDSO will study the modifications carried out by Railways and finalize the circuit.

Status:
RDSO have issued TC No.20 to be implemented by Railways. Mail/Passenger locos and CLW has cut in for WAG7 locos also by Northern Railway. (Item closed)

Subject (Item 82): Calculation of intersectional timing and other time tabling matters for trains working with electric locos.

Recommendations:
No specific recommendations are required to be made to Railway Board, but Railways will take action accordingly.

Status:
Item closed vide Board’s letter No. 95/Elec./(TRS)/138/1 (82) dt.3-1-96. (Item closed)

Subject (Item 83): Maintenance-free batteries.

Recommendations: R
(i) RDSO’s design of 110V system for RCC/SWS/SS equipment may be adopted for new projects. No tapping from 110 V battery will be permitted.
(ii) RDSO may undertake techno-economic study.

Status:
Developed and are under trials. (Item closed)

Subject (Item 84): POH of WAG6 locomotive.

Recommendations:
POH of WAG6 electric locomotives may be carried out at POH shop, Bhusaval. Additional infrastructural inputs may be identified and created at Bhusaval.
Status:
Nil (Item closed)

Subject (Item 85): Utilization of hotel loads of electric locomotive for air-conditioning/train lighting works.

Recommendations:
RDSO should evolve a design for utilization of hotel load winding on electric locomotives. ICF/RCF should implement the same for new rakes being made for high speed trains.

Status:
WAP5 Locos are with 1000 KVA hotel load winding. Order on ICF placed for two coaches suitable for feed from locos. (Item closed)

Subject (Item 86): Electrical coupling of electric locos.

Recommendations:
Electrical coupling of electric locomotives at 25 KV side may not be adopted on Indian Railways for the time being.

Status:
In line with ESC’s recommendations, RDSO have dropped this item (Item closed)

Subject (Item 87): Yardstick for laboratory staff for electric locomotives.

Recommendations:
An organization for M&C laboratory shall be created in each and every electric loco sheds. Extract of lab staff required may be decided by the Railways themeselve.

Status:
RDSO’s recommendations sent to Rly. Bd. vide letter No. EL/ESC/TE-VIII dt.9-9-98. (Item closed)

Subject (Item 88): Operation of 12 car EMU services.

Recommendations:
Operation of 12 car EMU services need not be standardized and individual railways may decide the consist of EMU services.
Status:
Board has sent this item for new missions to RDSO, now. (Item deleted)

Subject (Item 89): Vestibule arrangement in EMU coaches.

Recommendations:
The existing design for main line EMU services may for the time being be continued and the feedback from travelling public may be collected. The design may be reviewed there-after on the basis of public reaction.

Status:
Implemented for MEMUs only (Item closed)

Subject (Item 90): Provision of potential transformer (PT) on primary side of traction substation.

Recommendations:
RE & Railways should provide energy meter on H.T. side on traction sub-station to work as check meter for energy meters of electricity board.

Status:
Not found useful and hence not implemented. (Item closed)

Subject (Item 91): Making of OHE fit for speed beyond 160 kmph.

Recommendations:
RDSO should evolve a design for upgrading the present OHE fit for speeds upto 200 kmph and submit its recommendations.

Status:
Item was dropped in VIIth ESC in view of Board’s instructions. However, for high speed trains at 250-300 kmph on dedicated track, a new mission item has been taken up by RDSO. (Item closed)

Subject (Item 92): Replacement of contact wire.
Recommendations:
(i) A new plan head for replacement/renewal of OHE and related works may be created.
(ii) Railways will submit the details of the life of contact wire on urban/sub-urban and main line section to RDSO. RDSO will make techno-study regarding replacement of existing contact wire with 150 sq.mm size.
(iii) S.Rly. will expeditiously carry out the trials of metalized carbon panto strips on all locos/EMUs of meter gauge section.

Status:
Metalized carbon strips for pantographs introduced for achieving 2.8 times OHE contact wire life. (Item closed)

Subject (Item 93): Ceramic beaded neutral section.

Recommendations:
All railways will submit performance data of ceramic bead and PTFE neutral section to RDSO to carry out detailed study on the Subject. RDSO should submit its recommendations in this regard.

Status:
Performance satisfactory, being used in service wherever required. (Item closed)

Subject (Item 94): Skidding and slipping of locomotive.

Recommendations:
(i) The problem of skidding and consequent to damage of electric loco due to poor brake power which compels the drivers to apply loco brake. Minimum brake power for coaching/goods train on run up to destination should be specified. Board may appoint a multi-disciplinary committee to look into all these aspects.
(ii) Drivers may be trained to regulate the maximum speed for safe operation of their train in case of poor brake. At the first available opportunity the brake power should be got upgraded to 85% maintenance of brake rigging on locos such as adjustment of proportionate valve etc. should be paid special attention.

Status:
RDSO have issued SMI No. ELRS/SMI-197 issued on 5-2-98 (Item closed)
Subject (Item 95): Standardization and Manufacture of WAP locos.

Recommendations:
(i) Production of WAP1 loco should be stopped and only WAP3/WAP4 produced.
(ii) About 8 to 10 WAP3 locomotives should be available and further decision taken after gaining experience regarding their performance. Balance requirement should be met producing WAP4.
(iii) CLW should further tighten the quality control of bogies and bolsters and should in consultation with RDSO evolve a more reliable design of fabricated bolster.

Status:
Remarks as item 111 (Item closed)

Subject (Item 96): Sub-station spacing.

Recommendations:
Railways may decide traction with sub-switch spacing based on their local conditions like present traffic handled and future projections. Voltage drop location of switching station etc. RE/RDSO should carry out a techno-economic study to decide on the adoption of 2x25 KV vis-a-vis conventional system.

Status:
Committee of three HODS’ of CORE, C. Rly and RDSO is formed. (Item closed)

Subject (Item 97): Conversion of WAM4 to 6P combination.

Recommendations:
With the exception of S.E. Rly, all members agreed that 6P conversion is beneficial and will be implemented Subject to availability of funds.

Status:
Rly. Bd. have issued policy decision to convert all locos. (Item closed)

Subject (Item 98): Performance of NC-7 magnet valve.

Recommendations:
CLW will continue to use Rotex make magnet valves only and develop additional source in association with RDSO.
46\textsuperscript{th} ESC/Madras/1995

Status:
   RDSO’s have issued instruction on the Subject. (Item closed)
47th Electrical Standards Committee Meeting Held at Bombay, in 1996
Subject (Item 99): Requirement of compressors in electric locomotive.

Recommendations:
Presently, the performance of ELGI make TRC 1000 compressor is better than ELGI TRC 2000 compressors. Till the time, performance of the TRC2000 improves to desired level, 80% TRC 1000 should be used in the future locomotives and balanced 20% TRC 2000 should be used. Once the performance of TRC 2000 compressors, to the mark, it will be the standard for future and all future locomotives should be fitted with 2000 LPM compressors.

Status:
Approved vide Railway Board’s letter No.96/Elect.(TRS)/138/8(99) dated 11.2.97. The use of 1000 LPM to 2000 LPM in the ratio of 80:20 in new locomotives at CLW. (Item closed)

Subject (Item 100): Training of staff and development of infrastructure for maintenance & POH of 3-phase electric locomotives.

Recommendations:
(i) ELS/GZB & ELS/Gomoh who will be homing 3 phase locomotives to arrange the training of all other Railways staff.
(ii) Infrastructure required for POH as well as maintenance of 3-phase locos should be developed at nominated places in compilation with homing sheds.

Status:
Rly. Bd’s letter No. 96/ELEC.(TRS)/138/8(100) dated 3.6.98 have issued direction to set up POH facilities at BSL. (Item closed)

Subject (Item 101): Development of fire retardant low smoke and low halogen cable for metro coaches.

Recommendations:
In view of passenger’s safety during fire accidents in the underground metro coaches. Use of low smoke, low halogen cables is essential. As the cost of such cables will be enormous. The use of the cable should be at selected locations.

Status:
RDSO has already issued specifications No.E-14/04.ICF to implement. (Item closed)

Subject (Item 102): 25 KV OHE power supply.
Recommendations:
(i) Railway Board’s vide letter No. 86/RE/50/1 (NS) dated 2.8.93 have advised to railways that the neutral sections at feeding posts may be dispensed with, with the approval of CEE.
(ii) S.Rly should carry out the experiments for bringing MP to “O” while negotiating neutral sections in level sections. Observations of OHE after implementation should be advised to RDSO for study.

Status:
(i) Implemented.
(ii) Panto flashover protection relay developed and railways advised for trials. (Item closed)

Subject (Item 103):  Condemnation of tri-mount bogies - Policy to be adopted by zonal railways.

Recommendations:
(i) RDSO will make a detailed study and explore the possibility of reviewing 100 points condemnation criteria for co-co bogies.
(ii) It will be better if, railways go for planned replacements of such bogies.

Status:
Refer Rly.Bd’s order No.96/Elect.(TRS)/138/8(103) dated 11.2.97 to be implemented by Railways. (Item closed)

Subject (Item 104): Setting up of electric rolling stock development centre (ERSDC) at RDSO/Lucknow.

Recommendations:
In view of up-gradation of technology and the need to develop facility for simulating and testing of advanced equipments, development of ERSDC at RDSO is must.

Status:
Need based projects have been undertaken by RDSO and required facilities is set up at CLW/Manufacturers. (Item closed)

Subject (Item 105): Setting up of centralized repair facilities for electronic printed circuit board.
Recommendations:
There is a need of creating centralized repair facilities for advanced PCBs used in imported 3-phase locomotives. Such facilities should be created either in RDSO/Lucknow or Nasik or Bangalore.

Status:
Instructions under issue by Rly.Board based on RITES report. (Item closed)

Subject (Item 106): LED type flasher lights/marker lights and tri-colour hand signal lamps for use in electric loco/EMU.

Recommendations:
Use of LED type flasher/marker lights and tri-colour hand signal lamps for use in electric locos/EMUs to improve the reliability and for easier maintenance. RDSO should persue the development with safety directorate.

Status:
The matter is being taken up by RDSO for LED based flasher. (Item closed)

Subject (Item 107): Wheel flange lubricator.

Recommendations:
The trials with WFLS are continuing and their effectiveness is not yet proved. The railways should not go for mass scale fitment of WFLS till it is cleared and standardized by RDSO.

Status:
WFL’s of indigenous makes procured by board for trials are under trial at GZB shed. So far their performance has not been reported, it is known that they are not working satisfactory. (Item closed)

Subject (Item 108): Maintenance of tower wagons.

Recommendations:
There is a need to develop POH facilities of tower wagons other than engine portion in the nominated workshop in each railway. For diesel engine repair and maintenance should normally be got done either from the original manufacture or through some other suitable source.
Status:
Report indicating POH facilities for tower wagon etc. issued to Railways by Railway Board.
(Item closed)

Subject (Item 109): Standardization procedure for introduction of new equipment in electric locomotives.

Recommendations:
(i) No need to change existing procedures for development of new source or equipment by RDSO/CLW.
(ii) CLW should not fit trial equipment more than the numbers prescribed by RDSO.
(iii) All Railways should carefully monitor the performance of trial equipments and send the feedback.

Status:
Detailed instructions on the Subject has been issued by Rly. Board. (Item closed)

Subject (Item 110): Contact wire.

Recommendations:
(i) Contact wire manufactured from continuous cast copper rods is the best solution but till the time indigenous capability is developed. Contact wire with ERBW/CPBW joints should be used.
(ii) RDSO should develop additional sources of contact wire with ERBW/CPBW joints.

Status:
70% continuous cast copper conductor contact wire and 30% welded/jointed contact wire is being procured presently. (Item closed)

Subject (Item 111): Standardization of electric locomotive on Indian Railways.

Recommendations:
The design of electric loco may be frozen for the next 10 years and RDSO should concentrate on the reliability of locos. WAP4, WAG7/H, WAG9 and WAP5 should only be continued to manufacture.
Status:
Rly. Bd. has approved the recommendations vide letter No. 97/Elect(TRS)/138/3(3) dt. 1.5.98. (Item closed)
48th Electrical Standards Committee Meeting Held at Goa, in 1997
Subject (Item 112):
   i) Codal life of traction equipments of electric locomotives.
   ii) Codal life of traction equipments of EMUs.

Recommendations:
   (i) The committee consisting of CWM/KPA/ER, CWM/Bhusaval & JD/RDSO to decide the 
codal life of equipments for electric locomotives.
   (ii) Also study the practice used for Diesel Locos. CWM/MX/WR, Dy.CEE (EMU)WS/CR, 
CWM/KPA/ER and JD(EMU)/RDSO to study the codal life of AC & DC EMU 
equipments.

Status:
   (i) Rly. Bd. approved the formation of committee vide letter No.97/Elect.(TRS)/138/10 dt. 
28.1.98. Report sent by the committee to Railway Board in July ‘98.
   (ii) Committee has decided for the codal life for most of the equipment.  (Item closed)

Subject (Item 113): Use of nomex as insulating material for Loco/EMU transformers.

Recommendations:
   It was decided that a few locos/EMUs may be manufactured with nomex insulation.

Status:
   Feasibility and budgetary cost asked from firms. This is further being chased by RDSO.
   (Item closed)

Subject (Item 114): Development of 180 KVA static auxiliary converter for electric 
locomotives.

Recommendations:
   Adoption of 180 KVA static aux. converter in place of Arno converter is recommended in 
new locos. Based on the experience, replacement on existing locos could also be planned.

Status:
   Rly. Bd’s letter No.97/Elect(TRS)/138/15/item dated 2.3.98 has modified the 
recommendations. A copy of the Rly. Bd’s letter sent to CLW on 31.3.98. Atleast two 
independent sources to be developed by RDSO and CLW. This is in progress through Railway 
Board tender (Item closed)

Subject (Item 115): Provision of microprocessor based fault diagnostic system including traction 
control arrangement on electric loco.
Recommendations:
Committee recommended adoption of microprocessor based fault diagnostic system in 25 locomotives under manufacture at CLW and to be extended further after successful trials.

Status:
Four WAG7 locos fitted with this system by CLW in Dec.’97. These are in service. 25 more locos are being fitted with this system in 98-99 by CLW. RDSO revised the specification with new provisions. 50-100 more locos to be fitted with this system. (Item closed)

Subject (Item 116): Development of EMU coaches of stainless steel shell with light weight pneumatic suspension bogies.

Recommendations:
Initially 5 rakes of EMU coaches may be got developed with stainless steel and light weight pneumatic suspension bogies.

Status:
RDSO has sent comments on stainless steel EMU coaches offered by M/s BHEL vide letter No.EL/4.2.11 dated 24.3.98 to Railway Board. (Item closed)

Subject (Item 117): Development of 25 KV cable arrangement for connecting pantograph on motor coaches.

Recommendations:
One rake fitted with 25 KV cable arrangement for connecting pantographs on motor coach of EMU/MEMU rakes may be tried on NR based on the proven technology.

Status:
One motor coach fitted with this (25 KV cable) arrangement is working on EMU of Northern Railway/GZB shed. Five more units turned out by ICF with this arrangement. (Item closed)

Subject (Item 118): Development of multiple electrical couplers for EMU for replacement of 19 core electric jumper.

Recommendations:
The committee decided for extensive trials of the system fitted with multiple pin elec. couplers for EMUs in few rakes on different Railways.
Status:
Based on RDSO’s specification, ICF has invited tender which is under finalization by them. Trials should be arranged by Railways with EMUs turned out with such multi-pin couplers. (Item closed)

Subject (Item 119): Need based maintenance of traction installation.

Recommendations:
(i) S.Rly to circulate the write-up to all railways for their comments. Railways may send their comments to RDSO.
(ii) RDSO to issue necessary modifications in the wagons to avoid brake block hitting the OHE mast. Further, the insulator testing instruction may also be reviewed to avoid breakage of stay insulators in such cases.

Status:
(i) Write up received from Southern Railway has been circulated by TI Dte. of RDSO to all Railways. Comments received from Northern and Western Railway. Other Railways being chased.
(ii) Action taken by TI Dte. of RDSO. Modification issued.
(Item closed)

Subject (Item 120): Escorting of air-conditioning services.

Recommendations:
As per recommendations powers to be delegated to GM to create the posts of escorting staff for AC coaches on the lines of running staff cadre by Railways.

Status:
Action to be taken by zonal railways. (Item closed)

Subject (Item 121): POH of AC coaches.

Recommendations:
(i) POH of AC coaches to continue as per the present practice.
(ii) Railways may develop suitable facilities required in the workshops to cater to the POH need of the AC coaches.

Status:
Action to be taken by zonal railways. (Item closed)
Subject (Item 122): Creation of infrastructural facilities for maintenance of AC coaches.

Recommendations:
RDSO may issue necessary guidelines for creation of infrastructural facilities for maintenance of AC coaches.

Status:
Draft report no. ELPS/ESC/AC/01 of Dec.’97 has been sent to CAMTECH in view of Railway Board’s guidelines to CAMTECH to develop integrated maintenance facilities for AC coaches. (Item closed)

Subject (Item 123): Electrical tail lamps/flasher lights in generator cars of Rajdhani/Shatabdi Exp.

Recommendations:
The suitable system may be finalized at Railway Board’s level in consultation with Board’s safety Dte.

Status:
No further directives have been received from Railway Board’s Safety Dte. (Item closed)

Subject (Item 124): Standardization of colour of light/use of energy efficient light at Railway platforms and circulating areas.

Recommendations:
Since Board has already issued instructions vide their letter No.95/Elect(G)/138/5 dt. 19.3.96 on the Subject and the letter clarify/identifies the various requirements on the Subject. It was, therefore, decided that the above letter may be reiterated and item may be closed.

Status:
Board’s letter No.95/Elec(G)/138/5 dated 19.3.96 has been re-circulated by RDSO. (Item closed)

Subject (Item 125): Provision of second and subsequent coolers/chiller plant at a particular station.

Recommendations:
Director/IRIEEN to study the provision of second and subsequent water cooler/chillar plant at different class of locomotives.
Status:
Draft recommendations was sent by IRIEEN/Nasik to Railways for comments. RDSO’s views have been advised to IRIEEN. (Item closed)
49th ELECTRICAL STANDARDS COMMITTEE
MEETING
On 18th & 19th January 1999 at Pune, CR

Members Present

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**RDSO**

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<td>R.N. Lal</td>
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Subject (Item 126): Setting up the facilities for rehabilitation of electric locos.

Recommendations
The committee recommended that RDSO report on rehabilitation of electric locos may be considered by Railway Board for issuance of suitable directive. The cost of rehabilitation to be charged to DRF. The work to be carried out at Dahod/W. Railway and CLW to the extent spare capacity is available. Committee also recommended issuance of similar directives by Railway Board for EMU and AC coaches and TRD assets.

Status
RDSO’s report on rehabilitation of conventional electric locos has been accepted by Railway Board vide letter 2001 /Elect (TRS)/462/1/Pt.II dated 12-3-2003. Western Railway was advised to undertake MTR of at least two locos initially and upgrade the facilities, if necessary to meet the arising indicated in the report.

Subject (Item 127): Provision of speed recorders in freight locomotives also.

Recommendations
Speedometer with speed recorders being safety items, should be provided on freight locomotives also.

Status
Railway Board have issued orders for provision of speed indicators with half an hour memory module as per RDSO’s specification no. MP 0.3700.01 (Aug’97) vide letter no. 98/Elect (TRS)/13/9/29 dt 29-11-99 for all freight locomotives on IR.

Subject (Item 128): Provision of stainless steel pipes, air dryers, imported rubber items in critical air brake valves and composite brake blocks on electric locos.

