

FACE INVESTIGATION

SUBJECT: Machinist Fatally Injured from Being Pinned in Vertical Lathe

SUMMARY:

A 61-year-old male machinist (the victim) died after his clothing was caught by a clamp on the revolving turntable of a vertical lathe, and he was pinned against the machine parts. The 64" diameter turntable held a ring of steel stock secured to the table by six holding clamps. A cutting arm tool on the machine was used to bore the interior of the ring stock, producing metal turnings and filings that accumulated on the turntable and on the floor near the machine. A metal barrier guard shielded about two-thirds of the open side turntable from worker contact, and deflected the metal turnings and filings. At the time of the incident, the victim was wearing gloves while standing next to the unguarded section of the turntable. The incident was unwitnessed, but apparently the victim either reached over the revolving table or fell onto it. His glove was caught by a clamp, and his body was pulled against the opening between the lathe housing and the cutting arm. A co-worker heard a sound, saw the victim pinned in the machine, and went to the shop office to call emergency medical services (EMS). A second co-worker went to the machine and turned off the power, stopping the machine. By this time, the victim had fallen back onto the shop floor. EMS responders and police arrived within several minutes. The victim was pronounced dead at the scene. The FACE investigator concluded that, to prevent similar incidents, employers should:

- ! ensure that revolving machine parts are sufficiently guarded**
- ! review, revise where applicable, and enforce safety programs that include job-specific procedures for working with guarded machine parts and for shutting off and locking out machines before cleaning or maintenance.**
- ! conduct scheduled and unscheduled worksite safety inspections, which should include observations of employees' work practices.**
- ! develop policies and training programs that address the use of emergency shutoff devices for all workers who work near hazardous machines.**

In addition, employers of workers who are not fluent in English should:

- ! ensure that all workers receive initial and ongoing instructions on safe work practices in a manner that is clear, complete, and understandable to the employee.**

INTRODUCTION:

On March 29, 1995, a 61-year-old male master machinist died after being drawn into a vertical metal lathe. The Wisconsin FACE field investigator was notified by the Wisconsin Department of Industry, Labor and Human Relations, Workers Compensation Division, on March 31, 1995. On August 28, 1995, the field investigator visited the incident site and met with a company representative. The FACE investigator also obtained the death certificate and reports from OSHA, the medical examiner, police, and Workers' Compensation.

The employer was a machine shop that produced custom machining of large pieces of steel. The company had been in business about 22 years, with eight employees. This incident was the first fatality the company had experienced. The company owner was the designated safety director, with some safety duties delegated to the shop supervisor. Before new employees began their job duties, the company owner would explain a written list of general company safety rules and ask the employee to review and sign the list. The rules included requesting supervisor's approval to wear gloves while operating machinery, to always make sure any rotating part had completely stopped before reaching near it, never to reach through or behind any guard while a machine was running, and to shut down a machine before cleaning, oiling or adjusting it.

The company had an apprenticeship program for new machinists, and provided on-the-job training for experienced workers hired as machinists. The company owner demonstrated safe machine operating procedures for the employees, and observed employees each time a machine or procedure is initially used in this shop. When additional equipment was brought into the machine shop, the company provided training for all employees who were assigned to use the machine.

The victim received training as an engineer and mechanic in Russia, immigrated to the United States four years ago, and was hired by the company soon after arriving in the U.S. He did not speak or read the English language at the time he was hired. As a result, the company used a Russian interpreter to translate the written and verbal instructions regarding company policies, procedures and safe machine operation. The victim acknowledged receipt of this instruction through his signature on the training documents, with the witness' signature of the interpreter. While the victim was in America, he had learned some English and could participate in simple conversations with his co-workers during work and break times. Additional training after the time of hire was primarily done through demonstration and simple explanations in English.

INVESTIGATION:

The company shop area was on the ground level, with a glass-enclosed office area in a second-floor loft in one corner of the building. The rectangular shop was arranged with drill presses, boring mills, and vertical lathes near the shop walls, and stock and storage units in the center of the shop area.

