

CSI Country Wide Case Study Safety Strategy Discussion

Construction Safety Investigator



Instructions

The objective of this tool is to provide field supervisors with information to proactively engage workers and discuss safety related concerns that they may encounter. Safety discussions should not be limited to the subject above and should pertain to the activities that workers will be involved in that may have the potential for safety related exposures.

Case Day:

October 1999

Accident Type:

Crane Accident - Struck By Uncontrolled Load

Relevant laws, rules and codes may include:

29 CFR 1926.550, 1926.20, 1926.21

Case:

A 50 year old male carpenter (victim) working on a municipal construction project died after being struck by a loaded concrete bucket when the crane hoisting the bucket tipped over.

- The victim was a journeyman carpenter with 16 years experience with the company
- The crane operator had 26 years of experience and was a certified crane operator
- Construction was overseen by a Construction Management firm in business 44 years

Accident Detail:

A Manitowoc West Series 111 crawler crane, equipped with a 150-foot main boom with a 30-foot, 15 degree jib, was being utilized to hoist a 1 cubic yard capacity concrete bucket from street level to the rooftop to pour a concrete wall section. The crane was equipped with a computerized load-moment indicator (LMI), which provided a readout of lift conditions for the operator. When properly programmed the LMI activates a warning light when 90% of rated capacity is reached. When 100% of rated capacity is reached an alarm sounds and the boom functions are interrupted.

At approximately 8:30 a.m. on the day of the incident a concrete-finishing crew, consisting of a radio equipped spotter, 3 concrete finishers and a laborer. began pouring concrete into form work on the rooftop of the building approximately 25 feet above street level.

Several loads of concrete were hoisted successfully and poured into the forms located near the southwest face of the building within an 80 - 106 foot radius of the crane's center of rotation.

After completing these pours the crew moved away from the southwest face to begin pouring concrete in forms that were a little over 130 feet from the crane's center of rotation.

At some point during the hoisting operation, the victim arrived on the rooftop to begin stripping forms from a completed wall about 15 feet away from the concrete crew location.

As the operator moved the hoisted bucket with concrete toward the empty form, witnesses at street level observed the crane start to tip forward toward the building. The operator, realizing the crane had lost stability and was tipping, attempted to recover the crane by booming in but was unsuccessful. The victim heard the warnings of those in the area and tried to get out of the way of the bucket that was swinging out of control but was struck in the head and shoulder.

Workers notified emergency personnel who responded within 6 minutes. The victim was pronounced dead at the scene.

Reconstructive Safety Evaluation:

- What are some of the possible causes of the accident being discussed?
- What actions could have been taken that might have prevented this accident from occurring?

Accident Scene Conclusion:

The county's deputy coroner established the cause of death as blunt head and chest injuries.

- Evaluation of the crane's configuration, boom length and radius, weight of the load being hoisted and the manufacturer's load chart indicated that the crane's recommended capacity had been exceeded.
- Measurements conducted at the scene indicated the intended landing site for the concrete bucket was 132 feet from the crane's center of rotation. The load chart listed a capacity of 3,620 lbs for this radius. The hoisted load at the time of the accident, including headache ball, 50 feet of load line, rigging fixtures, concrete bucket and concrete, was estimated at 5,110 lbs, which was 1,490 lbs above recommended load chart
- After the incident the operator stated the LMI had been indicating about 2,700 lbs during the morning lifts. The LMI was examined and tested by the manufacturer and found to be indicating false readings. It was determined by investigators that subsequent to the accident the LMI was proving erroneous readouts.
- Apparently, the lift was already in progress when the victim arrived at the rooftop to strip forms. It was not known if he was aware that a lift was in progress.

Preventive Safety Measures Include:

- Employers, crane owners and operators must ensure cranes are operated within their safe capacities, as recommended by the crane manufacture's load charts and instructions.
- Crane owners and manufactures must ensure that monitoring instruments used for guidance during hoisting operations are calibrated accurately and operating correctly.
- Contractors must request and receive verification that any crane coming onto the project site has had a thorough inspection and that documentation is in place verifying this inspection (you should not rely solely on an annual inspection report).
- Do not rely solely on LMI or other computerized monitoring equipment. Procedures should be in place for the operator and contractor to have knowledge of the crane's configuration, including but not limited to boom length, radius, weight of load being hoisted, weight of ancillary equipment (i.e. hook block, rigging) and load chart information, to ensure the lift can be made within the safe capacity of the load chart.
- Ensure operators are certified and/or qualified to operate their assigned cranes. Ensure those involved in rigging operations are trained properly and qualified to perform this task.
- Pre-planning meetings must be held to review the task at hand, to ensure procedures and safety measures are in place to perform the task safely. Only workers involved in the activity should be in the immediate area.

