

California Department of Public Health
Occupational Health Branch

**FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM
(CA/FACE)**

A pipefitter, working in a trench, died when he was struck by an excavator bucket that detached from a quick coupler

Case Report: 20CA002

SUMMARY

A pipefitter, working in a trench, died after being struck by an excavator bucket that detached from a quick coupling device (quick coupler) that was attached to the end of the boom. The operator of the excavator was curling the bucket into the boom when the bucket came loose and fell on the victim. There was no competent person onsite the day of the incident. The CA/FACE investigator determined that, in order to prevent similar incidents, construction companies who operate excavators should:

- Maintain and inspect quick couplers to prevent malfunctions that may cause an unintended release of the excavator's bucket.
- Ensure that a competent person is onsite to identify hazards and determine all necessary safety precautions, including preventing workers from walking/traversing beneath an excavator boom swing radius or elevated load.

INTRODUCTION

On Thursday, June 18, 2020, at approximately 9:30 a.m., a 67-year-old male pipefitter suffered fatal injuries when he was struck by an excavator bucket that detached from a quick coupler. The CA/FACE investigator received notification of the incident on June 23, 2020, from the Cal/OSHA Weekly Fatality Report. On August 24, and September 21, 2020, contact was made with the employer of the victim who was also the operator of the excavator. On October 2, 2020, the CA/FACE investigator traveled to the location where the excavator was stored, and inspected the machine and took photos. The county coroner, fire department, and sheriff's department reports of the incident were also obtained and reviewed.

EMPLOYER

The employer of the victim was a general engineering contractor that specialized in underground sewer and water pipe installation. The employer had been in business for 21 years and had five permanent full-time employees, including the victim. Part-time seasonal employees were hired depending on the workload.

WRITTEN SAFETY PROGRAMS AND TRAINING

The employer did not have a written safety program. Safe operation of excavators and other heavy equipment was accomplished through on-the-job training (OJT) by supervisory personnel in both English and Spanish. There was no documentation that safety training included struck-by incidents, falling objects, or safety issues related to quick couplers.

WORKER INFORMATION

The victim was a 67-year-old Hispanic male who was employed as a pipefitter. He had been employed by this company for 15 years at the time of the incident.

INVESTIGATION

The incident scene was an outdoor construction site for new homes. The employer was installing underground sewer pipes, and had been at this worksite for six weeks prior to the incident. The only two people onsite the day of the incident were the victim and the employer who was also the operator of the excavator. The excavator machine (330) and quick coupler involved in this incident were both manufactured by Caterpillar (Exhibit 1). Quick couplers are hydraulic devices that are installed at the end of booms by pins that would normally be the mountings for the bucket or attachment. They facilitate the rapid exchange of working tools or buckets.



Exhibit 1. The excavator involved in this incident.

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At the time of the incident, the excavator operator was digging an additional trench next to existing underground sewer pipes. The new trench was going to accommodate more pipes that would be tied into the current sewer system (Exhibits 2 & 3). The depth of the trench was approximately nine feet. The deepest four feet were straight-sloped and wide enough to accommodate the new polyvinyl chloride (PVC) sewer pipes (Exhibit 4). The victim was likely in the trench acting as a spotter to signal to the operator where to move the bucket so that it would not damage existing pipe already in the trench.



Exhibit 2 and 3. Alternate views of the trench.



Exhibit 4. Slope and depth of the trench.

After digging a portion of the trench, the operator began curling the bucket (Exhibit 5) when it suddenly detached from the quick coupler (Exhibit 6) and struck the victim. The operator called 911 and used a chain attached to the excavator boom to remove the bucket from the victim. Emergency response personnel arrived on scene and removed the victim from the trench. Despite life saving measures, the victim was pronounced dead at the scene.

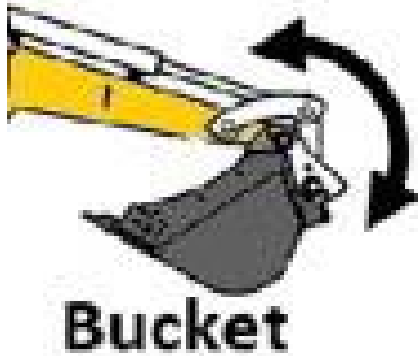


Exhibit 5. Bucket being curled into the end of a boom.



Exhibit 6. The quick coupler attached to the end of the boom.

