

Lathe

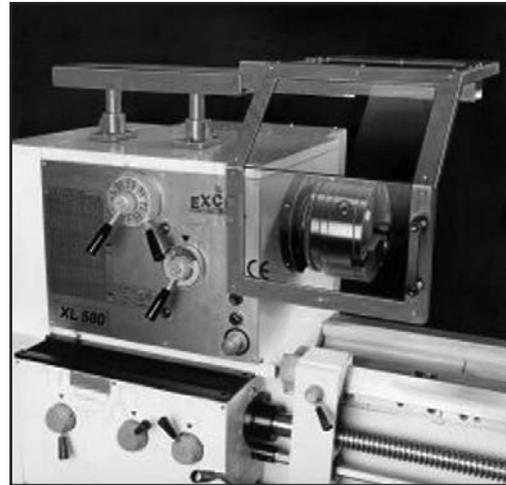
Metal

Wood

Metal lathe

A metal lathe is a precision turning machine that rotates a metal rod or irregular-shaped material while a tool cuts into the material at a preset position. Similar to the wood lathe, the metal lathe normally consists of a headstock and base that houses one or more spindles on which a work-holding device (chuck) can drive the stock and the cutting tools can remove metal, producing mainly cylindrical and conical shapes.

There are basically two main types of metal lathes: Lathes for shaft work (material supported at two or more locations) and lathes for bar (bar stock introduced through the spindle) or chucking work (individual pieces secured at the chuck). Shaft lathes include engine lathes, vertical-shaft lathes, and turning centers. Bar and chucking lathes include turret lathes (vertical and horizontal) and vertical boring mills.



RDM Industrial Services Ltd.

Hazard

Severe injuries and death can occur primarily from being caught in or struck by rotating parts. An operator can be pulled into the lathe from working perilously close (e.g., polishing a slotted shaft with emery cloth) and/or wearing gloves, loose clothing, hair, jewelry, etc. Trapping spaces are also created between the cutting tool, its mounting, and the work piece or chuck.

Projected parts or material such as chuck keys or unsecured work pieces can also strike nearby operators.

Flying chips and coolant also present hazards to the operator.



Hazardous exposures are present simply due to the operator's close proximity to the lathe's rotating parts.

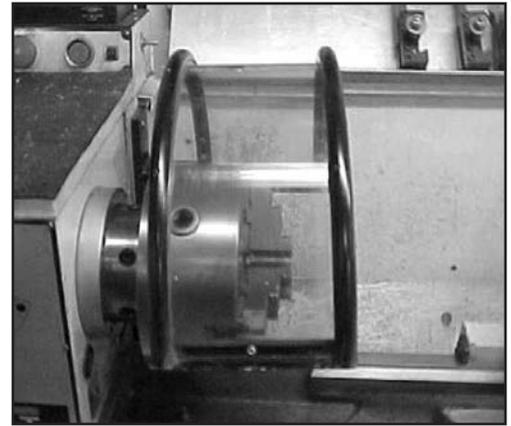
Solution

Avoid wearing gloves, loose clothing, long hair, jewelry, or other dangling objects near lathe operations. Pay close attention to work pieces that have keyway slots or other surface profiles that may increase the risk of entanglement. Assess the need to manually polish (e.g., emery cloth) rotating material. If necessary, consider milling keyways or other profiles after polishing or use emery cloth with the aid of a tool or backing boards. Always use a brush or tool to remove chips.

Cover work-holding devices (chucks) and tool trapping space hazards (especially in automatic or semiautomatic modes) with secured fixed or movable guards or shields. Vertical lathes and controlled turning centers are normally provided with fixed or interlocked guarding that prevents access during the automatic cycle.

Make sure all work pieces and work-holding devices are secure and free from defects. Remove the chuck key from the chuck after securing the material. A good rule is to never take your hand off the chuck key until you set it back onto a table. Consider using a spring-loaded wrench.

Provide a chip/coolant shield unless another guard or shield already provides protection. This does not replace the need for eye and face protection, however.



Chipmakers Metalworking World

NOTE: *Guards or shields used to protect lathe operators from projected parts must either be from the manufacturer or, if fabricated in-house, meet or exceed the same impact-resistance specifications as the original manufactured part. Various materials (such as polycarbonates) may possess different and less effective impact-resistance characteristics than the original materials used by the manufacturer.*

In one case, an operator was killed when the bell casting on a lathe came loose while the lathe was turning and was propelled through two, ½-inch-thick Plexiglas windows. The Plexiglas was installed as a replacement for the manufacturer’s original composite window on the machine’s door frame. The operator was fatally struck in the head and neck as he was looking through the window.

