



Circular saw benches - Safe working practices

Woodworking Sheet No 16 (rev)

Introduction

This information sheet is one of a series produced by HSE's Woodworking National Interest Group. Its purpose is to give practical guidance on safe working practices at circular saw benches. The main legal requirements covering the use of these machines are the Provision and Use of Work Equipment Regulations 1998 (PUWER 98)¹ and the Management of Health and Safety at Work Regulations 1992 (MHSW).² There is also a supporting Approved Code of Practice (ACOP) *Safe use of woodworking machinery*³ specifically for the woodworking industry.

As is the case with all woodworking machines, it is vital that operators are properly trained to safely carry out the work they are expected to do. Only operators who have been authorised, ideally in writing, as properly trained and competent, should be allowed to operate machines. Adequate instruction and supervision are also important.

When purchasing a new circular saw bench, it should be supplied with a declaration of conformity and have a CE Mark. It should be designed and constructed to meet BS EN 1870-1: 1999.⁴ New saw blades should meet BS EN 847-1: 1997.⁵

Accident history

In a study of 1000 accidents at woodworking machines,⁶ accidents at circular saw benches accounted for 35% of the total, with most resulting in the amputation of fingers. Eighty-three per cent of these accidents occurred while ripping or cross-cutting, and in most cases the saw guard was either missing, or not properly adjusted. Many of these accidents would have been avoided simply by having a correctly adjusted saw guard and using a push-stick.

General

A risk assessment should be carried out covering all foreseeable uses and operations at the circular saw bench. This is required by the MHSW Regulations and should identify the action needed to eliminate or control risks. As part of the assessment you should consider if there is a more suitable machine for the process or operation. For example, a properly guarded vertical spindle moulder or router are most suitable for grooving work.

Circular saw benches should be fitted with a suitable riving knife and saw guard, and these will need to be adjusted depending on the operations being carried out. Machines should be fully enclosed beneath the table.

To reduce the risk of contact with the saw blade during run down, machines should be fitted with a braking device that brings the blade to rest within 10 seconds.

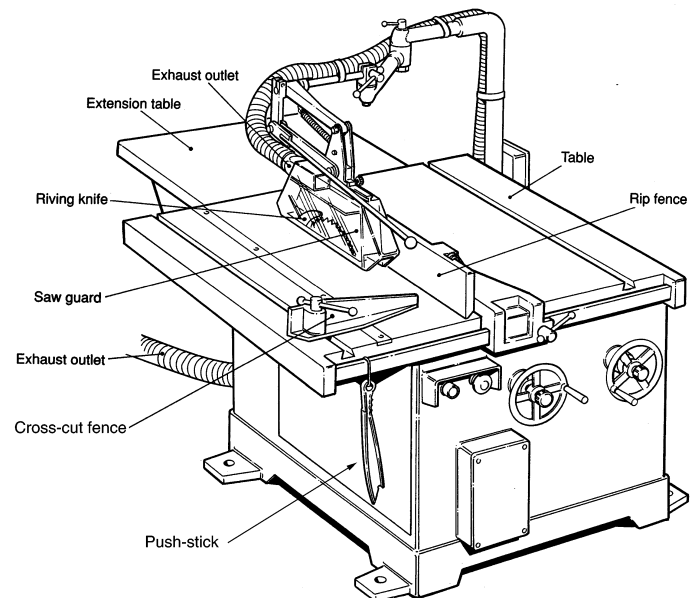


Figure 1 Circular saw

On unbraked machines, a braking device should be fitted no later than 5 December 2003.^{3,7}

Dull, badly set and badly ground saw blades produce poor quality work. They also increase the effort required for feeding and the risk of accidents. Deposits of gum or resin near the teeth tend to cause a saw to stall or the timber to stick. Never try to clean a running blade. The saw should be stopped, the blade removed and the resin removed with a proper scraper.

The diameter of the smallest saw blade that can be safely used should be marked on the machine. A small diameter blade (ie less than 60% of the diameter of the largest blade the saw can accommodate) will have a low peripheral blade speed and will cut inefficiently.

