

INDEX 

Health and Safety Executive		Sector Information Minute	
Manufacturing		SIM 03/2003/04	
Cancellation Date	11/03/2007	Open Government Status	Fully Open
Version No & Date	1: 11/03/2003	Author Unit/Section	Engineering & Utilities Sector - Birmingham

Target Audience
 FOD Inspectors
 SG Specialist Inspectors (Mech and Elec)

THE SAFEGUARDING OF PRESS BRAKES

This SIM describes the standard of safeguarding required on both new and existing hydraulic and mechanical press brakes. It updates and replaces NIGM 3/A/1998/9 and NIGM 3/A/1997/25.

INTRODUCTION

1 The safeguarding arrangements that should be provided at press brakes have been well established in previous guidance for many years. The information contained in the booklet *Press Brakes* (see [para 49](#)) and previously in NIGM 3/A/1998/9 and FIC 664/35 described the necessary standards.

2 Some modification to the previous position is necessary, in the light of technological developments in the design and construction of press brakes and the safety requirements for new machines which are set out in BSEN 12622:2001 *Machine tools - Safety - Hydraulic press brakes*. Inspectors should note that this CEN Standard only applies to hydraulic press brakes, and then only to new machines manufactured after the date of publication.

3 The British Standards referred to in this SIM can be accessed via the Internet on BS Online. A user guide to BS Online, prepared by DIAS, can be accessed via on the [intranet / HSE Information Services/ Information Services](#). To gain access to the full-text standards registration is first necessary; access is then by user name and password.

TYPES OF PRESS BRAKE

4 Press brakes are used for bending operations on sheet or plate material to form a whole range of components from simple ones with only a few bends to those which are very complex. The workpiece usually starts as a pre-cut blank which can also be pre-punched or slit to make, for example, box-sections. Press brakes typically range in size from about one metre up to 3 or 4 metres in width but can be much wider.

5 Depending on size of the machine the work material can be manually loaded and manipulated through the various bending operations or loaded using mechanical means. The use of powered work piece supports which hold/support the work material through the bending movement are becoming more common. Machines are often fitted with automatic powered back gauges which are used for the positioning of the work piece in a preset bending sequence.

6 As well as tools which take up the full width of the bed, a machine may be fitted with several different tooling arrangements, with gaps in between, across the width. This allows more complex bending sequences to be performed without the need to change tooling. Special tooling is sometimes fitted to press brakes to enable simple punching operations to be performed. Modern CNC controlled machines, used for high volume applications, can also be fitted with automatic sheet feeding, loading and unloading systems which incorporate material storage and transfer systems.

7 Press brakes may be mechanical, ie driven through a clutch, or hydraulically powered. Mechanical press brakes are subject to the requirements of PUWER part IV as they also fall within the definition of a 'power press', ie requiring an initial and periodic thorough examination and test, etc. Hydraulic machines would normally require an initial and periodic inspection under PUWER reg.6. Hydraulic press brakes are usually down stroking but there are some upstroking models. There is no particular distinction to be made in the standard of safeguarding required between down stroking and upstroking types.

8 Few, if any, new mechanical press brakes are now made or supplied in the UK or elsewhere in Europe. A limited number of reconditioned machines may be sold but most of the mechanical press brakes seen will be old. The majority of press brakes likely to be encountered will be hydraulically powered.

9 The advice in this SIM does not apply to bending machines such as the Keetona Hydroform or to similar machines marketed by other manufacturers. These are not press brakes. These machines are described, together with the safeguards required, in FIC 664/31. Updated guidance dealing with this type of machine is being prepared.

ACCIDENT HISTORY

10 Accidents continue to occur at the tools of machines which are unguarded or where the mute gap has been incorrectly set, eg above 6 mm (see [paras 20-25](#)). Injuries also happen at machines which are correctly guarded but the operator has their finger(s) trapped between the moving work piece and the machine frame during the bending process. This is one of the more common causes of injury at press brakes. There are no engineering controls specifically recommended to prevent trapping between the workpiece and the machine frame. Workpiece supports can help reduce the risks where they are suitable for the application but the risk of trapping should be considered as part of the safe systems of work for manually supporting the workpiece for each application, ie how and where the workpiece should be held for each bend. Injuries have also occurred at the trap created between the rear of the bottom tool and stops fitted to powered back gauges (see [para 44](#)).

