

## WIRE ROPE INSPECTION

It is essential to have a well-planned program to ensure regular inspections are carried out by an experienced inspector. All wire rope in continuous service should be checked daily during normal operation and inspected on a weekly basis. A complete and thorough inspection of all ropes in use must be made at least once a month. Rope idle for a month or more should be given a thorough inspection before it is returned to service. A record of each rope should include date of installation, size, construction, length, extent of service and any defects found. The inspector will decide whether the rope must be removed from service. (This decision will be based on, details of the equipment on which the rope has been used, maintenance history of the equipment, consequences of failure and experience with similar equipment.)

## MEASURING WIRE ROPE DIAMETER (Figure 1.0)

The true diameter of a wire rope is the diameter of a circle enclosing it. For this reason, measurements to determine the size of the rope should be taken across the largest cross sectional dimension. See illustration for more details.

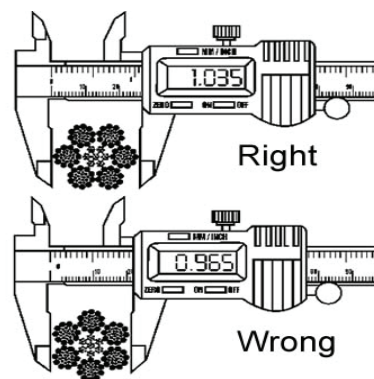
## UNREELING & UNCOILING WIRE ROPE (Figure 2.0)

*Caution: Great care must be taken when removing wire rope from reels or coils.*

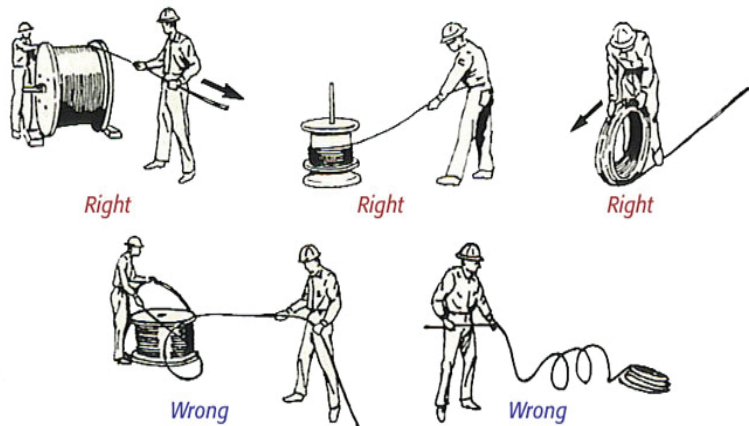
Looping the rope over the flange of the reel or pulling the rope off a coil while it is lying on the ground will create loops in the line. Pulling tighter on these loops will result in kinks, thereby permanently damaging the wire rope. See illustration showing the correct and incorrect ways of unreeling and uncoiling your wire rope.

## WINDING ON A DRUM (Figure 3.0)

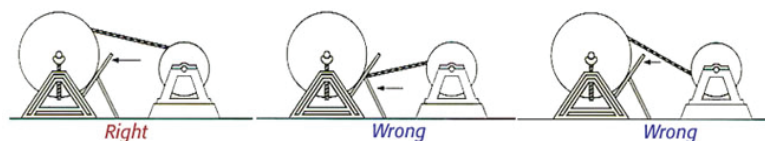
When wire rope is wound onto a drum, it should bend in the same manner it was originally wound - this will avoid causing a reverse bend in the rope. (Always wind wire rope from the top of the one reel onto the top of the other or reeling from the bottom of one reel to the bottom of another.) Re-reeling may also be done with reels having their shafts vertical, but care must be taken to ensure that the rope always remains taut - it should never drop below the lower flange of the reel. (A reel resting on the floor with its axis horizontal may also be rolled along the floor to unreel the rope.)



Checking the diameter (Fig. 1.0)



Unreeling/Uncoiling (Fig. 2.0)



The right and the wrong way to wind wire rope from reel to drum

(Fig 3.0)

## WINDING ON A DRUM/cont.

(Figure 3.1)

If the drum is grooved, the end of the rope must be secured to the drum by means that will give the end termination at least as much strength as is specified by the equipment manufacturer. Tension must be maintained on the rope when it is being wound so that the winding proceeds under continuous tension.

On smooth drums, the starting position should be at the correct drum flange so that each wrap of the rope will wind tightly against the preceding wrap. The rope should be properly attached to the drum and again, tension must be maintained as it is wound on the drum to ensure that each wrap is guided as close to the previous wrap as possible.

Note: It is always recommended (regardless of drum type) to have at least three dead wraps remaining on the drum when the rope is unwound during operation.

