

Board-edge processing machinery

Safe working practices

HSE information sheet

Woodworking Information Sheet No 27 (Revision 1)

Introduction

This information sheet gives practical guidance on safe working practices when using board-edge processing machinery, usually referred to as edge banding machines or edge banders. This information is aimed at employers and others who have control of how these machines are used. Machine operators will also find this information of use.

These machines are used to provide a decorative edge to coated or laminated chipboard or fibreboard (MDF) in one pass, for example for components of kitchen or bedroom furniture. The process involves cutting a profiled or square edge to which glue is applied before it is covered in solid lipping, veneer or plastic foil. The glue can be hot melt, PVA, PU or epoxy and curing can involve the application of heat or laser actuation.

The machines range from relatively simple hand-fed table top models to sophisticated conveyor fed micro-processor controlled machines. Most machines are designed to put an edge band on one end/side of the workpiece, see Figure 1. There are however some larger machines that can put an edge on both ends/sides, see Figure 4. The characteristics of individual machines should be considered when identifying hazards and assessing risks.

Accident history

Accidents, including finger amputations, are caused on edge banders by:

- the operator making contact with the saws and cutters;
- entanglement at rotating transmission shafts, sanding and buffing heads;
- trapping at chain/sprocket drives;
- trapping at conveyor nip points;
- contact with spiked feed rolls, guillotine blades or edge pressure rolls at the edging material feed;
- contact with hot surfaces.

Training issues

It is important that the machine is fitted with the necessary safeguards and operators are trained to use them and carry out the work safely.¹ Training is particularly important for those involved in maintenance, setting and cleaning to ensure that these activities are undertaken in a safe manner. No one should be allowed to work on an edge bander unless they have demonstrated competence. It is advisable that competent operators are authorised in writing by a responsible person (director, senior manager etc). This will then form part of the training records. Anyone who supervises the use of any work equipment must also have received adequate training and both operators and supervisors must have access to information and where appropriate, written instructions.¹

You should also consider potential health hazards which may be present such as toxic dusts from the cutting process and fumes/skin contact from the glue. Effective local exhaust ventilation (LEV) is necessary to control dust and prevent the build-up of waste.² Off-cuts produced by saws may require frequent access for waste removal and this should be taken into account in the training. High noise levels can also be a problem as these can reach over 100 dB(A) at the saws and cutters.³

Legal requirements

Legal requirements covering the use of these machines are contained in *Safe use of woodworking machinery. Provision and Use of Work Equipment Regulations 1998 as applied to woodworking machinery*.¹ This document gives practical advice on the provision of information and training as well as aspects of guarding and maintenance (see also 'Further reading').

When buying a new edge bander, it should be supplied with a declaration of conformity and have a CE Mark. Designers and manufacturers must conform to the essential safety requirements of the Machinery Directive and associated European Free Trade

