Machine Operator Crushed to Death After Falling Into a Plastic Pellet Blender

SUMMARY

On February 28, 1992, a 28 year-old male machine operator was crushed to death after he fell into a large blending machine that mixed plastic pellets. The incident occurred as the victim was apparently walking near the edge of the open blender when he slipped and fell into the operating machine. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, these safety guidelines should be followed:

- ***Employers should develop and implement a comprehensive employee training program that requires training and certification in the safe operation of industrial machinery.***
- ***Employers should perform periodic safety inspections of all machines and work stations to insure that safety interlocks and railings are in place and in good working order.***
- ***Employers should eliminate slip hazards by insuring that work areas are kept free of debris. Employees should maintain all personal protective equipment, including work shoes, in good condition.***
- ***Employers should consider the use of engineering controls for controlling safety hazards in the workplace.***
- ***Employers should develop and implement an emergency response plan.***

INTRODUCTION

On March 5, 1992, NJDOH FACE personnel were informed by an area OSHA compliance officer of a work-related fatal fall that had occurred the week before. FACE personnel contacted the employer and arranged an on-site investigation of the incident which was conducted on March 13, 1992. The site investigation included interviewing the employer representative, photographing the scene, and taking witness statements. Additional information was obtained from the OSHA case file, police report, and medical examiner's report.

The employer was a manufacturer of injection and vacuum formed plastic containers who has been in business for 71 years and employed 151 workers. The company also employed a safety officer and had a brief written safety program. The victim was a 28 year-old machine operator who had worked for the company for about one year. He was hired as a machine operator and had been trained on two different types of plastic pellet blenders, a railroad blender and a ribbon blender. After working for nearly a year on the railroad blender, the victim had been transferred to the ribbon blender where he had been working for about two weeks. The victim did not receive any retraining on the ribbon blender after the transfer.

INVESTIGATION

The incident occurred in the resin department of the factory where different types of plastic pellets are dry mixed in a ribbon blender. The ribbon blender is a large machine measuring roughly 15 feet long by 4 feet wide by 8 feet deep with a 10,000 pound loading capacity. The top of the blender is equipped with two large steel covers (see figure 1). The left cover is designed to remain open for loading the machine and has a steel grate to guard the opening into the blender. The larger right cover remains closed and is equipped with an electrical safety interlock switch which prevents the mixer from operating with the cover open. Near the top of the blender is an elevated work platform which is surrounded by guard rails except on the side facing the blender. In this operation, large boxes of plastic pellets are loaded onto a hydraulic lift and raised to the edge of the blender where they are tipped into the machine. Smaller loads of pellets may be added to the mix by hand, either by dumping directly through the grate into the blender or through a hatch in the right cover. A large rotating auger in the blender dry mixes the pellets.

On the day of the incident, the victim and his co-worker began work at 7 a.m. as usual. The victim started work on the ground, loading boxes of plastic pellets onto the lift while his co-worker worked on the elevated platform to supervise the dumping of the pellets into the blender. The doors that covered the blender were both open and the machine was turned off while the plastic pellets were dumped in. Work continued normally through the morning and after lunch the two workers switched places, with the victim working on the platform. At about 4 p.m., the victim spoke with his wife (also an employee) for a short time and climbed back up the ladder to the platform. After removing a plastic liner from one of the empty boxes of plastic, the victim was last seen moving near the edge of the operating blender when he disappeared from sight. The co-worker states he next saw the victim's feet up in the machine.

The co-worker climbed up onto the platform to stop the blender. He then went to a second worker for help, who in turn informed a supervisor who radioed for help on a portable radio. Hearing the radio call, several employees went to the blender. After making sure the power was disconnected, one of the employees opened a hatch to empty the machine while the others started digging in the pellets to find the victim. He was found at the bottom of the blender, underneath an auger blade. The employees were able to quickly remove the victim and started cardio-pulmonary resuscitation (CPR), but did not begin chest compressions due to the severe nature of the victim's injuries. The police and Emergency Medical Service arrived and, after examining the victim, requested that the medical examiner come to the scene. The victim was pronounced dead at the scene by the medical examiner.

