

Kentucky Injury Prevention and Research Center
Bona fide agent for Kentucky Department for Public Health
333 Waller Avenue, Suite 242 • Lexington, KY 40504 • 859-257-5839

REPORT#: 21KY002

REPORT DATE: 7/14/2021

INCIDENT HIGHLIGHTS



DATE:

February 17, 2021



TIME:

6:50 AM



VICTIM:

Age: 52

Sex: Male

Occupation: Lathe Operator



INDUSTRY/NAICS CODE:

Manufacturing / 332710



EMPLOYER:

Mid-level Manufacturing
Facility



SAFETY & TRAINING:

No formal safety training
program



SCENE:

Machine Shop



LOCATION:

Kentucky

EVENT TYPE:

Caught in or between



Machinist Dies after Being Pulled into Manual Lathe

SUMMARY

On Wednesday, February 17, 2021, a 52-year-old machinist was preparing to spot drill the center diameter a large piece of round steel in a manual lathe. The victim attempted to grab an item from the top of the lathe at the rear of the machine while the lathe was in operation and the steel rod was spinning. While doing so, the sleeve of his shirt became entangled on a clamping device on the rear of the lathe, pulling him into the motor of the machine, and causing fatal injuries.

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CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Lack of machine guarding
- Loose fit clothing
- Lack of hazard awareness

[LEARN MORE>](#) (p.6)

RECOMMENDATIONS

Kentucky FACE investigators concluded that, to help prevent similar occurrences, employers should:

- Fabricate or purchase guarding and affix to machines to protect operators from all rotating components.
- Mark “No entry areas” clearly and provide applicable training.
- Prohibit machine operators from wearing loose fit clothing while operating lathes.
- Consider implementing a job hazard analysis procedure.
- Provide hazard awareness training to employees regularly.



KENTUCKY

State **FACE** Program

Fatality Assessment & Control Evaluation

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Fatality Assessment and Control Evaluation (FACE) Program

This case report was developed to draw the attention of employers and employees to a serious safety hazard and is based on preliminary data only. This publication does not represent final determinations regarding the nature of the incident, cause of the injury, or fault of employer, employee, or any party involved.

This Case report was developed by the Kentucky Fatality Assessment and Control Evaluation (FACE) Program. Kentucky FACE is a NIOSH-funded occupational fatality surveillance program with the goal of preventing fatal work injuries by studying the worker, the work environment, and the role of management, engineering, and behavioral changes in preventing future injuries. The FACE program is located in the Kentucky Injury Prevention and Research Center (KIPRC). KIPRC is a bona fide agent for the Kentucky Department for Public Health.

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Website: <https://kiprc.uky.edu/programs/fatality-assessment-and-control-evaluation-face>



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INTRODUCTION

On Wednesday, February 17, 2021, a 52-year-old machinist (victim) was preparing to spot drill the center diameter a 103-inch-long piece of round steel material. Due to the length of the material, 24 inches were sticking out the back of the lathe, unguarded, and held in place with a clamping device that rotates as the lathe rotates. While the lathe was in operation and the steel rod was spinning, the operator attempted to reach to the top of the rear of the machine, allowing his clothing to contact the rotating clamping device of the lathe. The victim was pulled between the lathe motor and the rotating steel that was being machined, which resulted in the injuries that led to his death.

EMPLOYERS

The employer is a mid-level manufacturing company founded in 1982 and has a total workforce of 40. The company specializes in the machining of blueprinted steel parts for multiple industries, including automotive drivetrain parts, diesel engine components, industrial air handling components, truck chassis components and blasting components for quarry and strip mining.

WRITTEN SAFETY PROGRAMS and TRAINING

A company representative stated that new employees receive on-the-job training that is specific to the type of machine the employee will be responsible for operating. The duration of training is dependent on several factors, including experience, ability to comprehend instruction, and performance. During this training period, the new employee will work alongside a tenured employee for hands-on instruction. The tenured employee is responsible for the instruction of the new employee and monitors them until they feel that the new employee is ready to work on their own. A company representative stated new hires do complete required training on topics such as sexual harassment and bloodborne pathogens via a video-based platform; however, no formalized or documented training procedure is currently in place.

