ANDRITZ

NOVIMPIANTI
DRYING TECHNOLOGY

PULP & PAPER

PAPER & BOARD

BUILDING HEATING & VENTILATION

APRIL 30TH 2019

CHAPTER OVERVIEW

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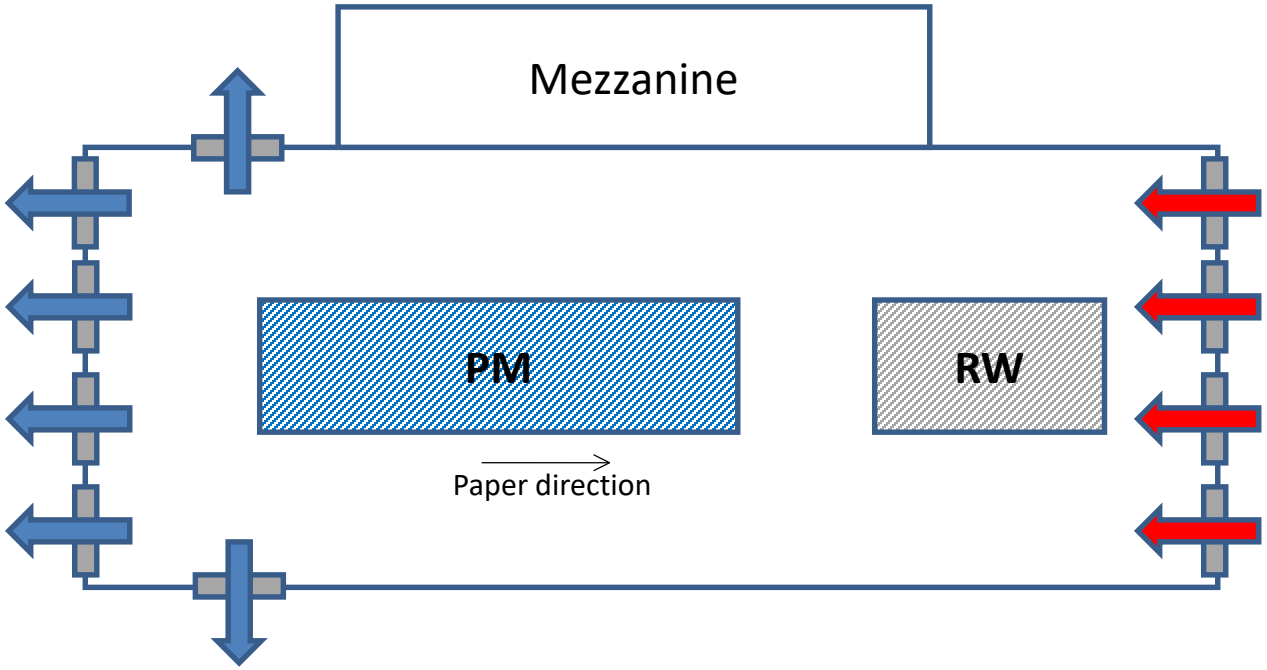
01 – LONGITUDINAL VENTILATION CONCEPT



- Air is blown from the dry zone towards the wet zone
- Longitudinal flow prevents from moisture migration to the dry zone
- Air blown is heated in order to warm the roof avoiding condensation effects in the room
- System is designed with air change rate number (number of complete changes per hour)

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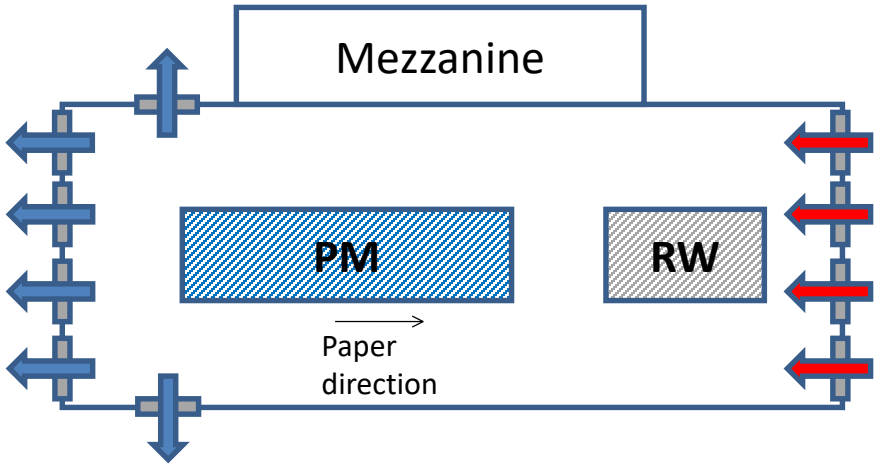
01 – LONGITUDINAL VENTILATION CONCEPT

Longitudinal Ventilation shows different problems:

- Longitudinal flows carries dust generated in the dry zone to the wet zone: dust can accumulate on machine (Hood top, ducts…) rising the probability of fire accidents
- Temperature of insufflated air decreases along pattern from dry zone ending with not enough heating to the roof on the wet zone



- Convectional flows from the machine break the longitudinal flow pattern
- Air change rate is not the only/right indicator for performance of building ventilation

