
	Health and Safety Policy		Section No:	29
			Initial Issue Date	1992
Rigging Safety Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.251/1926.1400	Page:	Page 1 of 7

Introduction

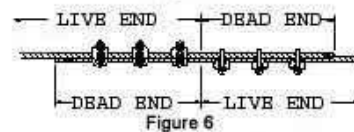
Rigging and hoisting refers to the lifting and moving of loads using mechanical devices such as hoists, slings, wire ropes, shackles, chain-falls, etc. Improper design, use, or maintenance of hoists, lifting devices, and rigging equipment can cause equipment to fail or a load to be dropped, which can result in personnel injury, death, or significant property loss. Employees that perform rigging activities have a critical role in helping to make sure each lift is a safe lift. The fact that an object is lifted off the ground does not mean it was rigged properly. Take the time to have your rigging checked, then double-checked by your supervisor or a competent person.

General Rigging and Safety Requirements

1. Only qualified personnel are authorized to perform rigging and signalperson activities.
2. A Pre-Lift Checklist should be utilized when using a crane to lift or set materials and/or equipment into place.
3. A Crane Personnel Platform MUST be used only as a last resort. (Accept in Steel Erection activities)
4. Personnel who perform rigging activities MUST be familiar with standard hand signals for controlling and directing the crane operator. If the operator sees that the signal person does not know proper signal techniques—STOP the lift and get a qualified signal person.
5. Communication is a critical part of the lift procedure—not only with the crane operator, but also with other employees working in close proximity to the hoisting operation. Make sure everyone in the area is aware a lift is taking place.
6. Have materials delivered as close to the work area as possible.
7. Always inspect hoists, lifting equipment, cables, straps and rigging equipment before using them each day.
8. Defective equipment SHALL be removed from service immediately and destroyed to prevent inadvertent reuse.
9. Rigging equipment not in use shall be removed from the immediate work area so as not to present a hazard to employees.
10. Never exceed the designed load capacity (Working Load Limit - WLL) for any lifting device or rigging equipment.
11. Do not walk or stand under any suspended loads unless authorized to do so.
12. Do not place your hands/fingers between a sling and its load while the sling is being tightened around the load.
13. Keep all body parts away from the areas between the sling and the load and between the sling and the crane or hoist hook.
14. Remain clear of loads about to be lifted and suspended. Use tag lines when necessary.
15. Employees are prohibited from riding on any lift, hook chain, or cable sling suspended from a crane or hoist.
16. Keep suspended loads clear of all obstructions.

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17. Ensure that, in a chock hitch, the choke point is only on the sling body, NEVER on a splice or fitting
18. Do not rest or drop load on chain.
19. Do not pull a sling from under a load when the load is resting on the sling.
20. Do not drag slings on the floor or over abrasive surfaces.
21. Ensure that slings are not constricted, bunched, or pinched by the load, hook, or any fitting.
22. Eliminate all twists, knots or kinks before lifting.
23. Do not shorten or lengthen a sling by knotting or twisting.
24. Do not point load hooks. The load should be seated properly within the throat opening and centered in bowl of the hook.
25. Balance the load to avoid undue stress on one leg of multi-leg slings.
26. Never bounce, jerk or shock load a sling when lifting or lowering items. Remove slack by slowly applying the load to the chain.
27. Avoid sudden starts and stops when moving loads.
28. Do not use slings, eye bolts, shackles, or hooks that have been cut, welded, or brazed.
29. The load capacity limits SHALL be stamped or affixed to all rigging components. If missing, remove from service.
30. Makeshift links or fasteners or other such attachments SHALL NOT be used.
31. Do not use manila rope for rigging.
32. Install wire rope clips (cable clamps) properly. Use the correct size and number of clips.
33. Never install U-bolts on the live end of the wire rope. The live end is where the saddle goes, so remember, "NEVER saddle a dead horse".
 - Store slings in a dry area out of direct sunlight, extreme temperatures, moisture, mechanical damage or corrosive environments. DO NOT leave them in the back of a pickup bed.



Plan Every Lift

Ask the following questions when planning a lift:

1. Who is the designated competent person/qualified rigger for the rigging?
2. Who is the designated qualified signal person?
3. Have communications been established between signalperson and operator?
4. Has the rigging equipment been inspected?
5. Does the rigging have proper identification?
6. Does all rigging equipment have known working load limits?
7. What is the weight of the load?

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8. Where is the load's center of gravity?
9. What is the sling angle?
10. Will there be any side or angular loading?
11. Are the slings padded against sharp corners?
12. Are the working load limits adequate?
13. Is the load rigged to the center of gravity?
14. Is the hitch appropriate for the load?
15. Is a tag line required to control load?
16. Will personnel be clear of suspended loads?
17. Will the load lift level and be stable?
18. Any unusual environmental concerns?
19. Any special requirements?

Rigging must be used within manufacturer's recommendations and industry standards that include OSHA, ASME, ANSI, API and others.

