

Massachusetts Construction Machine Operator Dies Under Conveyor of Stone Crushing Machine

Investigation: 95-MA-043

SUMMARY

On November 10, 1995 a 51 year old male construction machine operator/mechanic was fatally injured when his clothing was caught in the stone crushing machine he was cleaning. The victim, who had been operating the machine all day, had shut down one of two conveyors and proceeded to clean out the bottom small particle chute of the machine. Leaning into the chute while raking out the residue, his hooded sweatshirt was caught in an overhead axle and he became trapped. Co-workers were unable to extricate the victim from the machine until police and fire rescue workers arrived. The victim suffered severe trauma to the face, head and chest, and was unconscious. He was transported to the local city emergency room where he was pronounced dead. The MA FACE Program concluded that to prevent similar future occurrences, employers should:

- c ensure that all cleaning and maintenance of machinery takes place while power to the machine is completely shut down using lockout/tagout procedures.**
- c ensure that equipment is properly guarded to prohibit entry into working parts of the machinery.**
- c ensure that all equipment has properly marked and accessible emergency shutoffs and that all personnel are acquainted with their location and operation.**
- c develop, implement, and enforce a comprehensive safety program that includes, but is not limited to, worker training in controlling the health and safety hazards of heavy equipment.**
- c not allow employees to wear loose clothing, such as hooded sweatshirts, when working around unguarded moving or rotating parts of machinery.**

INTRODUCTION

On November 11, 1995, the MA FACE Program was notified by the Massachusetts Department of Labor and Industries that on November 10, 1995, a 51 year old male construction machine operator/mechanic was fatally injured when he was caught in the stone crushing machine he was cleaning. An investigation was immediately initiated. The MA FACE Program Director traveled to the jobsite on November 21, 1995 and interviewed the employer. The police report, death certificate, corporate information, and photographs were obtained during the course of the investigation.

The employer was a heavy construction/site excavation contractor who had been in business approximately 35 years at the time of the incident. The company employed four persons as heavy equipment operators including the owner. All four employees were working at the site at that time. There was not a designated safety person present, but written safety procedures, in the form of the equipment manual, were in place.

The victim was employed by the company for three years and had worked on the site approximately 2 weeks, operating the stone crusher for 6 days during that period. He was an experienced construction equipment operator and mechanic, who operated stone crushers on other sites for other employers.

INVESTIGATION

On November 10, 1995, a heavy construction/site excavation contractor was working on a major single-family housing development site. The company was one of many subcontractors on the site. The company's equipment consisted of earth-moving machinery, such as front-end loaders and backhoes. Its tasks were to excavate boulders and rocks, which were then crushed in the stone crusher, and to deliver the resulting crushed stone to other sites as fill. The company had been on site for two weeks at the time of the incident.

On the day of the incident a crew of four heavy equipment operators, one of whom was the owner of the company, were working. The stone crushing machinery was owned and usually operated by another company working at the site. For the past six working days, that company had no personnel available to operate the stone crusher. Therefore, the victim's employer agreed to have his employees operate the crusher so that their excavation activities could continue. The victim was the only crew member who operated the stone crusher because he had operated similar machinery on other jobs and for other employers.

The stone crusher was built by Pioneer, and possibly dated back to the 1950's. The machine was diesel driven with many exposed belts and pulleys. One conveyor belt, surrounded by a chute, would take in boulders and rocks and bring them into the crushing mechanism. A second unguarded conveyor belt would then carry the crushed stone to the other end to be deposited into a truck. The operators controls were located at a two-level station above and between the conveyors. The first level was approximately seven feet above the ground and accessed by an attached metal ladder.

A second operators platform was approximately five feet above the first and overlooked the incoming conveyor and the crushing mechanism. Access to this platform was from the lower platform. There were separate controls for each conveyor and the motor which ran the stone crushing mechanism. Each conveyor could be stopped by disengaging the clutch by a lever at the appropriate operator's platform. Shutting down the motor would shut down all three operations. This shutoff was a lever located at the lower platform. There was no shut off at ground level, nor were any of the levers marked as to function.

On the day of the incident the victim disengaged the incoming conveyor at approximately 3:45 PM. The motor and the outgoing conveyor continued to run. He and a co-worker then proceeded to clean out the machine. This process consisted of knocking loose and scraping fine stone which had collected under the crushing mechanism and around the incoming conveyor. A hole had been made in one side of the machine for this purpose. A chute had been built leading to the hole to enable fine stone or dirt to fall away from the machine while it was running.

The victim and his co-worker were on opposite sides of the machine at ground level, when the co-worker noticed smoke coming from a belt on his side of the machine. He then heard belts snapping and went around the machine to see what was happening. He discovered the victim with most of his body inside the opening which accessed the area underneath the crushing mechanism.

