

Updated Notes on Risk Assessment for Hand- Fed Platen Presses

Introduction

These notes should be read in conjunction with the *Corrugated Packaging Association Recommended Safety Specification for Hand-Fed Platen Presses* (March 2002), available from The Confederation of Paper Industries (CPI) http://www.paper.org.uk/services/health_safety/machinery_safety.html

Fatal Accidents 2007-2008

We are aware of 4 fatal accidents that have occurred on hand-fed platen presses between 2007 and 2008.

- Two accidents occurred in the UK on machines fitted with conventional safeguarding i.e. a U-shaped trip bar; pressure sensitive front edge of the moving platen; and side tables.
- The third accident occurred in Germany on a machine fitted with 3 laser scanners designed to protect a person gaining access to the danger zone i.e. the space between the fixed and moving platen.
- The fourth occurred in California and no significant details are yet available.

These recent fatalities clearly demonstrate the high risk that these machines pose to operators.

Accident reports for UK and Europe

There were a number of similarities between the 3 accidents:

- All the machines involved in the accidents were being operated in dwell mode (2.5 sec, 3.5 sec and 6 sec respectively);
- All the machines involved in the accidents were of the medium/large format size where whole body access onto the bed of the lower platen was not only possible, but also necessary to carry out an intervention such as, to clear a mis-feed.
- In each accident, it appears that the operative climbed onto the bed of the lower (movable) platen and then the dwell cycle operated, crushing the operator between the two platens.

Identified High Risk Situations

Large/Medium Format Machines - where whole body access is needed onto the bed of the Platen

The larger that hand-fed platen presses become, the more likely operators will need to gain whole body access/intervention onto the bed of the platen. When these larger machines are used in conjunction with the dwell facility, this creates a high risk crushing situation from the hazard zone between the two platens.

Control Measures

Managing the Risk

The first step in determining control measures is to consider the option of eliminating the hazard, which in this case means, considering if the machine is essential for the business. It may be possible to conclude that the machine is used infrequently and that there is a safer production method that does not adversely affect the business. If you cannot eliminate the hazard, then the risks must be controlled by other means.

To manage the risks effectively, employers will need:

- Safeguards to prevent access when the press is operating. This can be a difficult situation on larger machines that may require technically complex solutions that allow normal operation whilst also providing a safe working environment for machine operatives. In conjunction with these safeguards there will need to be:
- Safe systems of work
- Robust regime of workplace inspection and maintenance to ensure safeguards are working correctly
- Training and supervision
- Monitoring and review ensuring that all controls are being effectively implemented

Notes: Employers should not rely solely on the physical safeguards alone.

The HSE issued a safety alert which covers these points in more detail. <http://www.hse.gov.uk/printing/alert.htm>

Managing the Dwell Facility

Hand-fed platen presses have been around for a long time and the concept of dwell is well established. It is recognised that there may be strong commercial reasons to use the dwell facility to maximise productivity. It is recommended that the following comments be taken into consideration when assessing the use of a dwell facility:

- **Possible elimination of the dwell facility.** Consideration should be given to the removal of the dwell facility and whether it is practical to operate the machine only in manual (single stroke) or in automatic (continuous run) mode.
- **Possible reduction in the maximum length of the dwell cycle.** The current EU Standard (defined in EN 10 -10 Part 5) specifies that, where a timer-controlled operation or a 'dwell' device is fitted, the 'dwell' period should **not** exceed 12 seconds. In the HSE Printers Guide 2nd Edition 2002; it specifies that a maximum of 6 seconds should be used for most operations. A 'task' based risk assessment should consider the use of the dwell, and seek to define what is the maximum dwell that is required to achieve operational effectiveness? Consideration could be given to reducing it to a maximum of 6 seconds or less for any operation.

An HSE Human Factors Specialist, is currently looking at the issue of long dwell times and whether they are really needed in practice and this research may help future assessment of these machines.

- **The need for a safe intervention procedure/safe system of work.** It may be possible to climb onto the bed of the movable platen from the normal (front) operating position without operating any trips. Therefore it is essential that employers have a safe system of work to prevent the platen from stroking whilst the operator is between the platens. Suitable procedures may include isolation and locking-off the power supply or other equally effective measures before the operator attempts to gain access to the machine. The machine manufacturers' operators manual should provide relevant information.

