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**PTG HSE MANUAL
Volume- 02**

DocNo: PTG/HSE

Rev No: 001

Date: 10-06-2025

Power Tech Group of Companies

Committed to Excellence Across the Gulf

At Power Tech Group, we proudly operate across most Gulf countries employing over 500 skilled professionals. Our team is engaged in diverse sectors, including power generation, water treatment, refinery operations, and maintenance, and solar power plant EPC projects.

We believe that safety is not just a protocol—it is a core value embedded in everything we do. The safety of our employees and the protection of our clients' assets remain paramount in our day-to-day operations.

Our commitment extends beyond compliance. We uphold the principle that:

"The safety of man, machine, and equipment is our top priority."

And above all, human life is priceless—it cannot be measured in monetary terms.

In alignment with this belief, we conduct regular training and awareness programs to reinforce a culture of safety and preparedness for all our employees at all our worksites.

Let us always remember and practice:

"Safety First"

Mohamed Sultan
CEO, Power Tech Group of Companies



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15. RIGGING

Hoisting and Rigging



It is important that workers involved with hoisting and rigging activities are trained in both safety and operating procedures. Hoisting equipment should be operated only by trained personnel. The cause of rigging accidents can often be traced to a lack of knowledge on the part of a rigger. Training programs such as the Infrastructure Health & Safety Association's Basic Safety Training for Hoisting and Rigging provide workers with a basic knowledge of principles relating to safe hoisting and rigging practices in the construction industry.

A safe rigging operation requires the rigger to know

- the weight of the load and rigging hardware
- the capacity of the hoisting device
- the working load limit of the hoisting rope, slings, and hardware.

When the weights and capacities are known, the rigger must then determine how to lift the load so that it is stable.

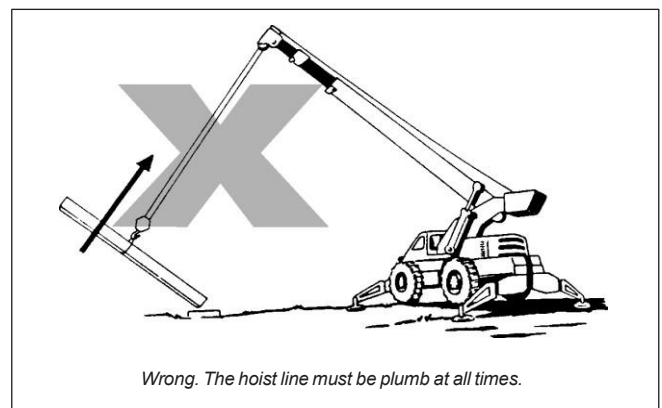
Training and experience enable riggers to recognize hazards that can have an impact on a hoisting operation. Riggers must be aware of elements that can affect hoisting safety, factors that reduce capacity, and safe practices in rigging, lifting, and landing loads. Riggers must also be familiar with the proper inspection and use of slings and other rigging hardware.

Most crane and rigging accidents can be prevented by field personnel following basic safe hoisting and rigging practices. When a crane operator is working with a rigger or a rigging crew, it is vital that the operator is aware of the all aspects of the lift and that a means of communication has been agreed upon, including what signals will be used.

Elements that can Affect Hoisting Safety

- Working Load Limit (WLL) not known. Don't assume. Know the working load limits of the equipment being used. Never exceed these limits.
- Defective components. Examine all hardware, tackle, and slings before use. Destroy defective components. Defective equipment that is merely discarded may be picked up and used by someone unaware of its defects.
- Questionable equipment. Do not use equipment that is suspected to be unsafe or unsuitable, until its suitability has been verified by a competent person.
- **Hazardous wind conditions.** Never carry out a hoisting or rigging operation when winds create hazards for workers, the general public, or property. Assess load size and shape to determine whether wind conditions may cause problems. For example, even though the weight of the load may be within the capacity of the equipment, loads with large wind-catching surfaces may swing or rotate out of control during the lift in high or gusting winds. Swinging and rotating loads not only present a danger to riggers—there is the potential for the forces to overload the hoisting equipment.
- **Weather conditions.** When the visibility of riggers or hoist crew is impaired by snow, fog, rain, darkness, or dust, extra caution must be exercised. For example, operate in “all slow”, and if necessary, the lift should be postponed. At sub-freezing temperatures, be aware that loads are likely to be frozen to the ground or structure they are resting on. In extreme cold conditions avoid shock-loading or impacting the hoist equipment and hardware, which may have become brittle.
- **Electrical contact.** One of the most frequent killers of riggers is electrocution. An electrical path can be created when a part of the hoist, load line, or load comes into close proximity to an energized overhead powerline. When a crane is operating near a live powerline and the load, hoist lines, or any other part of the hoisting operation could encroach on the minimum permitted distance (see table on the next page), specific measures described in the Construction Regulation must be taken. For example, constructors must have written procedures to prevent contact whenever equipment operates within the minimum permitted distance from a live overhead powerline. The constructor must have copies of the procedure available for every employer on the project.

Hoist line not plumb. The working load limits of hoisting equipment apply only to freely suspended loads on plumb hoist lines. If the hoist line is not plumb during load handling, side loads are created which can destabilize the equipment and cause structural failure or tip-over, with little warning.





