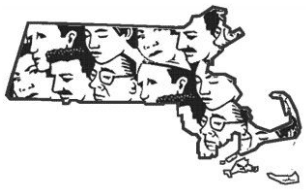
MA FACE
Occupational Fatality Report



Mechanic Crushed When the Dozer He Was Lowering Shifted and Fell off the Jack - Massachusetts

Release Date: March 12, 2015
Investigation: # 13-MA-002-01

Massachusetts Department of Public Health
Occupational Health Surveillance Program

SUMMARY

On January 21, 2013, a 70-year-old male heavy equipment mechanic (victim) was fatally crushed while lowering a dozer. The victim had finished replacing the dozer's track adjuster and was attempting to lower the dozer back onto its track when the dozer shifted, fell off the bottle jack and onto the victim. After hearing a loud bang and the victim yelling for help, co-workers placed a call for emergency medical services (EMS) and started to free the victim by jacking the dozer back up. The local police and EMS arrived at the incident location within minutes. The victim was transported to a local hospital where he died of his injuries three days later.

Contributing factors identified in this investigation included accessing the space underneath a raised dozer supported only by a bottle jack and working alone while manipulating heavy equipment.

The Massachusetts FACE Program concluded that to prevent similar occurrences in the future, employers should:

- **Ensure that employees never place any portion of their body under a load only supported by a jack;**
- **Ensure two people are assigned to tasks involving lifting and lowering of heavy equipment from start to finish; and**
- **Ensure equipment is visually inspected prior to each use, including inspecting safety warning labels to ensure they are legible.**

INTRODUCTION

On February 7, 2013, the Massachusetts FACE Program was alerted by the local media that on January 21, 2013, a male mechanic was fatally injured while repairing a dozer. An investigation was initiated. On February 20, 2013, the Massachusetts FACE Program Director traveled to the company's office location and met with company representatives to discuss the incident. The police report, death certificate, company information, and the OSHA fatality and catastrophe report were reviewed during the course of the investigation.

EMPLOYER

The employer is a site work, demolition and trucking company and has been in business for approximately 40 years. The company has approximately 65 employees of whom about ten work in the maintenance department. Of these ten maintenance department employees four were mechanics, including the victim. There were two types of mechanics, garage mechanics and field mechanics. The victim was a garage mechanic.

The victim typically worked Monday through Friday. His shift was from 7:00 a.m. to 3:30 p.m. and although sometimes employees worked weekends, the victim did not. Some of the company workers had union representation. The victim, being a garage mechanic, did not have union representation.

WRITTEN SAFETY PROGRAMS AND TRAINING

The company had an Illness and Injury Prevention Program (I2P2) and routinely conducted toolbox talks. The content of both the I2P2 and the toolbox talks primarily focused on field worker health and safety. All employees were provided the OSHA 10-hour training. The 40-hour HAZWOPER training was also provided to employees, but only to field employees. In addition, newly hired mechanics were provided with an orientation that included on-the-job training. The company had workers' compensation insurance as required by law in Massachusetts (G.L. c. 152, Sec. 25A).

VICTIM

The victim was a 70-year-old male heavy equipment mechanic who had been employed with the company for approximately seven years at the time of the incident. Prior to working for this company, the victim had worked as a diesel/heavy mechanic for many years. At the time of the incident, he held a current state-issued hoisting license, although this license was not required to perform the maintenance task. The victim arrived to work at 7:00 a.m. and was scheduled to work a normal full day shift.

INCIDENT LOCATION

The incident occurred on a Monday at the company's office location. On site at this location, the company also had a maintenance garage that was next to the company's offices. The garage had multiple bays for equipment and vehicle repair and maintenance. The incident occurred inside one of the garage bays.

EQUIPMENT

The machine involved in the incident was a track-type tractor (dozer) that had been manufactured in 2006. The company purchased the dozer in the same year it was manufactured (Figure 1). The dozer was equipped with an enclosed cab and an elevated sprocket undercarriage. The dozer had an operating weight of just over 44,200 pounds.[1] The dozer was 10'6" high, 8'8" wide, and 12'8" long without an attachment. The victim was replacing the dozer's right front track adjuster at the time of the incident. The defective track adjuster was under warranty by the manufacturer, but the labor cost to replace the part was not covered with the warranty. Therefore, the company was going to remove the defective track adjuster and send it to the manufacturer. Then the manufacturer was then going send a new track adjuster to the company to install.

To perform the repair, the dozer had to be lifted to remove the dozer's weight from the track. A 30-ton air actuated hydraulic bottle jack was used to raise the dozer (Figure 2). The bottle jack had a lifting capacity of 60,000 pounds and a maximum lift height of 18 inches. The base of the bottle jack was 10 ¼ inches long by 8 ¼ inches wide and the diameter of the saddle, the point of contact between the jack and the load being raised, was 2 ½ inches.[2] The jack had a warning label but it was no longer in readable condition. The company had the operating manual for the jack and the warning labels were included in the manual. The warning labels included that work should never be performed under or around a load supported only by the hydraulic jack. In addition, the operating manual included two warnings that were specific to this type of incident. These warnings were to ensure that: 1) all tools and employees are clear before lowering a load and 2) employees never place any portion of their body under a load while it is being raised or lowered.

INVESTIGATION

The victim and a co-worker were assigned the task of replacing the track adjuster. The company reported that the job would take about a day to complete if the part was readily available. A new track adjuster was not readily available and it took over a week for the part to arrive from the manufacturer.

