WARNING

The following 18 pages represent the proper operating practices for the rigging products found within this all-Grip catalog. There are instructions on the correct use of these products, product warnings, inspection critique and the requirements for removal from service for products found out of tolerance. It is imperative that all users, operators and supervisors familiarize themselves with these practices and instructions prior to using any of the products.

ADDITIONAL SOURCES FOR INFORMATIVE LITERATURE AND TRAINING ON PROPER VEHICLE RECOVERY PRACTICES

American National Standard Institute
American Society of Mechanical Engineers
1899 L. Street NW, 11th Floor
Washington, DC 20036
training@ansi.org

American Trucking Associations
950 N. Glebe, Suite 210
Arlington, VA 22203-4181
atamembership@trucking.org

Associated Wire Rope Fabricators
P.O. Box 748
Walled Lake, MI 48390-0748
awrf@awrf.org

California Code of Regulation
Title 13
Dept. of CHP
Commercial Vehicle Sec.
P.O. Box 942898
Sacramento, CA 94298
cvsregs@chp.ca.gov

Commercial Vehicle Safety Alliance
6303 Ivy Lane
Suite 310
Greenbelt, MD 20770-6319
cvsahq@cvsa.org

National Safety Council
1121 Spring Lake Dr.
Itasca, IL 60143-3201
customerservice@nsc.org

U.S. Department of Transportation
Federal Motor Carrier Safety
1200 New Jersey Ave. SE
Washington, D.C. 20590
800.832.5660

U.S. Department of Labor
O.S.H.A.
(see your local telephone directory for local listing)

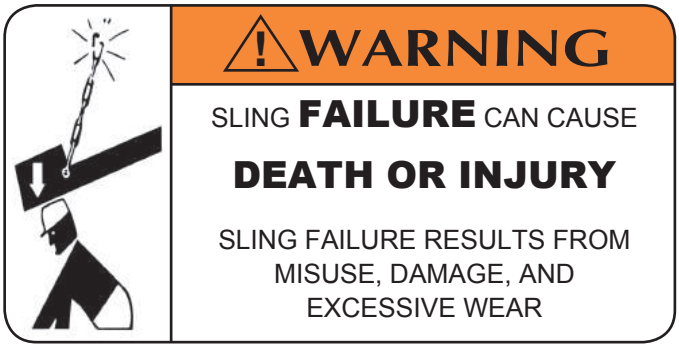
Your State or Local Towing Association
(see your local telephone directory for local listing)

Web Sling and Tiedown Association
9 Newport Drive
Suite 200
Forest Hill, MD 21050
wstda@stringfellowgroup.net

REMOVAL CRITERIA SYNTHETIC ROPE SLINGS

A synthetic rope sling shall be removed from service if conditions such as the following are present:

- Missing or illegible sling tag.
- Cuts or any area of extensive fiber breakage along the length of the rope.
- Damage that has reduced the diameter of the rope by more than 10%.
- Fused or melted fiber involving damage that exceeds 10% of the fiber in any one strand or the rope as a whole.
- Discoloration, brittle fibers and hard or stiff areas that may indicate chemical, ultraviolet light or heat damage including the presence of splinters and slivers on the rope surface.
- Excessive dirt or foreign matter that has permeated the rope.
- Kinks and distortion in the rope structure including hockles.
- Melted, hard or charred areas that affect more than 10% of the diameter of the rope.
- Other visible damage that causes doubt as to the strength of the rope.



⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using synthetic slings.
- Use by untrained persons is hazardous. It is important that all sling users be thoroughly familiar with the manufacturers recommendation and safety information.
- Determine that the weight pf the load is within the working load limit of the sling.
- Select a sling having suitable characteristics for the type of load, hitch and environment.
- Slings shall not be shortened or lengthened by knotting.
- Damaged slings shall not be used.
- Slings shall be hitched in a manner providing control of the load.
- Edges in contact with slings shall be padded.
- Keep all portions of the human body from between the sling and the load, and from between the sling and the lifting hook.
- Personnel should stand clear of the suspended load.
- It is dangerous if personnel are in line with a rope under tension. Rope failure can result in a deadly recoil force. Never have personnel between the load and the take up device.
- Personnel shall not ride the sling
- Shock loading shall be avoided.
- Slings should not be pulled from under a load when the load is resting on the sling.
- Store slings in an area where they will not be subjected to mechanical damage, moisture, extreme heat or ultraviolet light.
- Twisting of slings shall be avoided.
- Loads applied to the hook should be centered in the base of the hook to prevent point loading on the hook.
- Before lifting, make certain the sling or load shall not snag. personnel shall be continuously alert to avoid snagging or bumping.
- In a basket hitch, the lifting hook shall be above the center of gravity and the load balanced to prevent slippage out of the sling.
- When making a multiple leg lift or a basket lift, the capacity rating of each sling must be downgraded in accordance with the effect of leg angle chart found on page 95.
- Slings should not be dragged on the floor or over an abrasive surface.
- Synthetic rope slings shall not be used at temperatures in excess of 180 f or below -40 f.
- Exposure to sunlight or ultraviolet light degrades the strength of synthetic rope slings.
- Inspect slings for damage and defects prior to each use.
- Each sing shall be tagged to show the working load limits for each type of hitch.

NYLON vs. POLYESTER

The most popular material for web recovery straps and web slings is nylon. The tough, long wearing properties of nylon make it the best choice for general use. Nylon should never be used where acid or acid fumes are present. Where acid conditions are present, polyester slings should be used. Nylon web recovery straps and web slings will stretch under load which protects both the sling and the load from sudden shocks. This stretch can be reduced by using slings with larger work loads or by using polyester slings. Polyester slings should never be used where alkalis are present.

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using recovery straps and slings.
- Nylon recovery straps and slings should never be used where acid or acid fumes are present. (see chemical data below)
- Polyester recovery straps and slings should never be used where alkalis are present. (see chemical data below)

REINFORCED EYES

In many lifting applications, the eyes of the web sling may wear from constant and severe use. Abrasive resistant material is sewn into the eyes of all-grip® recovery straps and slings for added sling life. PLEASE SEE PAGE 21 and 70 for additional information on corner protectors.

RED CORE YARNS

all-grip® web recovery straps and web slings have red core yarns within the web material. When these red yarns become visible, it is evident that the sling is damaged and must be removed from service.

NOTE: Evidence of red core yarns is not the only gauge for which web slings must be removed from service. Please see page 94, 95 & 96 for additional criteria.

TAGS

Each all-grip® recovery strap, web sling and polyester round sling manufactured has a legible tag sewn to the sling body. Each is serial numbered and has the date of manufacture.

U.V. LIGHT

Environments in which web recovery slings, web slings and round slings are continuously exposed to ultra-violet light can affect the strength of these slings in varying degrees ranging from slight to total degradation. To minimize these effects, store slings not being used in a cool, dry and dark place. Visual indications of ultra-violet degradation are bleaching out of the color, increased stiffness and surface abrasion at points not normally in contact with the load .

CHEMICAL DATA

The chemical data included below should be used only as a guide. Please consult with Western Sling and Supply prior to using for specific information regarding chemicals.

	ACIDS	ALCOHOLS	ALDE-HYDES	STRONG ALKALIS	BLEACH-ING AGENTS	DRY CLEANING SOLVENTS	ETHERS	HALO GENATED HYDRO-CARBONS	HYDRO-CARBONS	KETONES	OILS CRUDE	OILS LUBRI-ATING	SOAP & DETER-GENTS	WATER & SEA-WATER	WEAK ALKALIS
NYLON	NO	OK	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
POLYESTER	*	OK	NO	**	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK

EFFECT OF LEG ANGLE ON SLING WORKING LOAD LIMIT (W.L.L.)

