Building Leadership Excellence

Operational Excellence Success Story

Clairefontaine PM 6: Energy Savings in Paper Machine Vacuum Systems

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RETHINK PAPER:
Lean and Green

Clairefontaine Mill Overview

- Clairefontaine paper mill is located north-east of France in Etival (approx 1 hour from Strasbourg)

Clairefontaine Mill Overview

- Clairefontaine paper mill is founded 1858
- Two paper machines (PM5 and PM6) with total capacity of 160 000 mt/year
- Main paper grades:
  - Uncoated Woodfree/Freesheet
  - Uncoated Woodfree/Freesheet Cut Size/Copy Paper
  - Envelope Paper
  - Specialty Uncoated Woodfree/Freesheet
- Non integrated mill

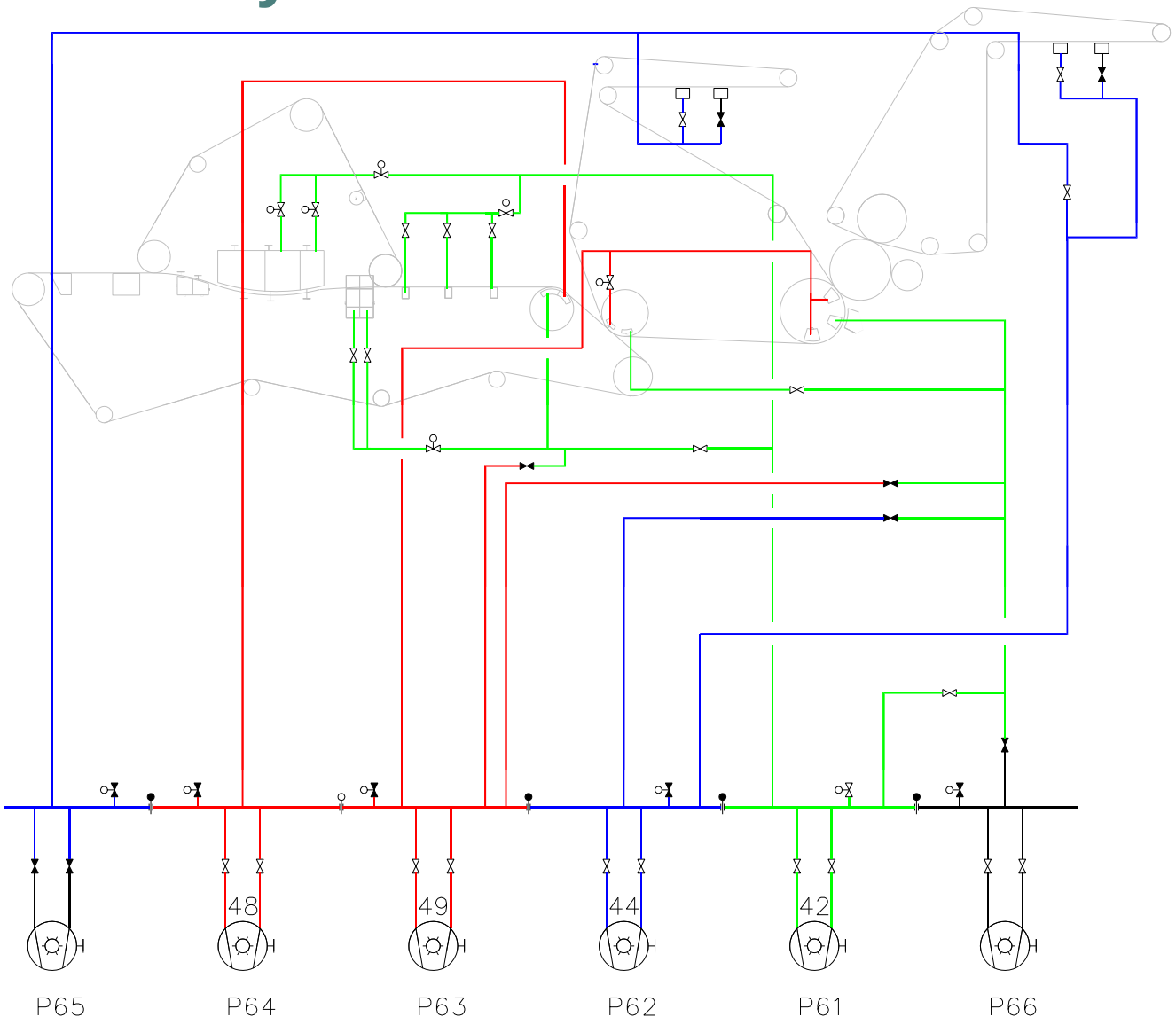
Paper Machine PM6

- Installed 1974, last rebuilt 2004
- Twin-wire forming section and tri-nip press with 2 x shoe presses (new press section installed 2004)
- Size press
- Trim width 3.4 m, max. speed 1,000 m/min
- Total capacity: 100,000 mt/y
- Grades produced: Uncoated woodfree/freesheet.

