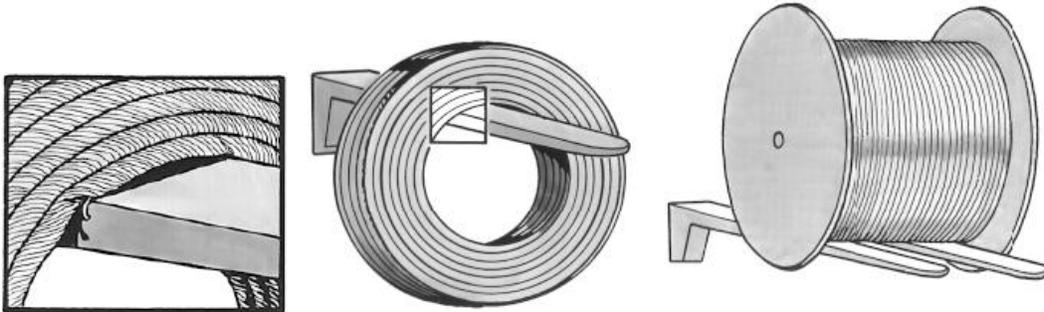


WIRE ROPE HANDLING & INSTALLATION

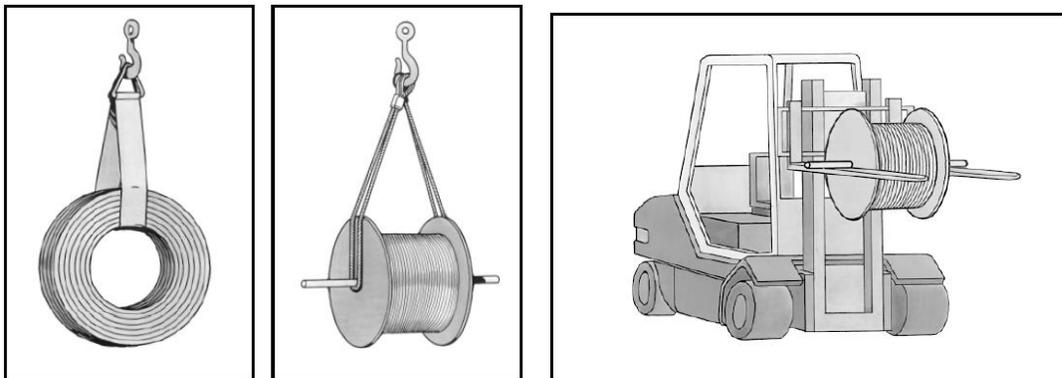
RECEIVING

On arrival, the rope should be carefully checked to make certain that the delivered product matches the description on tags, requisition forms, packing slips, purchase order, and invoice.

Wire rope received in coils or on reels should not have any contact with a metal hook or the fork of a forklift truck.



Instead, it should be lifted using a wide webbing sling or by means of a shaft put through its axis bore. If the fork of the forklift truck is longer than the width of the reel, the reel can also be lifted at the flanges.



Handling and installation of the rope should be carried out in accordance with a detailed plan and should be supervised by a competent person.

Incorrectly supervised handling and installation procedures may result in serious injury to persons in the vicinity of the operation as well as those persons directly involved in the handling and installation.

WIRE ROPE HANDLING & INSTALLATION

UNREELING AND UNCOILING

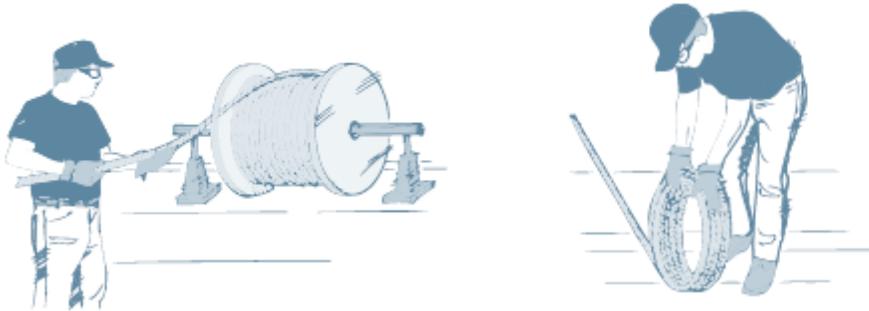
Handling and installation of the rope should be carried out in accordance with a detailed plan and should be supervised by a competent person.