Recommendations
i) Stainless steel pipes:
To reduce the problem on existing locos, cleaning and blowing out to be continued. Introduction of stainless steel pipes should be made on 10 new locos by CLW. Based on the service experience further adoption can be planned. Committee also recommended the Railway Board to issue explicit orders for use of stainless steel pipes on EMUs.

ii) Air dryers:
Recommended for provision on all locos as a regular measure.

iii) Rubber items in air-brake valves:
For meeting immediate requirements, import should be resorted to VAIB diaphram only. RDSO should develop indigenous sources which will have incentive and will agree for rate contract for uninterrupted supply of these items.

iv) Composite Brake Blocks:
These should tried after extensive and proven trains and can be adopted based on trial results and performance.
**Status**

Stainless steel pipes:
The cleaning and blowing of pipes are being followed by Railways to prevent rusting of the pipes. As regards, introduction of stainless steel pipes, CLW have placed orders for 15 loco sets for WAG7 and 5 loco sets for WAP4.

Air dryers:
Most of the Railways including CLW have given the feedback that the air dryers are still in the process of getting stabilized. RDSO has issued modification sheet no. ELRS/MS/0262 Rev. ‘0’ for modifications in the existing air dryers as suggested by M/s SAB WABCO for improving the performance.

Rubber items in air brake valves: Railway Board vide their letter no. 99/Elec (TRS)/138/6 (Pt) dt 30-7-99 have issued instructions to all the Railways to use imported rubber components for critical pneumatic valves.

Composite brake blocks:
CLW have ordered procurement of 20 loco sets for WAG7 locos. Railways will try such brake blocks after extensive service trial results are available.

C. Railway

**Subject (Item 129):** Use of Redox cables (used in three phase locos) in tap changer locos also.

**Recommendations**

CLW in association with RDSO to try these cables and conduct extensive trials. Large scale induction will depend upon satisfactory performance, longer life and the cost difference with elastomeric cables. In view of the life expectancy matching with codal life of EMUs as 25 years, these cables may be adopted for EMUs also.

**Status**

Thin walled cables have been imported for 10 loco sets by CLW except for 19x2.5 sq. mm. And 300 sq. mm. For which purchase orders have been placed already. These will be provided on 10 locos at CLW. On EMUs these cables will be tried after the same are stabilized on locos. RDSO have developed five sources for procurement of these cables through chemical bonding process and have recommended extensive field trials to Railway Board and CLW vide letter no. EL/2.2.37 dt 24-6-99.

**Subject (Item 130):** Standardization of SCADA system on IR

**Recommendations**

The committee recommended that RDSO should go ahead with the job of standardization of SCADA system.

**Status**

RDSO has prepared the specification no. TI/SPC/RCC/SCADA/0984 dt 8-3-99 for standard SCADA system to be followed in future and issued to Railways.

**Subject (Item 131):** Yardstick for maintenance staff for TL & AC coaches
Recommendations
1. For maintenance staff for the coaches at depot level, existing yardstick of Chirmule Committee should continue to be followed by Railways.
2. For requirement of staff for POH of coaches, a committee consisting of CESE’s Northern, Central & S. E. Railways be appointed for deciding the yardstick of staff.

Status
Most of the Railways are following the yardstick recommended by Chirmule Committee. C. Rly. Finance Deptt not agreed to Chirmule Committee Report, on the plea that the report has no finance concurrence.

Subject (Item 132): Standardization of norms for escorting staff for AC coaches

Recommendations
Railways should continue to follow the existing yardstick for the escorting staff for AC coaches and implement the same.

Status
Most of the Railways are following the existing standard norms. C. Rly. is found adequate yardstick for staff Rajdhani/Shatabdi trains as per Railway Board’s letter no. 99/TGV/12/2 dt 9-6-99.

Subject (Item 133): Merger of train lighting and air-conditioning cadre

Recommendations
The committee recommended that “Train Lighting and “Air conditioning” cadres should be merged. The committee also recommended to modify the trade test manual accordingly.

Status
Railways are in the process of implementation of the decision in consultation with the unions. C. Rly. Have a common cadre for TL & AC. However, necessary guidelines are required from Railway Board.

Subject (Item 134): Fire alarm system and fire prevention measures for EMUs

Recommendations
Fire Alarm System with its smoke detection system should take into account the following features as well:
i) Provision of tripping of breaker/contractor should be eliminated.
ii) Alarm system for fire should have distinct feature compared to chain purling arrangement.
iii) Feasibility to detect fir from the further places should be examined. Smoke detection along with temperature sensor should be used in the fire alarm system.
iv) No detection arrangement should provided in trailer coach as suggested by S. C. Railway.
Committee recommended that RDSO should revise specification incorporating above features. Fire alarm system as per revised specification should be tried first on few rakes and thereafter shall be considered for retrofitment and on new stock.

**Status**

**Subject (Item 135):** Recondition-ing/overhaul-ing of major/vital equipments e.g. tap changer, compressors, speedometers, transformers through OEMs against AMCs.

**Recommendations**
Rehabilitation of major equipments such as compressors, tap changers, traction motors, transformers and speedometers is essential. However, in preference to annual maintenance contracts (AMCs). Railways should go in for rehabilitation contracts for major/vital equipments on the need basis.

**Status**
Most of the Railways are of the opinion that rehabilitation of major equipment can be done through OEMs on condition basis only when capacity for such repairs are not available. There is no need for AMCs once the Railways implement the concept of AOH, IOH, POH kits as advised by RDSO. C. Railway is keen for rehabilitation of compressors, tap changer, speedometer and transformers through AMC.

**Subject (Item 136):** Yardstick for maintenance of OHE staff as different Railways have different manpower/TKM.

**Recommendations**
A sub committee consisting of Sr. DEE/TRD/BPL, Sr. DEE/TRD/KGP & DTI/RDSO which is already proposed for review of maintenance schedule may look into the aspect of suggesting staff yardstick for maintenance of OHE also. The additional staff requirements for 2x25 KV system may also be look into.

**Status**
Accepted

**Subject (Item 137):** Adoption of carbon strips for pantographs of electric locos and EMUs.

**Recommendations**
The committee recommended that the switching over to metallised carbon strips to cover all the locomotives at the same time and not to resort to a phased programme.

**Status:**
Being implemented by Railways. Panto strips being changed to carbon from steel progressively.
Subject (Item 138): Increasing the interval of MEMU maintenance schedule

Recommendations
RDSO will examine the schedules and review the periodicity of trip inspection schedule. Initially the periodicity be made 10 days and then to 15 days.

Status:
RDSO has reviewed the periodicity of trip inspection scheduled and enhanced the same from 7 days to 10 days. Report No. EL/4.6.1/MEMU was issued by RDSO and sent to Railway Board vide letter no. EL/4.6.1 dt 15-4-99. Railway Board approved it vide their letter no. 96/Elec(G)/18/1/30/MEMU dt 4-5-99.

Subject (Item 139): Increasing the spacing of OHE depots

Recommendations
With the latest technological developments OHE depot spacing of 70 km is recommended. However, to follow this increased sparing there is need for review of various maintenance schedules for OHE. A committee consisting of Sr. DEE(TRD)/BPL, Sr. DEE(TRD)/KGP and DTI/RDSO should look into this aspect and suggest revised maintenance schedules for OHE.

Status:
Accepted.
### 50th ELECTRICAL STANDARDS COMMITTEE

#### MEETING

on 7th & 8th August 2000 at Secundrabad, SCR

#### Members Present

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#### Railway Board

| 1.    | S.K. Khanna       | ML          | RB      |
| 2.    | I.C. Sharma       | EDEE(RS)    | RB      |

#### RDSO

| 1.    | Ramesh Chandra    | EDSE        | RDSO    |

#### Observers

| 1.    | V.P. Singh        | CEDE        | SER     |
Subject (Item 140): Revision of statistical manual

Recommendations
Statistical manual is clear on the Subject and needs no revision. Railways should take care while reporting failures and only the cases as defined in the statistical manual are reported.

Decision/Status:
Noted

Subject (Item 141): Fixation of yardstick for Rolling-Stock Officers, Supervisors and staff

Recommendations
Existing norms should continue. Trip shed should be separated from ELS staff.

Status:
Railway Board on 15-1-2001 laid down norms of i.e. 5.5 staff per loco of Hitachi Goods and 6.5 for TAO goods and Passenger locos.

Subject (Item 142): Painting of locos with polyurethane paints based on the experience on WAG7/WAP4 & WAG9/WAP5 locos.

Recommendations
The group recommended adoption of Epoxy-Polyurethane paint through airless spray technique on electric locomotives being manufactured by CLW.

Status:
Board vide letter no. 2000/Elec (TRS)/138/20 DT 20/28-11-2000 had asked RDSO to examine/verify the work cost. Accordingly, RDSO asked to furnish details of cost break up vide letter no. EL/3.2.113 dt 21-12-2000 and 15-3-2001.

Subject (Item 143): Railnet/e-mail usage

Recommendations
Railnet should be expeditiously extended to cover all loco sheds and depots along with Railway headquarters. The group also recommended that the user should use this facility with caution to the adequate safety precautions as the information will be accessible to outside parties.

Decision/Status:
Noted

Subject (Item 144): Cost reduction of WAP4/WAG7 Locos

Recommendations
The group recommended the adoption of the 10 recommendations made at CLW.

Status:
1. Board vide letter no. 2000/Elec(TRS)/138/22 dt 28/29-11-2000 had asked further details on -
a. Elimination of MU couples for WAP-4  
b. Provision of stainless steel bogie body shunts  
c. Removal of spare multi 19 core cables.

Details received vide CLW’s letter no. ELDD/3205/AKM dt 30-12-2000 were submitted to Board vide letter no. EL/3.1.23/4 dt 14-9-2001.

Subject (Item 145): Development of standard gauge and meter gauge electric locomotives with an eye on export

Recommendations
The group recommended that we must make all out efforts in the direction of export of electric locomotives specially giving due consideration to reduction in cost of 3-phase locomotives in a short span of time

Status:
1. A meeting was held at RDSO on 8-8-2001 and the minutes of the meeting were issued vide letter no. EL/3.1.44 dt 14-8-2001.
2. A task group consisting of officers from CLW and RDSO has been set up.

Subject (Item 146): Policy regarding realisation of OHE maintenance charges

Recommendations
Maintenance charges for OHE to be borne by Railways.

Status:
Railway Board vide letter no. 99/TC(FM/26/1) dt 29-9-2000 has issued instructions that OHE maintenance cost for existing as well as new sidings to be borne by the Railways

Subject (Item 147): Standardisation of capacity of Ats

Recommendations
Both 5 KVA and 10 KVA ATs may be used depending upon the load requirements

Status:
RDSO specification no. ETI/PSI/15 (11/92) for 5 KVA and 10 KVA ATs already exists

Subject (Item 148): Adoption of reduced electrical clearances under difficult over line structure for traction distribution system

Recommendations
All members expressed the need to review Electrical clearances. The group recommended that RDSO should carry out detailed studies, collect information from other countries, UIC practice, our experience with 250/250 mm clearances and draw out recommendations. The group also
recommended that in this study RDSO should confine only to air clearances and should not consider provision of insulating materials.

**Status:**
Presently, minimum static electrical clearance of 250 mm correspond to 250 kV lightening impulse which is the basic insulation level of overhead equipment. Study of system insulation coordination being tied up with IIT/Kanpur and same will include high voltage testing for power frequency voltages, switching surges and lightening surges under worst atmospheric conditions.

**Subject (Item 149):** Posting of electrical officers in Coaching Depot

**Recommendations**
Item was deleted from discussions

**Decision/Status:**
Noted

**Subject (Item 150):** Provision of lavatory engaged indication on AC coaches

**Recommendations**
The present systems may continue. RDSO should work to develop a more reliable product and conduct endurance test before we consider to extend the same to other coaches.

**Status:**
Implemented

**Subject (Item 151):** Adoption of one single Thermostat setting 17-22 deg C) against existing 3 options on AC coaches

**Recommendations**
Single set to be tried on 10 coaches on railway system to gather public opinion. RDSO should develop reliable thermostat on priority.

**Status:**
E. Railway has developed a digital electronic thermostat through M/s Atina Engg. Co (P) Ltd with temperature sensor range of 17-22\(^0\)C. The temperature setting may be selected as per requirement. 10 coaches have already been provided with this thermostat and the performance is found to be satisfactory. RDSO will evaluate feedback from passengers further.

**Subject (Item 152):** Provision of CFLs in coaches

**Recommendations**
At present only AC 3-tier would be provided with CFLs. RCF should study whether 1x11 W will be adequate. After gaining experience, the Subject may be discussed again for extending use of CFLs on other type of coaches.

**Status:**
1. RDSO has submitted report on cost effectiveness for CFL to Railway Board vide letter no. EL/6.4.6/D9 t 28-8-2000. There is no justification to go for CFL for new coaches where the FTL fittings are more cost effective.
2. CFL in place of incandescent lamps is more cost effective for retrofitment on old coaches but light distribution and its maintainability needs to be confirmed. S. Railway has provided 10 W CFL replacing incandescent lamps on 600 coaches and performance is reported satisfactory.

**Subject (Item 153):** The scale of electrical items to be kept in accident relief trains

**Recommendations**
At present only AC 3-tier would be provided with CFLs. RCF should study whether 1x11 W will be adequate. After gaining experience, the Subject may be discussed again for extending use of CFLs on other type of coaches.

**Status:**
Noted. S. Railway has proposed provision of two nos. of 110 Vx200 A battery charges for charging the coaches of ARTs.

**Subject (Item 154):**
Standardisation of provision of DG sets for pre-cooling and battery charging facilities

**Recommendations**
The group recommended provision of 160 Kva DG sets at major and medium depots for pre-cooling and battery charging facilities as a standby facility.

**Decision/Status:**
Noted

**Subject (Item 155):** Breakage of suspension in WAP1/WAP4 locomotives

**Recommendations**
RDSO, CLW and Zonal Railways should continue to insist on the quality of the springs with reference to end coil geometry.

**Status:**
1. RDSO’s recommendations have been issued to Railways/CLW in the form of Technical Circular No. TC/050 on precautions to be taken while inspection the springs.
2. The corrective measures to improve the bogie assembly have been advised to CLW vide letter no. EL/3.2.165 dt 14-11-2000.
Subject (Item 156): Breakage of wheels in WAG7 locomotives

Recommendations
RDSO should not give any relaxation to M/s DSP in view of cases of breakage of wheels of electric locomotives.

Status:
Noted

Subject (Item 157): Corrosion in floor of existing design of EMU stock

Recommendations
Vendor compartment should continue with stainless steel deck as recommended by MSG. In view of higher life of stainless steel decks, total life cycle cost may be worked out for trailer coaches and motor coaches also.

Status:
Life cycle cost for motor coach and trailer coach with stainless steel has been worked out and submitted to Railway Board vide letter no. EL/4.2.16 dt 19-9-2001. One prototype fully stainless steel coach (tanaka shell) will be manufactured by ICF during 2001-02.

Subject (Item 158): Bogie defects in EMUs

Recommendations
Noted.
Item closed.

Status:
1. Modification of pins and hangers have been issued by Carriage Dte vide their letter no. MC/EMU/MSG/DC dt 25-8-2000.
2. Bogie maintenance manual for AC & DC EMU and MEMUs have been issued by Carriage Dte vide letter no. MC/EMU/GM dt 16-11-2000.
3. Railway Board have issued instructions to use air springs in all new EMU stock vide letter no. 96/M(c)/137/17 dt 13-11-2000.
4. Bogie failure details have been collected from the Railways and being analysed by RDSO.

Subject (Item 159): Traction energy management

Recommendations
ESC recommended suitable set up both at headquarter and divisional level.

Status:
Noted

Subject (Item 160): Backup protection of distance relay
Recommendations
The proposal that use of delta-I and panto flashover static relays may be adopted as a standard.

Status:
Noted

Subject (Item 161): Provision of toilets in MEMUs

Recommendations
1. No toilets be provided in MEMUs
2. Restrict one rake journey to about 3 hrs.
3. In case further journey is required, fresh rake may be provided for further journey.
4. Since with MEMUs journey time will be considerably reduced, the new time table should be so made that start time at early hours say 5'O clock is avoided.

Status:
Noted.

Subject (Item 162): Setting up the facilities for rehabilitation of electric locos.

Recommendations
RDSO report on Electric locomotives may be considered by Railway Board for issuing suitable directives

Status:
Accepted.

Subject (Item 163): Codal life of traction equipment of electric locos and EMUs

Recommendations
Railway Board to pursue EDs committee to publish Part-I report on electric locos and Part-II report on EMUs at the earliest.

Status:
1. The recommendations of committee for an electric locomotive was submitted to Railway Board vide letter no. EL/2.5.20 dt 10-7-98.
2. Report of the committee set up to decide codal life of EMU equipments have been submitted to Railway Board vide letter no. EL/2.5.30/1 dt 27-9-99.

Subject (Item 164): Norms about codal life of TRD assets

Recommendations
Similar to electric locos and EMUs committee recommend that Railway Board may pursue EDs committee to issue Part-II of the report for TRD assets.
Status:

Subject (Item 165): Yardstick for maintenance of OHE staff as different Railways have different man power/TKM

Recommendations
The sub-committee should expedite the submission of the report.

Status:
Sub-committee set up has submitted the draft report in September 2001 to Railway Board vide letter no. TI/Gen/MTG/ESC/00 dt 3-9-2001.
51st ELECTRICAL STANDARDS COMMITTEE
MEETING
on 11th & 12th October 2001, at Vizag, SER

Members Present

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Subject (Item 162 a): Anti Wheel Skidding Device in Electric Loco.

Recommendations
Committee noted advantages of skid control and feasibility of providing it on existing and new locomotives. RDSO should initiate development of anti wheel slide system and put them on trial on few locomotives. Performance and maintainability of system be evaluated before its adoption as standard.

Status:
Approved for trials on 5 passenger and 5 goods locomotives.

Subject (Item 163 a): Provision of 3-phase AC MVRF in place of DC MVRF

Recommendations
1. In view of further overloading of ARNO, the system as proposed cannot be adopted as standard. However, S.E.Railway based on their experience on K K Line may adopt it on WAG5 locos working in 3 loco consist.

2. RDSO to expedite the development of 3 phase MVRF for provision on locomotives where ARNO is being replaced with 180 KVA static converter

Status:
Approved for provision of AC MVRF suitable for 900 Amps. Braking current on 10(ten) locomotives working with SI units.

Subject (Item 164 a): Cable layouts on new locomotives to be changed as per WAG-6 lay out

Recommendations
Committee recommends that CLW should finalize improved layout both from cable ventilation and maintenance point of view taking features of WAG6 and WAG9 locomotives as guideline

Status:
Approved. CLW to finalize cable layout in overhead ducts as in WAG6A and WAG9 locos, in consultation with RDSO, for adoption on WAG7, WAP4 locomotives.

Subject (Item 165 a): Self-illuminated Ammeter/Voltmeter & notch Indicators

Recommendations
Committee recommended that analog (needle) type meters with illuminated dial as also used in modern automobile be developed and performance evaluated for suitability to Railway rolling stock applications before adoption as standard

Status:
Approved for provision of LED type meters without moving parts already developed by CLW.

Subject (Item 166): Seamless steel pipes and fittings
**Recommendations**

Stainless steel pipes and fittings with arrangement similar to WAG9 locomotive be adopted on new locos by CLW.
Regarding socket connections, performance of locomotives turned out by CLW be watched and CLW provide Railways guidance in regard to requirement of skills/tooling for maintenance and making such joints.

**Status:**
Approved for extended trials on new locos ex-CLW only. CLW to cut-in. Railways to be provided guidance for skill & tooling required for maintenance.

**Subject (Item 167):** Re-arrangement of WAP4 Loco Layout

**Recommendations**

1. RDSO should examine loco layout/cab modifications carried out by GZB shed at Northern Railway and finalize the layout for adoption on existing WAP1/4 (non-modular) by Railways during POH/IOH/AOH/Spl. repairs.

