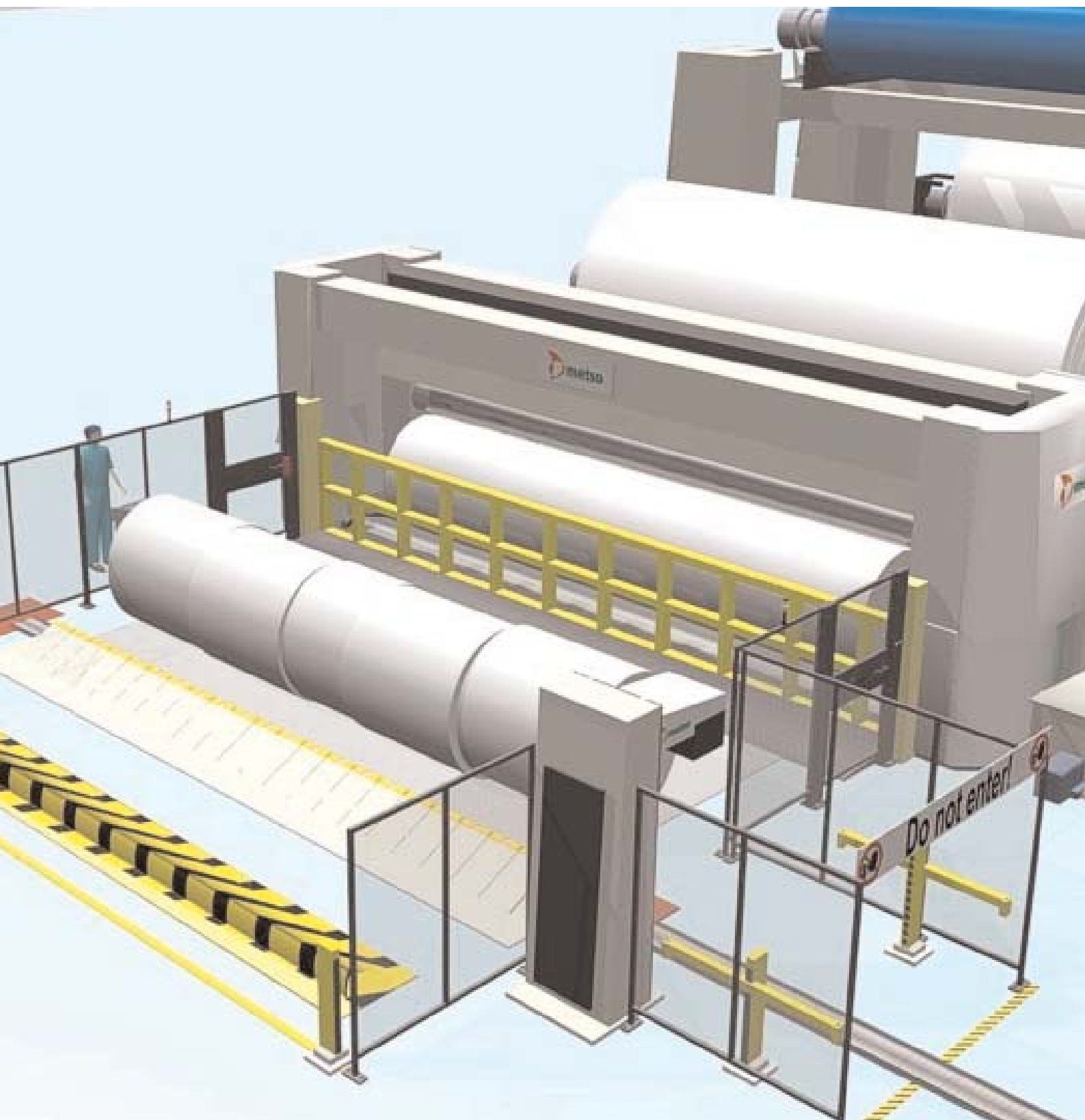


Rewinding paper safely: Safe use of reeling and slitting machines



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Introduction

Reeling and slitting machines (also referred to as winders) are used in the paper- and board-making industry to carry out the first slitting operation on the paper, board or tissue reel. They are usually found immediately after reel-up, but can also be in conversion areas and after coating machines or super calendars.

Reelers and slitters cause the most machine accidents in the paper and board industry (ie those accidents involving contact with moving machinery or the material being produced), often resulting in serious injury and sometimes death.

This guidance aims to reduce the number of accidents involving these machines. It also applies to re-winders, and, although it is not directly intended to apply to machines used in second-phase paper conversion, the same principles for safe working should be applied whenever possible.

The process

Reeling and slitting machines are widely used in the paper-, tissue- and board-making industries. They are usually used to produce narrower reels from a large parent reel, although they can also be used to re-reel poorly wound reels or produce one-offs for customer orders.

On all reeling and slitting machines, a parent reel is mounted at an unwind stand. This reel might weigh up to 40 tonnes and be up to 10 m wide and more than 3 m in diameter. The sheet of paper is pulled off this reel and fed around a series of steel rolls to the slitting knives where it is cut to the required widths. The slit webs are then rewound at the opposite end, usually onto cardboard cores, to produce the required size of smaller reels.

