



IMPORTANT WARNINGS

READ ALL WARNINGS BEFORE USING THIS PUBLICATION
Failure to follow warnings and instructions may result in serious injury or death.

Working Load Limit

This is the term used throughout the catalog. There are, however, other terms used in the industry which are interchangeable with the term Working Load Limit. These are: WLL, SWL, Safe Working Load, Rated Load Value, Resulting Safe Working Load, and Rated Capacity.

Never exceed the Working Load Limit.

The Working Load Limit is the maximum load which should ever be applied to a product, even when the product is new and when the load is uniformly applied - straight line pull only. **Avoid side loading.** All catalog ratings are based upon usual environmental conditions, and consideration must be given to unusual conditions such as extreme high or low temperatures, chemical solutions or vapors, prolonged immersion in salt water, etc. Such conditions or high-risk applications may necessitate reducing the Working Load Limit.

Working Load Limit will not apply if product has been welded or otherwise modified.

Matching of Components

Components must match. Make certain that components such as hooks, links or shackles, etc. used with wire rope (or chain or cordage) are of suitable material size and strength to provide adequate safety protection. Attachments must be properly installed and must have a Working Load Limit at least equal to the product with which they are used. Remember: Any chain is only as strong as its weakest link.

Raised Loads

Keep out from under a raised load.

Take notice of the recommendation from the Safety Council Accident Prevention Manual concerning all lifting operations:

"All employees working at cranes or hoists or assisting in hooking or arranging a load should be instructed to **keep out from under the load.** From a safety standpoint, one factor is paramount:

Conduct all lifting operations in such a manner, that if there were an equipment failure, no personnel would be injured. This means **keep out from under a raised load and keep out of the line of force of any load.**"

Do not operate a load over people. Do not ride on loads.

Shock Loads

Avoid impacting, jerking or swinging of load as the Working Load Limit could be exceeded and the Working Load Limit will not apply. A shock load is generally significantly greater than the static load. **Avoid shock loads.**



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Regular Inspections


Inspect products regularly for visible damage, cracks, wear, elongation, rust, etc. **Protect all products from corrosion.** The need for periodic inspections cannot be overemphasized. **No product can keep operating at its rated capacity indefinitely.** Periodic inspections help determine when to replace a product and reduce rigging hazards. **Keep inspection records** to help pinpoint problems and to ensure periodic inspection intervals.

Due to the diversity of the products involved and uses to which they can be put, it would be counterproductive to make blanket recommendations for inspection procedures and frequency. Best results will be achieved when qualified personnel base their decisions on information from rigging and engineering manuals and on experience from actual use in the field. **Refer to sources listed in T.O.C. > ADDITIONAL REFERENCE MATERIAL > TECHNICAL SAFETY AND INFORMATION SOURCES for technical literature.**

Frequency of inspection will depend on environmental conditions, application, storage of product prior to use, frequency of use, etc. **When in doubt, inspect products prior to each use.** Carefully check each item for wear, deformation, cracks or elongation - a sure sign of imminent failure. Immediately withdraw such items from service.

Rust damage is another potential hazard. When in doubt about the extent of corrosion or other damage, withdraw the items from service.

Destroy, rather than discard, items that have been judged defective. They might be used again by someone not aware of the hazard involved.

Additional warnings and information on wire rope, chain, cordage, blocks and tools can be found in the Table of Contents by clicking on the warning symbol icon (). These should be read and understood thoroughly before using a particular item.

DEFINITIONS

Information contained in this catalog is subject to change; all weights and dimensions are approximate. Ratings are stated in short tons (2,000lbs.) or pounds. All dimensions are in inches; all weights are in pounds, unless stated otherwise.

Working Load Limit (WLL)

The Working Load Limit is the maximum load which should ever be applied to the product, even when the product is new and when the load is uniformly applied - straight line pull only. **Avoid side loading.** All catalog ratings are based upon usual environmental conditions and consideration must be given to unusual conditions such as extreme high or low temperatures, chemical solutions or vapors, prolonged immersion in salt water, etc. **Never** exceed the Working Load Limit.

Proof Test Load (Proof Load)

The term "Proof Test" designates a quality control test applied to the product for the sole purpose of detecting defects in material or manufacture. The Proof Test Load (usually twice the Working Load Limit) is the load which the product withstood without deformation when new and under laboratory test conditions. A constantly increasing force is applied in direct line to the product at a uniform rate of speed on a standard pull testing machine. The Proof Test Load does not mean the Working Load Limit should ever be exceeded.