## INSPECTION OF SHEAVES AND DRUMS (Figure 4.0)

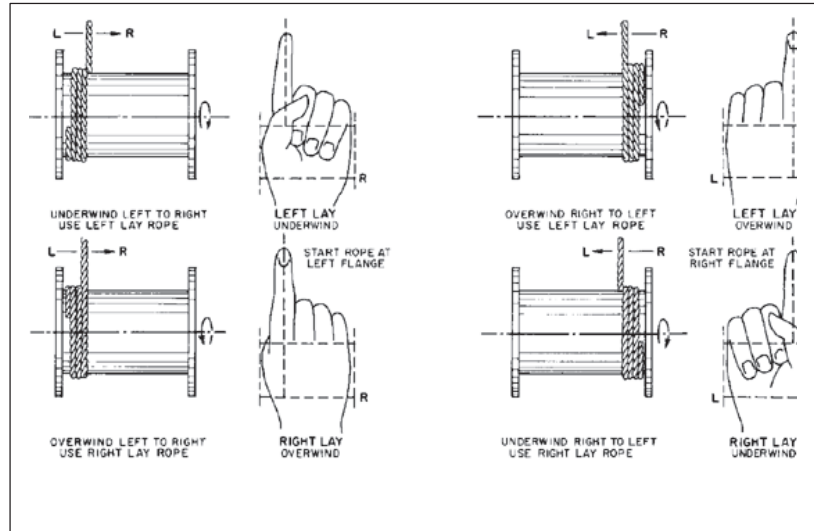
To check the size, contour and amount of wear, use a sheave gauge. The gauge should contact the groove for about 150 degrees of arc.

Also look for corrugation, worn, broken flanges and/or out-of-round sheaves.

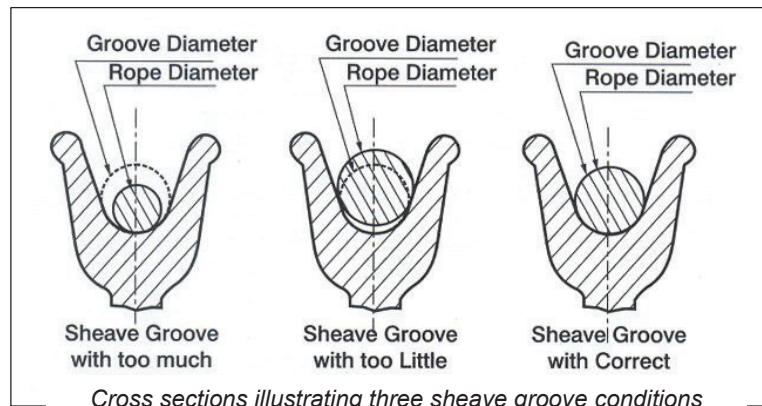
## FLEET ANGLE (Figure 5.0)

Inspect the fleet angle for poor sheave alignment. (The fleet angle is the side, or included, angle between a line drawn through the middle of a sheave and a drum perpendicular to the axis of each, and a line drawn from the intersection of the drum and its flange to the base of the groove in the sheave.) The intersection of the drum and its flange represents the farthest position to which the rope can travel across the drum.

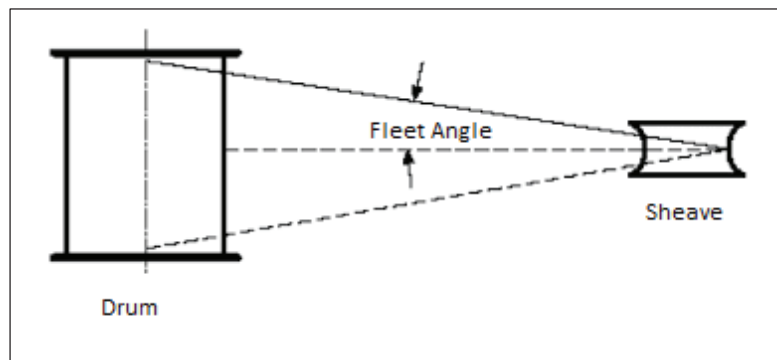
Note: It is important to maintain a proper fleet angle on installations where wire rope passes over a lead sheave and onto a drum.



A simple method of determining how a wire rope should be started on a drum is shown above. The person stands behind the drum, with the rope coming towards him. Using the right hand for right-lay wire rope, and the left hand for left lay wire rope, the clenched fist denotes the drum, the extended index finger the oncoming rope. (Fig 3.1)



(Fig. 4.0)



Fleet Angle (Fig. 5.0)

## FACTORS AFFECTING ROPE PERFORMANCE (Figure 6.0)

**Multi-coiling** of the rope on the drum can result in severe distortion in the underlying layers.

**Bad coiling** due to excessive fleet angles or slack winding can result in mechanical damage in the form of severe crushing, and may cause shock loading during operation.

**Small diameter** sheaves can result in permanent set of the rope, and will certainly lead to early wire breaks.

**Oversized grooves** offer insufficient support to the rope leading to increased localised pressure, flattening of the rope and premature wire fractures. Grooves are deemed to be oversize when the groove diameter exceeds the nominal rope diameter by more than 15%.