Longitudinal ventilation is not efficient → A new concept is needed

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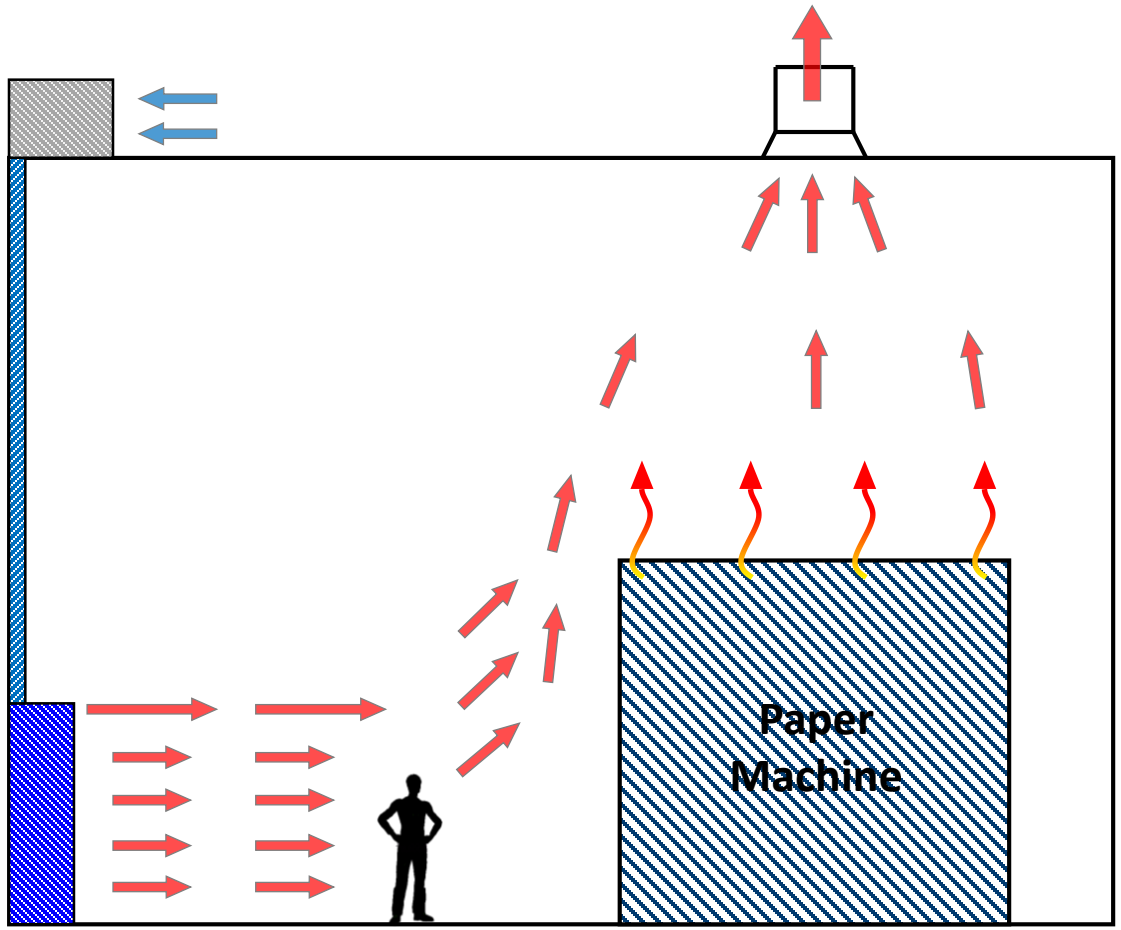
- Room ventilation is divided in different transversal sections
- Heating and blowing in each section is adjustable to control the air flow and stream lines
- Takes advantage of natural convectional flow from the machine
- Avoids problems of moisture and dust displacements in the room



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02 – SECTIONAL VENTILATION CONCEPT

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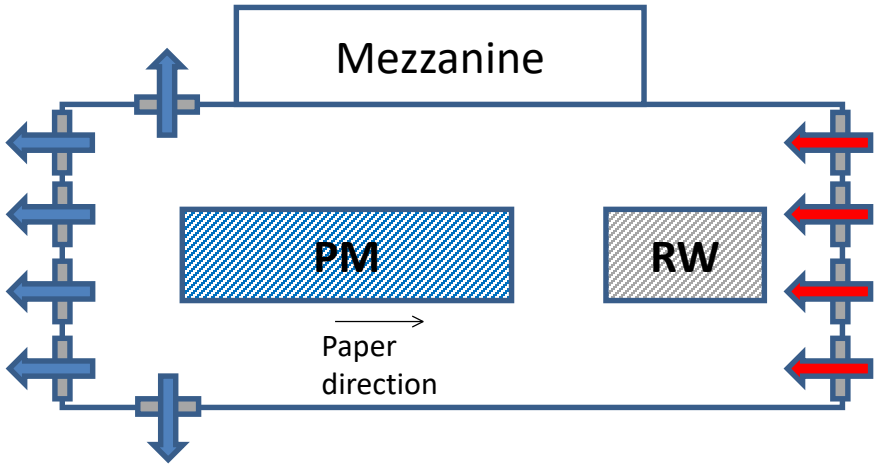