WORKER INFORMATION

The victim was a divorced 52-year-old male with one child. He held a high school diploma and had been employed with the company for one year. A detailed work history could not be obtained for the victim. A company representative stated that the victim had been self-employed for many years prior to joining the involved company and would perform odd jobs in the construction and farming industries.

INCIDENT SCENE

The incident occurred in one of the three buildings the owned and operated by the company. This particular building houses a variety of machines utilized for the manufacturing of steel parts, including several manual lathes (Photo 1). An overhead crane runs diagonal across much of the building and is used to lift large and heavy items on and off of the machines (Photo 2).

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Photo 1. Photo showing involved manual lathe and facility floor/layout in the background. Photo is property of KY FACE.

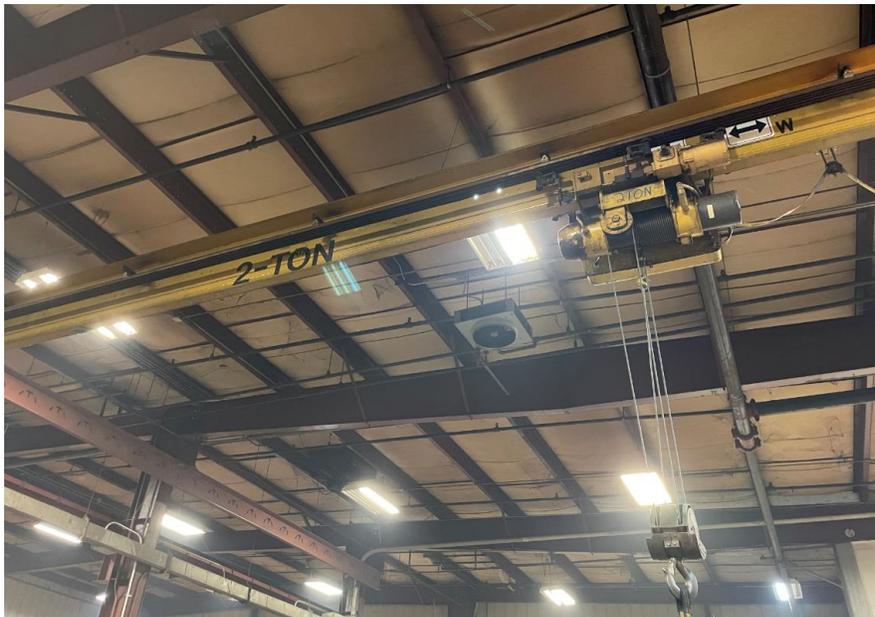


Photo 2. Photo showing overhead crane/hoist system located in the building. Photo is property of KY FACE.



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WEATHER

The temperature was approximately 9° F at the time of the incident. The humidity was 84% with a northeast wind at 7-mph and no precipitation. Weather was not determined to be a factor in the incident.¹

INVESTIGATION

On February 17, 2021, a 52-year-old machinist (victim) arrived at work and clocked in at 6:11 am. The operator typically worked first shift which ran between the hours of 6:00 am to 2:00 pm daily. The day the incident occurred, the victim was tasked with spot drilling the center diameter a 103-inch-long piece of round steel. He began working on this task shortly after arriving. The spot drill was a two-step process: the lathe operator was required to drill one end of the steel, remove the steel from the lathe via the overhead crane, reposition it in the lathe, and finish the spot drill on the other end of the steel.

According to a company contact, the spot drill had been completed on one end of the steel rod. The victim powered down the lathe, utilized the overhead hoist to lift and turn the part around, and placed the part back in the lathe to continue drilling. The victim secured the steel in the machine by utilizing the three-jaw chuck located on the front of the lathe spindle, and supported the material protruding out the rear of the lathe by using a clamping device that was attached at the rear of the lathe spindle and was unguarded. The steel rod protruded from the rear of the machine approximately 24 inches. The clamping device was an aftermarket addition (Photo 3), and uses four screw connections to hold the material in the center of the spindle to reduce rotational oscillations during the machining process. As the lathe rotated counterclockwise at 52 revolutions per min (RPM), the victim went to the rear of the lathe, extended his left arm as if he were attempting to retrieve an item from the top of the rear of the machine. Although no employees witnessed the incident, the event was captured on facility security cameras.