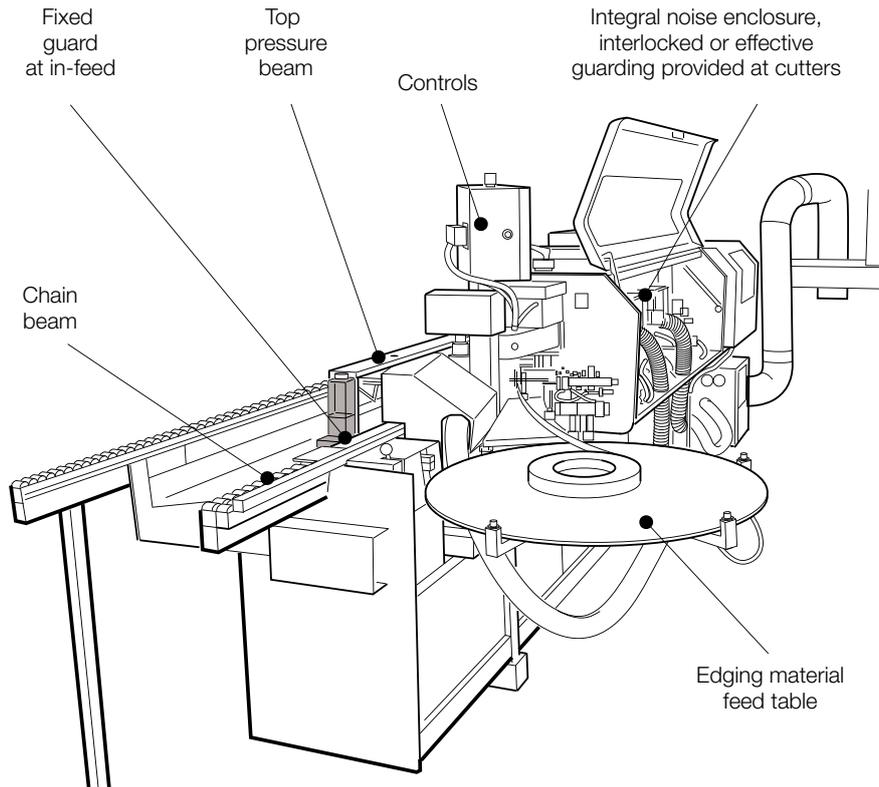


Figure 1 Single end/side edge bander

Association (EFTA) regulations. One way of achieving this is by designing and constructing the machine to meet BS EN 1218-4.⁴ Cutters should meet BS EN 847 Part 1.⁵ However, there are many older machines still in use and the guarding requirements for these machines will also be covered.

Safeguarding edge-banders

Guarding the tools

Edge banders can be fitted with either a complete enclosure or an integral enclosure and there are important differences between the two. Both types of enclosure generally have a hinged door but some sliding doors are also used.

Complete enclosures totally enclose the machine and are designed primarily for noise reduction. The machine settings, adjustments and operator can all be inside the complete enclosure. However, they can also form part of the guarding system where close approach to moving cutters is not necessary, for example at automatic machines with electronic setting. Where they do form part of the guarding, then complete enclosures should be provided with interlocking and/or guard locking that meet the same requirements as those of the integral enclosure. If the enclosure has only been provided to control noise hazards and there are other guards within the

enclosure for the mechanical hazards, then it doesn't need to be interlocked.

Integral enclosures are used to prevent access to the tools (including sanding tools) and consist of a guard or guards. Integral enclosures may also provide some noise reduction. Where access is required for maintenance, adjustment or setting then it should be via a movable interlocking guard that meets the requirements of BS EN 1088:1995⁶ unless a mode selection switch has been provided. The integral enclosure should normally be designed so that it is not possible for a person to stand inside it with the access doors closed. However, if this is impractical and the operator has to be inside then it should be designed so that:

- the movement of a person along the machine is limited;
- there is an emergency stop that can be accessed by the person inside;
- the access doors can be opened from the inside.

Mode selection switch

There should be a mode selection switch, if the guard(s) has to be opened for adjustment while certain parts of the machine are in motion. The control mode overrides all of the other control systems except for the emergency stop. Where a mode switch is provided then the following requirements should be in place:

- it should be lockable, for example by a key-operated switch;
- when in adjustment mode, the normal (automatic) control mode should be disabled;
- moving it to the adjusting position should stop the feed, tool spindles and other processing units;
- the movement of the feed and any powered adjustment should be controlled by a hold-to-run device;
- a deterring/impeding device should be fitted if necessary to prevent horizontal access to any rotating tools from inside the enclosure;
- it should not be possible to run the tool spindles, any dynamic processing units* or have any other dynamic movement when the relevant guards are open.

There should be an emergency stop fitted inside each enclosure where there is a mode selection switch and it should be possible to reach it from any position. More information on mode selection can be found in BS EN 1218-4.

Safeguarding for older machines

Users of older machines should compare the safeguards currently provided with those detailed in BS EN 1218-4 and decide if additional measures are required, see Figure 2. To do this you should produce a risk assessment that considers the current method of operation and existing methods of safeguarding. You should then consider:

- Do the current safeguards actually prevent access to the dangerous parts?
- Is it practicable to fit further safeguarding measures if they do not?
- Is it practicable to modify or change the method of operation?

Where there is a reliance on fixed guarding to prevent access to the dangerous parts then it has to be effective. Guidance on the requirements for fixed guards and deterring/impeding devices can be found in BS EN ISO 13857:2008.⁷

*A dynamic processing unit is one that moves with the workpiece during processing then returns to its starting position ready for the next workpiece, eg a sniper saw.