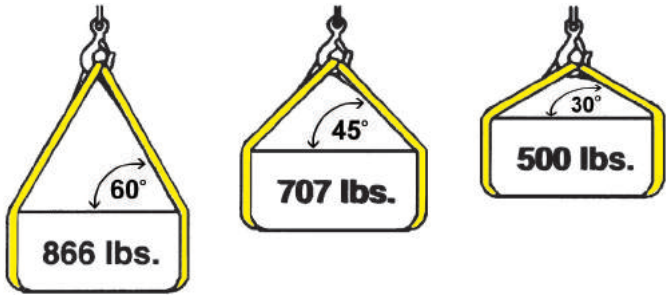
When recovery straps and slings are used at an angle (i.e. two slings or one sling in a basket attached to only one winch hook), sling capacity is reduced. How much it is reduced depends on the degree of the angle. You can determine whether a sling will be rated high enough if you know the angle between the sling leg and the horizontal. Once you know this angle, multiply the sling's rating by the appropriate factor in table A. This will give you the sling's reduced rating.
Horizontal sling angles less than 30° shall not be used.

Angle Degrees	Factor
90	1.0000
85	0.9962
80	0.9848
75	0.9659
70	0.9397
65	0.9063
60	0.8660
55	0.8192

Angle Degrees	Factor
50	0.7660
45	0.7071
40	0.6428
35	0.5736
30	0.5000

TABLE A

SLING CAPACITY DECREASES AS THE HORIZONTAL ANGLE DECREASES.



A sling capable of lifting 1,000 lbs. in a 90° horizontal basket hitch, can only lift 866 lbs. at 60° angle, 707 lbs. at a 45° angle and 500 lbs. at a 30° angle.

These calculations apply to all types of slings, web slings, polyester round slings, chain slings and wire rope slings.

INSPECTIONS (all types of slings)

Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer.

Additional inspections shall be performed during sling use, where service conditions warrant. A complete inspection for damage to the sling shall be periodically performed by a designated person. Each sling and component shall be examined individually, taking care to expose and examine all surfaces. The sling shall be examined for conditions such as those listed below for the type of sling used and a determination made as to whether they constitute a hazard. These type of periodic inspections shall not exceed one year. The frequency of periodic inspections should be based on:

(1) frequency of sling use
(2) severity of service conditions
(3) nature of lifts being made
(4) experience gained on the service life of slings used in similar circumstances

Guidelines for the time intervals are:
(1) normal service - yearly
(2) severe service - monthly to quarterly
(3) special service - as recommended by a qualified person.
Written records of the most recent periodic inspection shall be maintained.

REMOVAL CRITERIA WEB RECOVERY STRAPS, WEB SLINGS AND POLYESTER ROUND SLINGS:

shall be removed from service if conditions such as the following are present:
(1) missing or illegible sling tag
(2) acid or caustic burns
(3) melting or charring of any part of the sling or weld splatter that exposes core yarns
(4) holes, tears, cuts or snags or exposed core yarns.
(5) broken or worn stitching in load bearing splices
(6) excessive abrasive wear
(7) knots in any part of the sling
(8) discoloration and brittle or stiff areas on any part of the sling; Which may mean chemical or ultraviolet/sunlight damage.
(9) other conditions, including visible damage, that cause doubt as to the continued use of the sling

REMOVAL CRITERIA WIRE ROPE SLINGS:

A wire rope sling shall be removed from service if conditions such as the following are present:

(1) missing or illegible sling tag

(2) broken wires:

(a) for strand laid slings, 10 randomly distributed broken wires in one rope lay, or 5 broken wires in one strand in one rope lay.

(3) severe localized abrasion or scraping

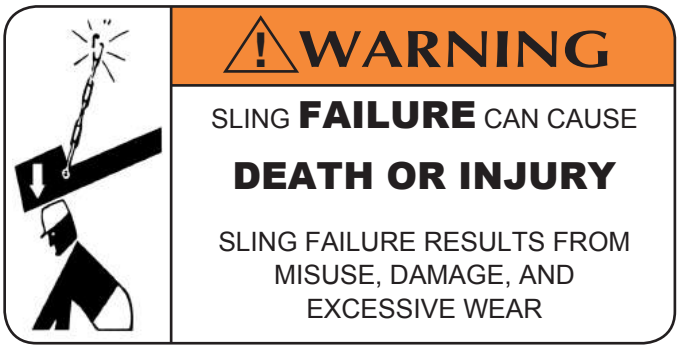
(4) kinking, crushing, birdcaging, or any other damage resulting in damage to the rope structure

(5) evidence of heat damage

(6) end attachments that are cracked, deformed, or worn to the extent that the strength of the sling is substantially affected

(7) severe corrosion of the rope, end attachments, or fittings

(8) other conditions, including visible damage, that cause doubt as to the continued use of the sling



WARNING

- Failure to read, understand, and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using recovery straps and slings.
- Determine that the weight of the load is within the working load limit of the sling.
- Select a sling having suitable characteristics for the type of load, hitch and environment.
- Slings shall not be shortened or lengthened by knotting or other unapproved methods.
- Damaged slings shall not be used.
- Slings shall be hitched in a manner providing control of the load.
- Edges in contact with slings should be padded.
- Keep all portions of the human body from between the sling and the load, and from between the sling and the lifting hook.
- Personnel should stand clear of the suspended load.
- It is dangerous if personnel are in line with a rope under tension. Rope failure can result in a deadly recoil force. Never have personnel between the load and the take up device.
- Personnel shall not ride the sling.
- Shock loading should be avoided.
- Slings should not be pulled from under a load when the load is resting on the sling.
- Web slings and recovery straps should be stored in an area where they will not be subjected to mechanical damage, moisture, extreme heat or ultraviolet light.
- Twisting of slings shall be avoided.
- Loads applied to the hook should be centered in the base of the hook to prevent point loading on the hook.
- Before lifting, make certain that the sling, attachments, or load shall not snag. Personnel shall be continuously alert to avoid snagging or bumping.
- In a basket hitch, the lifting hook should be above the center of gravity and the load balanced to prevent slippage out of the sling.
- When making a multiple leg lift, or a basket lift, the capacity rating of each sling must be down graded in accordance with the Effect of Leg Angle Chart found on page 95.
- Slings should not be dragged on the floor or over an abrasive surface.
- In a choker hitch, slings with hardware shall be long enough so that the choker fitting chokes on the webbing and never on the triangle.
- Nylon & polyester slings shall not be used at temperatures in excess of 194° F or below -40° F.
- Exposure to sunlight or ultraviolet light degrades the strength of synthetic web slings and polyester round slings.
- Inspect slings for damage and defects prior to each use.
- Each sling shall be tagged to show working load limits for each type of hitch.
- Web slings and polyester round slings shall not be constricted or bunched between the ears of a shackle or hook.

ALLOY CHAIN PROPERTIES

Federal regulations require the use of Alloy Chain for lifting and hoisting applications. We offer a full line of Grade 100 and limited items in Grade 80 chain which is produced from heat treatable alloy steel in conformance with ASTM specifications. Its typical mechanical properties provide for a tensile strength of 125,000 psi minimum and a minimum elongation of 20%. Strength and hardness of the alloy chain material are important factors, but are not the only criteria for selection. Acceptable alloy chain material also must have toughness, must be resistant to shock loading, and must possess sufficient ductility to provide ample visual evidence of damage caused by excessive over loading.

*** Your state may or may not have specific regulations limiting the use of certain grades of chain. Contact your D.O.T. or State Towing Regulation Board.**

INSPECTION

1. Schedule periodic link-by-link inspection of chain, based on frequency of chain use, severity of service conditions, experience gained on service life of chain used in similar circumstances.
2. Clean chain prior to inspections, to make damage or defects more easily seen.
3. Hang chain vertically, if practical, for preliminary inspection.
4. Inspect link by link, where the following should be looked for:
   A. Bent, gouged, nicked, worn or elongated links.
   B. Cracks, scoring or marking tending to weaken links. Transverse markings are the most dangerous.
   C. Severe corrosion.
   D. Excessive wear - chains with links having wear exceeding that shown in Table of Wear should be removed from service. (see figure 1)
5. Check master links and hooks for all of the above faults- hooks especially for excessive throat opening.