To effectively control wood dust, saw benches should be fitted with effective local exhaust ventilation both above and below the table (see Figure 1).⁸

Workpiece support

Adequate workpiece support is essential for all operations at a circular saw bench. Large workpieces should be supported using extension tables or roller supports at both the infeed and outfeed ends. If an assistant is employed at the outfeed end to remove cut pieces, the table should be extended so the distance between the saw blade spindle and the rear edge of the table is at least 1200 mm. The assistant should always remain at the outfeed end of the extension

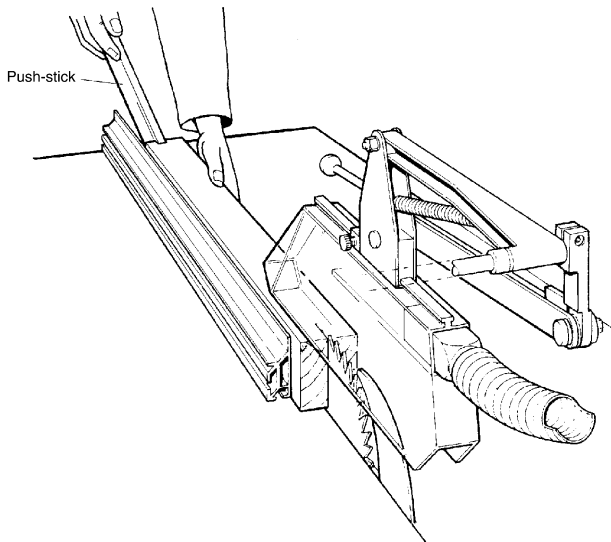


Figure 2(a) Normal fence position for ripping

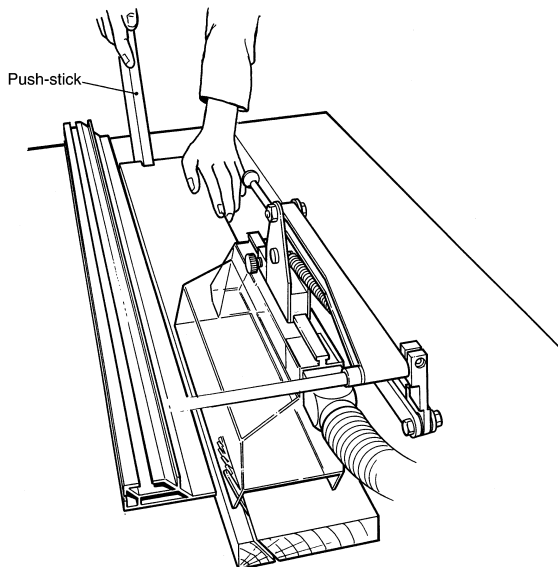


Figure 2(b) Low position fence for shallow or angled ripping

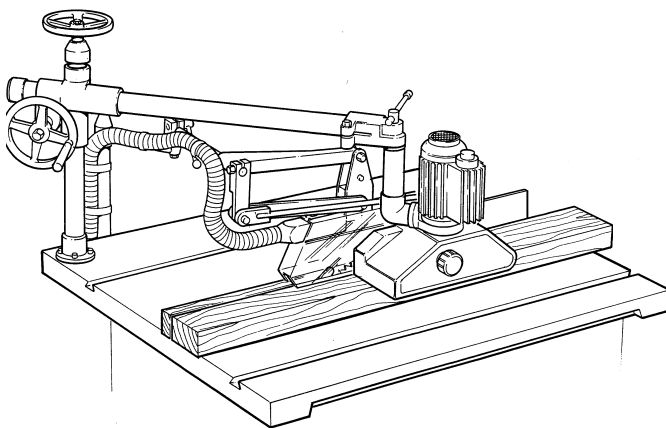


Figure 3 Using a demountable power feed

and should not reach forward towards the saw. Though the riving knife reduces the risk of contact, it cannot prevent it.

A rip fence or a cross-cut fence should be used to give adequate workpiece support during cutting (see Figure 2(a)). When cutting shallow or angled work the normal fence may need to be replaced with a low fence to aid the use of a push-stick and to prevent the canted saw blade touching the fence (see Figure 2(b)).

Timber with a round cross-section should not be cut on a bench saw unless the workpiece is adequately supported and held in position by a gripping device.

Use of a push-stick

A push-stick should always be used when making any cut less than 300 mm in length or when feeding the last 300 mm of a longer cut. The leading hand should never be closer than is necessary to the front of the saw and hands should never be in line with the saw blade.

A push-stick should always be used to remove the cut piece from between the saw blade and fence, unless the width of the cut piece exceeds 150 mm.

Use of power feed

A demountable power feed should be used whenever possible. This reduces the risk of contact with the saw blade (see Figure 3). A demountable power feed unit is not a substitute for a riving knife. The riving knife should be kept in position whenever a demountable power feed is used.

