

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
RESEARCH DESIGNS & STANDARDS ORGANISATION
MANAK NAGAR , LUCKNOW 226 011

INSTRUCTION NO. TI/IN/0015 REV '0'

**INSTRUCTION FOR APPLICATION OF LUBRICANT ON WIRE ROPE
USED WITH AUTO TENSIONING DEVICES**

1.0 General:

Lubrication is recommended for the maintenance of wire ropes & this is indicated in para 6.8 of RDSO specification No. TI/SPC/OHE/WR/1060. The lubrication of wire rope is a field; where from considerable amount of savings can be achieved by ensuring that the ropes are correctly lubricated. A rope is fully protected when each individual wire in it is lubricated. It is essential that the lubricant reaches deep into layers to avoid inter layer abrasion.

When wire rope passes around sheaves or drums, wires and strands move relative to each other to compensate for the difference in their diameters i.e. between inside and outside of each layer in the rope. Abrasion occurs between the wires as they move over the pulley (smaller the sheave diameter, the greater is the adjusting movement and thus more rapid is the wear). Every wire of the rope must be free to move and adjust, unless it is lubricated, this essential movement/adjustment cannot take place.

Lubricant protects the wire rope from external corrosion. Fatigue life of rope is greatly extended by proper lubrication, when the wires can move freely to equalize the stress distribution.

2.0 Objective:

The lubrication applied during manufacturing of ropes (before stranding and closing) is adequate only for initial storage and for the early stage of the rope's working life (one year from date of manufacture), to reduce internal abrasion, exclude external moisture and to avoid corrosion. It must be supplemented at regular intervals during service to prevent deterioration of wire ropes.

3.0 Methods for Application of Lubricant: Method of application of lubricant on the wire rope depends upon the viscosity of the lubricant, length of rope involved and limitation of space constraints for on line application.

3.1 Existing Practice on IR : Application of lubricant in field during service is normally accomplished by any one of following methods.

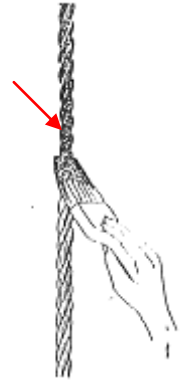
1. **SWABBING:** A rag is dipped in the lubricant and is used to swab the lubricant on to the rope as shown in Fig 1. The lubricant may also be applied by hand with leather gloves. Leather is preferred to canvas because of its greater protection and less penetration of grease.



Fig-1

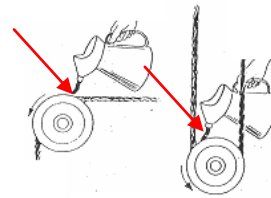
2. **BRUSHING:** The brush is dipped into the lubricant and applied as shown in Fig.-2.

Fig.-2.



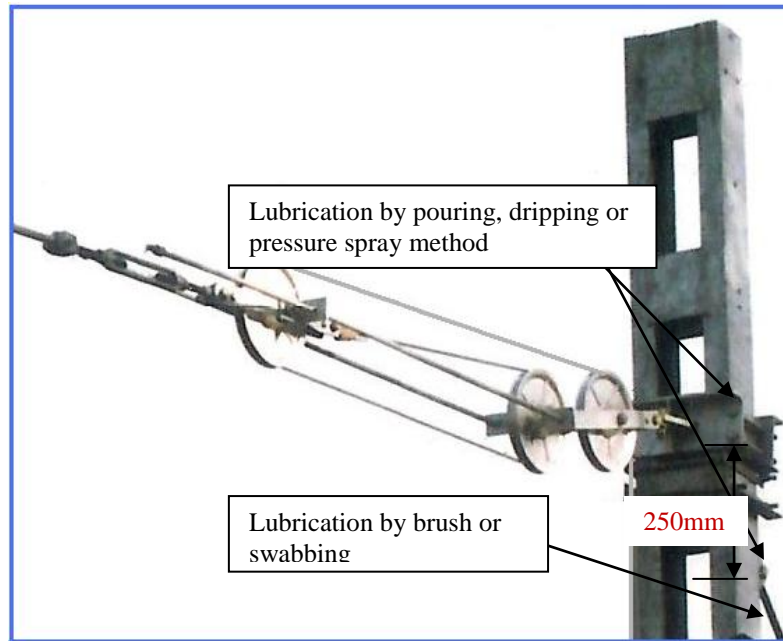
3. **POURING AND DRIPPING :** Lubricant is poured or dripped on the portion of the rope passing over the sheave as shown in Fig-3.