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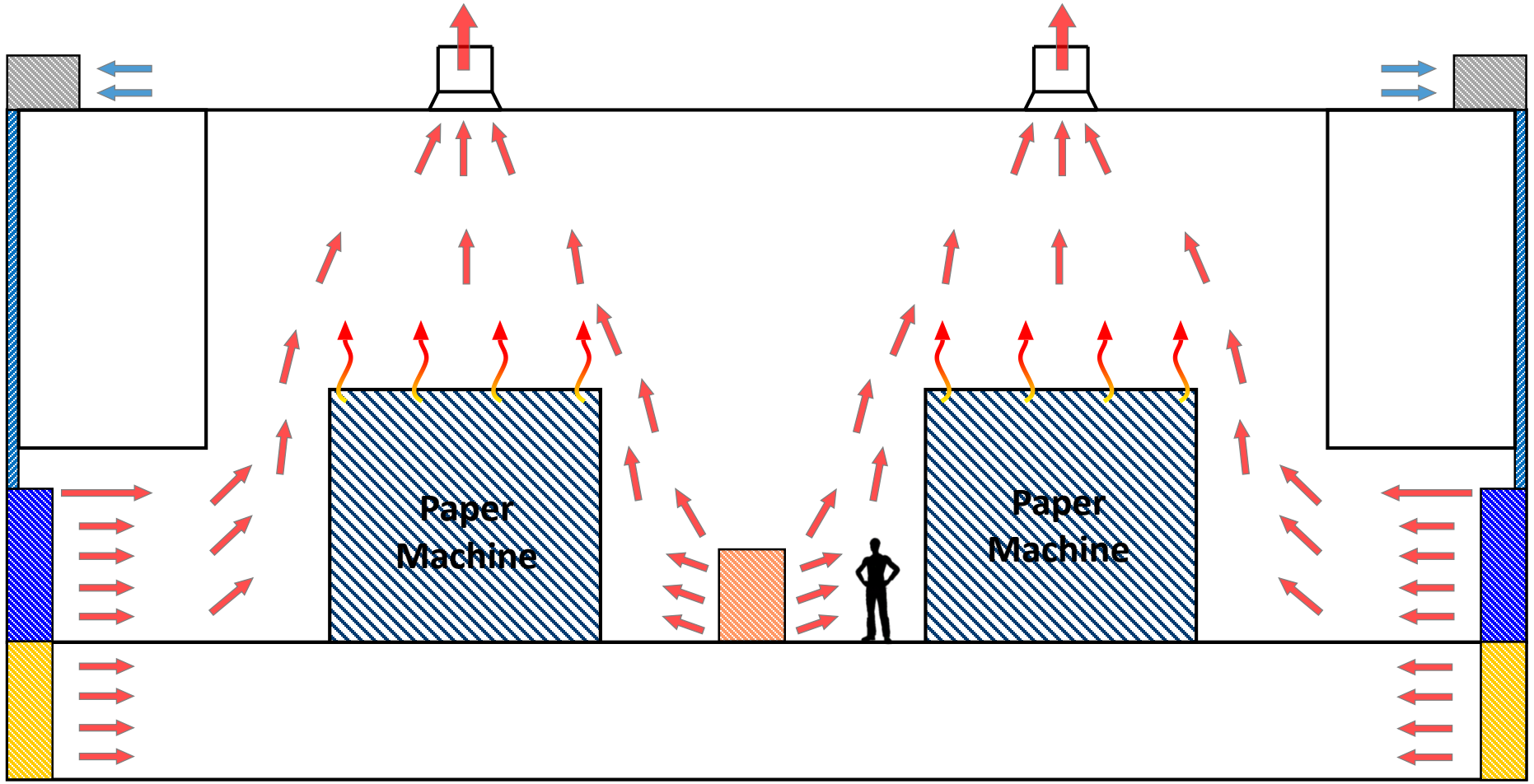

TWO MACHINES IN THE SAME ROOM

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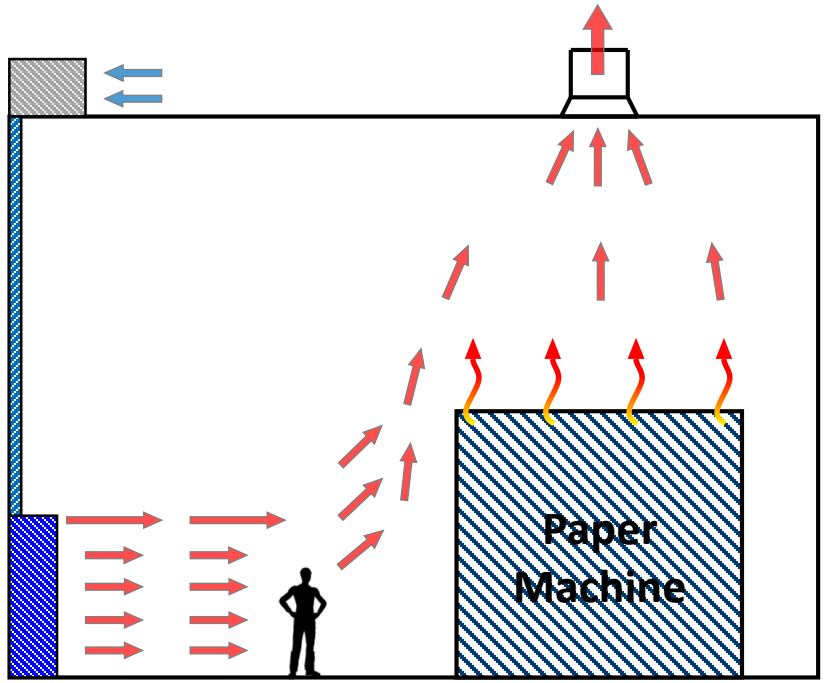
03 – ROOM VENTILATION DESIGN

OBJECTIVES

- to avoid moisture damages to process, machinery and building
- to remove and discharge thermal and airborne chemical pollutants in the machine area
- to assure a healthy and comfortable working environment for operators
- to control air flows in the room
- to heat the building during wintertime and refresh on summertime



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03 – ROOM VENTILATION DESIGN

The following **KEY FACTORS** should be taken in account when designing the room ventilation system

PRODUCTION
- Product
- Capacity
- Machine Speed
- Grammages

PAPER MACHINE
- Configuration
- Former, press, dryers
- Pulpers, filters, screens
- Calenders, reel, winders
- Coating

