



भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
EPBX (0522) 2451200
Fax : 0522 - 2452581

Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
DID (0522) 2450115
DID (0522) 2465310



No. EL/1.3.10

Dated 31.03.2011

Chief Electrical Engineers,

1. Central Railway, Mumbai CST 400 001
2. Eastern Railway, Fairlie Place, Kolkata 700 001
3. East Central Railway, Hajipur-844001
4. East Coast Railway, Bhubaneswar-751016
5. Northern Railway, Baroda House, New Delhi 110001
6. North Central Railway, Subedarganj, Allahabad (U.P.) - 210033
7. Southern Central Railway, Rail Neelayam, Secunderabad 500 371
8. South Eastern Railway, Garden Reach, Kolkata 700 043
9. South West Railway, Hubli (Karnataka)
10. South East Central Railway, Bilaspur-495004
11. Western Railway, Churchgate, Mumbai 400 020
12. West Central Railway, Jabalpur (M.P) - 482 001
13. Integral Coach factory, Perembur, Chennai
14. Rail Coach Factory, Kapurthala

SPECIAL MAINTENANCE INSTRUCTION No. RDSO/2011/EL/SMI/0266, Rev. '0', Dated 31.03.2011

1.0 TITLE:

Provision of compensating spacer ring between wheel disc hub and abutment piece (RWE) to eliminate possibility of shifting of MSU assembly of TM type 4303BY/C1005 (Fuji Design) of BHEL/CGL make used in AC-EMU.

2.0 BRIEF HISTORY:

Eastern Railway has reported failures of suspension bearing of two axles of motor coach no. 13052 fitted with traction motor type TM 4303BY. Failures were jointly investigated by KPA, ICF and RDSO and in light of failure and in order to ascertain its probable cause; wheel sets of all motor coaches of the rake were investigated and overhauled. In 8-wheels, gaps between disc-hub and abutment piece on RWE side were found ranging from 1.5mm to 10mm. Assembly drawing of the wheel sets does not provide for any gap at this location rather wheel disc hub shall make positive contact with the abutment piece. This gap has got inadvertently created during assembly of wheel sets and MSUs, which can lead to seizure of bearings of MSU. Accordingly, all wheel sets were provided with compensating spacers in the month of Nov'2010 and till date these MSUs are in service without any abnormality.

3.0 SCOPE:

After detailed study, it has been decided to provide spacer ring of appropriate suitable thickness (1mm to 5mm) equal to the actual gap. This compensating spacer ring will bridge the gap between wheel disc hub and abutment piece (RWE) and so that wheel disc hub shall make positive contact with the abutment piece. This will eliminate the possibility of shifting of MSU assembly in TMs type 4303BY/C1005 used in AC-EMU.

This SMI is applicable to only those wheel sets, which have already been manufactured with such gap. Necessary precautions shall be taken during manufacturing of wheel sets at Production Units and Workshops, so that disc hub shall always make a positive contact with abutment piece.

4.0 GENERAL PRECAUTIONS :

- 4.1 Before proceeding with the bearing installation, all the critical dimensions of axles should be checked under uniform conditions of temperature to make sure that the bearings can be applied without difficulty. All the dimensions of axles shall be as per drawings/specifications.
- 4.2 Axles should be checked on the bearing seat diameters, shoulder lengths and radii with proper gauges to determine that finished axle dimensions are within prescribed tolerances.
- 4.3 Micrometers used to measure the bearing seat diameters of axles should be calibrated from NABL accredited labs.
- 4.4 Micrometers and axle should be at room temperature. Axle diameters should not be checked while the axles are heated due to machining.
- 4.5 Axle bearing seat diameters, shoulders, and radii should have a smooth machined and rolled, or ground finish, and must be free from sharp corners, burrs, nicks, tool marks, scratches, or corrosion.
- 4.6 Axle bearing seat diameters should be concentric with the wheel seat diameters. This must be checked preferably on 3-D CMM and in case of non-availability of 3-D CMM , the same can be done on CNC lathe.
- 4.7 Axle journals should be protected if there is a possibility of damage or deformation resulting from mis-handling or uneven pressures being applied to the axle ends. Proper handling of axle during transportation is essential to avoid its bending.
- 4.8 Axles that have become magnetized must be demagnetized before bearings are mounted.
- 4.9 Check bearing seating diameters of the suspension tube and Bearing Housing labyrinths bores, etc. Ensure that they are within drawing dimensions.
- 4.10 Check the bore of abutment piece. Check all the machined surfaces of End Covers, Bearing Housing and Abutment pieces are free from any burr. If any sharp corner or burr is present it should be removed by filing.
- 4.11 Check End Cover GWE seating surface of the suspension tube. Keep End Cover GWE over suspension tube at its position before assembly. Ensure that it is seating freely. If not, use slight buffing/filing to ensure free seating during assembly.

