

Inspection—the key to longer, safer wire rope use

Any wire rope in use should be inspected on a regular basis. You have too much at stake in lives and equipment to ignore thorough examination of the rope at prescribed intervals.

The purpose of inspection is to accurately estimate the service life and strength remaining in a rope so that maximum service can be had within the limits of safety. Results of the inspection should be recorded to provide a history of rope performance on a particular job. On most jobs wire rope must be replaced before there is any risk of failure. A rope broken in service can destroy machinery and curtail production. It can also kill.

Because of the great responsibility involved in ensuring safe rigging on equipment, the man assigned to inspect should know wire rope and its operation thoroughly. Inspections should be made regularly and the results recorded.

When inspecting the rope, the condition of the drum, sheaves, guards, cable clamps and other end fittings should be noted. The condition of these parts affects rope wear: any defects detected should be repaired.

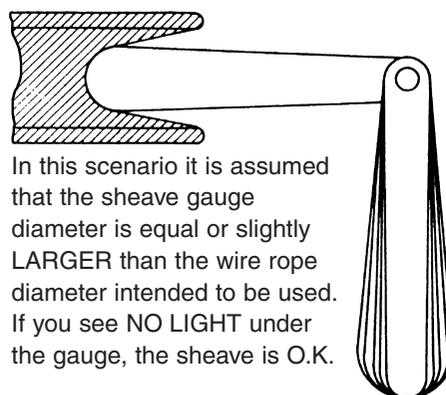
To ensure rope soundness between inspections, all workers should participate. The operator can be most helpful by watching the ropes under his control. If any accident involving the ropes occurs, the operator should immediately shut down his equipment and report the accident to his supervisor. The equipment should be inspected before resuming operation.

The Occupational Health and Safety Act has made periodic inspection mandatory for most wire rope applications.

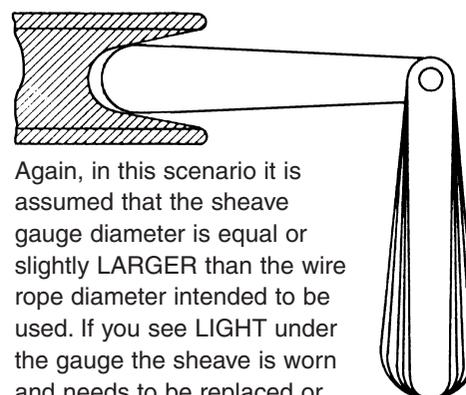
Just looking at the rope is not enough

When an inspector takes a look at a rope, he may see sections showing excessive wear. By flagging the rope, he can quickly determine where the rope is rubbing or contacting parts of the equipment, and then repair, replace, or modify the condition causing the wear.

Inspections of sheaves is a relatively simple, yet very vital task. A sheave groove gauge is used to check the grooves in a sheave. Hold the gauge perpendicular to the surface of the groove to observe properly the groove size and contour, as in this illustration.



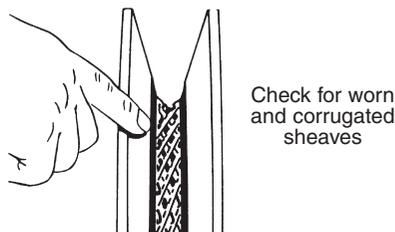
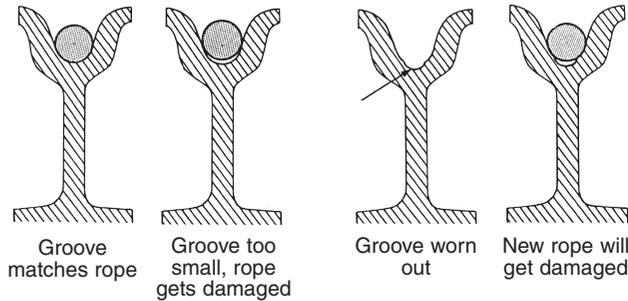
In this scenario it is assumed that the sheave gauge diameter is equal or slightly LARGER than the wire rope diameter intended to be used. If you see NO LIGHT under the gauge, the sheave is O.K.



