

HOW TO INSPECT

Despite their durability and strength, wire ropes used on cranes will wear out and need to be retired from service. That's why regular inspection is so crucial to your long-term success. It's important to designate a trained person that understands the mechanics and requirements of inspections to carry them out. A qualified person must examine any deficiencies identified by the designated person to determine if they meet removal criteria or present a hazard. This section offers you general guidelines. But, for more information, consult our TechReport 107 and reference *ASME B30.30 Ropes* for detailed requirements.

HOW OFTEN TO INSPECT.

Obviously, the more you use a wire rope, the more often it needs to be inspected. According to *ASME B30.30*, owners or users are required to have a designated person visually inspect all wire rope at least once every day and include all rope that can be reasonably expected to be in use during that day. Inspection records are not required for the frequent inspections. However, they are recommended. Periodic inspections need to be conducted at least once a year and cover the entire rope length. Records are required for these period inspections. Based on inspection results, a qualified person may determine that inspections should be performed more frequently.

We recommend that you set up a long-range inspection program, including the examination of ropes removed from service.

FOCUS ON YOUR ROPE'S CRITICAL POINTS.

While you're required to inspect the entire rope length, we recommend you pay particular attention to the critical points of a wire rope. These are the points subject to greater internal stresses, greater external forces or are more susceptible to damage. Rope deterioration normally occurs more quickly at these points, so it pays to expand your inspection in these important areas:

PICK-UP POINTS. These are sections of ropes repeatedly placed under stress when you apply the initial load of each lift such as those sections contacting the sheaves or on the drums.

END ATTACHMENTS. Attachments at the dead end and drum restrict the free movement of wires, normally leading to broken wires that are more difficult to detect. Inspect with an awl to expose them, and if you find more than one broken wire, replace the rope or cut off the affected area and reattach the fitting. Corrosion can be more prevalent in this area. Be sure to also inspect the fitting itself.

DRUMS. Check for signs of wear that could damage wire rope. For grooved drums, inspect the grooves for smoothness and absence of corrugation. For smooth drums, check for wire rope corrugation. It's also important to verify that the required minimum number of dead wraps remain on the drum and to check the condition of the drum flanges.

SHEAVES. The grooves on sheaves usually wear smaller over time. With a groove gauge, check each sheave for proper groove size and contour, as well as smoothness. Grooves that are too small or tight can cause pinching and increased wear while grooves that are too wide can cause flattening of the rope – both of which can reduce your rope's life.

Any application that has both ends of the rope on a drum (typically overhead cranes and boom hoists) has an "idler" sheave at the center of the rope. The rope at this point must be pulled off the sheave and inspected closely for crown and valley broken wires at each periodic inspection.

HEAT EXPOSURE. Watch for evidence of heat exposure which can damage the rope and its lubricant. Any contact with an electrical arc such as welding is reason for removal of the entire rope. Never use the rope as the ground for an arc welder.

ABUSE POINTS. Check for "bright" spots where ropes are subjected to abnormal scuffing and scraping. Look for any condition that causes the rope to be asymmetrical.

HOW TO FIND BROKEN WIRES.

One of the most common signs of rope deterioration is broken wires, normally the outside wires at the crowns of the strands. During your inspection, it's very important to search for broken wires, especially the areas of the rope in contact with sheaves and drums when loads are picked up.

It's important to remember there are minor – sometimes major – differences among applications, even on machines with similar designs. That's why it takes the judgment of a trained, knowledgeable inspector to choose the critical points on each rope application for closer inspection.



Typical valley wire breaks.



Typical crown wire breaks.

1. The first step is to relax your rope to a stationary position, move the pick-up points off the sheaves. Clean the grease from the rope with a cloth – a wire brush, if necessary – so you can see any breaks.
2. Flex the rope to expose any broken wires hidden in the valleys between the strands.
3. Visually check for any broken wires. One way is to run a cloth along the rope to check for possible snags.
4. With an awl, probe between wires and strands and lift any wires that appear loose. Evidence of internal broken wires may require a more extensive rope examination.