Incorrectly supervised handling and installation procedures may result in serious injury to persons in the vicinity of the operation as well as those persons directly involved in the handling and installation.

The Right Way to Unreel and Uncoil A Wire Rope

There is always a danger of kinking a wire rope if you improperly unreel or uncoil it. You should mount a reel on jacks or a turntable so that it will revolve as you pull the rope off.

CORRECT WAYS TO UNREEL AND UNCOIL WIRE ROPE



Coils

With a coil, stand it on edge and roll it straight out ensuring that it does not become contaminated with dust/grit, moisture or any other harmful material. You may also place a coil on a revolving stand and pull the outside end of the rope allowing the coil to rotate.

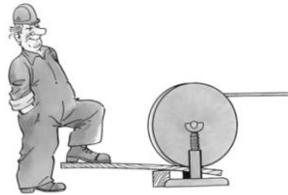
Never pull a rope away from a stationary coil as this will induce turn into the rope and kinks will form. These will adversely affect rope performance.

Reels

Pass a shaft through the reel and place the reel in a suitable stand which allows it to rotate and be braked to avoid overrun during installation. One method of braking is to apply sufficient tension by means of a board acting as a brake against the reel flange to keep slack from accumulating.

WIRE ROPE HANDLING & INSTALLATION

UNREELING AND UNCOILING, Con't

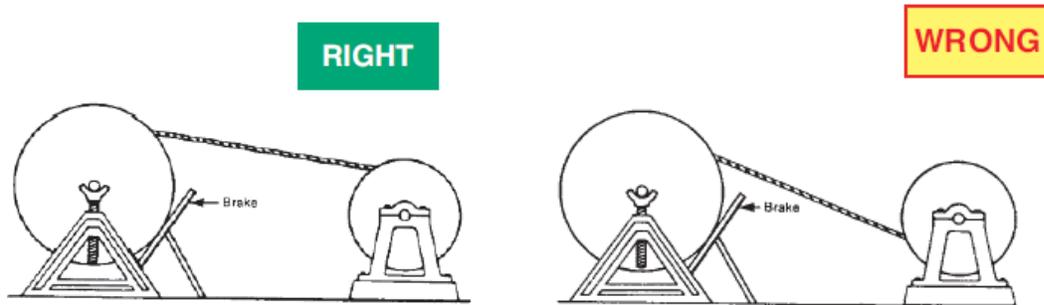


Position the reel and stand such that the fleet angle during installation is limited to 1.5 degrees.

If a loop forms in the rope ensure that it does not tighten to form a kink.

A kink can severely affect the strength of a six strand rope and can result in distortion of a Rotation-Resistant rope leading to its immediate discard.

Ensure that the reel stand is mounted so as not to create a reverse bend during the reeving.



