



#17- RIGGING-SAFE JOB PROCEDURE (September, 2007)

1. PURPOSE;

To ensure the safety of all personnel involved or in the vicinity and the safe handling of the property during rigging of equipment/materials.

To establish guidelines for the work force when rigging procedures are required. These guidelines will include;

- Responsibilities.
- Safety precautions.
- Safe handling of loads.
- Slings and ropes

2. GENERAL;

The versatility of rigging equipment makes it extremely useful on construction projects. Improper and unsafe use, however, can result in serious accidents.

This procedure outlines the requirements of the standards applicable to the use of rigging equipment/materials on construction projects.

Rigging may look like an easy operation that requires no particular skill or experience. Too many workers have lost fingers or hands or have suffered more serious injuries because they thought "Anybody can do that and there is no training involved".

3. SCOPE AND DEFINITIONS;

In rigging you have to evaluate the load, confirm that your rigging can handle the load, balance the load and land it safely.

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Rigging;

Is the operation of fastening, and balancing the load to the lifting equipment.

Load:

Is the equipment/material that is to be rigged to be raised or lowered.

Slings (choker);

Maybe a rope, synthetic/nylon web, wire rope, chain which secures the load to the lifting device, which is attached to the shackles.

Center of Gravity;

Is the location on the load where the sling when placed correctly balances the load perfectly.

Rigger;

The person who fastens the load to the lifting apparatus and understands rigging principles as applied to the job for which they are to be qualified.

Shackles;

Is the device usually a metal U with a pin or screw for coupling the sling.

Eye Bolts;

Is the device usually metal, shaped like an eye that is fastened to the equipment/material and the shackle is usually attached to it.

WLL;

Is the working load limit (rated capacity of the slings, hooks etc.)

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SWL;

Is the safe working load.

Hitch;

Is the method of applying a sling to a load.

Signalperson:

Is the person in charge who shall have the necessary knowledge and experience of the specific type of equipment/materials and the hazards of critical lifts to direct the safe completion of the operation?

4. PROCEDURE;

4.1. PLANNING

Determine the weight of the load, either by shop drawings or weights of materials, does not guess.

Determine the type of hitch and the proper size for slings and components required.

The sling angle capacity decreases with the angle being less than 45 degrees from the horizontal. An angle from the horizontal greater than 45 degrees is recommended.

Study the path of the lift so you can identify the restrictions, i.e. heights, communications, openings, personal safety equipment, etc.

Job Hazard Analysis;

Do a Job Hazard analysis worksheet with all involved parties identifying the sequence of steps, potential accidents or hazards and the preventive measures.

After the analysis has been completed advise all parties of the procedures etc.

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Weather;

When wind speeds reach 40 – 50 KPH consider limiting operations.

Never carry out rigging operations when weather conditions are such that hazards to personnel, property or the public are created.

If visibility of the riggers is impaired by dust, darkness, snow, fog or rain or any other condition, strict supervision of the operation must be exercised and if necessary suspended.

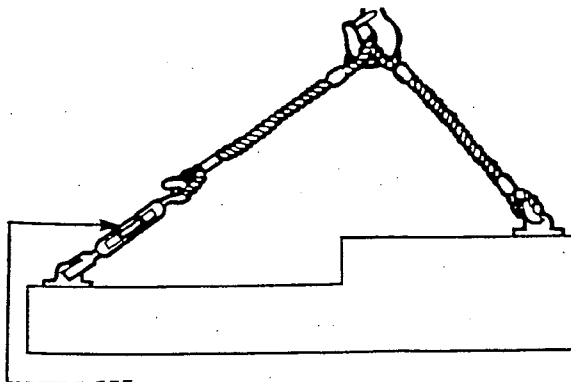
4.2 SELECTING RIGGING GEAR (ATTACHMENTS, ETC.) SLINGS

4.2.1 HITCHES:

There are basically 4 types of hitches;

1. BRIDAL HITCH-

Numerous vertical slings to the hook usually. Made up of 2, 3 or 4 single leg hitches. For hoisting an object that has lifting lugs or attachments. Position lifting hook over center of gravity.

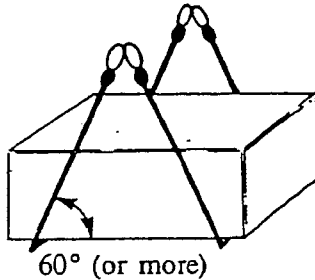


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2. SINGLE/DOUBLE BASKET HITCH –

The single basket is ideal for loads with inherent stabilizing characteristics. The load is automatically equalized, with each leg supporting half the load.

The double basket sling use 2 slings wrapped around the load and attached to the hook. Provides relatively good control and eliminates the tendency of the load to twist compared to vertical hitch. Do not use on a load that is difficult to balance

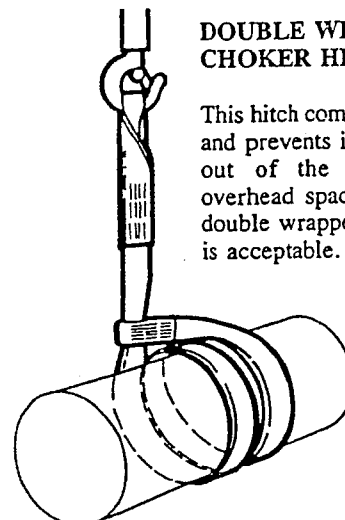


DOUBLE BASKET HITCH

Balance loads by keeping slings apart. Prevent sling slippage by keeping the angle between load and sling 60° or more.

3. CHOKER HITCH-

One or more slings wrapped around the load and through its loop to create a noose so when lifted it tightens around the load. Use choker hitches at 75% or less of rated sling capacity.



DOUBLE WRAP CHOKER HITCH

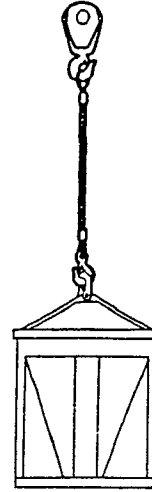
This hitch compresses the load and prevents it from slipping out of the sling. Where overhead space is limited, a double wrapped choker hitch is acceptable.

SKETCH

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4. VER TICAL HITCH –

In most cases use more than one sling, which is attached directly to the hook. A single sling load tends to rotate in a twisting action, which unwinds cables causing them to weaken. Do not use for lifting loose materials or unbalanced loads.



SKETCH

4.2.2 SLINGS:

1. BRAIDED SLING-

Fabricated from 6-8 small diameter ropes braided together to form a single rope that provides a large bearing surface, tremendous strength and flexibility in all directions. They are very easy to handle and almost impossible to kink. Especially useful for basket hitches where low bearing pressure is desirable or where the bend is extremely sharp.

2. CHAIN SLINGS-

Made for abrasive and high temperature resistance. The only chain suitable for lifting is fabricated from alloy steel and identified by a letter "A" or the number "8" or a combination of the two. Chain must be padded on sharp corners to prevent bending stresses.

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3. WIRE ROPE SLINGS-

The use of wire rope slings for lifting materials provides several advantages over other types of slings. While not as strong as chain, it has good flexibility with minimum weight. Breaking outer wires warn of failure allow time to react. Properly fabricated wire rope slings are very safe for general construction use.

4. POLYPROPYLENE/NYLON WEB SLING-

May be used for four types of hitches but when used on a basket hitch load must be smooth. Some advantages are fewer tendencies to crush objects, molds to the shape of the load, no sparking and minimize twists. Susceptible to overexposure to sunlight, chemicals, oil, cold weather, abrasive surfaces and sharp edges.

4.3 INSPECTION;

Inspect the rigging components regularly and before each lift.

Wire Rope:

Replace if;

- Excessive outside wear-If outside diameter wire is more than 1/3 worn away .
- Broken wires.
- Crushed, jammed or flattened strands
- Bulges in rope
- Gaps between strands.
- Kinks
- Hooks opened more than 15% at the throat
- Hooks twisted sideways more than 10% from the plane of the unbent hook.

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Polypropylene and Nylon web slings:

Replace if;

- Breaks, tears or patches
- Oil contaminated
- Chalky exterior appearance
- Abnormal wear
- Torn stitching
- Evidence of heat damage

Capacity label- needs to be legible to provide capacity of sling.

Chain slings;

Replace if;

- Stretched links
- Failure to hang straight
- Bent, twisted or cracked links

Gouges, chips or scores return to manufacturer for repair

Hardware:

All fittings must be of adequate strength for the application

Only forged alloy steel load rated hardware should be used, it stamped with its SWL

INSPECT HARDWARE FOR:

- Wear
- Cracks
- Severe corrosion
- Deformation/bends
- Mismatched parts
- Obvious damage

Any of these signs indicate a weakened component that should be replaced.

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4.4 THE LIFT;

If load has lifting lugs, use the bridal hitch and attach your slings to the lifting lugs.

Determine the number of slings based on:

- The need to balance the load.
- The weight of the load.
- Sling angles

Be sure that your sling angles always exceed 45 degrees, if your slings are less than 45 degrees; this will decrease the capacity of the slings and put too much tension on the slings.

Use the correct sling/ropes to attach to the load to the lifting device with the proper connections. Never wrap the hoist hook rope around the load.

Use slings of proper reach; never shorten a line to the lifting device by twisting or knotting. With chains slings do not use bolts or nuts, use only attachments designed for the chain.

The tagline shall be attached to the load, to control swinging and be of sufficient length so that the operator is not directly below the load. Pad sharp edges to protect slings.

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 flexible materials may be suitable for padding.

Confirm that the load is well secured and properly balanced before it is lifted more than a few inches off its support.

Slide the slings (fully onto the hoisting hook and ensure that the safety catch is closed.

Do not load the hook tip or hammer a sling into place.

Secure unused sling legs.

Do not drag slings or leave loose materials on a load being lifted.

Keep hands and fingers from being trapped when slack is taken out of a sling.

Step away before the lift is made.

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4.5 THE LOAD /REMOVE THE RIGGING:

Confirm that the landing area can handle the full weight of the load, have the load placed gently on the supports and have all supports or anchors attached.

Remove the hoist block first and gradually; do not unhook the slings from the hoist block until the load is safely on its supports or hangers.

4.6 STORING GEAR PROPERLY

Clean all rigging as required and remove from service any damaged rigging for repairs.
Return the rigging device to the designated storage racks.

Protect rigging hardware as required. Items left in the sun may have surface temperatures that exceed the safe limits of synthetic lifting devices.

5. EQUIPMENT/MATERIALS;

All personnel shall wear the appropriate personal protective equipment.

All materials/equipment shall be inspected to ensure that it meets the job requirements.

Safety latches on hooks shall not be deactivated or made inoperable.

Makeshift repairs are prohibited; wire rope splices should only be done by the manufacturer.

Synthetic web slings must have the manufacturers name, trademark and load capacity attached to the buffer cover.

Do not use screw pin shackles if the pin could roll under the; load and unscrew.