Breaking Strength/Ultimate Strength

Do not use breaking strength as a criterion for service or design purposes. Refer to the Working Load Limit instead.

Breaking Strength is the average force at which the product, in the condition it would leave the factory, has been found by representative testing to break, when a constantly increasing force is applied in direct line to the product at a uniform rate of speed on a standard pull testing machine. Proof testing to twice the Working Load Limit does not apply to hand-spliced slings.

Remember: Breaking Strengths, when published, were obtained under controlled laboratory conditions.

Listing of the Breaking Strength does not mean the Working Load Limit should ever be exceeded.

Design Factor (sometimes referred to as safety factor)

An industry term usually computed by dividing the catalog Breaking Strength by the catalog Working Load Limit and generally expressed as a ratio. For example: 5 to 1.

Shock Load

A load resulting from rapid change of movement, such as impacting, jerking or swinging of a static load. Sudden release of tension is another form of shock loading. Shock loads are generally significantly greater than static loads. Any shock loading must be considered when selecting the item for use in a system.

Avoid shock loads as they may exceed the Working Load Limit.



CORDAGE



IMPORTANT WARNINGS

Failure to follow warnings and instructions can result in serious injury or death.

Refer to warnings in T.O.C. > GENERAL WARNINGS.

These warnings also apply to cordage (rope). Only **additional** warnings and information are listed below.

Never exceed the Working Load Limit of rope.

Use Working Load Limits as published as guidelines only. Working Load Limit may have to be reduced when life, limb or valuable property are at risk, or other than new rope is used. When using multiple leg rope slings, the Working Load Limit of each leg will have to be reduced considerably. Consult industry recommendations for information such as published by the Cordage Institute. Working Load Limit does not apply if rope has been subjected to severe dynamic loading, **which may not be visible**.

Avoid overheating.

Exposure to high temperatures will cause ropes to lose strength rapidly. Even temperatures as low as 150° F (66° C) can reduce the strength of some ropes by 50%. When using synthetic rope (especially polypropylene) on a capstan or a winch, be careful to avoid excessive friction which heats, melts and fuses the outer fibers of the rope. Avoid repeated surging or hard rendering around poles or over cross arms. Polyester rope resists overheating best because its melting point is highest.

Attachments must have at least the same Working Load Limit as the rope used.

Hooks, links, shackles, etc. must be of suitable material and strength to provide adequate safety protection. Splice rope properly and use thimbles if applicable.

Choose rope to match gear or gear to match rope. Sheaves, pulleys, thimbles, etc. that do not match the size of rope being used can cause dangerous friction, abrasion, overload, etc.

Keep out from under a raised load.

Do not move load over people. Do not ride on load. Conduct all lifting operations in such a manner that if equipment were to fail or break, no personnel would be injured. This means **KEEP OUT FROM UNDER A RAISED LOAD, DO NOT OPERATE LOADS OVER PEOPLE AND KEEP OUT OF THE LINE OF FORCE**.

Avoid shock loads.

Rope that is strong enough to withstand a steady pull can be broken with a sudden jerk. Be aware of all possible dynamic loading situations. Avoid them when possible and allow for strong enough rope when they cannot be avoided. Keep in mind that the effects of dynamic loading are greater on shorter ropes than on longer ones and greater on low elongation ropes (such as Manila and polypropylene) than on high elongation rope (such as nylon).

Never stand in the line of rope under strain. If the rope breaks it will recoil with considerable force, especially if it is nylon.

Inspect rope frequently.

Closely examine entire length of rope for damage to determine general condition and detect localized wear. Excessive abrasion, fusing of outside fibers, hockles, rust or other chemical stains, broken fibers or other obvious damage to rope are reasons to retire rope from service. Internal damage can be assessed by twisting strands open and checking for powdered fiber. Rope that is suspected of having been exposed to severe shock loads or loads close to its catalog Breaking Strength should be retired immediately. **Such damage may not be visible.** Actual remaining strength of damaged or used rope can only be established by laboratory analysis and tension tests.

Destroy, rather than discard, rope to be retired.

It might be used again by someone not aware of the hazard or defect. This is best achieved by cutting it up into short pieces.

Rope Slings.

Refer to OSHA standard 1910.184 and ASME standard B30.9 for design factors and other important information. Other standards and information may apply in specific applications.

Refer to "Proper Care of Rope" for additional important cautions.