The different areas of the reeler/slitter are:

- the unwind area;
- the slitter area;
- the winder/wind-up;
- the ejection of the reel;
- reel handling.

What you need to do

Firstly, take a good look at how your own machines are guarded, the location of controls, the layout of plant and the tasks that are carried out. Make sure you consider the routine day-to-day tasks, as well as those that occur during maintenance and when things go wrong. Ask yourself, 'Where do people work and what do they do when they get there?' Make sure you consider all tasks, no matter how infrequently they happen.

Then think how much protection the workers in your workplace have compared to that described in this document. Where things fall short, draw up a plan of what you need to do to meet those requirements. The plan should be treated in the same way as any other project within your business – you need to allocate responsibilities, set milestones and, importantly, allocate a budget.

Remember that everyone is prone to human failure, including making errors and, in some cases, violating safety rules and procedures. Take this into account when doing risk assessments, designing safeguards and preparing safe systems of work and procedures. See HSE leaflet INDG163(rev1) *Five steps to risk assessment*¹ and HSE guidance book HSG48 *Reducing error and influencing behaviour*.²

Any risk assessment and selection of appropriate guarding must consider how this will affect:

- machine operators;
- other operators called to help during production, maintenance and setting tasks; and
- general personnel not associated with the operation of the machine.

1 Unwind area

Background

When the papermaking process is finished, large parent reels (or jumbos) are often stored before reeling/slitting. The parent reel is moved (using an overhead crane) either to a standalone storage rack or to a waiting station connected to the unwind stand by rails. The unwind stand is then loaded either by overhead crane or automatically along the rails.

Task list

- Load the parent reel onto the unwind stand and prepare it for threading into the winder.
- Thread the parent reel to rewind.
- Make the parent reel join.
- Remove the shell/spindle.
- Clean or slab-off the parent reel.
- Present the parent reel.
- Align the parent reel.
- Enter the unwind area – unwind the stand and/or storage rack.

Risks

- Being struck by the moving reel or being crushed between other reels or fixed objects during the loading and preparation of the parent reel into the unwind stand.
- Being crushed between the rails and the ends of the moving reel's shell (bearing) during the automatic transfer of reels from the waiting station to the unwind stand.
- Being struck by objects being moved with lifting equipment.³

Controls

- Provide distance guarding along the sides of the unwind stands to ensure people are kept away from trapping points between the reels and the rail. The guards may form part of the stand's framework.
- Maintain a minimum gap of 500 mm between two full reels on the stand by holding the reels at individual brake stations, with the gap between stations designed to accommodate two maximum diameter reels, plus 500 mm. If the storage rail is 2 m or more above the floor, the gap can be reduced to 300 mm.
- Crane drivers and banksmen should ensure there is nobody in the area below a suspended load.
- A gap in the distance guarding may be required to allow operators access into the machine to feed paper from the jumbo roll to the reeler/slitter. Entry into the machine through this gap must be protected by an interlocked gate, photoelectric guard, or other similar device, the activation of which, as a minimum, must slow the machine down to as low a speed as practicable (crawl speed – see section 7). Guard locking may also be used. Activation of the above devices should, under normal (default) operating conditions, cause the machine to stop. Only following the selection of an entry control, eg key switching, should activation result in the machine slowing down to a crawl speed. Upon reset, the system should return to the default setting, ie so that the machine stops on activation of the protective devices.
- The position of the entry controls should allow the winder operator (or other machine operator) to have a clear view of the machine operating area and also anyone wishing to enter the immediate area of the paper feed.

- Any dangerous part, eg drive chains, exposed as a result of providing an access point must be protected by fixed localised guards.
- Training, supervision and formal safe systems of work should ensure:
 - entry by authorised persons is for the minimum duration required to complete the non-stationary part of the task (such as manual paper feeding);
 - people do not work behind the access controlled guards while the machine is at full speed.
- Use scanners or pressure-sensitive mats inside the unwind enclosure to provide additional safeguards to prevent operators working behind guards, above crawl speed. This may not be practicable in the tissue and soft product industries, however, a number of sites have overcome this problem by installing dust extraction facilities.
- Ensure that the safety circuit, including these devices, is hard-wired due to the significant risk of injury.

2 Slitter area

Background

Slitting knives (also known as slitters or knives) are sharpened steel discs mounted on a shaft that cut the paper web to the required width. These slitters sometimes mate into grooves in a female roll. Paper is fed via the slitter knives before being rewound (ie forming the finished reel).

Various knives are positioned along the width of the machine. These are either automatically or manually adjusted (in and out, together with their positioning on the reel width) to provide the different finished products.



Figure 1 Bank of slitter knives

Task list

- Set the slitters (manually or remotely).
- Replace the knife units/knives.
- Clear the paper wrapped around blades or after a break.