Project Background

- Sealing water system was totally open so there was a pressure to close the system. This would have meant:
  - Cooling towers
  - New piping
  - Increased water pumping costs
  - Chemical treatment
- Old vacuum system with liquid ring pumps started to be worn out so there was lack of vacuum capacity

Old Vacuum System



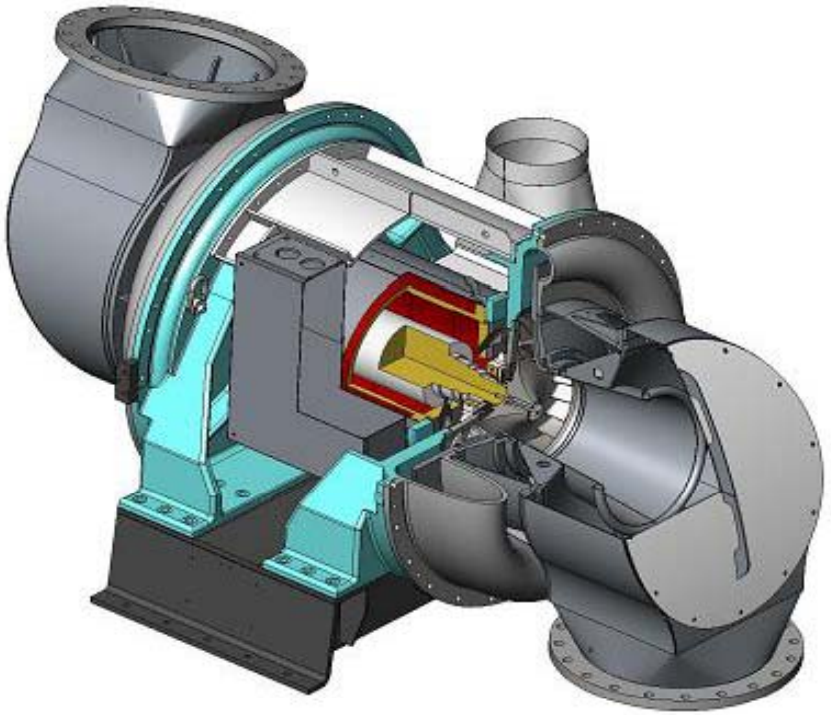
Old Vacuum System

Project Scope

- Two variable speed turbo blowers replaced the existing system, this consisted of 6 water ring vacuum pumps.
- The mill decided to keep 2 of the old water ring pumps as back-ups, the others were dismantled
- New horizontal model water separators (2 pcs)
- Oil lubrication units for the blowers
- Vacuum system engineering
- Installation supervision, start-up and process optimization

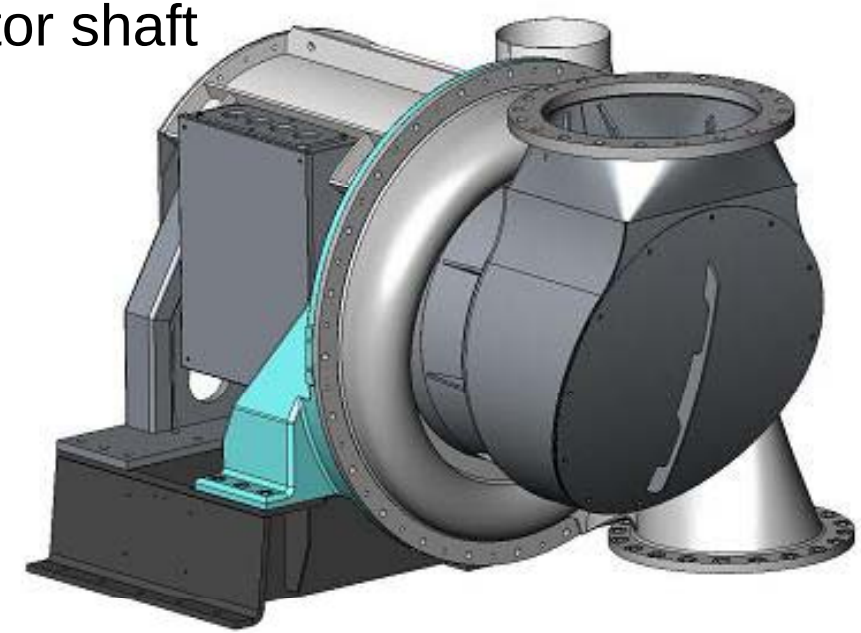
New Technology - Variable Speed Turbo Blower