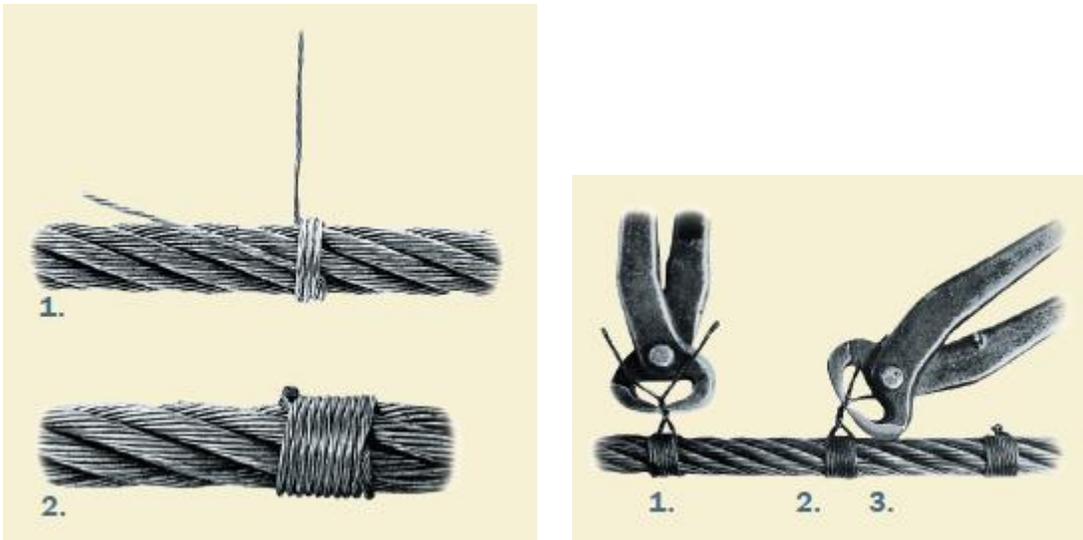
When releasing the outboard end of the rope from a reel or coil, ensure that this is done in a controlled manner. On the release of the bindings and servings used for packaging, the rope will want to straighten itself from its previously bent position. Unless controlled, this could be a violent action. Stand clear!

Failure to control could result in injury.

WIRE ROPE HANDLING & INSTALLATION

SEIZING WIRE ROPE & CUTTING

When a rope is to be cut – even though it has been preformed – you should carefully seize it to prevent displacement or relative movement of the wires or strands. Seizing strand or annealed wire should be used. The important point is that you must draw the servings down tight to prevent any strand being even slightly displaced. After all the seizings are secure, then you may cut the rope. Normally, one seizing on each side of the cut is sufficient. For non-preformed ropes or rotation-resistant ropes, a minimum of three seizing on each side is necessary. The two bands of seizing closest to the cut should be located at a distance equal to one rope diameter away from the cut. The four remaining bands of seizing should be evenly spaced at a distance equal to three rope diameters.



1. Lay one end of the seizing in the groove between two strands in the wire rope and wrap the other end tightly over the portion in the groove winding around the rope for a length equal to two rope diameters. Twist ends of the seizing strand together by hand.
2. Continue twisting with pliers to take up slack and tighten.
3. Twist seizing strand tightly against serving, winding twisted strand into knot before cutting off ends of the strand. Pound knot snugly against rope.

<u>Rope Diameters</u>	<u>Suggested Seizing Wire Diameters</u>
1/8 – 5/16	0.032
3/8 – 9/16	0.048
5/8 – 15/16	0.063
1 – 1-5/16	0.080
1-3/8 – 1-11/16	0.104
1-3/4 & larger	0.124

WIRE ROPE HANDLING & INSTALLATION

SEIZING WIRE ROPE & CUTTING, Con't

Cut the rope with a high speed abrasive disc cutter. Other suitable mechanical or hydraulic shearing equipment may be used although not recommended when a rope end is required to be welded or brazed.

When using a disc cutter be aware of the danger from sparks, disc fragmentation and fumes.

Ensure adequate ventilation to avoid any build-up of fumes from the rope and its constituent parts including any fiber core (natural or synthetic) and rope lubricant(s) and any synthetic filling and/or covering material.

Rope produced from carbon steel wires in the form shipped is not considered a health hazard. During subsequent processing (e.g. cutting, welding, grinding, cleaning) dust and fumes may be produced which contain elements that may affect exposed workers.

The products used in the manufacture of steel wire rope for lubrication and protection present minimal hazard to the user in the form shipped. The user must however, take reasonable care to minimize skin and eye contact and also avoid breathing their vapor and mist.

WIRE ROPE HANDLING & INSTALLATION

INSTALLATION

Wire rope service life is affected by several factors, including:

- The manner in which you install and “break in” your new rope.
- The operating technique and work habits of the machine operators.
- Physical maintenance of the rope throughout its service life.
- Physical maintenance of the system in which your rope operates.

Install Your Rope Correctly

The primary concern when installing a new rope is to not trap any twist in the rope system. Proper handling of the rope from the reel or coil to your equipment will help avoid this situation.

