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भारत सरकार - रेल मंत्रालय  
अनुसंधान अभिकल्प और मानक संगठन  
लखनऊ - 226 011  
Government of India-Ministry of Railways  
Research Designs & Standards Organisation  
LUCKNOW - 226 011

No. EL/3.2.66

Dated 16.9.1997

### **Modification Sheet No. RDSO/WAM4/198.**

1. **Title :** Improvement in the design of armature shaft of TAO-659 Traction Motors.
2. **Application :** TAO-659 TRACTION MOTORS.
- 3.0 **Object :** Since very beginning, TAO-659 Traction Motors are failing on account of the breakage of armature shaft at the set ring groove zone. On investigation in the past, it was noticed that these failures were due to the improper machining of set ring groove which causes development of fatigue stresses at set ring zone.

To overcome this type of failures and also to improve the performance of TAO 659 Traction Motors, RDSO had earlier issued a modification sheet No.RDSO/WAM4/90 in 1980. After this a lot of other improvements like - increasing the shaft dia from 120 mm to 140 mm, 102 mm to 110 mm, modified set ring groove dimension, adoption of modified set ring and retaining ring had been suggested and incorporated in the design of armature shaft under the guidance of RDSO.

In spite of the above mentioned modifications, it had been noticed that the failure of TAO 659 traction motors on account of the failure of armature shaft at the set ring groove could not be eliminated completely and Zonal Railways are still reporting the cases of failure of armature shafts even in the modified armature shaft. In view of this, it is recommended to consider this defect as a type defect for the armature shaft of TAO-659 Traction Motors.

Hence, it is proposed to eliminate the set ring groove and manufacture the new armature shaft similar to Hitachi Traction Motors design.

On the advice from RDSO, TMW/Nasik, C. Rly. have modified 5 armatures which are working without any problem for the last more than one year.

M/s BHEL have also prepared drawing for modified armature shaft and armature sleeve which are approved by RDSO. BHEL will also cut in this modification shortly.

In view of the above, it is recommended to eliminate the set ring groove and in future armature shafts may be manufactured.

without set ring groove as per RDSO Drawing No. SKEL. 4415 and corresponding modified armature sleeve as per Drg. No. SKEL. 4416. Alternatively, modified additional sleeve to RDSO Drg. No. SKEL. 4412 may be provided on existing armatures during reshafting.

#### **4.0 Work to be carried out :**

This modification should be implemented during reshafting of armature shaft.

#### **4.1 Adoption of modified armature shaft and armature sleeve :-**

- Remove the wornout/broken armature shaft from the stacked armature core.
- Reinsert the modified armature shaft manufactured as per RDSO Drg. NO.SKEL.4415 in the stacked armature core and mount the armature sleeve manufactured as per RDSO DRg. No. SKEL. 4416 as per existing procedure.

OR

**4.2 Adoption of Modified Armature Shaft, existing armature sleeve with modifies additional sleeve :**

- Remove the wornout/broken armature from the stacked armature core.
- Reinsert the modified armature shaft manufactured as per RDSO Drg. NO. SKEL.4415 in the stacked armature core and mount the armature sleeve and additional sleeve manufactured as per RDSO Drg. No. SKEL. 4412 as per existing procedure.

**Note :** Care should be taken while removing the wornout/broken armature shaft from the stacked armature core so that no damage occurs to stacked armature core.

**5. Reference Drgs. :**

RDSO Drg. No. SKEL. 4415 for modified armature shaft, SKEL. 4416 for modified armature sleeve and SKEL. 4412 for modified additional sleeve.

**6. Periodicity of implementation :**

- During reshafting of armature shafts.
- During On new Traction Motor.

**7. Agency of implementation :**

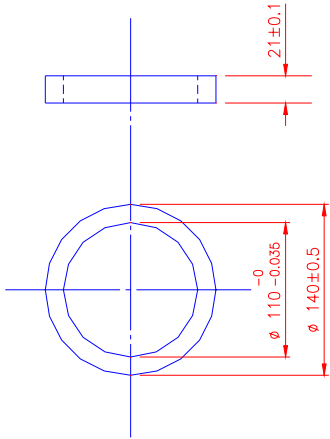
- POH/repair shops
- Traction Motor shops
- Traction Motor manufacturers.

**8. Distribution : As per enclosed list.**

DA: As Above.



