CSI Country Wide Case Study Safety Strategy Discussion

Construction Safety Investigator

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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:
July 5, 2007

Accident Type:
Concrete Accident - Formwork Failure

Relevant laws, rules and codes may include:
29CFR 1926.20(a)(1), 1926.21(b)(2), 1926.453, 1926.454, Aerial Lift Manufacture's Operating

Case:

Concrete formwork failed, causing a deck pour collapse where 16 workers fell to the floor below.

Accident Detail:

The company involved was contracted to do all pour in place concrete work for a 14-story condominium. On the day of the incident, a 35-person concrete crew had arrived at the job site and made their way to the 13th floor to complete formwork preparations (rebar, block outs, post-tension cables) for the concrete deck pour scheduled to begin that morning.

After about 1½ hours into the day, the concrete employees felt the formwork being adjusted from below. Immediately following, the concrete pumping began for the pour. After approximately 45 minutes into the pour, the formwork began to bounce and within a few minutes, it collapses to the floor below with 16 concrete employees on it.

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 investigation revealed that the shoring, formwork, and concrete remained substantially within the bay where it failed, indicating that the collapse was caused by internal failure of the shoring and did not occur due to any substantial external lateral loads or forces.

No pre-pour checklist was in place, no one from the company verified that equipment was set up properly and the employee assigned the task of checking the equipment was busy fixing guardrails, floor holes and monitoring fall protection.

Employees assigned to pour watch were stationed below the pour but were not trained in what to look for, had no communications, would have to travel 75 feet to access the pour area, then travel another 75 feet to the operator of the pumping unit and did not have authority to shut down the pour.

The formwork shoring legs were placed on sills that were poorly constructed and did not comply with good construction practice. The shoring system was extended beyond its capacity, not plumb, not tied together at the top or bottom but rather tied together in the middle with cross bracing and the cross bracing was not secured in all locations.

Preventive Safety Measures Include:

- All operations should be preplanned using a Job Safety Task Analysis (JSTA) to ensure potential safety hazards associated with an operation are identified and appropriate steps are taken to eliminate or control them and any necessary personal protective equipment (PPE) is provided and in use.
- Workers assigned to critical duties such as pour watch should be trained in the hazards of the work being performed, how to recognize symptoms of potential failure, and should have the authority to stop the pour and understand the communication procedures necessary to warn others of potential safety concerns.
- A concrete pre-pour checklist should be created and implemented, to identify those areas deemed critical to the structural stability and integrity of the formwork, its supporting structure and safety of the site workers.
- The concrete pour should not be authorized to begin until the pre-pour checklist is completed, which requires a pre-pour inspection by a designated and qualified inspector. Any discrepancies found during the pre-pour inspection should be corrected and the concrete pour should not be allowed to begin until all corrections are completed and are verified by the designated inspector.

Attendance Roster

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Reference: This case was reported in an Occupational Safety and Health Administration (OSHA) accident investigation power point presentation given by Jeffrey A. Alishio, Safety Specialist created 2/19/09.

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