2. Regarding WAP4 (modular) layout currently under production, CLW will finalize the revised lay out on the same lines.

**Status:**
CLW to cut-in the revised layout of cabs finalized by RDSO. Minor improvements in layout given by RDSO may be carried out by CLW wherever considered necessary.

**Subject (Item 168):**
Use of Convector type Heater suitably arranged on the Driver’s Desk in place of existing cab heater in WAP4/ WAG7 locomotives

**Recommendations**

Committee recommends the proposed improvement. RDSO should finalize the scheme and layout and develop equipment for adoption on different locos

Committee felt need for development an effective convector type heater in loco cabs and reiterated their earlier recommendations

**Status:**
The existing heaters be improved upon. ESC may re-examine.

**Subject (Item 169):** Vigilance control device for WAP-4 and WAG-7 locomotive

**Recommendations**
In consideration of safety, Committee recommends that RDSO should develop the system incorporating vigilance feature of operation of MP, MPS, Reverser, BL Key, Horn operation etc. on the lines provided on WAG9/WAG6 locomotives

**Status:**
RDSO to draw up specification for the VCD keeping in view aspects of safety, reliability and dependability, for provision on existing and new tap changer type electric locomotives.

**Subject (Item 170): Use of Bullet Proof Lookout Glasses on AC/DC Locomotives/EMUs/MEMUs**

**Recommendations**
Committee recommends use of stone proof look out polycarbonate sheet or equivalent material sheet on MEMU/EMUs only and electric locomotive may continue with existing glass based lookout glass.

**Status:**
Approved for trial on 5 electric locos of each shed.

**Subject (Item 171): Provision of Insulated Bus Bar/Insulated Sheet on Roof of Locos/EMUs**

**Recommendations**
Committee recommends that the arrangement of provision of insulated Bus-Bar/insulated sheet is not required to be extended to AC electric Rolling stock.

**Status:**
Recommendation for not providing this on AC rolling stock has been accepted.

**Subject (Item 172): Provision of Standard refrigerators and deep freezers on 230V supply provided from 2.5 KVA alternator inverters in SG Pantry Cars (Non-AC)**

**Recommendations**
(1) 230 Volt standard appliances like Refrigerator, deep freezer with proper earthing arrangement be developed by RDSO for use in pantry car.
(2) Electrical heating, i.e. ovens etc. not be used on pantry car

**Status:**
Approved for use of standard appliances with suitable inverter and earthing for the pantry cars and inspection carriages.

**Subject (Item 173): Conversion of Conventional Under- slung AC coaches in their mid life of RMPU.**

**Recommendations**
Committee recommends that arrangement of conversion from R-12 to R-22 undertaken by Southern Railway should be evaluated and RDSO should issue necessary SMI for guidance of other Railways in progressing conversion.

There is no need to convert underslung AC equipments to RMPU type during coach rehabilitation for this purpose.

**Status:**
Performance of coaches converted by NR, SR, SER & WR is being monitored by RDSO. Further decision on the Subject will be based on performance feedback and recommendations from RDSO.

**Subject (Item 174):** Policy on mid life rehabilitation of TL Coaches

**Recommendations**
There is no schedule of electrical rehabilitation of coaches. However, as cable gets damaged or has to be removed from coach on account of mechanical rehabilitation work, recabling work should be done along with mechanical rehabilitation.

**Status:**
Railways may take up work of recabling in TL coaches along with mechanical rehabilitation on condition basis through itemized coaching RSP.

**Subject (Item 175):** Provision of Geyser in first AC toilets of EOG type coaches

**Recommendations**
In view of the limited use and safety in regard to 230 V appliances in passenger area, the committee does not recommend provision of Geyser in IAC (EOG) toilets.

**Status:**
ESC should reconsider their recommendation as facility was earlier provided on Rajdhani trains as it existed in the beginning. The safety related aspect should also be reviewed.

**Subject (Item 176):** Solid state control panel for AC coaches.

**Recommendations**
Committee recommends that RDSO to go ahead with development of the system and put it on trial to evaluate its performance and standardize it.

**Status:**
Approval has already been accorded for provision of microprocessor control on one Rajdhani train (18 nos EOG AC coaches by NR and 9 nos SG AC coaches by ICF vide Board’s letter no. 2002/Elect(G)/114/3 dt 13-12-2002.

**Subject (Item 177):** Use of insulated catenary under FOBs and ROBs
Recommendations
Insulated Cd-Cu catenary may be provided under all over line structures in the new RE works. Railways may also use it at locations wherever trippings on this account are higher.

False catenary provided above catenary wire adopted as standard under FOB/ROB. However, at locations where clearances are less, insulated catenary may be adopted. RDSO should develop insulated catenary with life expectancy of more than 20 years.

Status:
Decision to pend. ESC may deliberate further efficacy of its use where provided may be examined.

Accepted provision of false catenary provided above catenary wire adopted as standard under FOB/ROB. For other locations, action to be taken on case to case basis.

Subject (Item 178): Use of stranded wire structure bonds

Recommendations
RDSO may study and suggest the required size of the stranded wire structure bond. The thimble may also be suitably designed to ensure proper contact with the rail and structure.

Status:
Approved. The specification may be finalized by RDSO by 31-1-2003.

Subject (Item 179): To dispense the use of RSJ/BFB 8”x8” in traction system

Recommendations
Use of RSJ and BFB masts for normal sections may be continued. However, fabricated masts may be used where wind velocities are higher. RDSO will issue necessary instructions in this regard.

Status:
Use of RSJ & BFB masts to be continued for normal sections. For regions where wind velocities are higher, instructions to be issued by RDSO.

Subject (Item 180): Foundation codes for intermediate soil pressure.

Recommendations
CORE will furnish the details regarding the new designs developed by M/s. RITES to RDSO who will study and suggest designs, which can be adopted for intermediate soil bearing capacities.
Committee recommended that CORE will make study in co-ordination with RDSO bringing out scope of savings by adopting intermediate stages of soil bearing pressure with recommendations for consideration by ESC

**Status:**
ESC may re-examine especially with respect to quantities of concrete and the manner in which it will be taken care of in tender schedules. Increasing the number of standard designs may also be considered.

**Subject (Item 181):** Standardization of area of TSS and economizing on TSS construction.

**Recommendations**
RDSO may issue the final layout drawing after taking into account Railways’ comments and the same should be adopted in future

**Status:**
Approved. Out of 10 types of TSS design, new drawings have already been issued by RDSO for 8 TSSs. RDSO may expedite & ensure issue of final layout of the remaining 2 drawings by 15-1-03.

**Subject (Item 182):** Operation with double decker container in respect of modification in OHE system.

**Recommendations**
RDSO should work out OHE design detail suitable for standard size of ISO container size of 2590.8 mm (8.5’) so that the same is available whenever these double deck container services are introduced.

**Status:**
Approved. RDSO to finalise OHE design for operation of double deck containers on deep well wagons by 28-2-03.

**Subject (Item 183):** Extending OHE supply through ATs for essential load, in addition to signalling installations already provided.

**Recommendations**
RDSO may study the load pattern in consultation with Signal Directorate and give a proposal for consideration to Railway Board. RDSO should also study regarding the provision of manual or automatic changeover switch in consultation with Signal Directorate and submit recommendation

**Status:**
Policy directives jointly signed by EDRE & ED/Signal have already been issued. No further action is called for. RDSO to submit recommendations for consideration by Board.
Subject (Item 184): Revision of OHE maintenance schedule to make them result oriented and to cover in particular coastal climatic conditions.

Recommendations:
The sub-Committee already nominated in this regard should review its recommendations with stress on directed maintenance using equipment or gadgets now available with objective of streamlining maintenance and increase in the periodicity of AOH and POH.

Sub-committee to submit report positively by 31.03.2003 in the meanwhile periodicity of replacement should be decided locally, particularly in respect of old fittings used at new locations Rly. Bd/RDSO’s decision

The accepted recommendations have already been circulated vide letter no. 200-Elect(G)/148/16 dt 21-5-2002. The sub-committee which was to go into the details of maintenance practices of traction sub-stations should submit its report before next ESC meeting for discussion during forthcoming ESC meeting.

Case will be processed after details are available.

Status:

The sub-committee consisting of Director/RDSO, Sr.DEE/BPL/C.Rly, Sr.DEE/KGT/SER is reviewed the existing maintenance practices.
### 52nd ELECTRICAL STANDARDS COMMITTEE MEETING

on 12th & 13th February 2003, at IRIEEN, Nasik

#### Members Present

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#### Railway Board

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#### RDSO

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Subject (Item 185): Maintenance of electronic equipments

Recommendation
Though electronics require little maintenance but to take care of eventuality of its failures, Railways should develop facilities and know-how for trouble shooting to identify defects at card level. Such facilities and protocol of testing cards etc should be obtained from suppliers with equipments.
Repair work of cards etc could be carried through running contract with OEM. To keep the repairs cost low offers be taken for repairs along with offer of equipment and same be taken into consideration in evaluation of offer by PUs/Rlys

Committee unanimously decided that SAG committee nominated by Board will look into the maintenance aspect of electronic equipments for conventional locomotives as well as 3-phase locomotives

Status:
The ESC’s recommendation is accepted as for all new equipment.
2. For existing equipment, repair/ replacement of defective components should be worked out similarly on basis of running repair contract through OEMs

Committee of CELE/CR, CELE/NR and DSE nominated by Sr. EDSE/RDSO will look into the maintenance aspect of electronic equipments for conventional as well as three phase locomotives.

Subject (Item 186): Standardization of MIS for sheds & TRD Depots/Divisions/Zonal HQrs & Railway Board

Recommendation
Central Railway is nominated as nodal Railway for coordinating with MIS in respect of software package for electric loco shed etc. Software package developed and standardized for electric loco shed management by committee of Sr. DEE of ELS/Erode, ESL/CNB, ELS/Ajni, ELS/BRC and ELS/BZA to be given by Central Railway to MIS for its evaluation and adoption as MIS standard

Status:
In the backdrop of MIS directorate pursuing the Subject separately, this need not be dwelt on by ESC and no action is needed on this item

Subject (Item 187): Pantograph metallised Carbon Strips

Recommendation
Railways confirmed their readiness and for change over to carbon panto strip w.e.f. 5-4-2003. Railways also confirmed to have identified sections/spots for monitoring the performance. Necessary information has already been given to RDSO who will co-ordinate and monitor performance closely
**Status:**
Switch over to metallised carbon strips has already been successfully executed in April-May’2003. RDSO to evaluate performance with use of carbon strips at end of first year.

**Subject (Item 188):** Compressors’ capacity enhancement & their mounting in underframe in Locos.

**Recommendation**
Air compressor capacity of 3000 LPM is considered adequate for electric loco for freight service. Accordingly, RDSO should take up development to see it 1500 LPM compressors provided on WAG9 loco can be adopted on conventional locos. Providing compressor underslung is desirable and RDSO will evaluate Northern Railway’s scheme in this regard with a view to evolve standard

**Status:**
2 x 1500 LPM F.A.D capacity after derating for environmental and input conditions is approved, as the minimum norm for all electric locos and pursue under slung version wherever possible.

**Subject (Item 189):** Provision of Temperature Sensors in Axle Boxes

**Recommendation**
Condition monitoring of vital items having bearing of safety i.e. MSU bearing for TM and axles boxes etc is important and should be taken by RDSO for development of reliable system including fixing norms for abnormal conditions requiring withdrawal from service

**Status:**
Recommendation of ESC is accepted.

**Subject (Item 190):** Inspection of locos

**Recommendation**
All members were unanimously in their view that loco should come to based shed for schedule inspections including IA & IB

**Status:**
Recommendation of ESC is accepted.

**Subject (Item 191):** Fixing uniform percentage for apportioning of energy from traction to non-traction purposes

**Recommendation**
Members felt that Railway Board earlier instructions to apportion 3 to 5% energy for non-traction purpose is adequate. According, Railways can review section by section and decide on % within above guidelines.
The committee recommended for apportioning of 5% of energy for non-traction purpose.

**Status:**
With increased usage of traction power in signaling, communication, station lighting, RRI’s automatic signaling, level crossing and on some railways other vital installation like DRM offices etc an uniform level of 5% could be considered. This will also take into account system losses from point of metering till consumption. Further deliberations are needed.

Apportioning of 5% of energy for non-traction purpose is approved

**Subject (Item 192)**
Utilisation of spare capacity of CLW

**Recommendation**
AC-EMU technology is old and 3-phase technology could be adopted on AC-EMUs to avail benefits in maintenance cost and saving in energy. The 3-phase technology is already available at CLW and CLW’s capacity could be utilized for development of 3 phase AC EMU sub-systems etc

**Status:**
Accepted

**Subject (Item 193):** Elimination of PATB from coaches

**Recommendation**
With the provision of passenger alarm through airflow and brake pressure sensing, PATB has now become redundant. ESC recommends discontinuing its provision on all new coaches. However, the cables wherever already provided on existing coaches need not be removed considering future usage

**Status:**
Accepted

**Subject (Item 194):** Use of solid state Fan Regulators in AC coaches

**Recommendation**
Solid state electronic regulator need not be provided. Production unit should continue to provide 3 step resistance regulator in 1 AC and two speed regulator in 2 AC and 3 AC coaches

**Status:**
Accepted

**Subject (Item 195):** Wiring/Rewiring of Railway Staff Quarters with copper wire
Recommendation
There are no instructions issued by Railway Board banning the use of Cu-wire in houses and office buildings. Govt of India, through a Gaz. Notification, banned the manufacturing of Cu-wire PVC cable. Now with ban already lifted and Cu-PVC cables readily available, technical sanctioning authority i.e. CEE of Railways may decide to adopt the wiring/re-wiring with Cu-cable

Status:
In view of better reliability, safety and continuous reduction in maintenance staff, copper wiring be adopted.

Subject (Item 196): Provision of Emergency Feed Terminal on AC Coaches

Recommendation
ESC recommends RDSO to design 110 V DC EFT for provision on newly manufactured AC coaches, as well as for retrofitment on existing coaches by depot/workshop

Status:
Accepted

Subject (Item 197): Interchangeability of RMPUs & AMC for RMPU Coaches

Recommendation
RDSO to review the specification of RMPU so as to in-built interchangeability of sub-assemblies for ease in maintenance

Status:
Accepted

Subject (Item 198): Issue of Guidelines for entering into works contract for critical items pertaining to general services/TL-AC/TRD

Recommendation
Railway Board has issued guidelines giving responsibilities to RDSO/Production Unit and Railways about items for preparation of specification, capacity assessment, prototype approval etc. The committee recommends that on similar lines, the list of items which can be outsourced for repair, Subject to insufficient repair capacity in the shops, and the authority to develop the sources be issued by Railway Board

Status:
ESC’s recommendations accepted. List can be enlarged based on Railways need. Authority for this will be Railway Board as suggested by ESC

Subject (Item 199): Provision of Pre-cooling/testing sockets in EOG Coaches
**Recommendation**
RDSO to develop suitable design and issue modification to facilitate testing of EOG coaches in sick line

**Status:**
Accepted

**Subject (Item 200):** Standardization of 1100 AH VRLA Batteries

**Recommendation**
1100 Ah VRLA battery for AC coaches should continue ESC also recommends use of ERRU to the extent of 100% in new manufacturing and 10% on existing coaches with priority on VRLA battery coaches. Specification of alternator and ERRU should be delinked and need not be procured as a set

**Status:**
Partly accepted.
1. Alternative to 1100 Ah VRLA batteries to be pursued.
2. ERRUs to be provided on VRLA battery coaches to the extent of 100%.
3. Alternator & ERRUs to be delinked.
For newly built ICF/RCF coaches, provision of ERRU be discussed in MSG.

**Subject (Item 201):** Provision of Gazetted posts in RE estimate for openline to cover construction and maintenance for post CRS inspection period

**Recommendation**
Provision should be made in R.E. estimate for Gazetted posts for open line units which will assist RE in co-ordination during construction and then continue for two years for maintenance of OHE

**Status:**
May be accepted.
This will need to be processed for finance concurrence in Board’s office

**Subject (Item 202):** Need for setting up of a Nodal Agency for availing 132 KV power supply for traction purposes

**Recommendation**
Central body CORE can coordinate and execute for availing the power from generating agencies like NTPC etc. Proposals for sanction will continue to be dealt by Zonal Railways

**Status:**
Only project of Korba-NGP was given to CORE, which has been lingering on. For expeditions execution, Railways may execute this work
Subject (Item 203): Standard SCADA Specification

Recommendation
Standardised software shall be adopted along with standard communication protocol in future

Status:
Accepted

Subject (Item 204): Improvement of voltage profile/power factor of OHE

Recommendation
Specific problem of high voltage drop in C. Railway may be studied by RDSO and recommendations finalized.
Work of Thyristor switched capacitor bank sanctioned as pilot project to be expedited to help in evolving future standard

Status:
RDSO to study and recommend.

Subject (Item 205): Standardization of practice of switching ‘OFF’ of standby transformers in traction sub-station

Recommendation
It was unanimously agreed that changeover of TSS’s transformer be carried out on weekly basis. The changeover could be earlier depending upon specific requirement of system

Status:
Changeover should be done in normal course unless operationally or technically not desirable in specific cases

Subject (Item 206): Provision of Toilet in Mainline EMU

Recommendation
Committee unanimously agreed for need of limited facility of toilet on MEMU. However, detailed design be carried out for providing one toilet of suitable design on each unit of MEMU

Status:
There has been reservation on account of maintenance problems caused by W.C. on MEMUs. In view of operational needs and demand of passengers, which is considered essential, this objection to have toilets needs to be withdrawn. Issue was also discussed in CEEs conference in August’03 at SER, Kolkata wherein it was decided to permit provision of toilets. One toilet in each coach of MEMU may be provided.
### 53rd ELECTRICAL STANDARDS COMMITTEE MEETING
on 18th & 19th March 2004, at Chennai, SR

**Members Present**

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<td>R.K. Gupta</td>
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<td>Satish Kumar</td>
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Subject (Item 207): Methodology for approval of sources for electric locomotive items

Recommendation
i) Railway Board has formed a standing committee of CEE/NR, CEE/CR and CEE/CLW who is the convenor for reviewing the approved vendor list of PUs along with framing the criteria for approval of sources in Part II & Part I. All Railways should furnish feedback to concerned CEEs for consideration in respect of those sources who are generally failing to execute orders within original delivery period.
ii) To ensure the quality of material, stringent qualification criteria should be laid down. This should include facilities for manufacturing and testing capacity.
iii) Railways & PUs should follow QAP criteria similar to RDSO. Firm assessment should be done preferably by JA Grade officer

Status:
  i) Accepted.
  ii) Besides stringent qualification criteria vendors, the specifications/drawings/testing procedures also need to be streamlined in order to have quality material

Subject (Item 208): Provision of parking brakes in conventional locos on the lines of WAP-5/WAG-9 locos

Recommendation
Design of existing hand brakes to be examined and strengthened to make them more effective.
Drivers to be counselled/given training for proper use/application of hand brakes

Status:
RDSO to study the design and issue modification sheet to make the hand brakes more effective.

Subject (Item 209): Use of either snubbers or shock absorbers in WAP-4/WAP-1 locos.

Recommendation
Spring specification needs review by RDSO. The method of provision of happy pad on spring of WAP-4 locomotive with full wheel dia as done by GZB to be studied by RDSO and suitable SMI issued.

Status:
Springs specification needs review by RDSO. The method of provision of happy pad on spring on WAP-4 locomotives with full wheel diameter as done by Ghaziabad shed to be studied by RDSO and suitable SMI issued.

Subject (Item 210): Increasing the periodicity of passenger locomotive WAP4 3½ to 6 years

Recommendation
Committee decided to retain the existing POH periodicity for passenger locomotives i.e. 6 years or 8 lakh km whichever is earlier in view of safety and mechanical problems involves such as crack in centre pivot, spring breakage etc
Status:
The existing POH periodicity for passenger locomotives i.e. 6 years or 8 lakh-km whichever is earlier in view of safety and mechanical problems involved such as crack in center pivot, spring breakage etc. shall continue.