BUILDING
- Geometry
- Layout
- Construction

CLIMATE
- Annual temperatures
- Location
- Elevation

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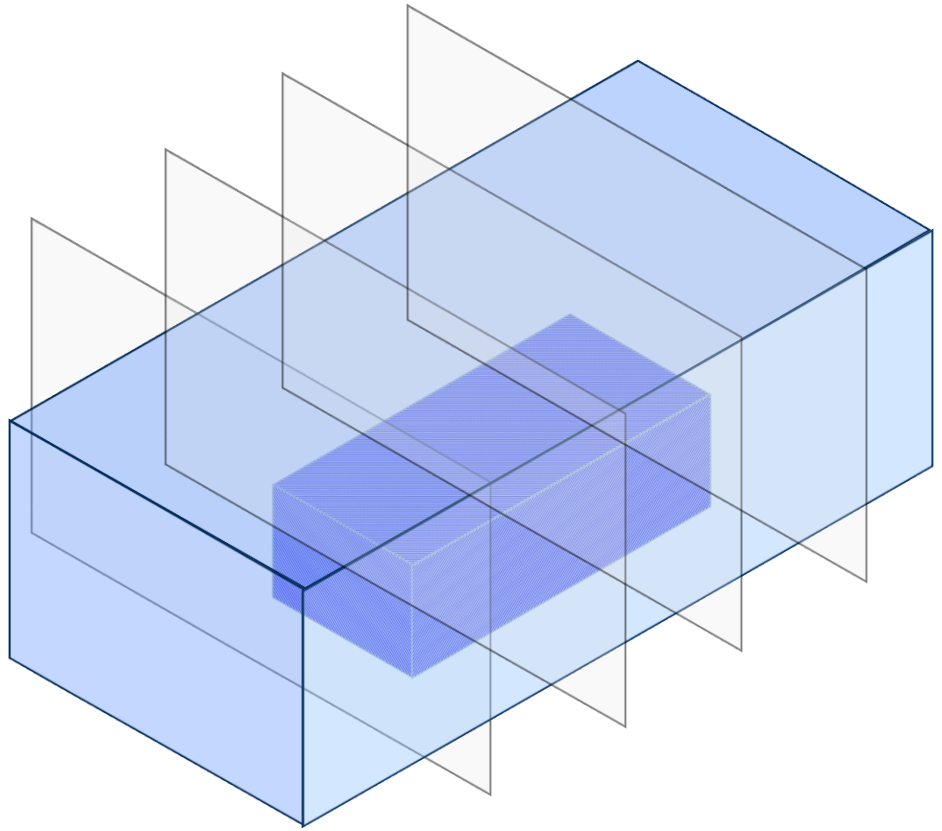
03 – ROOM VENTILATION DESIGN

AIR FLOW CONTROL in the room is obtained through:

- Dividing building length in several transversal sections
- Each section should be then balanced in terms of calculated:
  - Mass flow
  - Heat / Energy

  Depending on the equipment in the section
- Air flowing inlet and outlet each section is balanced



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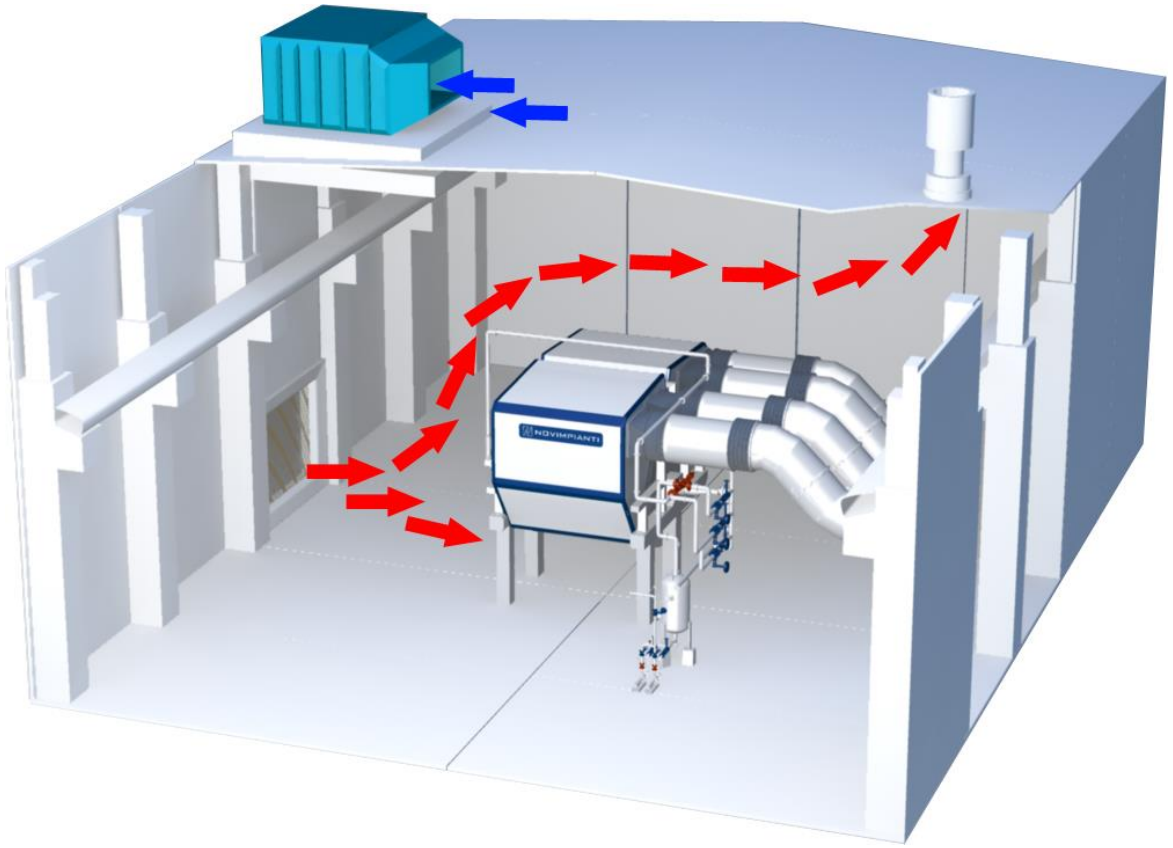
03 – ROOM VENTILATION DESIGN

AIR FLOW CONTROL in each section is studied to:

- Create a flow from operator side to drive side
- Dry zone to Wet zone air migration is eliminated balancing each section
- Location of outlets is studied to avoid flow stagnation points and to efficiently discharge moist in atmosphere



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04 – ROOF VENTILATION UNITS

- To be installed on roof top
- Are provided with fan, filter, water coil
- Live steam coil can be added for temperature correction