The CPI guidance on Isolation and Lock-off is available to members at <http://www.paper.org.uk/hands/machinery/machinery.htm>

Safeguarding Hand Fed Platen Presses

In considering safeguarding options, consideration needs to be given to both the side access and front access. Suitable/appropriate safeguard methods are likely to vary according to the size of the platen.

Side Access Safeguarding

Option 1: Fixed /Interlocking Guards/Gates



This option may be particularly suitable for medium/larger machines where side tables are perhaps less appropriate. They are relatively easy to produce and offer a cost effective solution. The principle is that an operative should **not** be able to reach over the 'protective structure' (fixed/interlocked guard/gate) and reach the hazard zone (the trapping point between the fixed and moving platen). The 'protective structure' also prevents an operative from climbing onto the bed of the movable platen.

See note re: protective structures

Option 2: Side Tables



This option may be particularly suitable for smaller machines where the side tables act as both a table for storing blanks and 'processed board' and as a 'protective structure' that prevents access to the hazard zone. They are easy to produce and represent a cost effective solution.

The principle is that an operative should not be able to reach over the 'protective structure' (side table) and reach the hazard zone (the trapping point between the fixed and moving platen). The 'protective structure' also prevents an operative from climbing onto the bed of the movable platen. The tables must be fixed to the floor and access arrangements (e.g. for cleaning) interlocked.

Note: because the side tables are also acting as a 'protective structure', they must also be suitably guarded underneath to prevent access from underneath the table. (See note re: protective structures).

Note: The current standards for "protective structures" of fixed/interlocking/ guards /gates to prevent access to the hazard zone, applicable to new machines, are in Section 4.2.2 (reaching over protective structures – horizontal distance to hazard zone for high risk) of BS EN ISO 13857: 2008 'Safety of Machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs'; or Section 5.2.2.3 of BS ISO 12643 -1:2007 which covers similar requirements. These provide useful guidance when considering the need for new / additional guarding.

Option 3: Pressure Sensitive Mats

The dimensions of the pressure sensitive mats must comply with the relevant requirements in section 7.2 of BS EN 999:1999 'Safety of Machinery – The positioning of protective equipment in respect of approach speeds of parts of the human body'.

- The first principle is that if an operative walks onto the pressure sensitive mat, whilst the lower platen is stroking/moving, the platens will stop before the operator can reach the hazard zone. In this case, the pressure sensitive mat is being used as a trip device. If the pressure sensitive mat is being used as a trip device, the absolute minimum width of the mat should be 1200mm. *(The current EN and draft ISO standards refer to a mat width of 1000mm, which does not meet this requirement and the matter is being taken up with the relevant standards authorities. **It is possible that this form of guarding will be excluded from the updated standards, when they are issued**)*
- The second principle is that if the operator is already on the pressure sensitive mat (before the platen strokes for example when it is in dwell mode) then the operator's presence on the mat should prevent start up of the machine. If the pressure sensitive mat is being used as a 'presence-sensing device' then an operative standing on the mat should prevent the machine starting up (i.e. movement of the platens). There is also the issue of needing to re-set the machine once the mat has been activated, otherwise someone could walk onto the mat, climb onto the platen and then if the machine is in dwell mode operate.

Option 4: Laser Scanners

(Note: these are only likely to be fitted to new or relatively new machines and, whilst it is possible to retrofit this type of device, it may be that a cost benefit assessment makes this an unlikely option for older machines)



The Current EN and draft ISO Standards make reference to the provision of laser scanners.
See note on General Comments regarding use of lasers

5. Supplementary Side Access Guarding (Referring to Options 1, 2 and 3 above) U-Shaped Trip Guard

The U shaped trip guard may, if the guards at the sides are well designed, offer some protection for hand / arm access from the sides. This should be assessed as part of the risk assessment process

Front Access Safeguarding

Option 1: U-Shaped trip Guard



The guard is more effective on the smaller machines where it offers hand arm protection against being trapped when the platens begins to close.

The guard begins to become less effective for larger machines.

Option 2: Laser Scanner

(Note: these are only likely to be fitted to new or relatively new machines and, whilst it is possible to retrofit this type of device, it may be that a cost benefit assessment makes this an unlikely option for older machines)



The Current EN and draft ISO Standards make reference to the provision of a laser scanner to provide front protection.

