



**Berea College**  
Learning, labor, & service

# **Machine Guarding**

## Table of Contents

Responsibilities .....	3
Department Head & Supervisors .....	3
Employees & Student Laborers .....	3
Machine Guarding	
Definitions 29 CFR 1910.211 .....	4
General requirements for all machines 29 CFR 1910.212 .....	5
General Requirements .....	5
Woodworking machinery requirements.....	6
Machine construction general requirements .....	6
Machine controls and equipment .....	6
Hand-Fed rip saws.....	7
Hand-fed crosscut table saws .....	7
Circular resaws .....	7
Self-feed circular saws .....	8
Swing cutoff saws.....	8
Radial saws.....	8
Band saws and resaws .....	9
Tenoning machines .....	9
Boring and mortising machines .....	9
Wood shapers and similar equipment.....	9
Planing, molding, sticking and matching machines .....	9
Profile and swing-head lathes and wood heel turning machine .....	9
Sanding machines .....	9
Veneer cutters and wringers .....	9
Miscellaneous woodworking machines.....	9
Inspection and maintenance of woodworking machinery .....	9
Guarding of Abrasive wheel machinery.....	9
General requirements.....	9
Guarding of abrasive wheel machinery .....	9
Flanges .....	9
Mounting.....	9
Guarding of farm field equipment, farmstead equipment.....	9

BEREA COLLEGE  
MACHINE GUARDING PROGRAM

**PURPOSE:** It is the goal of Berea College to properly inform all employees of safety and health hazards existing in the work place as identified under 29 CFR 1910 Subpart O - Machine Guarding. The aim of Berea College is to take all reasonable safeguards to minimize risks for exposure to any hazard encountered in the workplace.

The Berea College employee work place safety program: Machine Guarding consists of the following sections - Definitions, General Requirements, Woodworking Machinery Requirements, Abrasive wheel machinery and Agricultural machine guarding requirements (Farm).

**RESPONSIBILITIES**

Department Head & Supervisors

1. Identify all machinery in which machine guarding is required.
2. Ensure compliance with this program by all personnel through daily monitoring of employees.
3. Ensure that all affected employees and student laborers are properly trained
4. Maintain files of all required training documentation as maybe required by Berea College or any other Federal or state agencies.
5. Conduct meetings with employees and students to assess safety hazards, discuss potential accident situations, and outline emergency situations.
6. Conduct routine inspections of equipment to determine problems and potential failures that may contribute to or cause an accident.

Employees & Student Laborers

1. Employees and Student laborers are responsible for attending all scheduled departmental training sessions and those provided by other agencies.
2. Employees and Student laborers are responsible for adhering to safety policies and procedures of their department and safe work policies and procedures of Berea College.

3. Employees and Student laborers are responsible for taking proper safety precautions as outlined within this policy.
4. Employees and student laborers are responsible for wearing proper protective equipment as specified and/or specified by their supervisor, department policy, and/or the Campus Policy.
5. Employees and student laborers are responsible for informing their direct supervisor of unsafe conditions or equipment

This section of the Berea College Machine Guarding program will deal only with definitions that are used through out the entire Berea College Machine Guarding programs.

DEFINITIONS: As defined by 29 CFR 1910.211

Authorized Person: Means one to whom the authority and responsibility to perform a specific assignment has been given by the employer.

Abrasive Wheel: means a cutting tool consisting of abrasive grains held together by organic or inorganic bonds. Diamond and reinforced wheels are included.

Automatic Feeding: means feeding wherein the material or part being processed is placed within or removed from the point of operation by a method or means not requiring action by an operator.

Guarded: Means shielded, fenced, or enclosed by covers, casings, shields, troughs, spillways or railings, or guarded by position or location.

Guard: Means a barrier that prevents entry of the operator's hands or fingers into the point of operation.

Off hand grinding: means the grinding of any material or part which is held in the operators hand.

Point of operations: Means that the point at which cutting, shaping, boring, or forming is accomplished upon the stock.

Push stick: A narrow strip of wood or other soft material with a notch cut into one end and which is used to push short pieces of materials through saws.

Pinch Point: Means any point other than the point of operation at which it is possible for a part of the body to be caught between the moving parts of a press or auxiliary equipment, or between moving and stationary parts of a press or auxiliary equipment or between the material and moving part or parts of the press or auxiliary equipment.

Semiautomatic feeding: Means feeding wherein the material or part being processed is placed within or removed from the point of operation by an auxiliary means controlled by operator on each stroke.

Operators Station: Means the complete complement of controls used by or available to an operator on a given operation.