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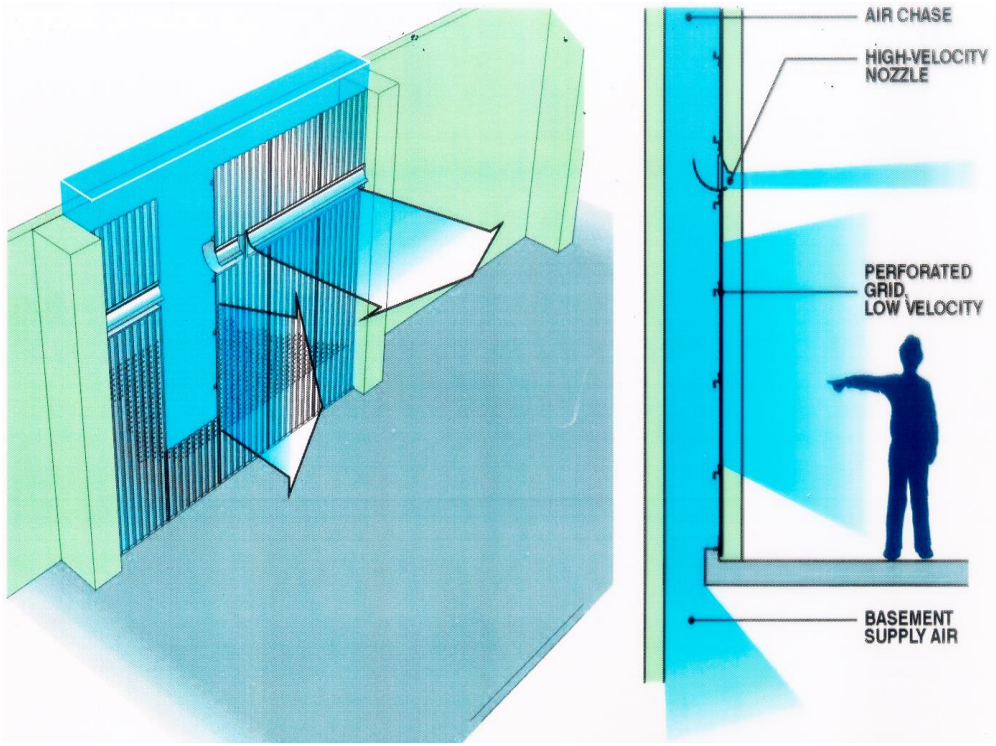
05 – DISTRIBUTION CHAMBER



Technical data

- velocity from the upper nozzle ab. 5-6 m/s
- velocity from perforated plate ab. 2-3 m/s
- holes in the perforated plate 8/10 mm
- open area ab 15-20%

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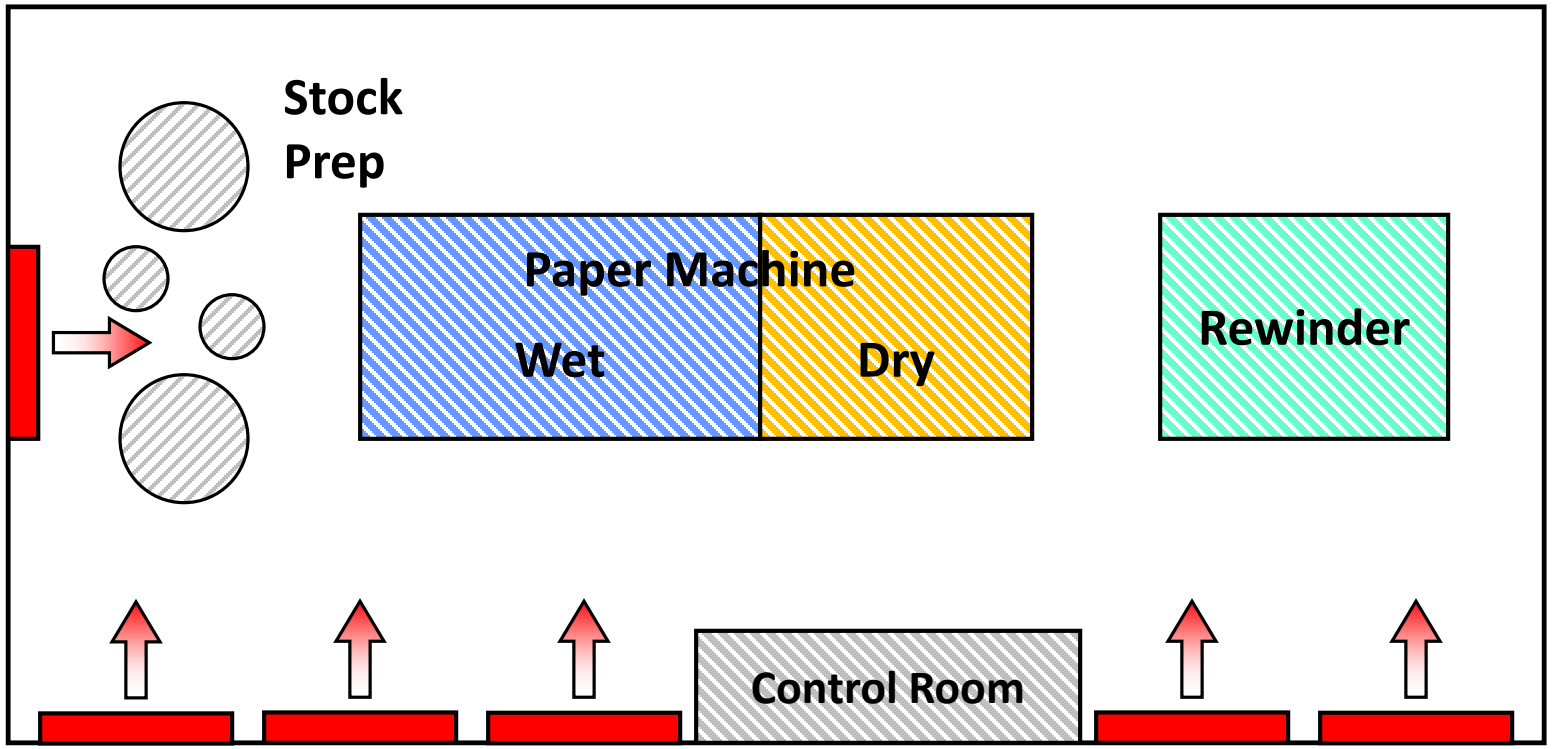
06 – DISTRIBUTION LAYOUT



