



Safe systems of work for cleaning web-fed offset lithographic printing presses

Printing Information Sheet No 2

Introduction

This information sheet has been produced by the Printing Industry Advisory Committee (PIAC) in response to concerns about the large number of accidents that continue to occur during the operation and maintenance of printing presses. It deals primarily with safety issues, as other PIAC publications cover health risks. It provides guidance for employers and supervisors on suitable defined safe systems of work appropriate for various cleaning and maintenance tasks on web offset presses. Employees will also find it useful. The safe systems of work described have been established following risk assessment which takes into consideration the nature of the cleaning task, the safeguarding arrangements and the machine controls provided.

Remember that the Management of Health and Safety at Work Regulations 1999 require you to carry out a risk assessment and implement any necessary control measures, including safeguarding and safe systems of work. Regulations 5 and 6 of the Provision and Use of Work Equipment Regulations 1998 (PUWER 98) require that safeguards are maintained. There is a safeguard checklist on the back page which will help to ensure you comply with this requirement.

Accident history

Table 1 Accidents involving work at all types of printing presses reported to HSE under RIDDOR 1991/92-1995/96

Year	1991/92	1992/93	1993/94	1994/95	1995/96
All	133	99	89	97	87
Major	17	12	13	19	12

As a result of significant under-reporting, these figures only represent a fraction of accidents involving printers. Employers are reminded that the reporting of accidents is a requirement of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995. You can be prosecuted if you fail to do this.

Causes of accidents

Approximately 70 accidents which occurred during cleaning tasks at presses were investigated by Health and Safety Executive (HSE) inspectors from 1986-1996. Table 2 shows the number of accidents at web offset presses, at what speed they were running and the parts of the press involved.

Table 2 Investigated accidents at web offset presses

	<i>Inking/damping</i>	<i>Blanket/plate/impression</i>	<i>Other</i>	Total
Production speed	1	1	2	4
Crawl/inch speed	2	3	1	6

More detailed analysis has shown that most of the accidents are caused by:

- inadequate safeguards allowing access to in-running nips;
- guards failing due to lack of maintenance, or guards being removed;
- control performance deteriorating (eg inch travel/crawl speed increasing) due to lack of maintenance or intentional interference;
- unsafe systems of work for cleaning the press.

Examples of incidents involving web offset presses

A press minder trapped two fingers between the ink transfer and ink form rollers on a newspaper press while cleaning the ink duct with a rag with the machine running at full speed. Access was possible beneath the interlocked guard because the wash-up tray was not in position.

A press manager suffered amputation of his left-hand index finger when it was caught between the forme and damping rollers at the first print unit of a Goss Urbanite press. He had been trying to remove scumming from rollers during the run as a result of production demands and reduced maintenance time.

A minder was cleaning the inking rollers on the colour satellite unit of a Goss Headliner press following failure of the automatic system. The cloth being used and his thumb were drawn between rollers rotating on continuous crawl, causing fracture and removal of the skin. The enclosing guards provided were not interlocked.

A no.2 press minder caught his finger in the damping rollers of a Baker Perkins G12 web-fed press and suffered removal of the flesh down to the bone. He had

been applying metallic ink with a cloth to the forme roller adjacent to the plate cylinder during the production run to 'improve the quality of the print'. This had been custom and practice and was possible because of defective guards.

What you need to do: A step-by-step approach

PIAC recommends that you use the following step-by-step approach to help you to decide on the appropriate system of work for your presses. Remember to consult employees and safety representatives at all stages of the process - they have valuable insights into the daily operation of systems and machinery.

Step 1: Assessing safeguarding standards for print units

Compare the safeguarding standards (ie the combination of cylinder stopping performance, nip bar position and maximum crawl speed) on your own machines against those in Table 3 and decide whether you need to upgrade what you now have to meet current standards. These standards are commonly accepted and practicable and PIAC believes all printers can achieve them. Standards will differ slightly for make, model, type and age of the press so that the same system of work for a cleaning operation may not be appropriate for what may appear to be similar presses. The control definitions in Table 3 are in italics and they are explained following the table.

