



Government of
Western
Australia

GUIDANCE NOTE

Safe use of Woodworking Machinery (Guarding)

COMMISSION

**WorkSafe
Western
Australia
COMMISSION**

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Basic safety rules for woodworking machines

Basic safety rules for woodworking machines

1. Use mechanical feeding wherever possible.
2. Enclose all cutters and saw blades as far as practicable.
3. Ensure all machines are well maintained.
4. Ensure adequate lighting at every machine.

Basic safety rules for people who work at or operate woodworking machines

1. Only authorised people who have been properly trained and assessed as competent, should operate or work at woodworking machines.
2. Safe operating procedures must be provided and used in respect of each machine.
3. Appropriate hearing protection, eye shields and dust masks should be worn when required.
4. Machines must be switched OFF when not in use and ISOLATED before any repair, cleaning or maintenance is done.
5. The machinist's attention must not be distracted while work is in progress.
6. Don't operate machinery if fatigued or otherwise unfit for the task at hand.
7. If mechanical feeding is not available, use push sticks or avoid the need for hands to be near cutters or saw blades.
8. Wear clothing that will not catch in cutters or other moving parts.
9. Don't have long hair free or wear jewellery that might get entangled in the machinery.

Safe Use of Woodworking Machinery (Guarding)

This Guidance Note provides important information for the safety and health of those who operate, clean, repair or maintain woodworking machinery.

It applies to employers, contractors, supervisors, self-employed persons, employees and safety and health representatives.

Failure to provide, attach or replace guarding on moving parts, or follow safe locking-out and tagging procedures are common causes of injury in woodworking industries.

Safe Use of Woodworking Machinery (Guarding) is one of three publications dealing with woodworking hazards - wood dust, chemicals and woodworking machinery.

What is woodworking machinery?

Woodworking machinery includes:

- spindle moulders,
- circular, crosscut and rip saws,
- radial arm saws,
- band saws,
- jointers,
- planers,
- shapers,
- lathes,
- sanding machines,
- boring and mortising machines,
- routers, and
- tenoning machines.

What are the risks?

Risk factors associated with woodworking machinery include:

- sharp unguarded parts that can
 - cut or amputate,
 - pierce, or
 - graze;
- rotating unguarded parts turning at high revolutions that can
 - severely cut or amputate body parts,
 - trap, nip or catch clothing, jewellery or body parts,
 - cause a friction burn or abrasion;
- the force exerted on a piece of wood by a rotating part causing the machinist to be injured or knocked off balance;
- unguarded moving parts “nipping” (or coming together), or moving without warning, or moving unpredictably, with the potential to
 - amputate fingers, or
 - crush body parts;
- hand feeding without using a jig or push stick.

What are the dangerous parts?

The parts most likely to cause injury or harm are:

- nip points;
- rotating blades;
- rotating wheels;
- moving parts;
- movable (reciprocating) blades; and
- pressing parts.

The employer must carry out risk assessments of these parts to determine their likelihood of causing injury or illness. Risk assessments should include any automated machinery at the workplace as well as other woodworking hazards such as wood dusts, chemicals, fire and manual handling.

Procedures for controlling the risk of injury or illness should be developed by the employer in consultation with employees and any others likely to have access to the machine, such as for maintenance or repairs.

Practical guidance on carrying out a risk assessment and controlling hazards is available from WorkSafe's internet site at www.safetyline.wa.gov.au

Which jobs are affected?

Most woodworking jobs involve machinery with moving parts. The risk of injury or harm must be assessed and action taken to eliminate or reduce the likelihood of injury or harm occurring. In most cases guarding will be the preferred option.

Regardless of which job or machine, those carrying out the work must have the skills, knowledge, training and experience, to allow them to work safely in accordance with the manufacturer's instructions and they must be provided with machines that are properly maintained.

Employees must be provided with information, instruction, training and supervision to allow them to work in a safe manner.

Instruction and training should be provided

- at induction of new employees,
- on introduction of new machines, and
- as refresher training, on an ongoing basis.

Controlling risks

This Guidance Note focuses on guarding machines or the parts of machines most likely to cause injury or harm.