- Distribution units are located on operator side of the tissue machine and of the rewinder
- Air distribution can be done in the stock preparation area

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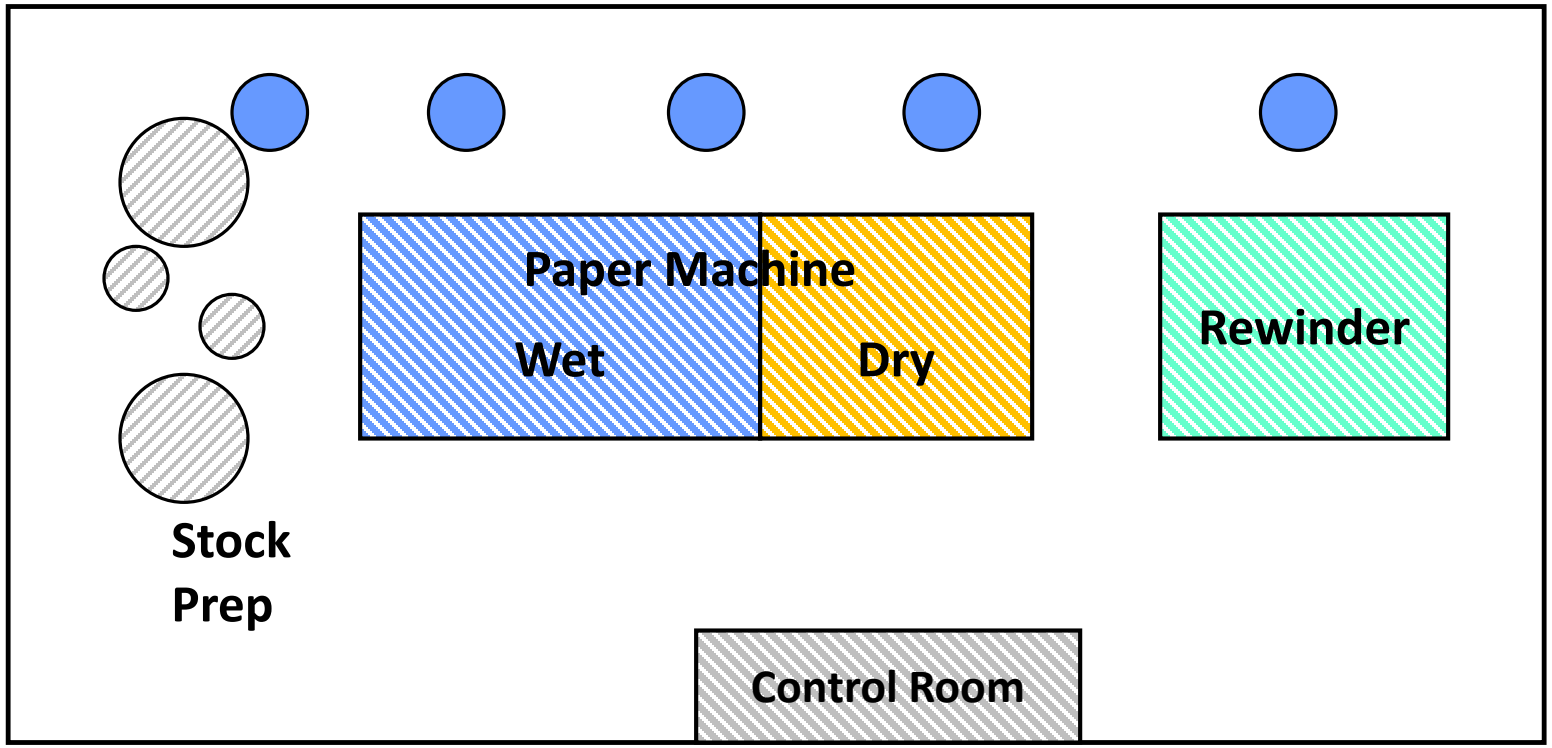

Exhaust units should be located:

- N.1 over stock preparation area
- N.2 over former section of the machine
- N.1 over dry end of the machine
- N.1 over the rewinder

More units can be added on tender side too depending on the particular application

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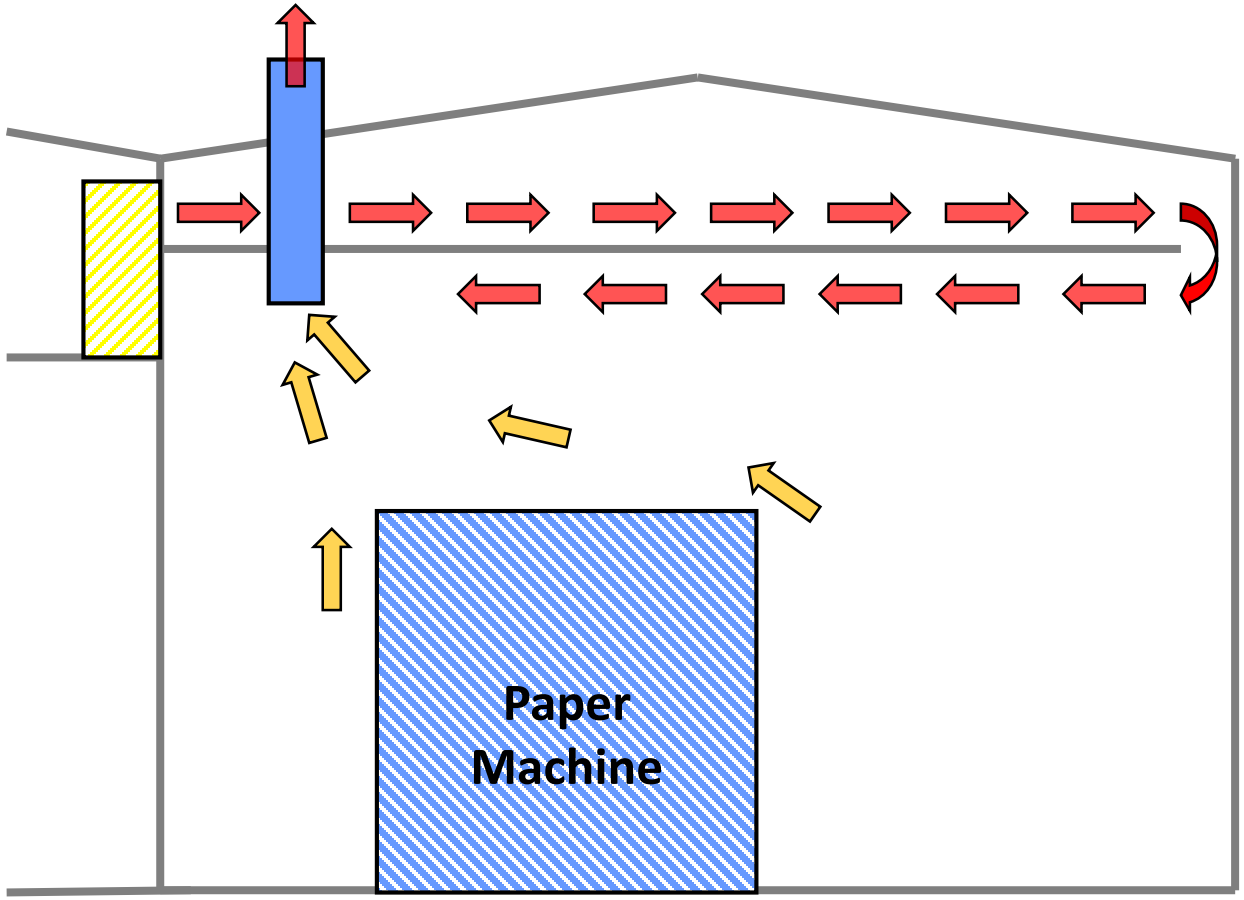
07 – FALSE CEILING

