Government of India
Ministry of Railways
Research Designs & Standards Organisation
Manak Nagar , Lucknow - 226011

NO. EL/3.2.14 Dated .04.1998

SPECIAL MAINTENACE INSTRUCTIONS NO. ELRS/SMI/199

1. TITLE :

General guidelines to follow for balancing of rotors and cooling blowers in position.

2. APPLICATION :

2.1 Impeller of all blowers used for cooling traction motor, transformer oil smoothing reactor and rectifiers.

2.2 RDSO have already issued SMI-152 for balancing of rotor, impellers individually as well as together, which may also be followed for general guidelines only.

2.3 Procedure mentioned in SMI-152 is only pertains to a particular type of dynamic balancing (Blue Star) machine. However, any other dynamic balancing machine can be used which is suitable for balancing rotor, motor fan, blower impellers, individually as well as together i.e., machine should be capable to balance weight of atleast 100 kg. with balancing quality grade of G 2.5 as per IS: 11723-1985 or ISO 1940 -1973.

3. OBJECT :

3.1 Rotors, with motor fans or individually, and impellers of cooling blower are balanced at motor, and blower manufactures work respectively upto the quality grade of G 2.5 as mentioned under para 2.3. However, when rotor, fan and cooling blower impellers are balanced together at blower manufacturers end, it is noted that residual unbalanced weight has crossed the limit of G 2.5 (i.e. 8 gms mm/kg of rotor and impeller weight in the case of MVMT rotor + VMT impeller). Since blower manufacturers are not balancing the rotor and impeller together at their works, during the fitment of these blowers in the locomotive, a lot of centrifugal forces are produced around the driving bearing which in turn produces the vibrations on blowers casing and on motors beyond acceptable limit of 40 microns and 15 microns respectively.

3.2 Similar phenomenon is also noted whenever rotors and impellers after repairs are fitted together and also in the case whenever rotor and impellers are interchanged during the maintenance for any reasons.

3.3 This Special Maintenance Instruction indicates the general method to be followed for balancing of rotor and impellers together in position, i.e. when the blowers are installed on the locomotive or blower set has been brought down on the shop floor for repair etc.

3.4 The balancing of rotor and impeller shall be done with the help of portable balancer.

4. INSTRUCTION DRAWING :

NIL

5. INSTRUCTIONS :

5.1 Follow the instructions as laid down in the balancing instruction manual of a particular type of portable balancer.

5.2 Sensor of the portable balancer shall be kept at least on the following places while balancing the impellers in position —

i) On both end of bearing - in the perpendicular direction of the axis of rotation of impellers.

ii) Parallel to axis of rotation, on the NDE side of bearings.

iii) On the top of the casing.

iv) Atleast on 4 places of the casing parallel to axis of rotation, i.e., two in front of the impeller casing and two behind the impeller casing.

5.3 Weld the unbalance mass (as indicated by the portable balancer) at the root of welded impeller which is just diametrically opposite from the impeller where the unbalance has been shown by the stroboscope of the portable balancer. Alternatively, residual unbalance mass can also be removed from the impeller which has been detected by portable balancer stroboscope.

5.4 Sheds, shops of Indian Railways and Blowers and Motor manufacturers should follow the balancing quality grade G 2.5 of IS : 11723 - 1985 or ISO : 1940 - 1973 which amounts to be 8 gm. mm. per kg. of rotor/impeller/rotor and impeller weight, i.e. 4 gm. mm. per kg. of weight at each plane of rotor, motor fan, and impeller.

5.5 Therefore, the magnitude of residual unbalance mass shall not exceed the maximum limit of 8 gm. mm/kg of rotor plus impeller weight as explained vide para 5.4 above.

6. PERIODICITY OF BALANCING :

6.1 Whenever any repair is done on rotor, fan and on impellers of blowers or improper working of blowers are reported in service.

6.2 In AOH on all the impellers of traction motor cooling blowers.

7. AGENCY FOR IMPLEMENTATION :

7.1 All Railways shed, shops of Electric Locomotives.

7.2 All blower and motor manufacturers.

8. REFERENCE :

8.1 As per the decisions taken during the meeting held between Railways, RDSO, CLW and manufacturers on 8.12.97 at TKD Electric Loco Shed of W. Rly.

8.2 Source of procurement of the "Portable Balancers 1000" are as follows —

BASELINE TECHNOLOGIES
E-17 Green Park
New Delhi 110 016
FAX No. 011-6866720
Telephone 011 668885
Approximate Cost : Rs. 70,000/-

Alternatively, equivalent portable balancer may be used.

9. DISTRIBUTION :

AS PER ENCLOSED LIST.

Raju Kumar

(R.K. Kulshrestha)
for Director General (Elect.)