

TerranearPMC Safety Share

Week of May 4, 2015 – Cranes in Construction

Many of us may think that the crane is a relatively new machine, developed during our days of the industrial revolution. Actually, the ancient Greeks are credited with its invention. They were operated on winch and pulley systems, powered by men or beasts of burden, such as donkeys and were used in the construction of tall buildings (remember in those days, Egypt's pyramids were the tallest structures!). In the High Middle Ages, harbor cranes were introduced to load and unload ships and assist with their construction. Some were built into stone towers for extra strength and stability. The first mechanical power for cranes was provided by steam engines, being introduced in the 19th century,

Crane operations have always posed sizable risks. Probably the most *famous* crane accident occurred on July 14, 1999, where the crane, known as *Big Blue* collapsed during the construction of the Miller Park baseball stadium in Milwaukee, Wisconsin. Three workers were killed when the suspended personnel platform in which they were observing a lift was hit by another crane that had tipped over. Wind speeds were between 20 to 21 miles per hour, with gusts of up to 26 to 27 miles per hour. The boom was rated to 20 miles per hour. An investigation revealed that the effects of side winds on the crane had not been calculated for the load the crane was lifting.

According to a NIOSH Alert report (September, 2006), between 1992 and 2002, there were 719 crane-related fatalities. The most significant cause was persons being struck by falling or swinging objects (290 deaths), followed by contact with electrical current (i.e. overhead power lines – 173 deaths). Other events that caused fatalities were: falls from the crane structure or cab, and persons getting caught in a crane's moving parts.

Yet, even after NIOSH released this publication, occupations injuries and deaths due to crane operations continued to happen. Three of the most notable crane fatalities occurred only two years after NIOSH's publication on crane safety: One in New York City, another Miami and then in Seattle; all in the same year (2008).

Up until this time, the OSHA regulation for cranes was Subpart N of the Construction Industry standards, 29 CFR 1926.550 – 556. This regulation was not only less-than-substantial, it lacked a focus on cranes as its concerns were distributed among derricks, hoists, elevators and conveyors. While this standard discussed equipment inspections, clearances from overhead power lines, as well as establishing acceptable rigging criteria and safe lifting practices, other items unnecessary for cranes operations (helicopter use for personnel transport, and hoisting persons per elevators and hoists) only served to dilute the focus necessary for safe crane operations.

It was clear that OSHA needed to establish a more thorough standard for cranes. The actual process for updating OSHA regulations for safe crane operations started in December, 1999. By November, 2011, OSHA introduced its newly created standard, Cranes and Derricks in Construction as Subpart CC of 29 CFR 1926; sections 1400 – 1442 (another section that follows Subpart CC, is Subpart DD – Cranes and Derricks Used in Demolition and Underground Construction).



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The new Crane and Derrick OSHA standard is considerably more extensive than its predecessor (approximately 95 pages of regulations compared with 5 pages in Subpart N) and address issues that specifically adhere to only crane and derricks. This includes S&H requirements for assembly and disassembly of cranes, as well as specifying the roles and responsibilities of competent persons, qualified persons and signal persons (including having qualified evaluators to determine if a signal person is qualified).

OSHA's definition of a competent person is one who is capable of identifying existing and predictable hazards and has the authority to take prompt corrective measures. While specific requirements for a competent person are not detailed, it is the employer's responsibility to designate someone in this position. Experience, formal training and education are typically the factors used for determining designation in this position.

When personnel are being transported in a crane, they need to be placed in a personnel platform that meets stringent requirements (persons need to wear proper fall protection). In addition, when wind speeds exceed 20 mph, a qualified person (a person with a recognized degree, certificate, or extensive training and experience) must determine if it is safe to proceed with transferring personnel.

Crane operators **MUST** be qualified or certified to operate their equipment. If they are a non-government employee, they need to be licensed by that government entity (i.e. state) where work is being performed or qualified via hands-on demonstration of their ability as well as completing a written test. A qualification is valid for five years.

Even though crane safety regulations have been substantially modified to ensure necessary rigor, crane disasters still continue. Investigations show, time and again, that while appropriate practices, training and inspections are important to control hazards, it is personal actions that seem to be causing the most recent incidents. For instance this past November, 2014, Cal OSHA investigated a crane fatality, where two men (in a man basket) plunged to their deaths. The finding was that the crane, due to its age, did not conform to the new safety requirements to have a full anti-tube lock. In addition, the work site did not have a qualified, trained signal person to assist with the lifting. According to the Cal-OSHA investigation, the men should have never been allowed in the man-basket; yet someone made the decision to proceed.

Cranes are very large pieces of equipment, towering over the landscape and weighing hundreds of tons. Working around them demands our respect and continuous attention; never taking anything for granted or assuming the operator can see you. Taking a short cut or letting time-constraints influence actions around such large equipment can only place you and your coworkers at risk. There is a common hard hat sticker worn by many persons working at construction sites: "If it Ain't Safe – Don't Do it!" Definitely words to live by.

Most of our so-called reasoning consists in finding arguments for going on believing as we already do.

James Reason (Accident Investigator and Pioneer in Accident Precursor Causation)

