

California Department of Public Health
Occupational Health Branch

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

A heavy equipment operator dies when he was struck by an excavator bucket that detached from a quick coupler

Case Report: 20CA001

SUMMARY

A heavy equipment operator died after being struck by an excavation bucket that became detached from the quick coupling device attached to the end of a boom. The job was located at a construction site for new homes. The victim was operating an excavator and digging trenches for the sewer system. After removing a few loads of dirt from a trench, the decedent swung the boom over to the side of the trench and exited the cab, leaving the boom elevated. As the victim approached the bucket and positioned himself under it, the bucket detached from the quick coupler and fell to the ground, striking him. The CA/FACE investigator determined that, in order to prevent future incidents, employers should ensure that operators of excavators with quick coupling devices:

- Always lower the bucket to the ground before exiting the cab.
- Never walk/traverse beneath an excavator boom swing radius or elevated load.

In addition, employers should:

- Train hydraulic excavator operators in the proper procedures for engaging excavation attachments and incorporate these procedures into the company's safety and health program.

INTRODUCTION

On Wednesday, June 10, 2020, at approximately 7:15 a.m., a 21-year-old heavy equipment operator suffered fatal injuries when he was struck by an excavation bucket that detached from the quick coupler holding it onto the boom of the excavator. The CA/FACE investigator received notification of this incident on June 16, 2020, from the Cal/OSHA Weekly Fatality Report. On August 6, 2020, contact was made with the employer of the victim. On September 25, 2020, the CA/FACE investigator traveled to the location where the incident occurred and interviewed the victim's supervisor/trainer, other operators, and the owner of the company. Photos of the equipment involved were taken. The county coroner, fire department, and sheriff's department reports of the incident were obtained and reviewed.

EMPLOYER

The employer of the victim was a general engineering contractor that specialized in water, sewer, and storm drain installation. The employer had been in business for 22 years and had approximately ten employees, but the number varied depending on the workload. There were two employees at the worksite at the time of the incident, one of whom was the supervisor.

WRITTEN SAFETY PROGRAMS AND TRAINING

The employer had a written injury and illness prevention program (IIPP) with all the required elements. Safety meetings were held weekly at the job site and were documented. Periodic training was also provided on topics directly relating to the work in progress such as confined space, shoring, and rigging. Excavator operator training was provided by experienced operators and was mostly on-the-job training (OJT). There was no written evidence that safety training included struck-by incidents, falling objects, or safety issues related to quick disconnects.

WORKER INFORMATION

The victim was a 21-year-old Hispanic male who was employed as a construction heavy equipment operator. He had been with the company for three years and had been training with this company on how to operate excavators for the past 12 months. It is not known whether he had prior experience operating similar equipment.

INCIDENT SCENE

The incident scene was an outdoor construction site of a new housing project. The victim was digging a trench for storm drains. He had been working at this construction site for eight weeks when the incident occurred.

THE EXCAVATOR AND ATTACHMENTS

The machine involved in this incident was a Hitachi hydraulic excavator (Exhibit 1). Attached to



Exhibit 1. The excavator involved in the incident.

the end of the boom was a hydraulic device called a quick coupler. Quick couplers are made by various manufacturers and have several designs. They are installed at the outer end of booms by the pins that would normally be the mountings for the bucket or attachment (Exhibit 2). They facilitate the rapid exchange of working tools or buckets. The quick coupler involved in this incident was fully automatic. The distributor of the quick coupler was Steel Unlimited Inc. The coupler was hydraulically connected to a Geith hydraulic control panel in the excavator operator's cab (Exhibit 3). The control panel is designed to hydraulically lock the bucket to the quick coupler, and has an alarm to warn the operator when the mechanism malfunctions. The excavator operator typically confirms proper attachment of the bucket by raising the boom and testing the operation of the bucket prior to use.



Exhibit 2. A quick coupler similar to the one involved in this incident.



Exhibit 3. The automatic hydraulic quick coupler control panel.

INVESTIGATION

On the day of the incident, the victim arrived at the jobsite and began operating the excavator to dig trenches for a concrete pipe drain system. When the supervisor arrived at the work location, he observed the victim maneuver the excavator as he pulled out two buckets of dirt from the trench and dumped it to the side. After removing a few loads of dirt from the trench, the victim swung the excavator boom away from the trench, stopped the boom in an elevated position and exited the cab.

It is not known why the victim stopped the excavator boom and exited the cab. It is possible that the quick coupler locking mechanism did not fully engage and the victim was alerted by an

alarm on the control panel. The victim may have exited the cab to check on the bucket. The supervisor witnessed the victim approach the elevated bucket from underneath, and then the bucket detached, striking the victim (Exhibit 4). The decedent fell onto a small dirt berm at the edge of the trench. 911 was immediately called and the supervisor performed cardiopulmonary resuscitation (CPR) until emergency services arrived. The fire department provided advanced cardiac life support (ACLS) measures and transported the victim to the hospital where he was pronounced dead by the attending physician.



Exhibit 4. The bucket that disconnected from the coupling.

CAUSE OF DEATH

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

RECOMMENDATIONS

The CA/FACE investigator determined that, in order to prevent future incidents, employers should ensure that operators of excavators with quick coupling devices:

Recommendation #1: Always lower the bucket to the ground before exiting the cab.

Discussion: In this incident, the victim left the cab while the boom and bucket were still elevated. If operators become aware that the bucket is not operating properly, they should always lower the bucket to the ground before inspecting. If the bucket had been lowered to the ground, it would not have disconnected and fallen on the victim.

Recommendation #2: Never walk/traverse beneath an excavator boom swing radius or elevated load.

Discussion: In this incident, the victim exited the cab and walked underneath the elevated bucket. All heavy equipment poses serious—even potentially fatal—risks to operators and others working in the vicinity. The relatively quick and far-reaching motion of the boom and bucket on an excavator is a particular source of danger. Manufacturers of excavators advise that no one should

walk below an elevated load or work within the boom swing radius during operation. If the victim had not walked under the elevated load, he would not have been struck by the bucket.

Recommendation #3: Train hydraulic excavator operators in the proper procedures for engaging excavation attachments and incorporate these procedures into the company's safety and health program.

Discussion: In this incident, the victim had received OJT training on how to operate the excavator. There was no documentation that he received specific instruction on the operation of quick couplers. If the victim had received increased training on excavator operations, he may have had greater knowledge about how quick couplers function and the the proper safety procedures to follow. With additional training, the victim may have lowered the boom to the ground, thereby preventing this 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 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/>

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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:

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