Risks

- Contact with the slitter knife during feeding, adjusting or retrieval of the workpiece.
- Cuts during movement (rotation) of the knife.
- Excess opening as the knife diameter reduces due to wear or resharpening.
- The ejection of the whole slitter knife.
- Slitter knife shatter at high-speed machines.
- Nip and trap injuries from automatic knife changers.
- Entanglement in large quantities of paper following a break.

Controls

- Eliminate the risks by using another method, such as a high-pressure water cutter which will require extra control measures, including:
 - local shrouding of the VHP (very high pressure) water jet;
 - a preventive maintenance scheme for the VHP pump which needs close monitoring because of the extremely high operating pressures;
 - calibration and regular monitoring of the water-jet nozzle; and
 - ensuring effective drainage.
- Enclose the general area of the machine by physical (fixed) guarding, eg an access gate to the area.
- Install software devices such as electrosensitive protective equipment (ESPE) to prevent access.
- Guard knives to prevent contact as far as practicable with the cutting edge of the knife and to prevent ejection of the whole knife or parts of it (see Figure 2).
- Because the diameter of the cutting blades will wear down significantly during use and after re-sharpening, take the following into account:
 - Provide enclosure guarding on both sides, enough to reduce the exposed part of the blade to the minimum required for the cut. The side of the guard should extend far enough to accommodate the reduced blade diameter resulting from normal operation. Find out from the manufacturer about the blade diameter at which guarding becomes ineffective.
 - Guarding on one side is only permitted if the gap between the knife and the top guard does not exceed 6 mm. In these circumstances, you must carry out frequent inspections and use locking nuts to prevent the knife working loose.



Figure 2 Slitter knife showing guarding

- Consider fitting quick-release blade guards to one side where regular access is required, to allow removal of product following wrap-up.
- Ensure the blade is compatible with its holder and is maintained in accordance with the manufacturer's instructions to reduce the risk of out-of-balance blades.

3 Winder/wind up

Background

The winder/wind-up area is the part of the machine where the paper from the parent reel is rewound onto a core and slit or trimmed into varying widths as required by a customer. The cores may be placed onto the machine manually or automatically. The rider roll is a metal roll that rides on top of the rewound reel. It is used to control the reel formation by keeping it compact, excluding air and avoiding wrinkles. The rider roll may be held on the reel with arms operated by springs, pneumatic or hydraulic power or dead weight and the rotation may or may not be independently powered.

Task list

- Load and secure the cores.
- Stick sheets to the cores.
- Set the winder ready to run/operate.
- Operate the winder.
- Deal with breaks.
- Set the reel changes.
- Stop the winder.

Risks

- In-running nips between:
 - the reel and the rider roll;
 - the reel and the drive or carriage drums;
 - the reel and other rolls;
 - pairs of in-running rolls;
 - revolving rolls and adjacent fixed parts.
- Entanglement with exposed shafts extending beyond the main frame of the machine.
- Traps including those associated with the following moving parts:
 - rider roll (both pressure and gravity fall);
 - guards (both pressure and gravity fall);
 - core pullers;
 - hydraulic lifting tables.
- Ejection of the reel or paper caused by:
 - a web break;
 - tension in the web;
 - overspeed;
 - a pivoted rider roll.
- Ejection of machine parts.
- Being crushed by the unexpected descent of a direct-acting rider roll.

Controls

- Install physical barriers to each side of the machine which should extend far enough to contain ejected reels or machinery parts and limit access to this area.
- To prevent access to rotating parts, protect entry across the face of the machine by a photoelectric system. The combination of physical barriers along the length of the machine and the photoelectric system should provide enough distance to ensure, as far as possible, that the time taken for a person to reach the dangerous parts following activation of the photoelectric system exceeds the time for those parts to come to rest.
- Provide front-face guards.

Front-face guards

- When the discharge table is in the raised position, it can act as an enclosure preventing access to dangerous parts. A top guard should also be fitted, lowering into position to reduce access (known as front-face guards).
- Front-face guarding should prevent local access to the dangerous moving parts while they are in motion above crawl speed and be capable of preventing ejection of the reel if either of these are a risk. (If machines do not have a discharge table, make other physical guarding arrangements.)
- Front-face guarding should be interlocked and configured so that speeds above crawl cannot be achieved until the guards are in position. Where the reeling and slitting machine has a long run-down time, fit an electrical relay or other mechanism to ensure that the dangerous parts are stationary before access to them is possible.
- Where reel-lowering tables are used to form part of front-face guarding, you must prevent access to the reel over the raised table or through gaps between the table and fixed parts. Where side guards are provided at either end of the reel-lowering table, take care to eliminate any gaps between the moving table and fixed guards that could create a trapping hazard. This needs careful design of the side guards and will usually need them to extend past the maximum outward point of travel of the machine table. If access between the side guard and table is required then the guard itself or any access gate should be interlocked so that it can only be opened at or below crawl speed. Interlocking requires a high level of reliability.



