



Safety requirements for pope reeler areas



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Scope

This practice note applies to all Mondi paper mills. All mills are to assess their associated risks and develop plans to implement the requirements listed in this practice note.

The pope reeler area starts at the pope reeler drum inlet and ends at the final position of the tambour after the change process or automatic manipulation. If additional hazards exist, the scope needs to be extended based on a risk assessment approach.

Objective

The objective of this practice note is to standardise the minimum requirements for pope reel areas across all Mondi operations.

All mills are to adhere to the minimum requirements within five years (end 2022). The relevant BU CEO and/or COO shall approve any exceptions of the requirements as listed in this practice note.

Tasks and hazards

1. Tasks conducted at the pope reel area include:

- Profile, edges and quality checking on running tambour by operators hand;
- Using various tools for conducting quality checks;
- Tambour ripping;
- Visual checking of brake pads;
- Sample taking from reels;
- Cleaning and removal of paper debris;
- Persons moving between tender and drive side;
- Broke handling (feeding broke and waste into the pulper, and feeding paper from tambour into the pulper);
- Paper web threading;
- Lifting of and manoeuvring of tambours;
- Tambour exchange;
- Maintenance inspection (i.e. diagnostic, greasing, etc.).
- Cleaning and housekeeping activities;
- Stopping (braking) of rotating tambour;
- Moving of empty tambours (reel spools).

2. Main hazards at the pope reel area include:

- Nip points;
- Moving and rotating equipment;
- Suspended loads;
- Falling objects;
- Flying paper and broke;
- Openings to the pulper;
- Squeezing between reels and structures etc.;



- Pressurised air systems;
- Rope rupture;
- Trips and falls.

Minimum requirements

The following requirements are based on four of the five elements of the hierarchy of controls, being substitution, engineering controls, administration and personal protective clothing and equipment.

1. Substitution

The risk shall be substituted as follows:

- Operator free, paper threading at pope reeler (automatic system ensuring no need for persons to stand in front of the drum or in the hazardous area, and ensuring no manual manipulation is required);
- Spraying of water or installation of automatic brushes that rest against the full tambour (jumbo reel) to prevent uncontrolled release of layers of paper;
- Use of online quality measurement equipment, thereby substituting the need to check full tambour (jumbo reel) quality by touching by hand.

2. Engineering controls

In order to reduce the risk levels to an acceptable level, the following is required to provide suitable protection of persons and to ensure segregation between persons and equipment:

a. Guarding of the pope reel area

- Guarding around the pope reeler at a minimum height of 1 meter;
- Guarding to protect operators against flying paper or debris;
- Guarding designed according to a risk based approach (consider operating speed, weight of paper etc.);
- Full mesh guarding on both sides of the tambour;
- Robust barriers designed according to strength calculation (according to protection required and relevant risk assessment);
- The height and length of the side guarding shall cover the maximum size of a full tambour (jumbo reel) in the winding position;
- Additional guarding at areas where activities are conducted that are close to the pope reeler.

b. Entrance to pope reeler areas

- All entrances to the pope reeler area shall be interlocked:
 - All entrances are to remain locked at all times (example: key, cards etc.);



- Systems should be installed to ensure doors cannot be opened when equipment is running and warning light is red, and can only be opened when the light is green;
- Only authorised persons may enter the area, however they must be approved, trained and names recorded in an authorisation list;
- The entrance to the pope reeler area (by authorised persons) is permitted only during limited time for specific tasks however these must be covered by a risk assessment;
- Controls are in place to ensure entry into the pope reeler area is strictly forbidden within 3 minutes of tambour exchange process “turn-up” starting (time period should be calculated according to the maximum speed of the specific paper machine);
 - During this phase, the red light must be activated as well as entrances locked and remain on until exchanged tambour has reached the end position and has come to a complete standstill.

c. General guarding

- All moving and rotating equipment that is in normal reach of persons shall be sufficiently guarded, including gears, drive shafts, couplings, nip points, drums, tambours, reels, arms (primary / secondary / tertiary) etc.;
- Minimum guarding requirements to be in line with local legislation and site specific standards;
- The gap in the barrier at floor level in front of the pulper shall not exceed 150 mm whilst pulper is running.

d. Safe guidance of tambour

- Tambours should be guided on the rail of the Pope Reeler to the end position and controls in place to prevent the tambour kicking back towards the pope reeler drum;
- A risk assessment is required if the tambour is not guided to the final position, and additional measures identified to reduce the risk of the tambour twisting on the rails;
- In the event that the tambours are not guided along the rails, an air pipe should be installed to keep the rails free of paper debris and dust build-up.

3. Administrative controls

Although implementing administrative controls does not necessarily reduce the risk levels, sites shall provide the necessary information of the risks and provide safe tools and equipment and warnings enable the operators to conduct the tasks safely, these include:

- The period when it is possible to enter the area to the pope reeler is indicated by a light signal as follows:
 - Green light indicating that authorised persons may enter the area for defined tasks and periods;
 - Red light indicating that the doors are locked and entry is forbidden;
 - The lights shall be installed at each entrance to the pope reel area.



