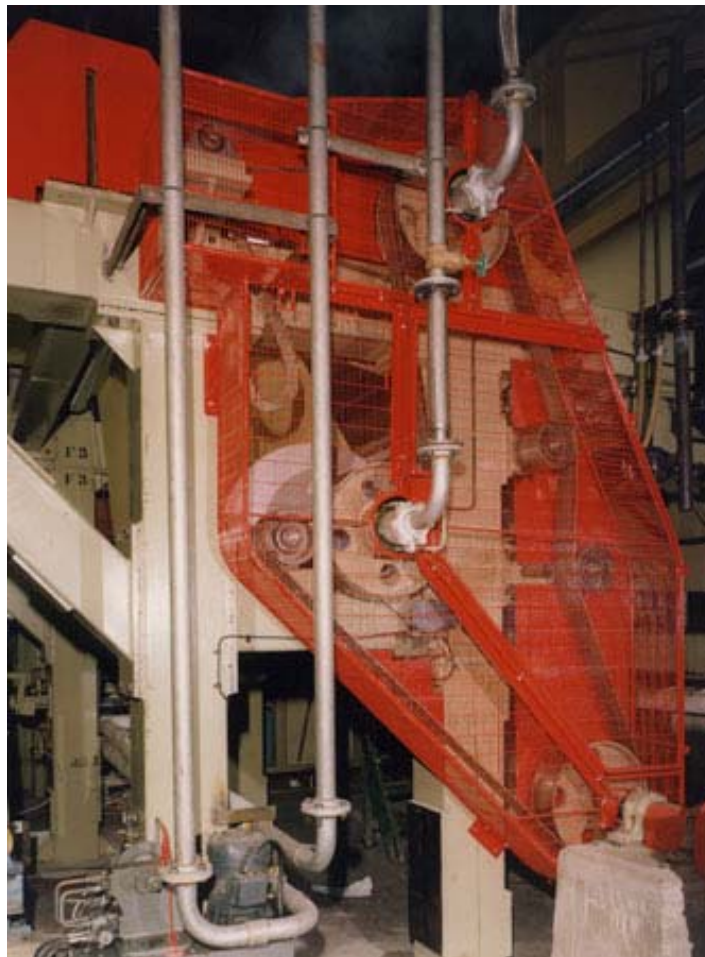


TECHNICAL ARTICLE

Safeguarding papermaking machines - what you need to know

Jeremy Procter, a Member of BSI's MCE/3 committee, Convenor of the European Standards Committee responsible for Machine Guards (CEN TC114 WG11), and Managing Director of Procter Machine Guarding, explains the requirements relating to guarding for papermaking machinery.



Caption: Properly designed, manufactured and installed guarding helps to prevent accidents at papermaking machinery.

Safeguarding papermaking machines - what you need to know

'Making paper safely' is a phrase that has been used within the papermaking industry since 1998, thanks to an initiative from the HSC (Health and Safety Commission) to improve the safety record of paper mills. While this initial three-year campaign resulted in many mills making significant improvements, the overall accident record for the industry remained poor. A further strategy for 2008-2011 from the HSE's Paper and Board Advisory Committee (PABIAC) aims to continue to drive for a 50 per cent improvement in over-three-day accidents in all mills and full compliance to Making Paper Safely in all mills. While the trend in injury rates continues to be downwards, there is still plenty of scope for improvement in machinery safety. After all, just because nobody has been injured by an unsafe machine, it does not mean that there will be no injuries; an inadequately guarded machine is 'an accident waiting to happen.' And it is not just older machines that pose a risk; a significant number of new or recently purchased pieces of equipment have been found not to be guarded to the required UK standards.

PABIAC has published guidance called 'Part 6, Making paper safely: managing safety in the papermaking process' (ISBN 0-7176-1907-9, priced £8.00). This booklet replaced the longstanding 'Safety in paper mills', more commonly known as the 'Fourth Report', and reflects technological progress. It is aimed at users of papermaking machinery to help them carry out risk assessments, to compare what they have now with the control measures recommended, and to decide what more they need to do (if anything). It applies to hazards arising from the papermaking process and gives advice, not only on guarding, but also on such matters as housekeeping, safe access and systems of work.

Two particular aspects of the papermaking industry give rise to concern: heavy rolls and fast-moving webs of paper mean that any injury carries a high probability of being serious or fatal. Furthermore, to keep mills running as efficiently as possible, operators have traditionally accessed hazardous parts of the machine to feed paper between the rolls at startup, to clean beneath the machine and to clear blockages. So, despite the fact that the number of serious and fatal injuries in the papermaking industry has been falling in recent years, the HSE is keen to see continued improvements.