GUARDING - OPERATING POSITION

11 The tools of all types of press brakes are dangerous parts of machinery and require safeguarding. Different types of safeguarding systems will be seen in use. These include mechanical guarding, electro-sensitive protective equipment (ESPE), eg light curtains (known as 'photo-electrics' or active opto-electronic protective devices (AOPDs) - this is the most common safeguard), pressure-sensitive mats, 'limited gap' between tools and slow movement with hold to run controls. A recent development in press brake guarding is an AOPD which utilises laser beams operating at the gap between the tools of the press brake (see [para 26](#)).

12 The circumstances in which the above options may or may not be acceptable are outlined in the paragraphs below.

MECHANICAL GUARDING

13 Mechanical guards of an early rising or push away type have been used in the past on mechanical press brakes. Some may be found still in use, but they are becoming increasingly rare. They are not supplied on new machines. If properly installed and maintained they remain an acceptable form of guarding. However, inspectors should look critically at the suitability of these guards for the type of work being carried out, and seek replacement with an alternative system of guarding where they are not suitable/effective and satisfactory maintenance cannot be achieved, eg due to the availability of spares. This is particularly necessary for the early rising screen type.

ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT (ESPE)

14 No mechanical press brake fitted with a band brake should be fitted with an ESPE system of safeguarding unless a friction clutch/brake unit is fitted to replace the band brake (see [Appendix](#) which replaces NIGM 3/A/1997/25).

15 Photo-electric devices or light curtains have been used for many years on both mechanical and hydraulic press brakes. Very old light curtains may be of the 'white light' type but these have now been largely replaced by the more common infra red type.

16 Where older devices, which are still in service, are made to BS 6491 *Specification for Electro-Sensitive Safety Systems for Industrial Machines*; are properly interfaced with machine controls and properly maintained, they are acceptable. New machines should be provided with ESPEs (AOPDs) to the standard in BS EN 61496-1 and BS EN 61496-2 *Safety of Machinery - electro-sensitive protective equipment*.

17 It should be noted that the terminology for these devices is variable. 'Electro-sensitive devices' is the term used in the Supply of Machinery (Safety) Regulations 1992 Schedule 4 (as amended) - similar to the traditional 'electro-sensitive safety device' (ESSD). BS 6491 uses "electro-sensitive safety system" (ESSS), and the ENs use "electro-sensitive protective equipment" (ESPE) using "active opto-electronic protective devices" (AOPDs).

18 Light curtains can be positioned either vertically or horizontally and are often provided so that they can be set in either position. It is important that any light curtain is positioned at a suitable distance from the tools of the press brake so that there is sufficient time for the tools to stop after the light curtain has been broken. This 'separation' distance is based on the overall response time of the system to stop movement of the tools, the approach speed of the operator towards the tools and the object detection capability (ODC) of the light curtain, ie the spacing provided between each beam. The correct settings are derived from formula in EN Standards (eg BSEN 999 see also para 19). The information obtained should normally be provided/marked on the machine. Alternatively it may be quoted on reports of thorough examination and test. The light curtain device should always be fixed in position so that the correct separation distance will be maintained. The light curtain should normally be tested, using a suitable test piece, on a daily basis. Some light curtain systems have what is known as 'blinking' facilities. This allows individual beams to be blanked off/muted so that the workpiece is not detected but the rest of the curtain remains active. It is possible for this feature to be 'floating' so that the work material can be moved through the curtain during bending without it tripping the safety system. However, the position of the curtain should be determined on the basis of the larger OCD due to the blanked off beams.

Detailed guidance on the application of light curtains and light beam devices can be found

in the HSE publication HSG 180 *Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery*. This supersedes HSE Guidance note PM 41 which is no longer available.

MUTING OF LIGHT CURTAINS

20 Most light curtains now in use can be arranged to 'mute', ie switch off, when the dangerous phase of the closing stroke has passed, but some very early types did not have this facility. This led to some operational problems and the myth survives in places that these safety devices are 'impractical' for some work. In particular, with vertical format ESPEs, operators could not hold the work piece without interrupting the light curtain and some work pieces interrupted it while the bend was forming. These problems could have been overcome by use of work supports or jigs and the use of horizontal format ESPEs respectively.

21 On modern machines, a key issue for complex work is correct use of the mute, although the availability of work supports and an ESPE which is able to operate in either vertical or horizontal formats will greatly enhance the versatility of a press brake.

