

GENERAL OSHA & MANUFACTURER REQUIREMENTS FOR ALL SLINGS

Safe Operating Practices

1. **Sling users must be trained** in operating practices, including sling selection, use, inspection, rigging practices, cautions to personnel, and effects of the environment.
2. **Inspect sling before each use** and remove from service if damaged.
3. **Protect sling from being cut or damaged** by corners, protrusions, or from contact with edges that are not well rounded, using material of sufficient strength, thickness and construction to prevent damage.
4. **Use sling properly.** Do not exceed a sling's rated capacities and always consider how the sling angle affects the amount of tension on the sling.
5. **Stand clear of the load.** Do not stand on, under, or near a load, and be alert to dangers from falling and moving loads, and the potential for snagging.
6. **Maintain and store sling properly.** The sling should be protected from mechanical, chemical and environmental damage.

1. TRAINING

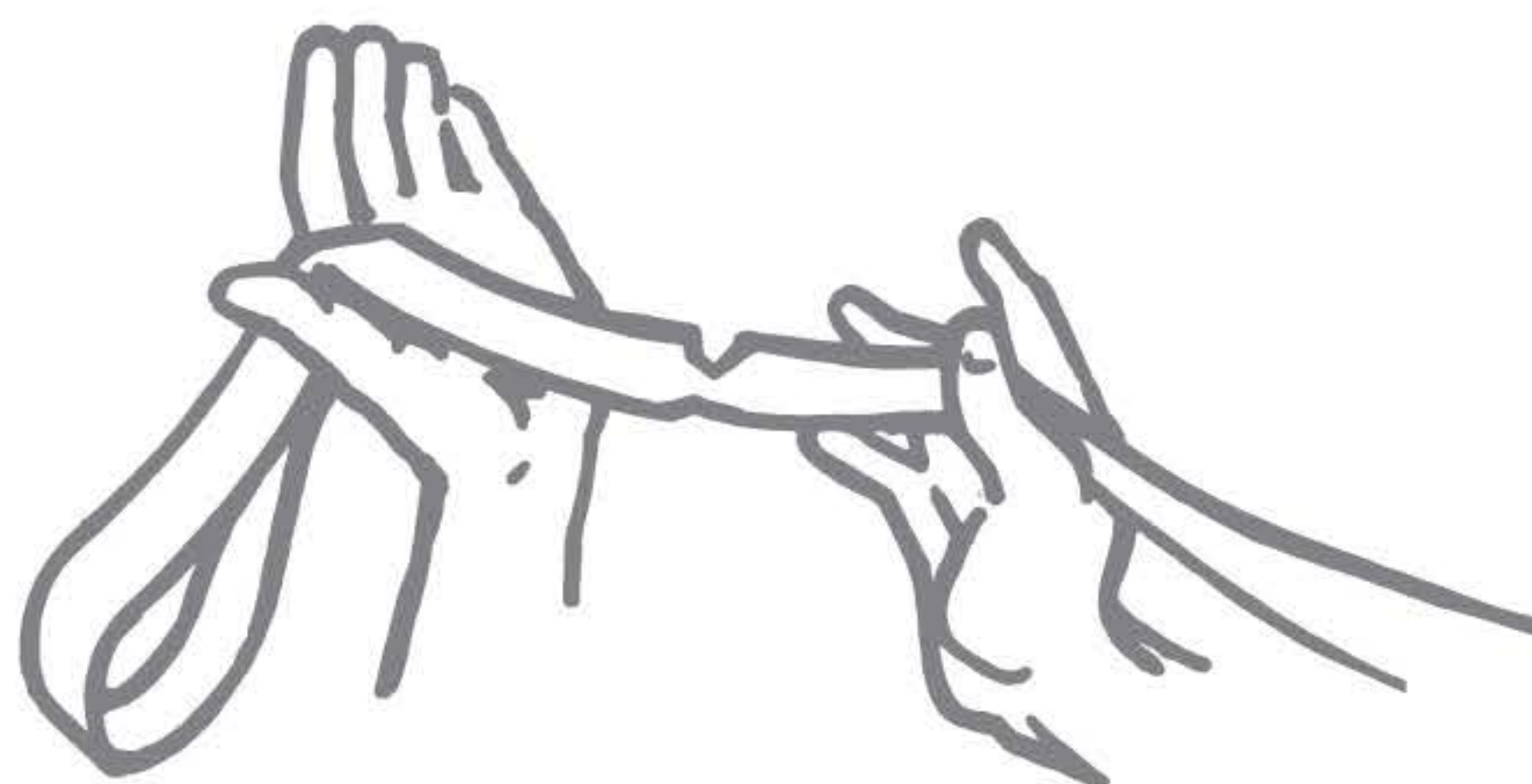
Sling users must be trained and knowledgeable

Sling users must be knowledgeable about the safe and proper use of slings and be aware of their responsibilities as outlined in all applicable standards and regulations.

ASME B30.9 states, "Sling users shall be trained in the selection, inspection, cautions to personnel, effects of the environment, and rigging practices."

OSHA Sling Regulation 29 CFR 1910.184 states that a qualified person is one *"who, by possession of a recognized degree or certificate of professional standing in an applicable field, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work."*

If you are unsure whether you are properly trained and knowledgeable, or if you are unsure of what the standards and regulations require of you, ask your employer for information and/or training — **DO NOT** use slings if you are unsure of what you are doing. Lack of skill, knowledge or care can result in severe **INJURY** or **DEATH** to you and others.



The Safety Bulletin that accompanies each sling must be read and understood by all sling users. See sling abuse illustrations in their respective section of this catalog. Damaged slings should never be used. It is possible (in some instances), to repair slings, proof-test and return them to service. Damaged components and sections of chain or wire mesh can be replaced. Hooks, links and other components that are in good condition can be salvaged from a damaged web or round sling; then re-webbed and proof-tested by *Lift-All* and returned to service.

2. INSPECTIONS

Damaged or defective slings shall be immediately removed from service.

Inspection Frequency

Initial Inspection — Each new sling must be inspected by a designated person to help ensure that the correct sling has been received, is undamaged and meets applicable requirements for its intended use.

Frequent Inspection — Slings must be inspected for damage before each use by the user or other designated person. Refer to safety bulletin provided with each sling.

Periodic Inspection — Every sling must be inspected periodically. The designated person should be someone other than the person performing the frequent inspection.

The frequency of periodic inspections should be based on the sling's actual or expected use, the severity of service and experience gained during the inspection of other slings used in similar circumstances, but must not exceed a one-year interval. General guidelines for the frequency of periodic inspections are:

- Normal service — yearly
- Severe service — monthly to quarterly
- Special service — as recommended

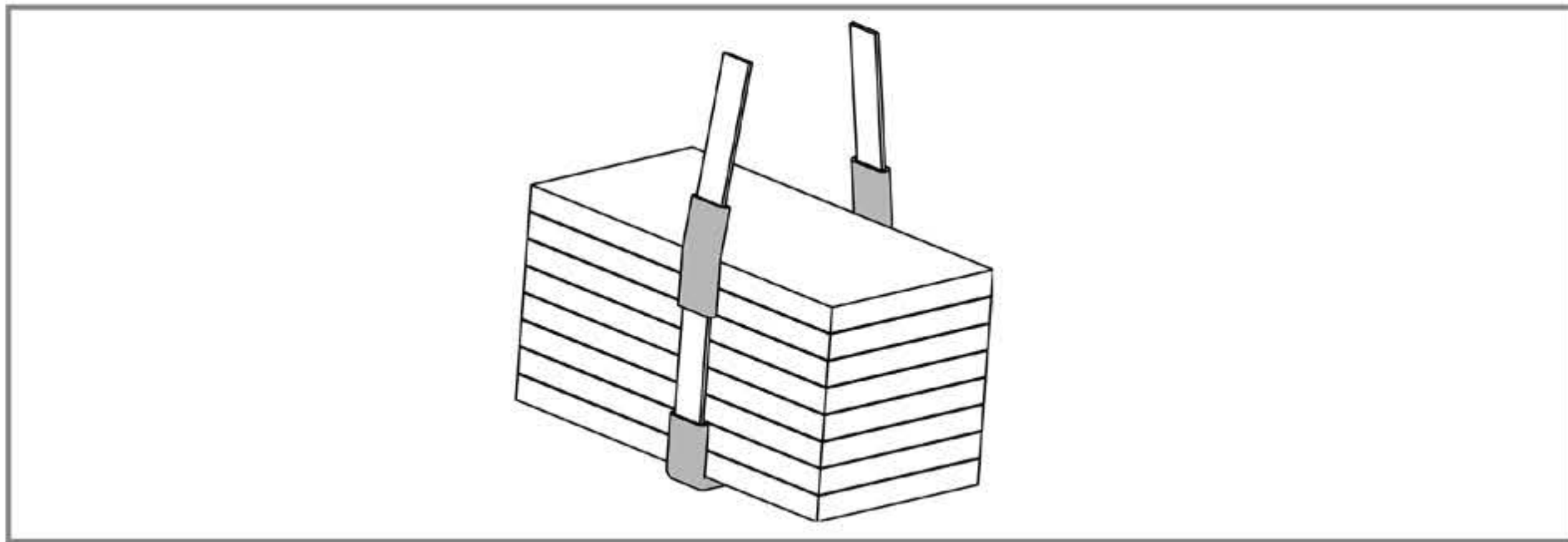
A written record of the most recent periodic inspection must be maintained. See WSTDA WS-1 for definitions of service conditions.

For specific inspection criteria for *Lift-All* slings, see the information at the end of each product section.

All sling users must read and understand the safety bulletin provided with each sling.

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3. PROTECT SLINGS



The cutting of synthetic slings is the primary cause of sling failure, usually caused by a sharp or small diameter load edge against the sling. Proper protection must be used to avoid cutting. (See Sling Protection section).

Heavy abrasion will seriously degrade sling strength. Rough load surfaces and dragging slings on the ground will damage all slings, steel or synthetic. Use proper sling protection between slings and rough loads. Never drag slings on the ground or concrete floors.

Sling Protection

A qualified person must select materials and methods that adequately protect slings from edges or surfaces. The sling protection section of this catalog includes information on available cut protection products and wear protection products. No protective device is cut proof.

Some protection devices provide abrasion resistance but offer virtually no protection against cuts. Several test lifts (done in a non-consequence setting), may be necessary to determine the suitability of each protection device. After each test lift, inspect all slings and protection devices for damage.

