W.M4/73

Government of India
Ministry of Railways
RESEARCH DESIGNS & STANDARDS ORGANISATION

Ref:EL/3.2.48/D4 Lucknow
Jan 1978
10-8

MODIFICATION SHEET NO.RDSO/WAM4/73

1. Title of modification

Strengthening of [illegible] Siemens make MVMT type IRA2 164-2.

2. Applicable to class of locomotive

WAM4,WAM4,WCAM1 and WCG2 class of electric locomotives.

3. Object of modification

It has been noticed from the reports received from Railways that cracks develop at the short circuiting ring of the squirrel cage rotors of MVMT of Siemens make type IRA2-164.2 The rotor bars of motorshave been placed in the slot without any tack welding and are subject to vibration in service, resulting in cracks at the joints between bars and short circuiting rings. The brazed joints between the rotor bars and rings have also given way.

4 Modification drawing No.

RDSO Drawing No.SK EL 2762.

5 Agency for modification

i) All Electric Locomotive Sheds

ii) POH shops of Railways

iii) Chittaranjan Locomotive works on locomotives under production and future builds.

6 (a)Material required and specification

i) Welding rod(See Note on drawing No.SKEL 2762) Probable supplier: M/s Advani-Oerlikon Pvt Ltd)

ii) Silphos Foil: available in the size of 75 mm(wide) x 0.25 mm(thick) from Indian Oxygen Ltd,Calcutta).

iii) Brazing material(See Note on drawing SKEL 2762 probable supplier: M/s Indian Oxygen Ltd.,Calcutta).

iv) Short circuiting rings & rotor bars as per SKEL 2762.

...2/-

6 (b) Material rendered surplus

Scrap copper bars and end rings.

7. Work to be carried out

All existing rotors of Siemens make MVMT type IRA2-164-2 should be changed with new short circuiting ring during AOH or whenever failure has occurred. Adopt the following process:

(a) Debraze damaged end rings and rotor bars.

(b) Drive in required number of rotor bars on to the rotor slots.

(c) Tack weld the bars to rotor slots at three places as indicated in the drawing SK EL 2762. Chip and clean so that weld is flush with rotor surface.

(d) Manufacture new endless(without joint) short circuiting rings as per SK EL 2762.

(e) Mill 24.25 mm x 3+ 0.1 mm x 19.0 mm slots in the short circuiting ring at an angle parallel to skew angle of the corresponding rotor slot, to accommodate the rotor bars. Use a suitable indexing head and fixture to obtain the required skew angles to radii.

(f) Place the rotor bar first in the short circuiting ring slot and then insert foils at the bottom and on the two sides of the rotor bar. Heat the end ring by induction heater or by torch flame upto about 720°C(the melting point of foil). The foil will melt and fill up the gap.

(g) In addition, braze the rotor bar to the short circuiting ring using, brazing alloy Ba Cu P5 conforming to IS:2927, ensuring formation of proper fillet.

(h) To avoid thermal distortion at the time of brazing of the rotor bars with short circuiting ring, use a suitable fixture. Braze diametrically opposite bars in sequence, so that the entire rotor is heated equally and there is uniform thermal expansion.

....3/-

(i) Test rotor by growler with an ammeter in the growler coil circuit for checking open circuit.

(j) Finally balance the rotor.

(k) Carry out 'No load' test after mounting in a stator.

Check that the current is according to the type test report.(i.e. at 380V-22 A, 290 V - 14.0 A and 460 V - 30 A).

8. **Reference**

RDSO Letter No.EL/3.2.48/D7 dated 4.2.75.

9. **Distribution** (2 copies each)

As per enclosed list.

Sd/-(V.VENKATESWARAN)
For Director General/Elec.