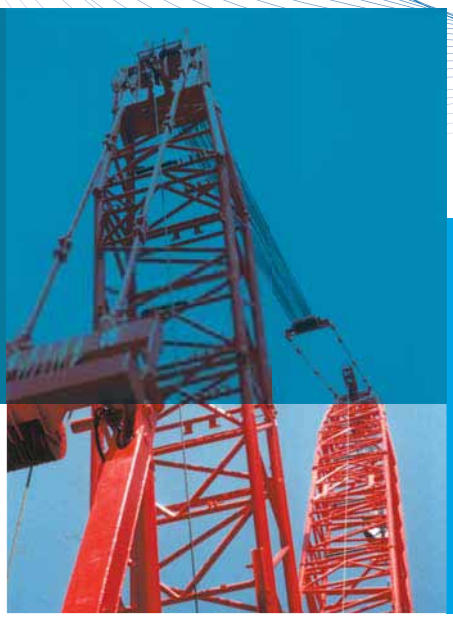
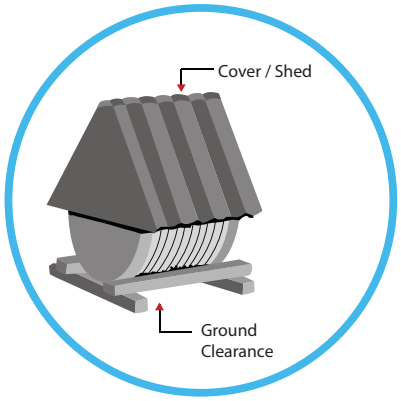
Crane Wire Rope



storage handling & installation procedure

Crane Ropes, like any machine or spares, deteriorate during storage as well as in service. Therefore, the assurance of safety and economy in use of the equipment, dictates the requirement for a procedure of proper storage, handling & installation of Crane ropes.

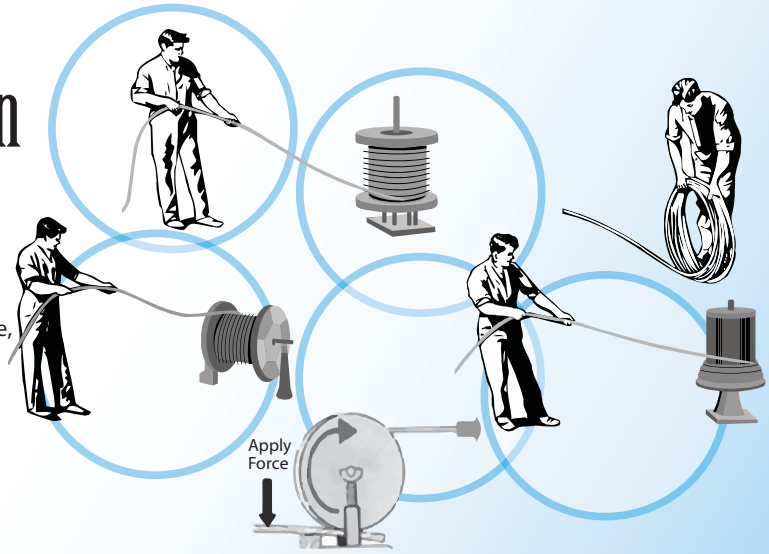


storage

- Store rope in a clean, dry, well ventilated, dust free undercover location.
- Cover the rope with waterproof material and/or canopy, if not stored inside.
- Storage should be free from steam, chemical fumes or any other corrosive agent.
- Avoid direct contact of rope with floor.
- Place reels, preferably over A-frame or cradle and allow flow of air under the reel.
- Avoid rope exposure to elevated temperatures.
- Avoid handling damages to wire ropes.
- Ensure that tag/marking is intact and follow 'first in, first out' principle.
- Inspect rope periodically and, apply suitable rope dressing compatible with manufactured lubricant, whenever necessary.
- Rotate reel periodically, say after every 3 months, particularly in warm environment.