- 30….60 % power savings in the vacuum system
- Easy to install or retrofit existing vacuum pumps
- Water free solution
- Excellent option when rebuilding the vacuum system
- Easy and quick to optimize
- Pumping energy recoverable
- Corrosion free materials
- Economical system to operate
- Fast and easy maintenance



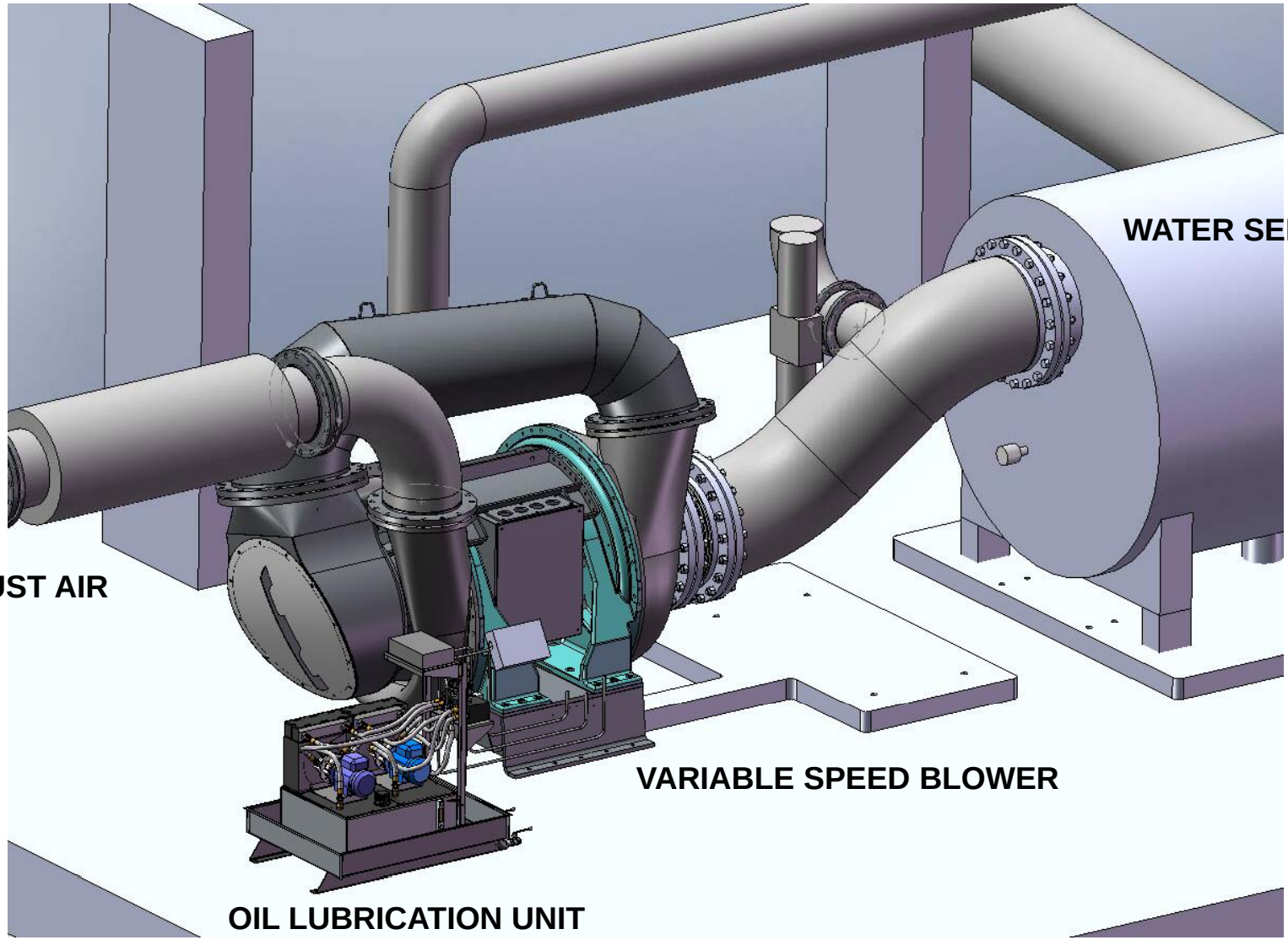
Features- Variable Speed Turbo Blower

- Variable speed control, controls the vacuum level
- System easily adapts to changes in machine speed, grammage and felt age without the need of bleed valves
- Wide air capacity range eliminates bleed valves
- Impeller mounts directly to the motor shaft
- No gearbox is needed
- Speeds up to 10 500 rpm
- Oil lubrication unit for the bearings
- Online condition monitoring