## GENERAL REQUIREMENTS

1. 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, in going nip points, rotating parts, flying chips and sparks.
2. 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.
3. Point of operation is the area on a machine where work is actually performed upon the material being processed.
4. The point of operation of machines whose operation exposes an employee or student laborer to injury shall be guarded. The guarding device shall be in conformity with any appropriate standards therefore, 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.
5. 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.
6. The following are some of the machines which usually require point of operation guarding.

- A. Guillotine cutters
- B. Shears
- C. Alligator shears
- D. Power presses
- E. Milling Machines
- F. Power saws
- G. Jointers
- H. Portable Power Tools
- I. Forming rolls and calendars

7. Revolving drums, barrels, and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

8. when the periphery of the blades of a fan is less than seven feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one half (1/2) inch.

9. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

10. Machines shall be maintained in a safe working condition and machines with defects that affect the safety of operation shall not be used.

#### MACHINE CONSTRUCTION GENERAL REQUIREMENTS

1. Each machine shall be so constructed as to be free from sensible vibration when the largest size tool is mounted and run idle at full speed.

2. Arbors and mandrels shall be constructed so as to have firm and secure bearing and be free from play.

3. Any automatic cutoff saw that strokes continuously without the operator being able to control each stroke shall not be used.

4. Saw frames or tables shall be constructed with lugs cast on the frame or with an equivalent means to limit the size of the saw blade that can be mounted, so as to avoid overspeed caused by mounting a saw larger than intended.

5. Circular saw fences shall be so constructed that they can firmly secured to the table or table assembly without changing their alignment with the saw. For saws with tilting tables or tilting arbors the fence shall be so constructed that it will

remain in a line parallel with the saw, regardless of the angle of the saw with the table.

6. Circular saw gages shall be so constructed as to slide in grooves or tracks that are accurately machined, to insure exact alignment with the saw for all positions of the guide.

7. Hinged saw tables shall be so constructed that the table can be firmly secured in any position and in true alignment with the saw.

8. All belts, pulleys, gears, shafts, and moving parts shall be guarded in accordance with the specific requirements of 29 CFR 1910.219.

9. It is recommended that each power-driven woodworking machine be provided with a disconnect switch that can be locked in the off position.

10. The frames and all exposed, non-current carrying metal parts of portable electric woodworking machinery operated at more than 90 volts to ground shall be grounded and other portable motors driving electric tools which are held in the hand while being operated shall be grounded if they operate at more than 90 volts to ground. The ground shall be provided through use of a separate ground wire and polarized plug and receptacle.

11. For all circular saws where conditions are such that there is a possibility of contact with the portion of the saw either beneath or behind the table, that portion of the saw shall be covered with an exhaust hood, or, if no exhaust system is required, with a guard that shall be so arranged as to prevent accidental contact with the saw.

12. Revolving double arbor saws shall be fully guarded in accordance with all the requirements for circular crosscut saws or with all the requirements for circular rip saws, according to the kind of saws mounted on the arbors.

13. No saw, cutter head, or tool collar shall be placed or mounted on a machine arbor unless the tool has been accurately machined to size and shape to fit the arbor.

14. Combs (feather boards) or suitable jigs shall be provided at the workplace for use when a standard guard cannot be used, as in dadoing, grooving, jointing, molding, and rabbeting.

## MACHINE CONTROLS AND EQUIPMENT

1. A mechanical or electrical power control shall be provided on each machine to make it possible for the operator to cut off the power each machine without leaving his position at the point of operation.
2. On machines driven by belts and shafting, a locking-type belt shifter or an equivalent positive device shall be used.
3. On applications where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.
4. Power controls and operating controls should be located within easy reach of the operator while he is at his regular work location, while making it unnecessary for him to reach over the cutter to make adjustments. This does not apply to constant pressure controls used only for setup purposes.
5. On each machine operated by electric motors, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control.
6. Each operating treadle shall be protected against unexpected or accidental tripping.
7. Feeder attachments shall have the feed rolls or other moving parts so covered or guarded as to protect the operator from hazardous points.

#### HAND-FED RIPSAWS

1. Each circular hand-fed rip saw shall be guarded by a hood which shall completely enclose that portion of the saw above the table and that portion of the saw above the material being cut. The hood and mounting shall be arranged so that the hood will automatically adjust itself to the thickness of and remain in contact with the material being cut but it shall not offer any considerable resistance to insertion of material to saw or to passage of the material being sawed. The hood shall be made of adequate strength to resist blows and strains incidental to reasonable operation, adjusting, and handling, and shall be so designed as to protect the operator from flying splinters and broken saw teeth. It shall be made of material that is soft enough so that it will be unlikely to cause tooth breakage. The hood shall be so mounted as to insure that its operation will be positive, reliable and in true alignment with the saw; and the mounting shall be adequate in strength to resist any reasonable side thrust or other force tending to throw it out of line.