Foreign Matter

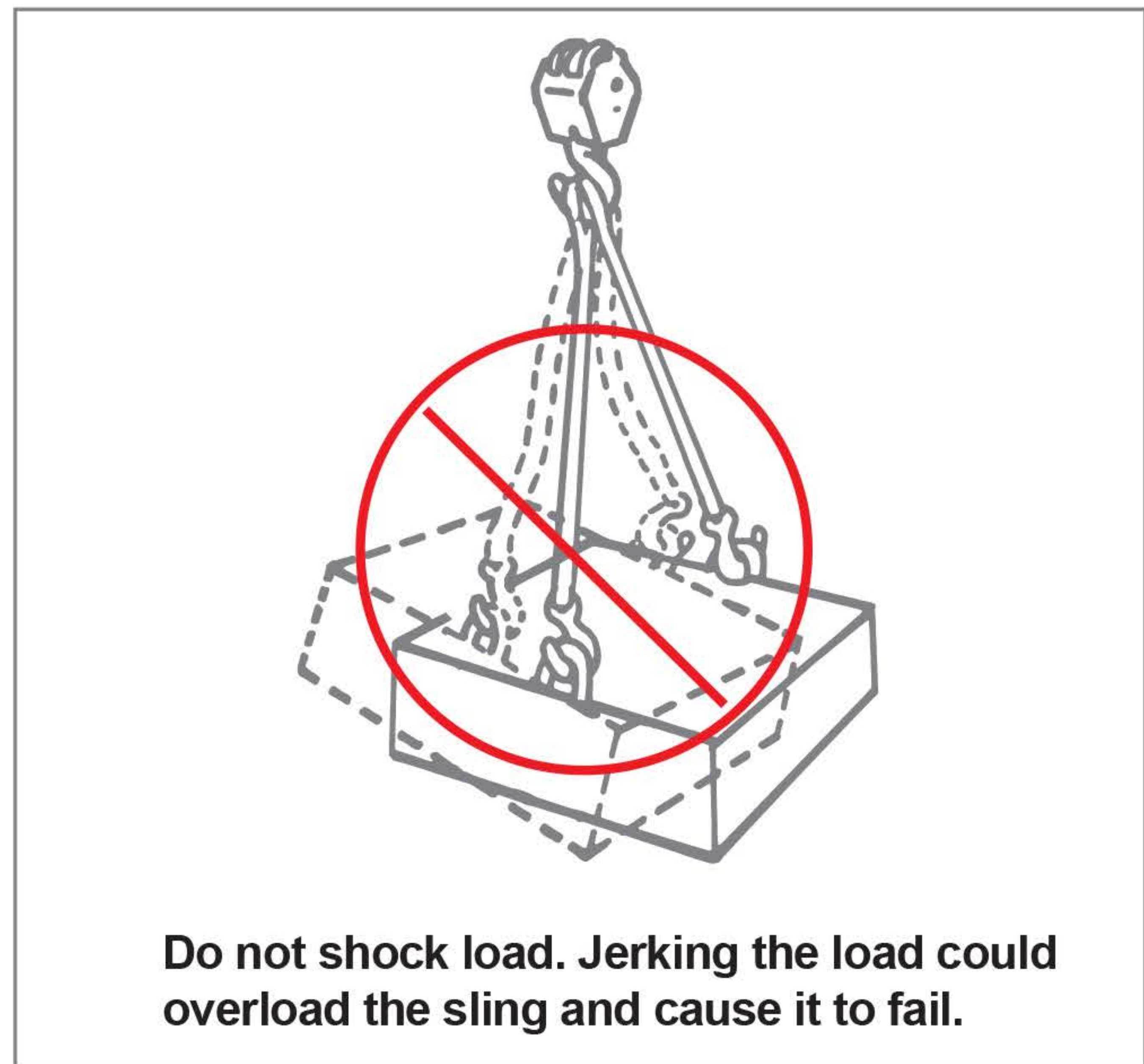
Material such as metal chips and heavy grit can damage slings, both internally and externally. Avoid contact with foreign matter whenever possible.

4. USE SLINGS PROPERLY

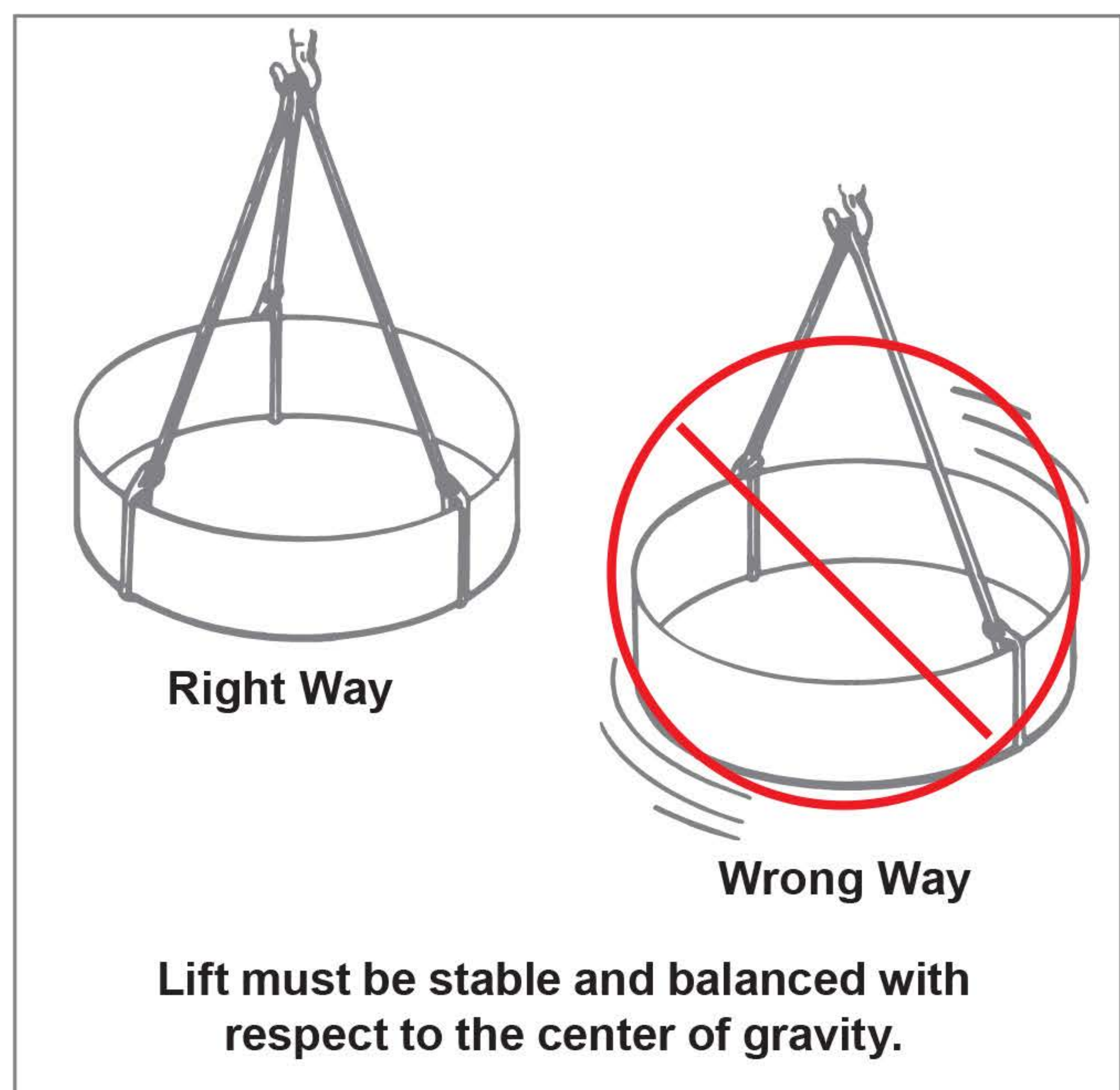
Improper Loading — Shock Loading, unbalanced loading, overloading and inadequate consideration for the effect of angle factors can adversely affect safety. Make sure the load weight is within the rated capacity of the sling(s) being used for both type of hitch, and angle of lift. OSHA wording.



Slings should not be dragged on floor.



Do not shock load. Jerking the load could overload the sling and cause it to fail.