handling & installation

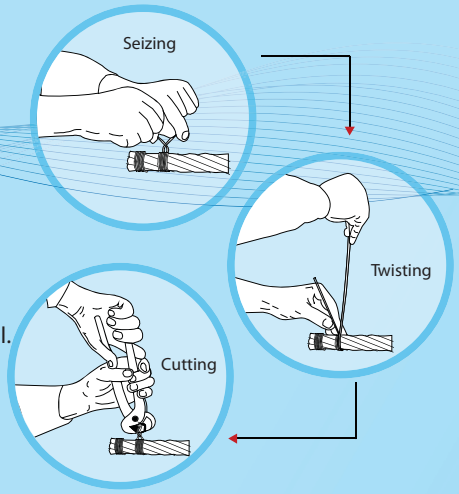
- Never pull out rope from stationary coil.
- Place rope coil on ground and roll out straight.
- If heavy, place coil on turntable and pull the end away from coil.
- Prevent contamination with dust, grit, moisture, chemicals and other harmful material.
- Put a shaft, of adequate strength, through reel bore and place the reel in a suitable stand.
- Allow reel to rotate freely and be braked to avoid overrun.
- Provide back-tension for multi-layer spooling and ensure to wind tightly, particularly the bottom layer.
- Maintain constant tension while reeving and avoid layer cross-over.
- Avoid formation of loops and / or kinks.
- Avoid reverse bend during reeving. Wind / unwind 'top to top' or 'bottom to bottom'.
- Take special care while releasing the outboard end of rope from supplied reel or coil.
- Maintain fleet angle at minimum during installation.



- Check that grooves of all sheaves are as recommended and sheaves are free to rotate.
- Check the diameter and pitch of drum grooves and ensure that these are as recommended.
- 'Run in' the new rope by running the equipment slowly, with a low load for a number of cycles.
- Inspect that the rope spools correctly on the drum and no slackness or cross-over occurs.

cutting the rope

- Apply one serving on either side of cut mark for preformed ropes.
- Apply two servings on either side of cut mark for non-preformed, parallel-closed and rotation-resistant ropes.
- Length of each serving should be at least equal to two rope diameters.
- Cut the rope with a high-speed abrasive disc cutter, flame cutting is not recommended.
- Maintain ventilation during cutting, use mask while cutting special ropes having synthetic material.



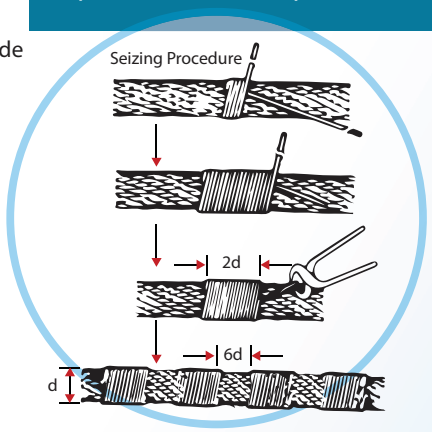
Ungalvanized Wire Rope	Galvanized Wire Rope
Soft, Galvanized Wire	
For 6.0 mm to 24.0 mm wire rope, use 1.0 mm wire	
For 25.0 mm to 36.0 mm wire rope, use 1.6 mm wire	
For 37.0 mm to 56.0 mm wire rope, use 2.0 mm wire	
Seizing Length 2 x $d_{rope\ dia}$	

Rotation – Resistant wire ropes resist rotation under load and hence these are specially designed for the intended purpose. This unique feature, therefore, requires that extra care should be taken during handling, installation and usage of rotation-resistant wire ropes. These ropes cannot and should not be treated in the same manner as 6 or 8 strand preformed wire ropes.

