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:
February 2005

Accident Type:
Demolition Accident - Bridge/Pile Cap Dismantling

Relevant laws, rules and codes may include:
29 CFR 1926.20, 29CFR 1926.21(b)(2), 29 CFR 1926.1053, 29 CFR 1926.605, 29 CFR 1926.500, 29 CFR 1926.501, 29 CFR 1926.502

Case:

Ironworker crushed when bridge support structure being dismantled, broke apart

Accident Detail:

The victim and a co-worker were dismantling a span of a temporary bridge support. The span was a steel framework consisting of two pairs of steel I-beams. In preparation for dismantling, a triangular-shaped pile cap, weighing approximately 8,000 lbs., was welded and chained to the ends of the I-beams by a steel chain. The span was then removed from the support and placed on a floating barge where the remainder of the dismantling took place.

To safely dismantle a pile cap, the cap was to be rigged with a crane before cutting the welds with a torch to free the cap from the I-beams.

The victim was straddling the two sides of the cap near its tip and the co-worker was standing on the base of the cap when the cap suddenly broke away from the I-beams. Before they were able to rig the cap to the crane cable, the cap broke apart from the I-beams and swung on the chain. The co-worker was thrown into the river and was not injured. The victim, however, was crushed between the pile cap and the ends of the beams.

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:

- Prior to the incident, at least two witnesses recalled seeing the victim cutting on the cap with a torch, but no one could confirm what part of the cap he was cutting.
- Although the company required workers to wear fall protection and to be tied to an anchorage when working ten feet in the air or higher, (OSHA regulations require employees to be protected from falling if working on elevations of six feet or higher) the victim and his co-workers wore life jackets, but did not use fall protection on the day of the incident.
- The post-incident examination revealed that the cap had been welded to the I-beams with two welds, and it appeared that both welds had been partially cut prior to the incident. The company's original engineering plan dictated that all pile caps were to be bolted to the I-beams; however, the job site superintendent proposed to replace the bolts with welds. The company professional engineer (PE) approved the request and specified that each cap be welded to the beams with four welds and chained to the beams with two 5000 lb. test steel chains. However, the cap that was involved in the incident had been welded to the girders with only two welds instead of four, and all pile caps were chained to the beams with a single 12,000 lb. test chain rather than two 5,000 lb. test chains. These deviations were not communicated to nor discussed with the PE. According to the company PE, the two welds on the cap would not have provided a sufficient safety margin to support the weight of the pile cap and the additional loads.

Preventive Safety Measures Include:

- Complete a Job Safety Task Analysis that includes scope of work, anticipated exposures and safety equipment and/or procedures needed to ensure the task is completed successfully and safely.
- Conduct a pre-work meeting to review the JSTA and ensure workers understand the task to be completed, any safe working procedures and have the necessary safety equipment.
- Provide task-specific employee refresher training addressing proper dismantling procedures.
- Strictly follow construction project engineering plans, and get approval from the project engineer for any deviations from the original plan.
- Perform quality control inspections on the jobs and tasks completed during each stage of a construction project.
- Ensure that all workers use fall protection equipment when there is a potential fall hazard.
- Ensure that safe access to working areas is provided to workers at each work site.

Attendance Roster

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Reference: This case was reported in the NIOSH Fatality Assessment and Control Evaluation (FACE) Program.

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