REMOVAL CRITERIA ALLOY CHAIN SLINGS:

An alloy steel chain sling shall be removed from service if conditions such as the following are present:

(1) missing or illegible sling tag

(2) cracks or breaks

(3) excessive wear, nicks or gouges. Minimum thickness on chain links shall not be below the values listed in Figure One found on page 97

(4) stretched chain links or components

(5) bent, twisted or deformed chain links or components

(6) evidence of heat damage

(7) excessive pitting or corrosion

(8) lack of ability of chain or components to hinge (articulate) freely

(9) weld splatter

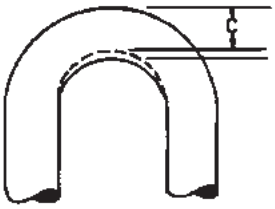
Additional data for end fittings such as hooks and shackles Can be found on page 27-29

TABLE OF WEAR

Specifications - Inches

Figure 1

Size of Chain Inches	Minimum Safe Dimensions at Worn Part of Link C Inches
1/4	13/64
3/8	5/16
1/2	7/16
5/8	9/16



⚠ WARNING

- Failure to read, understand, and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using chain.
- Determine that the weight of the load is within the working load limit of the chain.
- Select a chain having suitable characteristics for the type of load and environment.
- Chains shall not be shortened or lengthened by knotting or other unapproved methods.
- Damaged chains shall not be used.
- Chains shall be applied in a manner providing control over the load.
- Protect chain with corner protectors when engaging sharp edged loads.
- Protect chain against corrosion.
- Winch loads smoothly - do not jerk.
- Chains shall not be pulled from under a load when a load is resting on the chain.
- Chains should be stored in an area where they will not be subjected to mechanical damage.
- Twisting of chains shall be avoided.
- Inspect chains for damage before each use.
- Anchorages shall have design strengths not less than those which are required of the chains attached to them.
- Do not point load chain hooks.
- If a chain is not marked with its grade or working load limit, consider it the weaker grade 28 proof coil and do not use for recovery or lifting.
- Use only Grade 80 Alloy or Grade 100 Alloy for hoisting or lifting applications.
- Connect the towing hardware only to the vehicle Manufacturers approved connection points on the vehicle towed.
- Do not stand between disabled vehicle and recovery vehicle.

SHACKLES

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using shackles.
- Screw pin shall be fully engaged.
- If designed for a cotter pin, it shall be used and maintained.
- Applied load should be centered in the bow to prevent side loading.
- Multiple sling legs should not be applied to the pin.
- If side loaded, the rated load shall be reduced according to Table 1 found below.

Angle loads must be applied in the plane of the bow.

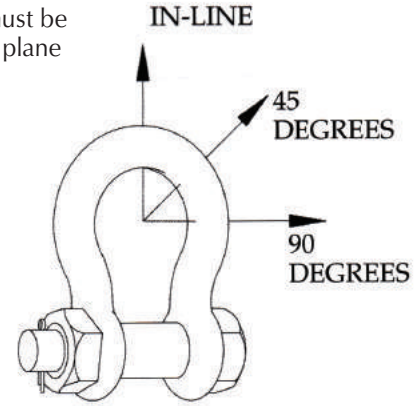


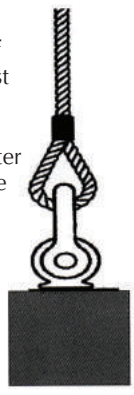
Table 1

Side Loading Reduction Chart For Screw Pin and Bolt Type Shackles Only +	
Angle of Side Load from Vertical In-Line of Shackle	**Adjusted Working Load Limit**
0° In-Line*	100% of Rated Working Load Limit
45° from In-Line*	70% of Rated Working Load Limit
90° from In-Line*	50% of Rated Working Load Limit

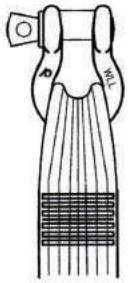
* In-Line load is applied perpendicular to pin.
+ DO NOT SIDE LOAD ROUND PIN SHACKLE

CONNECTION OF SLINGS TO SHACKLES

Diameter of shackle must be greater than wire rope diameter if no thimble in eye.



Shackle must be large enough to avoid pinching of synthetic slings.

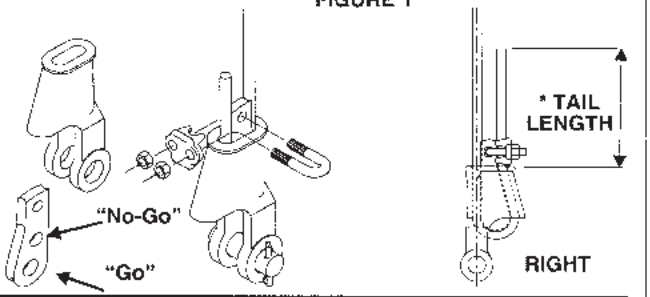


WEDGE SOCKET

⚠ WARNING

- Loads may slip or fall if the Wedge Socket is not properly installed.
- A falling load can seriously injure or kill.
- Read and understand these instructions before installing the Wedge Socket.
- Do not side load the Wedge Socket.
- Apply first load to fully seat the Wedge and Wire Rope in the socket. This load should be of equal or greater weight than loads expected in use.

FIGURE 1

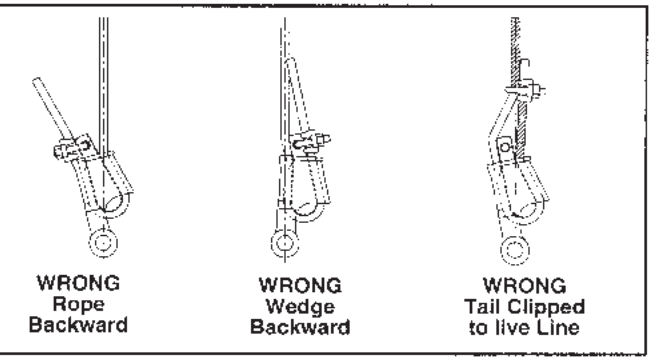


*Tail Length	
Standard 6 to 8 strand wire rope	**Rotation Resistant Wire Rope**
A minimum of 6 rope diameters, but not less than 6"	A minimum of 20 rope diameters, but not less than 6".

TABLE 1

Rope Size	3/8	1/2	5/8	3/4	7/8	1	1 1/8
Clip Size	3/8	1/2	5/8	3/4	7/8	1	1 1/8
*Torque Ft./lbs.	45	65	95	130	225	225	225

* The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.



OPERATING PRACTICES

- Apply first load to fully seat the Wedge and Wire rope in the socket. This load should be of equal or greater weight than loads expected in use.
- Efficiency rating of the Wedge Socket termination is based upon the catalog breaking strength of Wire Rope. The efficiency of a properly assembled Wedge Socket is 80%.
- During use, do not strike the dead end section with any other elements of the rigging (called two blocking).