Figure 3 Reel ejection area

Reel ejection

- Unintended ejection of a reel presents great potential for serious injury. The design of the front guard and its guide or mounting arrangements should be robust enough to contain the reel if it is ejected.
- There is an increased risk of reel ejection if there are any height restrictions that make the use of conventional rigid rise and fall interlocked guards impractical. In these circumstances consider other methods of protection, eg alternative means of guarding or locating people and control panels away from the danger area.
- Where such robust guarding is impracticable, provide a core chuck or spindle position interlocking system to ensure that the reel is correctly located and retained before it can be set in motion and to prevent the chuck or spindle being released while the reel is in motion.
- For machines with pivoted riding rolls that apply a horizontal force to the reel, meaning that the reel can be revolved while the front guard is not in position, provide a core chuck or spindle position interlocking system.
- Note that 'nip bars' are not as effective as front-face guarding as a safeguarding measure.
- Provide core support, eg by fitting an inner metal sleeve, when narrow reels are wound without paper covering the full width of a core, to reduce the risk of core break up and reel ejection.



Figure 4 A rider roll

Descent of rider rolls

- A mechanical latch or a latch and a hydraulic counter-balancing control must be provided to prevent unintentional descent.
- Where a mechanical latch is provided, it should automatically engage when the roll is raised before the guard is open. Any failure of the latch to engage correctly should trigger an alarm and prevent the guard from opening.

4 Ejection of, and work on, the finished reel

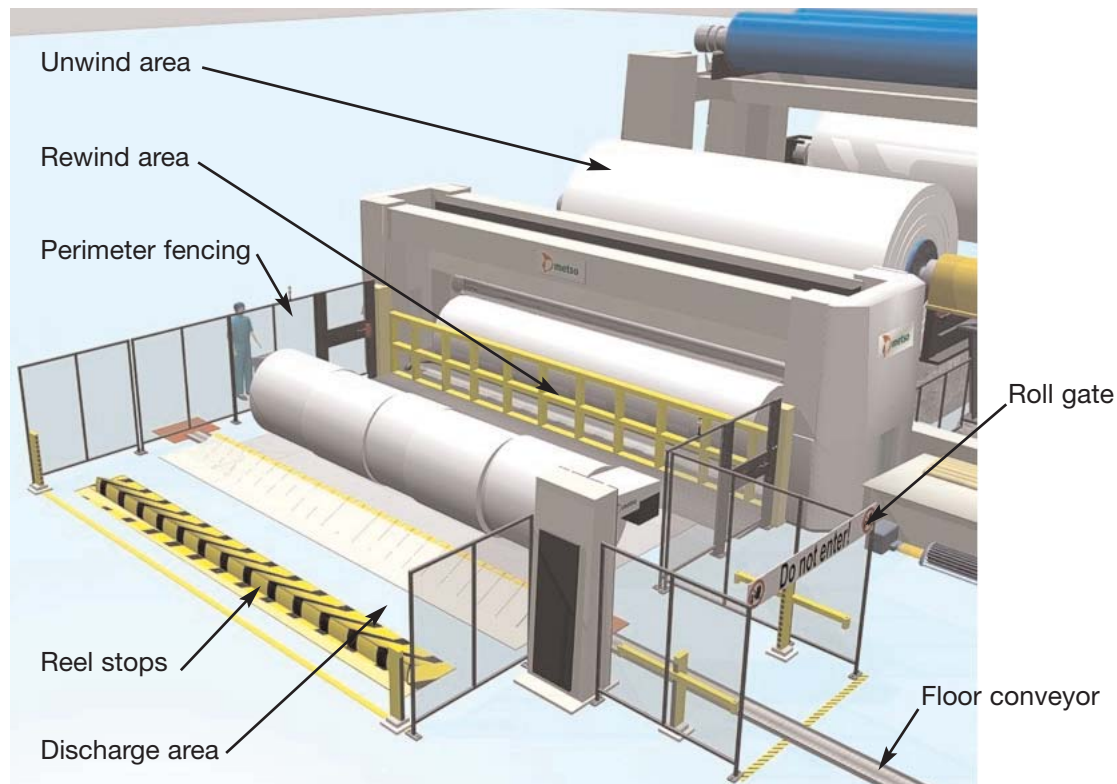


Figure 5 General view of finishing area

Background

This section covers the part of the process where the complete, stationary rolls are ejected from the rewind area to the discharge area where they stop rolling on the floor.

Task list

- Observe the finished cuts.
- Manually tape or glue the sheet on the finished customer rolls.
- Release the rolls from the winder.
- Lower the rolls onto the floor.
- Remove the core chucks (gabs).
- Manually move the roll away from the winder.

Risks

- Being hit by a roll rolling out of the ejection area during normal operation or following unexpected ejection.
- Being injured by other moving or rotating parts of machinery.
- Being trapped beneath or above the ejection table during lowering or raising.

Controls

- Prevent access to the danger area and dangerous parts by installing a combination of fixed guarding and a photoelectric curtain around the perimeter of the danger area (see Figure 5).