Subject (Item 211): Standardization of AC EMU with 3 phase technology

Recommendation
It was unanimously agreed that 3-phase technology with regeneration feature should be adopted in BG AC EMUs as energy saving will be quite substantial in addition other benefits associated with state-of-art technology of three phase drives.

Status:
Accepted for both AC EMUs and MEMUs.

Subject (Item 212): Modification of the layout of MEMU car shed for carryout maintenance of MEMU coaches provided with toilet facilities.

Recommendation
i) Each MEMU coach should have one toilet as being demanded by user. Accordingly, RDSO should look into the design of MEMU sheds and standardize the design of shed which should cater to cleaning of toilets and maintenance of 16 coaches MEMU rakes.
ii) Watering and cleaning of toilet/coaches to be done by Railway as being done for other passenger trains.

Status:
As far as Electrical Deptt is concerned there is no objection to provision of one toilet per coach in MEMUs. These may be provided based on traffic demand.

Subject (Item 213): Rationalization of 25 KVA Inverters of AC Coaches to limited sources.

Recommendation
i) RDSO should review the specification to standardize it and should meet interchangeability requirement and also issue guidelines so as to ensure selection of genuine, technically and financially sound vendors.
ii) Zonal Railways should furnish information to Railway Board for coaches giving makewise details of inverter to enable the Board to raionalise the coaches with one make to one Railway for ease of maintenance and to reduce the inventory/duplicity of spares.

Status:
Accepted

Subject (Item 214): Standardization of pantry car.

Recommendation
Presently equipment layout is dealt by Carriage Dte of RDSO. Committee feels that equipment and their layout should be decided by Electrical Dte of RDSO. Standardisation and issue of specification should be dealt by Electrical Dte of RDSO. Railway should avoid undertaking such experiments individually.

**Status:**
Only PS & EMU Directorate of RDSO should deal with the pantry car electrical equipments and its layout.

**Subject (Item 215):** Improved flush type tube fittings.

**Recommendation**
RDSO to standardize the tube light fittings for new manufacture. In this regard fittings being provided by RCF/NR may be looked into. RDSO should also finalise the scheme for retrofitment. The berth light design should also be finalized by RDSO instead of PUs.

**Status:**
Accepted

**Subject (Item 216):** Schedule of rates (SOR) for Electrical Department.

**Recommendation**
A committee consisting of SAG/Electric officer of WR, NR (Convenor) and NFR should go into details about SOR already finalized by Railways as well as by CPWD and submit recommendations within two months.

**Status:**
Accepted

**Subject (Item 217):** Medical categorization of Electrical General Services – colour perception test.

**Recommendation**
SAG level committee of Electrical Deptt of NWR (Convenor), NR and WR should study the practice of other department and submit the report. Committee also recommend that all category of staff (technician & supervisor) of TRS, TRD & General services including Gr ‘D’ should be included in safety category

**Status:**
Accepted

**Subject (Item 218):** Standard facilities for maintenance of AC coaches.

**Recommendation**
All the Railways to send their suggestion to RDSO who in turn prepare report for maintenance of 200 AC coaches
Status:
Accepted. RDSO should prepare the report on standard facilities for maintenance of AC coaches in consultation with Zonal Railways. The report be submitted by RDSO to Railway Board.

Subject (Item 219): Requirement of ACCA & ACCI.

Recommendation
Review of requirement and creation of the post of ACCA & ACCI should be done on the lines of running staff on six monthly basis. Work may be managed by off loading maintenance work and utilizing such maintenance staff for escorting AC coaches.

Status:
Accepted

Subject (Item 220): Standardisation of ceiling fan for passenger platform/out-door applications.

Recommendation
i) Committee noted that experience of CR and SCR of using ventilators is good and useful where exhaust requirement is high.
ii) RDSO should take up this item to formulate a specification to get good quality of fan for heavy duty (both outdoor & indoor) application.

Status:
Accepted, RDSO has already been advised on 8-4-2000 to check the suitability and feasibility of wind ventilators.

Subject (Item 221): Power supply arrangements for signaling & telecommunication installations at way side station on double line section

Recommendation
i) For S&T installation at way side station, supply from two ATs are to be given by Electrical Deptt. Provision of generator/battery should be done by S&T Deptt themselves.
ii) Electrification of all manned level crossing gates can be done out of road safety fund irrespective of distance. CEEs can decide case by case about electrification of manned gates

Status:
i) For S&T installation at way side station, supply from two ATs are to be given by Electrical Deptt. Provision of generator/battery should be done by S&T Deptt themselves.
ii) Electrification of all manned level crossing gates can be done out of road safety fund irrespective of distance. CEEs can decide case by case about electrification of manned gates.

Subject (Item 222): Provision of 8 Wheeler Tower Wagon in lieu of 4 Wheeler Tower Wagon in Suburban Section.

Recommendation
Issue of type of drive to be used in 8 wheeler tower cars and their locations should be examined by a committee consisting of EDTI/RDSO (convener), CEE/ER and CEE/NR

**Status:**
Issue of type of drive to be used in 8 wheeler tower cars and their locations should be examined by a committee consisting of EDTI/RDSO (convener), CEE/ER and CEE/NR. The issue of diesel hydraulic or diesel electric drive is under consideration in Board.

**Subject (Item 223):** Replacement of Insulators/ Wire ropes/ ATDs

**Recommendation**
Replacement of insulators, ATD, wire rope etc should be done in revenue. Railway to ask for more funds in their revenue budget

**Status:**
The replacement should be planned progressively. So far the insulators are concerned, RDSO may examine introduction of composite insulators on regular basis based on techno economical feasibility.

**Subject (Item 224):** Portal type arrangement for cross track feeders at TSS, SP, SSPs.

**Recommendation**
The detailed design shall be studied and evolved by RDSO. In new construction this arrangement can be adopted on trial basis but there is no need to effect any changes in existing system.

**Status:**
The detailed design shall be studied and evolved by RDSO. In new construction this arrangement can be adopted on trial basis but there is no need to effect any changes in existing system.

**Subject (Item 225):** Capacity of Traction Power Transformers

**Recommendation**
A committee of SAG level officer of electrical department from SR, CR, SER & RDSO should go through the loading pattern, losses etc and submit their recommendations about use of 21.6/12.5 MVA traction transformers.

**Status:**
A committee of SAG level officer of electrical department from SR, CR, SER & RDSO should go through the loading pattern, losses etc and submit their recommendations about use of 21.6/12.5 MVA traction transformers.

**Subject (Item 226):** Yardstick for Gazetted Posts in Electrical Department.

**Recommendation**
Chirmule committee recommendations may be approved by Railway Board and communicated to Railways.

**Status:**
Approved by Rly. Bd.
### 54th ELECTRICAL STANDARDS COMMITTEE
#### MEETING
On 17th & 18th March 2006, at Shimla, NR

**Members Present**

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Subject (Item 227): Speeding up of coaching trains on electrified routes

Recommendation
1. Allowances should be provided at intermediate Divisions/Railways and not only at the end of the journey.
2. The recovery time formula of RDSO should be rechecked and reviewed if required.

Status:
1. This issue is decided by Coaching Dte, however keeping in view the extant policy of Rly. Bd., minimum margin is to be provided for punctuality allowances at intermediate stations and sufficient margin at destination so that the punctuality on end to end basis is maintained.
2. Accepted.

Subject (Item 228): Right powering of freight trains

Recommendation
1. For goods trains 1.5 – 1.6 hp/ton and above should be provided.
2. Railway Board’s directives for augmenting the power of goods trains should be followed i.e. on level track, single WAG7 Locomotive should be deployed instead of WAG5 for running BOX N trains. Multi Unit WAG5 should be provided for operation in gradient section instead of single WAG7. Multi Unit WAG5 with TAO traction motor should be used to run the container trains. Multi WAG7 should be used in iron ore routes of SER and Coal routes in SECR

Status:
1. This is considered necessary for enhancing throughput, reduce failures and also to improve upon journey timings. Multi-disciplinary task force of EDs from Rly. Bd. nominated to make recommendations for achieving “Zero Defect Regime” has also recommended that horse power to trailing load ratio on IR should be increased at least to 1.5 to 1.6 from the existing level of below 1.0.
2.Accepted. Multiple WAG5 for BOX ‘N’ trains should be deployed not only on graded sections but also on saturated as per the guidelines on Right Powering of Freight trains issued vide Rly. Bd.’s letter no. 2005/ Elect(TRS)/440/17 Pt dt 23-12-2005.

Subject (Item 229): Introduction of MEMU for increase in the capacity in saturated sections

Recommendation
i) Sufficient MEMU rakes should be available to replace the Loco hauled passenger trains.
ii) Capacity of manufacture of more MEMUs rakes should be developed either within Railways or out side.
iii) Fuji Traction Motor with Roller Suspension Bearings should be adopted.
iv) Train sets should be developed for Intercity type trains
Status:
(i) a. EDs committee in their final report projected the requirement of 55 units (one unit comprising of 1 MC & 3 TC) of MEMU stock for the next 5 years on additional as well as for the augmentation of existing MEMU rakes. The requirement of 55 units of MEMU stock has already been proposed in the production programme of 2007-08 & 2008-09.

(i) b. A proposal has already been mooted by Electrical Dte that one toilet in each trailer coach of MEMU stock be provided to extend MEMU services beyond 160 km/4 hrs journey time. MT has proposed that the design of MEMU coaches with one modular toilet per trailer coach be developed on an experimental basis and one rake of MEMU with toilets be manufactured. The new design can be tried out and the experience gained would enable to take a practical decision regarding future possibilities. FC has agreed that on an experimental basis we may adopt the design. As desired by CRB, this item will be discussed in full Board’s meeting.

(ii) It is observed from the last 3 years production of RCF that only 12 units are manufactured on the average per year. To meet with the requirement of MEMU stock as recommended by ED’s committee, it is proposed in the production programme of 2007-08 & 2008-09 that production capacity of RCF for MEMU may be enhanced and balance left out quantity of MEMU stock be outsourced.

(iii) 26 nos Fuji design traction motors & 6 modular transformers of higher capacity are being procured by ICF through developmental orders for BG AC EMU motor coaches. RDSO & PUs have been advised with approval of Board (ML) that field trials on AC EMU motor coaches equipped with indigenously developed Fuji design traction motors & modular transformer of higher capacity be conducted on Eastern & Southern regions. After evaluating the performance by RDSO, further decision for adopting the Fuji design traction motor and modular transformer on newly built AC EMU/MEMU stock will be taken. RDSO has already been advised to work out the gear ratio for Fuji design traction motors for MEMU stock (in the combination of 1 MC + 3 TC) with weak fielding for 100 km/h. RCF has also placed developmental orders for Fuji design traction motor & 1550 kVA transformer.

(iv) EDEE/Dev is mooting out proposal for train sets covering New Delhi-Mumbai & New Delhi-Kolkata journey overnight.

Subject (Item 230): Review of concept of AMC and introduction of repair contract on long term basis (General Item).

Recommendation
i) Electronic equipments of Loco and Coaches should be maintained through AMC.
ii) The staff should have knowledge of trouble shooting for which necessary training should be organized in association with OEMs

Status:
1. Not accepted.

Rly. Bd. policy on repair/ rehabilitation under ‘Zero Defect Regime’ issued under item 1 of letter no. 2006/Elect (TRS)/440/10 dt 20-6-06 shall continue to be followed, according
to which regular maintenance/overhauling shall continue in the shed/ workshops. Instead of AMC repair/rehabilitation contract for all major loco equipments may be placed by the sheds on OEMs/approved source for which guidelines are issued from time to time.

However, for TL/AC coaches policy is under finalisation.

2. Accepted.

Training should be a continuous process involving OEMs, with emphasis on ‘on-the-job’ training at work site, periodical quality audit and review of maintenance methods. Rlys. should have a programme for such trainings in consultation with the respective OEMs. Latest computer based interactive modules for maintenance/operation of loco equipments should be got developed for education of shed and operating staff.

Subject (Item231): On-the-job training to staff by OEMs and vendors (General Item).

Recommendation
Manufacturers should provide training to Railways Staff/Supervisors in trouble shooting and maintenance both at manufacturers place and at field. For this purpose the help of Institution may also be taken.

Status:
Accepted.

Training should be a continuous process involving OEMs, with emphasis on ‘on-the-job’ training at work site, periodical quality audit and review of maintenance methods. Rlys. should have a programme for such trainings in consultation with the respective OEMs. Latest computer based interactive modules for maintenance/operation of loco equipments should be got developed for education of shed and operating staff.

Subject (Item 232): Layout of MEMU car shed need of having covered shed in inspection area

Recommendation
The inspection activities are same for motor coach and tailor coach of the MEMU. Covered shed with lighter structure for full length should be provided.

Status:
Partially accepted.

The activities and quantum of work to be carried out in MEMU motor & trailer coach during various inspection schedules are not the same. Lot of additional works are to be carried out during inspection schedules in MEMU motor coach such as checking of pantograph, HV insulators, VCB/ABB & earthing switch on the roof, checking of transformer, traction motors, gear case, switch group & tap changer contactors, main compressor, EP unit, radiator & auxiliary motors mounted in Underslung and flasher light, tail light and pneumatic horns in the leading end motor coach.

There is no need to go in for high bay roof on the inspection by in MEMU sheds, as cost involved is substantial. Low level transparent sheet roofs could be tried on inspection bays in selected work intensive areas i.e. for motor coach stabling points at the inspection bay.
Subject (Item 233): Interchange-ability and integration of microprocessor based control & fault diagnostic system (MBFS), Energy-cum-speed monitoring system (ESMON), event recorder and Vigilance control Device

Recommendation
As far as possible Electrical and Mechanical interchangeability of equipment should be ensured during development of equipment by RDSO.

Status:
Accepted.
RDSO should modify/improve specifications of various loco equipments for ensuring interchangeability at equipment level. Specifications should be framed in such a manner that equipments of different makes are interchangeable without requiring any modification in the locomotive.

Subject (Item 234): Makewise allotment of trial/ development/ items for Zonal Railways on regional basis

Recommendation
Allotment of one make of equipment to be made to keep them in maintenance depot/shed which should be nearer to manufacturer for enabling immediate attention.

Status:
Partially accepted. Shed-wise allotment of locos for conducting trial of particular equipment or a particular make at developmental stage can be arranged. However, once an equipment is developed for regular fitment, it will not be possible further to make shed-wise distribution. Rlys. should be prepared for the regular maintenance of all types of equipments irrespective of make.

Subject (Item 235): Conversion of double coil TAO stators into single potted coil in goods locomotive

Recommendation
i) WAM 4 Locomotives have been provided with single coil design TAO Traction Motor. As WAM4 Locos are getting condemned, the released TAO 659 Traction Motor should be utilized on Goods WAG5A Locomotives.
ii) No further conversion of TAO Traction from Double Coil to Single Coil design should be done

Status:
i) Accepted.
ii) Accepted. However, while undertaking rehabilitation/re-placement of defective coils, stators should be modified from double potted to single potted coil

Subject (Item 236): Procurement policy of carbon brushes for traction application
Recommendation
Block Manufacturers only should be approved for supply of carbon brushes of traction motors to ensure the quality.

Status:
Not approved.
i) Approval of firms for Carbon Brushes should be granted separately
   (a) for manufacturing of ‘Carbon Brush Blocks’ and
   (b) fabrication of ‘Carbon Brushes’.
Those approved sources for carbon brushes, who do not manufacture carbon brush blocks, approval will be with the condition that Carbon Brush fabricators to obtain ‘Carbon Brush Blocks’ from the approved manufacturers after inspection by RITES.
In case of sister concern operating from the same premises having common management, RDSO should insert suitable notes in the vendor director about the fact that the competing firms are sister concern and this fact should be kept in view while dealing with tender cases by Railways/PUs.dealing with tender cases by Railways/PUs.

Subject (Item 237): 8000 hp IGBT based electric locomotives

Recommendation
New Locomotive with 25 ton axle load having horse power 8000 HP or more should be developed. RDSO/CLW should finalize the specification of the same

Status:
RDSO may examine various options including 8-axle twin Bo-Bo type locomotive of rating 10000-12000 HP capable of hauling 6000 t, 25 t axle load on DFC and feeder routes with ruling gradients upto 1:100 and 7200 t, 30 t freight trains on DFC with ruling gradients of 1:200. The locomotive should be suitable for hauling double stack containers at a later stage.

Subject(Item 238): Use of metallised carbon strip on regular basis

Recommendation
i) Metalized Carbon Strips should be used on regular basis.
ii) Trials with pure Carbon Strip is not considered at this stage

Status:
   i)   Accepted.
   ii)  Accepted

Subject(Item 239): Policy regarding number of sources for vital & safety items of rolling stock and other electrical items

Recommendation
i) Number of vendors should be 3 to 5 having total capacity 2-3 times of requirement, similar to engineering Department. Railway Board may issue suitable instructions
ii) Alternate source for EMU electrics and other items which are so far being supplied by single source e.g. BHEL should be developed by RDSO/Pus.

**Status:**

i) Not accepted.

ii) Policy on vendor’s development shall continue to be governed in terms of Rly. Bd.’s letter no. 99/RS(G)/709/1 dt 6-9-99 & 16-9-99>

iii) Accepted

**Subject (Item 240):** Line haul cost of electric traction

**Recommendation**

A committee comprising of CELE/CR, CELE/NR and CELE/SER was nominated, who will study the matter and submit their report within two months to Railway Board.

**Status:**

Accepted (Convenor should be advised to complete the report within two months).

**Subject (Item 241):** Replacement of Merlin Gerin make Interrupters

**Recommendation**

Merlin Gerin make interrupter should be replaced in phased manner so as to maintain reliability of these interrupters at appropriate level overcoming the problem of spares by cannibalizing

**Status:**

Accepted

**Subject (Item 242):** Standardization of SCADA system with provision of Annual Maintenance Contract of 07/10 years

**Recommendation**

Railways should procure SCADA system only from approved sources with standard protocol. RDSO should not have more than 4 to 6 reputed sources. Procuring specification should be framed incorporating 3 years of warranty and thereafter 12 years AMC.

**Status:**

Accepted.

In addition the AMC for existing/new SCADA systems must be entered into with OEMs/sources approved by RDSO. This activity may be completed by 30-9-06.

**Subject (Item 243):** Replacement of Winch type ATDs with 3 pulley type ATDs to improve the reliability of OHE.

**Recommendation**

i) RDSO is finalizing specification for wire ropes as per 1971 specification which should be followed
ii) Performance of Winch type ATD is reportedly inferior as compared to 3 pulley wire rope. Whenever rehabilitation/ replacement of wire rope were done the performance of Winch type ATD have also been found improved. Future replacement of Winch type should be planned on condition/ performance basis.

**Status:**

Accepted.

**Subject (Item 244):** Provision of panto flash over relays for protection of OHE against snapping due to standing power arc on account of bridging of live and dead OHEs at Feeding Post Intermediate Over Lap Section

**Recommendation**

As there is no data to prove the efficacy of the relay, it is recommended to watch the performance for some more time before taking any decision.

**Status:**

Accepted.

**Subject (Item 245):** Replacement of OHE fittings/ components of MCI with forged type/compression type

**Recommendation**

OHE fitting/components should be replaced with forged type OHE fittings after completion of 20 years of life and in Coastal Area, after 15 years of life.

**Status:**

i) Accepted.

ii) The forged type OHE fittings shall be used in all new OHE works being executed by CORE, RVNL etc.

iii) All replacement of MCI fittings should be done with by open line Rlys. only with forged type fittings which are already developed and approved by RDSO.

