



HAZARD ALERT

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Tower and Mobile Crane Safety

Two recent tower crane accidents—one in New York and one in Florida—resulted in multiple fatalities. These events highlighted the inherently dangerous nature of work involving not only tower cranes but all types of cranes.



Tower crane collapse into adjacent building.

Cranes must be inspected and used properly. Many fatalities can occur when the crane boom, load line or load contacts power lines and shorts electricity to ground. Other incidents happen when workers are struck by the load, are caught inside the swing radius, or fail to assemble/disassemble the crane properly. Additionally, improper crane setup accounts for approximately 50 percent of crane accidents.

Cranes must be erected, dismantled and operated by competent people who have the necessary training and experience. Employers should have written procedures for each type of crane and their procedures should be based on the manufacturer's instructions. The procedures should be available on site, and those involved in the work should be familiar with them.

- ❖ Comply with the manufacturer's specifications and limitations applicable to the operation of any crane.
- ❖ Cranes are to be operated only by qualified and trained personnel.
- ❖ A designated competent person must inspect all crane

machinery and equipment before and during use to ensure its safe operation.

- ❖ Be sure the crane is on a firm/stable surface and level.
- ❖ During assembly/disassembly of the crane's boom, do not unlock or remove pins unless sections are blocked and secure (stable).
- ❖ Properly plan lifting operations and always supervise them appropriately.
- ❖ Watch for overhead electric power lines and maintain at least a 10-foot safe working clearance from the lines.
- ❖ Inspect all rigging prior to use; do not wrap hoist lines around the load.
- ❖ Be sure to use the correct load chart for the crane's current configuration and setup, the load weight and lift path.
- ❖ Do not exceed the load chart capacity while making lifts.
- ❖ Do not make any modifications or additions that affect the capacity or safe operation of the equipment without the manufacturer's written approval.
- ❖ Fully extend outriggers and barricade accessible areas inside the crane's swing radius.



Result of outriggers improperly set.

- ❖ Raise the load a few inches, hold, verify capacity/balance, and test brake system before delivering it.
- ❖ Do not move loads over workers.
- ❖ Be sure to follow signals and manufacturer's instructions while operating cranes.

Overloading occurs when the rated capacity of a crane is exceeded while a load is being lifted and maneuvered, resulting in upset or structural failure. Overloading occurs when poorly trained personnel are allowed to operate cranes. The operator must always know the weight of the load. Some variables that affect the lifting capacity of a crane:



Result of overloaded crane.

- ❖ The ability to lower a boom increases the radius and reduces capacity.
- ❖ The ability to extend a hydraulic boom increases the radius and reduces lifting capacity.
- ❖ The ability to lower a boom while extending a boom quickly reduces lifting capacity.
- ❖ The crane's tipping capacity can vary when the boom is positioned at the various points of the compass or clock in relation to its particular carrier frame.
- ❖ The operator may neglect to extend the outriggers or the crane is positioned on soft ground.
- ❖ The operator may mistakenly rely upon perception, instinct or experience to determine whether the load is too heavy and may not respond fast enough when the crane begins to feel light.

Another serious condition, two-blocking, occurs when the hoist block or hook assembly comes into contact with the boom tip, causing the hoist line to break and the hook and load to fall, endangering workers below.

Tower Crane Inspection Checklist

Preliminary

- Foundation bolts/anchors
- Main power disconnect switch
- Hook sheaves/swivel
- Power contact grounding
- Support guys/anchors

Cab

- Fire extinguisher
- Load chart
- Window glass
- Operations manual

Tower

- Ladders/platforms
- Section connecting bolts/pins
- Safety rails/chains
- Tie-in assembly(s)
- Cord and lacing welds
- Power cable
- Hydraulic hoses for leaks
- Gear boxes for oil level/leaks
- Slewing ring bolts
- Counterweights secure
- Motor/winch hold-down bolts
- Wire rope condition
- Hoist drum spooling

Crane Operation

- Control function
- Swing brake
- Moment overloads
- Hoist overloads
- Trolley cable/brake
- Sheaves
- Gear limits
- Trolley limits
- Luffing limits
- Hoist limits
- Proximity to power lines

Mobile Crane Inspection Checklist

- Manufacturer's operating and maintenance manual
- Guarding exposed moving parts
- Swing clearance protection
- Boom stops
- Jib boom stops
- Boom angle indicator
- Boom hoist disconnect, automatic boom hoist shutoff
- Two-blocking device
- Powered controlled lowering
- Leveling indicating device
- Sheaves
- Main hoist and auxiliary drums system
- Main boom, jib boom, boom extension
- Load hooks and hook blocks
- Hydraulic hoses, fittings, and tubing
- Outriggers
- Load rating chart
- Wire rope
- Cab—controls, gauges, glass, fire extinguisher, warning lights, horn, wipers, etc.
- Braking systems
- Turntable/crane body
- Counterweight
- Rubber tires (where applicable)