- In order to prevent condensation on the inner surface of the roof for the wet zone
- Blown air is heated up to 60°C granting to warm roof surface
- Energy from Yankee Hood exhaust can be use to heat air
- Temperature correction can be done through live steam coils



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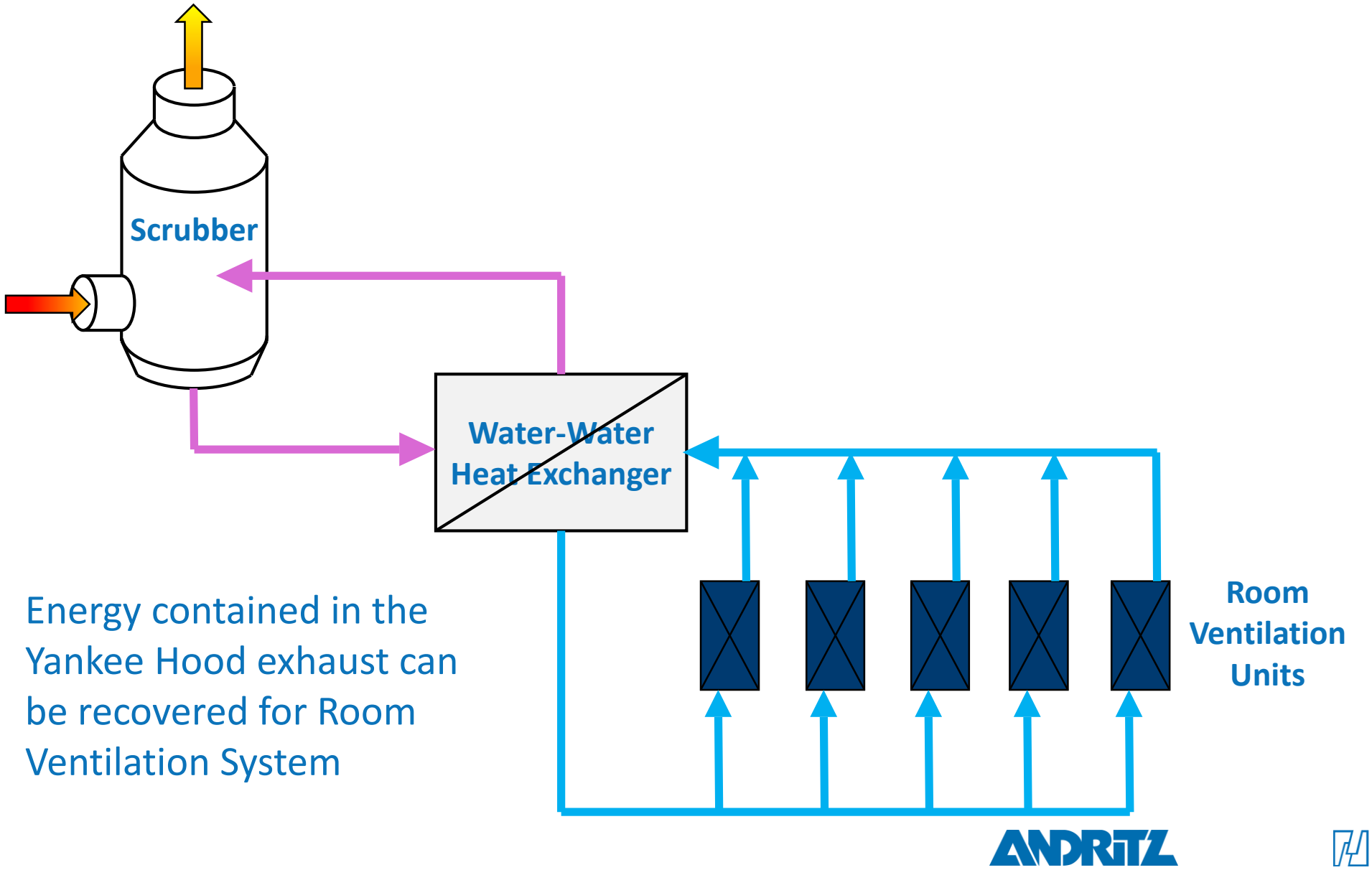
08 – ROOM VENTILATION UNITS