HOIST, WINCH & RECOVERY HOOKS

⚠ WARNING

- Loads may disengage from hook if proper procedures are not followed.
- A falling load may cause serious injury or death.
- Threads may corrode and/or strip and drop the load.
- Hook must always support the load. The load must never be supported by the latch.
- Never apply more force than the hook's assigned Working Load Limit (WLL rating.)
- Never shock load a hook.
- Read and understand these instructions before using hook.
- Always visually inspect hook before using.
- Never use a hook whose throat opening has been increased, or whose tip has been bent more than 10 degrees out of plane from the hook body, or is in any other way distorted or bent. **Note: A latch will not work properly on a hook with a bent or worn tip.**
- Remove from service any hook with a crack, nick, or gouge.
- Never repair, alter, rework, or reshape a hook by welding, heating, burning, or bending.
- Never side load, back load, or tip load a hook. (see figure 2)
- Eye hooks, shank hook and swivel hooks are designed to be used with wire rope or chain.
- Do not swivel a swivel hook while it is supporting a load.
- Always make sure the hook supports the load. (see figure 3) The latch must never support the load. (see figure 4)
- See ASME B30.10 "Hooks" for additional information.
- Do not stand between disabled vehicle and recovery vehicle.

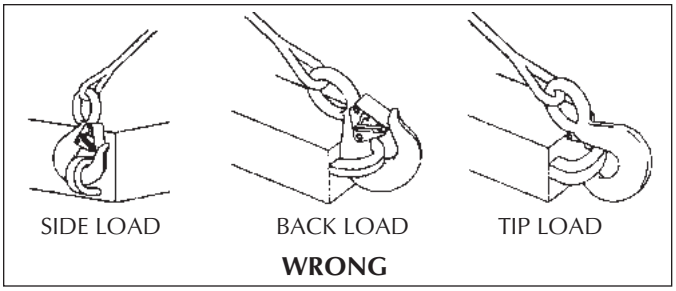


FIGURE 2

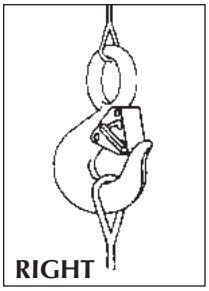


FIGURE 3

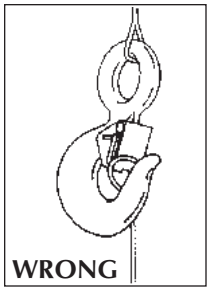


FIGURE 4

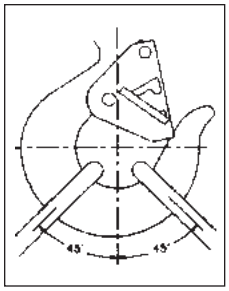
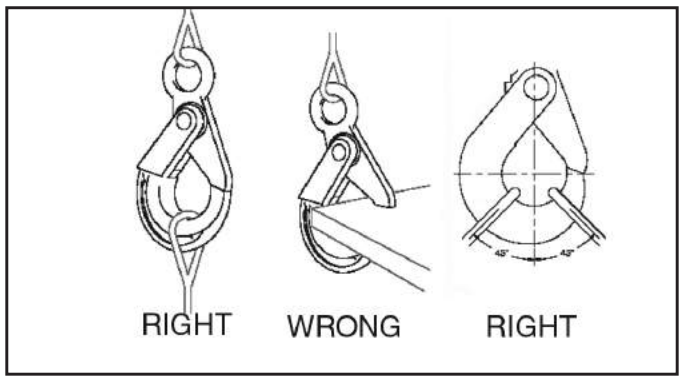


FIGURE 5

SELF LOCKING HOOKS

⚠ WARNING

- A visual periodic inspection for cracks, nicks, wear, gouges and deformation as part of a documented inspection program, should be conducted by trainedpersonnel in compliance with ANSI B30.10.
- Never use a hook whose throat opening has been increased or shows any visible apparent bend or twist from the plane of the unbent hook, or is in any other way distorted or bent. NOTE: A latch will not workproperly on a hook with a bent or worn tip.
- Remove from service any hook with a crack, nick, or gouge.
- Never repair, alter, rework, or reshape a hook by welding, heating, burning, or bending.
- Never side load, back load or tip load a hook. Side loading, back loading and tip loading are conditions that damage and reduce the capacity of the hook.
- Always make sure the hook supports the load.
- Do not use hook tip for lifting or pulling.
- Loads may disengage from hook if proper procedures are not followed.
- A falling load may cause serious injury or death.
- Self-Locking latch will unlock when trigger is depressed.
- Never use hook unless hook and latch are fully closed and locked.
- Keep body parts clear of pinch point between hook tip and hook latch when closing.
- Keep hand(s) from between throat of hook and sling or other device.
- Never apply more force than the hook's assigned Working Load Limit (WLL) rating.
- Read and understand these instructions before using hook.
- When placing two (2) sling legs in hook, make sure the angle from vertical to the leg nearest the hook tip is not greater than 45 degrees, and the included angle between the legs does not exceed 90 degrees.
- See ANSI/ASME B30.10 "Hooks" for additional information.



TACKLE BLOCK WARNING, USE & MAINTENANCE INFORMATION

⚠ WARNING

- A potential hazard exists when lifting or dragging heavy loads with tackle block assemblies.
- Failure to design and use tackle block systems properly may cause a load to slip or fall - the result could be serious injury or death.
- A tackle block system should be rigged by a qualified person as defined by ANSI / ASME B.30.
- Instruct workers to keep hands and body away from block sheaves and swivels - and away from "pinch points" where rope touches block parts or loads.
- Do not side load tackle blocks.
- Read, understand, and follow these instructions to select, use and maintain tackle block systems.

IMPORTANT:

For maximum safety and efficiency, tackle block systems must be properly designed, used, and maintained. You must understand the use of tackle block components in the system. These instructions provide this knowledge. Read them carefully and completely.
Some parts of these instructions must use technical words and detailed explanations. NOTE: If you do not understand all words, diagrams, and definitions — DO NOT TRY TO USE A TACKLE BLOCK SYSTEM!

TACKLE BLOCK MAINTENANCE

Tackle Blocks must be regularly inspected, lubricated, and maintained for peak efficiency and extended usefulness. Their proper use and maintenance is equal in importance to other mechanical equipment. The frequency of inspection and lubrication is dependent upon frequency and periods of use, environmental conditions, and the user's good judgment.
Inspection: As a minimum, the following points should be considered:

1. Wear on pins or axles, rope grooves, side plates, bushing or bearings, and fittings. Excessive wear may be a cause to replace parts or remove block from service.
2. Deformation in side plates, pins and axles, fitting attachment points, trunnions, etc. Deformation can be caused by abusive service and / or overload and may be a cause to remove block from service.
3. Misalignment or wobble in sheaves.
4. Security of nuts, bolts, and other locking methods, especially after reassembly following a tear down inspection. Original securing method should be used; e.g., staking, set screw, cotter pin, cap screw.
5. Deformation or corrosion of hook and nut threads.
6. Surface condition and deformation of hook.
7. Welded side plates for weld corrosion or weld cracking.
8. Hook latch for deformation, proper fit and operation.

Lubrication: The frequency of lubrication depends upon frequency and period of product use as well as environmental conditions, which are contingent upon the user's good judgment.
Assuming normal product use, the following schedule is suggested when using lithium-base grease of a medium consistency.
Bronze Bushings—(Not Self Lubricated)—Every 8 hours of continuous operation or every 14 days of intermittent operation.

LOADS ON BLOCKS

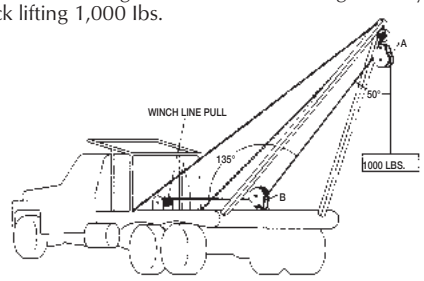
The Working Load Limit (WLL) for blocks indicates the maximum load that should be exerted on the block and its connecting fitting.
This total load value may be different from the weight being lifted or pulled by a hoisting or hauling system. It is necessary to determine the total load being imposed on each block in the system to properly determine the rated capacity block to be used. A single sheave block used to change load line direction can be subjected to total loads greatly different from the weight being lifted or pulled. The total load value varies with the angle between the incoming and departing lines to the block. The following chart indicates the factor to be multiplied by the line pull to obtain the total load on the block.