- Any access gates within the fencing must be interlocked and have guard locking until the reel stops rotating and the leading edge of the lifting table (if fitted) has lowered to less than 150 mm above the floor.
- Where a lowering table is fitted, for the remaining travel to the floor, restrict the speed of the reel table during lowering to <math><0.5\text{ m/min}</math>.
- Where photoelectric curtains are used to protect part of the discharge area, install a combination of localised fixed and interlocked guards which prevent trapping by the table, eg a photoelectric unit, pressure-sensitive mats or edge protection (see Figures 6-9).

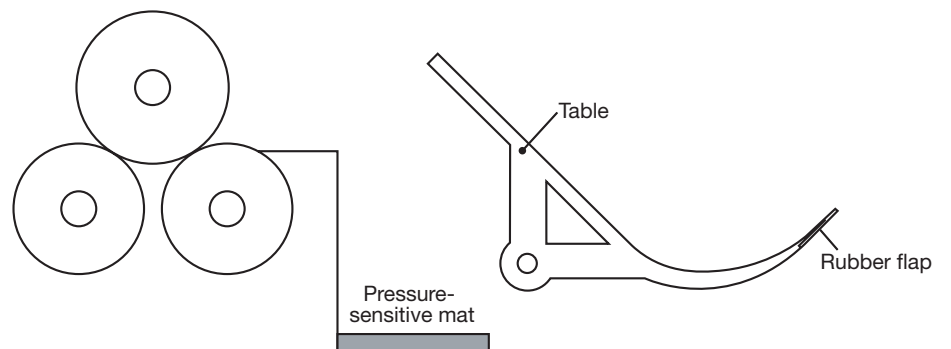


Figure 6 Lowering table with pressure-sensitive mat

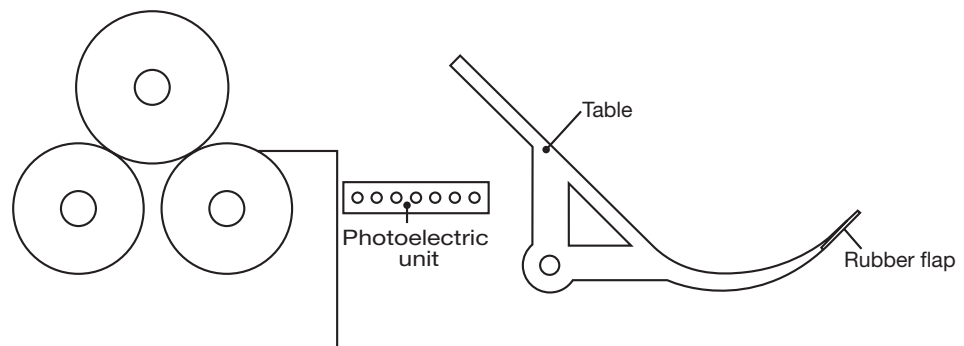
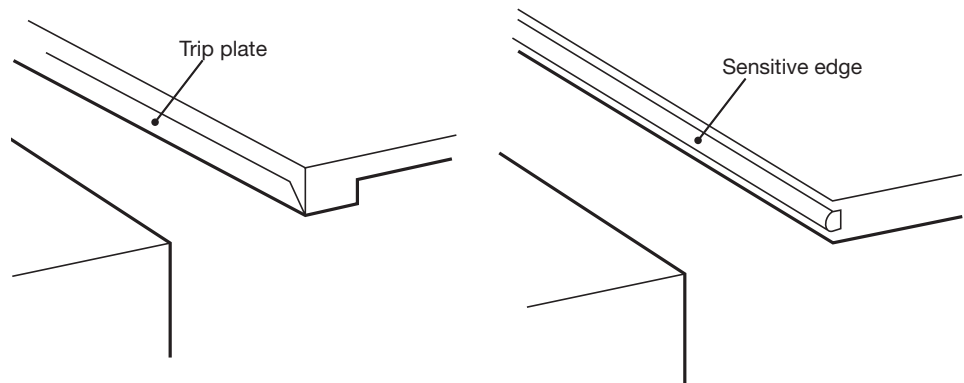


Figure 7 Lowering table with ESPE



Figures 8 and 9 Lowering table with edge protection

- All manual controls must be situated outside the perimeter guarding.
- Where it is not practicable to install these physical control measures, start controls to the reel-lowering table should be hold-to-run, so that removing the hand(s) from the controls during the cycle would raise or halt the table. Position the controls so that they give a clear unrestricted view of the discharge area with the machine operator being responsible for ensuring the area is clear.
- Additional safeguards which should only be used as well as and not instead of the other measures described above are:
 - Fit audible/visible warning indicators of table movement.
 - Fit a stiff rubber sheet (or similar material), which is wide enough to act as a push-away warning device, along the length of the trapping edge.
- Use chocks or ramps to prevent the reel from moving while taping or glueing. Where there is a high risk of injury when carrying out this task manually, you must use automatic systems.

Floor conveyors and turntables

Risks

- Slipping/tripping because of the unexpected startup of finished reel conveyors.⁴ The risk is increased when there are no finished reels on the floor conveyor.
- Trapping between fixed conveyors, turntables and cross-over points.
- Trapping between printing and/or labelling devices and fixed objects.
- Being struck by mobile plant.