One of the first steps performed during the replacement of the track adjuster was to remove the dozer's blade attachment. The 30-ton air actuated hydraulic bottle jack was used to raise the dozer and 12x12x4 oak blocking was used as cribbing to secure the raised dozer. Once the cribbing was in place, the jack was removed from underneath the dozer. While waiting for the new track adjuster to arrive, the dozer remained raised and supported by the cribbing inside one of the garage bays (Figure 3).

When the new track adjuster arrived from the manufacturer, the victim and the co-worker installed the new part. Up to this point, the task was described by the company as a two person job. Once the track adjuster was installed, the remainder of the task was considered a one person job. The victim was person assigned to finish the task, which included lowering the dozer onto its track. Although there were other employees in the garage at the time of the incident, the victim was working alone on the dozer and the incident was not witnessed.

The victim started the process of lowering the dozer by placing a bottle jack on a piece of oak blocking underneath the dozer. The victim then used the bottle jack to raise the dozer and removed the cribbing. The air line was then removed from the jack and the victim started to lower the dozer. While being lowered, the dozer wasn't lining up properly with the track's channel. The victim got onto a creeper so he could monitor the dozer's descent more closely. While the victim was partially underneath the dozer, the dozer shifted and fell off the bottle jack onto the victim's lower extremities.

After hearing a loud bang and yelling for help, co-workers found the victim partially underneath the dozer and they placed a call for emergency medical services (EMS). The co-workers then placed the same jack the victim was using on blocking at the front of the dozer and raised the dozer freeing the victim. The local police and EMS arrived at the incident location within minutes after the victim was freed. The victim was transported to a local hospital where he died of his injuries three days later.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. The Massachusetts FACE team identified the following contributing factors in this incident.

- Accessing the space underneath the raised dozer supported only by a bottle jack.
- Working alone while manipulating heavy equipment.

CAUSE OF DEATH

The medical examiner listed the cause of death as blunt force injuries of the abdomen and lower extremities.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure that employees never place any portion of their body under a load only supported by a jack.

Discussion: While bottle jacks are designed to raise and lower loads, these jacks are not designed to keep the loads in the raised position without other support. The operating manual for the 30-ton bottle jack listed multiple warnings, one of which was that employees should never place any portion of their body under a load that is only supported by a jack. This warning includes the process of raising and lowering a load. As mentioned above, the bottle jack's saddle, which is the point of contact between the jack and the load being raised, had a diameter of 2 ½ inches. This small surface area contact will not provide a great deal of stability. Raised equipment is not at a zero energy state, as the influence of gravitational forces will result in the unit falling to the ground should it become unsupported.

In this case, the dozer was raised by the bottle jack and then lowered onto cribbing in the form of oak blocks placed in a cross pattern underneath the dozer.[3] The dozer remained supported on the cribbing throughout the repair process. Once the dozer was ready to be lowered, the bottle jack was used to raise the dozer and the cribbing was removed. While lowering the dozer an issue was encountered and the victim then went partially underneath the dozer while it was only being supported by the bottle jack to try and observe the problem. At this point, prior to going underneath the dozer, the cribbing should have been put back in place to ensure the dozer was stable. A quicker alternative would be to use jack stands instead of cribbing. If jack stands are used, employers must ensure that the jack stands are rated to support the weight of the intended load. In addition, jack stands should only be used when the task is being performed on a hard level surface.

Recommendation #2: Employers should ensure two people are assigned to tasks involving lifting and lowering of heavy equipment from start to finish.

Discussion: In this case, the task was considered a two person job until the repair was complete and the dozer was going to be lowered. It was at this point that the task was considered a one person job and the victim was the only employee working on the dozer. The remainder of the task involved lowering the dozer that weighed over 44,200 pounds onto the track. If the co-worker was still assigned to the task with the victim, the co-worker might have stopped the victim from accessing the underside of the dozer while it was solely being supported by the 2 ½ inch diameter saddle of the bottle jack.

Recommendation #3: Employers should ensure equipment is visually inspected prior to each use, including inspecting safety warning labels to ensure they are legible.

Discussion: In this case, the warning label on the bottle jack was worn and no longer legible. While housekeeping was not the root cause of this fatality, if the warning label had been visible the employees might have been reminded of the hazards associated with using the bottle jack. As mentioned above, the warning label included that work should never be performed under or around a load supported only by the hydraulic jack.

Routine inspections of the bottle jack could have previously led to the observation and replacement of the worn warning label. In addition, the visual inspections would include looking for any abnormal conditions such as excessive wear, cracked welds, and damaged, loose or missing parts. If any of these or other conditions are observed, the jack should be immediately tagged and removed from service until it is repaired. OSHA also requires that all jacks, which are constant or intermittently used at one locality, to be inspected once every six months by the manufacturer or an authorized repair facility.

REFERENCES

1. Caterpillar, 2006. Service Manual, D6Rlll Track-Type Tractor.

2. Lift Omega Equipment. Air/Manual Hydraulic Bottle Jacks, Operating Instructions & Parts Manual. www.northerntool.com/images/downloads/manuals/145798.pdf. Date accessed: December 16, 2014.

3. Caterpillar, 1997. Safety – Right around the block https://safety.cat.com/cda/layout?m=130081&x=7&id=493877. Date accessed: December 16, 2014.

Figure 1 – The track type tractor (dozer) involved in the incident

Figure 2 – The 30-ton bottle jack being used during the incident

Figure 3 – The oak block cribbing being used during the incident