See note on General Comments regarding use of lasers

3. Supplementary Front Access Guarding - Front Pressure Sensitive Edge.

The requirement for a front pressure sensitive edge referred to in the current standards and guidance should apply to all machines.

Stop Device

The “knee bar” is fitted to many hand-fed platens and is considered to be an emergency stop device. On large platen presses, pressing one end of the device can fail to actuate the switches. This is because these devices can flex or become sprained and both switches are usually located at the same end of the trip device. The risk assessment should consider the need for locating switches at both ends of the trip device.

Safe Systems of Work

SSoW will be important, particularly on large / medium format machines and where the dwell facility is used. When the task has been assessed, the hazards identified and controls implemented as part of the risk assessment process, the steps to be taken to establish the safe system of work will be:

- define the safe method;
- train employees in the system;
- implement the system;
- monitor the system;
- review the system.

This process is most successfully carried out with the participation of employees who operate the equipment

Inspection and Maintenance

The Recommended Safety Specification (March 2002) includes sample checklists for inspection and maintenance. Particular attention should be paid to the detailed tests specified for the safety devices including the U-shaped trip guard. Procedures must ensure that if the device fails any of the tests (e.g. if the specified stopping performance is not achieved) the machine must be taken out of use immediately and not returned to use until the fault(s) have been rectified and the specified stopping performance achieved. An important part of the risk assessment is to establish the plan for maintenance and frequency of inspection, as required by the Provision and Use of Work Equipment Regulations 1998 (PUWER). The plan must take into account the expected deterioration period of machine components (PUWER Reg 6 (2)) and the machine manufacturer should provide guidance on this point.

Use of Laser Scanners - General Comments

- The ‘first’ principle is that if an operative walks towards the platen from the front or side of the machine and passes through the laser scanner, whilst the lower platen is stroking/moving, the platens will stop before the operator can reach the hazard zone. In this case, the laser scanner is being used as a trip device. If the laser scanner is being used as a trip device, the minimum width scanning beam should be determined by the relevant requirements in BS EN 999:1999 ‘Safety of Machinery – The positioning of protective equipment in respect of approach speeds of parts of the human body’ – Section 6 ‘Calculation of minimum distances for electro-sensitive protective equipment employing active opto-electronic protective devices. **(See appendix - Notes on risk assessment for existing ‘Hand-fed platen press machines’)**
- The ‘second’ principle is that if the operator has already passed through the laser beam, (before the platen strokes for example when it is in dwell mode) then the operators presence must have been detected by the laser scanner and should prevent start up of the machine. If the laser scanner is being used as a ‘presence sensing device’ then an operative passing through the scan, should prevent the machine start up (i.e. movement of the platens). There is also the issue of needing to re-set the machine once the laser has been activated, otherwise someone could walk through the laser scan, climb onto the platen and then if the machine is in dwell mode, operate.

The standards do not elaborate on the requirements for the laser scanner or give examples of how to get the product into and out of the bed of the platen the bed of without tripping the side or front laser scanners. In the German fatal accident, it is understood that the laser scanners were ‘muted’ on each dwell cycle for a short period of around 2 seconds. This certainly makes it easy to get the product into and out of the machine without ‘tripping’ the laser, but it also gives the operative time to get onto the bed of the platen undetected.

HSE have called on the Standards committees to elaborate on the requirements for the laser scanner and give examples of how to get the product into and out of the bed of the platen the bed of without tripping the side or front laser scanners.

In summary;

For side guarding this appears to be a complicated / costly solution that may be better solved by the much simpler (and cheaper) option of fixed/interlocked guards/gates (for large/medium machines) or side tables (for smaller machines)?

For front guarding if the reservations regarding muting and “tripping” associated with the feeding of board into the machine can be resolved, the front laser combined with the physical side guarding options described above might form a suitable solution for older machines, depending on the cost benefit analysis.

Development of Standards for New Machines

Currently there is a draft standard ISO 12643-5 which is being developed and the existing EU standard prEN 1010-5 which is being reviewed early in 2009. The UK representatives will be making recommendations, based on information provided by the CPI, BPIF & HSE, for these standards to address concerns raised by the fatalities referred to in the introduction. These Standards, when agreed, will be applied to new machines but cannot be retrospectively applied to existing (old) machines. **However, the “Date of Knowledge” for companies operating hand platens will be, at the latest, 28th May 2008 when HSE issued the safety alert regarding fatalities. All machines should be assessed against the existing standards and guidance.**

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