Because the machine had remained running, a pulley axle was still rotating just above where the victim was working. The rotation of this axle was related to the belts that continued running on either side of the machine, which drove the crusher and the outgoing conveyor. There were no materials in the crusher at the time.

The belts were snapping due to the victim's clothing, namely a hooded sweatshirt, being caught in the rotating shaft above him. The area in which he was working was just barely big enough to fit a person. He was leaning in and using a metal rod to loosen stuck material while standing on the chute (See pictures).

The co-worker, thinking the victim did not know there was a problem, first attempted to get his attention by tapping on his leg. He then discovered that the victim was stuck and ran for help. Another co-worker and the owner ran over to attempt to extricate the victim from the machine. Unable to do so, the owner shut off the motor and called for emergency responders. Fire rescue personnel and police worked for 15 minutes to dislodge the victim from the machine. The victim suffered severe trauma to the face, head and chest, and was unconscious. He was transported to the local city emergency room where he died.

CAUSE OF DEATH

The medical examiner listed the cause of death as transection of the cervical spine

caused by a crushing injury of the neck.

RECOMMENDATIONS

Recommendation #1: Employers should ensure that all cleaning and maintenance of machinery takes place while power to the machine is completely shut down using lockout/tagout procedures.

Discussion: The stone crusher is a high power machine designed to move heavy objects through it with great force. It has many rotating parts in which a person may become entangled. All power to a machine should be shut down whenever cleaning or maintenance is performed and anytime a person is required to enter a machine for any purpose.

Lockout/tagout is a procedure for insuring that power is not inadvertently restored by one person while the machine is being worked on by another person. Although not an OSHA requirement in the construction industry, it is good safety practice to lockout or tagout the power switch while the machine is occupied. The main power switch must be closed and either clearly tagged with instructions not to operate or locked with a lock owned by the person working inside the machine.

Recommendation #2: Employers should ensure that equipment is properly guarded to prohibit entry into working parts of the machinery.

Discussion: The stone crusher was not designed such that a person would have access to the inner part of the machine. At some point, a hole was cut into the side of the machine so that it could be cleaned out. This hole was large enough for a person to enter. Other methods should have been developed for cleaning out the machine. Even if this hole were necessary for cleaning out the machine, a guard or screen should have been used to prevent entry while the machine was running. All pulleys and conveyors on the machine should also have been guarded to prevent employee entanglement. When purchasing older, used equipment employers should check with the manufacturer for current guarding requirements and available accessories.

Recommendation #3: Employers should ensure that all equipment has properly marked and accessible emergency shutoffs and that all personnel are acquainted with their location and operation.

Discussion: Many of the workers on the site were not familiar with the operation of the stone crusher. No emergency shutoff was available to them at ground level when they discovered their co-worker stuck in the machine. The levers controlling the machine operation were very inaccessible located up a ladder at the operator's platform. None of the

levers were clearly marked, therefore only someone familiar with the machine could have turned it off. Devices to shut off various parts of the machine should be clearly labeled as such, with "emergency" designations and/or red paint. Machinery should be clearly labeled with emergency instructions and all workers in the area should be advised of these instructions.

Recommendation #4: Employers should develop, implement, and enforce a comprehensive safety program that includes, but is not limited to, worker training in controlling the health and safety hazards of heavy equipment

Discussion: The company did not have any comprehensive written safety, health and/or training programs in effect at the time of the incident. Employers, with the participation of employees, should develop, implement, and enforce a comprehensive safety program. The program should begin with an analysis of hazards associated with heavy machinery and equipment and the implementation of controls of those hazards. It should also include training for all employees in recognizing hazards and using controls for those hazards, such as proper work practices, engineering controls or personal protective equipment. In this case, had the workers been trained in the seriousness of possible entanglement in rotating parts, been made aware of where these hazards existing and provided proper guards and work practices, this incident may not have occurred.

Recommendation #5: *Employers should not allow employees to wear loose clothing, such as hooded sweatshirts, when working around unguarded moving or rotating parts of machinery.*

Discussion: *Hazards due to moving or rotating parts of machinery should be first eliminated through proper machine guarding, and secondarily controlled by proper work practices. These practices should include wearing clothing appropriate for the tasks at hand. Employees should be cautioned that clothing is often easily caught in rotating parts and is not easily removed. In this case, the hood of the victims sweatshirt was caught and he was not able to extricate himself from the machine.*

REFERENCES

Code of Federal Regulations, Labor 29 CFR 1910.147 Lockout/Tagout (General Industry); 29 CFR 1926.21 Safety Training and Education