Guarding is the most effective means of reducing the risk of injury or harm from dangerous parts of a machine. In its simplest form, guarding is a physical barrier preventing access to any part of a machine that has the potential to cut, pierce, graze or crush a person or a body part. Guarding can be designed and manufactured as part of a machine or it can be designed and manufactured as a separate part.

Many types of guarding systems are available to protect workers from dangerous machinery. If guarding is used as a control measure, it should, as far as practicable, prevent access to the danger points or dangerous areas of the machine.

Effective guards protect workers from preventable injuries. The guards should not be removed or disabled unless it is necessary for cleaning, repair or maintenance, and only then in accordance with agreed (and preferably written) safe procedures that prevent operation or unintentional start-up. The operators of the machines and other employees should be involved in developing these procedures, and be trained to carry them out.

Locking-out and tagging is an essential safe procedure when machinery guarding must be removed for cleaning, maintenance, adjustment or repair. This requires a machine to be stopped and its energy source isolated and locked off while work is being done. Only the person deactivating and working on the machine can hold the key to restore power and restart the machinery.

Personal protective equipment is not considered to be guarding, but safety signs should be placed on machinery advising of the PPE required by operators.

All new or inexperienced workers should be supervised at all times.

Guidelines for purchasing machinery

The law requires designers of machinery and those who manufacture and supply it to carry out a risk assessment of the likelihood of the machinery causing injury or harm when properly used at a workplace. When a new or used item of machinery is purchased for a workplace, information on the purpose for which the machine was designed and the knowledge, training or skill necessary for its safe use must be provided to the purchaser.

Designers, manufacturers, importers and suppliers are obliged to ensure this information is available. This information should also be available to enable an employer to take the risk of injury to employees into account when considering the purchase of new or used machinery.

Guarding should be a key consideration when purchasing machinery. Choosing machinery with appropriate guarding will reduce the potential for injury and be less costly if a risk assessment at the workplace identifies the need for additional guarding.

Employers are entitled to expect adequate guarding is in place before machinery is offered for sale. However, employers

▼ ***Thicknesser - showing lockable isolation switch, emergency stop button, and safety instructions on the machine.***



must still undertake their own risk assessments to ensure guarding on newly purchased machinery is sufficient to reduce the risk of injury or harm.

Well located emergency stop buttons should be considered when purchasing machinery.

A buyer of used machinery should also have access to related safety information before making a commitment to purchase.



▲ Multi-surface moulder with cutters fully enclosed.

How should hazardous machines be guarded?

In order of importance, guarding should be:

1. a permanently fixed physical barrier that ensures no person has either complete or partial access to dangerous areas during normal operation, adjustment, maintenance or cleaning;
2. an interlocking physical barrier that ensures no person has either complete or partial access to dangerous areas during normal operation, adjustment, maintenance or cleaning; or
3. a physical barrier securely fixed in position by fasteners to ensure that the guard can not be altered or removed without the aid of a tool or key, in cases where neither a

permanently fixed nor an interlocking physical barrier is practicable.

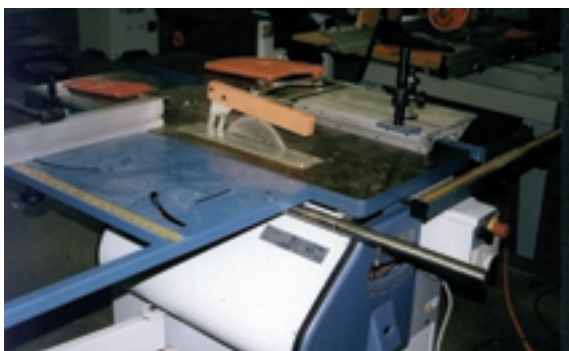
If none of these types of guards are practicable, installing a presence sensing system should be considered.

Stationary guards have no moving parts. They offer protection only when the guard is in the correct position. Stationary guards may be:

- fixed guards preventing access to moving parts by enclosing or providing a physical barrier;
- distance guards not completely enclosing the hazard but reducing the access to the danger point by their location in respect to the hazard;
- fence guards completely surrounding a machine, isolating the worker from the machine;
- adjustable guards provided with an opening to the machine through which material can be fed, the whole guard or part of it being adjustable to suit the size of the material

▼ **Combination belt and disc sander showing side guarding of drive belts.**





▲ **Panel saw showing riving knife, top guard and emergency stop.**

being used. The space between an adjustable guard and the material should be minimal;

- riving knives attached to circular saws to prevent cut timber jamming or catching on the rear of the saw blade and being thrown back at the operator.