Table 3 Safeguarding standards

<i>Hazard</i>	<i>Safeguard</i>
In-running nips between adjacent inking (and damping) rollers	<ul style="list-style-type: none"> ● All enclosing interlocked guards with either no powered movement or <i>true inch</i> or <i>hold-to-run slow crawl</i> only when the guard is raised; or ● fixed nip bars adjusted to within 6 mm of the roller surface.
In-running nips between plate, blanket/impression cylinders, including those resulting from reverse crawl	<ul style="list-style-type: none"> ● Interlocked enclosing guards (allowing <i>true</i> or <i>limited inch</i> or <i>hold-to-run slow crawl</i> only where nip bars are not fitted. All danger points should be within the view of a single operator, or of several operators each of whom needs to operate a hold-to-run control. Nips out of view should be safeguarded); and/or ● fixed nip bars adjusted to within 6 mm of the cylinder surface; and/or ● fixed or interlocked 'letterbox' distance guards; and/or

	<ul style="list-style-type: none"> ● sweep-on nip bars interlocked with reverse crawl or no facility for reverse crawl. ● Where nip bars are provided and <i>continuous slow crawl</i> is available, this should always be supplemented by an emergency stop (or 'stop-lock' control) at each print unit.
Unexpected start-up during multi-person cleaning	<ul style="list-style-type: none"> ● Pre-start audible warning device.

Control definitions

True inch - a single depression of the control button causing a cylinder movement of 25 mm. It should not be possible to cause uninterrupted movement of the cylinders by repeated depression of the button.

Limited inch - a single depression of the control button causing a cylinder movement greater than 25 mm but less than 75 mm. It should not be possible to cause uninterrupted movement of the cylinders by repeated depression of the button.

To test inch movement - mark the cylinder and the machine frame, inch and measure.

Hold-to-run slow crawl - uninterrupted movement of the cylinders at a maximum of 5 m per minute caused by continued depression of the control button. Crawl speed may be increased to a maximum of 10 m per minute **only** if there is no substantial increase in hazard.

Continuous slow crawl - uninterrupted movement of the cylinders at speeds not exceeding 5 m per minute which does not require continued depression of the control button. Crawl speed may be increased to a maximum of 10 m per minute **only** if there is no substantial increase in hazard.

To measure crawl speed - count the number of revolutions per minute and multiply by the cylinder circumference.

Step 2: Decide on the appropriate safe system for cleaning

This is determined by the standard of safeguards and the machine controls. Apply the following hierarchy:

- Reduce the frequency of cleaning to that necessary to maintain the quality of work, so reducing the need to approach hazardous parts.
- Use automatic wash-up systems. Where provided, make full use of automatic inking roller and blanket wash-up systems.
- Select a safe system of work which ensures that operators do not need to place their hands near accessible in-running nips. Appropriate methods of work for press cleaning are listed in Table 4.

Additional precautions

- Apply cleaning solvent with a suitable cloth folded to form a pad without loose edges, using close-fitting impervious gloves.
- Keep cleaning solvent within a suitable sealed container to prevent spillage and evaporation.
- Put used cleaning cloths in a closed, fire-resisting container.
- Provide adequate ventilation.