LINE PULL

EXAMPLE A

ANGLE FACTOR MULTIPLIERS			
ANGLE	FACTOR	ANGLE	FACTOR
0°	2.00	100°	1.29
10°	1.99	110°	1.15
20°	1.97	120°	1.00
30°	1.93	130°	.84
40°	1.87	135°	.76
45°	1.84	140°	.68
50°	1.81	150°	.52
60°	1.73	160°	.35
70°	1.64	170°	.17
80°	1.53	180°	.00
90°	1.41	—	—

(Calculations for determining total load value on single line system.)
A gin pole truck lifting 1,000 lbs.



There is no mechanical advantage to a single part load line system, so winch line pull is equal to 1,000 lbs. or the weight being lifted.

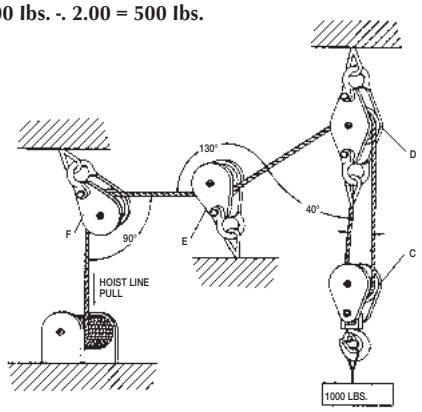
To determine total load on snatch block A:
A = 1,000 lbs. x 1.81 = 1,810 lbs.
(line pull) (factor 50° angle)

To determine total load on toggle block B:
B = 1,000 lbs. x .76 = 760 lbs.
(line pull) (factor 135° angle)

EXAMPLE B

(Calculation for determining total load value for mechanical advantage system.)
Hoisting system lifting 1,000 lbs. using a traveling block. The mechanical advantage of traveling block C is 2.00 because two (2) parts of load line support the 1,000 lb. weight.

To Determine Line Pull:
Line Pull = 1000 lbs. -. 2.00 = 500 lbs.



To determine total load on traveling block C:
C = 500 1bs. x 2.0 = 1,000 1bs.
(line pull)(Factor 0° angle)

To determine total load on stationary block D:
D = 500 lbs x 1.87 + 500 lbs. = 1,435 lbs.
(line pull) ↑ (dead end load)
(Factor 40° angle)

To determine total load on block E:
E = 500 lbs. x .84 = 420 lbs.
(line pull) (Factor 130° angle)

To determine total load on block F:
F = 500 lbs. x 1.41 = 705 lbs.
(line pull) (Factor 90° angle)

Wire Rope – a commentary

It has been said that wire rope is a machine. And it is a very complex machine.....composed as it is of a number of precise, moving parts which are designed and manufactured to bear a very definite relation to one another. In fact, many wire ropes contain more moving parts than most mechanisms that fall within the broad term of "machines." This can be seen readily when it is considered that a six-stand rope, consisting of 19 wires per strand, contains a total of 114 wires not including the core.... all of which must be able to move with respect to one another if the rope is to have the necessary flexibility during operation. Wire rope is used in many operations including mining hoists, elevators, crane ropes and of course our particular interest..... the towing industry.

Of all the industries that use wire rope, I can think of no one that places harder demands upon the product than those in the towing arena. And why is that you ask? Well, it comes down to two major factors..... the winch manufacturers themselves and the mis-use of the product by untrained operators. So how are the winch manufacturers responsible for the unreasonable demands placed upon wire rope used on tow trucks? Let me list three points:

- **LOW DESIGN FACTOR** (wire rope break strength vs. winch pull).
  The design factor of a wire rope is the ratio of strength to its operating stress. Manufactures of equipment that use wire rope must determine this design factor for their product and it usually falls within the minimum design factor recommended by wire rope manufacturers of 3.5:1 upwards to the higher design factors recommended in most applications which result in a ratio of 5:1 or higher. In the towing industry, it is common place that a rollback unit will have a winch using 3/8" fiber core wire rope with a break strength of 13,440 lbs installed on a winch with a stall pull of 8,000 lbs. That's a ratio of 1.7:1. That's a far cry from the absolute minimum recommendation of 3.5:1.

- **UNDER SIZED WINCH DRUM DIAMETERS**
  Bending stresses on wire rope increase as the drum diameter of a winch decrease and these same bending stresses decrease as the drum diameter of a winch increase. In other words, as the steel components of a wire rope are constantly bent over a given diameter, they will fatigue and eventually fail. This fatigue will be minimized the larger the winch drum and will be maximized the smaller the winch drum. For 3/8" 6x19, wire rope manufacturers recommend that the minimum drum diameter be 11.25". Most rollback units have a winch with a diameter of less than 4" .....far far less than needed.

- **LACK OF LEVEL WIND SYSTEMS.**
  Look at any good bait casting fishing reel and you will see a "Level Wind" feature that allows the line to payout and return with an even placement across the length of the reel drum. This assures that the line will not bunch up in one spot or another and keeps the line from being crushed or flattened as it crosses over itself. Is this a feature on winches you see on rollbacks?.....Very rarely indeed. Usually what you see is a coiled-up mess of wire rope that is scattered all across the drum, crossed over itself multiple times resulting in distortion, flattening and destruction of the wire rope.

Continued next page

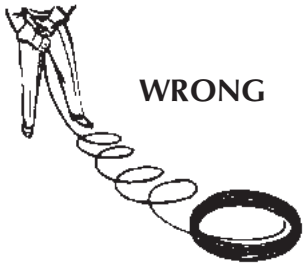
So, right from the start your wire rope winch line doesn't have a chance at truly meeting its longevity or life-span when installed on most wreckers or rollbacks. (some exceptions apply) Rather than provide proper design factors, correct winch drum diameters and level wind features.... Winch manufacturers sacrifice the wire rope. In my opinion...this is irresponsible. And to make it worst, many operators are untrained and follow practices that result in further abuse and damage to the wire rope. How many times do you see a vehicle loaded onto a flatbed..... the rear of the vehicle is usually tied down with chains or straps but the front is secured only with the wire rope winch line. As the casualty is transported the front of the vehicle bounces up and down on its suspension. This applied and released stress on the wire rope is un-measurable..... placing great force and tension that degrades and compromises the integrity of the winch line. This same force in many cases pulls the wire rope down into the lower levels of wire rope on the drum which creates scrubbing and distortion of the wires. When this happens, it is very common place that the wire rope will fail at the winch.....usually a foot or two back of the hook attachment. This is a practice that should always be avoided. Never secure or tie down a vehicle using a winch. Remove the winch line and tie down all four corners of the vehicle using proper chains or straps.

This is what your winchline will look like if you use it as a vehicle tie down!

PROPER UNWINDING

A wire rope can be damaged permanently even before it has gone into operation. Short lengths of wire rope often come in coils. Uncoil these lengths by rolling the coil slowly like a wheel, leaving behind a trail of *straight* rope. (Uncoiling by laying the coil flat and pulling off the top can give you hard-to-handle kinky rope.)

RIGHT



WRONG

When spooling onto operating drums, best service will be received if the rope can be first laid out straight on the ground prior to reeving and then pulled into the system under tension.

SHEAVES AND DRUMS

When an inspector examines a rope, he may see sections showing excessive wear. By flagging the rope, he can quickly determine where the rope is rubbing or contacting parts of the equipment, and then repair, replace, or modify the condition causing the wear.

Inspection of sheaves is a relatively simple, yet vital task.

Sheaves should be checked for:

1. Correct groove diameter.
2. Roundness or contour to give proper support to the rope.
3. Small holes, cracks, uneven surfaces, or other defects. which might be detrimental to the rope.
4. Extreme deep wear.

A sheave should also be checked to make sure it turns freely, is properly aligned, has no broken or cracked flanges, and has bearings that work properly.