Fig.-3



3.2 Recommended Practices during AOH:

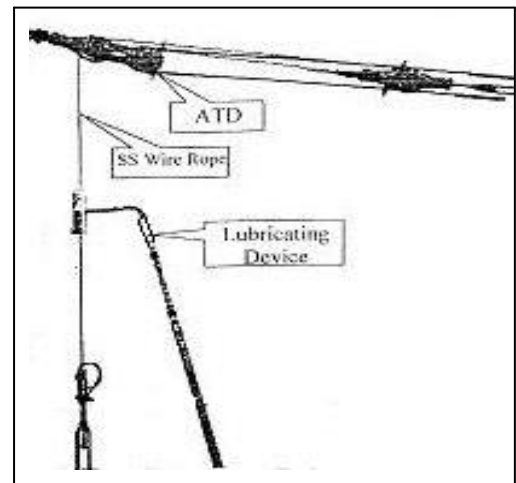
- 3.2.1 To ensure proper lubrication of each wire & strand of wire rope, it is recommended that lubricant is applied with adequate pressure.
- 3.2.2 The surface of the ropes usually gets covered with dirt, dust or other material during storage and in service. This covering prevents lubricants being applied in the field from penetrating into the wires of the rope. Therefore, ropes should be dried and cleaned prior to lubrication. For this purpose, a jet of air and wire brushing methods for drying and cleaning of wire rope during AOH can be used .
- 3.2.3 In the field, during AOH the straight portion of the rope towards counter weight (leaving 250mm vertical length of rope from center line of mast side pulley towards counter weight) shall be lubricated with lubricant “Balmerol Rope Lube 1000” **by brush/swabbing**”.
- 3.2.4 Lubricant shall also be applied on the portion of rope passing over drum or pulley and upto 250 mm towards counter weight by pouring, dripping or pressure spray method. Location of bent is usually the location where rope’s wire starts breaking due to inter layer abrasion. Rope shall slowly wound and unwound on and off the pulley several times, to work the lubricant. This can be achieved on line by using spring balance.



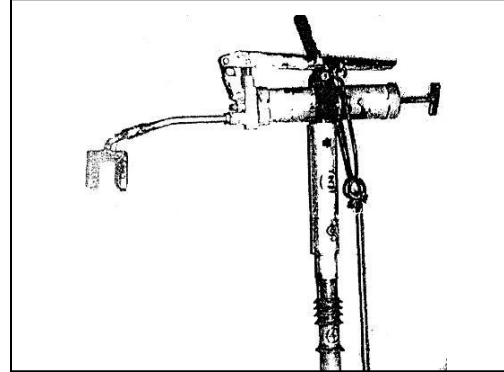
3.2.5 Re-lubrication of stainless steel wire ropes should be carried out regularly right from the beginning of the service life of the rope and not after the first damage has been ascertained. Frequency of application of lubricant may be decided based upon field experience. However, at present RDSO recommends applying the lubricant annually.

3.2.6 Equipments recommended for lubrication during AOH:

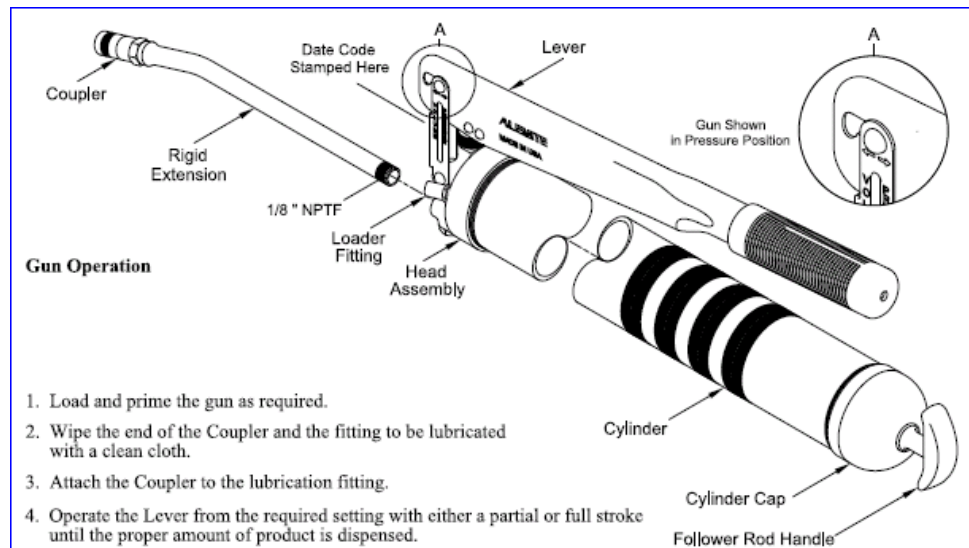
(A) **Wire brushes** recommended for lubrication of straight portion of wire rope in field. Brush and grease gun is fixed through nuts and bolts on an insulated link puller which can be operated from ground by a nylon rope attached to the grease gun.