**Subject (Item 246):** Review of electrical clearance in air for 25 kV, 50 Hz AC traction system for Indian Railway

**Recommendation**

RDSO should advise the recommendation of IIT/Kanpur to Railways. Recommendations suggested by IIT/Kanpur should be considered by CEE while deciding the minimum Electrical clearances on condition/case to case basis so as to ensure that tripping of feeder CB remains satisfactory.
Status:
Board vide letter no. 2000/RE/ 161/Pt. III (ACTM) dt 24-5-06 have issued the revised electrical clearance as given below –
(i) Long duration – 250 mm.
(ii) Short duration – 200 mm.
55th ELECTRICAL STANDARDS COMMITTEE MEETING
On 28th & 29th May 2007 at Nainital, NER

Members Present

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MRVC

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Subject (Item 247): For improving reliability & productivity of electric locos/ EMUs/ MEMUs arranging major repairs/rehabilitation of the major equipments through OEMs/approved sources and fixing eligibility criteria for deciding works contract

Recommendation
The committee felt that taking the assistance of trade for repair/rehabilitation of equipment for improving reliability and productivity of electric locos, EMU/MEMU is necessary. Initially SL, transformer, Traction Motor (both stator and armature including BHRR) and bogie should be selected for getting them repaired from trade.
RDSO should finalise the list of sources taking into account Part I sources as well as sources who have executed the work against works contract awarded by various Railways and their past performance for above equipment and prepare a list of sources to undertake repair/rehabilitation of above equipments.

Decision:
i) Accepted. In addition, tap changers and switch group of EMUs which consumes lot of manpower in work-shops during POH should also be repaired/rehabilitated through sources to be identified by RDSO to ensure reliability and avail-ability and helping UES.
ii) The scope of work should include repairs as well as overhauling during major schedules for which the details should be circulated by RDSO to Zonal Rlys. RDSO should formulate STR for assessing capacity/capability of sources for undertaking overhauling of bogies, traction motors, transformers and smoothing reactors based on which a list of prospective sources should be prepared by RDSO and advised to Zonal Railways. Rlys. may undertake repair/rehabilitation/overhaul of equipment during major overhauling schedules from these sources to the extent adequate facilities are not available in house.

Subject (Item 248): Setting up of Loco Transformer repair workshop

Recommendation
Manufacturers of transformers are over booked by orders for new supply of transformers. They are not interested in repair work. Hence, transformer repair shop within the Railways should be set up

Decision
i) Not approved.
ii) Presently adequate sources are available in industry to undertake repairs/rehabilitation of electric loco trans-formers. There are already nine sources available for this work.

Subject (Item 249): Uniform colour scheme and process of PU painting for electric locos/EMUs

Recommendation
A uniform colour scheme for painting the electric locos and EMUs should be followed by all the Railways. Railway Board to reiterate its instruction on the painting of locos and EMUs

Decision
i) Accepted.
ii) Board vide letter no. 2003/Elect(TRS)/440/4 dt 21-02-07 have already advised Rlys. & CLW/Pus to undertake PU painting during POH as per the procedure issued by RDSO (ELRS/IR/0115 Rev ‘0’, Sept’06) CLW to develop sources for painting and advise to Zonal Railways.

iii) A committee consisting of CELE/WR (Convener), CELE/CR, CELE/ER & CETE/NR is nominated to study and recommend colour schemes for various class of locomotives & EMUs. While doing so, stripes of different colour may be considered for different Railways keeping the basis colour scheme uniform and standardized.

**Subject (Item 250):** Standardisation of system of Zonal Railways for proper accountal of GTKMs earned on electric traction, monitoring of Specific Energy consumption and Line Haul cost for electric traction

**Recommendation**

i) The software developed by SCR may be adopted by other Railways to ensure proper accountal of GTKM.

ii) CELEs of the Railways should work out the requirement of locos considering the double headed operation also

**Decision**

i) A committee comprising of CELE/NCR (Convener), CELE/WCR, CELE/CR and CE:ESER is nominated to study the software and send recommendations to RDSO for taking approval of Board. This should be done before 31-8-07. FOIS software should be got corrected to ensure proper accountal of GTKMs. DEE(RS), Rly. Bd. to arrange.

ii) Accepted.

**Subject (Item 251):** Strategy for handling maintenance management of 1800 additional electric locos being acquired during XIth Plan considering productivity enhancement in existing sheds/workshops and requirement of additional sheds on IR

**Recommendation**

i) The capacity of the existing loco sheds having WAG5 locomotives should be 150 locos and for WAG7 locos it should be 160-180 locos. The new loco sheds should be planned for holding 200 locos.

ii) The location of the shed be decided keeping in view the in feed of the locos to the shed by Traffic Deptt i.e. nearest to the point of materialization of locos.

iii) Railways should work out the requirement and send their proposal for augmentation of existing shed capacity as well as for construction of new sheds keeping in view the fact that in future major equipment including motorized bogie need to be outsourced for major overhauling/rehabilitation and shed should keep only ready to use UES

**Decision**

(i), (ii) & (iii) accepted.
Subject (Item 252): Training needs of maintenance staff to handle new technology of electrical equipment.

Recommendation
i) The training of the staff and supervisors should be made compulsory for promotion. A centralized institute for training of supervisors may be developed at IRIEEN and basic training centre at each loco sheds.
ii) 3-D image modules for loco, EMUs, TRD and general services should be developed for imparting the training

Decision
(i) Accepted.
(ii) Accepted

Subject (Item 253): Introduction of IGBT based fast transit Electrical Multiple Units with stainless steel coaches

Recommendation
The problem of corrosion of coaches will get addressed by producing stainless steel body coaches. It is recommended to use 3-phase IGBT based electrics in AC EMUs having stainless steel body.

Decision
(i) This is not the right time to switch over to AC propulsion system as EMUs/MEMUs elsewhere in India other than Mumbai.
(ii) The RSP is to be retained for procurement of train sets (long distance/intercity Pass. Service like Rajdhani/ Shatabdi)

Subject (Item 254): Periodicity for washing EMU/MEMU rakes

Recommendation
The washing of the EMU/MEMU should be done in 10 days. For this purpose automatic washing/cleaning plant should be installed in the shed/stabling line similar to one available in DMRC

Decision
i) Approved washing of EMUs and MEMUs every ten days or earlier. Zonal Railway will develop adequate washing lines to meet this requirement and will implement it through conventional methods of washing within one year.
ii) Development of DMRC type washing equipment to be undertaken as separate parallel exercise. One such facility should be developed by NR at Maripat car shed.

Subject (Item 255): Alternative source for EMU/MEMU electrics
Recommendation
RDSO should develop second source other than M/s. BHEL for supply of entire electrics. The second source may get some of the items manufactured by their sub-vendors similar to M/s BHEL.

Decision
With the approval of Board (ML), RDSO & RCF have already been advised to develop alternate sources for complete set of electrics for motor coaches of AC EMU & MEMU stock vide Bd.’s letter no. 2002/Elec(G)/ 181/1 dt 15-3-2007.

The complete set of electrics contains variety of items and a single manufacturer for complete set is difficult to be developed. The source has to make a consortium to develop complete set of electrics. This will increase the cost for complete set of electrics. In past some of the items of electrics viz. high capacity transformer (1550 KVA), Fuji design high hp traction motor, gear case, nose suspension, Gear & pinion has been developed by sources other than BHEL.

In view of above, following is recomm-ended for approval:

i) 1000 KVA and high capacity (1550 KVA) transformers, fuji design high hp traction motor, gear case, nose suspension, Gear & pinion should be procured from BHEL and other sources who have already developed or are developing these items. Further source can be developed for better competition in due course.

ii) The development of items of electrics other than those mentioned above should be pursued by dividing electrics into following three groups as suggested by RDSO.
   a) Group 1: Tap changer switch group, motor switch group 1&2
   b) Group 2: Contactors, master controllers, switches & relays.
   c) Group 3: Resistances, HT earth link & insulator, panto operating valve etc.

iii) The agency for pre-paration of drawing/ specification, capacity/ capability assessment and approval of sources for develop-mental/regular orders, placement of develop-mental orders and prototype clearance in respect of electrics of EMU/MEMU coaches shall be as under:

   a) High capacity transformer of 1550 kVA/conventional transformer of 1000 kVA:
      1) Preparation of drg./ specn.:   RDSO.
      2) Capacity/capability assess-ment & approval of sources:   RDSO.
      3) Placement of develop-mental. Order:   RCF
      4) Prototype clearance:   RDSO.

   b) Fuji design traction motor/traction motor 460142:
      1) Preparation of drg./ specn.:   RDSO.
      2) Capacity/capability assess-ment & approval of sources:   RDSO.
      3) Placement of develop-mental Order:   RCF
      4) Prototype clearance:   RDSO.

   c) Gear case:
      1) Preparation of drg./ specn.:   RDSO.
      2) Capacity/capability assess-ment & approval of sources:   RDSO.
      3) Placement of develop-mental Order:   RCF/ZR
      4) Prototype clearance:   RDSO
d) Nose suspension blocks for traction motor:
1) Preparation of drg./ specn.: RDSO.
2) Capacity/capability assessment & approval of sources: RDSO.
3) Placement of developmental Order: RCF/ZRs
4) Prototype clearance:
RDSO

e) Gear & pinion:
1) Preparation of drg./ specn.: RDSO.
2) Capacity/capability assessment & approval of sources: RDSO.
3) Placement of developmental Order: RCF/ZRs
4) Prototype clearance:
RDSO
f) Group-1, Group-2, Group-3 (set of electrics as mentioned in para (ii) above:
1) Preparation of drg./ specn.: RDSO.
2) Capacity/capability assessment & approval of sources: RDSO.
3) Placement of developmental Order: RCF
4) Prototype clearance:
RDSO

While developing alternate sources it shall be ensured by RDSO that the electrics developed by other sources are inter-changeable with BHEL electrics.

iv) The complete set of electrics for conventional AC EMU/MEMU will continue to be procured from M/s BHEL by Rly. Board as free supply item for EMUs/MEMUs being procured from sources other than Pus till development of alternate source for items mentioned above are established.

Subject (Item 256): (i) Standardization of illumination level at platforms, washing lines, pit lines, yards, freight terminals, retiring rooms.
(ii) Revised standard for illuminating pit lines for coaching stock

Recommendation
It was unanimously recommended that RDSO should standardize the level of illumination as well as design of mast, type luminaries to be used in different area of Railway premises keeping in view the energy efficiency and comfort to the passengers

Decision
Policy guidelines on illumination level and type of luminaries to be followed at Railway Station has been issued and shall continue to be governed in terms of Railway Board’s letter no. 2004/Elect(G)/109/1 dt 18-5-07 for balance locations RDSO should standardize the level of illumination.

Subject (Item 257): Electric supply to Private Parties / Govt. Dept. /Public Sector undertaking on Railway land

Recommendation
It is recommended that normal rate of electricity should be charged to the private parties and percentage on license fee should be taken from commercial deptt towards supply of electricity
Decision
Finance view will be taken on this issue. Till then the existing guidelines will continue.

Subject (Item 258): Standardization of solar panels and use of other solar based products viz solar heating system/solar pumps/solar street light.

Recommendation
RDSO should issue the revised specification for LED based lighting with improved material and using maintenance free batteries for use in way side station and LC gates

Decision
i) Policy guidelines for solar based lighting at manned level crossing and way side station shall continue to be governed by Board’s letter no. 2202/Elect(G)/150/9 dt 8-3-07.
ii) Guidelines has also been issued for use of solar energy for water heating system vide letter no. 2006/Elect(G)/150/5 dt 17-5-07.
iii) RDSO should standardize model to be used for solar street light/solar pumps/solar water heating system.

Subject (Item 259): Energy Audit in view of Energy Conservation Act,2001 of energy intensive railway installations nominated by B.E.E

Recommendation
Railways should appoint concerned branch officer as energy manager who will get energy auditing done by auditors. Energy manager will submit the report to BEE

Decision
Energy audit shall be got done through accredited energy auditor as specified by regulation. BEE conducts the Certifica-tion Examination for energy auditors.

Subject (Item 260): Institution based Accreditation of IRIEEN for Energy Audit

Recommendation
It was unanimously decided that IRIEEN should take accreditation for energy audit with its own resources

Decision
IRIEEN must expedite the process for (General Services) getting Institutional based accreditation from BEE by 31-12-07.

Subject (Item 261): Escalator/ Travelators for world class stations.

Recommendation
RDSO will finalise the specification of escalators suitable for AC and non-AC area taking the assistance of experts.
Decision
RDSO will finalise the specification for (Gen services) escalators/ travelator suitable for AC and non-AC area by 20th August'2007.

Subject (Item 262): Neutral section at FP single transformer TSS & TSS in single line section

Recommendation
Provision of neutral section opposite to feeding post should generally be avoided as contained in Board’s letter dt 2-8-1993. However, where the distance of feeding post to sectioning post is more than 25 kms, CEE of the concerned Railway will decide the requirement for providing PTFE type neutral section.

Decision
Accepted

Subject (Item 263):
(i) Implantation of 2.8 metres as per RDSO’s letter no. TI/CTV/FND/05 dt 19.5.05 and Rly. Board’s letter no. 2002/RE/161/11 dtd. 14.11.06.
(ii) Revision in Schedule of Dimensions regarding implantation, track centre and earth formation profile

Recommendation
In a new construction of line the implantation distance of 2.8 m should be implemented as per the latest directives of Railway Board. It is necessary that the distance, between new construction line, of 5.9 m is incorporated in Schedule of Dimensions to ensure the implantation of 2.8 m. Where the track center distance is not adequate on the existing line, during electrification implantation of 2.5 m should be considered and it will also require change in the Schedule of Dimension accordingly.

Decision
RDSO has been advised vide RB’s L No. 2002/RE/161/11 dt 10-8-07 that –
i) The implantation of 2.8 m for main lines will be adopted for electrification of new lines and new gauge conversion works only, where formation is adequate & track center of 5.9 m (min) is available. Where these track centers are not available implantation on main lies will be 2.5m.
ii) Existing main lines implantation of 2.5 m will be adopted, wherever track centers are not 5.9 m.
iii) For all yard lines, implantation of 2.36 m will be followed.
RDSO may take further action to modify the revised SOD (2004).

Subject (Item 264): Revision of ACTM

Recommendation
The ACTM should be revised. The work of revision of ACTM should be given to M/s RITES. RDSO should decide the content of the ACTM regarding new rolling stock, safety rules and
other parameters ensuring that the detailed information not related directly with the rules of various Subject is avoided

**Decision**
i) Accepted.
ii) The inclusion of relevant instructions regarding general services including water supply arrangement in electrified areas may also be considered.

**Subject (Item 265): Universalization of PL nos**

**Recommendation**
CR will send the soft copy of universal PL nos to all the Railways. Railways should implement the universal PL nos as per letter no. 2000/RS(IC)/165/Misc dt 28-9-2005 of Stores Directorate.

**Decision**
Accepted.

**Subject (Item 266): Setting up of Electronic repair and Research cum Training Centre**

**Recommendation**
BSL Workshop should be developed as a centre of excellence for repair of electronic equipment of loco & EMU in phased manner. In Phase I equipment of electric loco may be taken up and in Phase II equipment for EMU & TRD can be taken.

**Decision**
Accepted.

**Subject (Item 267): Reduction in carbon emission by various methods and getting carbon credit for electrical systems**

**Recommendation**
Railway Board will issue necessary instruction regarding ownership of project/equipment. MRVC will apply for carbon credit for WR & CR project and submit the report to the Railway Board within a month.

**Decision**
RB has submitted PIN for three phase loco-motive and three phase EMU for Mumbai area. World Bank Review Committee has approved both PIN in principle. SCR have been assigned to prepare PIN for static converter. RB will assist SCR in this regard.
56th ELECTRICAL STANDARDS COMMITTEE
MEETING
on 31st July & 1st August 2009 at New Delhi, NR & Railway Board

Members Present

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Railway Board

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RDSO

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Special Invitee

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<th>P.C. Sehgal</th>
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Subject (Item 268): Standardization of maintenance schedules and work distribution in electric locos/EMU sheds.

Recommendation

Locos:
(The trip inspection schedule of Hitachi motor fitted freight locos may be increased from 20 to 30 days and booking in logbooks should also be checked regularly. Minor inspection schedule of Hitachi motor fitted freight locos may also be increased to 60 days in place of 45 days at present. Outsourcing work of overhauling of equipment should be done partially and the core expertise should remain with each shed also. Equipment specific decision can be taken. This can be increased gradually based upon the experience gained and implemented in sheds with manpower constraints first.

The first and second heavy repair POH schedules can be done in sheds only if necessary infrastructure existing for the same. Bogie overhauling infrastructure should be developed for these shed All new MEMU/EMU sheds coming up should be planned with facilities/infrastructure for undertaking POH.

Decision:
The proposed periodicity to be tried for six months before consideration for proliferation on all India basis in the following sheds.

- ELS/KZJ & ELS/BNDM for WAG-7 freight locos with Hitachi motors.
- SCRly and SERly to carry out minor schedules on freight locos with Hitachi traction motors in above sheds after every 60 ± 3 days instead of 45 ± 3 days.
- Stickers to be provided on these locos to advise Railways to carry out trip schedule after 30 days instead of 20 days.

(Ref: Board’s letter No. 92/Elect.(TRS)/138/5 Pt.IIdt 08.01.2010)

Accepted.

In the Northern & Southern Railways, the POH of EMU/MEMU coaches are being carried out in the same location where the routine maintenance of EMU/MEMU coaches is being done i.e at Ghaziabad and Avadi/Tambaram. In other Railways, POH of EMU/MEMU coaches is being carried out at their respective workshops. To carry out the 1st & 2nd POH in the sheds, necessary infrastructure facilities need to be created. Electrical directorate is of the opinion that the existing practice to carry out POH which also includes bogie overhauling should be continued from safety point of view. Electrical directorate is in agreement with the recommendations of the committee that new EMU/MEMU car sheds should have the infrastructure facilities for undertaking POH in the sheds.

Subject (Item 269): Shed Layout for New 3-Phase Locos
**Recommendation:**
A committee of three SAG Officers may be nominated by the Railway Board for studying the layout required for 3-phase loco maintenance. Consultancy from outside should also be taken for this purpose. The Committee should suggest the optimum capacity of the sheds for maintenance of 3-phase locos and facilities required to maintain them should also be spelt out. The committee may also suggest augmentation in infrastructure required in existing sheds for maintaining three phase locos.

**Decision:**
RDSO to give recommendations after consulting associated industries. Consultancy for industrial engineering wings of repute may be taken, if necessary.

**Subject (Item 270)**: Lay out and infrastructure facilities for homing 175 locos.

**Recommendation**
Facilities for wheel rediscing/pressing may be proposed while planning augmentation of facilities in existing sheds and for new sheds, this provision should be made mandatory. A committee may be nominated for finalizing the layout and infrastructure facilities for homing 175 conventional locos.

**Decision:**
-Do-

**Subject (Item 271)**: Impetus of training of electrical Officers/supervisors in view of introduction of new generation technologies—action plan including cadre planning.

**Recommendation**
With introduction of high ended technology in Railways, there is need to train the staff to acquire the skill in maintenance, trouble shooting and operation of the equipment. It is, therefore, recommended that scientific identification of training needs, formulation of training modules in consultation with educational institutions and manufacturers be done. There should be system of evaluation of trainees at different step to ensure that he/she has gained from the training.

Training facilities, training methodology should also be upgraded in training schools and interactive session through video conferencing should also be organized.

**Decision:**
Accepted

**Subject (Item 272)**: Strategy for containing traction tariff on IR.

**Recommendation**
Railway may avail power supply from NTPC/other utilities on Rlys own transmission lines and also may explore the possibility to avail traction power at cheaper rate from other sources.
Various pros & cons may be evaluated in terms of reliability, availability, quality and rate of traction tariff while taking this decision

**Decision:**
Accepted.

**Subject (Item 273):** Energy conservation – target and monitoring.

**Recommendation**
Railways shall ensure that energy conservation measures are implemented in time bound manner as decided by Railway Board and feedback given to assess further course of action on the Subject.