There are examples of papermaking machinery in the UK that are almost 100 years old, and many others that were manufactured or modified long before current machinery safety standards were introduced. Guarding on older machinery is rarely 'state of the art' and there is

no such thing as a one-size-fits-all guard; each mill and each machine needs to be considered individually. Some machines currently have little or no physical guarding, while others are commonly fitted with lift-off guarding. However, such guards are no longer considered acceptable because they can too easily be removed while the machine is running, exposing the operator or maintenance technician to significant hazards.

Four main types of guarding are available and each must be used appropriately. But before any type of guarding is considered, a risk assessment needs to be carried out to establish what the hazards are, how frequently a person will be exposed to those hazards, and what the likelihood and severity of an injury would be. It is, of course, important that the risk assessment is documented.

The guarding options are, broadly-speaking, fixed guards, interlocked guards, electro-sensitive guards and nip guards. Fixed guards can only be removed using a tool but, if at all possible, suitable access should be designed-in so that the guards will seldom have to be removed fully. Care also needs to be taken to ensure that people cannot access hazardous parts of the machine by reaching around or over fixed guards (or through, if the guards use mesh or bars).

As a rule-of-thumb, if fixed guards need to be removed more than once per week - even for maintenance or cleaning - interlocking should be considered. Interlocked guards will cause the machine to be stopped if the guards are opened; alternatively, the guard cannot be opened until power to the machine has been removed. For low-risk applications it is acceptable to use an interlock with a single actuator on the guard and a single control channel, but higher risk applications need two independent actuators with separate control channels so that, should one switch or channel fail, the other will operate as it should. For front face guarding on large reeler slitters and other very high-risk areas, the interlocking system should have dual control channels with cross-monitoring.

If part of a machine takes longer than ten seconds or so to come to rest, a time-delay relay should be incorporated so that the guard will remain locked until the machine has come to rest. Other high-risk situations, such as those where there is more than one entry point to the guarded area, might require a trapped key exchange interlock.

Electro-sensitive guards, such as light curtains and pressure-sensitive mats, can be suitable for some applications in the papermaking industry, but careful consideration needs to be given to

the harsh operating conditions found in this industry and whether the more sophisticated - and often costly - devices are justified through marginally reduced access times.

Nip points are inherent in papermaking machinery, so nip guards should be considered if there is a risk of somebody gaining access to the nip. Several different designs of nip bars can be fitted, but the remaining gap should be as small as possible (and always less than 8mm), and round-section nip bars should not be used because they create their own new in-running nips.

Procter Machine Guarding has been involved with guarding papermaking machinery for over 50 years and has been particularly active since the introduction of Making Paper Safely, with dozens of installations completed in UK mills. In most of these projects bespoke guarding has been designed to suit each part of the machine; any necessary interlocking has been supplied as well, but with the customer taking responsibility for the wiring and the safety circuit. Mills tend to have their own preferences for interlocking, but invariably robust products are chosen, and key exchange systems are popular when multiple entry points exist.

A typical mill will require a combination of fixed, removable and hinged or sliding guards, with infills of welded mesh or bars generally allowing good viewing of the process but without an onerous requirement for cleaning.

A common misconception about guarding paper mills is that the main issue is to keep operators away from the hazards. However, it is vital to ensure that the full operational, cleaning and maintenance needs of the mill are considered. Guards that do not provide adequate access are often removed and not replaced, giving rise to a situation that is more hazardous than would be the case if proper safe access had been designed-in from the outset.

In Procter's experience, it is highly desirable to involve the operators and maintenance staff in the specification process to ensure that the most appropriate guarding is chosen (while still providing the required safety). Procter Machine Guarding then undertakes all of the detailed design and manufacture, and can also provide an installation service. In one recent project no fewer than 14 installation staff were engaged on a project to install guarding during an extremely limited Easter shutdown period.

To achieve a satisfactory end-result, guarding should ideally be considered within the overall context of safety. As well as the physical guarding, the mill needs to be sure that there is a suitable safety control system that can handle the inputs from the guard interlocks and any

other measures such as hold-to-run controls and crawl-speed selectors. The guarding and control system must also be backed up by safe methods of working, training and, most of all, a culture of safety that discourages unsafe practices.

Procter Machine Guarding is in an ideal position to provide advice, thanks to its long history of supplying guarding to paper mills. For performing risk assessments in accordance with the requirements of BS EN ISO 14121-1, the company provides a free Risk Assessment Calculator. In addition, Procter offers a Safety Distance Calculator and a free guide to machinery guarding standards. To obtain copies of these, visit the 'Free Machine Safety Guides' section of the website at www.machinesafety.co.uk

To discuss any requirements for guarding papermaking machinery, please email Procter Machine Guarding at machinesafety@procterbedwas.co.uk or telephone 02920 882222.

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Note to editors

Procter Machine Guarding is the UK's leading machinery guarding specialist. From its sites in Leeds and South Wales, Procter offers a comprehensive service to survey, design, manufacture and install machine guards nationwide. All guards are designed to comply with EC and HSE requirements and a Declaration of Conformity is issued on completion.

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