(B) **Spray Guns:** SS wire rope over the pulley can be lubricated using grease gun with a guide to seat over the pulley. The grease gun can be operated from ground by a nylon rope attached to the grease gun.

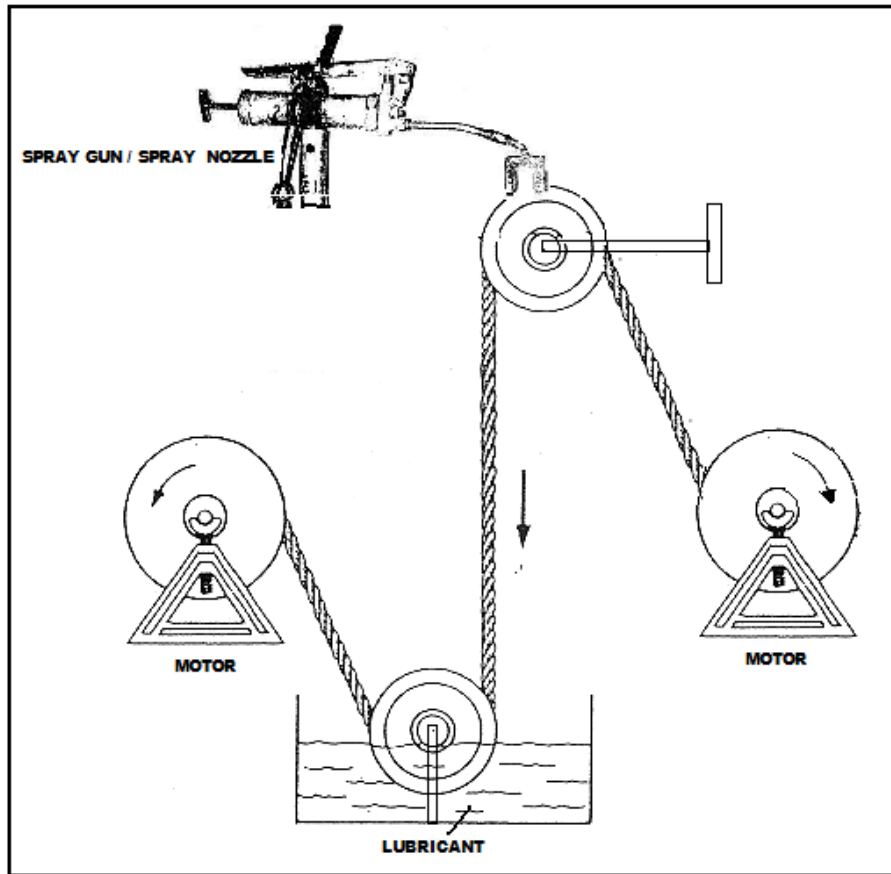


C) **Lever operated Grease Guns:** Recommended for lubricating the wire rope passing over the sheave during AOH.



3.3 Recommended Practices for lubrication during POH: Following methods of lubrication can be adopted for lubricating the wire rope during POH.

3.3.1 Ropes should be dried with a jet of air and cleaned with wire brushing methods before being lubricated. Thereafter, the rope should be passed under the pulley submerged in the lubricant, so that lubricant reaches to all the wires. Lubricant can also be applied through spray gun or spray nozzle on the rope passing over the pulley. One of the arrangements may be as shown below.



4.0 Importance of foot patrolling record

- 4.1 The service life of ropes is directly proportional to the effectiveness of the method used and the amount of lubrication reaching on working parts of the rope. Regular inspection of the rope with frequent application of lubricant produces better results. Proper lubrication and protection of wire rope along with proper alignment is instrumental in increasing its efficiency and ensuring longer service life. In this regard, the record of foot patrolling carried out by TRD staff is quite useful, wherein the staff check the movement of ATD with the help of spring balance and record the status of movement.
- 4.2 Railways to ensure that foot patrolling is being regularly carried out and abnormalities observed by foot patrolling staff are noted by depot incharges & corrective action taken on priority. The abnormality & its compliance report should also be scrutinized by concerned Sr. DEE/TRDs from time to time.

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