Based on the footage, a company representative speculates the victim was attempting to retrieve a glove that had previously been placed on top of the machine. As the victim extended his arm, his shirt sleeve contacted the clamping mechanism which pulled the victim into the lathe motor and rotating piece of steel. As the lathe continued to turn, the victim's body followed suit and rotated around the piece of steel forcing him to strike the motor of the lathe multiple times (Photo 5). An employee who was in the changing room heard the event unfold and ran out to investigate. After discovering the situation, the employee shut the machine down and called emergency services. Two employees worked to free the victim's tangled clothing from the lathe. Emergency medical services arrived at 7:01 am, 11 minutes after the incident occurred. The victim was reportedly partially conscious as he left the facility via ambulance. The victim was pronounced dead on arrival at a local emergency department. The site contact stated the video showed the victim rotating around the steel approximately twelve times.

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Photo 3. Photo showing the involved manual lathe. The steel rod protruded from the rear of the machine approximately 24 inches. The red line depicts how far the steel was protruding from the end of the lathe. Photo is property of KY FACE.



Photo 4. Photo showing similar piece of steel that was being machined when the incident occurred. Photo is property of KY FACE.

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Photo 5. The **red X** indicates the position of the victim when he attempted to reach on top of the machine. The **yellow X** indicates the location believed to be where the glove was located. The **purple X** represents the lathe motor which the victim struck multiple times after becoming entangled. The **orange circle** is highlighting the chuck which caught the victim's clothing. Photo is property of KY FACE.

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CAUSE OF DEATH

According to the death certificate, the cause of death was traumatic blunt force injuries.

CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Kentucky FACE investigators identified the following unrecognized hazards as key contributing factors in this incident:

- Lack of machine guarding
- Loose fit clothing
- Lack of hazard awareness

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should fabricate or purchase guarding and affix to machines to protect operators.

Discussion: According to a company representative, the manual lathe that the victim was utilizing was manufactured in the early 1950's. The company believes the machine never had any type of guarding, as it was less common in the past. OSHA addresses machine guarding in 1910.212 – general requirements for all machines:²

[1910.212\(a\)\(1\)](#) *Types of guarding.* 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 those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are barrier guards, two-hand tripping devices, electronic safety devices, etc.

[1910.212\(a\)\(2\)](#) *General requirements for machine guards.* Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

[1910.212\(a\)\(3\)\(i\)](#) *Point of operation guarding.* Point of operation is the area on a machine where work is actually performed upon the material being processed.

[1910.212\(a\)\(3\)\(ii\)](#) The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any appropriate standards therefor, or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

[1910.212\(a\)\(3\)\(iii\)](#) Special hand tools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding required by this section but can only be used to supplement protection provided.

[1910.212](#) General Requirements (OSHA, 2021).

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Although retrofitting aftermarket guarding can be difficult, OSHA stated in a letter of interpretation that the agency encourages the development of safety devices that will eliminate hazard exposure to employees. The company should purchase aftermarket guards for all unprotected machinery or fabricate their own guards for both the front and rear of each machine and have them tested by a nationally recognized testing laboratory.



Photo 6, 7, 8 & 9. Examples of aftermarket guarding systems on similar machines.⁴ Photos obtained from <https://www.eputec.de/en/safety-guards/safety-guards-for-lathes/>

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Recommendation #2: Employers should mark "No entry areas" clearly and provide applicable training.

Discussion: OSHA addresses work area control in standard 1926.1424, the below sections are applicable to the lathe involved in this incident:

926.1424(a)(1)

The requirements in paragraph (a)(2) of this section apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

1926.1424(a)(1)(i)

Striking and injuring an employee; or

1926.1424(a)(1)(ii)

Pinching/crushing an employee against another part of the equipment or another object.

[1926.1424\(a\)\(2\)](#)

To prevent employees from entering these hazard areas, the employer must:

1926.1424(a)(2)(i)

Train each employee assigned to work on or near the equipment ("authorized personnel") in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.