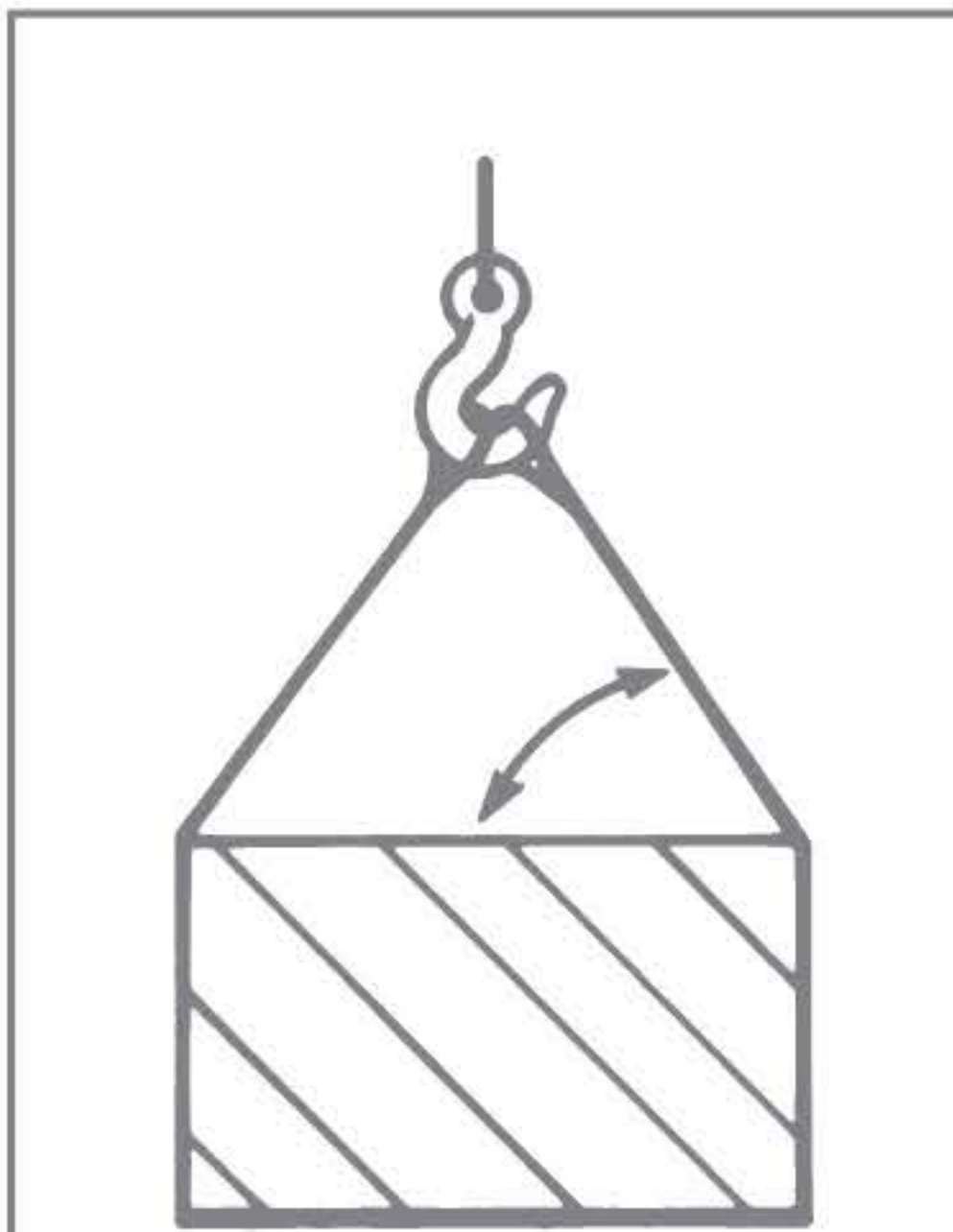
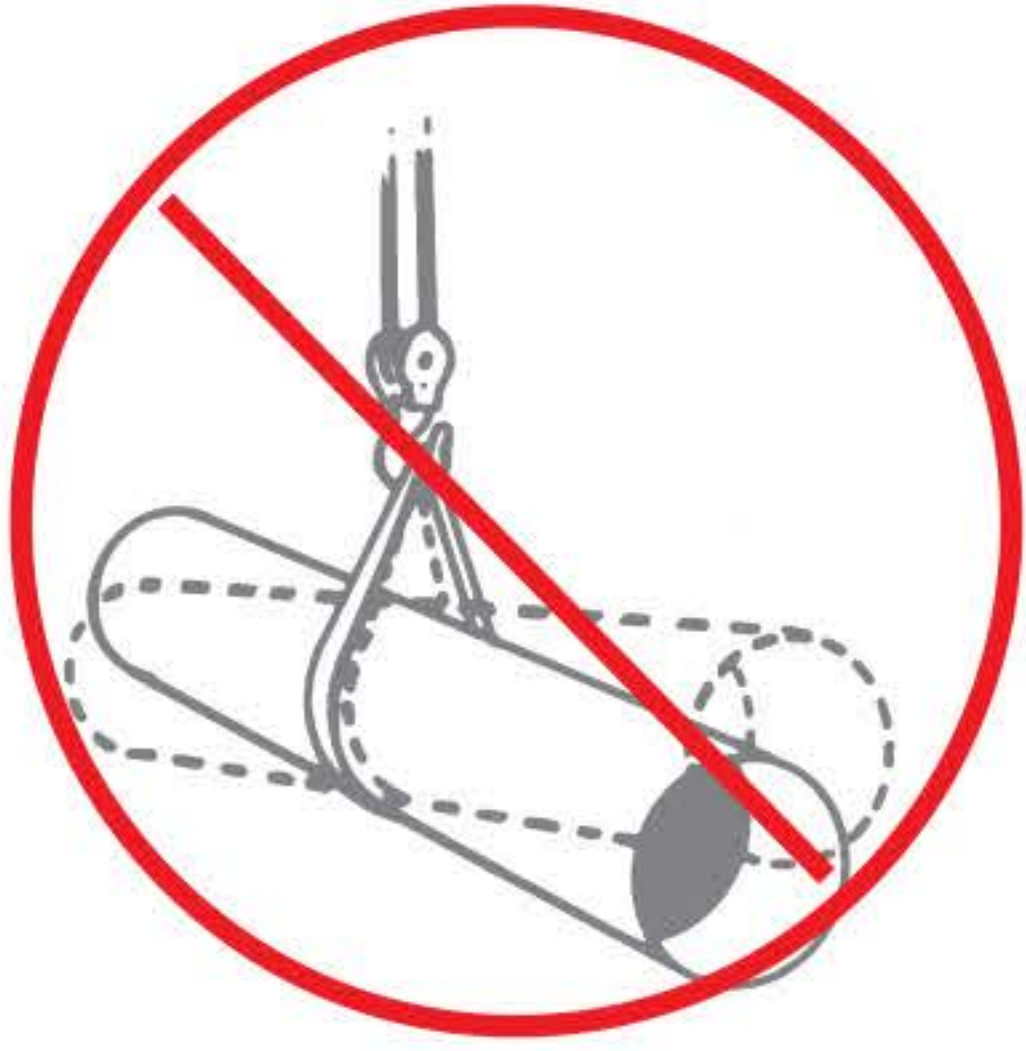
Right Way

Wrong Way

Lift must be stable and balanced with respect to the center of gravity.

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A qualified person must choose the quantity of slings, location of attachments, and the hitch types needed to effectively maintain load control.



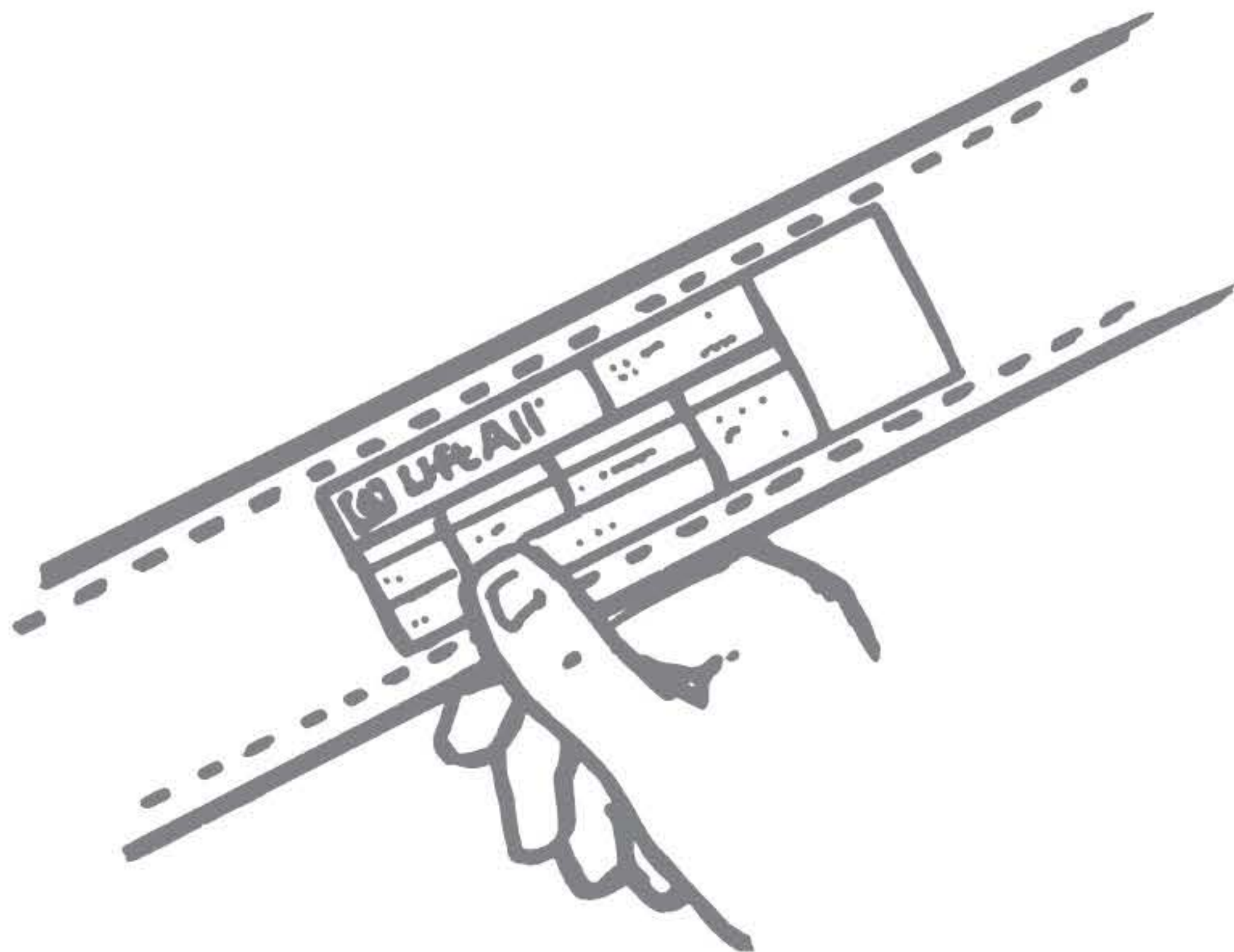
Angle of lift must be considered in all lifts. See Effect of Angle section of this catalog.

Temperature: Avoid loads and environments where temperatures exceed the limits of the slings being used. All slings can be damaged by excessive heat, including heat from welding torches and weld spatter.