Controls

- Guard floor conveyors at drive and roll placement/transfer (cross-over) mechanisms. This should include a combination of fixed fencing and pull-cord or E-stop trip devices.
- For machinery or parts of machinery designed to work together, assess the overall assembly before it is put into service, to ensure that its safeguards function correctly and that safety controls, including the emergency stop and isolators, can stop the machinery (including all associated equipment) if it is dangerous for it to continue operating.
- It is **not** acceptable for safety interlocks to be used for isolation.
- Flush-mount conveyor belting/sections to enclose the majority of moving parts.
- The conveyor should be a high-visibility colour to alert people when it is moving.
- For automatic conveyors, fit a time-delayed audible warning on start-up. It is the employer's responsibility to consider audible alarms as part of a general assessment of pedestrian routes/access across the site, although equally effective measures such as visual alarms may be adopted.
- For manually operated conveyor systems, locate the controls where the operator is able to see the full path of travel.
- Don't forget to include in your assessment any inspections that are carried out from underneath the conveyor.

Roll gates

A roll gate is a gap in the perimeter fencing which is provided to allow the finished rolls to pass through on a conveyor (see Figure 5).

Risks

- Being trapped between the reel and the perimeter fence.

Controls

- Restrict the height and width of the opening as far as practicable but making allowances to reduce the chance of a trapping risk.
- Wherever practicable install ESPE devices as part of the roll gate. Do a risk assessment to justify why such measures have **not** been adopted.
- Where a roll gate without photoelectrics is the only practicable method of deterring entry, it should include draped chains or something similar to act as a further visual warning and deterrent to inadvertent access.

Floor camber/condition at the finished reel discharge

Risks

- Being struck by rolls travelling in an unexpected direction due to an uneven floor.

Controls

- The discharge area flooring should be smooth and even, to ensure that finished rolls roll away from the machine in a controlled manner. Re-casting the floor slab, to the correct depth, with the right materials and essential curing time will result in considerable downtime and must be planned for suitable shutdown periods.

5 Roll handling

Background

This section covers the handling of the finished rolls from the floor to the system for transporting them away from the winder. It does not cover the hazards associated with wrap lines, up-enders, conversion and warehousing.

Task list

- Split reel into rolls.
- Push rolls.
- Weigh rolls.
- Manually label rolls.
- Print onto rolls.
- Move rolls with mobile plant.

General

Risks

- Being hit by a roll during pushing or conveying.

Controls

- The protection devices referred to in Section 4, eg interlocked access gates, will reduce the risks in this area during these tasks.

Reel splitting

Risks

- Serious injury to operators attempting to split rolls that have run together during production, usually using bars, hammers and wedges.
- Being struck by tools used during reel splitting.
- Being struck by a roll as it falls from the reel.

Controls

- Train winder operators to be aware of the causes of rolls running together so that they can reduce the frequency with which it happens.
- When rolls have to be split apart, consider the following measures in this order:
 - Return to pulper.
 - Set aside and slab-off when time is less pressing.
 - Slab-off *in situ*.
 - Wedge apart when time is less pressing.
 - Wedge apart *in situ*.
- Provide and use appropriate protective equipment and tools when manually wedging rolls apart.
- Never drop bound rolls to split them.

Automatic labelling and printing equipment

Risks

- Getting caught up in the printing and labelling mechanism.

Controls

- Where this equipment has moving parts that create a hazard, provide appropriate localised guarding.
- Locate control panels and keyboard input equipment outside the discharge area.

Pushing rolls

Access may also be required to manually help push the rolls to the conveyor. Where the size of a roll prevents a clear view of the direction of travel, make additional arrangements, eg use a banksman, mirrors etc. Newsprint rolls tend to move easily, however tissue rolls are very soft and tend to deform, which will mean workers have to enter the discharge area more often.

6 Working in/on the reeler/slitter – machine stopped

Background

Wherever possible, tasks must be carried out with the machine stopped. Whether the winder should be isolated or not will depend on the level of risk, therefore a risk assessment must be carried out.

Task list

- Remove broke.
- Housekeeping.
- Planned and unplanned maintenance.
- Adjustments.
- Visual checks.

Risks

The machine starts up causing injury.

Controls

Isolation

- All machines must have means to isolate and lock off power in an accessible position nearby.
- Isolation may take the form of locking off an electrical isolator, chaining off a valve spindle etc to allow personnel working on the equipment to attach a personal or departmental 'padlock'.
- Before you isolate/lock off, consider what effect it will have on the machine as a whole.
- Safeguards must function correctly and safety controls, emergency stop and isolators must stop the machinery itself **and** all associated equipment, if it is dangerous for it to continue operating.
- It is **not** acceptable for safety interlocks (or emergency stops) to be used for isolation. Under normal circumstances, it must be ensured that anyone working on equipment carries out physical isolation before gaining entry.
- The risk assessment should identify which tasks must be controlled by permit-to-work systems.