PROPER CARE OF ROPE

Avoid abrasion and unnecessary wear. Outer fibers as well as inner fibers contribute to a rope's strength. When outer fibers are worn by chafing or dragging over splintered, rough or gritty surfaces, the rope is worn and weakened. When rope is used on cleats, winchheads, etc. make sure they are smooth and use chafing gear if necessary.

Avoid sharp angles and bends. Sharp angles greatly affect the strength of a rope. Any sharp angle or bend is a weak spot. Use thimbles or chafing gear or padding where possible. **Knots are also weak spots.** They can reduce strength by as much as 50% or more. Use splices instead. **Splice rope correctly.** When a small section of a rope has been worn or damaged, cut out the section and splice it together. Splice in extra tucks for synthetic fiber ropes. Use proper splicing procedures as outlined by the Cordage Institute. Do not resplice rope that broke due to being overloaded - discard it instead. Its remaining strength will only be a fraction of the Working Load Limit when new. Prevent unraveling of rope - whip or tape cut ends.

Avoid sustained loads. Fiber ropes subjected to heavy loads for long periods of time can break well below catalog Breaking Strength. Natural fiber ropes such as Manila and Sisal have less ability to take sustained loads than synthetic fiber ropes such as nylon or polypropylene. Never exceed the Working Load Limit and do not subject fiber rope to sustained loads for more than two days.

Avoid rust. All ropes, synthetic or natural, should be kept away from rusting iron or steel. Rust can cause rapid loss of strength, sometimes in as short a time as one to two weeks. If ropes become rust stained, inspect the extent of the stain. If it is halfway through the rope, then rope strength may be reduced by as much as 50%.

Keep rope away from chemicals. Even though synthetic rope is generally considered to be resistant to damage from oils, gasoline, paint and most chemicals, exposure to any of these may cause some damage. Avoid contact with such things as storage battery solution, washing compounds or solutions, and animal wastes. Strong acids, alkalis and solvents can damage any rope. Natural fiber rope is extremely vulnerable to all chemicals and solvents.

Avoid the use of swivels in ropes under load - a loss of turn will cause permanent damage to the rope.

Never use a nylon line which has a high stretch factor in combination with another rope of low stretch. The nylon line will stretch and not carry its proportionate share of the load, thus putting extra strain on the other lines.

Reverse ends of the rope periodically. Especially in tackles and winches, reverse the rope end-for-end periodically so that all sections will be worn equally. Also, using a line in one direction over a winch many times can also damage the rope by twisting it too tight or untwisting it so that hockles occur. Kinks pulled through a restricted space such as a tackle block, can seriously damage rope fibers. The initial use should be in a clockwise direction, then reverse the rope periodically.

Slack off guys in wet weather. When ropes are used as guy lines or other supports exposed to weather, they should be slacked off in wet weather, or damage to the rope, as well as what it is supporting, may result.

Store rope properly. Rope is best stored in a dry, unheated place where air circulates freely, off the floor, and away from direct sunlight and other contact with the elements. Keep in mind that **synthetic ropes will deteriorate in direct sunlight** due to exposure to ultraviolet radiation. Light colored polypropylene especially is severely affected, smaller diameters more so than larger sizes. Natural fiber ropes (Manila and Sisal) will deteriorate in storage even under ideal conditions.

Dry rope properly. Whenever natural fiber ropes become wet they should always be thoroughly dried before they are stored or they will rot in a very short time. Do NOT dry synthetic fiber rope in direct sunlight.

Keep rope clean. Dirt on the surface of rope can become embedded inside and act as an abrasive on fibers. When rope gets dirty, wash it thoroughly with clean fresh water. Remember to dry natural fiber rope before storing.

Remove rope from coils and reels properly. Regular right hand laid rope should be uncoiled in a counter clockwise direction.

Coiled rope: Lay the coil on the floor with the inside end at the bottom, then reach down through the center and pull the inside up through the coil.

Reeled rope: Remove the rope from a reel by pulling it off the top while the reel is free to rotate. Rope should never be taken from a reel lying on its end because it is more likely to kink or hockle or pull yarns on the wooden flange.

When substituting natural fiber rope with synthetic fiber ropes (or substituting one synthetic rope for another) substitution should not be made on a straight breaking strength-for-breaking strength basis only. Other important factors must be considered.

Consult the Cordage Institute or other sources listed in **T.O.C. > ADDITIONAL REFERENCE MATERIAL > TECHNICAL SAFETY AND INFORMATION SOURCES** for additional information.