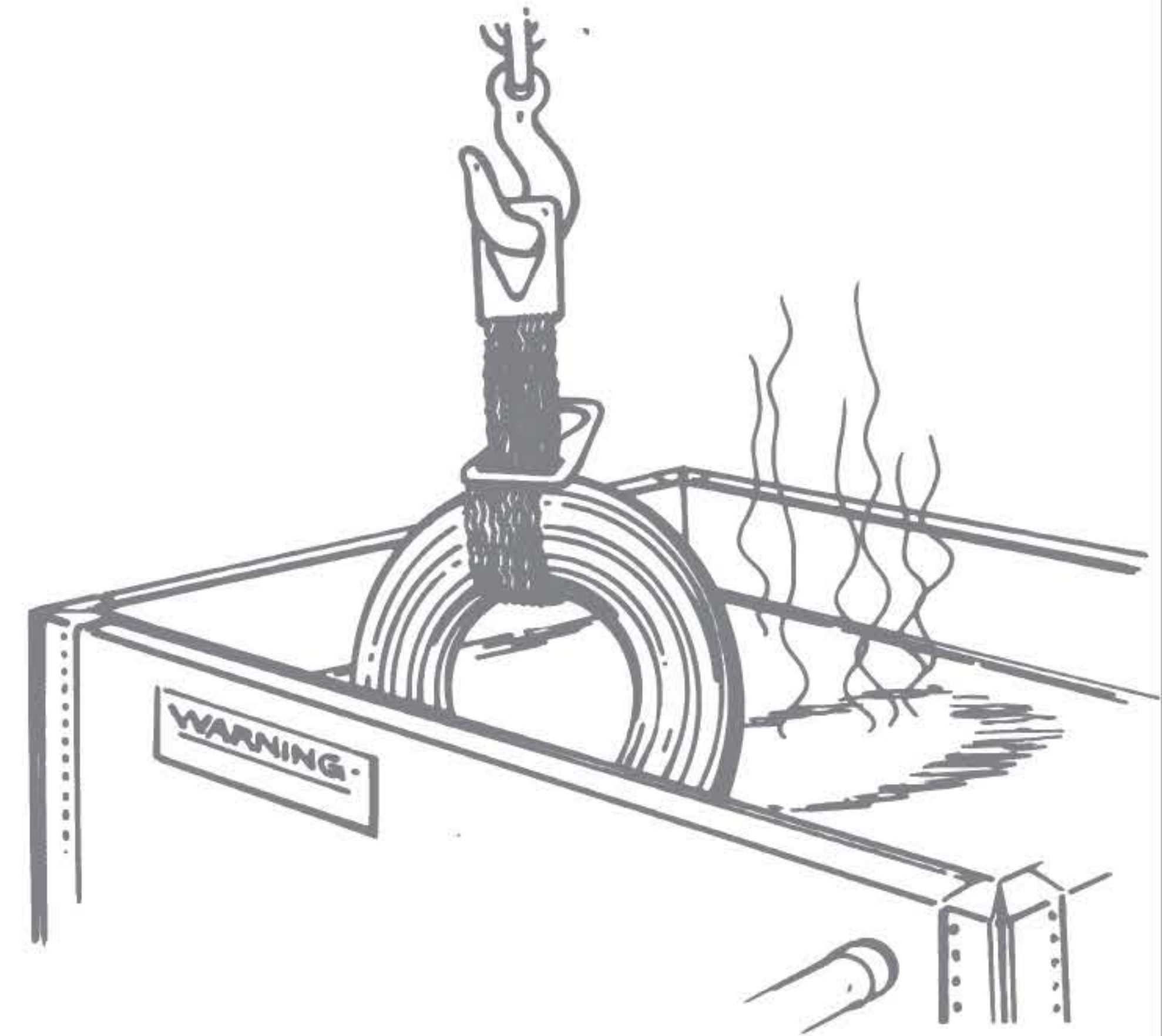
Chemical Environment: Slings exposed to certain chemicals or the vapors of these chemicals can lose some or all of their strength. When using slings in a chemical environment, contact *Lift-All* to ensure sling compatibility.

Temperature and chemical environment must be considered. See specific sling types for data.

Slings shall not be loaded in excess of their rated capacities. OSHA wording.

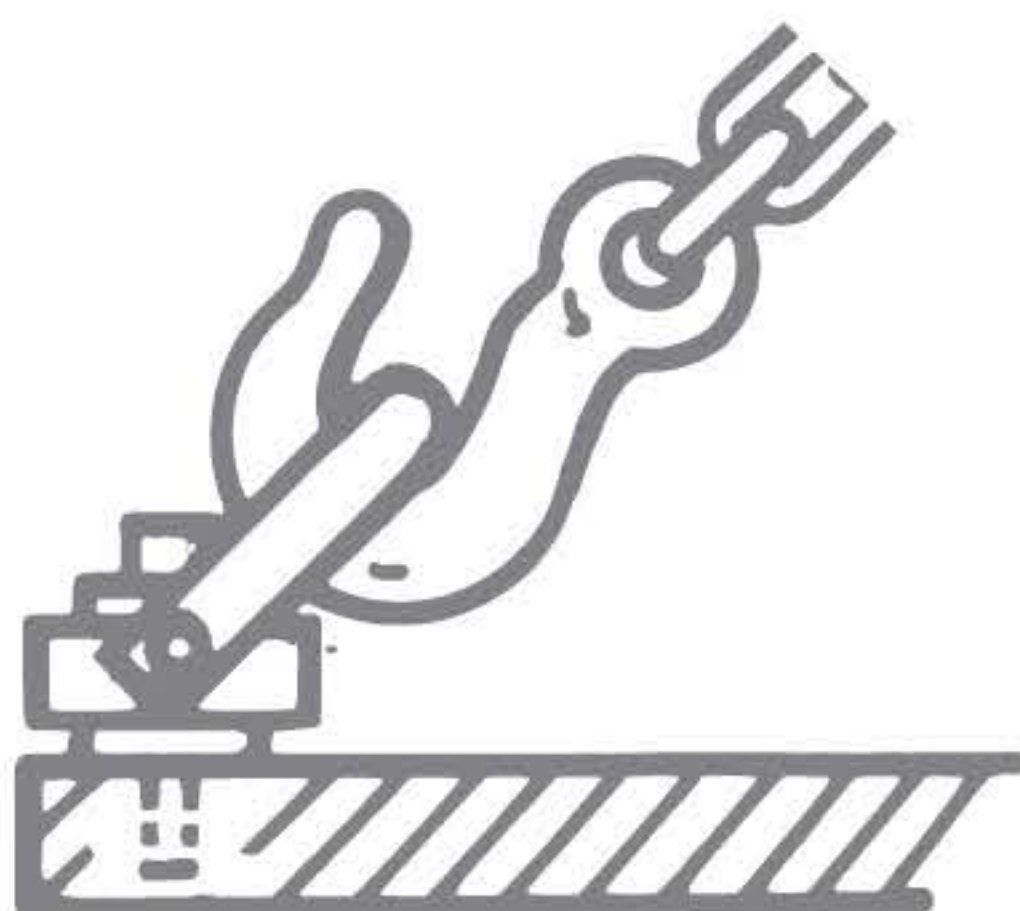


Rated Capacity (Working Load Limit) must be shown by markings or tags attached to all slings.



Slings shall be securely attached to their loads. OSHA wording.

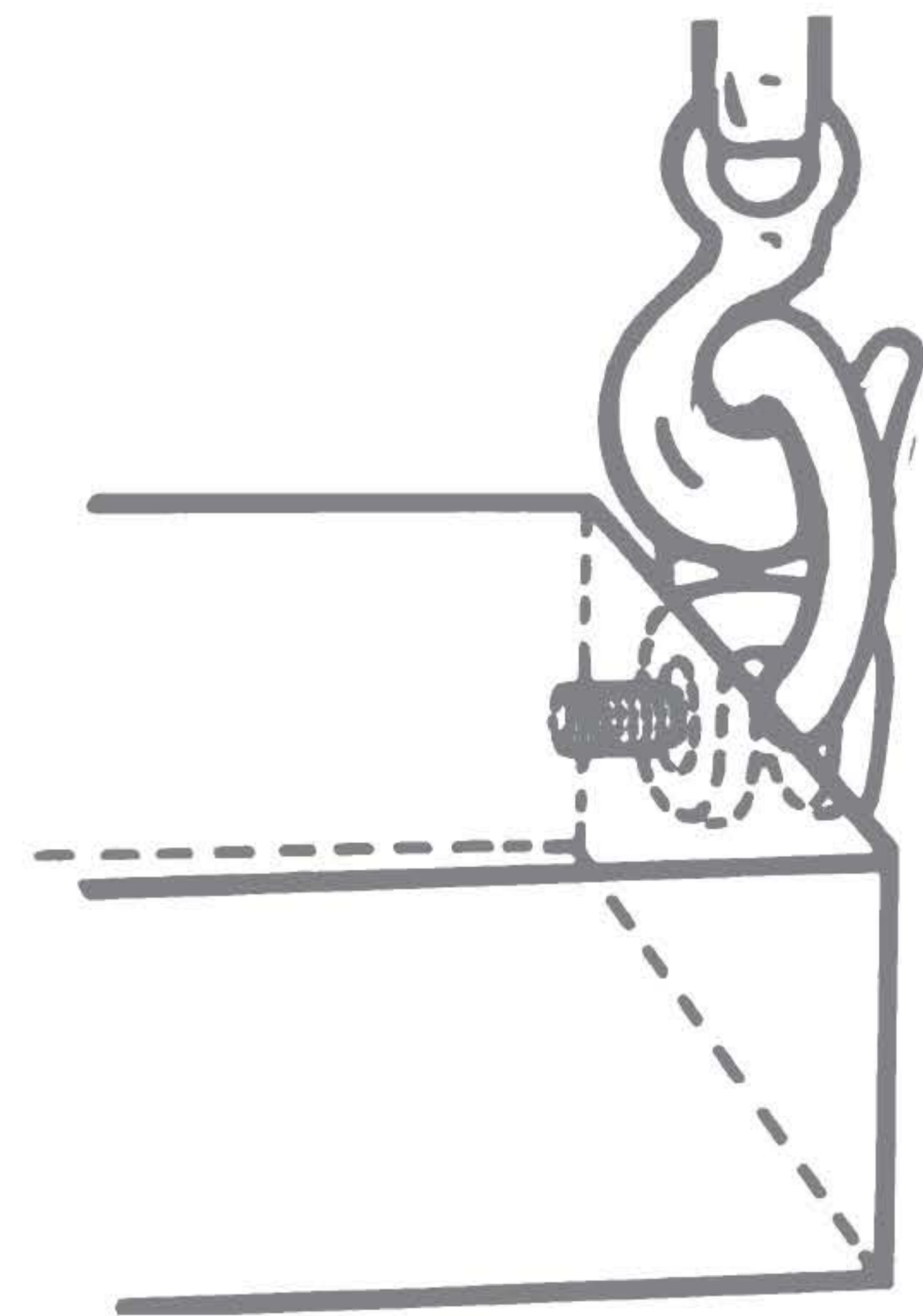
Do not point load hooks — center load in base of hook.