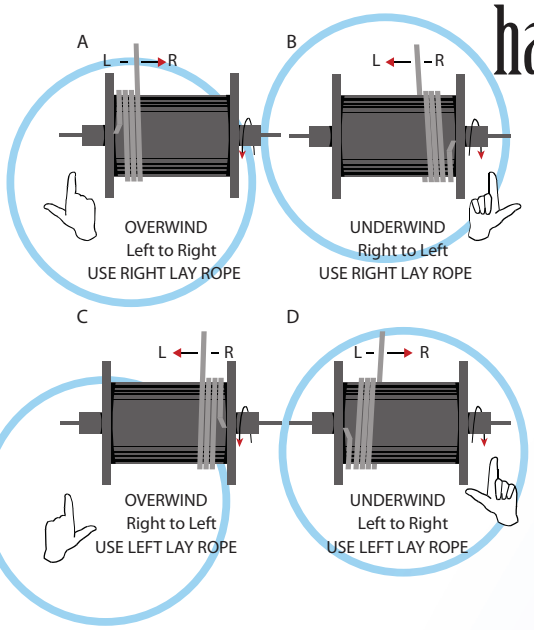
seizing procedure

The purpose of seizing a rotation-resistant wire rope is to prevent relative movement of individual strands of inner core as well as outer layer and thereby preserving its designed integrity and rotational balance. Therefore, before cutting any rotation-resistant wire rope, tightly double seize with soft steel wire of suitable size, on either side of the intended cut. The length of each seizing should be at least equal to 2 x $d_{rope\ dia}$. and each of these seizing should be spaced approximately 6 x $d_{rope\ dia}$.

- Use of adhesive tape in lieu of seizing is strictly prohibited.
- Fusing of cut ends is strongly recommended.



Powerform 18/Hyflex 18	Powerform 35/Hyflex 35
6.0 mm to 24.0 mm wire rope, use 1.0 mm wire	
25.0 mm to 36.0 mm wire rope, use 1.6 mm wire	
37.0 mm to 56.0 mm wire rope, use 2.0 mm wire	
Double seizing & end fusing mandatory	

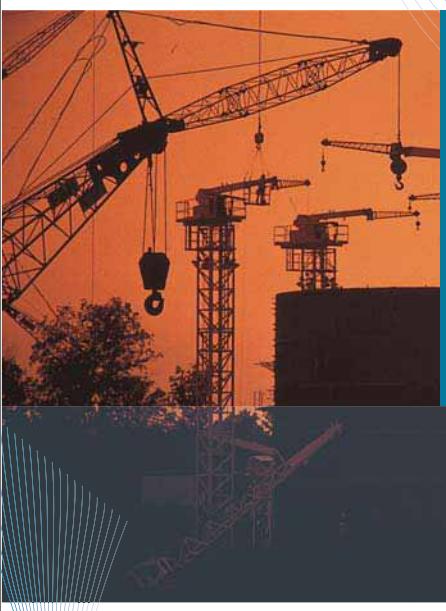


handling & installation

Since rotation-resistant wire ropes have special layering and arrangement of strands they are very sensitive and therefore, they require careful handling and installation in order to avoid deterioration, hoisting problems and premature removal of wire rope. The recommendations given below should be followed in addition to the general ones mentioned overleaf.

- Always wind 'top to top' or 'bottom to bottom' to avoid reverse bends.
- Ensure that wire rope anchorage point corresponds correctly with wire rope lay.
- Provide back-tension and maintain constant winding tension.
- The first and all subsequent layers should be wound tightly and correctly.
- There should not be any rope layer cross-over.
- There should not be any formation of loop or kink.
- Do not weld the old and the new rope during installation.
- Do not induce twist in the new rope, remove if induced.
- A swivel may be used during installation to prevent transfer of torque to new rope.
- Swivels may be used with Hyflex 35 and Powerform 35 ropes but are not recommended for use with Hyflex 18 and Powerform 18, and should never be used with non rotation-resistant wire ropes.
- To adjust to operating condition, 'run in' the wire rope, after proper installation, at reduced speed and load (up to approximately 10% of Working Load Limit) for a number of operational cycles.
- Remove any accumulated torque or turn which is induced during initial stage of operation.

This document is intended to provide general guidelines for storage, handling & installation of wire ropes used on cranes. The user should always refer relevant standard / regulation like EN 12385, ISO 4309 for wire rope care, maintenance & installation.