The manufacturer’s original observation window was made of a ¼-inch-thick laminated glass plate with a ½-inch-thick polycarbonate window, separated by an approximately ¼-inch air space. The original window was replaced with Plexiglas material that had a lower impact resistance than the polycarbonate shield originally supplied by the machine manufacturer.

Polycarbonates are a family of various polymers that includes Macrolux, Lexan, Relex, Replex, Dynaglass, Exolite, Verolite, Cyrolon, and Makrolon. These materials have different impact-resistance characteristics for different thicknesses and surface areas. It is important to note that increasing the thickness beyond a certain level does not always improve or increase the impact resistance. Furthermore, some studies have shown polycarbonate degrades due to age and prolonged contact with metalworking fluids and lubricants.

References

■ General Industry

- Oregon OSHA Division 2/Subdivision O 29 CFR 1910.212 — *General Requirements for All Machines*
- Oregon OSHA Program Directive A-236 “*Guarding: Metal Lathe Chucks (Engine Lathes)*” (April 4, 2000)
- OSHA Safety Hazard Information Bulletin 00-06-23 “*Potential Hazards Associated with the Use of Replacement Materials for Machine Guarding*” (June 23, 2000)
- HSE Engineering Information Sheet #33 “*CNC turning machines: Controlling risks from ejected parts*”
- HSE Engineering Information Sheet #2 “*Accidents at metalworking lathes using emery cloth*”
- ANSI B11.6 *Lathes - Safety Requirements for Construction, Care, and Use*

Wood lathe

While most tools rotate or move a blade or bit to cut, the wood lathe moves the work piece being cut. The wood lathe is used to turn stock into round objects by securing the stock between two centers: the headstock and tailstock (spindle turning), or by securing the work to the headstock only with a faceplate (facing). Spindle turning is used for long objects such as table and chair legs, while facing is used for cups, bowls, and plates.

The stock rotates rapidly while the operator applies a single-point tool to the wood. The operator holds the tool on a tool rest and advances it along the length of the tool rest to shape the stock as desired.



Delta Inc.

Hazard

Due to its unique operation — rotating the stock being cut — the lathe presents several concerns. The primary hazards arise when using a hand tool against the rotating stock, and, in the close proximity the operator has to the rotating parts.

Serious injuries can occur if the tool becomes caught between the rest and the rotating stock, bringing the operator's hands in with it. Also, hands, arms, clothing, hair, or jewelry may be caught on the rotating parts and pulled into the machine simply because of the close distance the operator is from the machine's components.

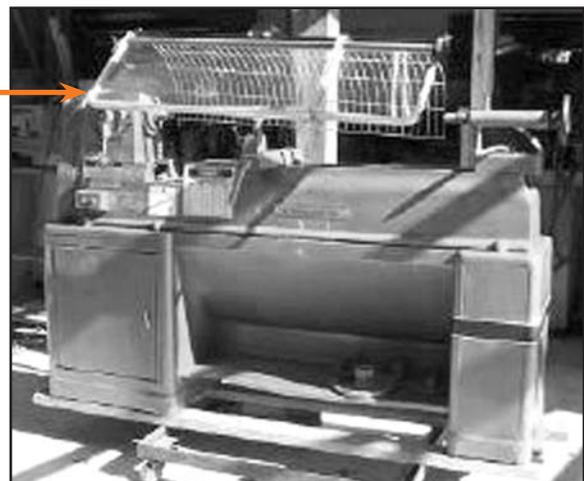


Projected or broken work pieces can be another hazard if not secured between the centers or if the work piece is defective. Furthermore, chuck keys can project if left in the chuck. Flying wood chips from the turning operation also can pose a hazard on wood lathes.

Solution

Cover all rotating parts and points of operation with shields.

Cover lathes used for turning long stock with long curved guards that extend over the top of the lathe. These shields, or guards, must protect the operator if the stock comes loose and is thrown from the machine.



Make sure the tool rest is secure and set close to the stock (1/8-inch). Rotate the stock by hand to make sure it clears the tool rest before turning the lathe on. Guide the turning tool on the rest only — do not attempt to support the tool with your hands.

The work piece must be secured and should be free of cracks, splits, knots, and other defects. Check for weak glue joints.

Remove chuck keys or adjusting wrenches. Develop the habit of never letting go of the chuck key or wrench when you are using it. Consider using a spring-loaded chuck wrench.

Check to make sure that the chuck is secured before turning the lathe on.

Never permit operators to wear loose clothing, long hair, jewelry, dangling objects, or gloves.

References

■ General Industry

Oregon OSHA Division 2/Subdivision O 29 CFR 1910.213(o)

■ ANSI 01.1 *Woodworking Machinery — Safety Requirements*



Make sure the tool rest is secure and set close to the stock.