Right Way



Wrong Way

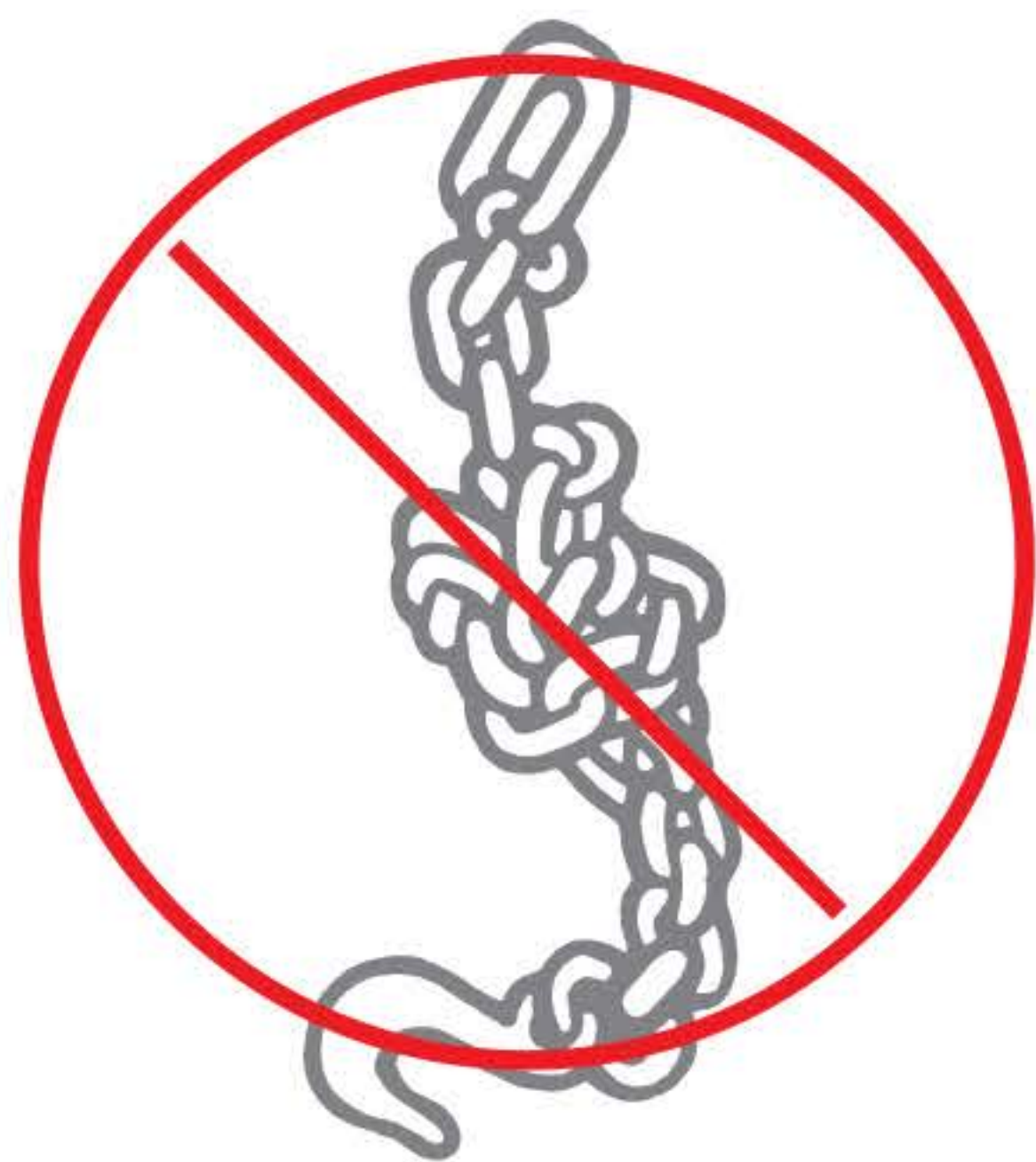


- Information
- General
- Web Slings
- Round Slings
- Sling Protection
- Wire Rope
- Chain Slings
- Rigging Hardware
- Mesh Slings
- Load Huggers
- Tow Products
- Lift-All Hoists
- Hoist Rings
- Plate Clamps
- Lifting Devices

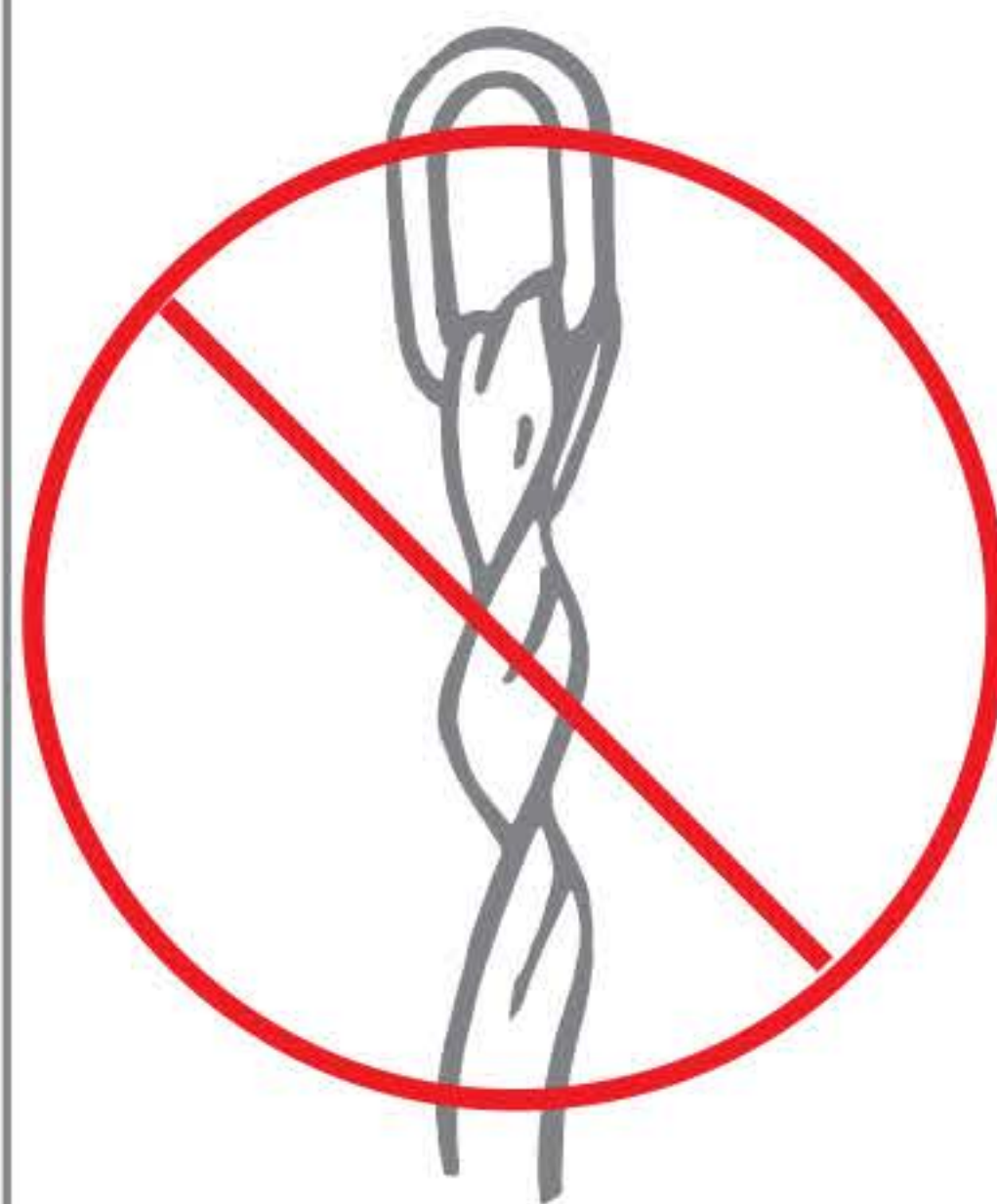
GENERAL OSHA & MANUFACTURER REQUIREMENTS FOR ALL SLINGS

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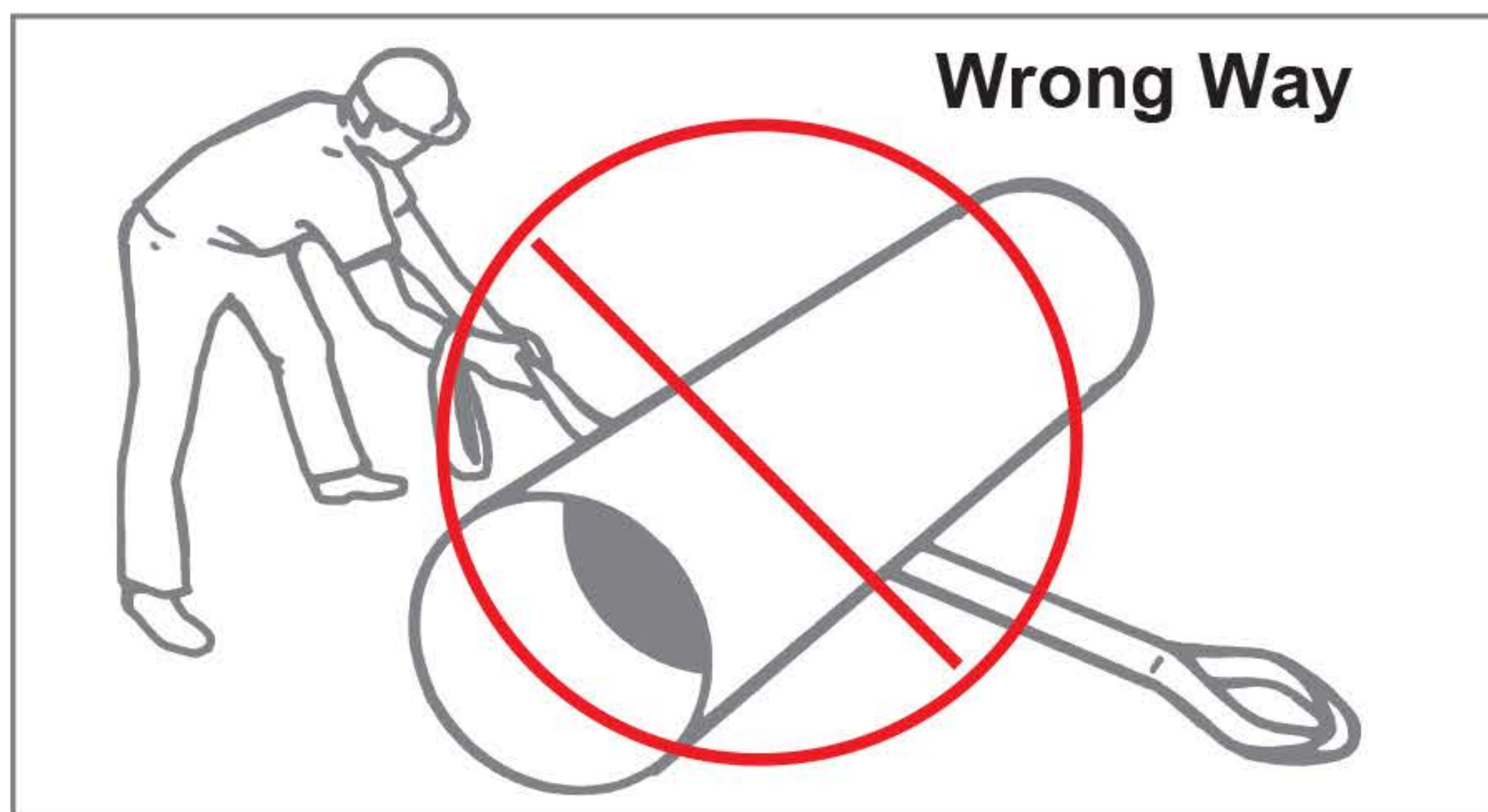
Slings shall not be shortened with knots or bolts or other makeshift devices. OSHA wording.



Sling legs shall not be kinked. OSHA wording.



