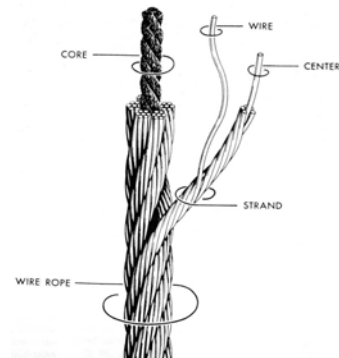


Fact Sheet No. 3 Proper Inspection of Wire Rope used on Hoists

Trained personnel should inspect wire rope on hoists on a regular basis in accordance with the manufacturer's recommendation. In addition, the operator is responsible to complete visual inspections before each shift and before lifting a load. This fact sheet provides information to determine if a wire rope is damaged and should be replaced. The use of worn or damaged wire rope can lead to a failure and a drop of a load, which could result in serious injury or death.

Definition

- **Wire Rope:** A flexible rope composed of many steel wires or hemp fibers in groups. A wire is first twisted about a center to form strands, several of which are again twisted together about a core to form a rope.
- For example, wire rope is designated by:
 - Number stands x number of wires per strand
 - 6 x 37, 6 x 19
 - Core
 - Independent Wire Rope Core (IWRC), hemp or fiber, steel
 - Material
 - Improved Plow Steel (IPS) or Extra Improved Plow Steel (EIPS)
 - Lay
 - Right or Left Hand



CORE



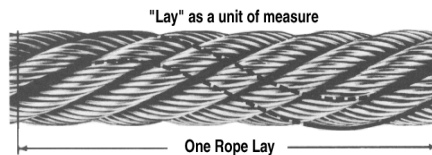
FIBER



WIRE ROPE



WIRE STRAND

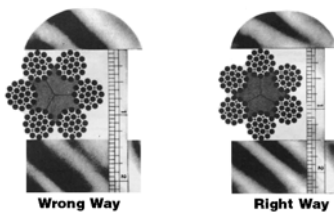


Showing how "one rope lay" is the lengthwise distance in which a strand makes one complete turn around the rope.

- Nominal diameter
 - The rope diameter as stated in the catalog for a given rope size, measured across the high points of the rope.

Measuring Wire Rope Diameter

Replace wire rope if the diameter reduction is greater than the allowable reduction listed below



Measure rope diameter across the high points of the strands, NOT across the flats

Rope Diameter (Ø)		Allowable reduction from nominal	
Inches	mm	Inches	mm
$\text{Ø} \leq \frac{5}{16}$	$\text{Ø} \leq 8$.015	0.4
$\frac{5}{16} < \text{Ø} \leq \frac{1}{2}$	$8 < \text{Ø} \leq 13$.031	0.8
$\frac{1}{2} < \text{Ø} \leq \frac{3}{4}$	$13 < \text{Ø} \leq 19$.047	1.2
$\frac{3}{4} < \text{Ø} \leq 1 \frac{1}{8}$	$19 < \text{Ø} \leq 29$.063	1.6

Wire Rope Visual Inspection

Replace wire rope if one of the following conditions exists.

Broken wires or excessive wear

- ☞ 12 randomly broken wires in one lay of rope
- ☞ 4 broken wires in one strand in one lay
- ☞ 1 outer wire is broken at the contact point with the core, which has worked its way out
- ☞ Wear on individual wires to of $\frac{1}{8}$ of original diameter

Kinks

- **Tight kinks**

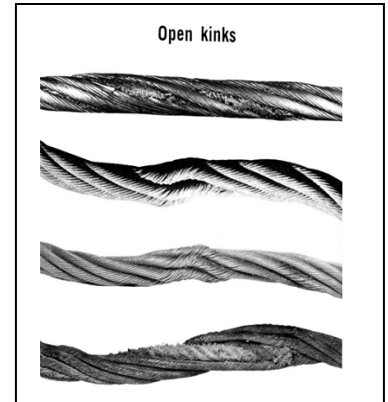
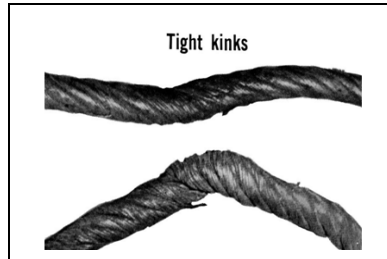
- Shortens lay

- **Open kinks**

- Opens the lay

- Caused by sudden release of the load

- Hoist operating in restricted area



Other examples of damaged rope that should be replaced:

