

Rigging

A majority of crane and rigging accidents happen below the “hook”. If this means anything, it means we need to be more aware of what is happening between the load and the hook.

Top Three Reasons Rigging Fails:

Overloading

- Overloading primarily occurs from not knowing the weight of the load being lifted
- When loads suddenly shift, the shock load can exceed the working load limit of the rigging

Defective Rigging

- Rigging wears out
- Natural wearing is accelerated by cuts, snags, bends, sharp edges, etc.
- Inspect rigging frequently
- Defective rigging must be removed from service

Improper Sling Angles

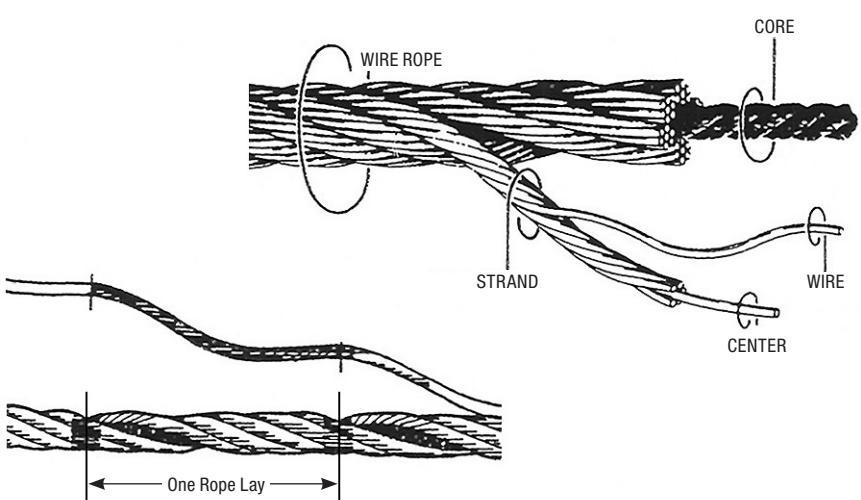
- Improper sling angles causes additional stress on rigging
- Additional stress deteriorates the rigging even when overloads are not apparent

Inspection

Rigging shall be inspected by the person handling it each day for any possible damage. When you see any of the following conditions, replacement may be necessary:

Wire Rope

- Ten randomly distributed broken wires in one rope lay or five broken wires in one strand in one rope lay
- Severe localized abrasion or scraping
- Kinking, crushing, birdcaging, or any other distortions
- Evidence of heat damage
- End attachments that are cracked, worn, or deformed
- Severe corrosion of the rope or end attachments

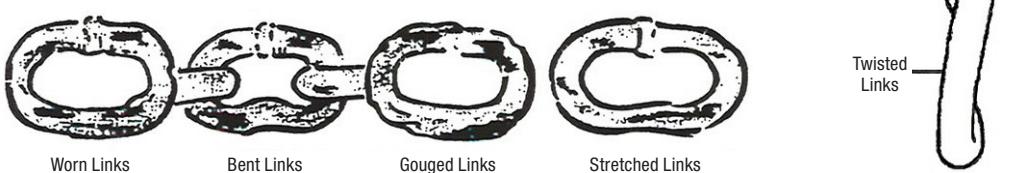


Chains

- Stretched or bent links
- Cracks, gouges, or wear between links
- Chains not tagged with identification and capacity

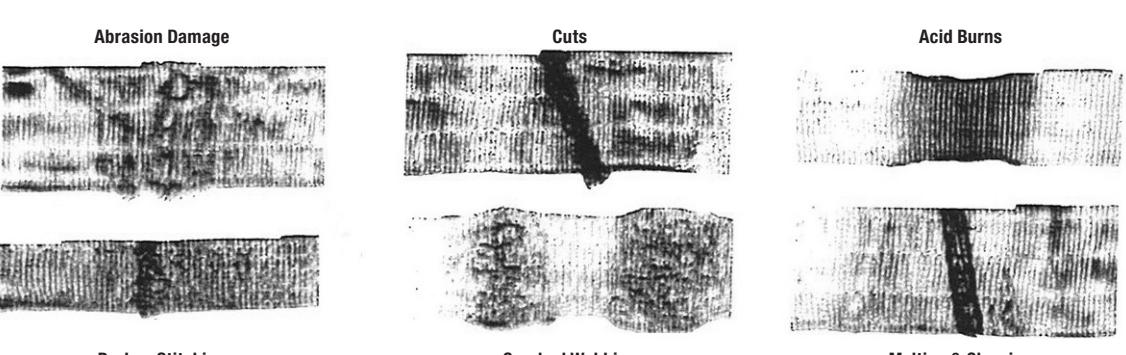
- Chains must be grade 80 alloy if used for rigging loads.
- Chains must be inspected link by link.
- Chains must be clean before inspecting so flaws, marks, gouges, or wear can be easily seen.

Look for:



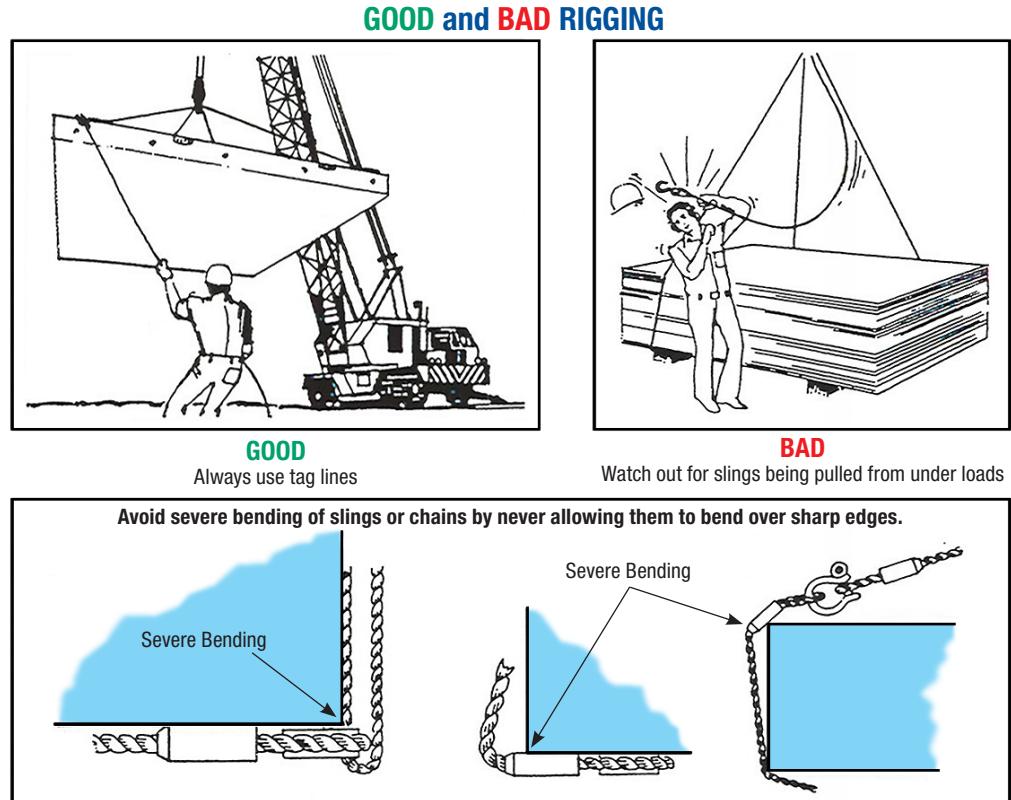
Synthetic Web Slings

- Acid or caustic burns
- Melting or charring of any part of the sling surface
- Snags, punctures, tears, or cuts
- Broken or worn stitches
- Distortion of fittings
- Missing or unreadable labels for rated load



Rigging Safety Absolutes:

- Designate and train riggers and associated personnel in the proper selection, inspection, and rigging practices
- Assign competent lift supervisor, rigger, signal person and tagline person
- Determine the weight of each load
- Locate the load's center of gravity
- Determine the most appropriate hitch (e.g. vertical, choker, basket)
- Size the capacity of sling(s) and rigging hardware to exceed the load weight
- Determine the D/d ratio and size slings accordingly
- Inspect the condition of slings and hardware before each use
- Pad or protect rigging from edges
- Ensure the rigged load is balanced and securely attached
- Determine the need for tagline use
- Keep all employees clear of loads about to be lifted and/or suspended



Hooks

Hooks having any of the following conditions must be removed from service until repaired or replaced:

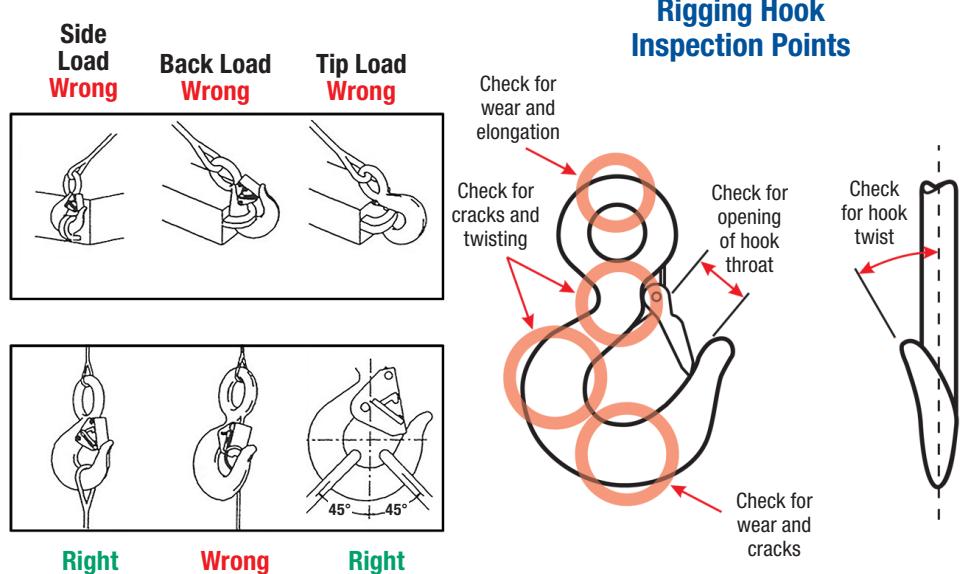
Deformation - Any bending or twisting from the plane of the unbent hook (or per manufacturer recommendations).

Throat Opening - Any distortion causing an increase in the throat opening exceeding 5% (or manufacturer recommendations).

Wear - Any wear exceeding 10% of the original section dimension of the hook or loaded pin.

Cracks - Remove hooks with cracks from service immediately.

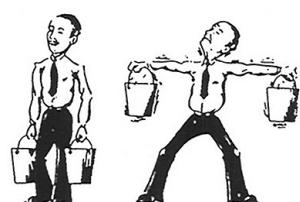
Latch - If a latch is provided, and it becomes inoperative because of wear or deformation, or fails to fully bridge the throat opening, the hook shall be removed from service until the device has been replaced or repaired.



Load Angle Factors

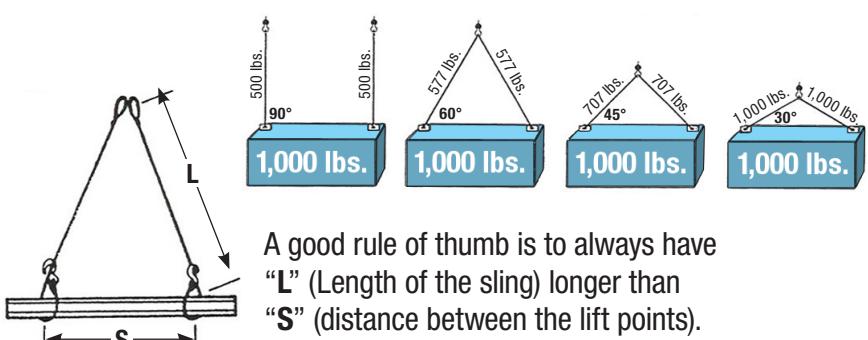
The load angle factor calculates the added tension that is applied from a load to the rigging. This added tension is due to the angle the lifting legs are to the load.

For example, lift a bucket of sand straight up along your side and you feel the tension in your arm from the weight of the sand.

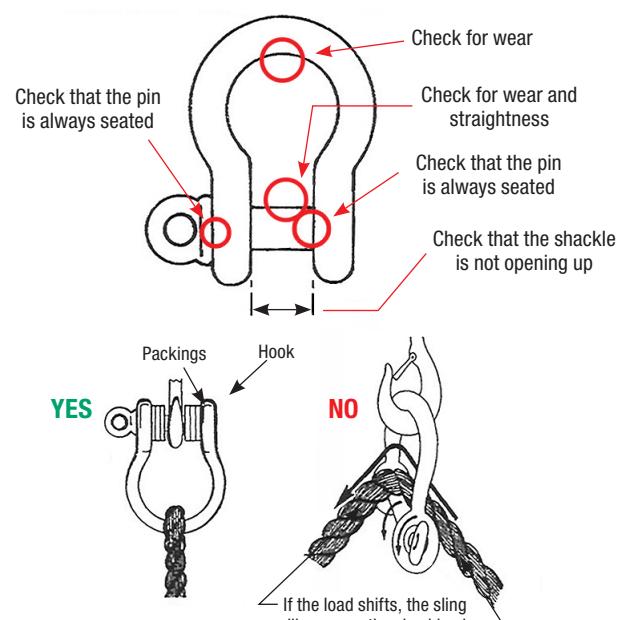


Now extend your arms with the bucket straight out from your sides, and you feel the added tension due to the angle your arm is in relation to the loaded bucket. Many loads have failed due to this added tension.

Load Angle Factors (LAF)



Shackles and Hooks



Hook Slings

