

## Milling Machine – Horizontal & Vertical

Milling machines cut metal using a rotating cutting device called a milling cutter. These machines cut flat surfaces, angles, slots, grooves, shoulders, inclined surfaces, dovetails and recessed cuts. Cutters of different sizes and shapes are used in a wide variety of milling operations. Milling machines include knee-and-column machines, bed-type or manufacturing and those designed for special applications. These machines may have single or multiple spindle cutters and may be manually or automatically controlled

**Operator involvement:** After machine set up, the operator must select and install the milling cutter, load the piece on the milling table, direct the table movement to feed the part against the rotating milling cutter, and caliper or measure the part before unloading.

**Hazards:** Getting jewelry, long hair, work gloves or loose-fitting clothing entangled in the rotating cutter when loading or taking measurements; flying chips, oil, turnings from the rotating cutter

### Safeguarding:

Use a guard or guarding device (shield) when the rotating cutter teeth are exposed on a machine in the automatic or semiautomatic mode, or if the operator must be within 12 inches of the moving parts for any purpose (i.e., load, unload, clean, adjust). [29 CFR 1910.212](#)

Guard all power transmission apparatus such as belts and pulleys, any drive mechanism, etc. [29 CFR 1910.219](#)

Ensure that the milling machine has a start/stop button within easy reach of the operator.

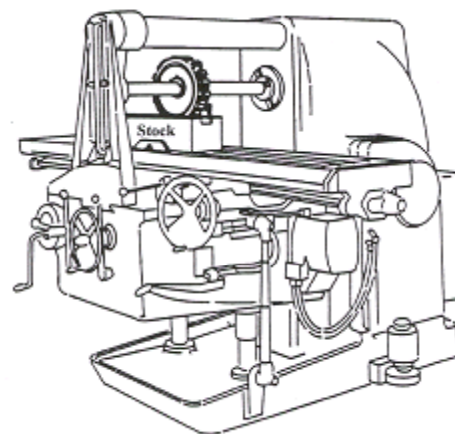
### Safer Work Practices

- ❖ Ensure that all operators receive appropriate on the job training by experienced operators until they can work safely on their own.
- ❖ Instruct operators to move the work holding device back to a safe distance when loading or unloading parts and calipering or measuring the work and not to perform these activities while the cutter is still rotating unless the cutter is adequately guarded.

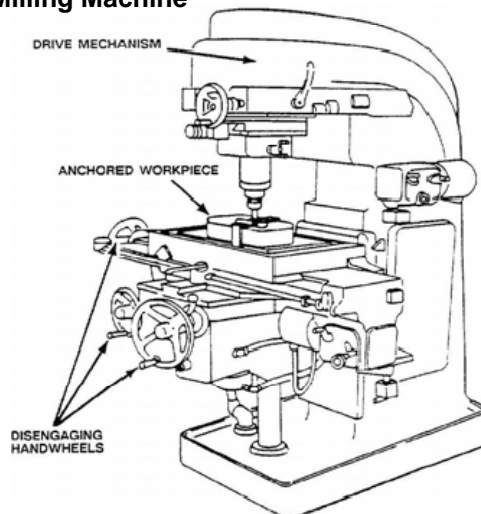
### Case Study

An employee was using a milling machine to cut metal samples to length. After a part had been cut, the employee needed to gauge the part size. While he was checking the edge of the sample, the blade caught the tip of his glove, pulled his hand into the cutting area, and amputated his right ring finger and part of his middle finger.

### Horizontal Milling Machine



### Vertical Milling Machine



**References:** [29 CFR 1910.212](#); [ANSI B11.8](#)



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## Milling Machines

- ❖ Prohibit operators from reaching around the cutter or hob to remove chips while the machine is in motion or not de-energized. Stop the machine before trying to -remove accumulated chips.
- ❖ Instruct operators to remove fines, turnings, or particles only with a vacuum, brush or rake while the cutter is stopped.
- ❖ NEVER remove chips with compressed air. The flying chips may injure you or a nearby person.
- ❖ Instruct operators to place the jib or vise locking arrangement so that force must be exerted away from the milling cutter.
- ❖ Instruct operators not to leave the cutter exposed after withdrawing work piece.
- ❖ Instruct operators to turn off the milling machine when:
  - not in use
  - left unattended for any period of time.
  - opening or removing guards and covers.
  - making adjustments
- ❖ Wear appropriate clothing (no loose sleeves, no jewelry) and approved safety glasses!
- ❖ Ensure that the work piece and cutter are mounted securely before taking a cut. Check that work is mounted squarely. Mount work in a vise that is bolted or held magnetically to the table. Use proper hand tools to make adjustments.
- ❖ Hold milling cutters with a cloth to avoid being cut when handling them.
- ❖ Move table as far as possible from cutter while setting up work to avoid injuring your hands.
- ❖ Keep hands, brushes and rags away from the revolving milling cutter.
- ❖ Change cutting compounds periodically.
- ❖ Keep cutters sharpened correctly and in good condition.
- ❖ Keep working surface clear of scraps, tools and materials. Keep floor around the milling machine free of oil and grease.
- ❖ Do not lean or rest hands on a moving table.
- ❖ Do not use paper shims to check the distance from the cutter to the stock.
- ❖ Do not move the operating levers without knowing what they control and what action is going to take place.
- ❖ Get help to move any heavy machine attachment, such as a vise, dividing head, rotary table or large work.

The number of accidents and the circumstances in which they occur show that most can be avoided by a knowledge of the risks and by adopting safety measures. The simple safety steps given will help to prevent most accidents. You may find them useful as a safety check list.