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Keep the Minimum Distance from Powerlines

Normal phase-to-phase voltage rating	Minimum distance
750 or more volts, but no more than 150,000 volts	3 metres
Over 150,000 volts, but no more than 250,000 volts	4.5 metres
More than 250,000 volts	6 metres
Beware: The wind can blow powerlines, hoist lines, or your load. This can cause them to cross the minimum distance.	



This crane boom could reach within the minimum distance.

Factors that Reduce Capacity

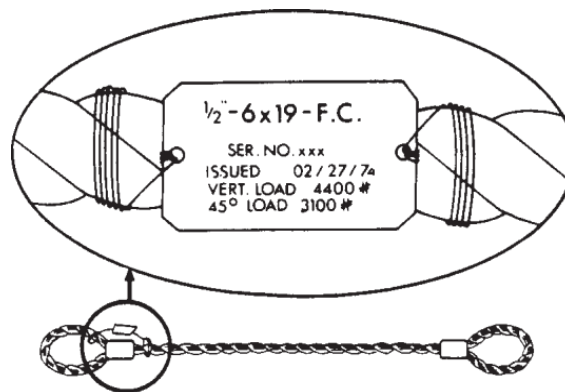
The working load limits of hoisting and rigging equipment are based on ideal conditions. Such ideal circumstances are seldom achieved in the field. Riggers must therefore recognize the factors that can reduce the capacity of the hoist.

- Swing.** The swinging of suspended loads creates additional dynamic forces on the hoist in addition to the weight of the load. The additional dynamic forces (see point below) are difficult to quantify and account for, and could cause tip-over of the crane or failure of hoisting hardware. The force of the swinging action makes the load drift away from the machine, increasing the radius and side-loading on the equipment. The load should be kept directly below the boom point or upper load block. This is best accomplished by controlling the load's movement with slow motions.
- Condition of equipment.** The rated working load limits apply only to equipment and hardware in good condition. Any equipment damaged in service should be taken out of service and repaired or destroyed.
- Dynamic forces.** The working load limits of rigging and hoisting equipment are determined for static loads. The design safety factor is applied to account, in part, for the dynamic motions of the load and equipment. To ensure that the working load limit is not exceeded during operation, allow for wind loading and other dynamic forces created by the movements of the machine and its load. Avoid sudden snatching, swinging, and stopping of suspended loads. Rapid acceleration and deceleration also increases these dynamic forces.
- Weight of tackle.** The rated load of hoisting equipment does not account for the weight of hook blocks, hooks, slings, equalizer beams, and other parts of the lifting tackle. The combined weight of these items must be added to the total weight of the load, and the capacity of the hoisting equipment, including design safety factors, must be large enough to account for the extra load to be lifted.

Slings

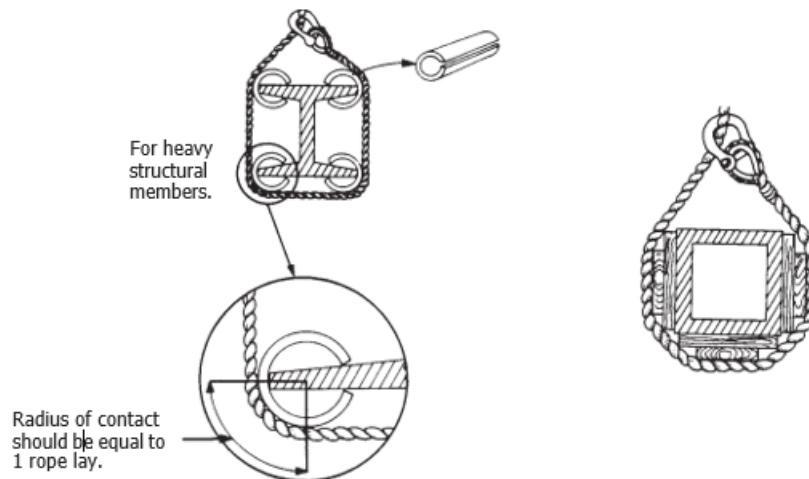
After the hoist rope, the sling is the most commonly used piece of rigging equipment. Observe the following precautions with slings.

- Never use damaged slings. Inspect slings regularly to ensure their safety. Check wire rope slings for kinking, wear, abrasion, broken wires, worn or cracked fittings, loose seizings and splices, crushing, flattening, and rust or corrosion. Pay special attention to the areas around thimbles and other fittings.
- Slings should be marked with an identification number and their maximum capacity on a flat ferrule or permanently attached ring. Mark the capacity of the sling for a vertical load or at an angle of 45°. Ensure that everyone is aware of how the rating system works.



- Avoid sharp bends, pinching, and crushing. Use loops and thimbles at all times. Corner pads that prevent the sling from being sharply bent or cut can be made from split sections of large-diameter pipe, corner saddles, padding, or blocking.

Ensure that Slings are Protected at All Sharp Corners on Heavy Item



- Never allow wire rope slings, or any wire rope, to lie on the ground for long periods of time or on damp or wet surfaces, rusty steel, or near corrosive substances.
- Avoid dragging slings out from underneath loads.
- Keep wire rope slings away from flame cutting and electric welding.
- Never make slings from discarded hoist rope.
- Avoid using single-leg wire rope slings with hand-spliced eyes. The load can spin, causing the rope to unlay and the splice to pull out. Use slings with Flemish Spliced Eyes.



NEVER WRAP A SLING AROUND A HOOK

- Never wrap a wire sling completely around a hook. The sharp radius will damage the sling.

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