NELSA

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Workshop Safety

A Guide to Guarding
Small Machine Tools Used in Workshops
Third Edition

Procter Machine Guarding

The UK's leading machine guarding specialist

Workshops are encountered in a diverse range of industrial, commercial, educational and other establishments, not just within the manufacturing industries. While some workshops contain a considerable number and variety of machines, others have little more than a drill, a press and a set of hand tools. In all cases, however, it is important to ensure that the machinery is adequately guarded, as machinery is frequently involved with accidents resulting in minor, serious and even fatal injuries. Statistics from the HSE underline the fact that the hazards often translate into real accidents.

HSE statistics for 2009/10 show that contact with moving machinery was responsible for significant numbers of injuries and fatalities in the manufacturing industries alone. Not all of these will have involved workshop machinery, but the figures nevertheless highlight how dangerous machinery can be:

- 1542 out of 15,047 over-three-day injuries (10%)
- 599 out of 4015 non-fatal major injuries (15%)
- 2 out of 23 fatalities (9%)

In fact the number of non-fatal injuries is likely to be much higher than these figures suggest, as it is estimated that just over half of non-fatal injuries to employees are actually reported, with the self-employed reporting an even smaller proportion.
Source: HSE statistics for 2009/10

If the moral argument is not, in itself, a sufficient reason to guard machinery, it should be borne in mind there are also regulatory requirements relating to the safety of machinery and work equipment. Furthermore, the costs associated with an accident are likely to exceed by far the cost of providing guarding.

Fortunately the subject of machine guarding is well understood by specialist suppliers, so stakeholders need not worry that their guarding requirements will be difficult to meet; virtually all standard machine types have been equipped with suitable guarding at some time, and bespoke guards for non-standard machinery can be manufactured and installed very cost-effectively.

This present guide is not intended to be a comprehensive treatise on health and safety in workshops; rather it provides advice and guidance relating to safeguarding of the physical hazards presented by machine tools typically found in workshops within the UK. Note that special cases - such as woodworking machinery and power presses - are excluded, as are welding and cutting equipment, portable power tools, lifting equipment, and degreasing, painting and finishing equipment. Stakeholders are advised to assess health and safety issues relating to these too, as the hazards can be at least as severe as those relating to basic machine tools.

Guarding: Costs And Benefits

Where, for example, guarding has been removed for machine maintenance and not replaced, rectifying this situation is straightforward and costs almost nothing. However, it is inevitable that most machinery that is inadequately guarded will need money to be spent in order to bring it up to an acceptable standard.

Spending on health and safety is occasionally viewed as an investment that gives little or no return, but working out what the cost of an accident would be can show the opposite to be true: accidents are extremely costly in terms of lost time, lost production, sick leave, fines, legal costs, increased insurance premiums, and so on. These costs alone could easily amount to tens of thousands of pounds.

Example Prosecution

A company was fined £500 and ordered to pay costs of £2,287.76 after an employee's little finger was amputated in the unguarded rotating part of a pedestal drill. The employee was using the machine to de-burr holes when his cotton glove became caught in the tool.

The HSE brought a charge against the company under Regulation 11(1) of the Provision and Use of Work Equipment Regulations 1998 and the court found that the company had failed to ensure that effective measures were taken in order to prevent access to dangerous parts of machinery during the de-burring task.

Regulations And Legislation

Safeguarding of workshop machinery is covered in various ways by the following:

- The Health and Safety at Work etc Act 1974
- The Supply of Machinery (Safety) Regulations 2008
- The Provision and Use of Work Equipment Regulations 1998
- The Management of Health and Safety at Work Regulations 1999

In addition, residual risks are often managed using PPE (personal protective equipment), which is covered by The Personal Protective Equipment at Work Regulations 1992. (as amended)

Machinery almost always generates noise; while emissions from individual machines are covered by The Supply of Machinery (Safety) Regulations, noise in working environments is additionally covered by The Noise at Work Regulations 1989.