**Decision:**
CEEs of Zonal Railways/PUs shall monitor 28 point Action plan for Energy Conservation. The target of reduction in energy consumption (non traction) by 5%.

**Subject (Item 274):** Integrated renewable energy sources for UTS.

**Recommendation**
signaling and emergencylighting loads at stationsHarnessing of solar/wind energy should be pursued as much as possible. Some projects can be sanctioned by respective General Managers. Railway Board shall also provide fund.

**Decision:**
A scheme for use of solar/wind/solar + wind energy for feeding S&T, PRS/UTS and emergency lighting loads for stations of Indian Railway has been finalized jointly by Electrical and S&T departments and issued to the Railways vide RDSO letter no. EL/8.11.16.4 dated 19.05.2009 for implementation. Detailed specification has been circulated to Railways by RDSO. Railways shall progressively adopt this system and all new construction work must comply with this arrangement.

**Subject (Item 275):** Role of IT and action plan for managing electrical assets on IR

**Recommendation**
Role of IT in managing electrical assets cannot be undermined. Comprehensive centralized fault diagnostic system and linking to Railways Headquarters, Division through GSM/Internet etc. be developed for managing all the electrical assets on

**Decision:**
As per XIth Plan document IT enabled tool for Energy Management for Indian Railways need to be developed. Policy guidelines vide Board’s letter NO. 2009/Elect(G)/150/1 dated 15.06.09 has been issued for standardized protocol to be used on IR application for energy metering purpose.

NR must send pilot project in Works Programme. TI/PS&EMU/EM Directorate of RDSO shall finalize the scheme by 30.09.2009.
Subject (Item 276): Yardstick for staff/supervisor for POH of electric locos, EMUs/MEMUs and TL/AC coaches.

Recommendation

Benchmarking should not be taken into account and linked to yardstick and staff should be created as per yardstick. It is recommended that a committee may be formed to look into the fixing norms for staff/supervisor required for POH of electric locos, EMU/MEMU and TL/AC coaches.

Decision:

Boards’ instructions on benchmarking which are explicit to be reiterated. Accepted. Committee comprising of CWM/BSL/CR, CWM/MXX/WR, Dy. CEE/LLH/ER and one finance member nominated. Board to issue order.

Subject (Item 277): Policy on 2x25 kV OHE and revision of norms of electrification.

Recommendation

2x25 kV a.c. system may be adopted on merit of cost and traffic density. RDSO may work out the present cost per TKM considering feeder wire as open conductor and insulated cable separately.

Decision:

The migration plan from 25 kV to 2X25 kV may be rolled out by RDSO & draft circulated to CEEs of NCR, ECR, ER, SER & WR for comments, migration plan to include protection & KVAR compensation also.

Subject (Item 278): Suburban Railway system for Airport link on Linear Motor driven urban transport system for Lucknow & Varanasi

Recommendation

The project of development of MRTS with LIM technology may be carried out as a demonstration project and pursued further.

Decision:

Accepted

Subject (Item 279): Condition monitoring and directed maintenance of OHE.

Recommendation

Condition monitoring and directed maintenance of OHE is to be adopted by the Railways keeping the present circumstances in view and accordingly directed maintenance is to be done. The maintenance tools as mentioned above, may be procured by the Railways as per the norms approved by Railway Board. RDSO shall provide specification of above equipments.
Decision:
WCR to re-propose with greater inputs. To be discussed again with detail on maintenance tools and methodology for directed maintenance

Subject (Item 280) : Consultancy on energy

Recommendation
Railway Board will pursue this matter further for granting tariff and availing power supply through open access.

Decision:
Finance in Board.

Subject (Item 281): Provision of microprocessor based automatic announcement system for EMUs/MEMUs using GPS technology

Recommendation
It is recommended that a standardized GPS based passenger information, display and announcement system is introduced in all EMUs. This may also be considered for provision in those MEMUs which is operated in Metros

Decision:
AC/DC EMUs with Siemens electrics plying in Mumbai area are having the provision of GPS based passenger information display and announcement system. This system can also be adopted in future built EMU/MEMU stock for which RDSO should frame the specification for GPS based Passenger information display and announcement system.

Subject (Item 282): Inspection pit for under fram checking with OHE isolation facilities at out station stabling points for roof inspections with automatic washing plants for EMUs/ MEMUs.

Recommendation
Rly Railways should develop inspection pit and OHE isolation facilities to facilitate examination of EMU/MEMU rakes at outstations on need basis wherever rake link provides return of rake in home sheds beyond 7 days.

Decision:
Accepted

Subject (Item 283): Introduction of Road Rail light vehicle with hydraulic raised platform on mini truck for OHE maintenance/ breakdown

Recommendation
MRVC will provide Road Rail light vehicle one each for CR & WR as per RDSO’s specification

Decision:
Accepted.
Subject (Item 284): Maintenance of private siding.

Recommendation
Being a policy decision, Railways Board may consider the revision of Para 4.3 of the Board’s letter in line with Para 4.2 relating to maintenance cost of Civil Engg. So that maintenance charges of private siding can be realized.

Decision:
Accepted.

Subject (Item 285): Introduction of fuel cell technology on electrical assets including rolling stock.

Recommendation
The committee was of the view that development of fuel cell technology should be pursued as there is a future in this technology and nonrenewable energy resources are getting exhausted. It should be adopted by the Railways.

IRIEEN shall install a fuel cell based plant at Nasik Road as a pilot project

Decision:
IRIEEN to make a presentation in next ESC with detail on fuel source, prospects & end use on rolling stock and stationary installations to level maximum demand etc.

Subject (Item 286): Introduction of battery operated GREEN locos for NG section, for shunting operations in yards and for main line operations

Recommendation
25 kv AC BG cum shunting loco with battery backup would be proposed under RSP for replacement of Kolkata Metro shunting loco. For Narrow Gauge loco, R&D efforts should be continued and foreign funding agencies like World Bank may be approached for its development.

Decision:
Being examined in Board on file. Ministry of Non-conventional & Renewable Energy Sources may be consulted by EEM dte.

Subject (Item 287): Revision of syllabus of AEE LDCE (30%).

Recommendation
A committee of 3 SAG Officers from IRIEEN, RDSO & WR may be nominated with convener as IRIEEN, for examination of the syllabus for 30% LDCE examination as well as 70% examination in electrical engineering.

Decision:
Committee comprising of Sr.EDSE/RDSO (Convener) and Director/IRIEEN is nominated.
Subject (Item 288): Authenticated Operating Manual for AC & TL coaches.

Recommendation
RDSO shall review the existing instructions issued by Zonal Railways on operating instructions on AC, TL coaches. CAMTECH shall assist RDSO in compilation of these instructions and standardization of uniform instruction on operation/troubleshooting of various TL and AC equipment and procedure for emergency feed extension.

Decision:
Accepted

Subject (Item 289): Formation of a corporation under ML for executing works related with Electrical Infrastructure in India and abroad.

Recommendation
A committee comprising of CEE/NR, CAO/ECR. CEE/CORE and Director/ IRIEEN is nominated as members to work out modalities and decide the roadmap for formation of a Corporation under ML.

Decision:
Accepted.
### 57th ELECTRICAL STANDARDS COMMITTEE MEETING

On 3rd & 4th June 2011 at Pune, CR

#### Members Present

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#### Railway Board

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#### RDSO

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#### Special Invitee

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<td>A.K. Bharadwaj</td>
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</table>
Subject (Item 290): Compliance to Energy Conservation Building Code (ECBC)/ GRIHA

Recommendation
IRIEEN shall give the schedule for next course on GRIHA in collaboration with MNRE and SCR. Participation of officers from Civil Engineering and Finance department in such courses shall be ensured. IRICEN shall also be asked to incorporate regular training modules on GRIHA for all Civil Engineers.

Decision
Accepted with the remarks that the extracts of ECBC shall also be disseminated at Railway Staff College, Baroda in the modules of Electrical & Civil Engg.

Subject (Item 291): Development of High Power density battery

Recommendation
Detail technological survey, cost cum comparison of haulage cost with respect to low power density batteries and identification of applications for Li-ion batteries shall be done by RDSO. The general consensus was that high energy density batteries should be developed only for such locations, where there is serious constrains of space/weight.

Decision
This item should be discussed in maintenance study group meeting

Subject (Item 292): Standardization of equipments of Pantry Car

Recommendation
The committee has been sized to three members only with ED/PS&EMU, CEDE/RCF and ED/T&C as members. Based on the Catering Policy of 2010, the committee shall work out the requirements of electrical appliances, power requirement, associated requirements for electrical circuits, such as deploying 30 kW coach alternators suitable size of batteries, voltage level (110 V or 230 V), use of industrial fittings with proper earthing arrangement, possibility to use vertical boilers, type of wirings, connections and protection arrangement, chimney, water purifier etc. both for pantry cars and mini pantries.

Decision
This proposal is under consideration of the committee. Decision will be taken based on outcome of recommendation of committee.

Subject (Item 293): Policy regarding deployment of composite insulators

Recommendation
1. Vandalism prone areas shall be de-linked from procurement policy of composite insulators.
2. Railway Board’s policy of Sept’2007 on procurement “on distinction between porcelain & composite insulators and procurement to be done through open competition on financial condition” shall be withdrawn.
3. Policy on 100% mandatory use of composite insulator for polluted zones. Suburban area of Mumbai, Chennai, Kolkata & New Delhi and in vandalism prone & disturbed area shall be restricted to only polluted areas.

**Decision**
A committee consisting of CEDEs/C&W Rly, CEDE/NCR and Sr.EDTI (Convener) is nominated to submit report within a month.

**Subject (Item 294):** Increased requirement of air – In view of induction of pneumatic suspension, Control discharged toilet (CDTS) and wheel slide protection (WSP) on coaching stock

**Recommendation**
1. Provision of two 1750 lpm compressors with an additional reservoir of 203 liter in WAP4 locomotives and two 1750 lpm compressors in WAP7 locomotives
2. Maintaining the compressors in good fettle.
3. Quality audit of performance of all makes of compressors in terms of discharge rate at various stages of overhauling cycles (i.e. 3 months, 6 months, etc.) shall be carried out.

Railways shall submit data of free air delivery (FAD) of compressor in-situ condition as recommended by RDSO

**Decision**
Accepted

**Subject (Item 295):** Procurement of star rated electrical equipment

**Recommendation**
WR should modify the specifications suitably and take up the matter with COS for ensuring the procurement of star rated materials. The item is to be closed.

**Decision**
Accepted

**Subject (Item 296):** Executing the works involving electrical equipments in coaches.

**Recommendation**
The item shall be closed as it is specific to WR and so WR is asked to take up the issue at appropriate level.

**Decision**
RDSO has issued the electrical scheme for destination Board vide letter no. EL/7.3.6 dated 18.12.2009 under information to Railway Board. As per the scheme the responsibility of the electrical wiring is entrusted to electrical supervisor only.
Subject (Item 297): Maintenance schedule approval to be part of design approval activity

Recommendation
1. Our specification shall have maintenance requirement of Railways and the vendor shall be asked to develop the product accordingly.
2. At the time of design stage, RDSO shall call for maintenance requirement such as frequency of maintenance, spares AOH/IOH/POH kits and manpower requirement etc. analyze and ask for justification of every activity, if found suitable, approve along with the design.

Decision
Accepted.

Subject (Item 298): Policy regarding regular cut-in of new electric loco items

Recommendation
1. A limited quantity (say 10 locos, all based at one loco shed) should be put on trial initially.
2. Regular cut-in only after FRPCPY has stabilized below 10% or less than that of equipment being replaced. FRPCPY based on period of 6 months or more.
3. For safety items, which are to be cut-in in all locomotives at a time without adequate field trials shall be monitored by Railways more closely, their performance feedback to be sent to RDSO quarterly. In turn, after analysing the failure data and interactions with vendors, RDSO will get action plans for reliability improvement, prepared by respective vendors and Railways will have to monitor their effective implementation and performance

Decision
Accepted.

Subject (Item 299): Benchmarking and outsourcing activities for Electric locomotives, General Services & substations of TRD

Recommendation
1. Railways must submit their comments/views on the report of the committee on out sourcing in TRD circulated vide letter no. TI/GEN/ Outsourcing/11 dated 05.05.2011.
2. For locomotives and coaching, sufficient guidelines are existing and Railways may take appropriate view on local issues.

Decision
Accepted.

Subject (Item 300): Review of standard tests for loco & traction transformer

Recommendation
1. RDSO shall collect the data from the railways, transformer type, service type, make wise, no. of repair/rehabs done, age wise, etc.
2. This item is related to maintenance of transformers and shall be transferred to MSG.
Decision
Accepted.

Subject (Item 301): Improving longevity of traction installations including masts, cantilevers & fixed installations

Recommendation
This item is related to maintenance of cantilever and shall be transferred to MSG.

Decision
Accepted.

Subject (Item 302): 33 kV Power line crossings of Railway tracks by cable.

Recommendation
1. ACTM needs to be modified that upto 33 kV, there shall be only underground cable crossings.
2. During preparation of abstract estimate, due care shall be taken by open lines for underground cable crossings upto 33 kV in all new RE works.

Decision
Accepted. To include doubling, gauge conversion work as well beside RE work.

Subject (Item 303): Review of cab equipments and combining of display for crew in Electric loco cab

Recommendation
This item is related to standardization and integration of various new equipments in locomotives and shall be transferred to MSG.

Decision
Accepted.

Subject (Item 304): Provision of Bulk Inverter- 110 V DC/110V AC, 1 KVA capacity in lieu of 18/16 Nos. of 100 VA cell phones/ Laptop charger in TL and AC Coaches.

Recommendation
This item is related to adoption of bulk charger vis-à-vis individual chargers and shall be transferred to MSG.

Decision
Cost of 2.5 kVA bulk inverter is about Rs. 54000/- therefore as such no cost advantage is expected. Further in case of failure of bulk inverter the charging supply of complete coach will be affected which will not be there in case of individual 100 VA inverter. This problem has also been experienced in AC fans provided with bulk inverters in TL coaches. Not Recommended.
Subject (Item 305): Review of illumination level at Railway Stations/Adjoining Area

Recommendation
RDSO to review the illumination level for various types of model and non-model stations, in consultation with railways. In giving their suggestions/feedback to RDSO, railways should take care so that reduction in illumination do not result in public complaints at a later date.

Decision
Accepted.

Subject (Item 306): Redundancy in 180 KVA static inverter of Electric Locomotive

Recommendation
1. Railways need to monitor implementation of various stages of action plan more carefully and regular feedback shall send to RDSO.
2. No redundancy is required.
3. Reliability of locomotives fitted with SIV and ARNO should be compared in terms of auxiliary failure, also.

Decision
Accepted.

Subject (Item 307): Standardization of IGBT locomotive module:

Recommendation
1. Free hand shall be given to vendors to offer the best technology available worldwide without restricting them to design the product for a particular hardware or software.
2. Complete system shall be on open platform so that interchangeably at equipment level can be possible.
3. There shall be limitations on number of players, say 2 or 3 to avoid multiplicity, depending upon volume of business.
4. While framing the specifications, experience gained shall be incorporated by RDSO and CLW.. In the specification, repair of critical electronics cards/modules and up-gradation with time to avoid obsolescence shall be incorporated so that long term contract for repair and up-gradation can be entered with OEM while deciding the supply contract itself.

Decision
Policy of IGBT as approved by Board (ML) vide letter No. 2003/Elect(Dev)/440/18/17 dated 05.09.2011 should be adopted.

Subject (Item 308): “Schedule of Rates” for Electrical General Services items

Recommendation
1. There is need for SOR in preparation of estimates and faster finalization of tenders.
2. Model of CPWD can be adopted.
3. Rates shall be workable and realistic and will be decided by Zonal Railways.
4. There is no need to engage RITES for preparation of SOR.

Decision
Accepted.

Subject (Item 309): New Design Panel for SGAC Coaches & use of micro processor

Recommendation
This item is related to standardization the design of panels for SGAC coaches and shall be transferred to MSG

Decision
Accepted.

Subject (Item 310): Switch Board Cabinet for Power Car DG set

Recommendation
This item is related to redesign of panels for power for power cars and shall be transferred to MSG.

Decision
Accepted.

Subject (Item 311): Midterm rehabilitation of EMU coaches

Recommendation
MTR of EMU & MEMU is essential for the reliability of EMU/MEMU and technology upgradation.
A committee of three officers comprising of ED/PS & EMU, HODs of ER and CR responsible for identification of items for MTR may be nominated. The terms and reference of the committee shall be scope of the work, cost of each items to be replaced in 1st, 2nd & 3rd POH and MTR and periodicity of MTR.

Decision
Accepted.
The committee comprising of ED (PS&EMU)/RDSO (Convenor), CETE/ER and CEE(RS)CR is nominated with the following term of reference:
(i) Scope of the work during MTR.
(ii) Time taken for MTR
(iii) Cost of MTR
(iv) Age profile of coaches to be taken under MTR
(v) Workshops for MTR to be identified.
(vi) The list of new equipments to be provided on codal life basis and further utilization of released equipments.
(vii) Contents of additional works to be done during MTR such as corrosion repair, re-cabling etc. excluding normal POH activity.
(viii) Any possibility of increasing codal life by doing MTR.
(ix) Any other suggestion committee feel will improve the reliability of the EMU/MEMU coaches with reduction in maintenance cost.

**Subject (Item 312):** Indication to driver for defective air spring of coaches

**Recommendation**
This item is related to maintenance of air springs and shall be transferred to MSG.

**Decision**
Accepted.

**Subject (Item 313):** Development of Centralized Repair/ Rehabilitation Centre for Electronics Cards

**Recommendation**
1. Few good sources having requisite facilities and know-how other than OEM should be developed.
2. No more such repair centre shall be established
3. CLW should expedite the setting up of the centre
4. All the core-groups of the sheds shall be trained for identification of defective cards, their replacement, handling and testing

**Decision**
Accepted.

**Subject (Item 314):** Track Crossing Regulations- Inclusion in Schedule of Dimensions

**Recommendation**
SOD needs to be amended to empower CEE for giving any relaxation/condone any deviation in SOD on track crossing regulations.

**Decision**
The modifications made in ACTM from time to time have to be incorporated in SOD. The concerned electrical directorate of RDSO has to liaise with the track directorate in RDSO, for getting these changes incorporated in the SOD. TI directorate of RDSO, in the present case, has to take up the matter suitably with Track directorate of RDSO. Reference in this connection has already been made by EDCE(G), Railway Board to RDSO.
Subject (Item 315): Combined seniority of OHE and PSI non-gazetted cadre

Recommendation
This item is related to maintenance of assets of TRD and shall be transferred to MSG

Decision
Accepted.
### 58th ELECTRICAL STANDARDS COMMITTEE MEETING

on 28th & 29th Sep’2012, at Jaipur, NWR

#### Members Present

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**RDSO**

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**Railway Board**

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Compendium of ESC 1935-2014
Subject (Item 316): Evolving “Code for Electrical Engg. Department”.

Recommendation
- The committee expressed an urgent need for early formulation of code for Electrical Engineering Department” Railway Boa may engage M/s RITES, as the consultant for drafting & framing of code.
- Code formulation cell shall be constituted at the earliest.
Expert committee shall be constituted for reviewing various provisions already in vogue and to modify them to suit present day need.