Three months before the incident, the company had purchased a used vertical turret lathe manufactured in 1928. The lathe was electrically powered and driven by a belt and gear. An electronic emergency switch, 24 inches from the side edge of the turntable, was used to turn the entire machine off. It was accessible to the machine operator or other workers without reaching over, under or through any moving machine parts: it was red-colored to distinguish it as a safety device. A 64" diameter turntable revolved 25 times per minute. The top surface of the turntable was 36 inches from the floor, and was shielded by a 33 ½ inch high metal barrier guard. The barrier guard extended around the front half of the turntable. It consisted of two sections that could be freestanding and individually positioned. When the lathe was in use, the turntable held a ring of steel stock secured to the table by six holding clamps that projected about 8 inches above the surface of the turntable. A cutting tool was mounted on an arm above and to the right of the turntable, and could be adjusted by the machine operator to do specified cuts on steel stock.

The victim helped the company owner install the lathe, received training in its operation from the owner, and had operated the machine since its installation. The machine required biannual maintenance, but the first service check was not due for several months. At this company, minor machine repairs and adjustments were usually made by the machine operator without notifying the supervisor, unless additional followup was required. There were no reports of repairs or other adjustments to the machine after the initial installation process.

While the machine was in operation, the cutting tool would bore the interior of the ring stock to the pre-set specifications without further intervention by the operator. This process produced metal turnings and filings which were deflected by the metal barrier guard, and accumulated on the turntable and floor near the machine. There were no specific written company policies about the removal of turnings and filings. However, machine operators usually wore gloves while cleaning the turntable and used a broom and shovel to clean the floor after a job was completed.

On the day of the incident, the victim and four co-workers began work in the shop at 7:30 A.M., while the shop owner, office manager and shop supervisor worked in the office. The victim worked at the vertical lathe, cutting a steel ring until about 2:10 P.M. Although the event was unwitnessed, it appears that he removed one section of the metal barrier guard that shielded the front of the turntable. It was found near the storage bin, leaving an opening of approximately 36 inches next to the control levers and button. The victim was wearing a long-sleeved shirt and work gloves as he operated the machine. He apparently either reached over the revolving table to sweep away turnings and filings or slipped and fell onto it. His glove was caught by a clamp. He was pulled by the rotating turntable against the 10 x 14-inch opening between the lathe housing and the cutting arm (Figure 1). At the time of the incident, a co-worker was working at a machine about 7 feet from the victim. Hearing a sound, the co-worker turned and saw the victim pinned in the machine. He went to the stairs leading up to the shop office (about 15 feet from where the co-worker was working) and shouted to the staff to call emergency medical services. A second co-worker then went to the machine and turned off the power, thereby stopping the machine. By that time, the victim had fallen to the floor, with his right hand amputated and deep lacerations across his left upper arm and back. EMS responders and police arrived within several minutes. Investigators found the victim's heart and portions of his spleen near the back of the turntable. He was pronounced dead at the scene, and an autopsy was done.

CAUSE OF DEATH: The medical examiner listed the cause of death as multiple traumatic injuries as the result of an industrial accident.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: **Employers should ensure that revolving machine parts are sufficiently guarded.**

Discussion: The machine operator and other employees in the machine area were exposed to hazards created by the inadequately guarded rotating turntable on the vertical lathe. A 3-foot section of the barrier guard had

been removed, and the victim was standing next to the rotating turntable near the cutting tool arm while operating the lathe. The installation of a tamper resistant safety switch on the barrier could have prevented the incident by causing the machine operation to cease if the continuity of the barrier was interrupted. The turntable was 36 inches high with holding clamps and steel stock projecting about 8 inches above the tabletop, while the barrier guard was only 33 ½ inches high. The barrier guard should be high enough to prevent workers from contacting the rotating turntable. Requirements in OSHA standard 29CFR 1910.212 (a) state that one or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as rotating parts and flying chips.

Note: The employer in this incident has installed a mounted barrier guard that is 42 inches high and surrounds the exposed edge of the turntable.

Recommendation #2: Employers should review, revise where applicable, and enforce safety programs that include job-specific procedures for working with guarded machine parts and for shutting off and locking out machines before cleaning or maintenance.

