

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

The following information is NOT a complete discussion of wire rope or wire rope slings. WHAT FOLLOWS IS A BRIEF OUTLINE OF THE BASIC INFORMATION REQUIRED TO SAFELY USE WIRE ROPE AND WIRE ROPE SLINGS.

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 FORCE, the published (CATALOG) strength, of a wire rope applies ONLY to a NEW, UNUSED rope.
4. The MINIMUM BREAKING FORCE (published catalog strength) of a wire rope SHOULD BE CONSIDERED the straight line pull which will ACTUALLY BREAK a new, UNUSED rope. The published catalog strength of a wire rope should NEVER BE USED AS ITS WORKING LOAD.
5. To determine the working load of a wire rope, the MINIMUM BREAKING FORCE 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 BREAKING FORCE 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 OSHA, by ANSI, by ASME and similar government and industrial organizations.

No wire rope or wire rope sling should ever be installed or used without full knowledge and consideration of the Design Factor for the application.

6. WIRE ROPES WEAR OUT. The strength of a wire rope begins to decrease when the rope is put in use, and continues to decrease with each use.
7. NEVER OVERLOAD A WIRE ROPE. This means NEVER USE the rope where the load applied to it is greater than the working load determined by dividing the MINIMUM BREAKING FORCE 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 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 it is 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 FOR ALMOST EVERY WIRE ROPE INSTALLATION. The purpose of inspection is to determine whether or not a wire rope or wire rope sling 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 OSHA, ANSI, ASME and similar organizations.

## IF IN DOUBT, REPLACE THE ROPE.

An inspection should include verification that none of the specified removal criteria for this usage are met by checking for such things as:

- Surface wear: Normal and unusual.
- Broken wires: Number and location.
- Reduction in diameter.
- Rope stretch (elongation).
- Integrity of end attachments.
- Evidence of abuse or contact with another object.
- Heat damage.
- Corrosion.

In addition, an inspection should include the condition of sheaves, drums and other apparatus with which the rope makes contact.

11. When a wire rope has been removed from service because it is no longer suitable for use, 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 the 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 cause damage to a wire rope.
  - Broken wires mean a loss of strength.
  - Kinks permanently damage a wire rope and must be avoided.
  - Wire ropes are damaged by knots, and wire ropes with knots must never be used.
  - 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 wires and the resulting arcing will damage a wire rope.