Working Around Cranes

In recent months, crane collapse stories splashed the headlines in a number of major cities. These high-profile examples provide a sobering reminder that powerful and potentially dangerous equipment is required on many jobsites. For that reason, everyone working on a jobsite should understand the workings of a crane, as well as be familiar with related safety precautions.

The workings of a crane

Cranes lift large, and heavy loads using the principle of leverage. Choosing the right crane for the job, knowing the weight and center of gravity of each load, and remaining aware of jobsite conditions are important factors toward accomplishing a job safely and efficiently.

Accidents and unsafe conditions occur when cranes are improperly inspected, set up incorrectly, or when the simple laws of physics are violated. NIOSH's "Preventing Worker Injuries and Deaths from Mobile Crane Tip-Over, Boom Collapse, and Uncontrolled Hoisted Loads" alert offers six case studies detailing examples of what can go wrong when using these powerful machines.

In one example from 1999, a crane's recommended capacity was exceeded, which led to a tipping accident and a fatality. Hoisting a 1-cubic-yard bucket load of concrete, the crawler-mounted mobile crane lost stability and tipped toward the victim. Although the crane operator radioed a warning to a spotter, there wasn't enough time for the victim to react. Crane collapses are often sudden, meaning workers must be aware of the hazardous conditions that exist around a crane at all times.

Another accident occurred in 1997, when a crane tipped over onto a truck cab because the right outriggers were not fully extended. Even though it was a temporary condition due to the unique aspects of the jobsite, it resulted in the crane losing balance and tipping over.

Choose the right crane for the job and remain aware of jobsite conditions. Photo: Manitowoc

In addition to those examples, the NIOSH publication offers explanation, "A crane's lifting capacity is reduced as the boom is lowered, because the distance from the load's center of gravity to the tipping axis is increased." As the crane moves to lift the load to a new position, the changes in various parameters—such as the location of the center of gravity, the crane's tipping axis, and the extension of the boom—can create an imbalance that has the potential to tip the crane.

A safe lift begins by following the manufacturer's specifications and load capacity charts unique to each crane. For rough-terrain cranes, that includes making sure the outriggers are fully extended. When set up on the ground, conditions also should be checked and monitored with each lift to ensure the forces exerted by the crane do not exceed the soil's load-bearing capacity. This can be important if a crane remains on a jobsite over numerous days or if inclement weather has occurred.

Be aware

Although crane operators are licensed experts, it's important that every person on a jobsite remain conscious of the crane. A number of recommendations for riggers and ground workers are outlined in NIOSH's safety alert:

- Never work directly under a suspended load.
- Always check for overhead power lines and other obstructions.
- Barricade the swing radius to keep unauthorized persons from entering areas of pinch points.
- Follow a written engineered lift plan for all critical lifts.
- Follow the correct procedures when setting up or dismantling a crane. Make sure boom sections are blocked or supported before removing pins. Stay out from under the boom at all times if possible.
- Know the possible pinching and crushing hazards around the machine and the load landing area.
- Be familiar with the standard crane hand signals. NIOSH provides these signals in its alert, which is available for download on its Web site.

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