Unload Rope Properly And Relieve Any Twists

Pull the rope off the shipping reel or unroll it from the shipping coil as outlined in the guidelines for unreeling and uncoiling. Then lay the rope on the ground in a direct line with the boom. This helps release any twist in the rope.

Attach Rope’s End To Drum

Pull the rope over the point sheave and attach the end to the drum. Before making any end attachment, be sure the rope strands are free to adjust. (In other words, make sure the end of the rope is not welded together.)

Wind Rope Onto Drum Slowly And Carefully

At this point, it isn’t necessary to provide additional load other than the weight of the rope being pulled across the ground.

Spool First Layer Tightly

It’s essential on smooth-faced drums that the first layer is spooled with wraps tight and close together since the first layer forms the foundation for succeeding layers. If need be, use a rubber, lead or brass mallet (but never a steel hammer) to tap the rope in place.

Spool Multiple Layers With Sufficient Tension

It’s very important to apply a tensioning load to the ropes during the breaking-in process. If not, wraps in upper layers will pull down between wraps already on the drum, which can cause crushing damage and reduced rope strength and service life. Spooling the remaining rope on the drum should be done with a tension approximately 1% to 2% of the rope’s minimum breaking force.

Any looseness or uneven winding will result in excessive wear, crushing and distortion of the rope.

WIRE ROPE HANDLING & INSTALLATION

INSTALLATION, Con't

For Ropes In Multi-Part Systems

Reeve the traveling block and boomtip sheaves so the rope spacing is maximized and the traveling (hook) block hangs straight and level to help assure block stability. Avoid dead-ending the rope at the traveling block if possible.

Check Rope For Twist

With the rope slack, pull enough rope out to allow it to hang in a loop. If the rope hangs without twisting together, there is no twist in the rope. If the rope twists together, the rope has twist in it.

Break In Your New Rope Properly

A new wire rope requires careful installation and following all the appropriate guidelines previously noted. After the rope is installed and the ends secured in the correct manner, the equipment should be started carefully and then permitted to run through a cycle of operation at very slow speed. With the boom fully raised – and fully extended if you're using a hydraulic boom – attach a light load at the hook and raise it a few inches off the ground. Allow to stand for several minutes. Then cycle the load between the full “up” and “down” positions several times. During this trial operation, closely watch all working parts – sheaves, drums, rollers – to make certain that the rope runs freely, and without any possible obstructions as it makes its way through the system. If no problems appear in running the rope, the next step should include several repetitions of the normal operational cycle under increasing loads and speeds. This procedure allows the component parts of the new rope to make a gradual adjustment to the actual operating conditions. Taking the time and effort to perform these breaking in procedures should result in obtaining the optimum service life from the wire rope.

Always Leave Three Wraps On Drum

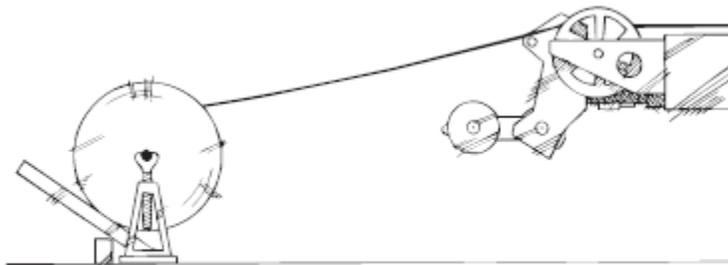
Although ASME B30.5 states that two wraps must remain on the drum when the hook is in the extreme low position, we recommend at least three wraps always remain on the drum.

WIRE ROPE HANDLING & INSTALLATION

INSTALLATION, Con't

Rigging In Tight Quarters

If you can't lay the new rope out on the ground before rigging – and you need to pull it directly from the reel – further steps are necessary. First, you should mount the reel on a shaft through the flange holes and on jack stands, making sure you spool as illustrated below. While unspooling, do not allow the reel to “free-wheel”. Brake the reel by applying pressure to a flange. Never apply braking pressure to the rope on the reel – or pass the rope between blocks of wood or other material.



Install from reel top over the point sheave.