An investigation by OSHA found that the safety interlock switch that prevents operation of the blender with the right cover door open was inoperative. The co-worker stated that it was procedure to leave the covers open on the blender and to shut down the machine while it was being loaded. Photographs of the scene show small amounts of plastic pellets spilled on the work platform.

CAUSE OF DEATH

The county medical examiner attributed the cause of death to laceration of multiple internal organs and fractures. The medical examiner noted that the victim's boots were worn flat and smooth.

RECOMMENDATIONS AND DISCUSSION

Recommendation #1: Employers should develop and implement a comprehensive employee safety program that includes retraining and certification in the safe operation of industrial machinery.

Discussion: Although the worker had been previously trained on the ribbon blender, he had been working at another machine for nearly a year. When he was transferred back to this blender, he did not receive any retraining in its operation. It is recommended that a written safety program be developed that includes workers to be trained and certified by a supervisor in the safe operation of the machine before being allowed to use the equipment on their own. Recertification should be required if a worker has not operated the equipment for a period of time. Training should include standard operating procedures and safety practices unique to each piece of equipment.

Recommendation #2: Employers should perform periodic safety inspections of all machines and work stations to insure that safety interlocks and railings are in place and in good working order.

Discussion: In this case, a broken electrical safety interlock switch allowed the blender to operate with the right cover open. In addition, guard rails were not present which may have prevented a fall into an open blender. It is recommended that the employer conduct periodic safety inspections of all machines and work areas to insure that the proper safety devices are in place and in good working order. Preventative maintenance of the machine and it's safety devices should also be done periodically to prevent equipment breakdowns. Employees should also be instructed to notify their supervisors if safety devices are missing or malfunctioning.

Recommendation #3: Employers should eliminate slip hazards by insuring that work areas are kept free of debris. Employees should maintain all personal protective equipment, including work shoes, in good condition.

Discussion: Photographs of the incident scene show some accumulation of plastic pellets on the work platform near the edge of the blender. It was also noted that the soles of the victim's shoes were worn flat and smooth, factors that can create a serious slipping hazard. Although it is not known if these were factors in the incident, it is recommended that all work areas should be kept clear of plastic pellets and other debris and that work shoes should be replaced when the tread becomes worn. Proper housekeeping is required under the OSHA standard 29 CFR 1910.22(a).

Recommendation #4: Employers should consider the use of engineering controls for controlling safety hazards in the workplace.

Discussion: Many safety hazards can be reduced through the use of engineering controls installed on the machinery. While writing this report, several types of engineering controls have been suggested for the ribbon blender which could be applied to other similar types of equipment. These include:

a) Extending the steel grating to cover the entire top of the blender. This will prevent a person from falling into the machine even if the cover was raised. The grating should have a close enough mesh to prevent a person's limbs from passing through the grating.

b) Redesigning the elevated work platform to prevent plastic pellets from collecting on the surface and creating a slip hazard. A detailed example of this is included in figure 2 of this report.

c) Install an emergency stop switch that would automatically stop the blender. An example would be to install a pull cord made of aircraft cable across the opening of the blender. A falling person would hit or pull the cord, activating a safety switch which would de-energize and stop the machine. This system would provide a redundant system to the existing cover interlocks.

Recommendation #5: Employers should develop and implement an emergency response plan.

Discussion: In this case, a witness statement indicates that there may have been some confusion by the co-worker in reporting the incident to his superiors. To prevent this, it is recommended that the employer develop and implement a response plan for reporting emergencies and train the employees on how to use it. This plan should provide an easy and rapid means for employees to report a problem, such as a emergency telephone or intercom system.

REFERENCES

Code of Federal Regulations 29 CFR 1910, 1991 edition. US Government Printing Office, Office of the Federal Register, Washington DC, Pg 97.

To contact New Jersey State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.