Crane Wire Rope

discard criteria

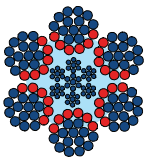
Crane Ropes, must be removed from service if the examination reveals that the rope deterioration has exceeded limits of certain criteria. A general retirement plan states that any one of the factors listed below, severe enough, can cause rope discard. However, rope deterioration and decision to discard, almost always, is the result of cumulative effect of combination of these factors.

• Broken Wires • Diameter Reduction • Corrosion • Deformation

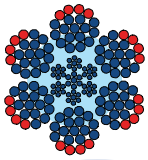
Number & Characteristic of Broken Wire

Crane rope must be considered for discard if number of visible broken wires equals or exceeds the allowable limit. For 6 and 8 strand wire ropes, occurrence of wire breakages, to a large extent is on the outer surface, whereas for rotation-resistant wire ropes, majority of wire breakages are expected to occur internally and require specialized examination techniques to reveal.

The table below specifies the number of visible broken wires, which when equalled or exceeded requires mandatory discard of ropes working on steel sheaves.



Wire Breakages at Valley



Wire Breakages at Crown

- Wire breaks in the strand valley, generally, indicate internal rope deterioration and require closer inspection of the rope. It should be considered for discard if there are two or more such breaks in a length of rope equal to 6 x d.
- Broken wires at, or adjacent to, the termination, require the termination to be remade by shortening the rope, otherwise the rope should be discarded.

Product	Construction	No. of visible broken wires in wire rope length equals	
		6 x d	30 x d
Hyflex 4	4x39	2	4
Hyflex 6/ Powerform 6	6x25 F	5	10
	6x29 F	6	11
	6x26 SW	6	13
	6x31 SW	8	16
	6x36 SW	9	18
	6x41 SW	10	21
Hyflex 8/ Powerform 8	8x25 F	6	13
	8x26 SW	9	18
	8x31 SW	10	21
	8x36 SW	12	24
	8x41 SW	14	28
Hyflex 18/ Powerform 18	18x7 18x19 S 18x26 SW	2	4
Hyflex 35/ Powerform 35	35x7 35x19 S 35x26 SW	2	4

- Concentrated close group of broken wires in a rope length of 6 x d or in any one strand, require discard of the rope even if the numbers given above are not reached.
- Complete fracture of one strand or collapse of core requires immediate discard of the wire rope.

rope diameter reduction

Rope diameter may reduce due to one or a combination of these factors:

- Internal wear and/or wire indentation
- External wear due to abrasion of crowns of outer wires
- Deterioration or collapse of core (fibre/steel) or internal layers of multi-layer rotation-resistant ropes.

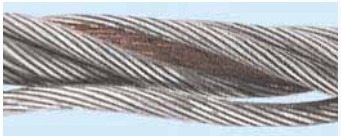
The rope should be discarded :

- If rope diameter reduction exceeds 7% of nominal rope diameter, only due to external wear.
- If rope diameter reduction exceeds 3% of nominal rope diameter for rotation resistant ropes and exceeds 10 % for other 6 and 8 strand wire ropes, due to reasons other than external wear.

corrosion

Corrosion may occur on the outer surface of the wire rope, which can be detected visually, or on the internal layers of the wire rope, which is more difficult to detect. The following conditions justify immediate discard of wire rope:

- Wire slackness due to corrosion of external wires
- Confirmation of severe internal corrosion



Corrosion

deformation

Permanent distortion from its original shape and orientation is termed as deformation.

The following common forms of distortion, require immediate discard of the wire rope:

- Birdcage or Basket formation
- Wire, Strand or Core Protrusion and/or Distortion
- Kink or Loop formation
- Localized diameter increase in excess of 5% of actual rope diameter
- Localized rope diameter reduction and lay length variation associated with severe waviness

Kink or Loop formation

Distortion

Deformation

The rope should be examined by a competent person who should always refer relevant code/recommendation/ standard (like ISO:4309) for deciding rope discard.