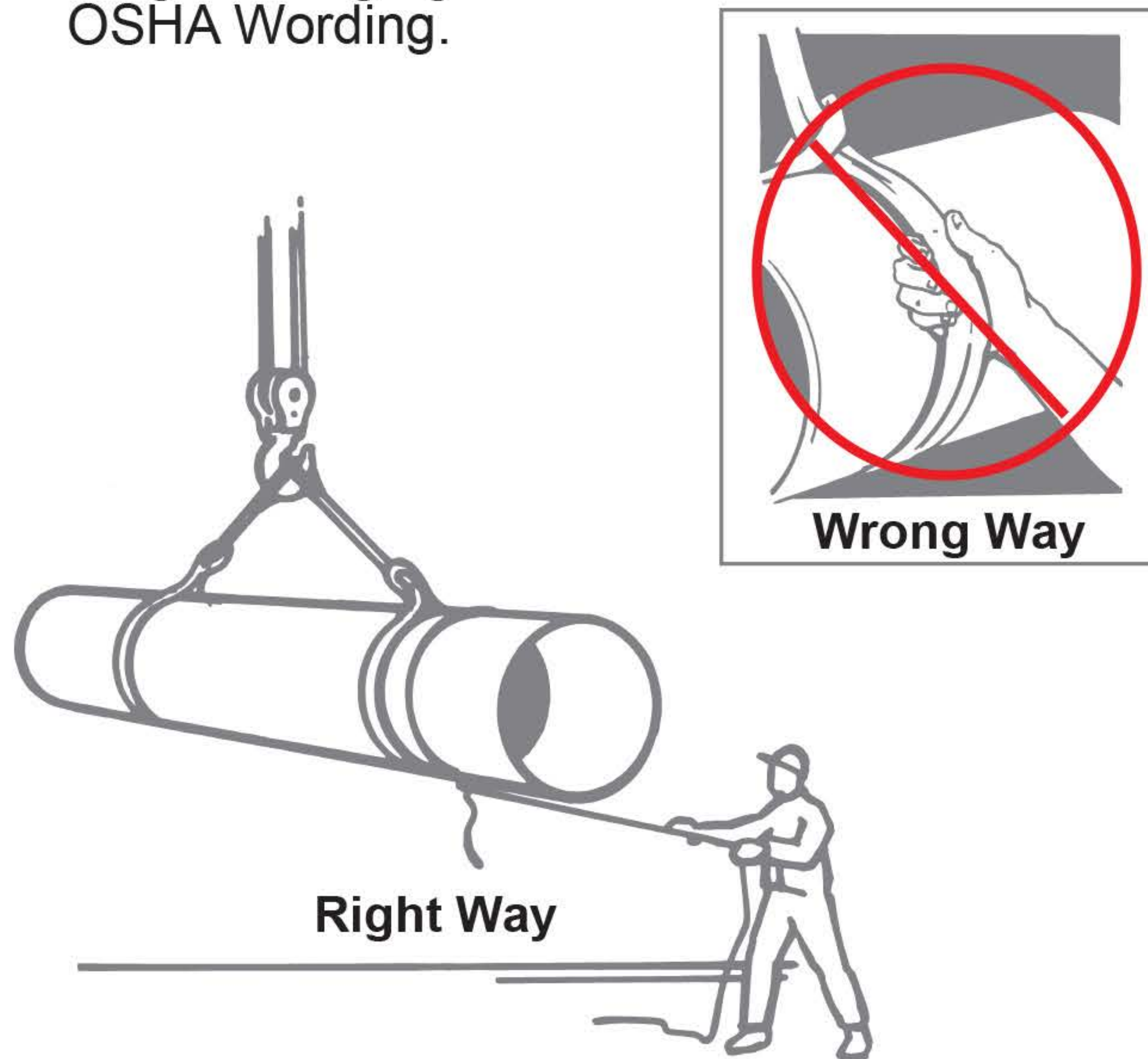
A sling shall not be pulled from under a load when the load is resting on the sling. OSHA wording.



Prior to lifting the load, prepare the area where it is to be put down. Lumber can be used to allow space for removing the sling and prevent shifting.

5. STAND CLEAR OF THE LOAD

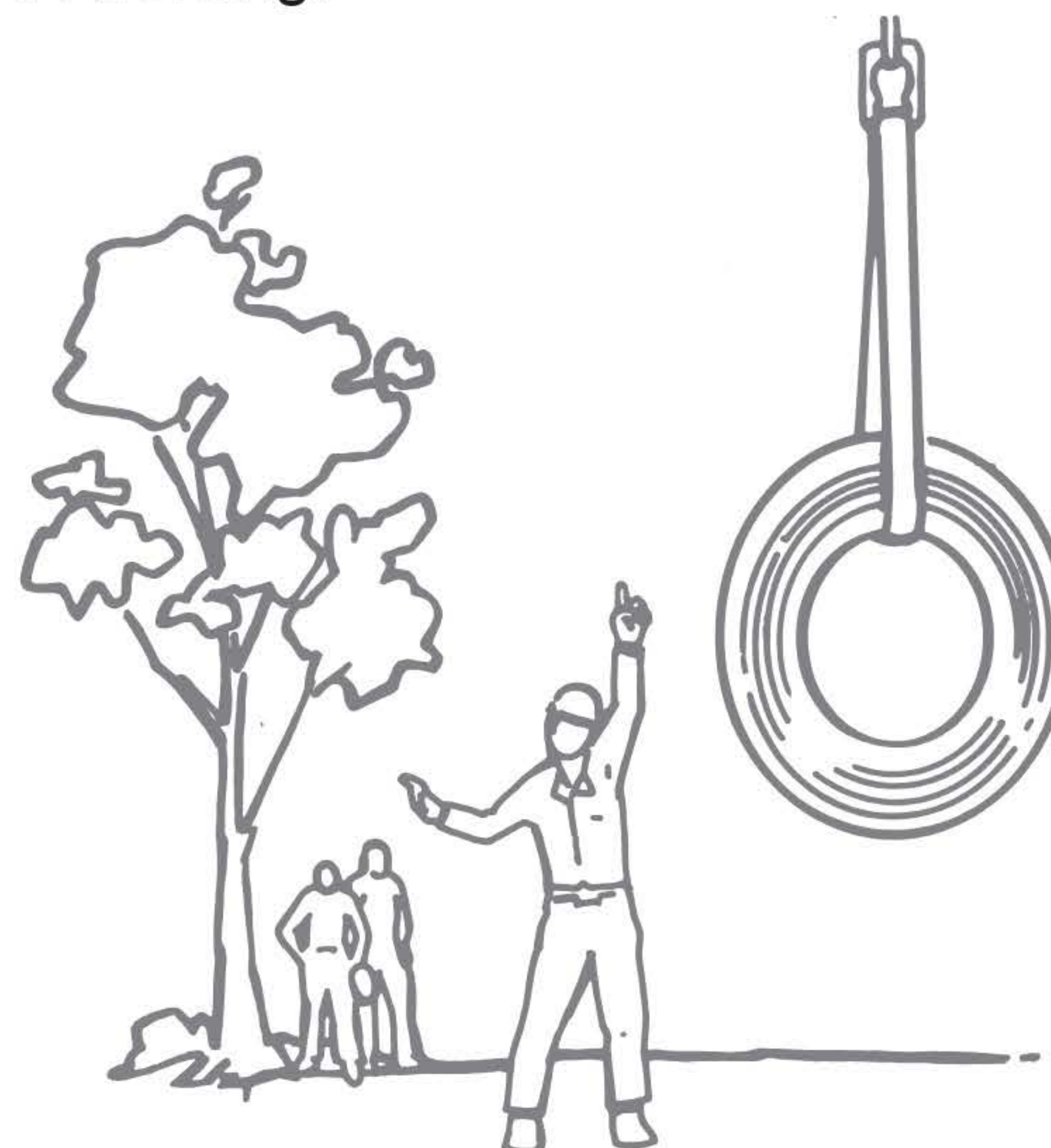
Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load. OSHA Wording.



Tag lines may be used to help keep personnel away from the load.

Suspended loads shall be kept clear of all obstructions.

All employees shall be kept clear of loads about to be lifted and of suspended loads. OSHA wording.



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6. MAINTAIN & STORE SLINGS PROPERLY

Attempt to keep slings clean and free of dirt, grime, and foreign materials.

When not in use, slings should be stored in an area free from environmental or mechanical sources of damage, such as weld spatter; splinters from grinding or machining; or sources of UV, heat or chemical exposure; etc.



Slings shall be stored in cool, dark, dry areas, preferably on racks.

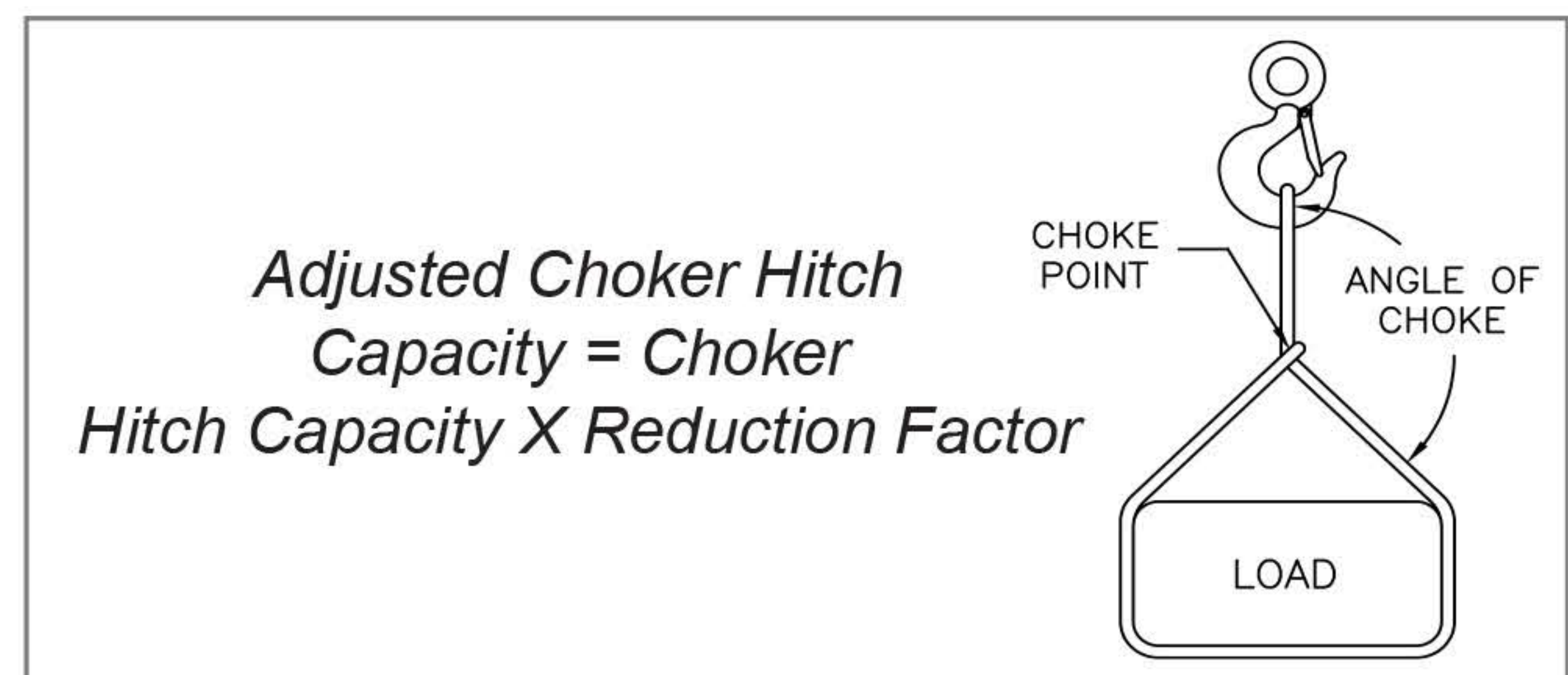
Additional Factors to consider when handling loads

- Integrity of the attachment points.
- Structural stability of the load.
- Loose parts that could fall from load.
- Power lines in the area.
- Secure a clear load path and avoid any contact with objects that would impede load movement.
- Tag lines can often be attached to the load and be used to aid in controlling load position.

