



Safety requirements for paper machine basements



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Scope

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

The paper machine basement is defined as a cellar located directly beneath the wet end, pre-drying and after-drying sections and underneath the popereeler area of the paper machine, and is limited by either paper machine hood or the structure of the machine.

Objective

The objective of this practice note is to standardise the minimum requirements for paper machine basements across all Mondi operations.

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

Tasks and Hazards

1. Tasks conducted in the basement of paper machines

The following are typical tasks, which are conducted in the basement of paper machines whilst the machine is in running mode:

- Removal of broke (from cellar floor, crossbeams, machine structure, pulleys, guards);
- Spreading of broke on the conveyer belt feeding the re-pulper;
- Maintenance activities (adjustments of greasing components, vibration measurement);
- Felt and rope measurement;
- Various types of inspections;
- Fire alarm verification and response;
- Inspection of the wires;
- Other measurement activities;
- Washing of felts and wires;
- Maintenance of CCTV cameras and other equipment.

2. Main Hazards in the basement of paper machines

The main hazards that exist in paper machine basements include the following:

2.1. Falling objects include:



- Rolls;
- Pulley;
- Other machinery parts;
- Felt;
- Broke;
- Ropes;
- Pieces of concrete;
- Etc.

2.2. Nip points include:

- Between felt and rolls;
- Between two rolls;
- Between rotating parts and crossbeams;
- Between rotating parts and structures;
- Between pulleys and ropes;
- Between wires and rolls;
- Tensioning mechanism and felts, ropes;
- Drying fabric guiding mechanism;
- Etc.

2.3. Rotating parts include:

- Both sides of paper machine clothing;
- Rolls and pulleys;
- Broke conveyors;
- Etc.

2.4. Fire risks and combustible materials include:

- Paper;
- Grease and oil (leakages);
- Lubrication / hydraulic stations;
- Dust, paper dust;
- Wires;
- Hot surfaces;
- Etc.

2.5. Other hazards include:

- Tripping (uneven floor, sewer channels);
- Slipping (water, oil and grease spillages);
- Heat.



3. 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.

3.1. Substitution

It is possible to eliminate the risk by substitution of the task by installation of the following equipment:

- Installation of a rope less tail threading system if:
 - Other measures considered do not reduce the risk to an acceptable level, and;
 - It is technically possible (e.g. machine speed higher than 300 m/min, depending on paper grade, basis weight, moisture, machine components).
- Installation of a broke conveyor system (only for those areas, where we do not find any other possibility to remove broke, e.g. procedures requiring the stopping of the machine to remove the broke);
- Installation of an automatic felt measurement system;
- Installation of manual lubrication systems between the hood and drop zones;
- Vibration measurement points outside the drop zone.

3.2. Engineering controls

In order to reduce the risk levels to an acceptable level, the following should be installed to provide means of preventing build-up of broke and serving as a barrier between the operators and the equipment:

- Crossbeam covers to prevent the accumulation of broke on the beams (only for those areas, where we do not find any other possibility to remove broke, e.g. procedures requiring the stopping of the machine to remove the broke);
- Guarding of all the nip points and rotating parts;
- Solid fencing (no chains or plastic barriers) of the drop zones.

3.3. Administrative controls

Although implementing administrative controls does not necessary reduce the risk sites shall provide the necessary information of the risks and issue the necessary tools to be able to conduct the cleaning tasks safely, these include:

- Displaying of suitable labelling indicating “no unauthorized entry” on the doors of the hood;
- Displaying of the necessary warning signs on the doors of the hood, i.e. moving and rotating equipment, slipping hazards, etc.;
- Development of a safe operating procedure defining who is permitted to access the paper machine areas and under which clearly conditions. Generally, the drop zone area shall be treated as “no-go area”;



- Issue of sufficient “long-fingers”, hooks and pressurised air for broke removal and ensure usage thereof.

3.4. Personal Protective Equipment

Suitable personal protective clothing and equipment shall be issued in addition to the administration controls listed above and or in the site-specific task based risk assessments and safe operating procedures. These include, but not limited to the following:

- Foot protection fitted with steel toe-caps;
- Hearing protection.

4. Additional requirements & good practice

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. These controls are based on the top four of the five elements of the hierarchy of controls, being elimination, substitution, engineering controls and administration controls.

4.1. Elimination

- Ensure there are no cross beams included in the structure of the paper machine during design phase.

4.2. Substitution

- Installation of online vibration diagnostic system to prevent the measurements being conducted manually.
- Central lubrication system;

4.3. Engineering controls

- Installation of distance guarding or fencing around the drop zones (considering rolls, felts, broke, wires) with interlocking devices thereby making access only possible when the paper machine has been switched off and has come to a complete stand-still;
- Installation of a life line next to the entry from conveyor to the pulper on which the operator can attach his/her safety harness;
- Installation of a portable roof.

4.4. Administrative Controls



The following administrative controls could be considered in addition to those listed in element 3.3 above:

- Installation of CCTV (close circuit television) or flash alarm providing warning of persons entering the basement area;
- Installation of access system (e.g. chip card to enter the zone between hood and drop zone).

Support and References Documentation

- SD PR 19.11 (Machine Guarding).
- Safety Rules to Live By.
- Requirements for guarding are described in EN 1034
- Audit template for safe operation of paper machines

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Author: Reinhard Horvatits

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Owner: Brian Darlington, Harm Bergmann-Kramer, Lars Mallasch



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