

Chief Electrical Engineer,

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- South Eastern Railway, Garden Reach, Kolkata -700 043
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- Chittaranjan Locomotive Works, Chittaranjan- 713 331

SPECIAL MAINTENANCE INSTRUCTION NO. ELRS/SMI/0225-2001, REV. '0'

1. TITLE :

Improvement in the performance of equaliser spring seat on Co-Co trimount bogies of WAM4/WAG5/WCG2/WCAM1 class of Electric Locomotives.

2. BRIEF HISTORY :

Railways have been reporting following problems of equaliser spring seats;

- 2.1 Ultrasonic testing procedure for guide pin of equalizer spring seat to RDSO's Drg. No. SKDL-3867, Alt. '2' has not been provided. As a result, it is difficult to detect the internal flaw in the guide pin casting at the time of inspection/routine maintenance. Presently Sheds are checking guide pin at the base using RDPT for surface cracks only which is not sufficient.
- 2.2 The tolerance on guide pin dia have not been shown in the RDSO's Drg.
- 2.3 The spring seating area on the spring seat has not been shown as 'cast smooth and true' which is required to avoid any possibility of notch formation on the end coil of helical spring.
- 2.4 The provision for manufacturer's name, year and month of manufacture as well as Sl. No. is not there in RDSO's Drg. for easy identification of the spring seat.
- 2.5 Safety bracket, Ref: 7 in RDSO's Drg. No. SKDL-3867, Alt. '2' is shown to be manufactured by welding three pieces at two locations. To avoid its breakage due to poor quality of welding or external hitting during run, it should be manufactured in one piece only.
- 2.6 The casting specification shown in the RDSO's Drg. SKDL-3867, Alt. '2' is IRS-M2, Gr. 20-40, which is basically IS 1030, Grade III. This specification prescribes important tests such as 'impact test', 'bend test' and 'non-destructive tests' e.t.c. to be conducted on the casting only if specified by the customer in the enquiry and order. As existing drawing (SKDL-3867, Alt. '2') does not contain any reference to these tests, these are not being carried out by the manufacturers. As a result, the quality of casting is not getting ensured.

3. APPLICABLE TO :

WAM4, WAG5, WCG2 and WCAM1 class of Electric Locomotives.

4. OBJECT :

This SMI incorporates the improvements in the RDSO's Drg. of spring seat as discussed above.

5. INSTRUCTIONS:

- 5.1 Improvements are to be incorporated in RDSO's Drg. of spring seat SKDL-3867, Alt. '2' of ;
- i) Tolerance on guide pin dia.
 - ii) Specification of casting.
 - iii) Provision of manufacture mark with Sl. No.
 - iv) Identification of surface for ultrasonic testing & liquid penetrant testing.
 - v) Finish of spring seat area .
- 5.2 Additional tests in regard to casting as shown in Annexure II, to be carried out in addition to the tests specified in clause 12 & 13 of IS:1030-1989 during inspection of new spring seats.
- 5.3 The ultrasonic testing of guide pins as well as liquid penetrant examination of the base of guide pins as well as 'I' section as indicated in Annexure-I is to be carried out at the time of inspection during AOH/IOH/POH schedules for all the spring seats. The ultrasonic testing procedure for the guide pins is enclosed as Annexure-III.
- 5.4 Safety bracket (Ref. 7 of RDSO's Drg. No.SKDL-3867, Alt. '2') is modified to one piece design to enclosed Drg. No. SKEL-4609, Alt.'0' at Annexure- IV.
- 5.5 Inspection schedule for maintenance of spring seat and associated parts is to be ensured as prescribed in RDSO's SMI No. ELRS/SMI/0194 dated 14.01.98.

6. DRAWING /SKETCH :

Enclosed as Annexure-I, II, III & IV (SKEL - 4609, Alt. '0').

7. IMPLEMENTATION AGENCY :

All Electric Loco Sheds and Workshops dealing with WAM4/WAG5/WCG2 & WCAM1 class of Electric Locomotives.

8. DISTRIBUTION :

As per standard mailing list no. EL/M/0028, Ver. '0'

Encl: as above

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ANNEXURE-II of SMI No. ELRS/SMI/0225-2001, Rev. '0' Dated .01.2002

Requirement of Additional Tests During Inspection at the Time of Procurement of New Spring Seats

In addition to the tests & procedures specified in IS:1030-1989, the following additional tests may be carried out ;

1. **Impact Test :**

One impact test shall be carried out in accordance with IS:1757-1973 and values obtained shall conform to the requirement given in table-2 (IS:1030-1989).

2. **Bend Test :**

Bend test shall be carried out in accordance with IS: 1599-1985. Test pieces prepared as per clause 13.4.1 of IS:1030-1989 shall be capable of being bent cold without fracture to an angle given in Table -2 (IS:1030-89) round a mandrel having a dia of 50 m.

3. **Heat Treatment :**

All castings shall be heat treated as per the provisions of clause 12.1 of IS:1030-1989. The castings shall be fully normalised to achieve a grain size ASTM 5 or finer. (ASTM E- 112-63).

4. **Non Destructive tests :**

- i) **Radiographic Examination :** Radiographic examination at vulnerable locations as specified in the Drg. at Annexure-I is to be carried out on the castings. 5% of the castings subject to a minimum of 5 castings per cast shall be randomly selected and tested as per code of practice IS:2595-1978. Radiographs shall have sensitivity of minimum 2% and shall satisfy the requirements of level II acceptance level to ASTM E-446-98 (reference Radiographs for steel castings) in respect of blow holes, slag, sand inclusions and shrinkages. No cracks and hot-tears shall be permitted.
- ii) **Ultrasonic Examination :** Ultrasonic examination on the guide pins of equaliser spring seat shall be done as per "Code of procedure for Ultrasonic testing of equaliser spring seat guide as per M&C report No. MC - 46" (enclosed as Annexure - III) and acceptance standard shall be as per clause 3.2.3 and 3.2.4 of M&C report no. MC-46.
- iii) **Liquid Penetrant test :** Liquid penetrant examination shall be carried out on 100% of the castings at vulnerable locations as indicated in the Drg. at Annexure-I as per procedure laid down in IS:3658-1981 or latest version. Defects like shrinkage, cracks, hot tears are not permitted. However, minor porosity and surface imperfection may be permitted.