1926.1424(a)(2)(ii)

Erect and maintain control lines, warning lines, railings, or similar barriers to mark the boundaries of the hazard areas. *Exception:* When the employer can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as "Danger-- Swing/Crush Zone") and high visibility markings on the equipment that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

To reduce the likelihood of future occurrences, employers should mark applicable areas according to the OSHA standard and train employees appropriately on their application.

Recommendation #3: Employers should prohibit machine operators from wearing loose fit clothing when operating lathes.

Discussion: According to a company representative, the victim was wearing a long sleeve, loose fit shirt while operating the lathe. The shirt's sleeve became entangled in the clamping mechanism at the rear of the lathe when the victim was reaching on top of the machine. Wearing loose fit clothing can present a grave risk when operating machines with moving parts, such as a lathe. These risks may increase based on the season, weather, and temperature, as employees are more likely to utilize long sleeve jackets and shirts to stay warm. Other items such as long hair, beards, necklaces,



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and jewelry can also pose similar risk. As a best practice, employers should prohibit machine operators from wearing loose fit clothing when operating lathes.

Recommendation #4: Employers should perform a job hazard analysis.

Discussion: Implementing a job hazard analysis process can help employers identify safety hazards that may be present and unique to a particular worksite prior to performing a job. OSHA defines a Job Hazard Analysis (JHA) as “a technique that focuses on job task as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment.” A properly executed JHA of the worksite would have exposed both known hazards and hazards that are likely or could be present in the future⁵. It is probable that the lack of proper guarding and the need to prohibit loose fit clothing would have been identified as potential hazards. A JHA would allow the company to analyze these risks, proactively develop a procedure for addressing the risk, ensure employees have the proper personal protective equipment, and allow for adequate training of employees prior to placing them in a risky environment. A JHA can be specific to a particular site as well, not just a task. Often times, a new work site, new machine or the manufacturing of a new part can expose new risk which may be unique. Performing a JHA anytime employees are required to work in a new area, with a new machine or on a new part is essential to worker safety. A JHA may also surface the need for additional policy and procedures and allow them to be proactively implemented, prior to an incident occurring. To ensure employee safety, employers should perform a job hazard analysis on the task they require their employees to perform.

Recommendation #5: Employers should provide hazard awareness training to employees regularly.

Discussion: Incidents with lathes typically occur rapidly leaving the victim helpless and unable to act, which is why proper hazard awareness training is critical for workers who could potentially be exposed to the risk associated with operation of lathes. The victim had been employed with the company for one year. When hired, he received two weeks of on-the-job training from an experienced employee. According to the company, a large portion of this training included discussing the dangers associated with the operation of the machine. However, it is particularly important that hazard awareness training occur on regular basis. The training should be specific to the types of exposure the employee is likely to encounter. This training should include company specific policies and procedures that have been developed and aligns with the expectations the company has for the employee’s response to hazards. Each employee subject to being exposed to the hazard should receive training; the training should include a form of validation that the employees understand and should reoccur on a regular basis but at a minimum, once annually to combat complacency. The Kentucky Department of Workplace Standards, Division of Occupational Safety and Health Education and Training can often assist with the development of training or provide training at no cost in many situations. A training request can be submitted online by visiting <https://kysafe.ky.gov/programs/training/Pages/requested.aspx>.



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PROGRAM FUNDING

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REFERENCES

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- [4] Guarding Photos. Retrieved February 26, 2021 from <https://www.eputec.de/en/safety-guards/safety-guards-for-lathes/>
- [5] OSHA. Job Hazard Analysis. Retrieved December 1, 2020 from <https://www.osha.gov/Publications/osh3071.pdf>.

INVESTIGATOR INFORMATION

This investigation was conducted by Beau Mosley, Fatality Investigator, Fatality Assessment and Control Evaluation, Kentucky Injury Prevention and Research Center, University of Kentucky, College of Public Health.

ACKNOWLEDGEMENTS

The Kentucky FACE Program would like to thank the involved company for their assistance with completion of this report.

SURVEY

[Please click here](#) to take a brief, anonymous survey concerning this report. We appreciate any feedback you may have.