Drums should also be inspected for signs of wear which could damage rope.

Operating with a smooth drum calls for special care. Be sure the rope is always tightly wound and thread laid on the first layer. Any loosening of the line is easily observed as the winding will be bad and the rope will be coming off with a series of “bad spots”.

Other places of contact such as rollers, scrub boards, guides and end attachments should also be inspected.

FREQUENT INSPECTION

Wire rope shall be visually inspected by the person handling the wire rope each day it is used. These visual observations should be concerned with discovering gross damage, such as listed below, which may be an immediate hazard:

(a) distortion of rope such as kinking, crushing, unstranding, bird caging, main strand displacement, or core protrusion. Loss of rope diameter in short rope lengths or unevenness of outer strands should provide evidence the rope should be replaced.

(b) general corrosion;

(c) broken or cut strands;

(d) number, distribution, and type of visible broken wires.

PERIODIC INSPECTION

A periodic inspection shall be performed by a designated person on a regular basis with frequency of inspection based on:

(a) frequency of wire rope use;
(b) severity of service conditions;
(c) nature of lifts being made;
(d) experience gained on the service life of wire rope used in similar circumstances.

REMOVAL FROM SERVICE

Wire Rope shall be immediately removed from service if any of the following conditions are present:

1. Kinks, bird caging or popped core in the working section of the wire rope.
2. Discoloration due to excessive heat.
3. Corrosion with pitting of the wires.
4. More than 11 broken wires in 6 diameters of length.
5. More than 3 broken wires in any one strand.
6. More than 2 broken wires at the end connection.
7. U-bolt clip installation other than specified and illustrated on page 105.

OPERATING PRACTICES

The following rules are required operating practices to be followed each time wire rope is used.

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- The weight of load shall be within the working load limit of the wire rope.
- Wire rope shall not be knotted.
- Wire rope that appears to be damaged shall not be used.
- Rollback winch lines are used to position the vehicle upon the deck. After this is accomplished and the vehicle has been secured with tie downs, the winch line must be removed from the vehicle prior to traveling. Never use a winch line as a tie down securement.
- Sharp corners in contact with the wire rope shall be padded.
- When wire rope fails, it will whip and recoil with great and violent force. Always stand clear.
- It is an urban myth that fiber core wire rope will “laydown” or drop to the ground when it breaks. This is NOT true as all wire rope will recoil with great and violent force when it fails. Always stand clear.
- Do not stand between a disabled vehicle and the recovery vehicle.
- Personnel shall stand clear of the suspended or winching load.
- At no time shall nonprofessional layman (tow truck customers) be placed in harms way during a winching operation or recovery.
- Shock loading shall be avoided.
- Wire rope should not be pulled from under a load when the load is resting on the wire rope.
- Twisting and kinking the wire rope shall be avoided.
- Fiber core wire rope should not be subjected to degreasing or solvents because of possible damage to the core.
- Fiber core wire rope shall not be exposed to temperatures in excess of 180 degrees F (82 degrees C).
- Loads may disengage from hook if proper procedures are not followed.
- Hook must always support the load. The load must never be supported by the hook latch.
- Never use a hook whose throat opening has been increased, or in anyway distorted or bent.
- Remove from service any hook that has a crack, nick or gouge.
- Never side load, back load or tip load a hook.
- The load applied to the hooks should be centered in the base bowl) of the hook to prevent point loading on the hook.
- Positive locking latch hooks (some refer to as self-locking hooks)will unlock when the trigger is depressed. Never use hook unless hook and latch are fully closed and locked.

Removal Criteria Synthetic Rope Winch Lines

A synthetic rope winch line shall be removed from service if conditions such as the following are present:

- Cuts or any area of extensive fiber breakage along the length of the rope.
- Damage that has reduced the diameter of the rope by more than 10%.
- Fused or melted fiber involving damage that exceeds 10% of the fiber in any one strand or the rope as a whole.
- Discoloration, brittle fibers and hard or stiff areas that may indicate chemical, ultraviolet light or heat damage including the presence of splinters and slivers on the rope surface.
- Excessive dirt or foreign matter that has permeated the rope.
- Kinks and distortion in the rope structure including hockles.
- Melted, hard or charred areas that affect more than 10% of the diameter of the rope.
- Other visible damage that causes doubt as to the strength of the rope.
- Damaged, distorted or improperly functioning hooks or the hook latch.

⚠WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using synthetic rope.
- Use by untrained persons is hazardous. It is important that all users be thoroughly familiar with the manufacturer's recommendation and safety information.
- Determine that the weight of the load is within the working load limit of the rope.
- Ropes shall not be shortened or lengthened by knotting.
- Damaged rope shall not be used.
- Edges in contact with rope shall be padded.
- Keep all portions of the human body from between the winch line and the load.
- Personnel should stand clear of the winching load.
- It is dangerous if personnel are in line with a rope under tension. Rope failure can result in a deadly recoil force. Never have personnel between the load and the take up device.
- Shock loading shall be avoided.
- Rope should not be pulled from under a load when the load is resting on the rope.
- Store rope winch lines in an area where they will not be subjected to mechanical damage, moisture, extreme heat or ultraviolet light.
- Loads applied to the hook should be centered in the base of the hook to prevent point loading on the hook.
- Self-locking hooks shall always be closed and locked before use.
- Before pulling, make certain the rope or load shall not snag.
- Personnel shall be continuously alert to avoid snagging.
- Rope should not be dragged on the floor or over an abrasive surface.
- Synthetic rope winch lines shall not be used at temperatures in excess of 180 f or below -40 f.
- Exposure to sunlight or ultraviolet light degrades the strength of synthetic rope.
- Inspect rope for damage and defects prior to each use.

WARNING

THE IMPROPER USE OF ROPE IS DANGEROUS

Rope Failure Can Cause Serious Injury or Death

- The **USER** is responsible to determine the suitability of a Rope for specific applications.
- **USE** only rope in good condition, without cuts or pulled strands.
- **KNOW** the Working Load Limit (WLL) of your rope.
- **DO NOT** exceed the WLL or shock load the rope.
- **DO NOT** stand within recoil (snapback) area.
- **DO NOT** use over rough surfaces without chafe protection
- **DO NOT** bend around unprotected, sharp corners.
- **USE** sheaves with a minimum of 8 times the rope diameter.

Fiber Rope will Fail if Worn, Damaged, Abused, Overloaded, or Not Properly Maintained.

WIRE ROPE CLIPS

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using clips.
- Prepare wire rope end termination only as instructed.
- Do not use with plastic coated wire rope.
- Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next check and retighten nuts to recommended torque. (see Table 1)

Efficiency ratings for wire rope end terminations are based upon the catalog breaking strength of wire rope. The efficiency rating of a properly prepared loop or thimble-eye termination for clip sizes 1/8" through 7/8" is 80%.

1.

Refer to Table 1 in following these instructions. Turn back specified amount of rope from thimble or loop. Apply first clip one base width from dead end of rope. Apply U-Bolt over dead end of wire rope live end rests in saddle. Tighten nuts evenly, alternate from one nut to the other until reaching the recommended torque.

2.

When two clips are required, apply the second clip as near the loop or thimble as possible. Tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn-nuts on second clip firmly, but do not tighten. Proceed to Step 3.

3.

When three or more clips are required, space additional clips equally between first two - take up rope slack - tighten nuts on each U-Bolt evenly, alternating from one nut to the other until reaching recommended torque.

4. IMPORTANT

Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torque. In accordance with good rigging and maintenance practices, the wire rope end termination should be inspected periodically for wear, abuse and general adequacy.