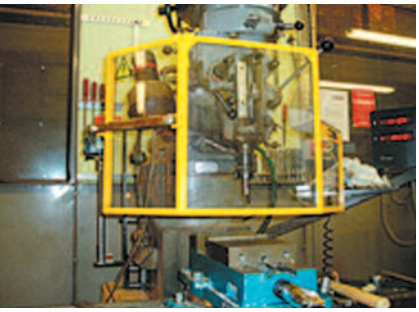
Numerous British, European and International standards provide information about safeguarding machinery (see below). While compliance with the standards is not compulsory, doing so will normally be sufficient to satisfy the necessary legal requirements. There are also official guidance documents and codes of practice that should be consulted and complied with as appropriate.

Workshops in Schools and Colleges

Workshops in schools and colleges present a particular challenge due to the young, inexperienced and occasionally foolish nature of the students using or observing operations. BSI has therefore published BS 4163: 2007, *Health and safety for design and technology in schools and similar establishments - Code of practice*. This covers the full spectrum of health and safety, including machine guarding.

Machines in educational establishments are typically not used as much as their equivalents in production environments, so older machines may continue to be used for longer. If still fitted with their original guards and safety-related control systems - or even if they have been upgraded - older machines might therefore have safeguards that are not up to the current standards. Establishments with older machinery should therefore take note of BS 4163 subclause 2.3, which states that the phrases 'as far as reasonably practicable' and 'adequate control' should be understood to mean that up-to-date good practice is applied as appropriate. Fortunately, subclause 2.3 also goes on to clarify how far establishments should go in applying control measures.

Schools, colleges and similar establishments fall within the scope of the Health and Safety at Work etc Act 1974, the Management of Health and Safety at Work Regulations 1999 and the Provision and Use of Work Equipment Regulations 1992. Although there is no legal requirement to comply with the Code of practice BS 4163, doing so demonstrates that reasonably practicable steps have been taken to minimise the risks from machinery and other hazards.



General Requirements For Machine Guards

Most machine-related accidents involve operators loading or unloading components, removing swarf, taking measurements or making adjustments (eg to the coolant supply). On manually-operated machines, operators are typically injured by the moving tool. Automatic and CNC machines also present hazards through movement of machine elements. Injuries range from minor cuts and abrasions through to eye injuries, broken bones, dislocations and amputations (fingers and hands are not infrequently lost). Fatalities can also occur, often arising from hair or loose clothing becoming entangled with moving machinery.

Many of these incidents can be prevented by means of fixed guards, often in conjunction with jigs and fixtures (to make loading and unloading of components safer), and safe means of setting up, removing swarf, taking measurements and making adjustments. Note that measures can either prevent access to dangerous parts or prevent access until such time as the parts are no longer dangerous (eg on machinery that has a run-down time).

Regulation 11(2) of PUWER 98 specifies the measures that should be taken to prevent access to dangerous parts of machinery. These measures should be adopted, where practicable, in the following order:

(a) fixed enclosing guards;
(b) other guards or protection devices such as interlocked guards and pressure mats;
(c) protection appliances such as jigs, holders and push-sticks; and
(d) the provision of information, instruction, training and supervision.

If a workshop contains machinery that is known or suspected of having inadequate guarding, then this should be addressed as a priority. And although all workshops should by now have undertaken a PUWER assessment, with the risks assessed and recorded for each item of machinery and work equipment, it is possible that the assessments have not been kept up to date or were never performed at all.

When looking at machinery, bear in mind that older machines might have their original guards in place but these might not meet today's standards - especially if the machinery was built prior to 1992 (when PUWER was first introduced) or 1995 (when the Machinery Directive was first introduced). Beware of machinery that has had safety-related modifications carried out in the past, as the state of the art may have evolved further since the time of the modifications. In addition, pay particular attention to machinery that has been bought second-hand, either as an item of equipment in its own right or as an asset of a business that has been acquired. Look closely at all machinery to see whether guards have been damaged or discarded and not repaired or replaced.

If the original guards are reinstated or new guarding installed, check that all controls can still be accessed and that the lighting is adequate for the machinery as it is currently being used.

Just because a machine has, say, a safety interlock on a movable guard, do not assume that this provides adequate safety. Some interlocks are easier to override or bypass than others, so both the type of interlock and the associated safety circuit need to be checked.

Machinery that has been upgraded - such as with CNC - warrants close attention, and do not neglect non-powered equipment such as fly presses, treadle guillotines and hand-operated folding machines. In addition, assess all of the machinery that is located outside the workshop (eg in a research laboratory, assembly area or tool room).