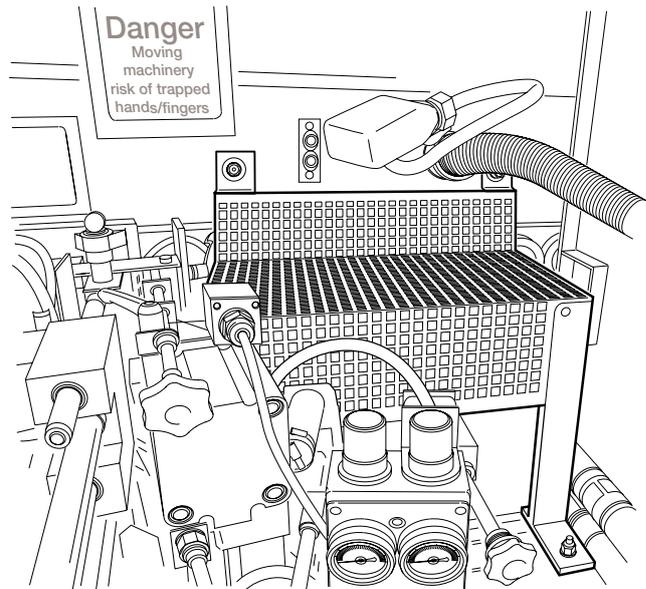


Figure 2 Additional fixed guarding fitted around dangerous parts of an older machine (drawing from photograph)

Guarding the sanding belts

Access to the sanding belt should be prevented by fixed guards. These should allow the belt to be changed or adjusted as well as cleaning and dust removal to take place. This can be achieved by a non-interlocked hinged cover, capable of being locked in the closed position during normal operation.

Guarding the edge banding zone

Access to the snipping knives, spiked rollers and pressure/loading rollers should also be prevented by fixed guards. Any other hazards such as trapping or crushing can be minimised by the use of a deterring/impeding device that prevents direct horizontal access.

Guarding the chain/feed mechanism

Access to chains and pressure devices/pads should be prevented by the integral enclosure. Any chains or feed mechanism outside of the integral enclosure should have guarding. This is particularly important at the in-feed end where the pads move around the end pulley, see Figure 3. Other options that can be used to control the risk are:

- chain design;
- a work support piece;
- a suitable extension to the casing to cover the trapping point.