22 One suggested method of working is to insert the workpiece only after the tool has reached the mute position. The operator will then be able to hold the workpiece during the final bend without interrupting the light curtain. In this case, the gap between the bottom tip of the top tool and the top surface of the workpiece should not exceed 6 mm to allow the operator to move forward to support the bend as it forms - (see also [para 32](#) and [Fig 1](#)).

23 Because the wrong setting of the mute has led to accidents (when it is set too high), new machines, complying with BSEN 12622 can have a facility which will automatically select slow speed (less than 10mm/sec) after the mute position is reached and the ESPE is switched off (muted). A suitable hold to run device, such as a three position switch (see [para 35](#)), is also required to initiate further movement beyond the mute position. This has the advantage that to allow insertion of more complex work pieces, the mute can be set at more than the traditional 6 mm "safe gap", in fact, at any gap, because the final closing motion of the tools will no longer be considered dangerous. Modern CNC press brakes may have variable mute positions which are set automatically by the part programme.

24 Hydraulic press brakes can also be set/adjusted so that the stroke can be limited to working at slow speed within the mute gap for second operations, without returning to the top position and completing a full stroke every time.

25 It is sometimes claimed that very complex workpieces, in particular, cannot be produced with safeguarding in place. If the work is done on a suitable machine, with a suitable light curtain and tooling, there should be little, if any, work which cannot be done on a properly guarded press brake. However, some businesses may take on work which is inherently unsuitable for the machine they have available. This should not be treated as an excuse for overriding or removing guards.

LASER BASED AOPDs

26 Details of this new development in press brake guarding is given in [SIM 3/2002/27](#). In summary the devices comprise an emitter and receiver mounted at either side of the moving beam assembly. The emitter produces either a band or series of single beams of visible laser light. The arrangement of the beams is designed to detect obstructions as the beam descends down to the point where the device is muted - normally just above the work piece. There are special features provided to mute individual beams when bending tray

shaped components which would otherwise cause a 'trip' condition.

27 These devices work on the principle that if an operator's finger/hand remains in the danger zone, between the tools, it will be detected and the machine will stop before injury can occur. The application of these devices is, therefore limited to machines which have:

- 1) an appropriate stopping performance (distance) in relation to the speed of movement of the machine; and
- 2) control system arrangements which provide the necessary level of integrity to perform the safety functions under a high demand rate and foreseeable fault conditions.

28 It should be noted that BSEN 12622 is being amended to take these devices into account, however, until the amended standard is published any machine fitted with one of these devices should have been type approved by a Notified Body. The notified body concerned should be detailed on the EC Declaration of Conformity supplied with the machine.

PRESSURE-SENSITIVE MATS AND SCANNERS

29 The use of these devices is uncommon and not generally recommended, but they have been used in the past as a safeguard to prevent access to the tools of hydraulic press brakes, mainly for upstroking machines. In general they cannot be installed to meet Category 4 of BSEN 954:1996 and will not have the necessary control system integrity for such high risk applications. Therefore, on new machines, this form of safeguarding is not considered acceptable as the main safeguard at the operating position of manually loaded/unloaded machines unless there are specially adapted applications, and the arrangements have been type tested by a notified body. They may be found in use as a proximity sensing device within the enclosures of fully automated systems. Programmable laser scanners (not the same type of device referred to in para 26) may also be seen in use as a proximity sensing device within the enclosures of automated systems on new machines. They would normally be used in conjunction with other safeguards, eg light curtains.

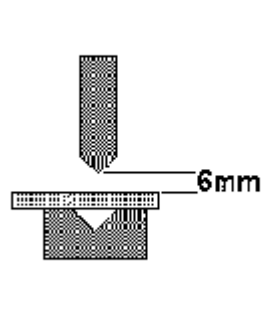
LIMITED GAP BETWEEN TOOLS

30 If a press brake can be set and used with a maximum gap of 6 mm between the closing surfaces, no further guarding is required during that use, subject to further guidance in the paragraphs below.

31 The machine setting must not be capable of being adjusted by the operator and a safe system of work must be established to maintain control of the adjustment facility. If a new machine is supplied which is capable of being adjusted by the user company to allow use with a gap in excess of 6 mm, further safeguarding measures such as light curtains should also be provided.

32 There is often confusion about where the 6 mm gap is measured. The measurement is between the bottom tip of the top tool and the top surface of the work piece (see Fig 1).