Moving, non-interlocking guards are connected to the machine so that when the machine moves or the material is moved, the guard moves with it and takes a safe position by covering the dangerous parts. Moving, non-interlocking guards may be:

- automated guards moved automatically by the machine;
- self-adjusting, moveable guards which adjust to accommodate the material. These guards are opened at the beginning of the operation by the passage of the material and return to the safe position when the last of the material passes through the guard.

Interlocking guards provide a physical barrier connected to the power or control system of the machine, preventing the machine from operating until the guards are in place. Interlocking guards may be:

- moving interlocking guards that contain movable parts and whose movement is interconnected with the power or control system of the machine;



▲ Surface planer/buzzer with swing/swivel guard.

- interlocking distance guards that don't completely enclose a hazard, but prevent access by their distance from the hazard.

Guard construction

Where guarding is not an integral part of the machine and has to be constructed and installed at the workplace, consideration should be given to how the guard should function, e.g. by preventing access, containing the hazard, or a combination of both these safeguards.

Where a risk assessment shows an existing guard to be inappropriate or inadequate, any modifications or redesign should ensure the guard itself will not create a hazard, e.g. with trapping or shear points, and rough or sharp edges likely to cause injury.

Guards can be made from durable material suitable for the purpose and may be:

- solid sheet metal,
- metal rod,
- perforated or mesh material (small enough to ensure that body parts cannot enter the danger zone),
- acrylic or polycarbonate,

- stainless steel,
- rubber, or
- timber.

When selecting a material for guarding or assessing its adequacy, the following should be considered:

- weight (if its too heavy it is unlikely to be replaced, e.g. after maintenance),
- strength and durability of the material,
- effects on the machine's performance and reliability, e.g. does it cause the machine to overheat?,
- does it affect the visibility of the operator, and
- control of other hazards, e.g. does it affect the control of wood dust and noise?

Removal of Guarding

An employer may provide guarding that allows the convenient repair, servicing, adjustment and maintenance of the machine when not in normal operation.

▼ Radial arm saw with automatic guard.



However, by-passing or disabling guarding, whether deliberately or by accident, should be made as difficult as possible.

If removing guarding is the most practicable means of providing access to the machine for servicing or maintenance, the guarding must be replaced and secured before normal operations re-commence.

The machine must be isolated and locked-out whenever guarding is not in place.

If a machine is designed with guarding that does not allow a particular task to be carried out, the reason could be that the machine is being used incorrectly or inappropriately for the task.

Locking-out and tagging

Agreed (and preferably) written locking-out and tagging procedures must be followed each time machinery guarding is removed for cleaning, repair or maintenance.

The procedures should be drafted to ensure:

- only one person holds the key to locking off the machine's power supply;
- all persons likely to be involved with the machine are notified of intended work;
- normal shut-down procedure for the machinery is followed;
- the machine's power is isolated from its main source by an isolating switch;
- no other stored or other energy source remains that may activate machinery thought to be shut-down;
- the isolating switch is locked "off" with a locking-out device until work is finished and guarding replaced;
- a danger tag is attached to the isolating switch;
- danger signs are placed strategically to warn people entering the area;

- only the person doing the work and holding the key can turn the power back on;
- there is an emergency procedure to isolate or restore power if the person holding the key is unavailable or cannot do so.

Other forms of safety devices

Safety devices can be designed to sense the presence of a person or body part and shut the machine down before access to the dangerous area occurs. Safety devices may be:

- *Trip devices* - physical devices that stop the operation of a machine or make it assume a safe position when a person approaches beyond a safe limit, thereby preventing an injury.
- *Electro-sensitive safety systems* - also called photoelectric safety systems, light curtains or electronic beams. These systems detect an object when the beam of light is broken, and shut the machine or parts of it down so that a person cannot come in contact with the dangerous parts.
- *Pressure sensitive systems* - systems based on sensors that detect pressure applied by a person or object. Once a predetermined pressure has been detected, the machine, or parts of it, is shut down, so that a person cannot reach the dangerous parts.