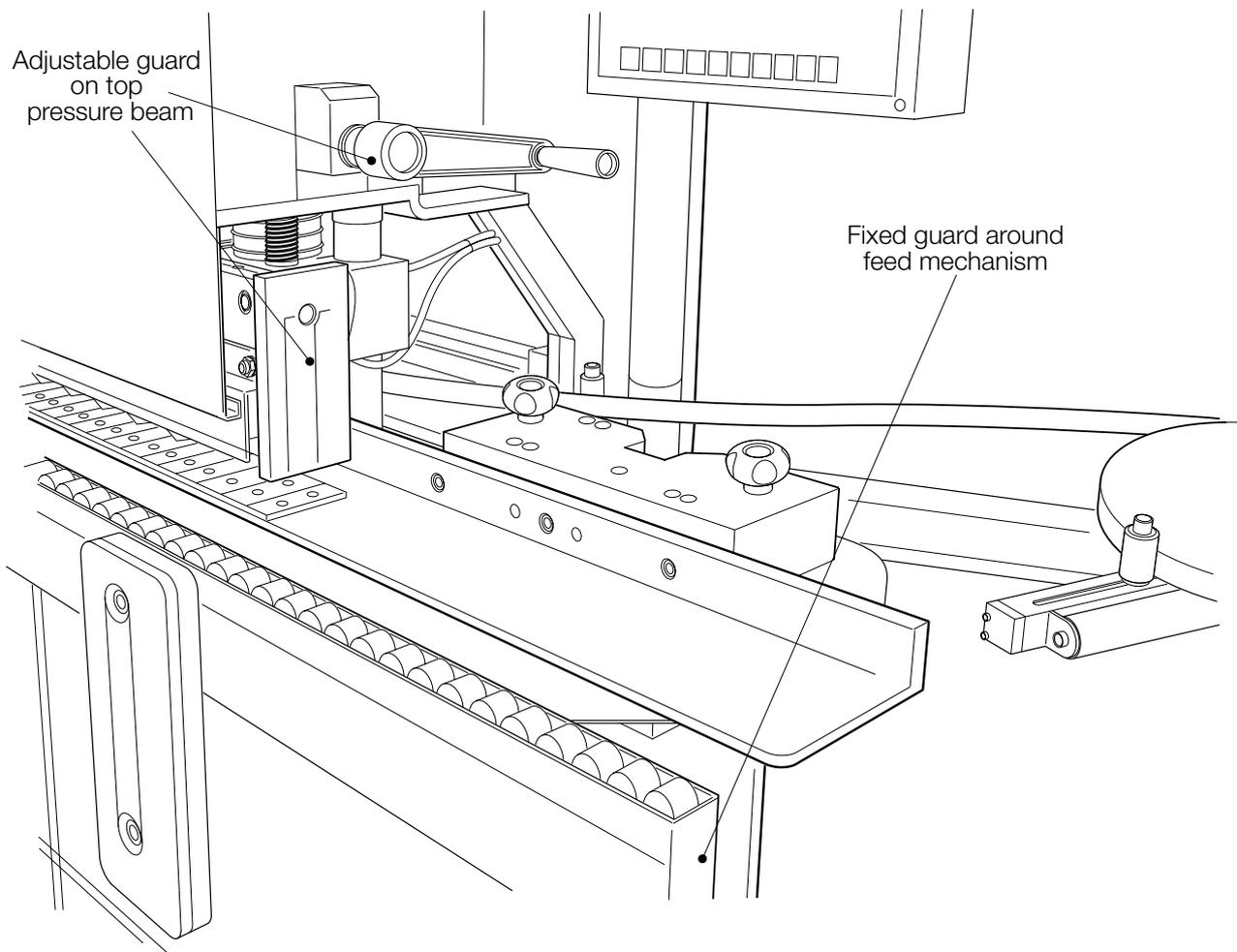


Figure 3 Fixed guarding around the feed mechanism and adjustable guard on top pressure beam at in-feed

Guarding the in-feed end of the machine

The top pressure beams are used for guiding and holding the workpiece. To prevent access to the trapping point at the in-feed end of each beam use either:

- a guard on each top pressure beam, see Figure 3. On machines designed to BS EN 1218-4 this can be adjusted vertically, ie with a handle, to limit the gap between the guard and the workpiece to 4 mm or less;
- a mechanically actuated trip device that meets the requirements of BS EN 1760-2.⁹

Guarding the machine halves (double end/side machines only)

Double end/side machines have two halves which open or close to accommodate the width of the workpiece, see Figure 4. These machines have a crushing hazard between the chain beams and a crushing/shearing hazard between the fixed parts of the machine and the moving/opening of the machine

halves. Options for controlling these risks include using either:

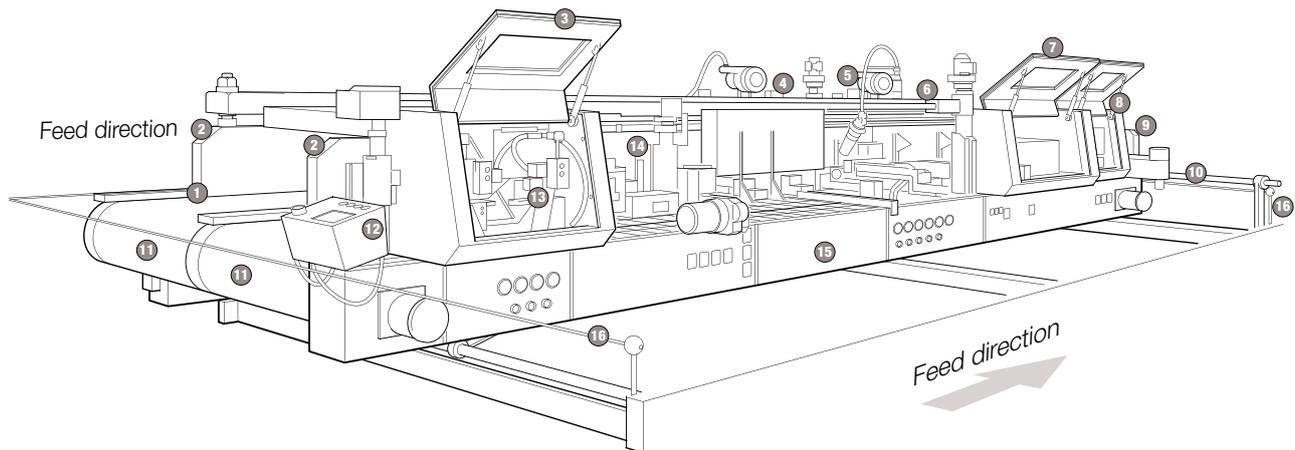
- a mechanically actuated trip device that meets the requirements of BS EN 1760-2:2001;
- a light barrier that meets the requirements of BS EN 61496-2;⁹
- a hold to run device.

To prevent involuntary access between the machine halves, use either:

- a trip wire extending across the full width of the opening between the chain beams;
- a light barrier.