Fig. 1



For an upstroking machine the gap will be measured in an equivalent way.

33 Reliance on this method of safeguarding can severely restrict the type of work which can be done on the press brake and claims that this arrangement is always used correctly should be treated with caution. As most press brakes which are supplied are capable of working with a gap of over 6 mm, and this facility is required by most users, further safeguarding, eg light curtains will be necessary in most cases. Consideration should be given to the size of the workpiece relative to the width of tooling on presses which are operating faster than 10 mm/sec before accepting this method of safeguarding. For example a thick narrow workpiece being bent using a wide set of tools can create a gap greater than 6 mm on either side of the work piece which could expose the operator to a trapping point.

SLOW SPEED APPROACH

34 On non CE Marked press brakes, if the speed of movement of the tool is 12 mm/sec or less and used in conjunction with a hold to run control, no other form of safeguarding is necessary for the front of the machine. Where the machine is designed so that tool speed can exceed 12 mm/sec and is used in that way for certain work, additional safeguarding, eg light curtains, will be required.

35 For new press brakes, the arrangements for use of 'slow speed' is slightly different. When it is used for either production or setting purposes, the speed of movement of the tool should not exceed 10 mm/sec together with a hold-to-run device. The hold-to-run device, usually a foot switch, should meet the following which is described in BSEN 12622:

"The hold-to-run device shall consist of a single actuator having the following positions:

- 1st for stop
- 2nd for run
- 3rd for stop again
-

After operating the actuator over a pressure point in position 3, a restart shall only be possible after returning the actuator to position 1.

The interfacing between hold-to-run control devices and the operative parts of the control system shall be hardwired and not rely solely on one relay."

36 If the slow speed facility is used for production purposes, the setting must not be capable of being interfered with or reset by operators and a safe system of work to ensure this must be in place, eg normally a lockable selector switch is provided. Again, where the machine is **designed** so that tool speed can exceed 10 mm/sec, further safeguarding arrangements are necessary, eg light curtains.

37 There are circumstances where two operators may be working at the machine, eg to load larger or awkward shaped work pieces. The safeguarding arrangements should provided similar standards of risk control for each operator.

TWO HAND CONTROL

38 A two-hand control is not acceptable as the sole protection device at the operating position on a press brake for production purposes with the machine operating at full speed, because of the easy access allowed to the danger zone by persons other than the operator. In most cases two-hand controls are also impracticable to use because where the work piece requires supporting by hand the device cannot then be operated. A two-hand control may be used for setting purposes when used in conjunction with slow speed of > 10 mm/sec or less.

39 Two-hand controls have been widely used as the only safety device on press brakes in other parts of Europe, when it was necessary only to safeguard the operator in order to meet their legal requirements. Two-hand control for the operating position for production purposes is not permitted in BSEN 12622.

FIXED GUARDS

40 It is theoretically possible to provide close fixed guarding for the tools but is unlikely to be practicable on press brakes operated in the conventional manner. A combination of fixed and interlocked guards may be found on machines provided with automatic loading/unloading systems.

41 Occasionally Inspectors may find 'closed tools' in use. This would usually be in the form of a series of punches that have been specially fitted to produce a series of holes in the sheet at predetermined positions. The limited stroke arrangements described in [paras 30-33](#) above would need to be applied in these circumstances. Other safeguarding arrangements such as light curtains would need to be provided for normal use of the machine.

GUARDING FOR THE SIDES AND REAR

42 A combination of fixed and interlocked moveable guards will normally be required at the sides and rear of the press brake to prevent access to the tools from other directions, eg by persons other than the operator. No machine movement should normally be possible with the rear guard open. The height of the rear guards should meet the requirements of BSEN 294 for CE marked machines and the relevant standards in BS 5304:1988 will be satisfactory for older non CE marked machines. Any openings in side or rear guards should also meet these standards, as appropriated.

43 Access through the side guards, adjacent to the tools, may be required for the removal of long work pieces which cannot be taken out from the front of the machines. On some machines Inspectors may find that the press brake can operate at slow speed, under hold to run control, with the side guards open, to enable very long components to be processed. Provided the speed is limited to 10 mm/sec or less and the hold to run

arrangements for the foot switch meet the standards described above ([paras 34-37](#)) this operating function is acceptable.