Zero energy isolation

Isolation of all forms of power source **must** be considered. Pneumatic and hydraulic machinery should be isolated and held in a position so that:

- any residual energy can be discharged, eg release any air held under pressure in associated pipework feeding to or discharging from a machine, or draining a tank when working on a drain line or takeoff pump; and
- uncontrolled movement, eg gravity descent of a tool or die, does not happen when the power is disconnected (consider the similar consequences of electrical isolation).

Lock out

- Locking out of equipment or machinery is the most effective way of preventing it becoming operational during cleaning or maintenance. Its effectiveness lies in the 'one key per lock, one lock per person' procedure.

- If there is only one key per lock, the key has to be with the person carrying out the maintenance. Where more than one person is working on equipment or machinery, follow a multi-lock system, ensuring that each person has attached a 'personal' lock to the equipment or machine's multi-lock switch. With multiple keys, key safes should be used.
- Normally the person who puts on a lock should be responsible for removing it, but there should be arrangements for handing over at the end of shifts and for removing locks that are inadvertently left in place by people who cannot immediately be traced. These should only be removed after a systematic assessment by an adequately trained supervisor or competent person.

7 Working in/on the reeler/slitter – machine still in motion

Background

In the past, many operations have been carried out at reeling and slitting machines with the machine in motion. Areas of the machine have been either unguarded, or provided with an access gate (occasionally interlocked).

Consider elimination of the need to intervene manually. Mechanical feed arrangements (eg belt or rope systems, air chutes) and web-holding devices have reduced or eliminated the need for access.

There are certain essential tasks where you may need to approach dangerous areas or parts.

Task list

- The initial feed of the paper tail round the cores and the attachment of the web to the cores.
- Clear after a paper break.
- Splice the web to the reel after a web break.
- Check the parent reel for defects.
- Slab off.
- Adjust trim, spreader bars, and various rolls.

Risks

- Being caught up or struck by moving machinery parts.

Controls

- Implement safe operating procedures and safe systems of work.
- Access to any danger zone while the machine is running must only be possible at crawl speed.
- Where there is a foreseeable risk of injury that can be controlled by having the work carried out by a trained or experienced person using an established technique, use a written safe system of work. It should:
 - state who should do the work;
 - detail the safety devices required;
 - say what training, instruction and supervision is required;
 - identify the hazards and the correct method for the job to be completed;
 - be written as a formal, regimented system of work, including a written set of instructions, to minimise the potential dangers;
 - help supervisors to audit/ensure that work was being carried out correctly.
- Fixed guarding enclosure should restrict access to the machine. Any access points should, where practicable, be monitored by the machine/winderman. The access point should be controlled by ESPE or interlocked gate.
- Where the system of work may be defeated or the machine restarted by a third party, consider removing the key from the control panel or using a captive key system. Keys can be configured so that a predetermined sequence of events takes place to ensure safety (ie the control panel key must be switched to 'crawl' mode before it can be released. The key must then be placed and contained in the access gate to the reeler area).
- When inspecting for defects affecting quality, such as holes, creasing etc, consider preventive measures to reduce risk, based on the frequency of access

and severity of injury, such as:

- Eliminate the need for entry by fitting high-speed cameras.
- Use interlocked gates with guard-locking which is not released until the machine slows to a speed which has been determined by a risk assessment for each type of quality check.
- Automatic break detection that stops the machine when activated – its effectiveness depends on the type of paper being processed.
- Configuration and layout of the machine, eg provision of a broke pit.

Crawl speed

- Crawl speed has been accepted as a method of carrying out certain tasks where full isolation is not possible. Crawl speed should not be regarded as inherently safe.
- Working on any machine, even when operating in crawl mode, is a dangerous task. Injuries can occur at slow speed as well as higher speeds and such live working should only be carried out if absolutely necessary, following an assessment of the risks and implementation of a safe system of work.
- Working at the machine while it is running, even at slow speed, must only be attempted when absolutely essential, where the task cannot be done with the machine stopped.
- Where a crawl speed is required, this should be limited to as low as practicable. *Making paper safely* (Part 6 of *Guide to managing health and safety in paper mills*)⁵ advises that a maximum crawl speed should be 10 m per minute. Where a slower speed can be achieved, this should be implemented.
- There are exceptional circumstances to this, such as tissue production, where very slow speeds result in repeated breakage/tearing of the sheet (causing excessive downtime).

Emergency stop buttons

- Consider where people work and where they could become trapped or injured.
- Install suitable and sufficient emergency stop devices where they can be quickly reached by anyone working in the area.
- Emergency stop devices must stop the machinery **and** all associated equipment if it is dangerous for it to continue operating.

8 Other risks and health hazards

Background

This section is provided to act as a 'catch-all' area for any tasks not already dealt with and also for those risks, such as manual handling, that are common throughout the process.

Task list

- Working on or around the under-the-machine pulper (UTMP).
- Cutting paper and tape.
- Glueing labels.
- General lifting and carrying.