SPECIAL HANDLING INSTRUCTIONS FOR ROTATION-RESISTANT WIRE ROPE

Use Extra Care – The very nature of rotation-resistant ropes requires special handling, selection and usage. The operational properties of this type rope are the result of the relationship of the lay of the outer strands to the inner strands. The outer strands are not preformed and must be tightly restrained to maintain the rope's operational properties.

Seizing Wire Rope & Cutting

The purpose of seizing a rotation-resistant rope is to maintain its balance by preventing movement of the individual strands and lay lengths. Die drawn (compacted) rotation-resistant wire ropes are very sensitive. Die drawing enhances the strands' ability to rotate against themselves, eliminating the normal ratchet effect of non-die drawn designs. It is therefore imperative that rotation-resistant ropes, particularly those of a die drawn design, are properly and tightly seized. The use of electrical tape or duct tape for seizing is unacceptable. Tape cannot provide the holding power needed to restrain the outer and inner strands.

- Before cutting the rope make three separate bands of seizing on each side of where the cut is to be made.
- The cut should be made with an abrasive saw. Immediately after the cut, both ends are welded together, preventing any movement between them. The outer strands must not be able to move with respect to the inner strands. The weld must not exceed the diameter of the rope.
- Once cuts and welding have been completed, the seizing bands are to be left in place if possible.

CATEGORY 1 ROTATION-RESISTANT WIRE ROPE

has at least 15 outer strand, has three layers of strands (over a center) and has little or no tendency to rotate, or, if guided, transmits little or no torque.

A Category 1 rotation-resistant rope features a unique design that minimizes the torque and rotation of the rope at normal load ranges of zero to 20% of the rope's minimum breaking force.

Because Category 1 rotation-resistant wire ropes are manufactured with little or no performing, it is critical to not remove the welded ends. If the welded ends are removed the rope can become unbalanced.

Category 1 rotation-resistant wire ropes may be used with a swivel.

**SPECIAL HANDLING INSTRUCTIONS
FOR ROTATION-RESISTANT WIRE ROPE**

Con't

CATEGORY 2 ROTATION-RESISTANT WIRE ROPE

has 10 or more outer strands, has two or more layers of strands (over a center) and has a significant resistance to rotation.

Category 2 rotation-resistant wire ropes are shipped with the ends seized as they are prepared for cutting. You can usually install seized ropes without further preparation. In some cases, though, tight openings in drums and wedge sockets – or even complicated reeving systems – require special end preparation. Then, the strands must be tightly held without increasing the rope diameter. In such cases, the ends are welded or fused. **The welding or fusing of the rope must be cut off in a manner that leaves the strands and wires free to adjust before you clamp the rope or seat it in an end termination.**

Category 2 rotation-resistant wire ropes should **NOT** be used with a swivel.

CATEGORY 3 ROTATION-RESISTANT WIRE ROPE

has no more than 9 outer strands, has two layers of strands (over a center) and has limited resistance to rotation.

Category 3 rotation-resistant wire ropes should **NOT** be used with a swivel.

Because rotation-resistant ropes are special, there are separate design, maintenance, inspection and removal criteria established for them in many industry regulations and standards. Rotation-resistant ropes must be replaced when you see two randomly distributed crown wire breaks in six rope diameters – or four randomly distributed crown wire breaks in 30 rope diameters. If any significant reduction in diameter is found in a short length of a rotation-resistant rope, the rope needs to be replaced.

Rotation-resistant ropes must be used with a minimum design factor of 5.0.

SWIVELS

Under certain circumstances it may be necessary to use a swivel in a lifting system to prevent rotation of the load. It is possible however, that the use of a swivel will have an adverse affect on rope performance and may in some cases damage the wire rope.

There are many types of accessories available that incorporate different types and degrees of rotation preventing swivels. The swivel may be either an independent accessory or an integral part of a lifting device such as a crane block with a swivel hook. A typical independent accessory is a ball bearing anti-friction swivel.

The type of swivel that causes the most concern from the standpoint of the wire rope is the independent anti-friction swivel that attaches directly to the rope. The purpose of using a swivel in a lifting system is to prevent rotation of the load. This then allows the wire rope to rotate. Excessive rope rotation can damage a wire rope.