POWERED BACK GAUGES

44 On numerically controlled machines fitted with powered back gauges a trapping/crushing hazard is present when the gauge automatically advances rapidly towards the rear of the bottom tool. Whilst the risk is relatively low it can be controlled by providing slow movement of the gauge in the last 50 mm of travel or by requiring the operator to initiate forward movement rather than it being initiated automatically. These safeguards are only likely to be available on new CE marked machines.

ENFORCEMENT MANAGEMENT MODEL

45 With suitable safeguarding, training and instruction the bench mark is a nil/negligible risk of 'serious personal injury' at the tools. Where the tools are not adequately safeguarded to prevent access or the mute gap has been incorrectly set and the machine is not operating at slow speed the likelihood of injury is 'probable' and the risk gap 'extreme'. It should be remembered that press brake work can involve more than one person working at the tools.

ACTION BY INSPECTORS

46 The purpose of this SIM is to advise inspectors of the standard of safeguarding required on both new and existing hydraulic and mechanical press brakes. It updates and replaces the guidance in NIGM 3/A/1997/25 *Band brakes and cams and switches on presses and press brakes* (which has been updated and included as an [Appendix](#) to this SIM) and NIGM 3/A/1998/9 *The safeguarding of press brakes*.

47 Where inspectors come across this non-priority topic, eg during the investigation of an accident or complaint, or where the absence of safeguarding is seen as creating a risk of serious personal injury which would normally result in enforcement, action should be taken to ensure that the risks have been fully assessed and the appropriate precautions taken.

48 With regard to issues relating to mechanical presses and press brakes fitted with electro-sensitive safety systems or early-opening interlocking guards in combination with band brakes, the [Appendix](#) is a summary of HSE's policy. It includes information which can be copied to users or other interested persons outside the HSE. All known UK insurance engineering inspecting companies, and makers of guards and machines were informed of HSE's policy in 1991. Inspectors may still occasionally receive copies of reports of thorough examination and test (Adverse Insurance Reports (AIR) on Form 2197) under Part IV of the Provision and Use of Work Equipment Regulations (PUWER) stipulating remedial action in part 5. These should be followed up in accordance with current AIR policies and priorities.

FURTHER ADVICE

49 The booklet "Press Brakes", issued in 1984, is available in Subject File 664. This is out of print but Subject File copies are being retained as it contains useful information. If any further advice is needed please contact the Engineering Sector in Birmingham (Nick Hitchcott or David Arnsby Midlands SG).

CANCELLATION OF INSTRUCTIONS

50 FIC 664/35 - **cancel** and **destroy**.
NIGM 3/A/1998/9 - **cancel** and **destroy**.
NIGM 3/A/1998/14 - **cancel** and **destroy**.
NIGM 3/A/1997/25 - **cancel** and **destroy**.

Date first issued: 11 March 2003

[TOP](#) 

[Back to Main Paper SIM 3/2003/04](#)APPENDIX
(paras 14, 46, 48)

BAND BRAKES AND CAMS AND SWITCHES ON PRESSES AND PRESS BRAKES

This appendix contains updated guidance previously issues in NIGM 3/A/1997/25. It sets out the safety requirements at mechanical presses and press brakes fitted with electro-sensitive protective equipment (ESPE) and, in particular, to the phasing out of band brakes and the security of cam positioning. Competent persons have been notified of these requirements. **Attached** is a document summarising the position which may be copied to interested parties outside HSE.

BACKGROUND

1 For many years band brakes have been used at presses and press brakes as either the whole or part of the means whereby the motion of the machines has normally stopped at top dead centre (TDC), or at a later point in an emergency. They are fitted to key clutch presses fitted with interlocking guards.

2 With the development of ESPE and early opening interlocking guards fitted to presses with friction clutches, effective and reliable stopping performance became essential. While the band brake can be an effective stopping device, it is unreliable in the sense that it can fail without notice, and does not provide the required consistent stopping of the stroke within the specified time.

3 Previous HSE publications have emphasised this problem, ie *Press Brakes* (file 664) at paragraph 45 and Guidance note PM 41 (superseded by HSG 180 *Application of electro-sensitive protective equipment using light curtains and light beam devices to machinery*).

4 However, both publications implied that band brakes could remain in use in conjunction with additional braking systems. Although their use was not recommended, such use was not absolutely prohibited, eg *Press Brakes* para 47(c).