5.0 METHOD:

- 5.1 Assemble the MSU , bearings , gears and other bearing components on the axle as per procedure laid down in the maintenance manual . Put the correct size of abutment piece on RWE side of the axle , next to end cover . Measure the axial end play by as per the laid down procedure, it shall be between 0.05

- mm to 0.25 mm. To obtain this end play, provide appropriate size of split adjustment washers in between bearing housing and MSU tube on RWE side.
- 5.2 Now, the axle and MSU is ready for wheel discs pressing in.
 - 5.3 Before pressing in the disc on RWE, the distance between abutment piece face towards wheel seating and shoulder of wheel seating on the axle shall be measured. Ideally, there shall be no gap in between the abutment piece face towards wheel seating and shoulder of wheel seating on the axle. If there is a gap, compensating spacer ring having suitable thickness equal to the gap shall be provided next to abutment piece and wheel seating to bridge this gap as per RDSO's drawing no. SKEL-4856, Alt '0
 - 5.4 Remove the adjustment washer . Fit road wheel on to the axle, so that complete wheel disc hub should now make positive contact with the compensating washer. The cone may move slightly on the axle which is acceptable.
 - 5.5 Now measure width of gap at three positions between bearing housing and the MSU tube. Taking an average of the three measurements and the adjustment washer of thickness of measured value shall be provided . The thickness of adjustment washer shall be such that axial end play shall be from 0.05mm to 0.25mm.
 - 5.6 Fit two halves of adjustment washer refit cover bolts and once again tighten to clamp the cup holder, the split adjustment washer, cover & the tube together.
 - 5.7 It is possible that, during the previous operations, the road wheel end cone assembly may have been moved out of position and thereby disturbed the lateral clearance in the bearings. This can be checked by displacing the tube laterally in both directions. The lateral movement should be checked by use of a dial indicator. The thickness of the adjustment washer should be modified where necessary to maintain lateral clearance within specified limits (axial endplay of 0.05mm to 0.25mm. The parallelism of the correct adjustment washer should be within 0.04mm).

6.0 DRAWINGS & REFERENCES

Description of Drawing	Drawing No.
Compensating Spacer	SKEL-4856, Alt '0'
Axle Finish Turned	ICF's drawing no. DMU/DPC ₅ -0-2-505 Alt 'c'
MSU manufactured by BHEL ,Bhopal	04461699027 Rev '0'
General arrangement Axle Suspension Unit manufactured by BHEL ,Bhopal	04461699028 Rev '0'
MSU manufactured by CGL ,Bhopal , CGL	106801 Rev'6'
General arrangement Axle Suspension Unit manufactured by CGL ,Bhopal	106001 Rev'2'

- BHEL, Bhopal's Maintenance Manual no. IB-603 for Traction Motor
- CGL' Bhopal's Maintenance Manual for Traction Motor

7.0 SURPLUS MATERIAL

Nil

8.0 APPLICATION TO

MSU assembly in TM type 4303BY/C1005 used in AC-EMU.

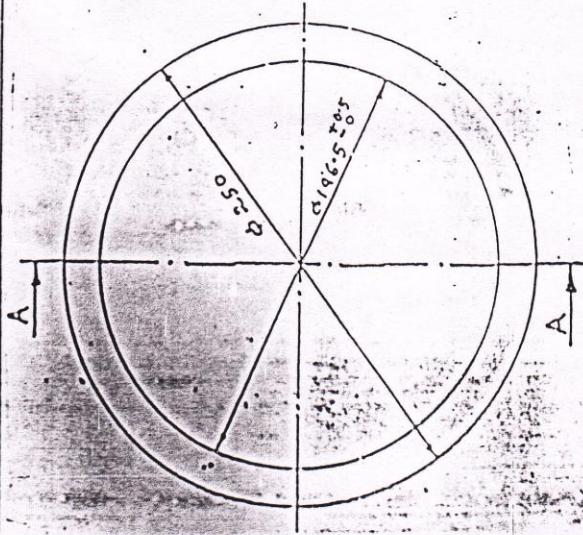
9.0 AGENCY OF IMPLEMENTATION

- i) POH and Wheel Repair shops carrying overhauling/repair of wheel sets, without replacement of wheel discs. Where new wheel disc is being provided , the process for assembly of complete wheel sets as per manufacturer's manual to be followed.
- ii) All EMU Car Sheds to weed out such wheels and send them for repair.

(GANESH)
for Director General/Elect.

Encl: SKEL-4856, Alt '0' for compensating spacer ring

Copy to :



SECTION A-A

ITEM	THICKNESS
5	5 mm
4	4 mm
3	3 mm
2	2 mm
1	1 mm

NOTE: ALL SHARP CORNERS TO BE REMOVED

REF.	PART NO.	DESCRIPTION	DETAIL DRG. NO.	NO. LOC.	MATL.	SPEC.
REF.		SCALE	APPD. BY			
COMPENSATING SPACER RING OF MSU FOR TM4303BY/C1005 OF AC EMU/MEMUS						
FIRST ISSUED \$1.03.2.011						
SUPERSEDES						
SUPERSEDED BY						

REF.	APPD. BY	DATE
REF.	DESCRIPTION	DATE
REF.	REF. NO.	DATE
REF.	STATUS	DATE

RDSO ELECT DTE SKEL-4856
ALT '0'