Under the machine pulper (UTMP pits and chests)

These are pits under some machines which collect product or offcuts.

Risks

- Entanglement with machinery.
- Falls.
- Being struck by falling objects.

Controls

- Carry out correct isolation of the reeler, UTMP agitator, water feed pump etc before entry.
- Treat the pit as a confined space and take precautions, including gas testing, to ensure there is no build-up of dangerous or toxic fumes.
- When working on the machine floor in the area of the UTMP, provide enough floor guarding and upstands to ensure people cannot fall/slip into the pulper during production.

Dust

Dust can affect the quality of the finished sheet (newsprint). In tissue manufacture, softer product results in a higher volume of dust being created.

Risks

- If dust is allowed to accumulate and settle it will lead to an increased risk of a fire starting which can quickly spread.
- Inhalation exposure to any dust, including paper dust, can cause respiratory problems ranging from the acute symptoms of coughing, breathlessness and sore throat to the chronic health effects of lung inflammation and possible scarring.⁶
- Skin contact with the dust can cause dermatitis or irritation. Eye contact with dust particles produced during cutting, slitting etc can cause eye damage or irritation.
- The specific health effects will depend on the composition of the dust, the size of the dust particles and the amount generated.

Controls

- Historically, air lances have been used to clean areas down, although this tends to just move the dust around, and does not extract or remove it. Depending on the volume of dust, extraction systems may help control the problem.
- Where the generation of dust cannot be prevented, control it by a combination of engineering and process measures, for example:
 - segregate or enclose the dusty process;
 - provide local exhaust ventilation (LEV) where total enclosure isn't possible;
 - use mechanical handling systems;
 - provide a good standard of general ventilation;
 - use a vacuum cleaner or a wet method to clean floors and remove excess dust.
- Where dust cannot be adequately controlled by the above measures, use a combination of personal monitoring along with controlled dispersal. Carry out dispersion during quiet hours, with the area segregated **and** the operator being equipped with full respiratory protective equipment (RPE).

Using hand knives

Risks

- Cutting or stabbing.

Controls

- Eliminate the use of hand knives where possible.
- Where this is not possible, consider the following steps for every task where hand knives are currently used:
 - Elimination – use a safer cutting tool.
 - Specify the correct knife.
 - Ensure spare knives and blades are available.
 - Provide safe storage for knives and blades.
 - Specify and provide the correct personal protective equipment (PPE).
 - Consider the working environment.
 - Develop and deliver training.

Glues

Risks

- Burns from contact with hot melt glues.

Controls

- Consider using alternatives.
- Provide PPE.

Static

Risks

- Shock from large charges of static that can build up on the reels.

Controls

- Earthing.
- Static eliminators.

Manual handling

Risks

The following tasks specific to the paper industry have been identified as high-risk activities:

- Broke handling.
- Clearing jams.
- Moving finished reels by hand.
- Core handling.

Controls

See HSE leaflet INDG143(rev2) *Getting to grips with manual handling*⁷ for further information on how to carry out assessments of tasks involving manual handling.

Occupational health surveillance

It is good practice to monitor the effects of health risks via health surveillance using an occupational health advisor. For more information see HSE leaflet INDG304 *Understanding health surveillance at work: An introduction for employers*.⁸

Find out more

- 1 *Five steps to risk assessment* Leaflet INDG163(rev1) HSE Books 1998 (single copy free or priced packs of 10 ISBN 0 7176 1565 0)
- 2 *Reducing error and influencing behaviour* HSG48 (Second edition) HSE Books 1999 ISBN 0 7176 2452 8
- 3 *Simple guide to the Lifting Operations and Lifting Equipment Regulations 1998* Leaflet INDG290 HSE Books 1999 (single copy free or priced packs of 15 ISBN 0 7176 2430 7)
- 4 *Slips and trips: Guidance for employers on identifying hazards and controlling risks* HSG155 HSE Books 1996 ISBN 0 7176 1145 0
- 5 *Guide to managing health and safety in paper mills* Binder (contains six parts) HSE Books ISBN 0 7176 2942 2
- 6 *COSHH a brief guide to the Regulations: What you need to know about the Control of Substances Hazardous to Health Regulations 2002 (COSHH)* Leaflet INDG136(rev3) HSE Books 2005 (single copy free or priced packs of 10 ISBN 0 7176 2982 1)
- 7 *Getting to grips with manual handling: A short guide* Leaflet INDG143(rev2) HSE Books 2004 (single copy free or priced packs of 15 ISBN 0 7176 2828 0)
- 8 *Understanding health surveillance at work: An introduction for employers* Leaflet INDG304 HSE Books 1999 (single copy free or priced packs of 15 ISBN 0 7176 1712 2)
- 9 BS EN 294: 1992 *Safety of machinery. Safety distances to prevent danger zones being reached by the upper limbs* British Standards Institution
- 10 *Simple guide to the Provision and Use of Work Equipment Regulations 1998* Leaflet INDG291 HSE Books 1999 (single copy free or priced packs of 15 ISBN 0 7176 2429 3)

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This document 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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