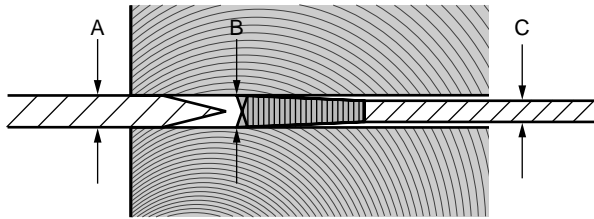
Ripping and cross-cutting

Safe ripping and cross-cutting relies on adequate workpiece support, correct positioning of the hands and the appropriate use of a push-stick, and also on the adjustment of the riving knife and saw guard.

Riving knives should have a chamfered leading edge, and should be thicker than the body of the saw blade, but slightly thinner than the width of cut (see Figure 4).

The riving knife should be rigid and set accurately in line with the saw. It should be shaped so the inner edge follows as closely as practicable the contours of the largest saw blade designed to be used on the machine (see Figure 5).

The saw guard should be strong and easily adjustable. It should be large enough and shaped so as to enclose as much of the blade as is practicable during the cutting operation. The saw guard should be fitted with a flange at either side and should be kept adjusted as close as possible to the surface of the workpiece (see Figure 6).



Key: A is riving knife thickness
 B is kerf of saw (width of cut)
 C is thickness of saw blade body

A to be greater than C but less than B

Figure 4 Thickness of riving knife in relation to the saw blade

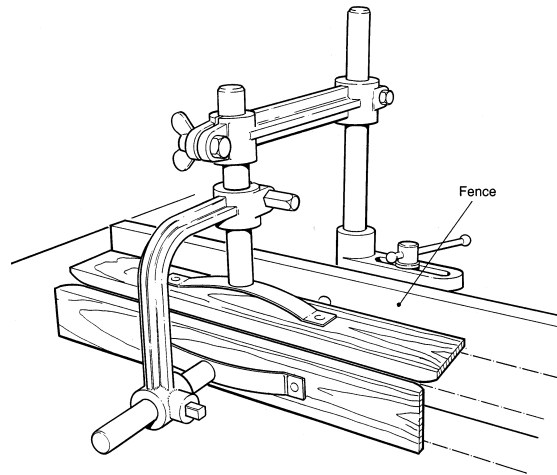


Figure 7 Saw guard for rebating and grooving on a saw bench

should project through the upper surface of the material being cut.

A suitable saw blade should be selected for the work. For example, when cross-cutting on a circular saw bench the ripping blade should be replaced with either a cross-cut or combination blade.

Rebating and grooving

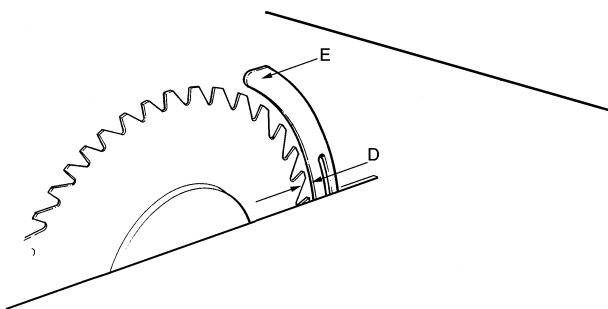
A circular saw should **not** be used for cutting a rebate or groove unless the blade is effectively guarded. This is because the normal saw guard cannot be used. Suitable alternative guards and fixtures are necessary. Figure 7 shows an example of one method for rebating or grooving using Shaw guards. Where practicable the tunnel formed by the pressure pads should be designed to meet the requirements of Table 4 of BS EN 294: 1992.⁹

Stopped grooving should **not** be done on a circular sawing machine. This should be done on a vertical spindle moulding machine.

Angled cutting and bevelling

Angled cuts can be made on a tilting arbor saw by inclining the saw blade to the required angle and feeding the workpiece as for ripping or cross-cutting. The fence should be set in its low position or an auxiliary fence used to prevent the possibility of the fence touching the rotating saw blade.

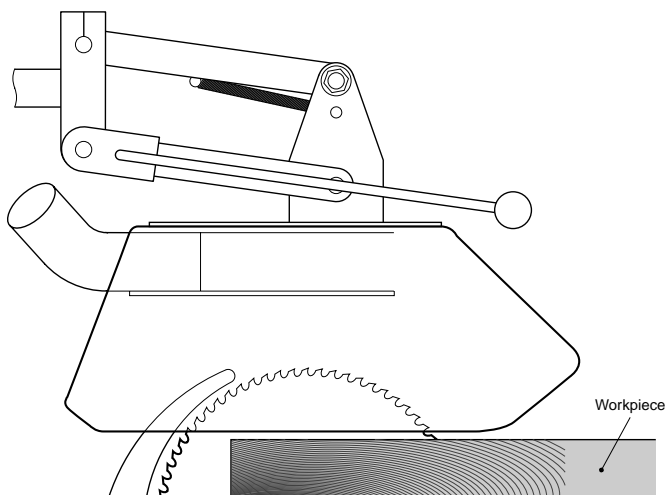
On machines with a fixed position spindle, a simple jig may be constructed to give adequate workpiece support during the cutting operation (see Figures 8(a) and 8(b)).