Decision:
The steering committee consisting of following officers has already been nominated.
- Sr.EDTI, RDSO, Lucknow (Convener)
- Sr.EDSE, RDSO, Lucknow
- ED(PS&EMU), RDSO Lucknow
- ED (EEM) RDSO, Lucknow.
- Representative of Central Electricity Authority (CEA).
- Representative from Bureau of energy Efficiency (BEE).
Finance Dte. Of Railway Board suggested that RDSO may be made nodal Dte. For evolving the Electrical code. RDSO may engage the consultant for those areas where the expertise within railway is not available. Any special arrangement if required for this purpose will be considered by Board.
Accordingly, the above nominated steering committee under the convener ship of Sr. EDTI, RDSO should start the work of evolving the electrical code immediately

Subject (Item 317): Framework for optimizing wheeling charges from IR’s captive power plants.

Recommendation:
- The committee constituted by Railway Board, vide letter no 2010/Elect(G)/150/1pt.) dt 25.05.2012, shall deliberate and submit the detailed plan to economies on wheeling of power from power plants located at Nabinagar, Adra & Thakurli Mumbai.
- Ways & means to be explored to avail the electricity at cheaper rates through power Exchanges.
Zonal Railways shall furnish all the details to RDSO by 15.10.2012 as asked vide letter no. TI/PSI/TRMETR/12 dt.15.03.2012 & 23.04.2012.

Decision:
Accepted. RDSO to submit the report by 31.12.12.

Subject (Item 318): Increasing the capacity of RMPUs from 7.5 TR to 10 TR especially in ACCW & ACCN coaches
**Recommendation:**
- Cut in of kW permanent magnet (PM) alternator in all LHB SGAC coaches may be implemented after successful field trials.
- Development of 30 KVA/ 32.5 KVS inverter with soft start feature may be taken up by RDSO.
- Possibility of controlling the coach temperature through variable frequency control may also be explored.

10 TR capacity RMPU can be provided in EOG LHB coaches for gaining experience and evaluation of performance/benefits.

**Decision:**
Accepted. 10 TR capacity RMPU already developed for Kolkata metro coaches be tried out with changes in physical dimension and controls to suit mainline coaches.

**Subject (Item 319):** Provision of additional alternator with battery preferably PM (permanent Magnet) in TL coaches.

**Recommendation:**
As the electrical load is increasing gradually in non-AC coaches, there is a requirement of additional alternator. Since, the existing 4.5 Alternator is already proven, therefore, 2x4.5 kW system in each SG non-AC coach is recommended. Simultaneously, develop 6 kW permanent magnet alternator can be pursued as a futuristic project. After successful development of 6 kW permanent magnet alternator the same can be cut in as the same will result in reduction of weight, energy saving and will have adequate reserve in case of emergency feed extension.

**Decision:**
RDSO should develop 6 kW alternator scheme for TL coaches.

**Subject (Item 320):** Strategy for additional sanction of (4000Rkm) of new electrification works in each financial year.

**Recommendation:**
Feeder routes to Eastern DFC & Western DFC may be taken up for electrification immediately if not planned earlier.

The survey for electrification of all the routes mentioned in Hon’ble minister for Railway’s Budget speech (Circular vide Railway Board’s letter No. 2008/RE/161/8 Voi-II,FTS-15731 dt. 13.04.2012) may be completed at the earliest and proposal may be sent to include in the works program me for the year 2013-14.

**Decision:**
Zonal railways to initiate electrification proposals of following nine electrified DFC feeder routes:
Non-electrified Eastern DFC Feeder routes:

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Non-Electrified Western DFC Feeder routes:

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<td>Viramgram-samakhiali</td>
<td>182</td>
<td>WR</td>
</tr>
<tr>
<td>Hazira-Surat</td>
<td>40</td>
<td>WR</td>
</tr>
<tr>
<td>Ludhiana-Hisar</td>
<td>210</td>
<td>NR</td>
</tr>
<tr>
<td>Panvel-Pen-Roha</td>
<td>75</td>
<td>CR</td>
</tr>
</tbody>
</table>

Zonal Railways to initiate electrification proposals of following nin electrified DFC feeder routes:

Non-electrified Eastern DFC Feeder routes:

<table>
<thead>
<tr>
<th>Section</th>
<th>RKM</th>
<th>Railway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zafrabad-Tanda</td>
<td>99</td>
<td>NR</td>
</tr>
<tr>
<td>Beas-Govindwal Sahib</td>
<td>27</td>
<td>NR</td>
</tr>
<tr>
<td>Rajpura-Dhuri</td>
<td>155</td>
<td>NR</td>
</tr>
<tr>
<td>Hisar-Bhatinda-Suratgarh</td>
<td>18</td>
<td>NR&amp; NWR</td>
</tr>
<tr>
<td>Suratgarh-Biradhwal</td>
<td>18</td>
<td>NWR</td>
</tr>
</tbody>
</table>

Non-Electrified Western DFC Feeder routes:

<table>
<thead>
<tr>
<th>Section</th>
<th>RKM</th>
<th>Railway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipavav- surendranagar-virngam-mehsana</td>
<td>395</td>
<td>WR</td>
</tr>
<tr>
<td>Kandla port-Gandhidham</td>
<td>312</td>
<td>WR</td>
</tr>
<tr>
<td>Mundra port Gandhidham</td>
<td>66</td>
<td>WR</td>
</tr>
<tr>
<td>Viramgram-samakhiali</td>
<td>182</td>
<td>WR</td>
</tr>
<tr>
<td>Hazira-Surat</td>
<td>40</td>
<td>WR</td>
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<tr>
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<td>210</td>
<td>NR</td>
</tr>
<tr>
<td>Panvel-Pen-Roha</td>
<td>75</td>
<td>CR</td>
</tr>
</tbody>
</table>

Zonal Railways to initiate electrification proposals as per Hon’ble MR’s budget speech of 2012-13
Subject (Item 321): Strategy for increasing the pace of electrification to (2000 Rkms) per year including CRS sanctions.

Recommendation:
(i) An urgent need was expressed for modern “Wiring Train” which lays catenary & contact wire simultaneously.
(ii) Use of Gas insulated switchgear (GIS) for Traction substation having restricted space may also be planned.
(iii) Pole mounted switchgear posts is also the correct choice for reduction of time of railway Electrification activities.

Decision:
Item (i) approved. RDSO needs to finalize the specifications of wiring train at the earliest. Regarding item (ii) & (iii) help of DMRC may be taken, whenever such item are needed.

Subject (Item 322): Increasing the alternator capacity to 30KW in SG AC Coaches.

Recommendation:
Immediate cut in for 30 kW permanent magnet alternators in all SGAC LHB Coaches

Development of 30 kVA inverters with soft start features, possibility to control temperature through regulating the speed of compressors shall be explored. No 10 TR RMPUUs shall be provided in SGAC LHB coaches. 10 TR RMPU can be provided in EOG Coaches for gaining experience and proving its performance.

Once these developments are through, combination of 30 kW permanent magnet alternators with 30 kVA and four numbers of 10 TR RMPUs.

Decision:
Noted

Subject (Item 323): Up-gradation & cadre restructuring in Electrical Department.

Recommendation:
Railways can send their comments to Railway Board.

Decision:
Accepted

Subject (Item 324): Mechanized maintenance to optimize power block working of TRD network.

Recommendation:
Procurement of an intelligent 8 wheeler Tower car for each Electrified Zonal Railway is utmost & urgent need for directive maintenance of OHE.

“Upgrading the ‘OLIVER-Equipment Deployment of high speed high resolution Thermal imaging Camera one to each Division, Laser based Height stagger measurement device etc. at each maintenance depot; use of Forged Fittings/ Components are to be adopted immediately.

Decision:
Recommendation are modified as under:
(i) Specification for intelligent 8 wheeler Tower car is under approval.
(ii) Use of mechanized tooling including electrical & pneumatic portable tools like power wrenches, modern tools replacing manual tools/ turfers etc. required for day to day maintenance activities as per the practice in other countries/railways/IRCON (in offshore projects) shall be finalized by RDSO in consolation with CORE/RITES/IRCON/RVNL etc.
(iii) RDSO shall review the present position regarding use of Forged fittings/ components in place of MCI fittings/ components and a comprehensive report/ recommendation with adequate sources shall be put for approval of railway board.

Regarding other suggestion like upgrading the ‘OLIVER-G’ Equipment Deployment of high speed high resolution Thermal imaging camera at each Division laser based height stagger measurement Device etc., RDSO shall issue detailed guidelines in consultation with zonal Railway for use & effective measurement along with up gradation/ development of related specifications as railways feedback of their effectiveness & past trials were not very encouraging & needs improvement/modification. Field trails with these instructions should be conducted one per each zonal railway

Subject (Item 325): Homing capacity of 200 electric locomotives and benchmarking of staff.

Recommendation:
The committee agreed on including following aspects in the terms and reference of existing RB’s committee.
- To decide the number of each type of locomotives a shed can home.
- Preparation of a model document for out sourcing of various equipment of locomotives.
- To give recommendations on how to enlarge the base of capable contractors, as no splitting is allowed in works contract. The ESC felt that in order to enlarge vendor base the concept of developmental order in lines with stores tenders at CLW shall be incorporated. Further, fall back arrangement should be made in case of failures of the contract.
- To include items like motorized bogie, air conditions of cabs, etc. in the list of proposed out sourcing.

Decision:
The report submitted by SAG level committee (Convener RDSO) is accepted by board.
Subject (Item 326): Creation of Card Repair Facilities at Electric Loco Sheds Homing three phase locos.

Recommendation:
RDSO and CLW shall finalise the specifications of Functional Test Jigs in two months time after considering the feedback of working of test jigs at GMO, AQ and BSL and establishing their performance.

Decision:
Accepted

Subject (Item 327): Creation of tower wagon POH facilities.

Recommendation:
It has to be planned to take up POH activity at the existing workshop of Indian railways for maintaining the 8 wheeler Tower cars of various zonal railways. The distribution is as follows:

<table>
<thead>
<tr>
<th>Workshop</th>
<th>Zonal railways (covered)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kachrapara</td>
<td>ECR,ECO,R,ER,NF,SER,</td>
</tr>
<tr>
<td>Dahod</td>
<td>WR,WCR</td>
</tr>
<tr>
<td>Bhusaval</td>
<td>CR,SECR,WCR</td>
</tr>
<tr>
<td>Mahalaxmi (for 4w heeler only)</td>
<td>Mumbai CST Division of CR &amp; Mumbai Central division of WR.</td>
</tr>
<tr>
<td>Avadi</td>
<td>SCR,SR,SWR</td>
</tr>
<tr>
<td>Gaziabad Emu car shed.</td>
<td>NCR,NER,NR</td>
</tr>
</tbody>
</table>

POH (for 8 wheeler Tower Cars) related works may be planned through works program me.

Decision:
Accepted.
Zonal railways shall coordinate with nominated workshop & forward the details of different Tower cars (POH overdue dates, type of transmission system/Alternators/Generators etc.) to plan for centralized AMC of critical systems/ stocking and to create the required facilities for the above process.

Subject (Item 328): Development of SOR for electrical works.

Recommendation:
- SOR has to be railways specific and is required to be vetted by respective finance.
- Railways will prepare their SORs and send copy to IRIEEN for compilation and preparation of general guidelines.
  Railways will spare SAG officers engaged in SOR documentation project for IRIEEN and prepare a comprehensive document of SOR, which will be sent to RB for approval.

Decision:
SR who has already prepared the SOR documents should circulate to other zonal railways for reference purpose. Zonal railways shall prepare SOR document within next three months and
send to IRIEEN for compilation. IRIEEN should develop & compile unified comprehensive SOR clearly defining scope of work units, indicative units rate etc. on the similar lines of engineering SOR & COWD guidelines and shall be submitted to Railway Board by 31st March 2013. This comprehensive SOR shall be used by all zonal railways to ensure unification of schedule of items to the extent possible. The effect of local factors of SOR shall be ensured augmentation of capacity of 13.5 MVA traction transformers options available and their use in new RE works. ed by incorporating suitable guidelines and practices of EnggDeptt.

Subject (Item 329): Development of SOR for electrical works.

Recommendation:
(i) RDSO shall furnish the details of schedule of works, STR and list of probable vendors to all the zonal railways and CORE.  
The zonal railway shall plan the up-gradation on need cum condition basis

Decision:
Board to issue directives to zonal rlys

Subject (Item 330): Revision of ACTM

Recommendation:
- The present version of AC Traction manual is two decade old. ACTM to be immediately upgraded to reflect the changes.
- ACTM has to be designed on modern lines with proper cross referencing and graphics.
- ACTM should draw from the experience of Railways world over.

A suitable consultant to be engaged immediately

Decision:
The steering committee consisting of following officers has already been nominated:
- Sr. EDTI, RDSO (Convener)
- Director IRIEEN
- CEDE/NCR
- CEDE/SR

Finance Dte. Of Railway Board suggested that RDSO in consultation with IRIEEN may be made nodal Dte. For revision of ACTM. RDSO may engage the consultant for new technologies areas where in house technology expertise is not available. Any special arrangement for this purpose will be considered by Board. Accordingly the above nominated steering committee under the convener ship of Sr. EDTI, RDSO should start the work of revising ACTM, the Treatise of Electrical Traction Distribution prepared by IRIEEN shall also be considered. The first draft of the revised ACTM should be submitted to Railway board by May 2013.

Subject (Item 331): Mini pantry and touch screens for control in AC coach.

Recommendation:
- RCF has to turnout SG AC pantry car. RCF has also to develop touch screen monitoring and control system for EOG shatabdi coaches provide in one coach on trial basis.
Decision:
- RCF shall turn out one EOG shatabdi rake with mini pantry having touch screen control on the pattern of air craft.
- RCF has to turnout SG AC pantry car.

Subject (Item 332): Standardization of 3 phase electrics for future EMUs, MEMUs & Metro trains.

Recommendation:
- Need for standardisation and not allowing too many variants is crucial to IR.
- Possibility of standardisation as far as possible should be pursued.

Decision:
Accepted

Subject (Item 333): Issue of competency certificate to points men for operation of isolators during emergency

Recommendation:
- It was agreed to legislate the inclusion of points man/porters, of the operating Department to operate the isolators by imparting requisite training and issue of competency certificate. Necessary correction slip to the relevant rules/manuals may be issued.

Decision:
Guidelines in this regard are being issued in consultation with traffic department.

Subject (Item 334): Provision of PTFE neutral section at Feeding post.

Recommendation:
PTFE Neutral section shall be provided in front of feeding post (at the Feeding overlap). It shall be made mandatory.

Decision:
Accepted.

Subject (Item 335): Surcharge for power supply Harmonics.

Recommendation:
- The matter may be taken up with central electricity Authority, New Delhi. State Regulatory commissions & with central power research institute, Bangalore.
- However to follow the National Law, efforts may also be made to filter the Harmonics either at the locomotive end or at the Traction Sub-station end or at both ends.
- Harmonic mitigation Equipment may be installed one each in ECR, NR, SECR,&SR to judge the efficacy.
RDSO may study provide the technical support and suggest the actions/ specifications.

Decision:
- To address the issue of voltage and current harmonics beyond the prescribed limit on traction system, IR has nominated a committee consisting of Sr. EDTI/RDSO (convener), Sr. EDSE/RDSO,CELE/NR,CEDE/NCR, Based on RDSO’s report CEA has placed relevant instruction on web regarding matter of harmonics, based on which stay by SERC in northern railway case on harmonic issue was granted.
- The matter shall be taken up with respective Authorities/Commissions by RDSO/Zonal Railways.
- Harmonic mitigation equipment only for suppression of 3rd harmonies shall be tried at one or two locations first.
RDSO should develop the specification for this item as per Railway Board’s letter no 2008/RE/170/1dt 07.12.12.

Subject (Item 336): Provision of second feeder and transformer as part of electrification

Recommendation:
It is proposed to have three phase Double circuit Transmission line ex Grid sub-station to Railway’s traction sub- station at the beginning of railway electrification project.

Decision:
Railways board vide their letter no 2012/RE/240/2(FTS-50757), dated 21.08.12 had collected data from all over Indian Railways regarding failures of GSS single circuit transmission line vis-à-vis double circuit transmission line. As per this data it is seen that even in case of double circuit transmission line the feeding GSS is the same. It is noticed that maximum number of failures (to the extent of 74.4%) on all zonal railways combined have taken place because of outage in GSS and not because of failure of transmission line. It is also seen that double circuit transmission lines have contributed to 15.5% of the total failures combined of (GSS, single circuit transmission lines). The corresponding figure for single circuit transmission lines is 10.2%. the data given below for all zonal railways combined enclosed as Annexure “A”

Hence in new RE projects the existing practice of providing single circuit transmission line on towers fit

Subject (Item 337): Provision of second feeder and transformer as part of electrification

Recommendation:
- With the advancement in track technology, now the rail cannot be assumed to be at natural ground potential. Hence, there is need to provide connection between the traction rail to mother Earth at each switching post.
- Further RDSO may revise the “Earthling & Bonding code at the earliest.
- RDSO may study the method of connecting Earthling system with running rail & suggest a better interface (Fasteners).
Decision:
Accepted.

RDSO to revise the earthling & bonding code by December 2012.

Subject (Item 338): Adoption of upgraded protection scheme.

Recommendation:
(i) The present protection scheme of 1960 vintage needs upgradation in view of higher traction transformer capacity & higher trailing load being hauled.
(ii) It is the utmost need to adopt ‘Multizone protection scheme’ in high density route as recommended in RDSO report No. TI/Report/00076(05/2008) and as is being used in most of the developed electrified Railway abroad.

Decision:
While adopting upgraded protection scheme, Board’s office letter No. 2006/RE/161/4/Vol.VI/FTS-30831 dated 17.07.12 may be referred to which was issued with the approval of board (ML) the relevant paragraph is again reproduced below:

“Exiting relay panels and relay panels being provided during railway Electrification at present against old sanctioned works need not be replaced and should be allowed to complete their codal life in view of RDSO’s letter No TI/PSI/PROTCT/STATIC/11 dated 12th /16th January 2012.

Subject (Item 339): (a) Use of 150 sq.mm Silver bearing HDGC Contact Wire on 25 kV AC Traction over ‘A’ & ‘B’ Routes of Indian Railways.
(b) Use of 125 sq. mm Copper-Tin/Copper Magnesium Wire with current carrying Copper Droppers on 25 kV AC Traction over ‘A’ & ‘B’ Routes of Indian Railways.
(c) Use of Copper-Tin/Copper Magnesium Catenary wire in place of Stranded Copper/Cadmium Copper Catenary Wire for 65, 125, 242 & 323 mm² sizes.

Recommendation:
- With the continuous increase in trailing loads and increase of frequency of Mail/Express/Freight train, It is recommended to use 150 sq.mm Silver bearing Contact Wire over high density route progressively whenever the existing Contact Wire (107Sq.mm) is due for replacement on any account.
- Current carrying Droppers may also be used for proper distribution of current in OHE.
- Copper-Magnesium Catenary Wire may be developed for use in place of Cadmium Catenary Wire as Cadmium is not environment friendly. It has already been banned in foreign countries.
- The existing Cadmium-Copper Catenary Wire to be replaced by Magnesium-Copper Catenary Wire, whenever and wherever the need arises.
**Decision:**
Accepted

**Subject (Item 340):** Policy on 2x25 kV systems.

**Recommendation:**
- Increase in train load and increase in frequency of trains was catered by enhancing the transformer capacity from 7.5MVA to 30/42MVA and reducing the spacing of Traction sub-station to 25 km.
- It is imperative now to switch over to 2x25kV AT system in high density Route which can support higher Traction power delivery with longer spacing of Traction sub-station.
- RDSO may evolve strategy so that least power block is required in migrating to 2x25 kV AT system from the conventional 25 kV system.
  RDSO may prepare a sample techno-commercial proposal and send to all zonal railways for their guidance & formulation of works program me, on need basis.

