

Lubrication

Wire rope is manufactured with lubricant to protect the rope while in storage and transit, and to provide lubrication during the rope's initial operation. WW uses a hot application lubricant in the manufacture of its Bethlehem Wire Rope® mining ropes. Applied to the rope during manufacturing, this heated, low viscosity lubricant becomes a soft solid when cooled and remains on the rope's surface in a thick film to protect the rope from corrosion. Mining ropes are generally heavily lubricated with this type of lubricant, which contains abundant rust inhibitors and water-displacing additives.

For various reasons the originally applied lubricant becomes depleted or contaminated over a period of time and the decision to apply field lubricant in the field must be made.

Rope Lubricant Types

There are two types of cold application lubricants suitable for use on crowd, retract, dump, hoist and drag rope applications.

Heavy-bodied lubricants

Heavy-bodied lubricants are best suited for applications where the rope is exposed to an abusive environment, or where lubricant is applied to the drums and sheaves. Heavy-bodied lubricants typically contain a carrier of some type to improve its viscosity, ensuring the lubricant reaches the rope's inner wires including those in the IWRC. After a short period of time, the carrier dissipates and leaves a heavy, wax-like self-healing lubricant film on the rope, sheaves and drums to provide maximum corrosion and abrasion resistance.

Due to their nature, heavy-bodied field dressings begin to increase in viscosity when temperatures decline. If a heavy-bodied lubricant increases in viscosity (becomes thicker or less fluid) beyond the point of usefulness, as in extremely low

temperatures, it is better to forgo lubrication or temporarily change lubricants than it is to thin or cut back the lubricant with a solvent. The use of solvent is never recommended to thin lubricants or clean ropes for inspection. Not only will the solvent thin the new lubricant, it will also have a negative effect on the remaining lubricant in the rope and actually cause the rope to further dry out.

Light-bodied lubricants

These lubricants are of a light oil consistency and offer excellent penetration to the interior of the rope and the IWRC. Light-bodied lubricants deposit a thin film on the rope wire crowns and are therefore less likely to pick up and carry site contamination debris onto the sheave and drum areas. Some mines may also prefer to use a light-bodied field dressing; light-bodied lubricants leave a light, transparent film and allow for easier inspection in critical hoist areas.

It should be noted that both heavy and light-bodied lubricants for wire rope applications can be easily applied by an automated spray or drip system, resulting in consistent, low-cost application.

Frequency of Field Lubrication

A specific schedule of lubrication frequency needs to be established based upon each application, digging conditions and visual examination. There are some applications where field lubrication may prove detrimental. Where ropes are contaminated with abrasive products from the site, these particles can greatly shorten the life of sheaves and grooves (due to the abrasive characteristic of the contaminants). These applications normally have short rope life, and the original lubricant is adequate for the rope life involved. However, in general, rope service life benefits from proper field lubrication.



Wire Rope Works, Inc.

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Lubrication

Field lubrication:

- Minimizes wear and friction between ropes and sheaves.
- Minimizes corrosion due to atmospheric and/or operating conditions.
- Helps reduce bending fatigue by allowing easier movement between wires and strands.

In effect, field lubrication can extend rope life to the point that it pays for the costs of field lubricant, automatic lubrication systems, and labor costs associated with the field application of lubricant. Field dressing is best applied:

- When the rope surface first begins to show dryness.
- In small, moderate amounts to the rope areas showing the dryness.
- In frequently applied small amounts rather than in frequently applied large amounts. Excessive lubrication causes lube throw-off and, in some instances, rope slippage.
- So that the lubricant can be detected with the touch of the hand as well as being visible between wires.
- With an automatic lubrication system using a spray or drip unit. These units are frequently installed at a convenient location where the rope passes or bends over a sheave.

Never apply used motor oil as a wire rope field lubricant. These lubricants may contain acids that accelerate corrosion of the wire rope.

Field Applied Lubricants

Most quality lubricants designed for wire rope applications are compatible with our lubricant applied during manufacture.

Such lubricants should have water displacement, lubricity and penetrating qualities.

It is best to consult a lubrication supplier for suggested lubricants for field applied wire rope lube.

The use of solvents or used oil is not recommended due to break down of manufacturer's applied lube and acidic properties of used motor oils.

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