TABLE 1

Clip Size (Inches)	Minimum No. of Clip	Amount of Rope to Turn Back in Inches	Torque in Ft. Lbs.
1/8	2	3-1/4	4.5
3/16	2	3-3/4	7.5
1/4	2	4-3/4	15
5/16	2	5-1/4	30
3/8	2	6-1/2	45
7/16	2	7	65
1/2	3	11-1/2	65
9/16	3	12	95
5/8	3	12	95
3/4	4	18	130
7/8	4	19	225

WINCH LINE AND HOIST HOOKS

⚠ WARNING

- Loads may disengage from hook if proper procedures are not followed.
- A falling load may cause serious injury or death.
- Threads may corrode and/or strip and drop the load.
- Hook must always support the load. The load must never be supported by the latch.
- Never apply more force than the hook's assigned Working Load Limit (W.L.L. rating.)
- Never shock load a hook.
- Read and understand these instructions before using hook.
- Always visually inspect hook before using.
- Never use a hook whose throat opening has been increased, or whose tip has been bent more than 10 degrees out of plane from the hook body, or is in any other way distorted or bent. **Note: A latch will not work properly on a hook with a bent or worn tip.**
- Remove from service any hook with a crack, nick, or gouge.
- Never repair, alter, rework, or reshape a hook by welding, heating, burning, or bending.
- Never side load, back load, or tip load a hook. (see figure 2)
- Eye hooks, shank hook and swivel hooks are designed to be used with wire rope or chain.
- Do not swivel a swivel hook while it is supporting a load.
- Always make sure the hook supports the load. (see figure 3) The latch must never support the load. (see figure 4)
- See ASME B30.10 "Hooks" for additional information.
- Do not stand between disabled vehicle and recovery vehicle.

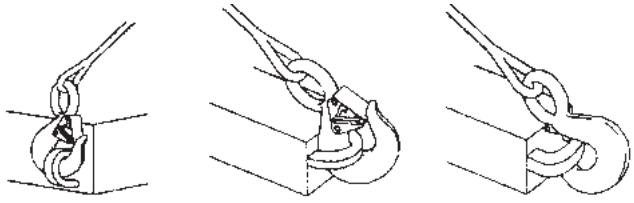


FIGURE 2

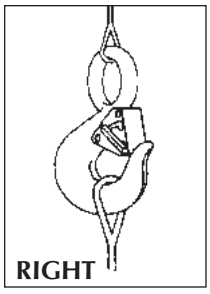


FIGURE 3

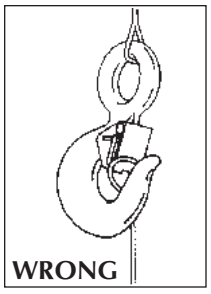


FIGURE 4

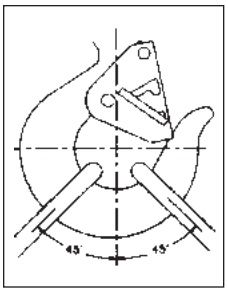


FIGURE 5

SELF-LOCKING HOOKS

⚠ WARNING

- A visual periodic inspection for cracks, nicks, wear and deformation should be part of a documented inspection plan.
- Remove from service any hook with a crack, nick or gouge.
- Never repair, alter or reshape a hook by welding, heating or bending.
- Never side load, back load or tip load a hook. These conditions damage and reduce the capacity of the hook.
- Loads may disengage from hook if proper procedures are not followed.
- A falling or recoiled load may cause serious injury or death.
- Self-locking latch will unlock when trigger is depressed. Never use hook unless hook and latch are fully closed and locked.
- Keep body parts clear of pinch point between hook tip and hook latch when closing.
- Never use a hook whose throat opening has been increased or shows any visible apparent bend or twist from the plane of the unbent hook, or is in any other way distorted or bent. NOTE: A latch will not work properly on a hook with a bent or worn tip.
- Always make sure the hook supports the load.
- Never apply more force than the hook's assigned Working Load Limit (WLL) rating.
- Read and understand these instructions before using hook.
- See ANSI/ASME B30.10 "Hooks" for additional information.
- Observe proper use as shown in figures 2, 3, 4 and 5

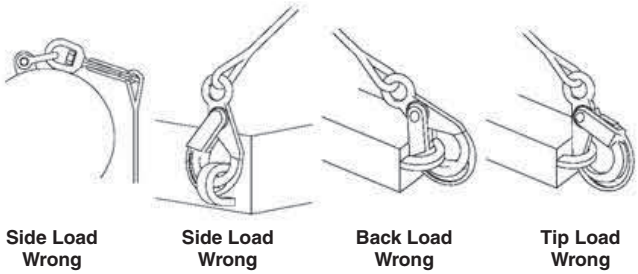


FIGURE 2

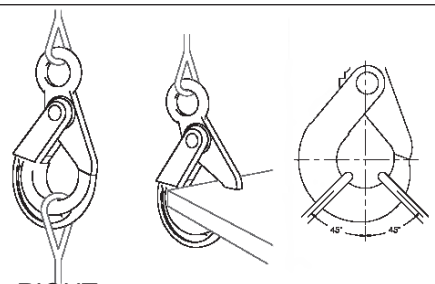


FIGURE 3 **FIGURE 4** **FIGURE 5**

Operating Practices — Web Tiedown Straps

NYLON vs. POLYESTER

The most popular material for web tiedowns is polyester. The tough long wearing properties of polyester make it the best choice for general use. The low stretch characteristics of polyester helps to reduce load movement, maintaining load control. Polyester should never be used where alkalis are present. (see chemical data page 94)

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using web tiedown straps.
- Polyester tie downs should never be used where alkalis are present. (see chemical data page 94)

TAGS

Each all-grip® web tiedown has a legible tag sewn to the web body. Each tag has the date of manufacture for better accountability as well as the Working Load Limits in both pounds (lbs.) and kilograms (kgs.).

U.V. LIGHT

Environments in which web tiedowns are continuously exposed to ultra-violet light can affect the strength of web tiedowns in varying degrees ranging from slight to total degradation. To minimize these effects, store tiedowns not being used in a cool, dry and dark place. Visual indications of ultra-violet degradation are bleaching out of the color, increased stiffness and surface abrasion at points not normally in contact with the load.

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using web tiedowns.
- Determine that the weight of the load is within the working load limit of the web tiedown(s).
- Select a web tiedown having suitable characteristics for the type of load and environment.
- Damaged web tiedowns shall not be used.
- Web tiedowns shall be applied in a manner providing control over the load.
- All edges in contact with web tiedowns shall be padded.
- Web tie downs shall not be pulled from under a load when a load is resting on the tiedown.
- Web tiedowns should be stored in an area where they will not be subjected to mechanical damage.
- Twisting of tiedowns shall be avoided.
- Web tiedowns shall not be used at temperatures in excess of 180° F.
- Exposure to sunlight or ultraviolet light degrades the strength of synthetic fibers used in web tiedowns.
- Inspect web tie downs for damage and defects prior to each use.
- Snubbers or other devices which are designed to stretch with movement of the load shall not be used with web tiedowns.
- Anchorages shall have design strengths not less than those which are required of the tiedowns attached to them.
- No more than one web tiedown shall be attached to the same anchorage or tightening device.
- Web tiedowns shall be applied at an approximate 90° angle to the spindle of any ratchet or winch.
- The manufacturers name or trade mark shall be printed on the webbing in 5′ or less intervals.
- Web tiedowns attachments shall have a design load rating not less than that required of the web tiedown to which they are attached.
- Web tiedowns may not be repaired.
- Web tiedowns shall not be used for lifting. (use web slings)
- Connect the towing hardware of web tiedowns only to the vehicle manufacturers approved connection points on the vehicle towed.
- Do not stand between disabled vehicle and recovery vehicle.