Again, in this scenario it is assumed that the sheave gauge diameter is equal or slightly LARGER than the wire rope diameter intended to be used. If you see LIGHT under the gauge the sheave is worn and needs to be replaced or the selected rope diameter is too large for the sheave (or drum).



Wire Ropes



Sheaves should be checked for:

1. Correct groove diameter
2. Roundness or contour to give proper support to the rope
3. Small holes, cracks, uneven surfaces, or other defects that might be detrimental to the rope
4. Extreme deep wear

A sheave should also be checked to make sure it turns freely, is properly aligned, has no broken or cracked flanges, and has bearings that work properly.

Drums should also be inspected for signs of wear that could damage rope.

Plain-faced or smooth drums can develop grooves or impressions that prevent rope from winding properly. Repair by resurfacing the face or replacing the lagging.

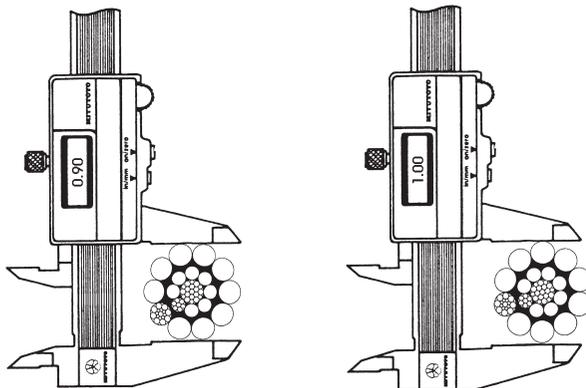
Scrubbing will occur if the rope tends to close wind. If the tendency is to open winding, the rope will encounter abnormal abuse as the second layer forces itself down between the open wraps of the first layer on the drum.

Operating with a smooth drum calls for special care. Be sure the rope is always tightly wound and thread laid on the first layer. Any loosening of the line is easily observed as the winding will be bad and the rope will be coming off with a series of "bad spots."

Grooved drums should be examined for tight or corrugated grooves and for differences in depth or pitch that could damage the second and subsequent layers. Worn grooves can develop extremely sharp edges that shave away small particles of steel from the rope. Correct this condition by grinding or filing a radius to replace the sharp edge.

Drum flanges, as well as the starter, filler and riser strips, should be checked. Excessive wear here often causes unnecessary rope abuse at the change of layers and cross-over points.

Other places of contact such as rollers, scrub boards, guides and end attachments should also be inspected.



Wrong way. This is the wrong way to measure wire rope diameter. Widest diameter is not being read.

Right way. Set the machinist's caliper to read the widest diameter.

Allowable Rope Oversize Tolerance

5% Diameter Tolerance			
Nominal Diameter	Maximum Diameter	Nominal Diameter	Maximum Diameter
inch	inch	mm	mm
3/8	.395	10	10.5
7/16	.46	11	11.5
1/2	.525	12	12.6
9/16	.590	14	14.7
5/8	.65	15	15.7
3/4	.79	16	16.8
7/8	.92	18	18.9
1	1.05	20	21
1-1/8	1.18	22	23.1
1-1/4	1.31	24	25.2
1-3/8	1.44	26	27.3
1-1/2	1.58	28	29.4
1-5/8	1.71	30	31.5
1-3/4	1.84	32	33.6
1-7/8	1.97	34	35.7
2	2.10	36	37.8

Measure the widest diameter

Ropes and sheave grooves must be precisely fitted to each other to get the most service out of your wire rope dollar. Make measurement of rope diameter a normal part of your inspection program.

There's only one right way to measure rope diameter: use machinist's calipers and be sure to measure the *widest* diameter. The drawings at the left compare the right way with the wrong way.

This method is not only useful for measuring the diameter of a new rope, but also for determining the amount of wear and compression that has occurred while the rope has been in use. Accurate recording of this information is essential in helping to decide when to replace wire rope.