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Ministry of Railways
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No. EL/3.2.13/1

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Chief Electrical Engineer,

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Chittaranjan Locomotive Works, Chittaranjan-713 331 (WB)

MODIFICATION SHEET No. RDSO/2014/EL/MS/0440 (Rev-2)

1. Title:

Modification from conventional hand brake to modified hand brake (Gear type) arrangement in WAP-4, WAG-7, WAP-7 and WAG-5 Electric locomotive applications.

2. Background:

At present, electric locomotive are fitted with conventional type loco hand brake. This type of loco hand brake is very hard to operate due to the heavy size of the handle and complicated system of operation. Because of inadequate attention complexity of design and wear tear the brake often does not release after application. This problem has been reported by some of Zonal Railways. In addition to above, operating space requirement is also more due to long handle, thus inconvenient to operate.

3. Object:

The object of this modification advice is to provide necessary guidelines to replace the existing conventional hand brake of Electric locomotives by modified hand brake to facilitate easy operation, maintenance and to improve reliability.

4. Investigation

A study was conducted by RDSO on the existing design of hand brake. The existing design of hand brake has limitations like difficulty in operation, unwieldy design of handle, high wear tear in gear/pinion etc. Also, hand brake dooe not get released due to breakage of lock plate. To overcome the problem, a modified design of hand brake having worm & worm wheel arrangement was developed & successfully working on ALCO diesel locomotives. Similarly,

Gear type hand brake was provided in no. of Electric locomotives in different Zonal Railways on trial basis. The performance of modified hand brake was reported to be encouraging.

In view of above, drawing no. SKEL-4993 Alt '0', SKEL-4998 Alt '0', SKEL-4999 Alt '1', SKEL-5000 Alt '0', SKEL-5001 Alt '0', SKEL-5002 Alt '1' for modified hand brake assembly for Electric locomotive has been prepared for fitment of modified hand brake in electric locomotive.

5. Modification contents:

1. Release the chain from existing conventional hand-brake.
2. Dismantle the existing conventional hand-brake from foundation.
3. Weld concealing MS plate (510mm X 400mm X 6mm thick) with a cut out (265mm X 165mm) for the mounting of the Modified Hand Brake Gear Box Assembly with 3 No. 5/8" diameter bolts.
4. Fit the chain in chain pulley & link properly with brake cylinder.
5. In order to apply the brake, the wheel has to be rotated clockwise until the brake blocks fully grip the wheel tread of the loco and after that wheel has to be properly locked with the locking pin.
6. Brake can be released simply by rotating the wheel anticlockwise.
7. After complete releasing of the Loco brakes the wheel should be locked again with the wheel locking pin so nobody can hamper it.

6. Materials required and sources of supply:

Material required as per RDSO drawing no. SKEL-4993 Alt '0', SKEL-4998 Alt '0', SKEL-4999 Alt '1', SKEL-5000 Alt '0', SKEL-5001 Alt '0', SKEL-5002 Alt '1'.

7. Additional information (Special benefits, financial implications):

The gear type hand brake has the following advantages over conventional hand brake:

- i) Very easy to operate as there is a circular steering. For application, the wheel is to be rotated just in clockwise direction only.
- ii) Brake can be released simply by rotating the steering anti-clockwise with worm & worm wheel drive.
- ii) The Paul-ratchet has been avoided here. The steering, worm & worm wheel mechanism can do application, release and locking at same time.

8. Application to class of locomotives: WAP-4, WAG-7, WAP-7 & WAG-5 Electric locomotives.

9. Agency and schedule of implementations:

Electric loco sheds holding Electric Locomotives during major schedules.

POH Shops during POH.

CLW during manufacturing.

10. Likely source of supply: As per RDSO QA/Mech vendor directory for item "Modified hand brake assembly".

11. Modification Drawing : RDSO drawing no. SKEL-4993 Alt-0.


(Pratibha Gupta)
for Director General/Electrical

Encl.: As above

Copy to-

EDEE (RS), Railway Board, Rail Bhawan, New Delhi-110 001 for kind information please.