DATE

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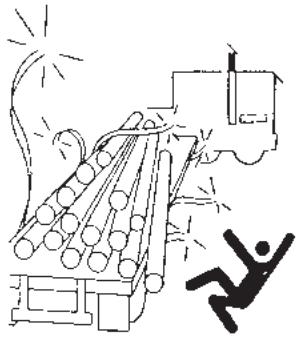


⚠ WARNING

Can fail if damaged, misused or overloaded. Use only if trained. Observe rated load. Avoid sharp edges and exposure to acid, alkali, sunlight and temperature over 180°F(82°c). Do not use for overhead lifting. Remove from service if metal fittings are cracked, worn or deformed. DEATH OR INJURY can occur from improper use or care.

INSPECTIONS

Each day before being used, the web tiedown and all attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during web tiedown use, where service conditions warrant. Damaged or defective web tiedowns shall be immediately removed from service.

DEFECT CLASSIFICATION TABLE

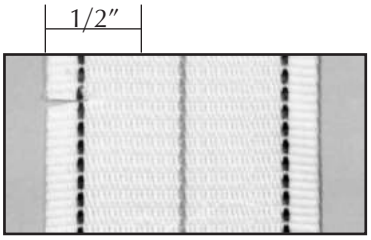
Web Size Inches	Removal From Service Range Total Defect Size (in)
4	Larger than 3/4″
3	Larger than 5/8″
2	Larger than 3/8″
1.75	Larger than 3/8″

REMOVAL FROM SERVICE—WEB TIEDOWNS

Web tiedowns, shall be immediately removed from service if any of the following conditions are present –

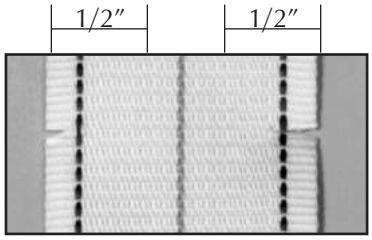
1. Cuts, burns and or holes which total more than that shown in the following Defect Classification Table
2. Separation of its load carrying stitch pattern(s).
3. Any broken, non-functioning fitting, tensioning device or hardware.
4. Any fitting, tensioning device or hardware which is obviously sprung, bent, twisted or contains visible cracks, or significant nicks or gouges.
5. Any knotted webbing, splices or other repair.
6. Any apparent defect, including but not limited to crushed areas, damaged loop ends, severe abrasion etc.

All cuts, burns, and/or holes are additive across the width of the webbing face for its entire length, but only one defect is additive for any specific width. (see below)



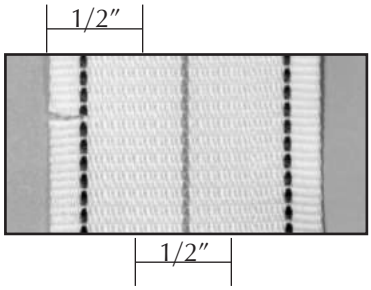
4″ WEB SAMPLE #1

Cuts on same edge are not additive
Total defect size is 1/2″
Tiedown may be used



4″ WEB SAMPLE #2

Cuts on opposite edges are additive.
Total defect size is 1″
REMOVE FROM SERVICE



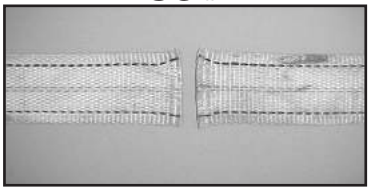
4″ WEB SAMPLE #3

Cuts and holes at different locations across the width are additive
Total defect size is 1″
REMOVE FROM SERVICE

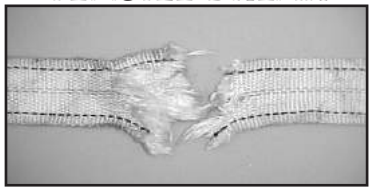
Identifying Web Damage

Not a week goes by that we do not receive a web strap from a customer who states “My Strap Broke” or “It Just Let Loose”. Well, web straps don’t just let loose and they seldom break. In most cases the failure is due to a cut. Web straps are essentially nothing more than heavy fabric. Fabric and edges from sheet metal, bumpers and the like do not mix well. A seemingly dull edge can become a knife when the strap is put under tension. Cuts can be identified by a clean straight severing of the web fibers similar to what a pair of scissors would make. Tensile breaks are the result of the web fibers being pulled beyond their physical strength. Tensile breaks are identified by the fibers being frayed and elongated. Sometimes web strap failures are a combination of a cut and then the remaining fibers are broken by tensile breaks. Heat from hot tailpipes, engine components and friction will melt the web, resulting in its failure. Sharp edges, overloading and hot surfaces are the web straps enemies.

CUT



TENSILE BREAK



HEAT DAMAGE

Always use Corner Protectors!

TIEDOWN CHAINS

⚠ WARNING

- Failure to read, understand and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using tie down chains.
- Determine that the weight of the load is within the working load limit of the tie down chains.
- Never exceed the working load limit of the tie down chains.
- Understand that as angles decrease in tie down chain assembly use, the working load limit is drastically reduced.
- If a tie down chain assembly cannot be identified as to grade, do not use it.
- Do not do makeshift repairs to tie down chains.
- Never use tie down chains for lifting. Refer to grade 80 and grade 100 recovery chains for such applications.
- Inspect the tie down chain, hardware and all attachments before each use.
- Never use any tie down chain, hardware or attachments that are visibly worn or damaged including those that are bent, elongated, stretched, gouged or nicked.
- Attach hooks such that the load is applied to the base or bearing point in a straight line with the eye or clevis.
- Point loading, side loading and back loading of hooks or attachments should never be done.
- Apply tie down chain and attachments in a straight line. Do not apply chain around sharp corners or edges.
- Do not twist or kink tie down chains.
- Do not tie knots in tie down chains.
- Connect towing hardware only to the vehicle manufactures approved connection or anchor points for that vehicle.
- Always stand clear of the vehicle when a load is being applied.
- Always be aware and avoid pinch points.
- Never stand between disabled vehicle and the recovery vehicle.
- Always avoid shock loading, jerking or dropping of the load.

LEVER LOADBINDERS

⚠ WARNING

- Failure to use this load binder properly may result in your serious injury or even death.
- Do not operate load binder while standing on the load.
- Hook load binder to chain so you can operate it while standing on the ground. Position load binder so its handle can be pulled downward to tighten chain (see photo). **Be aware of ice, snow, rain, oil, etc. that can affect your footing. Make certain your footing is secure.**

- All-Grip specifically recommends AGAINST the use of a handle extender (cheater pipe). If sufficient leverage cannot be obtained using the lever type load binder by itself, a ratchet type binder should be used.
- If the above recommendation is disregarded and a cheater pipe is used, it must closely fit the handle and must slide down the handle until the handle projections are contacted. The pipe should be secured to the handle, for example, by a pin, so that the pipe cannot fly off the handle if you loose control and let go. The increased leverage, by using a cheater pipe, can cause deformation and failure of the chain and load binder.
- During and after tightening chain, check load binder handle position. Be sure it is in the locked position and that its bottom side touches the chain link.
- Chain tension may decrease due to load shifting during transport. To be sure the load binder remains in proper position: Secure handle to chain by wrapping the loose end of chain around the handle and the tight chain, or tie handle to chain with soft wire.
- While under tension, load binder must not bear against an object.
- When releasing load binder, remember there is a great deal of energy in the stretched chain. This will cause the load binder handle to move very quickly with great force when it is unlatched. **Move handle with caution. It may whip - Keep Body Clear**.
- **Never use a cheater pipe or handle extender to release handle**. Use a steel bar and pry under the handle and **stay out of the path of handle** as it moves upward.
- If you release the handle by hand, use an open hand under the handle and push upward. **Do not close your hand around the handle. Always keep yourself out of the path of the moving handle**.
- **Always consider the safety of nearby workers as well as yourself when using load binder**.
- **You must be familiar with state and federal regulations regarding size and number of chain systems required for securing loads on trucks**.

See page 8 for definition of Working Load Limit (W.L.L.)

Always use Corner Protectors!