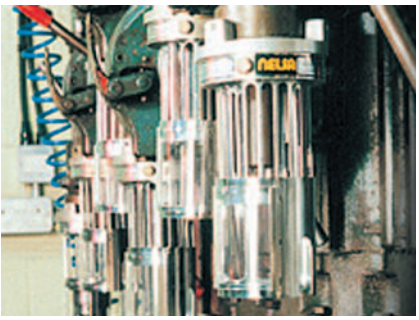
Guards must be well designed so that they provide good visibility, access to controls, and do not hinder operation, setting or maintenance of the machine. Applying these principles will minimise the temptation to override or bypass guards and interlocks. Note that retrofitted guards should not introduce new hazards (unless those hazards are very minor in comparison with the hazards being safeguarded).

Before carrying out any work on machinery guarding or safety measures, perform a risk assessment and ensure that the following are taken into account: the intended use of the machinery; how the machine is likely to be used; how the machine might be misused; the people likely to use the machine, and their skills. For more information about risk assessments, see the Risk Assessment Calculator in the Useful Resources section below.

Finally, remember that machinery must only be used for its intended purpose, all users should be adequately trained and, where appropriate, instructions should be available in English and the language of the person using the machine.

Machine Types

Further to the general requirements outlined above, the following notes will help to ensure that guarding is adequate on specific types of machine likely to be found in workshops.



Drilling Machines

For manually operated bench or pillar drills, telescopic guards are often a simple and cost-effective way of preventing access to the dangerous parts and also helping to contain swarf. When the drill is not operating, such guards provide good access to the chuck, drill bit and workpiece, which should normally be held securely by means of a vice or jig/fixture (serious injuries can result from loose workpieces that spin after the drill bit has become jammed or that ride up the drill when it breaks through). Note that most accidents with drilling machines occur at the drill tip when it is in its uppermost position and the operator is removing the workpiece or securing the next; guarding of the drill (in addition to the chuck and spindle) can therefore provide a high standard of protection without obstructing the view of the workpiece or otherwise interfering with production. Where practicable, guards should be used in preference to trip devices, as trip devices merely reduce the severity of injury and do not prevent entanglement with the rotating parts of the drilling machine.

Manually operated drilling machines may be used for producing various batch sizes. Depending on the batch size and the component dimensions, it might be appropriate to install a fixed guard, together with other measures to keep the operator's hands away from the dangerous parts - such as a feed magazine and discharge slide.

If the drill speed is altered by means of gears or an arrangement of pulleys and belts, the corresponding guard should be electrically interlocked to prevent the machine from starting while the guard is open.

Radial arm drilling machines are often best safeguarded using fixed, adjustable guards. A vertical tripping device linked to DC injection braking may also be required, depending on the application and hazards. Some older types of radial drilling machines have horizontal and vertical shafts that transmit the drive to the drill, rather than the more modern arrangement of a motor built into the saddle. These exposed shafts should be protected using telescopic guards.

Small CNC drilling machines are best protected using fixed guards and interlocked movable guards. If access to the moving machine is required during setting, then it should be equipped with a hold-to-run device and the movements should have their speed restricted to a safer level.

Because of the nature of drilling work, operators are often tempted to wear gloves to protect against cuts and contact with cutting fluids. However, wearing gloves when drilling greatly increases the risk and severity of injuries; the HSE claims that nearly half of all accidents at drilling machines involve gloves becoming entangled. It is therefore recommended that other hand-care measures should be used (such as carefully selected cutting fluids and the provision of barrier creams and after-work conditioning creams) or, if gloves are still felt to be necessary, particular care should be taken in designing and maintaining protective measures. In addition, gloves should be selected that are less likely to become entangled or, if they do, tear easily.

Milling Machines

For a manual horizontal milling machine, a combination of fixed guards and adjustable (using tools) fixed guards is likely to be the most appropriate safeguard. A false table can help to restrict access to the cutter.

On horizontal and vertical milling machines used for one-off or batch production, a combination of fixed and interlocked moveable guards is likely to be the optimum safety measure. Alternatively, an adjustable table guard may be adequate. Either way, the guards should still give good process visibility when closed and clear access when opened. If the machine has a manual quill feed arm, the guard should provide access to this as well.