Carrying cutting tools

Sharp, well maintained cutting tools are essential to safety and productivity. Satisfactory arrangements must be made for the carriage of these valuable items to and from the machines so that the tools are protected from damage and their handlers from injury.

Cutting tools should normally be carried in a purpose made box or other form of protection to ensure the tools are not handled directly. A trolley should be used for heavy or awkward loads.

Every person involved in carrying or handling cutting tools should be trained in the approved methods for each type of tool.

What the law says

The *Occupational Safety and Health Act 1984* says as far as is practicable, employers must provide and maintain a work environment in which employees are not exposed to hazards. This includes providing a safe system of work, information, training, supervision and, where appropriate, personal protective equipment.

The Act says employees must take reasonable care of their own safety and health and avoid adversely affecting the safety and health of others. They must comply, as far as possible, with safety instructions, use personal protective equipment provided and report hazards and injuries.

The Act says any person who designs, manufactures, imports or supplies any machinery for use at a workplace shall, as far as practicable, ensure the design and construction of the machinery does not expose people who properly install, maintain or use the machinery to hazards.

The Act says any person who designs, manufactures, imports or supplies any machine must provide information on hazards that are likely to result from the use of the machine, and should provide information on its safe operation and maintenance.

Machinery guarding is covered in Part 4 of the *Occupational Safety and Health Regulations 1996*. These regulations should be explained to woodworking employees and others involved in machinery maintenance as part of their induction and ongoing information and training.

Where guarding does not eliminate the risk of injury, or it is not practicable to guard a moving part, workers should not operate or be close to the moving part unless a safe system of work is in place to reduce the risk.

Do not use safety devices such as the emergency stop button or lanyard to routinely shut off the machine.

Further information

Further information and guidance on the regulations specific to plant is provided in:

WorkSafe Western Australia Commission Publications

Guidance Note: *Plant Design - Making it safe A guide for designers, manufacturers, importers, suppliers and installers of plant.*

Guidance Note : *Plant in the Workplace - Making it safe A guide for employers, self-employed persons and employees.*

SafetyLine Institute

[www.safetyline.wa.gov.au] *Machinery and Guarding Lecture “Lock Out And Tag Out”.*

Australian Standards

AS 4024.1-1996 Safeguarding of machinery: General principles. AS 4024:1, an approved code of practice under Section 57 of the Occupational Safety and Health Act, identifies the hazards and risks arising from the use of industrial machinery and describes methods for eliminating or minimising associated risks. It covers the safeguarding of machinery and the use of safe working practices.

AS 1473.1-2000 Wood-processing machinery - Safety: Primary timber milling machinery specifies requirements for the design, manufacture, guarding and use of milling equipment used for the primary milling of saw logs into green sawn timber products.

AS 1473.2-2001 Wood-processing machinery - Safety: Finishing machinery - Common requirements specifies requirements for the design, manufacture, guarding and use of machinery for the processing of sawn, gauged and machined timber used in the manufacture of components for joinery, furniture and the like.

AS 1473.3-2001 Wood processing machinery - Safety: Finishing machinery - Circular sawing machines specifies the particular requirements for the design, manufacture, guarding and the use of circular sawing machines. It is to be read in conjunction with *AS 4024.1* and *AS 1473.2*, which contains general requirements. This Standard does not apply to circular saws used for the primary milling of logs.

AS 1473.4-2001 Wood processing machinery - Safety: Finishing machinery - Bandsawing machines specifies the particular requirements for the design, manufacture, guarding and use of bandsawing machines used in the manufacture of components for joinery, furniture and the like. It is to be read in conjunction with *AS 4024.1* and *AS 1473.2*, which contains general requirements. This Standard does not apply to bandsaws used for the primary milling of logs.

AS 1473.5-2001 Wood processing machinery - Safety: Finishing machinery - Moulding machines and routers with rotating tool specifies particular requirements for the design, manufacture, guarding and use of moulding and routing machines with an interchangeable rotating tool used in the manufacture of components for furniture, joinery and the like. It is to be read in conjunction with *AS 1473.2*, which contains general requirements.

Contacts for further information

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