Discussion: Although the company had written safety rules for working in the machine shop, these rules lacked directions about removal of machine guards, and were not specific for operating, cleaning and maintaining the vertical lathe. At the time of the incident, the victim was operating the lathe with a section of the guard removed. Although the incident was unwitnessed, he may have been cleaning turnings and filings from the rotating turntable. Safety programs should be periodically reviewed and revised, as necessary, to identify and reduce or eliminate worker exposures to hazardous situations. The safety program should include specific procedures to ensure rotating turntables are turned off when guards are not in place, or when machines are being cleaned, maintained or repaired.

Recommendation #3: Employers should conduct scheduled and unscheduled worksite safety inspections, which should include observation of employees' work practices.

Discussion: Scheduled and unscheduled worksite inspections should be conducted by a competent person¹ to ensure that work sites are free from hazardous conditions. A safety program cannot be effective unless implemented in the workplace. The inspections show the employer's commitment to the enforcement of the safety program and to the prevention of occupational injury. In this incident, an inspection might have revealed the missing machine guard and the victim's use of gloves while operating hazardous machinery.

Recommendation #4: Employers should develop policies and training programs that address the use of emergency shutoff devices for all workers who work near hazardous machines.

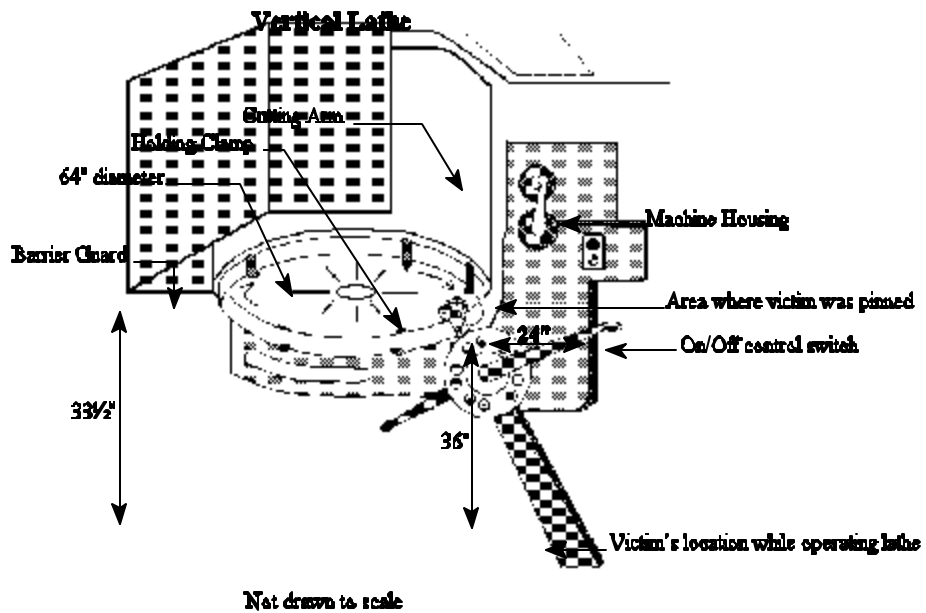
Discussion: The machine involved in this incident was equipped with an emergency shutoff button located about 24 inches from the machine operator's work position. At the time of the incident, one co-worker ran to the shop office to call for emergency help and a second co-worker (responding to the call) went to the machine and pushed the emergency button, shutting off the machine. Workers who might be exposed to hazardous machine parts should be trained in emergency shutoff procedures.

Recommendation # 5: In addition, employers of workers who are not fluent in English should ensure that all workers receive initial and continuing instructions on safe work practices in a manner that is clear, complete, and understandable to the employee.

Discussion: Employees who are placed in situations that may present hazards to their health and safety need information and resources on recognition and avoidance of dangerous conditions. If the worker is not fluent in written and/or spoken English, the employer must ensure that the information is presented in another manner that is easily understood. This could be done by using verbal and written translations, audiovisual recordings in the worker's primary language, and/or bilingual signs. In this case, the company provided a Russian-English interpreter for the victim when he was hired four years before the incident. Companies could ensure that speakers of foreign-languages continue to receive clear and complete safety instructions by using the resources available from literacy councils, workplace literacy programs offered by schools and colleges, and community social service organizations.

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.

Figure 1



REFERENCES

29CFR 1910.212 (a) Code of Federal Regulations, U.S. Government Printing Office, Office of the Federal Register.