CHOKER HITCH ANGLES

Choker Hitch Angles

When a choke hitch is used, and the angle of choke is less than 120°, the sling choker hitch capacity decreases. To determine the actual sling capacity at a given angle of choke, multiply the sling capacity choke rating by the appropriate reduction factor determined from the below. Sling capacity decreases as choke angle decreases.



$$\text{Adjusted Choker Hitch Capacity} = \text{Choker Hitch Capacity} \times \text{Reduction Factor}$$

REDUCTION IN RATED CAPACITY AS A FUNCTION OF ANGLE OF CHOKE

SYNTHETIC SLINGS		
Angle of Choke		Factor
> or =	<	
120	180	1.00
105	120	.82
90	105	.71
60	90	.58
0	60	.50

WIRE ROPE SLINGS		
Angle of Choke		Factor
> or =	<	
120	180	1.00
90	120	.87
60	90	.74
30	60	.62
0	30	.49

Lift-All is dedicated to manufacturing and developing products for material handling that meet or exceed current industry and government requirements (OSHA and ASME B30.9). Ultimately, the life and strength of any sling depend on those who inspect, use and maintain the product.

The ASME B30.9 Sling Safety Standard can be obtained from:
 ASME Customer Service
 Phone: 800-843-2763
www.asme.org

Occupational Safety and Health Administration (OSHA) "Industrial Slings" Regulations are published by the Office of the Federal Register, National Archives and Records Administration — Part 29 1910.184
www.osha.gov

EFFECT OF SLING ANGLE

Using slings at an angle **can become deadly** if that angle is not taken into consideration when selecting the sling to be used. The tension on each leg of the sling is increased as the angle of lift, from horizontal, decreases. It is most desirable for a sling to have a larger angle of lift, approaching 90°. Lifts with angles of less than 30° from horizontal are not recommended. If you can measure the angle of lift or the length and height of the sling as rigged, you can determine the properly rated sling for your lift. The Increased Tension method provides the increased tension as a function of the sling angle. Alternatively, the sling Reduced Capacity method may be used to determine reduced lift capacity for any angle.

INCREASED TENSION

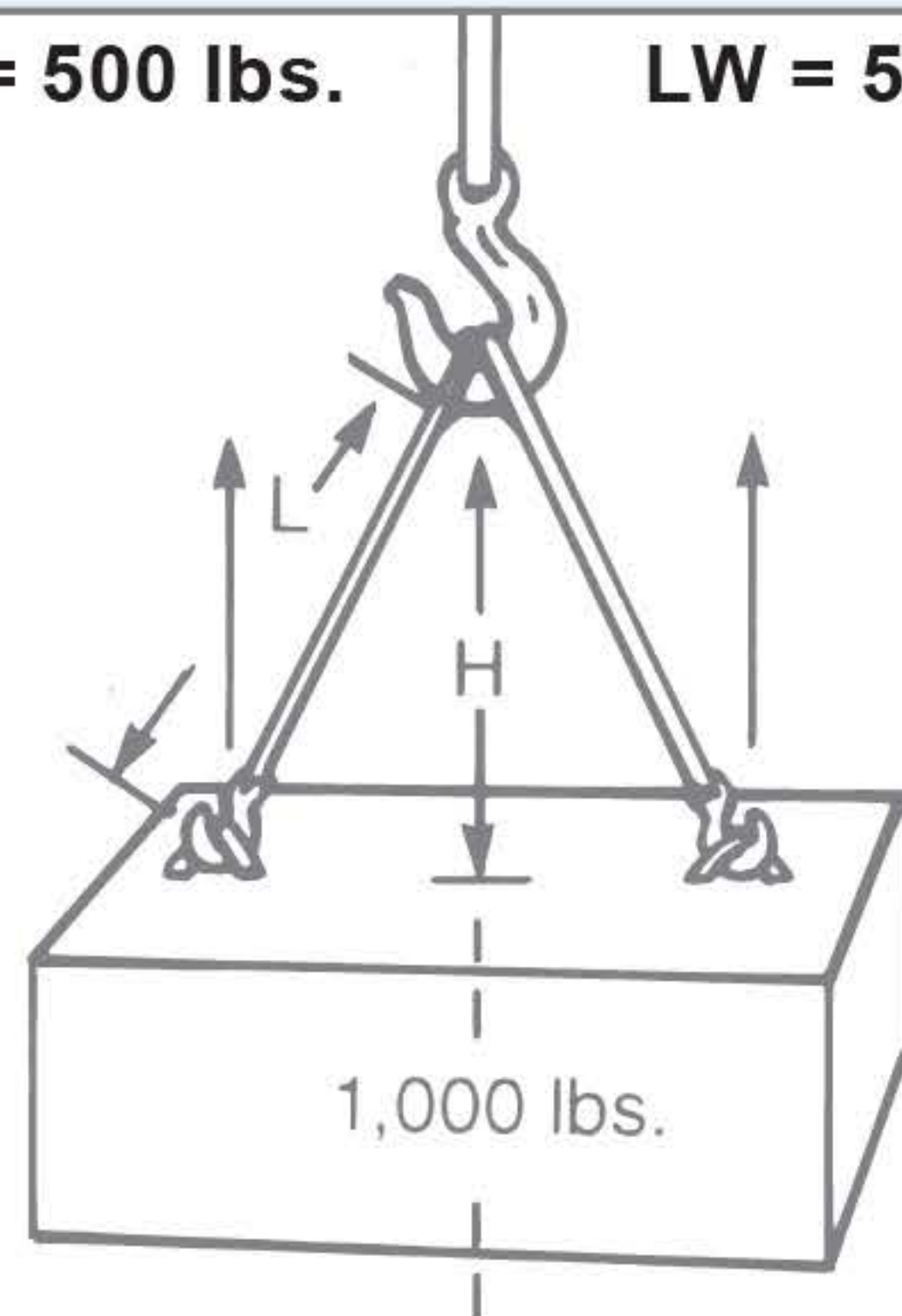
Determine capacity of sling needed

- Determine the load weight (LW).
- Calculate the tension factor (TF):
 - Determine the sling angle as measured from the horizontal, and the corresponding tension factor (TF) from the effect of angle chart.
- OR
 - Length* (L) divided by height* (H)
- Determine the share of the load applied to each sling leg (LW).
- Multiply (LW) by (TF) to determine the sling leg tension. The capacity of the selected sling or sling leg must meet the calculated tension value.

* Measured from a common horizontal plane to the hoisting hook.