**Undersize grooves** in sheaves will crush and deform the rope, often leading to two clear patterns of wear and associated wire breaks.

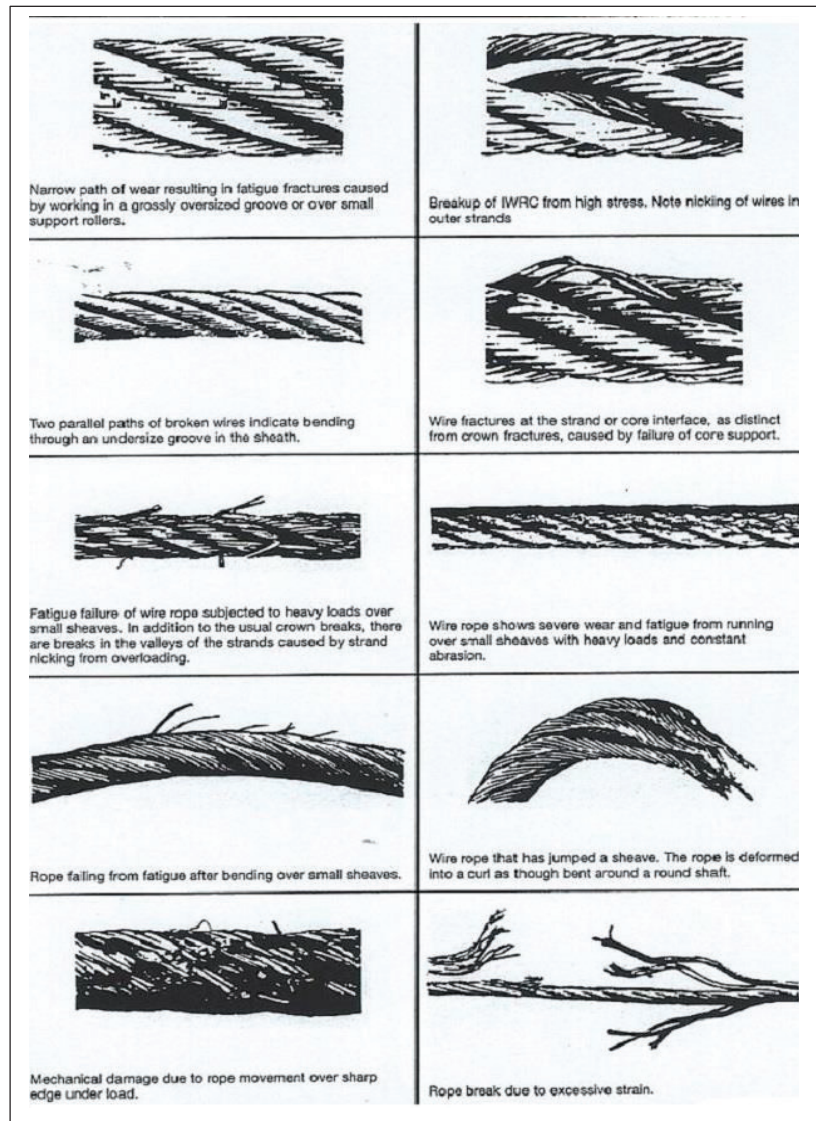
**Excessive angle** of fleet can result in severe wear of the rope due to rubbing against adjacent laps on the drum. Rope deterioration at the termination may be exhibited in the form of broken wires. An excessive angle of fleet can also induce rotation causing torsional imbalance.

## WIRE ROPE CLIPS (Figure 7.0)

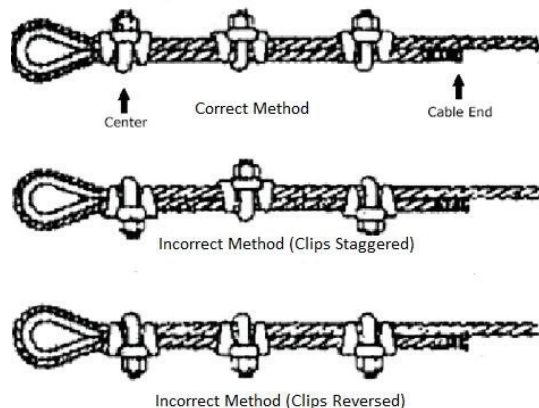
Turn back specified amount of rope from thimble or loop. Apply U-Bolt over dead end of wire rope – live end rests in saddle. (Never saddle a dead horse!) Tighten nuts evenly, alternate from one nut to the other until reaching the recommended torque.

When two clips are required, apply the second clip as near the loop or thimble as possible. Tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten.

When three or more clips are required, space additional clips equally between first two - take up rope slack - tighten nuts on each U-Bolt evenly, alternating from one nut to the other until reaching recommended torque.



Wire Rope Damage (Fig. 6.0)



Wire Rope Clip Installation (Fig. 7.0)