These devices should stop the movement of the feed once actuated.

- 1 Trip device or fixed guard at in-feed
- 2 Top pressure beam
- 3 Integral noise enclosure, interlocked or effective guarding provided at cutters
- 4 Hot surface shields



These devices should stop the movement of the feed once actuated
NB: Extraction equipment not shown

- | | | |
|---|--|---|
| ① Trip device or fixed guard at in-feed | ⑦ Noise enclosure interlocked or interlocked guard provided within enclosure over cutters | ⑫ Controls |
| ② Top pressure beam | ⑧ Other cutters and sanding heads effectively guarded within enclosure | ⑬ Trip device at in feed |
| ③ Integral noise enclosure, interlocked or effective guarding provided at cutters | ⑨ Buffing heads guarded if there is a risk of entanglement | ⑭ Edge banding zone |
| ④ Hot surfaces shielded | ⑩ Drive shaft sleeved or trip wire provided | ⑮ Machine halve |
| ⑤ Guillotines and feed rolls provided with fixed or interlocked guards | ⑪ Chain beams - conveyor chains and sprockets enclosed by guards that extend to prevent trapping between closing conveyor pads | ⑯ Trip wire or light barrier to prevent involuntary access between the two halves at in-feed and out-feed |
| ⑥ Side pressure rolls enclosed | | |

Figure 4 Double end/side edge bander

- 5 Other cutters and sanding head effectively guarded within enclosure
- 6 Buffing heads also guarded if there is a risk of entanglement
- 7 Feed cross drive shaft with trip device over its full length

Guarding the drives (double end/side machines only)

The feed cross drive shaft should be safeguarded by having a trip device that extends over its full length, see Figure 4. Prevent access to all other drive mechanisms by a fixed guard. However, if frequent access is required for adjustment or maintenance, ie more than once per shift, then use a moveable interlocked guard. If access to the tools is also possible then the moveable guard should be interlocked with guard locking that meets the requirements of BS EN 1088:1995.

More detailed information on guarding requirements can be found in BS EN 1218-4.

Braking

The tool spindles should stop within ten seconds. However, if the run-up time exceeds ten seconds, then the stopping time should be less than the run-up time but not exceed 30 seconds. The sanding belt units should also stop within 30 seconds. To achieve these stopping times, automatic braking may need to be provided. Machines should have been fitted with a braking device after 5 December 2003.^{1,10}

References

- 1 *Safe use of woodworking machinery. Provision and Use of Work Equipment Regulations 1998 (as applied to woodworking machinery). Approved Code of Practice and guidance L114* (Second edition) HSE Books 2014
www.hse.gov.uk/pubns/books/l114.htm
- 2 *Wood dust: Controlling the risks* Woodworking Information Sheet WIS23(rev1) HSE 2012
<http://www.hse.gov.uk/woodworking/wis.htm>

3 *Noise at woodworking machines* Woodworking Information Sheet WIS13(rev1) HSE Books 2007 <http://www.hse.gov.uk/woodworking/wis.htm>

4 BS EN 1218-4:2004+A2:2009 *Safety of woodworking machines. Tenoning machines. Edge banding machines fed by chain(s)* British Standards Institution

5 BS EN 847-1:2013 *Tools for woodworking. Safety requirements. Milling tools, circular saw blades* British Standards Institution

6 BS EN ISO 14119:2013 *Safety of machinery. Interlocking devices associated with guards. Principles for design and selection* British Standards Institution

7 BS EN ISO 13857:2008 *Safety of machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs* British Standards Institution

8 BS EN 1760-2:2001+A1:2009 *Safety of machinery. Pressure sensitive protective devices. General principles for the design and testing of pressure sensitive edges and pressure sensitive bars* British Standards Institution

9 BS EN 61496-2:2013 *Safety of machinery. Electro-sensitive protective equipment. Particular requirements for equipment using active opto-electronic protective devices (AOPDs)*

10 *Retrofitting woodworking machine brakes* Woodworking Information Sheet WIS38(rev1) HSE 2013 <http://www.hse.gov.uk/woodworking/wis.htm>

Further reading

Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance L22 (Fourth edition) HSE Books 2014 www.hse.gov.uk/pubns/books/l22.htm

Further information for suppliers, installers and users of new and second-hand machinery can be found on HSE's Work equipment and machinery webpages: <http://www.hse.gov.uk/work-equipment-machinery/index.htm>

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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