Note: 1 Distance D measured at table level should not exceed 8 mm. For blades greater than 600 mm diameter, E should be at least 225 mm above the table.

2 Guard removed for clarity.

Figure 5 Riving knife fixing



Note: The saw guard must be adjusted as close to the workpiece as possible

Figure 6 Setting of the saw guard

At all times during cutting, the teeth of the saw blade

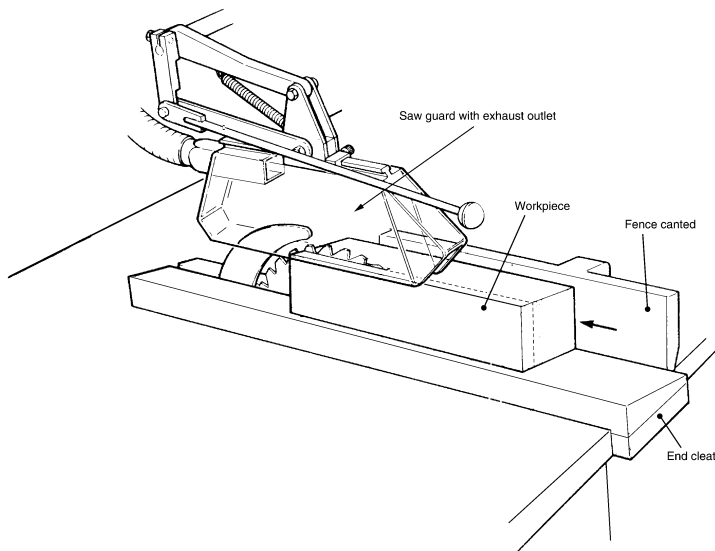


Figure 8(a) Bevel ripping

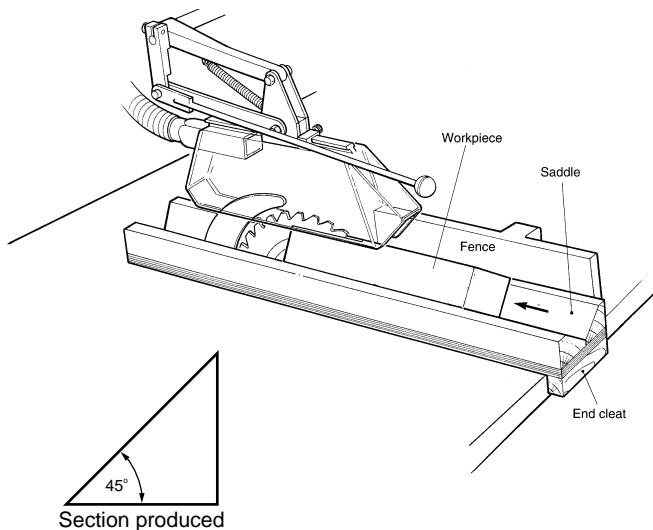


Figure 8(b) Angle ripping

References

- 1 *Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance* L22 HSE Books 1998 ISBN 0 7176 1626 6
- 2 *Management of health and safety at work. Management of Health and Safety at Work Regulations 1992. Approved Code of Practice* L21 HSE Books 1992 ISBN 0 7176 0412 8 (A new version of this booklet will be available in early 2000.)

3 *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 HSE Books 1998 ISBN 0 7176 1630 4

4 BS EN 1870-1: 1999 *Safety of woodworking machines - Circular sawing machines - Part 1: Circular saw benches (with and without sliding table) and dimension saws*

5 BS EN 847-1: 1997 *Tools for woodworking - Safety requirements - Part 1: Milling tools and circular saw blades*

6 *Accidents at woodworking machines* WIS7(rev1) HSE Books 1999

7 *PUWER 98: Retrofitting of braking to woodworking machines* WIS38 HSE Books 1998

8 *LEV: dust capture at sawing machines* WIS24 HSE Books 1992

9 BS EN 294: 1992 *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs*

While every effort has been made to ensure the accuracy of the references listed in this publication, their future availability cannot be guaranteed.

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