- Warning signs (no entry and moving and rotating equipment) are displayed at each entrance;
- Sampling of the full tambour (jumbo reel) is conducted from the safe side only (not from the running tambour side);
- Each empty tambour (reel spool) is numbered and the frequency of its use is monitored and tracked;
- A tambour (reel spool) maintenance checklist (see below) is implemented and kept up to date;
- The lowering speed of cranes into to the final position shall be limited to minimum 0.5m/min. If lowering speed is faster, it must be reflected in the dynamic strength calculation of the tambours (reel spools) (higher safety factor).

Note: It is prohibited for operators to slow down the rotating tambour with a manual tool, or by use of the crane.

4. Personal protective clothing and equipment

Suitable personal protective clothing and equipment shall be issued (risk-based approach) in addition to the controls listed above and in the site-specific task based risk assessments and safe operating procedures.

Additional requirements

The following requirements are compulsory when designing and/or purchasing new paper machines as well as during major rebuilds of paper machines or parts thereof.

- Automatic tambour transport equipment and systems;
- Equipment for transporting broke to the pope pulper.



Maintenance checklist

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Control, Test, Maintenance	Comment	Condition	Period	Responsible
Ultrasonic test of journals from edge side	Detection of cracks on surface and inside of journals	Access from edge side of journals available, detail journal drawing is necessary for measuring	annually	Maintenance Skilled specialist
Ultrasonic test of journals from the surface side	In the event that a fault is detected by the ultrasonic test from edge side	Bearing housing remove, bearing dismantling	annually if necessary	Maintenance Skilled specialist
Magnetic particle or capillary (red white) test	In the event that a fault is detected by the ultrasonic test from edge side	Bearing housing remove, bearing dismantling	annually if necessary	Maintenance Skilled specialist
Check if bearing seat or clutch has been repaired by welding - found tambours must be excluded from operation	Welding, or thermal treating can influence structure of journal what causes cracks and initiates fatigue	Available equipment - spectrometer or surface etching method is needed. Quality of journal steel must be known	once	Maintenance
Control journal tolerance, bearing seat + do magnetic particle or capillary (red white) test	Control conditions before bearing assembly	Bearing housing remove, bearing dismantling	each bearing exchange	Maintenance
Control round out of tambour, journals, shaft	Round out control according producer's standard - protocol	Bearing housing remove, bearing dismantling, tambour placed to stand and rotating	each bearing exchange	Maintenance
Check shaft journals for a continuous fitting key groove.	If the fitting key groove is open, the fitting key (straight sunk key) is secured to the front of the shaft journal, using a glued worm screw.		once	Maintenance
Stretching-over of the fastener	Protective covers of the roll body end faces		3M	Maintenance
Check colored marks on the screws of tambour clutch	In case released screws can blocked moving rotating tambour - construction and condition on Pope like in Neusiedler		each reel change	Operator
Visual control - check clutch, sunk key, bearing housing, surface Inspection of the roll cover condition, bearing body covers and end	Complete visual control of tambour condition in mounted state	Tambour available to be turned bearing housings, access to all part of tambour available	2W	Maintenance



faces of bodies, condition of fasteners, gear rim				
Visual control - shaft run out, abnormal noises, slaps and others	Detect anomalies during winding and transports		8H	Operator
Check tambour bearings - axial play, bearing condition	Play depends on bearing arrangement. Should be provided by tambour's producer resp. bearing's producer		annually	Maintenance
Check screws from bearing cover and clutch including marks	Tightening the screws, fixed by glue, screws are remarked if necessary		6M	Maintenance
The lubrication fittings are glued on at the tambour bearing lubrication point			only first time, or after change	Maintenance
Bearing lubrication	Period depends on bearing arrangement, producer's recommendation, bearing producer's prescription		1M - 12M	Maintenance

Recommended Procedures	Comment	Condition
Implement tambour counter in the control system	Register operating time - hours in operation at Pope. Valuable information for lifetime calculation.	Numeration of tambours, registration of each tambour to system
Analysis of tambours with low operating time	Analysis of reasons for underutilization for tambours with operating time which is significantly lower than average operating time	
Strength recalculation of tambour	In case of production changes, speed increase, paper weight increase... 42CrMO4 standard steel quality for journals	Availability of all technical parameters during tambour operation
Calculation of theoretical tambour's life time	Calculation by finit element method provides theoretical life time of tambour. Value predetermine maintenance strategy	Availability of all technical parameters during tambour operation. Tambour's operating time.
Each journal needs to be replaced every ten years	Let calculate strength journal properties by supplier. Provide supplier all relevant information concerning tambour operation. Check real crane lowering speed and safety margin of journal.	Age of tambour. Evidence of tambour operating time.



References

- SD PR 19.11 (Machine Guarding).
- Safety Rules to Live By.
- Audit template for safe operation of paper machines.
- Tambour maintenance checklist.

Document Control

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