Government of India
Ministry of Railways

RESEARCH, DESIGNS & STANDARDS ORGANISATION

Ref: EL/3.2.92/J2

Lucknow
July 1978

MODIFICATION SHEET No. RDSO/WAM4/71

1 Title of modification

Modification to increase the thickness of short circuiting ring of compressor motor type 51d2 supplied by M/s Oerlikon, Switzerland.

2 Application to class of locomotive

WAM4, WCAM1, WCG2, WAM1, WAM2, WAM3 class of electric locomotives.

3 Object of modification

Some failures have occurred on compressor motor type 51d2 of Oerlikon in which the short circuiting ring and rotor bars have melted or fused at the junction of bar and short circuiting ring. Also, end rings have cracked and rotor bars have broken. These defects are probably due to excessive heating. Therefore, in order to arrest these types of failures the thickness of end ring should be changed from 3 mm to 5 mm.

4 Modification Drawing No.

RDSO Sketch No. SK EL 2901.

5 Agency for modification

1 All Electric Loco Sheds
2 POH shops of the Railways.

6 (a) Material required and specification

(i) The short circuiting ring shall be made of Electrolytic copper GR-EHC IS: 191-1967, fully annealed. The bar will be made of Electrolytic copper as per IS: 613.

(ii) The brazing of the bars to the short circuiting ring should be carried out using copper-silver-phosphorous-brazing alloy, Ba Cu P5 as per IS: 2927-1965 (for example Rupatam 14 of M/s Indian Oxygen Ltd., Calcutta).

(iii) Araldite AY 105/HT 972 of M/s CIBA, Bombay shall be used between rotor slots and bars.

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7 Work to be carried out

All rotors of MCP type 51d2 of Oerlikon make should be changed with new short circuiting ring during AOH or ~~pir~~ prior to that if failure has occurred. The following process may be adopted for the modification to the existing rotors.

(a) Part off short circuiting rings by machining.

(b) Drive out old conductors from the slot.

(c) Drive in new rotor bars of size 6 mm diameter, and 197 mm length into the rotor slot.

(d) Make new endless (without joint) short circuiting rings as per SK EL 2901. Drill the short circuiting ring to accommodate 6 mm dia rotor bar. Use a drill jig to suit dimension as per SK EL 2901.

(e) Fit the short circuiting rings to the rotor bars and then braze with silver phosphorous (Rupatam 14) at the junction of rotor bar and short circuiting ring. Prepare the surfaces to have a clean and smooth finish so that brazing material may flow properly. The torch temperature shall be maintained at 625 to 785°C during brazing.

(f) Keep the rotor vertical while brazing so that molten brazing material may flow easily and enter the space available between rotor bar and short circuiting ring. To avoid thermal distortion at the time of brazing of the rotor bars with the end ring use a suitable fixture. Braze diametrally opposite bars in sequence, so that entire rotor is heated equally and there is uniform thermal expansion.

(g) Clean all superfluous brazing material from the surface of short circuiting ring rotor bar after brazing is over.

(h) Apply Araldite AY 105 and Hardner HT 972 mixed in proportion, allo wing it to trickle in between the bar and slot.

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

(j) Balance finally the rotor to avoid buckling and premature failure.

8 Distribution (2 copies each)

As per list.

(V. VENKATESWARAN)
for DirectorGeneral/Elec.