Energy contained in the Yankee Hood exhaust can be recovered for Room Ventilation System

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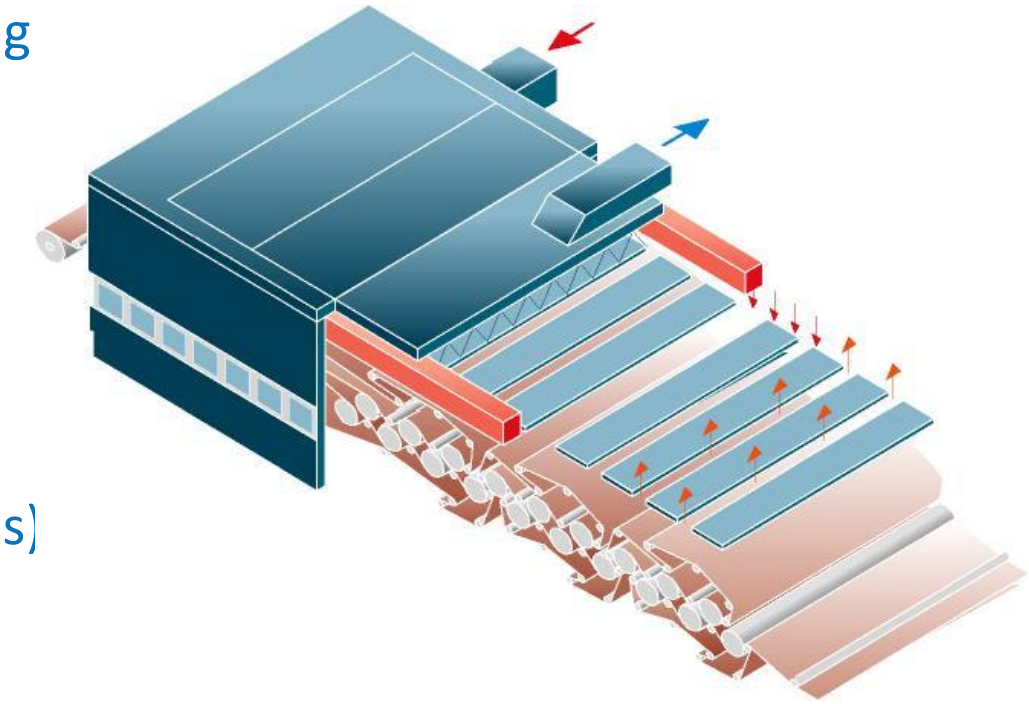
09 – ROOM VENTILATION FOR EXISTING PM

Designing of Room ventilation system need be related to existing equipments and building layout.

In particular paper machine environment and ventilation depends on:

- Mist Removal System
- Closed Hood System (leakages)
- Vacuum System Exhaust
- Motor Cooling System



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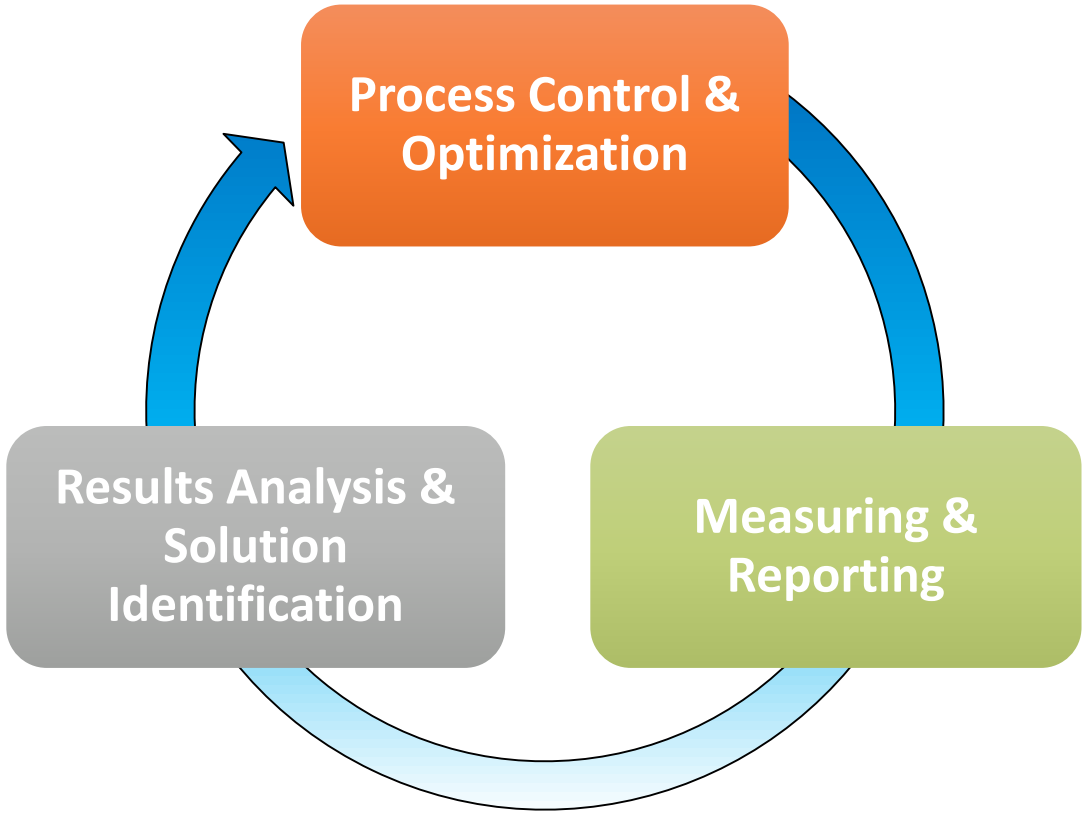
09 – ROOM VENTILATION FOR EXISTING PM

Room Ventilation System needs to be designed being aware of:

- Air flow measurements
- Air change rates
- Temperature and humidity levels
- Analysis of units location
- Analysis of system efficiency



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