DEVELOPMENTS

5 Since 1984 evidence has confirmed that band brakes are not sufficiently reliable and should not be used with a light curtain guarding system. Publicity initiated by the Engineering NIG ensured that most band brakes were replaced by the end of 1992, but it is possible that they may still be found on occasional machines.

6 Band brakes only remain acceptable when fitted to key clutch presses with interlocking guards which remain locked closed until TDC, and which are properly maintained. While very few new presses of this type are made, Inspectors will find plenty of old machines still in use.

7 An additional problem is that concerning the adjustment of TDC and emergency-stopping cams. Sometimes such cams are adjusted to prevent the emergency overrun switch from being operated when brake performance has declined beyond a safe limit.

8 Following a prosecution in the Crown Court in 1991, HSE has given guidance that

cams and switches should be secured to stop the dangerous practice of adjusting the operation of the brake initiation and/or overrun switch when braking performance is inadequate.

[TOP ▲](#)

[Back to Main Paper SIM 3/2003/04](#)

Health and Safety Executive

National Engineering Group

SAFETY STANDARDS ON PRESSES AND MECHANICAL PRESS BRAKES FITTED WITH ELECTRO-SENSITIVE SAFETY SYSTEMS OR EARLY-OPENING INTERLOCKING GUARDS

(Updated guidance previously issued by HSE's Engineering Sector in August 1997)

INTRODUCTION

1 In the light of accident experience and prosecutions, this document clarifies matters for those who use and examine presses and mechanical press brakes, by updating the position on band brakes, supplementary brakes, back-up brakes and control of stopping performance at these machines where access to dangerous parts is possible before the machine has stopped at top dead-centre.

2 Advice is contained in *Press Brakes* (ISBN 0 11 883784 2), first published in 1984 (but now out of print) which emphasised the unreliability of band brakes. This update does not apply to machines fitted with fixed guards or interlocked guards with guard control.

ACTION REQUIRED

3 Mechanical presses and press brakes fitted with guarding systems listed above and with band brakes, should be modified by either:

- a) replacement of both the existing band brake and clutch by an integral friction clutch/brake unit (see paragraph 47[a] of *Press Brakes*); or
- b) replacement of the existing band brake (see paragraph 47[b] of *Press Brakes*).

4 In both cases the replacement brake should be approved for use on the machine by the manufacturers of the brake, and of the machine. Where the machine manufacturer no longer exists a decision should be made by a person qualified to do so that the machine may be safely fitted with an effective replacement brake.

5 No electro-sensitive protective equipment or early-opening interlocking guard should be fitted to key clutch (full revolution) mechanical presses or press brakes. A band brake may be used on such machines, fitted with fixed guards or interlocking guards with guard control to an acceptable standard.

ELECTRO-SENSITIVE SAFETY SYSTEMS: OVERRUN DETECTION AND MONITORING

6 The devices provided on these machines for fail-safe stopping capability, overrun detection and monitoring of stopping performance should meet the requirements set out in EN 999:1996 and associated standards, eg pr EN 501001-1:1995 and EN 692:1996 for new machinery.

7 Steps should be taken to prevent unauthorised adjustment to the stop/initiate cam

or overrun cam to prevent the dangerous practice of cam adjustment to allow for an excessive stopping time without operation of the overrun switch. Where this can be achieved without lowering the integrity of the cam-driving system, these cams should be pinned to the crankshaft, pinned together or secured in position, but where necessary, and particularly in the case of multi-speed machines, technical advice should be sought from the machine manufacturer. The positioning and fixing of the associated limit switches should also be effectively secured against unauthorised adjustment.

PROVISION AND USE OF WORK EQUIPMENT REGULATIONS (PUWER) PART IV: COMPETENT PERSON'S EXAMINATION/ASSESSMENT

8 The thorough examinations of each mechanical press brake should identify where action is required. Any necessary remedial action should be recorded on the report of thorough examination and test as should the period specified by the competent person for completion of remedial action. The period specified should be stipulated by the competent person and is a judgement based on the imminence of danger.

NEW MACHINERY

9 EN 692:1996 Machine tools - Safety - Mechanical Presses states at clause 5.2.1.9 "Band brakes shall not be used on mechanical presses for the purpose of stopping the slide". The standards for fail safe stopping capability, overrun detection and monitoring are set out in this standard and in EN 999:1996 "Approach speeds of parts of the body for the positioning of safety devices".

