

How to identify and correct common rope problems in the field.

REDUCING CRUSHING AND SCRUBBING DAMAGE ON WIRE ROPE

CRUSHING When a wire rope crosses over the preceding layer on the drum, it is susceptible to crushing because there is only a single point of contact. This increases pressure and can result in damage by distorting the cross-section shape of the rope, its strands or core – or all three. Ropes that are new or not spooled onto the drum under tension are also more susceptible to crushing.

In addition, crushing may occur at the change-of-layer point where the rope is wedged against the flange of the drum.

SCRUBBING As the rope spools on the drum, it rubs against the preceding wrap at the kickover points, making the sides of the rope vulnerable to scrubbing damage. Scrubbing occurs most commonly when the rope runs into its preceding wrap in the same valley between two ropes on the lower layer. It can also occur as the adjacent rope comes into contact as a result of fleet angle.

FACTORS AFFECTING ROPE WEAR

The degree of scrubbing and crushing damage depends on a variety of factors, such as rope construction, previous usage of the rope, the load on the rope, the drum diameter, the number of layers and the pitch of the grooving.

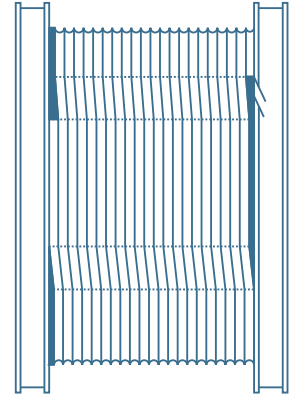
Single-layer winding on a plain-faced drum is more likely to produce an increased rate of wear to both the rope and drum compared to a grooved drum. Grooved drums control the position of the base rope layer, thereby reducing some types of spooling problems.

FIELD SOLUTIONS

If crushing is a problem on drill lines, one solution is to go to more parts of line to reduce the load in the wire rope. This will result in longer string-up and may cause less service from your drill line. If crushing proves to be a continual problem, drum modifications may help.

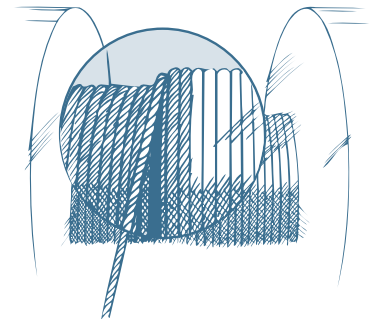
COUNTERBALANCE GROOVING

Has smaller displacement on the drum, which is less damaging at each crossover point compared to helical or parallel grooving. This reduces scrubbing problems at the kickover points as well as line “whipping.” It also keeps the drum in balance by placing the kickover points halfway around the drum from each other.



IMPROPER TENSIONING

Insufficient tensioning of the first two or three layers of rope can also cause rope wear by allowing “pulling in” by subsequent layers of rope. Without enough tension, these lower layers can be pushed apart by the upper layers. The upper layers then become wedged into the lower layers, which can distort the rope and/or individual wires.



WHIPPING

Rope whipping or vibration is another problem that may be encountered with high line speeds and multiple layer winding. Whipping is introduced by the lateral displacement or “throw” of the rope at the crossover points. When a wave is thrown into a rope by a crossover, this disturbance travels along the rope and is reflected back at the sheave at a speed relative to its weight and tension.

To reduce whipping problems, a line guide can be used between the drum and the crown sheaves.