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Construction worker crushed between falling dump box and truck frame

SUMMARY

During the fall of 1999, a 53-year-old construction worker was killed after he unloaded sand from a dump truck. He partially raised the box of his truck to dump out a portion of wet sand at a work location, then leaned under the box to manually trip the hydraulic linkage to bring the box down. The hydraulic linkage was located at the hydraulic pump, behind the cab between the main frames of the truck. This action was apparently a habit to save some time from walking around the truck to push the dump lever inside the truck cab. However, this time, because of the heavy load of sand, and because the box was only partially raised, the truck box came down immediately pinning the man between the box and the frame of the dump truck. The man suffered massive head injuries and was dead at the scene. The deceased truck driver had several years of experience with machinery and was the lead man for the small construction company.

Photo 1

RECOMMENDATIONS based on our investigation are as follows:

- ***Workers should use proper machine controls rather than actuating machine functions at hazardous locations.***

- ***Employers should train and supervise workers adequately to ensure that safe procedures are followed.***
- ***Manufacturers of dump trucks should consider options to discourage unsafe use of dump box hydraulics, such as placement or shielding of controls***

INTRODUCTION

In October, 1999 a 53-year-old construction worker was killed after he had unloaded sand from a dump truck at a work site. The Iowa FACE program was notified of the incident a week later from the Iowa Department of Public Health. Information was gathered from the local police, the county medical examiner, and contact was made with the company owner. The police had impounded the truck, and investigations from OSHA determined that it was in proper working order. Two Investigators from the Iowa FACE program went on-site to see and photograph the dump truck, and talked with the man's employer.

The employer was a small general contractor who had been in business for the last 30 years. He had a crew of 5-6 employees, the lowest number he had in many years. There was another employee at the work site when the death occurred; however, this man did not witness the accident. The victim had many years of experience with several builders. He was the "lead man" for the work crew and managed equipment maintenance. This was a year-around business with a variety of indoor and outdoor jobs.

There was no official safety program for this small company. In the past when the company was larger, the owner and his lead man regularly attended regional OSHA meetings. However, now that the number of employees was much smaller, this was no longer done. The owner said he was careful to only hire workers with significant experience. There was no certification required for employees to operate specific equipment. Safety issues were handled on a job-by-job basis. The victim was very experienced in all types of equipment operations, and was responsible for vehicle maintenance and repair.

INVESTIGATION

The construction company was doing flat concrete work at the site of a new mini-mall. The victim was a dump truck driver and was unloading sand from his truck for this work. He was working alone at the time, although there was another company employee at that job site. The ground was flat and the weather was mild, with a temperature of 65 degrees.

The dump truck was a 1968 model with a payload of seven tons. It was maintained by the victim and was in normal operating condition. The hydraulically-controlled dump box was actuated by a hand-operated knob inside the cab of the truck (see Photo 2), and controlled by the clutch pedal. A cable ran from the knob to a hydraulic valve located

between the main frames of the truck (see Photo 3). When the box was raised, this cable end and actuator lever at the hydraulic pump housing were visible and within easy reach.

Photo 2.

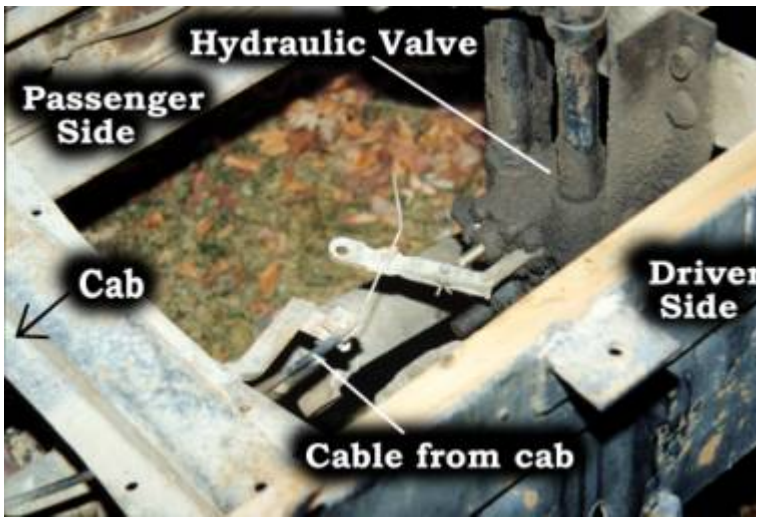

Photo 3.