2. Each hand-fed circular rip saw shall be furnished with a spreader to prevent material from squeezing the saw or being thrown back on the operator. The spreader shall be made of hard tempered steel, or its equivalent, and shall be thinner than the saw kerf. It shall be of sufficient width to provide adequate stiffness or rigidity to resist any reasonable side thrust or blow tending to bend or throw it out of position. The spreader shall be attached so that it will remain in true alignment with the saw even when either the saw or table is tilted. The provision of a spreader in connection with grooving, dadoing, or rabbeting is not required. On the completion of such operations, the spreader shall be immediately replaced.

3. Each hand-fed circular rip saw shall be provided with non kickback fingers of dogs so located as to oppose the thrust of tendency of the saw to pick up the material or to throw it back toward the operator. They shall be designed to provide adequate holding power for all the thickness of materials being cut.

#### HAND-FED CROSSCUT TABLE SAWS

1. Each circular crosscut table saw shall be guarded by a hood which shall meet all the requirements of this program.

#### CIRCULAR RESAWS

1. Each circular resaw shall be guarded by a hood or shield of metal above the saw. This hood or shield shall be so designed as to guard against danger from flying splinters or broken saw teeth.

2. Each circular resaw (other than self-feed saws with a roller or wheel at back of the saw) shall be provided with a spreader fastened securely behind the saw. The spreader shall be slightly thinner than the saw kerf and slightly thicker than the saw disk.

#### SELF-FEED CIRCULAR SAWS

1. Feed rolls and saws shall be protected by a hood or guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The guard shall be constructed of heavy material, preferably metal, and the bottom of the guard shall come down to within three-eighths inch of the place formed by the bottom or working surfaces of the feed rolls. This distance (3/8 inch) maybe increased to 3/4 inch, provided the lead edge of the hood is extended to be not less than 5-1/2 inches in front of the nip point between the front roll and the work.

2. Each self-feed circular rip saw shall be provided with sectional non-kickback fingers for the full width of the feed rolls. They shall be located in front of the saw and so arranged as to be in continual contact with wood being fed.

## SWING CUTOFF SAWS

The requirements of the section are also applicable to sliding cutoff saws mounted above the table

1. Each swing cutoff saw shall be provided with a hood that will completely enclose the upper half of the saw, the arbor end, and the point of operation at all positions of the saw. The hood shall be constructed in such a manner

and of such material that it will protect the operator from flying splinters and broken saw teeth. Its hood shall be so designed that it will automatically cover the lower portion of the blade, so that when the saw is moved forward the hood will drop on top of and remain in contact with the table or material.

2. Each swing cutoff saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of its travel. Such a device shall not depend for its proper functioning upon any rope, cord, or spring. If there is a counter weight, the bolts supporting the bar and counterweight shall be provided with cotter pins; and the counterweight shall be prevented from dropping by either a bolt passing through both the bar and counterweight , or a bolt put through the extreme end of the bar, or, where the counterweight does not encircle the bar, a safety chain attached to it .

3. Limit chains or other equally effective devices shall be provided to prevent the saw from swing beyond the front or back edges of the table, or beyond a forward position where the gullets of the lowest saw teeth will rise above the table top.

4. Inverted swing cutoff saws shall be provided with a hood that will cover the part of the saw that protrudes above the top of the table or above the material being cut. It shall automatically adjust itself to the thickness of and remain in contact with the material being cut.

## RADIAL SAWS

1. The upper hood shall completely enclose the upper portion of the blade down to a point that will include the end of the saw arbor. The upper hood shall be constructed in such a manner and of such a material that it will protect the operator from splinters and broken saw teeth and will deflect sawdust away from the operator. The sides of the lower exposed portion of the blade shall be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock being cut to give maximum protection possible for the operation.

2. Each radial arm saw used for ripping shall be provided with non kickback fingers of dogs located on both sides of the saw so as to oppose

This section still under construction

Band saws and resaws

Tenoning machines

Boring and mortising machines

Wood shapers and similar equipment

Planing, molding, sticking and matching machines

Profile and swing-head lathes and wood heel turning machine

Sanding machines

Veneer cutters and wringers

Miscellaneous woodworking machines

Inspection and maintenance of woodworking machinery

Guarding of Abrasive wheel machinery.

Guarding of abrasive wheel machinery

Flanges

## Mounting

Guarding of farm field equipment, farmstead equipment, and cotton gins.