

July 19, 1995

Nebraska FACE Investigation 95NE024

SUBJECT:

Hydraulic Hammer Rollover Crushes Operator

SUMMARY:

A 61 year-old male machine operator was fatally injured when a hydraulic hammer overturned on him. The victim was driving the hydraulic hammer down a paved street with a 10-degree incline. Part of the way down the hill, the hydro hammer traveled off the left side of the road onto an inclined embankment, striking some small trees. The hydraulic hammer rolled over landing upside down. The victim was pinned underneath the hydraulic hammer and sustained fatal injuries.

The Nebraska Department of Labor (NDOL) Investigator concluded that to prevent future similar occurrences:

*Employers should consider retrofitting older equipment with rollover protection system (ROPS).

*Equipment manufacturers should consider designing ballast for equipment (such as a Hydraulic Hammer) which has a substantial weight imbalance.

PROGRAM OBJECTIVE:

The goal of the workplace investigation is to prevent work-related deaths or injuries in the future by a study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact.

This report is generated and distributed **solely** for the purpose of providing current, relevant education to the community on methods to prevent occupational fatalities and injuries.

INTRODUCTION:

On May 1, 1995, a 61 year-old male machine operator died as a result of the injuries sustained when the hydraulic hammer machine he was operating overturned on him. NDOL was notified by telephone on May 2, 1995, by the safety director of the company which experienced the incident. The company safety director accompanied the FACE evaluator to the incident site on May 2, 1995. After evaluating the incident scene they went to the company transportation maintenance shop to check out the hydraulic hammer involved in the incident.

The employer is a public utilities company that has been in business for 106 years. They employ 780 personnel. The company has a written safety program and full-time safety director and staff.

INVESTIGATION:

The victim, who had worked for the company over 42 years, was an experienced machine operator. The day of the incident the victim began work at around 7:30 am and had a lunch break, returning to work at approximately 1:00 pm. The incident occurred around 1:30 pm.

The machine involved in the incident was a hydraulic hammer which is a tamping machine used to pack dirt. This particular machine has the hammer device mounted on the right side. While in use the hammer is raised 90° to an upright position. While the machine is traveling the hammer is lowered so it is parallel to the ground. When the incident occurred the hammer was in the lowered (proper) traveling position.

The victim was moving the hydraulic hammer from one location to another when the incident occurred. He was driving down a narrow, steep (10 degree grade) asphalt street with a rough uneven surface and no gutter or curbs. There were cars parked on the right side of the street and a dirt incline on the left side. There were no witnesses to the incident but from physical evidence the following scenario is probable. For some unknown reason the hydraulic hammer left the street and went up the dirt incline, hit some small trees and then rolled 180 degrees back on the street, pinning the operator underneath. This hydraulic hammer does not have springs or shock absorbers which makes it bouncy on rough road surfaces. It is possible the victim took evasive action to avoid hitting a child running into the street or an animal running into his path, and lost control on the rough road, subsequently going up the dirt incline and overturning the machine.

At the time of the incident the hydraulic hammer was in second gear, which allows the machine to travel between 6 and 12 mph. The hydraulic hammer tends to be unstable with the majority of its weight on the right side. The machine overturned on its right side and landed completely upside down, crushing the operator's cage and pinning the victim in the machine. The hydraulic

hammer was not equipped with (ROPS). Two individuals working nearby heard the machine overturn and rushed to the scene and discovered the victim who was still conscious. One of the individuals called 911 which quickly responded. The hydraulic hammer was lifted with a crane to allow rescue personnel to get to the victim. The victim was transported to the hospital where he was pronounced dead at 1:58 pm.

After the victim was removed from the incident site the machine was lowered and after measurements were taken the police directed the machine be removed from the street. The machine was impounded at the company transportation area. Considering the possibility that loss of brakes could have been a factor in this incident the company had an outside independent brake system specialist check out the hydraulic hammer. It was the specialist's conclusion that braking capacity was present when the incident occurred, either through the hydraulic brakes or the emergency brakes. The steering system was also checked and found to be in good working order with no defects.

CAUSE OF DEATH:

The cause of death, as stated on the death certificate, was positional asphyxiation.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Employers should consider retrofitting older equipment with rollover protection systems (ROPS).

Discussion: Although this hydraulic hammer was not equipped with ROPS at the time of the incident it was an available accessory. A ROPS in this case might have prevented fatal injury. It should be noted that very soon after this incident this company retrofitted this hydraulic hammer and others in the company with ROPS.

Recommendation #2: Equipment manufacturers should consider designing ballast for equipment (such as a Hydraulic Hammer) which has a substantial weight imbalance.

Discussion: The hydraulic hammer is inherently imbalanced due to the weight of the hammer mechanism on the right side of the machine. This is even mentioned in the owner's manual. Had ballast been provided on the left side of the hydraulic hammer it would have made the machine more stable and may have prevented it from overturning. Manufacturers should consider designing all new equipment with ballast for improved stability as well as designing retrofit kits for machines already in service.