CAUSE OF DEATH

The cause of death, according to the death certificate, was thoracic blunt force trauma.

RECOMMENDATIONS

The CA/FACE investigator determined that, in order to prevent future incidents, construction companies who operate excavators should:

Recommendation #1: Maintain and inspect quick couplers to prevent malfunctions that may cause an unintended release of the excavator's bucket.

Discussion: The bucket detached from the quick coupler during operation, suggesting that there was an equipment malfunction. Although it is unknown why the bucket detached, the operator stated that the quick coupler had recently been repaired. It is unknown if the operator performed an inspection of the quick coupler prior to use. Employers using hydraulic excavators with quick couplers can prevent release of attachments by:

- Inspecting all quick couplers to determine if they are subject to unexpected release hazards.

- Using newer models of quick couplers that have been specifically designed to prevent the unintended release of attachments.
- Following the manufacturer's recommendations for maintenance and inspection of quick couplers.
- Training workers in the proper use of quick couplers, including making visual inspections, proper procedures for engaging attachments, and methods for testing connections.
- Requiring workers to use proper procedures for engaging excavator attachments and incorporating the procedures into the company's safety and health program.

It is possible that proper maintenance and inspection may have identified a mechanical problem with the quick coupler, thereby preventing detachment of the bucket.

Recommendation #2: Ensure that a competent person is onsite to identify hazards and determine all necessary safety precautions, including preventing workers from walking/traversing beneath an excavator boom swing radius or elevated load.

Discussion: The victim was in the trench and likely within the radius of the boom when the excavator was in operation. When the operator curled the bucket, it detached and fell on the victim. According to the owner of the company, the bucket had never detached before. When employees are required to work in trenches deeper than five feet, a competent person is required to be onsite to perform the necessary daily inspections of excavations, and the precautions that are necessary and required. A competent person is defined by OSHA as someone who, by way of training or experience, is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them. Employers should designate a competent person to conduct a Job Hazard Analysis (JHA) to identify high risk jobs and to determine appropriate employee training on recognized hazards and safe work procedures. This training should include trenching safety, operations in safe zone/danger zone, and inspection of equipment. If there had been a competent person onsite, the victim would most likely have not been underneath the boom swing radius and elevated load and struck by the bucket when it detached, thereby preventing this fatal incident.

REFERENCES

California Division of Occupational Safety and Health - Title 8 regulations - Subchapter 7. General Industry Safety, Group 2. Safe Practices and Personal Protection. Article 7. Miscellaneous Safe Practices

California Division of Occupational Safety and Health - Title 8 regulations - Subchapter 4. Construction Safety Orders . Article 4. §1504. Definitions. Article 6. Excavations -§1541. General Requirements.

Preventing Injuries When Working with Hydraulic Excavators and Backhoe Loaders (NIOSH Publication No. 2004-107) <https://www.cdc.gov/niosh/docs/wp-solutions/2004-107/pdfs/2004-107.pdf?id=10.26616/NIOSH PUB2004107>

Australian Institute of Health and Safety (AIHS) Newsletter: Safety warning over semi-automatic quick hitches on excavators

<https://www.aihs.org.au/news-and-publications/news/safety-warning-over-semi-automatic-quick-hitches-excavators>

Safework Australia: Quick-hitches for earthmoving machinery (August 2016).

<https://www.safeworkaustralia.gov.au/doc/information-sheet-quick-hitches-earthmoving-machinery>

Wisconsin FACE Report 03WI003: Laborer Dies After Being Struck by Detached Excavator Bucket

<https://www.cdc.gov/niosh/face/stateface/wi/03wi003.html>

Plant Assessor Quick Hitch: <https://assessorclone.wpengine.com/nsw-quick-hitch-position/>

Hank Cierpich
FACE Investigator

Robert Harrison, MD, MPH
FACE Project Officer

Laura Styles
FACE Research Scientist

Glenn Shor
Cal/OSHA CFOI Program

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Public Health, in cooperation with the Public Health Institute and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations of work-related fatalities. The goal of the CA/FACE program is to prevent fatal work injuries. CA/FACE aims to achieve this goal by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. NIOSH-funded, state-based FACE programs include: California, Kentucky, Massachusetts, Michigan, New York, Oregon, and Washington.

**Additional information regarding the CA/FACE program is available from:
California FACE Program
California Department of Public Health
Occupational Health Branch
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804
www.cdph.ca.gov/face**