Rigging a Load

1. Perform the following when rigging a load:
2. Determine the weight of the load. **DO NOT GUESS.**
3. Determine the proper size for slings and components. Look for a permanently attached identification tag on each sling stating the size, grade, rated capacity and the name of the sling manufacturer. If the identification is not attached, take the defective equipment out of service.
4. Make sure that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
5. Make sure that ordinary (shoulder less) eye bolts are threaded in at least 1.5 times the bolt diameter.
6. Use safety hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
7. Use wear pads to protect slings from sharp edges. Remember that machinery foundations or angle-iron edges may not feel sharp to the touch, but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding.
8. Verify that each sling is capable of supporting the load based on the projected horizontal angle of the sling during the lift.
9. Calculate the sling tension before the lift to ensure that it can support the load.
10. Determine the center of gravity and balance the load before moving the load. Initially lift the load only a few inches to test the rigging and balance.
11. Tag lines **SHALL** be used as required to prevent the load from swinging during the lift.

User Responsibilities

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1. Must be trained in rigging procedures.
2. Utilize appropriate rigging gear suitable for overhead lifting.
3. Utilize the rigging gear within industry standards and the manufacturer's recommendations.
4. Conduct regular inspection and maintenance of the rigging.

Inspection of Rigging Hardware

1. A visual inspection shall be performed by the user or a designated person each day before the rigging is used.
2. A periodic inspection shall be performed by a designated person, at least annually. The rigging hardware shall be examined and determination made as to whether it constitutes a hazard. Written records are not required.
3. Semi-permanent and inaccessible locations where frequent inspections are not feasible shall have periodic inspections performed.

Rejection Criteria of Rigging Hardware Per ASME B30.26

1. Missing or illegible manufacturer's name or trademark and/or rated load identification (or size required)
2. A 10% or more reduction of the original dimension
3. Bent, twisted, distorted, stretched, elongated, cracked or broken load bearing components.
4. Excessive nicks, gouges, pitting and corrosion.
5. Indications of heat damage including weld spatter or arc strikes, evidence of unauthorized welding.
6. Loose or missing nuts, bolts, cotter pins, snap rings, latches or other fasteners and retaining devices.
7. Unauthorized replacement components or other visible conditions that cause doubt as to the continued use of the sling.
8. Additionally, inspect wedge sockets for:
 - a. Indications of damaged wire rope or wire rope slippage
 - b. Improper assembly
9. Additionally, inspect wire rope clips for:
 - a. Insufficient number of clips
 - b. Incorrect spacing between clips
 - c. Improperly tightened clips
 - d. Indications of damaged wire rope or wire rope slippage
 - e. Improper assembly

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Introduction of Slings

1. A visual inspection for damage shall be performed by the user or designated person each day or shift the sling is used.
2. Additional inspections shall be performed during sling use where service conditions warrant.
3. A complete inspection for damage shall be performed periodically by a designated person, at least annually.
4. Damaged or defective slings shall be immediately removed from service.
5. Written records of the most recent periodic inspection shall be maintained.

Rejection Criteria for Slings


1. Missing or illegible sling identification.
2. Evidence of heat damage.
3. Slings that are knotted.
4. Fittings that are pitted, corroded, cracked, bent, twisted, gouged, or broken.
5. Other conditions, including visible damage, that cause doubt as to the continued use of the sling.

Wire Rope Slings

1. Excessive broken wires, for strand-laid and single part slings, ten randomly distributed broken wires in one rope lay or five broken wires in one strand in one rope lay.
2. Severe localized abrasion or scraping, kinking, crushing, birdcaging.
3. Any other damage resulting in damage to the rope structure.
4. Severe corrosion of the rope or end attachments.
5. Evidence of heat damage.
6. Hooks opened more than 15% at the throat.
7. Hooks twisted sideways more than 10 degrees from the plane of the unbent hook.

Chain Slings

1. Cracks or breaks.
2. Excessive wear, nicks or gouges.
3. Stretched chain links or components.
4. Bent, twisted or deformed chain links or components.
5. Excessive pitting or corrosion.

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6. Lack of ability of chain or components to hinge freely.
7. Weld splatter.

Web Slings

1. Acid or caustic burns.
2. Melting or charring of any part of the sling.
3. Holes, tears, cuts or snags.
4. Broken or worn stitching in load bearing splices.
5. Excessive abrasive wear.
6. Discoloration and brittle or stiff areas on any part of the sling, which may mean chemical or ultraviolet/sunlight damage.

Round Slings

1. Acid or caustic burns.
2. Evidence of heat damage.
3. Holes, tears, cuts, abrasive wear or snags that expose the core yarns.
4. Broken or damaged core yarns.
5. Weld splatter that exposes core yarns.
6. Discoloration and brittle or stiff areas on any part of the slings, which may mean chemical or other damage.

How Angles Effect Sling Stress


As the angle between the legs of the sling increase, the load each leg has to lift increases. This applies to a single sling used in a basket hitch as well as a multi-leg sling or bridle.

First, divide the total load to be lifted by the number of legs to be used. This provides the load per leg if the lift were being made with all the legs lifting vertically.

Determine the angle between the legs of the sling and the vertical.

Then multiply the load per leg by the load factor for the leg angle being used (*from the table below*) to compute the actual load on each leg for this lift and angle.

Note: The actual load must not exceed the rated sling capacity.

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Example: in the illustration below (sling angle of 45 degrees): $1000/2= 500$ (Load per leg is a vertical lift) 500×1.414 (45-degree load factor) = 707 lbs. = the actual load on each leg at the 45-degree horizontal angle being used.

LEG ANGLE (Degrees)	LOAD FACTOR
0	1.000
5	1.003
10	1.015
15	1.035
20	1.064
25	1.103
30	1.154
35	1.220
40	1.305
45	1.414
50	1.555
55	1.743