The victim partially raised the box of his dump truck and unloaded about 1/3 of the load of sand, which was wet and heavy. Then while standing and leaning in from the passenger side of the truck, he manually tripped the hydraulic control lever to bring the box down. However, due to the weight of the wet sand and the low height of the box, it slammed down immediately and pinned the man to the frame of the truck. He was killed instantly from severe head injuries.

Apparently the victim had lowered the truck box manually before instead of using the cable control inside the truck cab. Co-workers who witnessed him lowering the box in this manner at other job sites confirmed this. When the box was fully raised and the load was completely dumped, the box would descend slowly and he would have ample time to get out of the way. The victim had worked with this company for the last three years and probably had lowered a partially-raised truck box in this fashion many times. It is not clear whether he might have slipped, lost his balance, or got caught by his clothing, preventing him from escaping.

Local police impounded the dump truck after the accident expecting that tests would be performed on the hydraulic system. OSHA investigators came to inspect the truck and found it to be in normal operating condition. The company owner demonstrated how the partially filled truck box would come down by manually tripping the hydraulic while lying on the ground under the truck. The box came slamming down rapidly without much resistance. OSHA issued no citations against the construction company. During the FACE on-site investigation, the dump box hydraulic controls were demonstrated. The cable connecting to the hydraulic control lever appeared to have a bend in it, however it functioned properly. It is unlikely that any malfunction occurred which would have lead to the worker to attempt lowering the box by manually pushing the lever under the box.

CAUSE OF DEATH

The official cause of death from the county medical examiner was massive head trauma due to accident with dump truck.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: *Workers should use proper machine controls rather than actuating machine functions at hazardous locations.*

Discussion: The victim was in the process of dumping a partial load of wet sand. It appears he had developed a system of monitoring how much had been dumped by standing to the side of the dump truck, then at the proper time, manually releasing the dump box hydraulic lever to bring the box back down. This was probably a more accurate method of measuring how much had been dumped, rather than using the controls in the truck cab. In many cases the workers would be working alone, so it may not be possible to ask other workers to monitor and signal when the box should be lowered. This method had reportedly been used before, but on this day, perhaps because of the wet sand and the lower position of the box; the box may have fallen much faster. It is not known whether he slipped or got caught while trying to move out of the way of the falling truck box. However, during demonstrations, the box descended very fast giving little time to escape in a similar situation. Since the event was unwitnessed, the details of this accident will never be fully known. However, it is clear that actuating the hydraulics under the raised box is hazardous and should not be done in any circumstances.

Recommendation #2: *Employers should train and supervise workers adequately to ensure that safe procedures are followed.*

Discussion: The co-workers had observed that the victim had operated the dump box hydraulics manually from under the dump box before, presumably to save time. However, this work practice is obviously hazardous, and should be brought to the attention of the worker and his employer. Since the victim was the lead man on site and an experienced worker, perhaps other workers were unwilling to discuss this practice with him or others. The employer has the responsibility of providing adequate training, supervision, and monitoring to ensure that safe work procedures are followed. This construction company was small and had a reduced workforce from earlier years. It appears that safety activities were also reduced.

Recommendation #3: *Manufacturers of dump trucks should consider options to discourage unsafe use of dump box hydraulics, such as placement or shielding of controls.*

Discussion: The hydraulic linkage in this older dump truck was easily accessible from the sides of the truck when the box was raised. While this is an unexpected hazardous behavior, it might be possible to prevent such behaviors by placing the linkage where it cannot be easily reached or enclosing the linkage so that it could not be easily misused.

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Fatality Assessment and Control Evaluation

FACE

FACE is an occupational fatality investigation and surveillance program of the *National Institute for Occupational Safety and Health* (NIOSH). In the state of Iowa, *The University of Iowa*, in conjunction with the *Iowa Department of Public Health* carries out the FACE program. The NIOSH head office in Morgantown, West Virginia, carries out an intramural FACE program and funds state based programs in Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Wisconsin, Washington, and Wyoming.

The purpose of FACE is to identify all occupational fatalities in the participating states, conduct in-depth investigations on specific types of fatalities, and make recommendations regarding prevention. NIOSH collects this information nationally and publishes reports and Alerts, which are disseminated widely to the involved industries. NIOSH FACE publications are available from the NIOSH Distribution Center (1-800-35NIOSH).

Iowa FACE publishes case reports, one page Warnings, and articles in trade journals. Most of this information is posted on our web site listed below. Copies of the reports and Warnings are available by contacting our offices in Iowa City, IA.

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