CNC milling machines and machining centres are best equipped with fixed guards and interlocked moveable guards to prevent access to all dangerous parts (not just cutters). If access to the machine is required with the guards open (eg during setting), then a hold-to-run control should be used to enable the machine to operate at safe slow speeds. If workpiece transfer devices, automated tool changers or swarf collection/removal systems operate in conjunction with the milling machine or machining centre, then these must be adequately guarded too.

Vertical boring machines

In many respects vertical boring machines are similar to milling machines, as borne out by the fact hat both are covered by the same machinery safety standard, BS EN 13128 (see the table of standards below). As with milling machines, the safeguards tend to be very different, depending on whether the machine is operated manually or automatically by means of NC or CNC. Typically manual machines require close-fitting guards that do not hinder access to the controls, while NC/CNC machines are fully enclosed. Additional safeguards may also be necessary for other hazardous parts of the machine such as swarf conveyors and automatic tool changers.

Lathes

The optimum safeguards for lathes depend on the model and size of lathe, as well as the type and size of chuck and workpiece. In most cases a fixed guard will be required at the rear of the machine, plus there will need to be a means of guarding the chuck and feed and lead screws. Guards can be mounted on the headstock or saddle, and they are usually interlocked so as to stop the lathe in the event of the guard being opened.

In addition, protective screens (sometimes referred to as chip guards) can prevent swarf and coolant being ejected out of the machine. If equipped with a magnetic base and an adjustable support, this type of protective screen can be located easily in the optimum position.

CNC lathes normally benefit from a combination of fixed guards and sliding interlocked guards. If access to the lathe is necessary with the guards open, it should be equipped with a hold-to-run device that enables safe, slow-speed operation.

Note that it is also important to guard any stock bar projecting beyond the headstock.

Grinding Machines

Grinding machines are often installed in workshops for off hand grinding and tool sharpening. As well as protecting the operator from contact with the moving wheel, the guarding must also contain fragments in the event of the wheel bursting.

Typically the guarding on a pedestal grinding machine will be upgraded by adding an adjustable protective screen with a clear viewing panel.

Saws

Manually-fed, pivoting-head circular saws can cause injuries when workpieces are fed into, adjusted in or retrieved from the saw. Guards should prevent access to the saw blade when the saw head is in the raised position, and minimise the amount of the blade that is exposed during cutting. Self-adjusting guards using mechanical linkages are preferred; blade guards that rely on gravity for their adjustment are not considered to be fully effective. If a mechanically linked guard cannot be installed, a hold-to-run control should be mounted on the operating handle so that when the handle is released the power to the saw blade is removed. Alternatively, if the saw is only used for one operation and rarely requires resetting, then fixed guards can be attached to the machine table.

Presses

Note: The following information applies only to hand- and foot-operated presses. Powered presses are not covered here, as they are a specialist case with particular requirements due to the nature of the hazards they present.

Hand- and foot-operated presses, often referred to as fly presses, may be used for one-off operations or batch production. Different types of guarding may be appropriate in each case.

Where practicable, fixed guards or closed tools should be used to prevent access to dangerous parts, yet it must remain possible to feed the workpiece into and out of the press. As an alternative, devices can be used to restrict the maximum opening.

If the measures outlined above are insufficient to prevent access to all dangerous parts, interlocked guards can be used to prevent the tool from closing unless the guard is closed.

Should none of the above be practicable, other devices may be used; for example, sweep-away guards can be set so as to sweep across the area in front of the tool as the press operates, thereby either moving the operator's (or other person's) fingers out of the way or stopping the press.

Other Measures Relating To Machinery Safety

While this guide is focused on machinery guarding, it is pertinent to mention other machine-related issues to be aware of in workshops. More information about these is available from other sources (see later).

- Training, operating procedures and the availability of machine instructions
- Machine-generated noise
- Machine-generated vibration
- Coolants and other chemicals that can cause skin diseases
- Dusts and fumes that can cause respiratory and eye diseases
- Chips and swarf that can cause eye injuries
- Sharp tools, workpieces and swarf
- Hot tools and workpieces
- Lifting of heavy workpieces and tooling
- Maintenance and periodic inspection of safety-related equipment
- Warning signs
- PPE
- Housekeeping (eg clearing away spilt coolant or lubricants, and tidying trailing cables and other trip hazards)
- Working alone

Standards

There is an extensive range of British, European and International standards that may be applicable to machine guarding in workshops. This present guide cannot advise which standards apply in particular situations; it is the stakeholder's duty to ensure the health and safety of employees and others in the workshop. Remember that compliance with standards is not mandatory, though doing so will usually be sufficient to meet the necessary legislative requirements.

