

# Use and Care of Wire Rope Some Things Every User Should Know

## About Use and Care of Wire Rope

What follows is a brief outline of the basic information required to safely use wire rope

- 1.** Wire rope WILL FAIL IF WORN OUT, OVERLOADED, MISUSED, DAMAGED, or IMPROPERLY MAINTAINED.
- 2.** In service, wire rope loses strength and work capability. Abuse and misuse increase the rate of loss.
- 3.** The MINIMUM BREAKING STRENGTH of wire rope applies ONLY to a NEW, UNUSED rope.
- 4.** The Minimum Breaking Strength should be considered the straight line pull with both rope ends fixed to prevent rotation, which will ACTUALLY BREAK a new, UNUSED, rope. The Minimum Breaking Strength of a rope should NEVER BE USED AS ITS WORKING LOAD.
- 5.** To determine the working load of a wire rope, the MINIMUM or NOMINAL Breaking Strength MUST BE REDUCED by a DESIGN FACTOR (formerly called a Safety Factor). The Design Factor will vary depending upon the type of machine and installation, and the work performed. YOU must determine the applicable Design Factor for your use.  
For example, a Design Factor of "5" means that the Minimum- or Nominal Breaking Strength of the wire rope must be DIVIDED BY FIVE to determine the maximum load that can be applied to the rope system.  
Design Factors have been established by DIN, ISO, CEN, OSHA, ANSI, ASME and similar government and industrial organizations.  
No wire rope should ever be installed or used without full knowledge and consideration of the Design Factor for the application.
- 6.** WIRE ROPE WEAR OUT. The strength of a wire rope slightly increases after the break in period, but will decrease over time. When approaching the finite fatigue life span the breaking strength will sharply decrease. Never evaluate the remaining fatigue life of a wire rope by testing a portion of a rope to destruction only. An indepth rope inspection must be part of such evaluations.
- 7.** NEVER overload wire rope. This means NEVER use the rope where the load applied is greater than the working load determined by dividing the Minimum Breaking Strength of the rope by the appropriate Design Factor.

- 8. NEVER 'SHOCK LOAD'** a wire rope. A sudden application of force or load can cause both visible external damage (e.g. birdcaging) and internal damage. There is no practical way to estimate the force applied by shock loading a rope. The sudden release of a load can also damage a wire rope.
- 9.** Lubricant is applied to the wires and strands of a wire rope when manufactured. This lubricant is depleted when the rope is in service and should be replaced periodically.
- 10.** Regular, periodic INSPECTIONS of the wire rope, and keeping of PERMANENT RECORDS SIGNED BY A QUALIFIED PERSON, are required by OSHA and other regulatory bodies for almost every rope installation. The purpose of inspection is to determine whether or not a wire rope may continue to be safely used on that application. Inspection criteria, including number and location of broken wires, wear and elongation, have been established by DIN, ISO, CEN, OSHA, ANSI, ASME and other organizations.

IF IN DOUBT, REPLACE THE ROPE.

- 11.** When a wire rope has been removed from service because it is no longer suitable, IT MUST NOT BE RE-USED ON ANOTHER APPLICATION.
- 12.** Every wire rope user should be aware of the fact that each type of fitting attached to a wire rope has a specific efficiency rating which can reduce the working load of a rope assembly or rope system, and this must be given due consideration in determining the capacity of a wire rope system.
- 13.** Some conditions that can lead to problems in a wire rope system include:
  - Sheaves that are too small, worn or corrugated can cause damage to a wire rope.
  - Broken wires mean a loss of strength. • Kinks permanently damage a wire rope.
  - Environmental factors such as corrosive conditions and heat can damage a wire rope. • Lack of lubrication can significantly shorten the useful service life of a wire rope.
  - Contact with electrical wire and the resulting arcing will damage a wire rope.