Defined safe systems of work for press cleaning

There are three main safe systems:

Inch-stop-lock-clean. In this system, the press is subject to limited movement using the inch button, stopped and the power isolated using the 'safe' or emergency stop button before applying the solvent-soaked cloth. **In multi-person operation, each person must retain control over the re-setting of their own emergency stop or 'safe' button so that it is not possible for another person to cause the press to move unexpectedly.**

Inch-stop-clean. In this system the cylinders are rotated enough to expose the next section of cylinder surface to be cleaned. The hand with the cleaning cloth is held clear of the cylinder while it is rotating. The cylinder should be stationary before the solvent-soaked cloth is applied. For machines with a *true or limited inch* control, several depressions of the button may be required to expose enough of the cylinder surface to clean. **Multi-person cleaning is acceptable using this system only where zoned print unit controls are provided, ie cylinder movement at each print unit can occur and be controlled independently of the rest.**

Slow crawl cleaning. In this method, the cleaning cloth is applied to the cylinder as it rotates at very slow speed. Movement is controlled using *hold-to-run slow crawl* controls or non-hold-to-run controls (*continuous slow crawl*).

Table 4 Appropriate systems of work for press cleaning

Task	Risk factors	System of work
Cleaning inking rollers, multi- or single-person	Absence of nip bars	● Auto tray wash-up.
Cleaning plate, blanket (and impression) cylinders, multi- or single-person	'Smooth' cylinders only (gutter not exceeding 4 mm radially by 8 mm circumferentially (exceptionally, 4 mm x 19 mm on newspaper presses))	● <i>Inch-stop-lock-clean</i> , forward motion. ● Forward <i>slow crawl cleaning only</i> if nip bars and an emergency stop are provided and a suitable guard checklist is completed.
Cleaning transfer/path rollers, multi- or single-person	Relative inaccessibility; absence of nip bars	● <i>Inch-stop-lock-clean</i> where rollers are powered, or by hand turning where free running.

Step 3: Train and instruct employees

As an employer, you need to train and instruct employees in the appropriate system of work and safeguard checks for their press. Systems of work and guard checklists need to be documented. Make sure that you discuss the options with employees and safety representatives and agree safe systems of work with them.

You should ensure that the press controls are understood and that the reason a particular system of work is needed is properly explained. Make it clear that employees will be accountable for this work. You also need to explain what they should do if a safeguarding or control defect is found and you should support any employee who identifies a hazardous defect. Any such defects should be investigated and dealt with before continuing to use the machine.

It is a good idea to attach a guard checklist to each press. This will act as a reminder and will show that the minder has an important role to play.

Safeguard checklist

Check that:

- interlocks have not been intentionally defeated;
- cams on interlocking guards have not moved out of adjustment;
- fixed nip bars are adjusted to within 6 mm of the cylinder surface over their whole length;
- inch and limited inch movement have not increased;
- the crawl speed is limited to 5 m per minute;
- pre-start warning devices are audible.

Step 4: Monitoring and review by managers

Completion of the press operator's daily and weekly checks will help to ensure compliance with regulation 5 of PUWER 98, and managers need to make periodic checks that these agreed procedures are being implemented. Satisfy yourself for example that:

- safeguard checklists have been completed and signed, and any defects noted and reported;
- the correct system of work is being used.

If your risk assessment has shown that slow crawl cleaning is appropriate, to ensure compliance with regulation 6 of PUWER 98, the position of the nip bar should be checked at regular intervals. This is because an increase in the distance between the nip bar and the cylinder surface would lead to a significant risk to the operator during cleaning on slow crawl. The results of the check should be recorded and kept until the time of the next inspection.

If you routinely find problems after any check, investigate to find the root cause, and then reassess. By doing this you will also be able to determine the most appropriate frequency for inspection.

Further information

HSE priced and free publications are available by mail order from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA. Tel: 01787 881165 Fax: 01787 313995. Website: www.hsebooks.co.uk

HSE priced publications are also available from good booksellers.

For other enquiries ring HSE's InfoLine Tel: 08701 545500, or write to HSE's Information Centre, Broad Lane, Sheffield S3 7HQ. Website: www.hse.gov.uk

This leaflet was prepared by the Printing Industry Advisory Committee and has been agreed by the Health and Safety Commission. It contains notes on good practice which are not compulsory but which you may find helpful in considering what you need to do.

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