

Government of India
Ministry of Railways
Research Design & Standardisation Division

No.EL/3.2.11

Dated : 2 .11.94

SPECIAL MAINTENANCE INSTRUCTIONS:RDSO/ELRS/
SMI/ 163

1. TITLE

Detection of rotor bar end and ring cracks on
'Arno-converter' and 'Auxiliary motors' by
"Search coil and Motor tester."

2. APPLICATION

- (i) All electric locomotives fitted with 3-phase induction motors and Arno-converters.
- (ii) EMU motor coaches fitted with auxiliary motors.

3. OBJECT

3.1 To detect the rotor bar end and ring cracks on Arno-converters and auxiliary motors.

3.2 This method is applicable for Die cast rotor also.

4. PROCEDURE

4.1 Place the search coil (which is wound on a core) on the curvature surface of rotor as shown in the enclosed sketch.

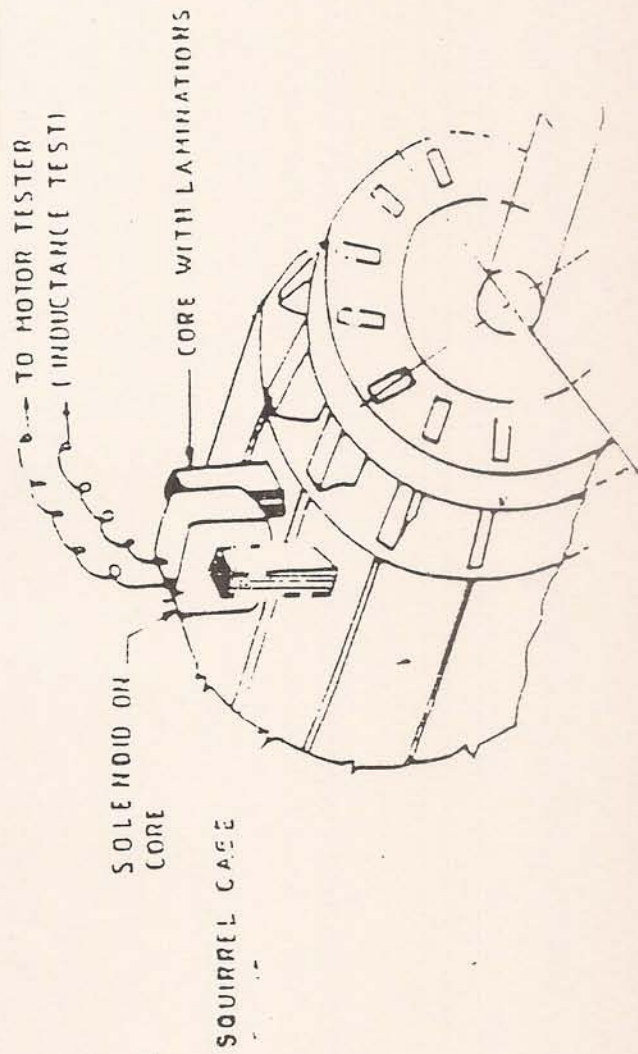
4.2 Measure the inductance of the coil on the motor tester while the search coil is moved along the core straddling a slot or rotor is rotated slowly.

4.3 Repeat the process as mentioned in para 4.2 by placing the search coils at vulnerable locations of the rotor and end-ring. If, there is any cracked bar, the meter will show an unusual deflection.

4.4 Rotor bar cracks may also be detected on Arno-converter in stationary position during the maintenance schedule like "IC". In this case, only disconnect the supply cable from Arno-converter and connect the motor's star terminal to one of the phase or between two terminals of the Arno converter and rotate the rotor slowly, meter will show an unusual deflection if there is any cracked bar. A normal rotor will produce small variation in the bar pass under the coils.

- 4.5 If any crack d bar and end ring is detected in no. 4.4, Arno should be replaced.
- 4.6 Steps No.4.4 and 4.5 shall be followed for only Arno conv motor while the steps no.4.1 to 4.3 are applicable for Arno and Auxiliary motor rotors.
- 4.7 While repairing any rotor with crack d bars, replace all the bars and both the end rings, by new bars and end rings.
- 4.8 Rotor bars should be "Araldite" only in the middle third of the rotor slots leaving the end portion free for expansion and contraction
- 5.0 Drawing/sketch no. .
- 6.0 Agency for Implementation
- i) All electric loco shed and shops of Indian Railways.
 - ii) EMU car sheds.
- 7.0 Periodicity of Implementation
- (i) During every 'IC' inspection schedule for Arno rotors only.
 - (ii) Whenever any abnormal sound is reported from rotor of Arno and Auxiliary motors.
- 8.0 References :
- Reliability Engineering study on electric locomotives part-12 for Arno Failure, prepared by RITES, New Delhi.
- 9.0 Sources for procurement of the measuring instrument.
- (i) Electric Motor checker EMC-22 excluding search coil
Marketed by
M/s SPM Instrument Pvt. Ltd.,
7-1-27/1, Srinivasa Complex,
1st floor, 'B' Block, Amarnet,
Hyderabad-500 016.
- 10.0 Distribution
- As per enclosed list.

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



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| REF: | SCALE: | APPROVED <i>DeSne</i> FOR D |
| SEARCH COIL FOR ROTOR BAR AND END RING CRACKS. | | |
| R.D.S.O. ELECT.DTE. | SKEL-4320 | |