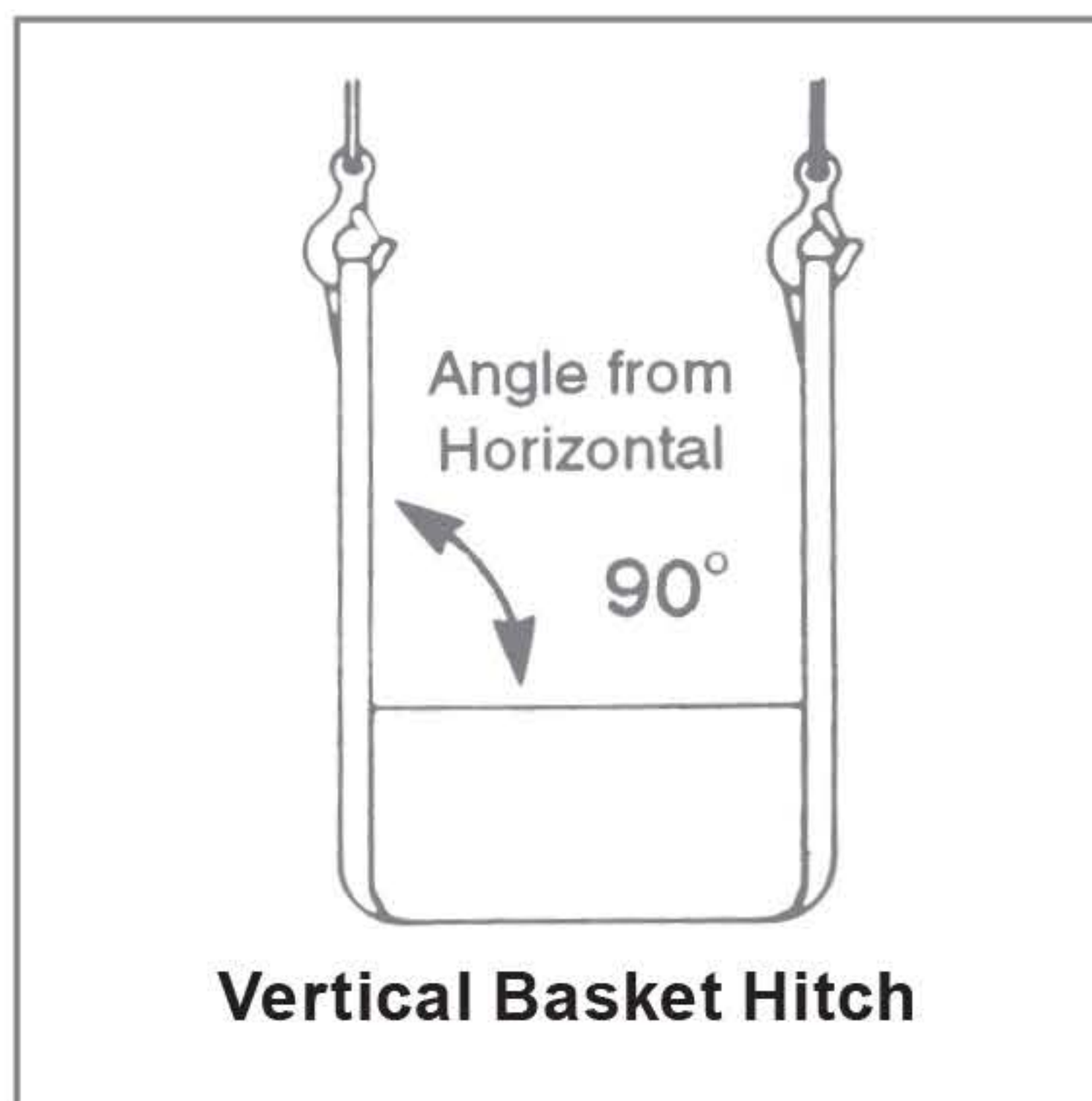
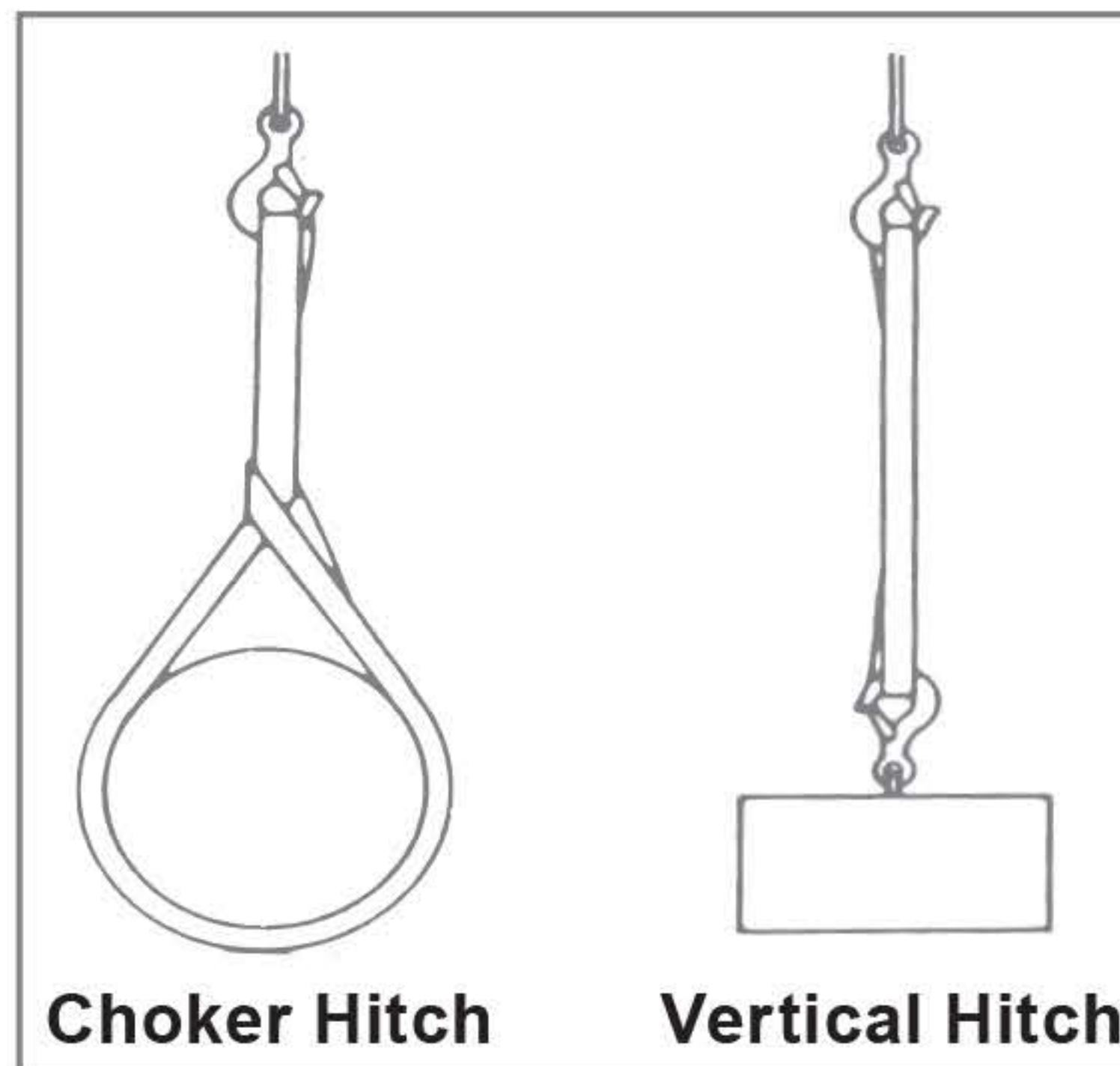
INCREASED TENSION

LW = 500 lbs. LW = 500 lbs.



EXAMPLE

Load weight: 1,000 lbs.
 Rigging: Two slings in vertical hitch
 Lifting weight (LW) per sling: 500 lbs.
 Measured sling length (L): 10 ft.
 Measured Sling Height (H): 5 ft.
 Tension factor (TF): $10(L) \div 5(H) = 2.0$
 Minimum vertical rated capacity required for this lift:
 $500(LW) \times 2.0(TF) = 1,000 \text{ lbs. per sling}$



REDUCED CAPACITY

Calculate rating of each sling rigged at this angle

- Calculate the reduction factor (RF).
 - Using the angle from horizontal, read across the angle chart to the corresponding number in the Reduction Factor column.
- OR
 - Divide sling height* (H) by sling length* (L).
- Reduction factor (RF) x the sling's rated capacity for the type hitch that will be used = sling's reduced rating.

* Measured from a common horizontal plane to the hoisting hook.

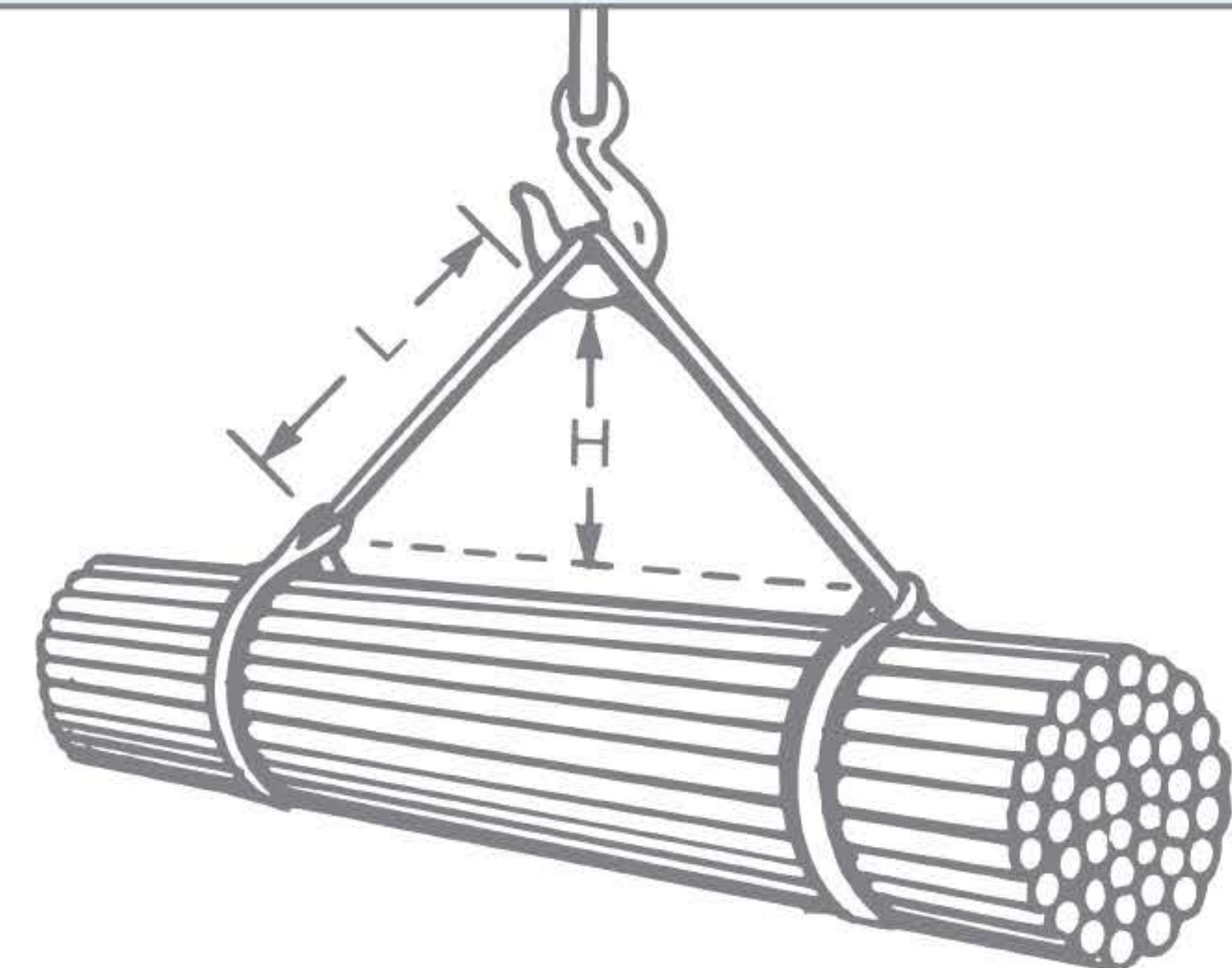
EFFECT OF ANGLE CHART

Tension Factor (TF)	Angle From Horizontal	Reduction Factor (RF)
1.000	90°	1.000
1.004	85°	0.996
1.015	80°	0.985
1.035	75°	0.966
1.064	70°	0.940
1.104	65°	0.906
1.155	60°	0.866
1.221	55°	0.819
1.305	50°	0.766
1.414	45°	0.707
1.555	40°	0.643
1.742	35°	0.574
2.000	30°	0.500

Sling capacity decreases as the angle from horizontal decreases.

Sling angles of less than 30° are not recommended.

REDUCED CAPACITY



EXAMPLE

Vertical choker rating of ea. sling: 6,000 lbs.
 Measured sling length (L): 6 ft.
 Measured sling height (H): 4 ft.
 Reduction factor (RF): $4(H) \div 6(L) = .667$
 Reduced sling rating in this configuration:
 $667(RF) \times 6,000 \text{ lbs.} = 4,000 \text{ lbs. of lifting capacity per sling}$