

CHANGING PRODUCTS AND STANDARDS FOR LIFTING AND RIGGING

Presented by

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(special thanks to The Crosby Group)

ASTM A906 (overhead lifting)

“THE PROCESS OF LIFTING WHICH WOULD LEAVE A FREELY SUSPENDED LOAD TO SUCH A POSITION THAT DROPPING THE LOAD WOULD PRESENT THE POSSIBILITY OF BODILY OR PROPERTY DAMAGE”

How do we protect ourselves?

THREE WAYS

- Experience
- Training
- Standards and Regulations

O.S.H.A.

-www.osha.gov-

American Society of Mechanical Engineers

-www.asme.org-

THE RIGGING PLAN

Have communications been established?

Who is responsible for the rigging?

What is the weight of the load?

Where is the center of gravity?

What is the capacity of the equipment?

Will there be angular loading?

Are slings padded or protected from sharp edges?

What is the condition of the equipment?

Is the equipment properly identified?

Is the equipment appropriate for the job?

Is there a possibility of fouling?

Is the pathway clear of all obstruction?

Is the pathway clear of all personnel?

Will the load be under control?

Are there any environmental concerns?

Are there any other special requirements?

OSHA 1926.21 (b)(2)

“ The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.”

ANSI/ASME B30.9-2006

- SECTION 9-1.1: TRAINING
- “...SLING USERS SHALL BE TRAINED IN THE SELECTION, INSPECTION, CAUTIONS TO PERSONNEL, EFFECTS OF ENVIRONMENT, AND RIGGING PRACTICES...”


Selection Considerations

- Capacity (based on how it is used)
 - Sharp edges? Heat?
 - Weight
 - Ease of use
 - Is it identifiable?
(Does it have a tag?)
 - Condition (must be inspected)
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INSPECTION

OSHA 1926.251 (a)(6)

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



Types of Inspection

- ❑ Initial – “prior to use, all new, altered, modified, or repaired” (by designated person, written records not required)
 - ❑ Frequent – each day, each shift, during use.. depending on item (by user or designated person, written records not required)
 - ❑ Periodic – “inspection intervals not to exceed one year” (by designated person) (written records required for slings and hooks but not for other rigging hardware)
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Effect of Environment

- Temperature ranges allowed
 - * alloy chain
 - 40 degrees to 400 degrees F

- * wire rope (IWRC)
 - 40 degrees to 400 degrees F

- * synthetic web
 - 40 degrees to 194 degrees F

(For temperatures outside these ranges, consult manufacturer.)

Effects of Environment

- ❑ Chemically Active Environments
 - *Acids and caustics can cause sling damage.
 - *Some types or grades of materials may be more appropriate in given conditions.
 - ❑ Extensive exposure to sunlight or ultraviolet light will degrade synthetic slings over time.
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Rigging Practices

- Slings shall be shortened or lengthened only by methods approved by the sling manufacturer.
 - The sling shall be hitched in a manner to provide load control.
 - Sharp edges in contact with the sling should be padded with material of sufficient strength to protect the sling.
 - Shock loading should be avoided.
 - Loads should not be rested on the sling.
 - Twisting shall be avoided.
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Rigging Practices

- ❑ Slings should not be pulled from under a load when the load is resting on the sling.
 - ❑ During lifting, with or without load, personnel shall be alert for possible snagging.
 - ❑ In a basket hitch, the load should be balanced and the sling should contain or support the load from the sides and above the center of gravity so that the load remains under control.
 - ❑ Slings should not be dragged on the floor or over an abrasive surface.
 - ❑ Slings should not be constricted, bunched or pinched by the load, hook or any fitting.
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Rigging Practices

- ❑ In a choker hitch, the choke point should only be on the sling body, not on a splice or fitting.
 - ❑ In a choker hitch, an angle of choke less than 120 degrees should not be used without reducing the rated load.
 - ❑ The load applied to the hook should be centered in the base (bowl) of the hook to prevent point loading on the hook.
 - ❑ An object in the eye of a sling should not be wider than one-half the length of the eye.
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Cautions to Personnel

- All portions of the human body shall be kept from between the sling and the load, and from between the sling and the crane hook or hoist hook.
 - Personnel should never stand in line with the leg(s) of a sling that is under tension.
 - Personnel shall not stand or pass under a suspended load.
 - Personnel shall not ride the sling.
 - Synthetic web slings shall not be used as bridles on suspended personnel platforms.
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ASME B30.26-2004

- Rigging hardware “users shall be trained in the selection, inspection, cautions to personnel, effects of environment and rigging practices”.

Selection Considerations

- What is the rated capacity? (based on how it will be used)
 - Weight
 - Is it compatible?
 - Condition
 - Is it identifiable?
 - *At minimum, all rigging hardware is required to be marked with manufacturer's name or trademark and size.
 - *Shackles, rigging blocks and swivel hoist rings are required to be marked with rated load.
 - *Rigging blocks are required to be marked with rope size(s).
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Effects of Environment

- ❑ Chemically active environments can be a problem.
 - ❑ Temperature ranges allowed unless listed below, i.e. clips, shackles, links, etc.
 - (-40 to 400 F)
 - *swivel hoist rings (-20 to 400 F)
 - *wedge sockets (-4 to 400 F)
 - *rigging blocks (0 to 150 F)
 - *carbon steel eyebolts (30 to 275 F)
- (consult manufacturer on temperatures outside of these ranges)
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Rigging Practices

- ❑ On shackles, the screw pin shall be fully engaged, with the shoulder in contact with the shackle body.
 - ❑ Multiple sling legs should not be applied to the shackle pin.
 - ❑ On all rigging hardware, repairs, alterations or modifications shall be as specified by the manufacturer.
 - ❑ Replacement parts, including nuts, pins and bolts shall meet or exceed the original equipment manufacturer's specifications.
 - ❑ The use of wire rope clips to fabricate slings is generally prohibited.
 - ❑ Only shouldered eyebolts shall be used for angular loading. The shoulder shall be flush and securely tightened against the load. The working load limit must be reduced.
 - ❑ When using shouldered eyebolts for angular lifts, the plane of the eye shall be aligned with the direction of loading.
 - ❑ A swivel hoist ring shall be free to pivot and rotate without interference during lifting.
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Rigging Practices

- ❑ The load applied to a swivel hoist ring shall be centered in the bail to prevent side loading.
 - ❑ Any lifting component attached to a swivel hoist ring shall be narrower than the inside width of the bail to avoid spreading.
 - ❑ Shock loading should be avoided.
 - ❑ While it is OK to place a spacer or washer beneath the shoulder of an eyebolt, it is not the case with swivel hoist rings. The bushing flange shall fully contact the load.
 - ❑ Contact with sharp edges that could damage rigging hardware should be avoided.
 - ❑ Maximum angle for loading of hoist hooks is 45 degrees from vertical.
 - ❑ Maximum included sling angle for loading shackle, links and rings is 120 degrees.
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Cautions to Personnel

- ❑ All portions of the human body shall be kept from between the rigging hardware, the load, and any other rigging during the lift.
 - ❑ All portions of the human body shall be kept from between the rigging block and its running lines.
 - ❑ Personnel should stand clear of suspended load.
 - ❑ Personnel shall not ride the rigging hardware.
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Places to Go for Additional Information

- ❑ Jim Leach (American Rigger's Supply)
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 - ❑ American Society of Mechanical Engineers
asme.org
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