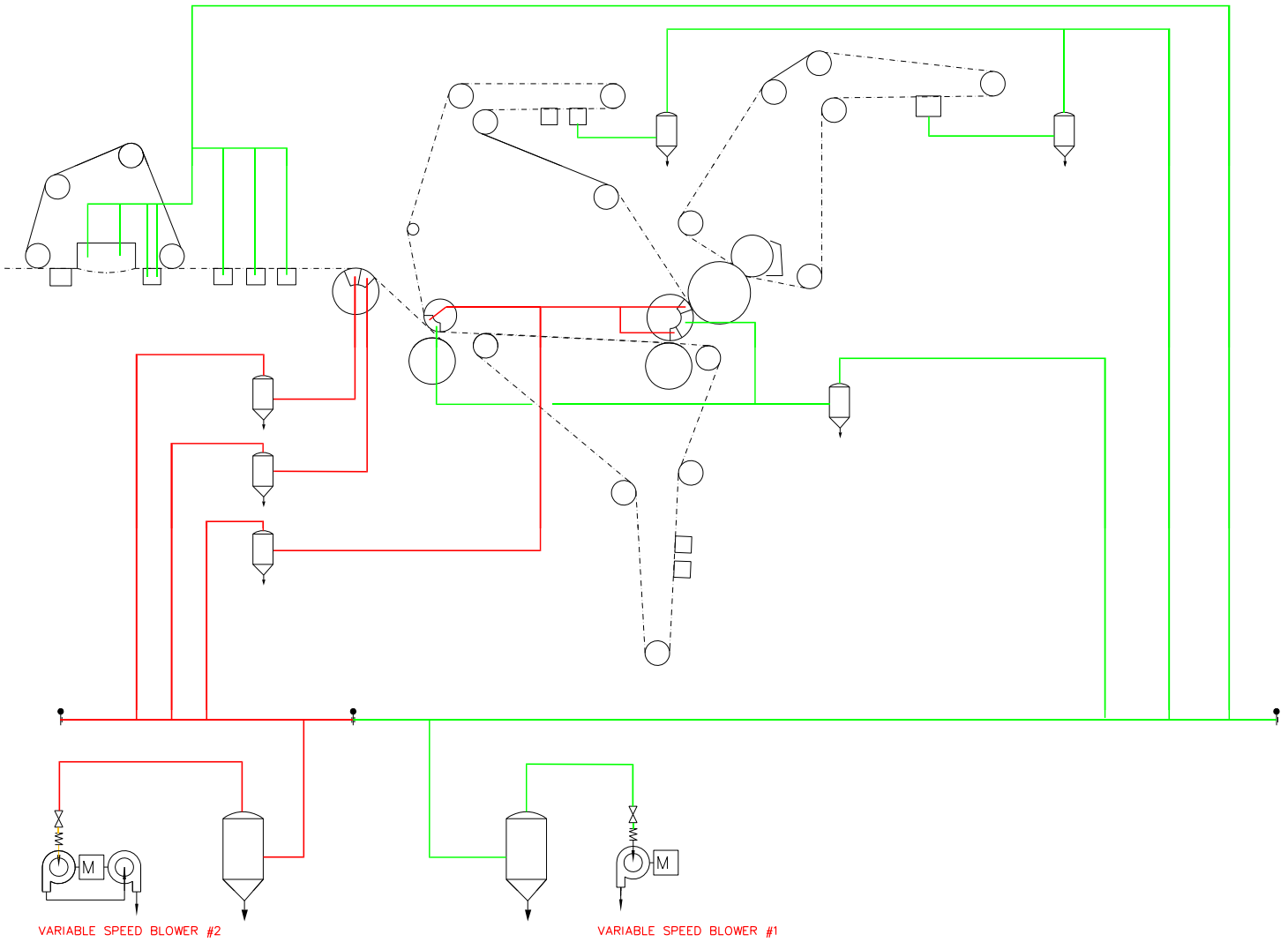


Compact Size Minimized Civil Work

Serial Connected Turbo #2 Unit – High Vacuums



New Vacuum System



Results

- Energy saving 840 kW (45% of the original situation)
- Complete saving of the sealing water system, as the turbo blower process is dry. Water savings totally 770 000 m^3/year
- More vacuum flexibility on the paper machine
- Vacuum flexibility increased for the paper machine vacuum system, enabling better runnibility. This was by increasing or reducing HiVac or LowVac levels according to the process needs.
- Vacuum levels are very stable and levels can be controlled from the DCS
- Annual savings 500 000 USD/year
- ROI approx 2 years

Thanks for your Attention!