



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Maintenance Man Dies After Being Drawn Into 17½-Inch-Diameter Positive Pressure Intake Pipe—Virginia

FACE 9239

SUMMARY

A 38-year-old male maintenance worker (the victim) died after being drawn into a 17½-inch-diameter positive-pressure vacuum pipe at a paper processing plant. The victim and two co-workers were attempting to replace a blower on a vacuum line with a pressure of 3,740 pounds per square inch (psi). The vacuum line transported wood chips 300 yards from the milling process into the paper plant. The blower was located 10 feet above the ground at the outside wall of the plant, and was accessed by a 2-feet-wide steel-grate catwalk fastened to the outside wall of the plant. The crew on the previous shift had prepared the replacement blower for installation and moved it to the worksite. When the victim and his co-workers arrived at the site they were instructed to remove the faulty blower and install the replacement blower. After the men unbolted both the 10-inch pipe that fed wood chips to the blower from the milling process, and the 17½-inch pipe that led from the discharge end of the blower, the faulty blower was lifted out of position by a small crane. The victim attempted to walk past the unguarded 17½-inch pipe when the vacuum suction pulled his chest against it. He called to his co-workers for help and both men grabbed him and tried to pull him away from the pipe; however, the victim was doubled over backwards and pulled 38 feet through the pipe by the vacuum until he was stopped by the intake shroud of the next blower on the vacuum line. NIOSH investigators concluded that, to prevent future similar occurrences, employers should:

- **develop comprehensive, written task-specific hazardous energy control procedures for each phase of a maintenance process that may result in worker exposure to hazardous energy, and train all workers that perform maintenance in these hazardous energy control procedures**
- **conduct a job-site survey to identify potential hazard hazards and implement appropriate control measures for these hazards**
- **encourage dialogue and discussion among rotating shift workers performing the same task so that all workers are familiar with the status of the work being performed**
- **designate a competent person to conduct periodic safety inspections.**

INTRODUCTION

On August 30, 1992, a 38-year-old male maintenance worker (the victim) died after being after being drawn into a 17½-inch (internal diameter) line under 3,740 psi of vacuum pressure. On September 14, 1992, officials of the Virginia Occupational Safety and Health Administration (VAOSHA) notified the Division of Safety Research (DSR) of this fatality,

and requested technical assistance. On September 23, 1992 a DSR safety specialist conducted an investigation of the incident. The incident was reviewed with the VAOSHA Compliance Officer and the county coroner's and sheriff's office. Photographs of the scene immediately following the incident were reviewed during the investigation.

The employer in this incident was a paper processing plant that had been in operation for 20 years and employed 260 workers, including 17 maintenance workers. The employer had a written safety program and safety policy. The personnel director managed the company's safety functions as a collateral duty. The employer had a joint labor/management safety committee that conducted periodic safety meetings. Although written general lockout/tagout procedures existed, machine- or operation-specific procedures did not. This was the employer's fourth fatality.

INVESTIGATION

A milling operation that processed logs into wood chips, to be used in the paper manufacturing process, was located 300 yards from the paper processing plant. The chips were conveyed to the plant through a 10-inch inner diameter (ID) vacuum line that was pressurized at 3,740 psi. A blower located at the outside wall of the plant was malfunctioning and plant management decided to replace it. The blower was located on a platform approximately 10 feet above ground and was accessed by a 2-foot-wide steel-grate walkway attached to the outer plant wall.

The Sunday afternoon shift (4 p.m. to 12 a.m.) crew prepared the replacement blower for installation and transported it to the worksite. This was accomplished by 7 p.m., and the victim and two co-workers, who had worked the Saturday midnight shift (12 a.m. to 8 a.m.), were called to the plant and instructed by the shift supervisor to replace the malfunctioning blower.

The workers removed the bolts from the 10-inch line on the incoming side of the blower, then removed the bolts from the outgoing 17½-inch ID line that led into the plant. The blower was lifted from the platform using a small crane.

The workers began to prepare the area for the replacement blower. As the two co-workers gathered the bolts and placed them in a bucket, the victim walked (facing the plant wall) in front of the 17½-inch open pipe. His chest was immediately pulled against the pipe opening and he yelled to his co-workers for help. Both co-workers tried to pull the victim away from the pipe; however, the force of the vacuum doubled him over backwards and pulled him into the pipe. His body was pulled through the pipe for approximately 38 feet before his path was blocked by the intake shroud of the next blower on the vacuum line. The entire vacuum line was shut down and the body was removed from the line approximately 1 hour after the incident occurred. The victim was pronounced dead at the scene by the county coroner.

CAUSE OF DEATH

The coroner listed the cause of death as massive trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should develop comprehensive, written task-specific hazardous energy control procedures for each phase of a maintenance procedure that may result in worker exposure to hazardous energy, and train all workers that perform maintenance in these hazardous energy control procedures.

Discussion: In this incident, general written lockout/tagout procedures existed; however specific procedures for maintenance of machines used in the different types of plant operations did not. Procedures clearly detailing the steps to be taken to isolate potential hazardous energy associated with each type of machinery should be developed and implemented as specified in 29 CFR 1910.147. This would help to eliminate worker confusion when working on different types of machinery. Once task-specific hazardous energy control procedures are developed and implemented, all workers who might perform maintenance in an environment where such measures would be necessary, should be trained to employ the proper hazardous energy control procedures for the task to which they have been assigned. Workers should be retrained periodically, and applicable hazardous energy control measures should be reviewed before the start of each job.

Recommendation #2: Employers should conduct a jobsite survey to identify potential hazards and implement appropriate control measures for these hazards.

Discussion: Prior to beginning any work, employers should ensure that a competent¹ person evaluates the worksite to determine work priorities and the methods to be used to accomplish this work in a safe manner. In this incident, the workers were instructed to replace the blowers, although the line, which remained operational, contained 3,740 psi of vacuum pressure. A pre-worksitesite evaluation might have identified the hazard associated with the vacuum in the 17½-inch line. Once identified, the high-pressure vacuum hazard could have been isolated from the workers by shutting down the vacuum line or otherwise totally isolating the vacuum from the workers by locking and tagging out all sources of energy.

Recommendation #3: Employers should encourage dialogue and discussion among rotating shift workers performing the same task so that all workers are familiar with the status of the work being performed.

Discussion: Oncoming and offgoing shift workers and supervisors performing the same task should discuss the status of the work being performed prior to the oncoming shift beginning work. During shift rotation, potential hazards or other encountered problems could be discussed. In this incident it is not known whether the men installing the blower realized the hazard presented by the vacuum in the 17½-inch line, or if the vacuum even existed at that point. A pre-work discussion detailing the exact status of the task being performed would aid oncoming workers in identifying the potential hazards to which they might be exposed so that control measures can be implemented.

Recommendation #4: Employers should designate a qualified person to conduct periodic safety inspections.

Discussion: To ensure that workers, particularly new employees, are performing their assigned tasks in the safest possible manner, scheduled and unscheduled safety inspections should be conducted at job sites by qualified personnel. Any potential hazards or improper work practices which are identified should be immediately corrected. Such inspections demonstrate to workers that their employer is committed to the prevention of occupational injury.

¹ Competent person – one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

REFERENCES

29 CFR 1910.147, Code of Federal Regulations, Office of the Federal Register, Washington, D.C.

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