BS 4163:2007	Health and safety for design and technology in schools and similar establishments - Code of practice
BS EN 349:1993 +A1:2008	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
BS EN 574:1996 +A1:2008	Safety of machinery. Two-hand control devices. Functional aspects. Principles for design
BS EN 614-1:2006 +A1:2009	Safety of machinery. Ergonomic design principles. Terminology and general principles
BS EN 614-2:2000 +A1:2008	Safety of machinery. Ergonomic design principles. Interactions between the design of machinery and work tasks
BS EN 626-1:1994 +A1:2008	Safety of machinery. Reduction of risks to health from hazardous substances emitted by machinery. Principles and specifications for machinery manufacturers
BS EN 626-2:1996 +A1:2008	Safety of machinery. Reduction of risk to health from hazardous substances emitted by machinery. Methodology leading to verification procedures
BS EN 894-1:1997 +A1:2008	Safety of machinery. Ergonomics requirements for the design of displays and control actuators. General principles for human interactions with displays and control actuators
BS EN 894-2:1997 +A1:2008	Safety of machinery. Ergonomics requirements for the design of displays and control actuators. Displays
BS EN 894-3:2000 +A1:2008	Safety of machinery. Ergonomics requirements for the design of displays and control actuators. Control actuators
BS EN 894-4:2010	Safety of machinery. Ergonomics requirements for the design of displays and control actuators. Location and arrangement of displays and control actuators

BS EN 953:1997 +A1:2009	Safety of machinery. Guards. General requirements for the design and construction of fixed and movable guards
BS EN 954-1:1997	Safety of machinery. Safety related parts of control systems. General principles for design *NB This standard is officially both 'current' and superseded by BS EN ISO 13849-1:2008. However, BS EN 954-1 will be withdrawn at the end of 2011.*
BS EN 1005-1:2001 +A1:2008	Safety of machinery. Human physical performance. Terms and definitions
BS EN 1005-2:2003 +A1:2008	Safety of machinery. Human physical performance. Manual handling of machinery and component parts of machinery
BS EN 1005-3:2002 +A1:2008	Safety of machinery. Human physical performance. Recommended force limits for machinery operation
BS EN 1005-4:2005 +A1:2008	Safety of machinery. Human physical performance. Evaluation of working postures and movements in relation to machinery
BS EN 1005-5:2007	Safety of machinery. Human physical performance. Risk assessment for repetitive handling at high frequency
BS EN 1037:1995 +A1:2008	Safety of machinery. Prevention of unexpected start-up
BS EN 1088:1995 +A2:2008	Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
BS EN 1760-1:1997 +A1:2009	Safety of machinery. Pressure sensitive protective devices. General principles for the design and testing of pressure sensitive mats and pressure sensitive floors
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

BS EN 1760-3:2004 +A1:2009	Safety of machinery. Pressure sensitive protective devices. General principles for the design and testing of pressure sensitive bumpers, plates, wires and similar devices
BS EN 1837:1999 +A1:2009	Safety of machinery. Integral lighting of machines
BS EN ISO 4413:2010	Hydraulic fluid power. General rules and safety requirements for systems and their components
BS EN ISO 4414:2010	Pneumatic fluid power. General rules and safety requirements for systems and their components
BS EN 13128:2001 +A2:2009	Safety of machine tools. Milling machines (including boring machines)
BS EN 13478:2001 +A1:2008	Safety of machinery. Fire prevention and protection
BS EN ISO 13855:2010	Safety of machinery. Positioning of safeguards with respect to the approach speeds of parts of the human body
BS EN 60204-1:2006 +A1:2009	Safety of machinery. Electrical equipment of machines. General requirements
BS EN 60529:1992	Degrees of protection provided by enclosures (IP code)
BS EN 60825-1:2007	Safety of laser products. Equipment classification and requirements
BS EN 60825-4:2006 +A2:2011	Safety of laser products. Laser guards
BS EN 61000-6-2:2005	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
BS EN 61000-6-4:2007 +A1:2011	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments
BS EN 61496-1:2004 +A1:2008	Safety of machinery. Electro-sensitive protective equipment. General requirements and tests
BS EN 61496-3:2001	Safety of machinery. Electro-sensitive protective equipment. Particular requirements for active opto-electronic protective devices responsive to diffuse reflection (AOPDDR)
BS EN 62061:2005	Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems

BS EN ISO 3744:2010	Acoustics. Determination of sound power levels of noise sources using sound pressure. Engineering method in an essentially free field over a reflecting plane
BS EN ISO 3746:2010	Acoustics. Determination of sound power levels of noise sources using sound pressure. Survey method using an enveloping measurement surface over a reflecting plane
BS EN ISO 4871:2009	Acoustics. Declaration and verification of noise emission values of machinery and equipment
BS EN ISO 7731:2008	Ergonomics. Danger signals for public and work areas. Auditory danger signals
BS EN ISO 9614-1:2009	Acoustics. Determination of sound power levels of noise sources using sound intensity. Measurement at discrete points
BS EN ISO 9614-2:1997	Acoustics. Determination of sound power levels of noise sources using sound intensity. Measurement by scanning
BS EN ISO 9614-3:2009	Acoustics. Determination of sound power levels of noise sources using sound intensity. Precision method for measurement by scanning
BS EN ISO 11202:2010	Acoustics. Noise emitted by machinery and equipment. Measurement of emission sound pressure levels at a work station and at other specified positions. Survey method in situ
BS EN ISO 11204:2010	Acoustics. Noise emitted by machinery and equipment. Measurement of emission sound pressure levels at a work station and at other specified positions. Method requiring environmental corrections
BS EN ISO 11688-1:2009	Acoustics. Recommended practice for the design of low-noise machinery and equipment. Planning
BS EN ISO/TR 11688-2:2001	Acoustics. Recommended practice for the design of low-noise machinery and equipment. Introduction to the physics of low-noise design
BS EN ISO 12100:2010	Safety of machinery. General principles for design. Risk assessment and risk reduction
BS EN ISO 13849-1:2008	Safety of machinery. Safety-related parts of control systems. General principles for design

BS EN ISO 13857:2008	Safety of machinery. Safety distances to prevent hazard zones being reached by upper and lower limbs
BS EN ISO 14122-1:2001 +A1:2010	Safety of machinery. Permanent means of access to machinery. Choice of a fixed means of access between two levels
BS EN ISO 14122-2:2001 +A1:2010	Safety of machinery. Permanent means of access to machinery. Working platforms and walkways
BS EN ISO 14122-3:2001 +A1:2010	Safety of machinery. Permanent means of access to machinery. Stairways, stepladders and guard-rails
BS EN ISO 14122-4:2004 +A1:2010	Safety of machinery. Permanent means of access to machinery. Fixed ladders
BS EN ISO 15641:2001	Milling cutters for high speed machining. Safety requirements
BS EN 61000-6-2:2005	Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
BS EN 61000-6-4:2007 +A1:2011	Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments
PD ISO/TR 18569:2004	Safety of machinery. Guidelines for the understanding and use of safety of machinery standards.
DD CLC/TS 61496-2:2006	Safety of machinery. Electro-sensitive protective equipment. Particular requirements for equipment using active opto-electronic protective devices (AOPDs)
PD IEC/TR 61496-4:2007	Safety of machinery. Electro-sensitive protective equipment. Particular requirements for equipment using vision based protective devices (VBPD)

Official Information And Guidance

Almost all of the following documents are published by the HSE (Health and Safety Executive (or HSC - Health and Safety Commission, as it was), though one item is published by BIS (the Department for Business, Innovation and Skills). HSE documents are generally available as free PDF downloads or can be purchased as hard copies.