**Decision:**
Railway board has already advised RDSO vide board’s letter no. 2012/Elect(G)/148/5 dt 07.11.2 to evolve suitable schemes for such conversion and send a detailed proposal including its financial implication to railway board for consideration. While formulating the scheme experience of IR on existing electrified track at 2x25 KV system between bina-katni section maintenance aspects use of existing single phase transformers in scott connection etc., shall be kept in view. The scheme evolved by RDSO should also specify threshold level of traffic density and also interspacing between traction substations.

RDSO to submit the detailed scheme by Jan 2013.

**Subject (Item 341):** Traction information system (TIS) & Traction Distribution Management System (TDMS).

**Recommendation:**
- Indian Railways is one of the largest institutional Electricity consumers along with serious stake in transmission and generation thereby.
- Indian Railways would have to explore options in Energy trading or contracts for procurement of Electrical energy to take benefits of free access regime.
- There is an urgent need of an on- line traction Energy information systems (TIS) which will permit Railways to negotiate better rates and regime of energy procurement.
- The traction distribution management system (TDMS) will fully automate the Traction distribution management functions of the Indian Railways with advanced business intelligence and analytical capabilities with improved experience.
- It was opined that TDMS will eliminate the hassle or confusion of data integrity and consolidate from zonal to the central infrastructure and vice- versa.
  It is immediately required for all the OHE/PSI/RC maintenance Depots and at field level.
**Decision:**

Accepted.

As already decided MRVC will fund the pilot project for CR & WR under the supervision of RDSO for execution through CRIS. Board is further proposing sanction of TDMS system through C&IS dtd. Of railway Board during works programme 2013-14

**Subject (Item 342):** Development of 1300 mm creepage distance (CD) insulators in place of 1050 mm creepage distance.

**Recommendation:**

- It was opined that increase in Creepage Distance (CD) is required to counter the increase in pollution levels from lower severity to higher severity.
- Due to increase in traffic density, frequent cleaning of insulator is not feasible.
- It is recommended to use higher Creepage Distance Insulators (1300mm) (Porcelain & Composite) as a regular measure.
- Post development and stabilisation of 1300mm CD Insulator, no new procurement of 1050 mm CD Porcelain insulator to be done.

**Decision:**

Due to increased pollution level, it was decided to use Insulators with creepage distance (CD) of 1050 mm from 2006 onwards in place of earlier insulators with CD of 800 mm. Thus the insulators being used after 2006 either during replacement or new constructions are only with 1050 mm CD. On pan India scenario, the pollution of 800 mm CD is about 90% and not much failure have been reported by the Zonal Railway in insulators on account of flashing due to less CD.

To address the issue of pollution, instructions have already been issued by Railway Board to use 1050 mm CD composite insulators and trials are also on for development of 1600 mm composite insulators in highly polluted areas. To address the tracking issues due to pollution/foggy conditions, RDSO may suitably improve the profile of the petticoat of 1050 mm porcelain insulators along with the strict enforcement of quality control at manufacturing stage.

As regard development of 1300 mm CD porcelain insulator, various issues related to higher weights, handling issues during maintenance and replacement, effect of higher weights on cantilever movement, cost effectiveness of these insulators etc. are to be addressed before undertaking developmental activities by RDSO.

**Subject (Item 343):** Arranging/co-ordinating traffic blocks, diesel locomotives for RE works by Sr.DEE/TRD or Sr. DEE/G.

**Recommendation:**

- It is recommended that better Co-ordination with Division can be there if SrDEE(TrD) (in already electrified Division is being taken up) or SrDEE(G) (in the newly electrified Division) are made responsible.
• In addition a work charged post of Traffic Controller may be created at the Division who would co-ordinate with the open line for day to day traffic/Power Block management.

**Decision:**
Noted

**Subject (Item 344):** To give power to RVNL’S employees for taking traffic, power blocks for RE works being done by RVNL.

**Recommendation:**
It is recommended that the Authority for taking Traffic/ power block can be given to RVNL employee, having the minimum technical eligibility as is applicable for the employees of Indian Railways.

**Decision:**
Railway serving employees on deputation to RVNL with technical competency duly certified by Sr. DEE/TRD concerned would be entitled after following laid down procedures.
59th ELECTRICAL STANDARDS COMMITTEE MEETING
On 6th & 7th March 2014 at Goa, KRCL

Members Present

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name/Shri</th>
<th>Designation</th>
<th>Railway</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ambika Prasad</td>
<td>CEE</td>
<td>ER</td>
</tr>
<tr>
<td>2.</td>
<td>Sunil Goyal</td>
<td>CEE</td>
<td>WR</td>
</tr>
<tr>
<td>3.</td>
<td>B.P Verma</td>
<td>CEE</td>
<td>NFR</td>
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<tr>
<td>4.</td>
<td>Narottam Das</td>
<td>CEE</td>
<td>RCF</td>
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<tr>
<td>5.</td>
<td>J.S.P. Singh</td>
<td>CEE</td>
<td>SR</td>
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<tr>
<td>6.</td>
<td>G.R. Agarwal</td>
<td>CEE</td>
<td>SCR</td>
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<td>7.</td>
<td>M. Meshram</td>
<td>CEE</td>
<td>SECR</td>
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<td>8.</td>
<td>Yogesh Asthana</td>
<td>CEE</td>
<td>DLW</td>
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<td>10.</td>
<td>V.K. Aggarwal</td>
<td>CEE</td>
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<td>11.</td>
<td>M.K. Mathur</td>
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<td>S.K. Patel</td>
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<td>V.V. Kokate</td>
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<td>A.K. Gupta</td>
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<td>15.</td>
<td>Harindra Rao</td>
<td>CEE</td>
<td>CLW</td>
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<tr>
<td>16.</td>
<td>S.G. Hundekari</td>
<td>CEE</td>
<td>ICF</td>
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<td>Anand Dev</td>
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<tr>
<td>18.</td>
<td>Lokesh Narain</td>
<td>CEE</td>
<td>CORE</td>
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Railway Board

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</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kul Bhushan</td>
<td>ML</td>
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<tr>
<td>2.</td>
<td>Raj Kumar</td>
<td>AML</td>
</tr>
<tr>
<td>3.</td>
<td>S.K. Sharma</td>
<td>Advisor/Elect./G</td>
</tr>
<tr>
<td>4.</td>
<td>VedPal</td>
<td>ED/RS</td>
</tr>
<tr>
<td>5.</td>
<td>R.K. Bhatnagar</td>
<td>Advisor/Elect./G</td>
</tr>
<tr>
<td>6.</td>
<td>Sudhir Saxena</td>
<td>ED/EEM</td>
</tr>
</tbody>
</table>

RDSO

<table>
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<tr>
<th>S. No.</th>
<th>Name/Designation</th>
<th>Railway</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pravin Pradhan</td>
<td>Sr. EDSE</td>
</tr>
<tr>
<td>2.</td>
<td>J.N. Lal</td>
<td>Sr. EDTI</td>
</tr>
<tr>
<td>3.</td>
<td>Nasim Uddin</td>
<td>ED PS&amp;EMU</td>
</tr>
<tr>
<td>4.</td>
<td>Dr. Amitabh Ojha</td>
<td>ED/EEM</td>
</tr>
<tr>
<td>5.</td>
<td>Ganesh</td>
<td>DSE/TM</td>
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</table>

Special Invitees

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<th>Name/Designation</th>
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<tbody>
<tr>
<td>1.</td>
<td>D. Ramaswamy</td>
<td>DIRECTOR</td>
</tr>
<tr>
<td>2.</td>
<td>Naresh Chandra</td>
<td>DSE (Tech)</td>
</tr>
<tr>
<td>3.</td>
<td>Atul Kumar</td>
<td>EDSE (Elect.)</td>
</tr>
<tr>
<td>4.</td>
<td>Naimul Haq</td>
<td>CAO (Constr.),</td>
</tr>
<tr>
<td>5.</td>
<td>A.K. Bharadwaj</td>
<td>CEE</td>
</tr>
</tbody>
</table>
Subject (Item 345): LED lights in coaches.

Recommendations:
(i) RDSO has already issued specifications for LED based luminaries and so far one source has been developed and two more sources are under development. RDSO shall develop more sources, who have supplied such luminaries in the past.
(ii) ER, NR and WR shall provide LED based luminaries in one complete rake of Rajdhani Express of their respective base, whereas SCR will provide in one conventional rake. The performance shall be monitored and feedback shall be given to RDSO.
(iii) Actual cost of product shall be decided based on the developmental orders, placed by Railways.

Decision:
ESC recommendation for providing LED lights initially on one rake of (recommendation at para-2), each by ER, NR, SCR and WR is accepted.

Subject (Item 346): Increase in alternator capacity in SGAC Coaches.

Recommendations:
(i) Due to advancement in technology, it is possible to pack 30kW power in the same frame size so that conventional alternator of high capacity may be used in SGAC coaches. RDSO is required to explore the possibility.
(ii) Because of the space constraints, only PM alternator of 30kW capacity can be used in LHB AC3 coaches. For evaluation of technology and to gain more experience, ICF and RCF shall provide 30kW PM alternator in 10 T RMPU fitted 10 nos. of LHB AC3 coaches, each.

Decision:
Accepted.

Subject (Item 347): Centralized monitoring of control of RMPUs in trains through touch screens.

Recommendations:
(i) Wireless communications shall be adopted for monitoring.
(ii) Each coach shall have one microcontroller based monitoring system, which can work in Master or Slave mode as selected in order to make independent of coach integrity.
(iii) RDSO shall develop a specification for this system.
(iv) A trial on five SGAC coaches shall be carried out by WR and the feedback shall be given to RDSO.
(v) Since the microcontrollers are already available in LHB EOG AC coaches, the same system can be developed faster. The trial may be conducted in one Rajdhani rake of NR.

**Decision:**
ESC recommendations for providing centralized monitoring of control of RMPUs in trains through touch screens initially on 5 SGAC coaches by WR and 1 Rajdhani rake by NR is accepted on trial basis.

**Subject (Item 348):** Issues related with Pantry cars.

**Recommendations:**
(i) After getting the recommendations of the committee of multi-disciplinary team comprising Electrical, Mechanical and Commercial Directorates of Railway Board, for deciding functional requirements of pantry, RDSO, ICF and RCF will jointly prepare a revise scheme.
(ii) After finalization of the scheme, field trial shall be carried out in few trains before regular cut in.

**Decision:**
(i) Report of Railway Board committee to be put up to Board for the acceptance.
(ii) Thereafter, ESC recommendations together with Directorates comments are approved for implementation.

**Subject (Item 349):** Provision of Automatic Door Closer arrangement with improved Ventilation in EMU coaches.

**Recommendations:**
(i) Two EMU rakes with 3-phase propulsion system of BT make can be modified by ICF for the provision of:
   a. Automatic door closer arrangement.
   b. Vestibules.
   c. Windows to be redesigned for better ventilation.
(ii) CCTV along with emergency communication between passenger and Guard/Motorman in ladies coaches in one EMU rake can be provided by WR. The scheme can be jointly decided by WR and RDSO.

**Decision:**
Approved in principle on trial basis. The issue for provision of automatic door closing system in two EMU rakes with 3-phase propulsion system of BT make is still under consideration in Board’s office. This will require full Board approval.
Subject (Item 350): Development of High speed and sensitive Relays.

Recommendations:
(i) Efforts shall be made to reduce the tripping time as far as possible within the limitations of technology. Life of Numerical Relays shall also be defined in view of the life of electronics components, used there in.
(ii) Zonal Railways shall start using the latest developed Delta I Relay and Battery Monitoring Relay.

Decision:
RDSO needs to develop specification at the earliest for high speed sensitive relays based on international practices to reduce the tripping time. While this should be done quickly by RDSO, the existing relays & control panel should be allowed to complete their codal life, before they are upgraded. Moreover, life of numerical relays be defined by RDSO based on manufacturer’s data, duty cycle, extent of de-rating & practices adopted by TRANSCOs, DISCOMs & PGCIL.

Subject (Item 351): Retro fitment of existing 8 wheeler Tower Wagons with instrumentation to convert them into intelligent Tower Cars for monitoring OHE Parameters.

Recommendations:
Efforts shall be made to prepare specifications for Retro fitment of instruments to the existing 8 Wheeler Tower Wagons to monitor OHE Parameters.

Decision:
Accepted. RDSO to develop specifications quickly within a month. Retro fitment of instruments in existing tower wagons may be done during POH. One tower wagon of each division should be equipped with such instruments initially.

Subject (Item 352): Maintenance of Electric locomotives using Long term maintenance service support through PPP.

Recommendations:
As a pilot project, second BNDM shed shall be considered on appropriate model.

Decision:
Approved in principle. SE Railway to submit a model tender document to operate BNDM II\textsuperscript{nd} shed with bare minimum requirement of manpower, duly indicating schedule/un-
schedule maintenance supervision activities to be undertaken by Railway staff and outside agencies, further supervision model, level of responsibilities & cost savings shall have to be submitted for Railway Board’s approval. Proper procedure to be followed for taking approval of competent authority consulting all stakeholders.

Subject (Item 353): Provisioning of ALP along with Motorman in MEMU train services.

Recommendations:
(i) ALP is not required in MEMU.
(ii) Guard shall be substituted with motorman in MEMU also.
(iii) Front view camera can be provided with display in rear cab.

Decision:
Accepted in consultation with Safety Directorate of Railway Board, it has already been decided that Assistant Loco Pilot is not required for running of MEMU train service.

Subject (Item 354): Introduction of Electronic trade in direct recruitment of Group-C staff of Electrical department.

Recommendations:
All new direct recruitments of supervisors and artisans shall include Electronic trade also.
Necessary amendments shall be carried out in IREM.

Decision:
(i) For direct recruitment of JE-II through RRB, Diploma in Electronics is already mentioned in the educational qualification further in IREM it is mentioned that Railways can even specify no. of candidates from each discipline (e.g. electronics).
(ii) Vide Railway Board letter no. RRCB no. 01/2014 dated 17.01.2014 common written exam for technician Gr.-III & ALP has been started with effect from notification CEN01/2014 issued in 01/2014. The common qualification include all relevant trade of ITI, Railways can therefore indicate their requirement of electronics trade accordingly while placing indents to RRB.
(iii) Southern Railway vide CEN no. 01/2014 has already advertised the vacancies of Technician Gr. III electrical with Electronics trade. Other Railways can also process their recruitment accordingly.

Subject (Item 355): Review of Unit Exchange Spares norms of Electric locomotives.

Recommendations:
Proposed norms shall be followed.
Decision:

Accepted.

Subject (Item 356): Bench marking of Manpower of Electrical Assets.

Recommendations:
(i) Yardsticks already exist and same shall be followed. The report submitted by SAG level committee (Convener RDSO) for Elect (TRS) is under consideration of Board. Suitable directives shall be issued by the Railway Board, in this regard.
(ii) Detailed proposal may be prepared for revision of yardstick, along with outsourcing of TRS and TRD activities.

Decision:

For TRS:
- Manpower yardstick were issued in the year 2006 duly taking into account almost all improvements in design and maintenance practices hence same can continue to be followed as also recommended by ESC.
- At present IR is facing severe constraints of manpower and other resources because of which creation of new posts by Railways is not materializing. Therefore till situation improves, Railways to achieve a benchmark of 4.0 man/loco (which is close to IR’s average manpower available per loco) bridging the gap by carrying out some maintenance activities through expertise available with OEMs/trade.
- RDSO to standardize model tender documents/templates including technical specifications and STRs for different Railways.
- RDSO after interaction with Railways can identify new maintenance activities which can be added along with likely sources to the existing list of repair/reconditioning of major equipment.
- As yardstick issued in 2006 does not cover three phase locos, a new proposal for the same may be processed at Railway Board similar to done by Mechanical Department vide letter no. 2007/M(L)/466/3(1505) (Yardstick) dated 30.08.2010.

For TRD:
- Recommendation as contained in Para (2) regarding outsourcing of TRD activities are accepted.
- After deliberation of the report submitted by SAG Committee, instructions have been issued vide Board’s letter no. 2008/Elect(G)/150/12 dated 15.05.13 advising that there is no change in yardstick and non power block activities of TRD can be outsourced commensurating shortfall in manpower.
- The committee consisting of Sr.EDTI/RDSO, CEE/WR and CEE/SER nominated vide Board’s letter no. 2008/Elect(G)/150/12 dt 20.05.13 should finalize the framework for
outsourcing activities for TRD including preparation of schedule of quantity and linking outsourcing activities with the reduced availability of manpower.

**Subject (Item 357):** Codal life of IGBT propulsion systems.

**Recommendations:**
Life of electronic equipment is world over taken as 5 years. This is based on acceptable reliability and also obsolescence. RDSO is of the opinion that being costly equipment we may accept life of 10 years, extending the life by rehabilitation of low power/ control circuit after 5-6 years. IGBT’s shall be replaced when it fails. After 10 years complete converter/equipment shall be replaced with the new one of prevailing new technology. A proposal for the same will be sent to Railway Board.

**Decision :**
(i) The codal life of traction Converter Aux. Converter & VCU is stipulated as 18 years by Railway Board letter RBA no. 25/2006 dated 24.05.2006 with concurrence of Railway Board Finance.
(iii)RDSO to submit detailed proposal clearly indicating modules/cards requiring replacement or rehabilitation after 5-6 years. Complete replacement of traction converter after 10 years (i.e. 1st POH of passenger locos and 2nd IOH of freight locos) needs to be further examined & justified in view of the cost implications.

**Subject (Item 358):** Use of pure carbon strips on pantographs.

**Recommendations:**
Trails shall be carried out in Main line & Sub-urban Sections. After trial suitable decisions shall be taken.

**Decision :**
Accepted. Trials be conducted with pure carbon strips on locos and EMUs/MEMUs on following identified sections:
Waltair-Kirandul (KK line)- Elect locos &
Chennai-Gummidipundi section- EMUs

**Subject (Item 359):** Provision of one High rise pantograph in all new Freight Locomotives produced by CLW.

**Recommendations:**
Checking of OHE with 2032 mm Panto Pan with Tower Wagon shall be carried out in next four months. After obtaining necessary confirmation from Railways, one high rise Pantograph, in all new locomotives, shall be provided.

**Decision :**
(i) Accepted.
(ii) CLW has already been advised to cut in High reach pantographs in all WAG-9 locos.
(iii) The cost differential between conventional and high rise pantograph should be brought down by addition of new sources.
(iv) RDSO should also quickly finalize the employment schedule and design of high rise OHE.

**Subject (Item 360):** Provision of Power Quality Compensating Equipment.

**Recommendations:**
It is recommended to install dynamic Harmonic mitigation Equipment having inbuilt feature of Power Factor Correction, taking care of lagging & leading Power Factor.

**Decision :**
(i) Accepted.
(ii) RDSO being the member of recently nominated committee by CEA should finalize the recommendations for the review of regulations duly addressing the issues raised by Railways.
(iii) RDSO should develop the specifications for the equipment as advised vide Board’s letter no. 2008/RE/170/1 dated 28.05.13.
(iv) SR should propose new work immediately for undertaking trials of harmonic mitigation equipment.
(v) SR to expedite trial one no. equipment on new section being electrified by CORE.

**Subject (Item 361):** Identification of Polluting Zones & stone pelting prone area.

**Recommendations:**
(i) Railways shall identify the patches of stone pelting & polluting zones.
(ii) Railway board’s directives already exist for use of type of insulators in these areas.

**Decision :**
(i) Accepted.
(ii) RDSO should compile the data receive from zonal Railways and circulate it to CORE/RVNL for compliance.
(iii) Zonal Railway may also plan implementation of board’s policy dated 04.07.12 for polluted zones during replacement.

Subject (Item 362): Support Services System” for maintenance of OHE network.

Recommendations:
Detail proposal may be prepared for revision of yardstick, along with outsourcing of Traction Distribution field activities.

Decision:
Accepted particularly for new RE sections. RDSO to develop comprehensive for OHE & PSI activities duly linking the shortfall.

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