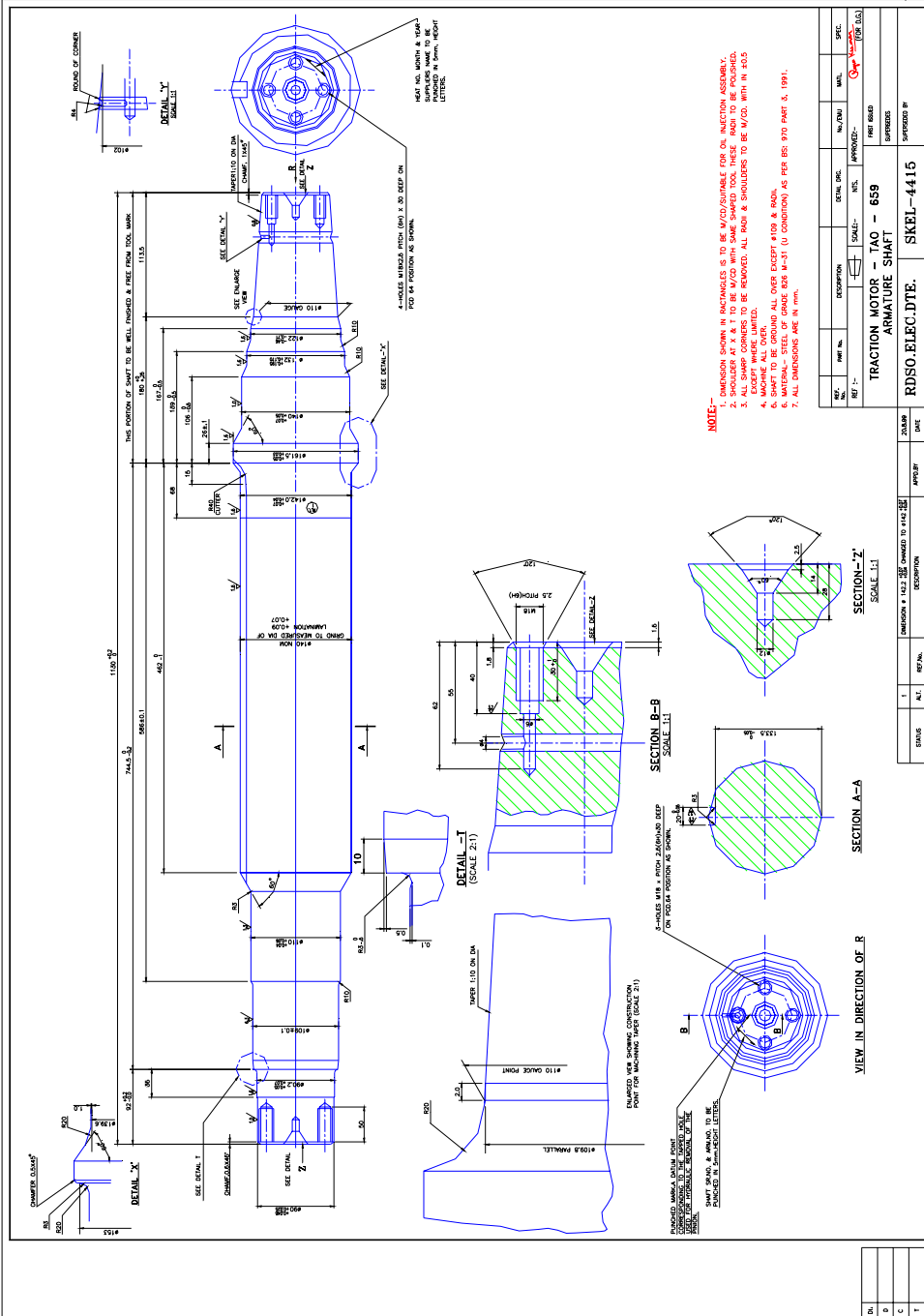
(R. K. Kulshrestha )  
for Director General/(Elec.)



MATERIAL – MILDSTEEL AS PER IS:961–75.St–55 HTW.


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|---|-------------|--|
| REF:–   | SCALE:– NTS | APPROVED:–<br><i>Rajiv Kumar</i><br>FOR D.G. |
| TM TYPE TAO–659<br>MODIFIED ADDITIONAL SLEEVE |             |  |
| RDSO. ELECT. DTE.                             |             | SKEL – 4412                                  |

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| Dt: 20.6.97  |  |
| D: S.CHANDRA |  |
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| REF. NO.               | PART NO. | DESCRIPTION   | DETAILS   | NO./QTY       | MAIL | SPEC. |
| REF. 1                 |          |  | SCALE 1:1 | APPROVED 1:   |      |       |
| TRACTION MOTOR TAO-659 |          |   |           |               |      |       |
| ARMATURE SLEEVE        |          |   |           |               |      |       |
|                        |          |   |           | FIRST DRAFT   |      |       |
|                        |          |   |           | SUPPOSED      |      |       |
| RDSO. ELECT. DTE       |          |   |           | SUPERSEDED BY |      |       |
|                        |          |   |           | SKEI-4416     |      |       |

| STATUS | ALT. | REF No. | DESCRIPTION | AMOUNT | DATE |
|--------|------|---------|-------------|--------|------|
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