ISBN 9780717662852	PUWER 1998. Provision and Use of Work Equipment Regulations 1998: Open learning guidance (HSE)
URN 95/650	Product Standards. Machinery: guidance notes on UK regulations (BIS)
EIS2	Accidents at metalworking lathes using emery cloth (HSE)
EIS7	Safeguarding 3 roll bending machines (HSE)
EIS12	Safety at manually-fed pivoting-head metal-cutting circular saws (HSE)
EIS13	Safeguarding of combination metalworking machines (HSE)
EIS19	Engineering machine tools - Retrofitting CNC (HSE)
EIS27	Control of noise at metal-cutting saws (HSE)
EIS28	Safeguarding at horizontal boring machines (HSE)
EIS30	Safety in the use of hand- and foot-operated presses (HSE)
EIS33	CNC turning machines: Controlling risks from ejected parts (HSE)
HSG17	Safety in the Use of Abrasive Wheels (HSE)
HSG38	Lighting at Work (HSE)
HSG129	Health and Safety in Engineering Workshops (HSE)
HSG180	Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery (HSE)
INDG163	Five Steps to Risk Assessment (HSE)
INDG174	A short guide to the Personal Protective Equipment at Work Regulations 1992 (HSE)
INDG229	Using Work Equipment Safely (HSE)

INDG244	Workplace health, safety and welfare. A short guide for managers (HSE)
INDG362	Noise at work. Guidance for employers on the Control of Noise at Work Regulations 2005 (HSE)
L21	Management of health and safety at work. Management of Health and Safety at Work Regulations 1999. Approved Code of Practice and guidance (HSE)
L22	Safe use of work equipment. Provision and Use of Work Equipment Regulations 1998. Approved Code of Practice and guidance (HSE)
L24	Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice (HSE)
L64	Safety signs and signals - The Health and Safety (Safety Signs and Signals) Regulations 1996. Guidance on regulations (HSE)
PM83	Drilling machines. Guarding of spindles and attachments (HSE)

Useful Resources

Free Risk Assessment Calculator

Based on the requirements of BS EN ISO 12100 and designed to be simple to use.
Email: RA@procterbedwas.co.uk
Download: www.machinesafety.co.uk/free-machine-safety-guides/view-category/

Free Machine Accident Investigation Kit

To help companies meet their statutory obligations and prevent future accidents.
Email: MAIK@procterbedwas.co.uk
Download: www.machinesafety.co.uk/free-machine-safety-guides/view-category/

Free Guide to the New Machinery Directive 2006/42/EC

To help companies comply with the new Machinery Directive that came into force on 29 December 2009.
Email: NMD@procterbedwas.co.uk
Download: www.machinesafety.co.uk/free-machine-safety-guides/view-category/

Further Information

Procter Machine Guarding (bespoke guards)

Tel: 02920 855758 – Fax: 02920 887005

Email: guards@procterbedwas.co.uk – Website: www.machinesafety.co.uk

Nelsa Standard Machine Shop Guards from Procter

Tel: 02920 855751 – Fax: 02920 887005

Email: nelsa@procterbedwas.co.uk – Website: www.nelsaguards.co.uk

Angel (modular guards)

Tel: 02920 882222 – Fax: 02920 887005

Email: angel@procterbedwas.co.uk – Website: www.machinesafety.co.uk/angel

Satech (low-cost modular guards)

Tel: 02920 882222 – Fax: 02920 887005

Email: satech@procterbedwas.co.uk – Website: www.machinesafety.co.uk/satech-perimeter-guarding/

BSI

Tel: 020 8996 9001 – Fax: 020 8996 7001

Email: cservices@bsigroup.com – Website: www.bsigroup.com

Health and Safety Executive (Infoline)

Tel: 0845 345 0055

Email: hse.infoline@santia.co.uk – Website: www.hse.gov.uk

HSE Books

Note: Many publications are now available to download for free as PDF files.

Tel: 01787 881165 – Fax: 01787 313995

Email: hsebooks@prolog.uk.com – Website: http://books.hse.gov.uk

Department for Business, Innovation and Skills, BIS (previously BERR and DTI)

Tel: 020 7215 5000 – Fax: 020 7215 0105

Email: enquiries@bis.gsi.gov.uk – Website: www.bis.gov.uk

European Commission

List of standards harmonised to the Machinery Directive
2006/42/EC and a PDF of the official guide to the application of the Directive
http://ec.europa.eu/enterprise/newapproach/standardization/harmstds/reflist/machines.html
Note: The new Machinery Directive 2006/42/EC came into force on 29 December 2009

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