RDM Born to be converted

VOITH

RDM Arnsberg KM3 Rebuild
Working Together for Extra Productivity

Bled, 2017-11-23

Two Traditional Companies Prepared for the Future
116 Years Arnsberg and 150 Years of Voith

Arnsberg

1903
Start-up BM 1

1905
Start-up BM 2

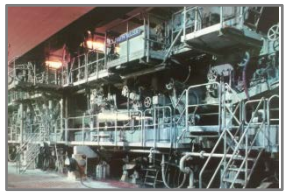
1906

1st bleached lined FBB

1957

Start-up BM 3

1980



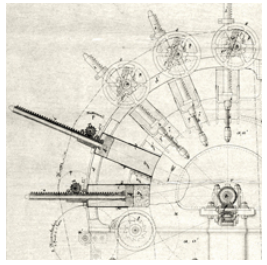
Rebuild to Fourdrinier

2016
Rebuild Middle Layer

Welcome to the Next 150 Years

Voith

1869



Voith obtains the first patent for a wood grinder

1961

Voith delivers largest newsprint machine in Europe

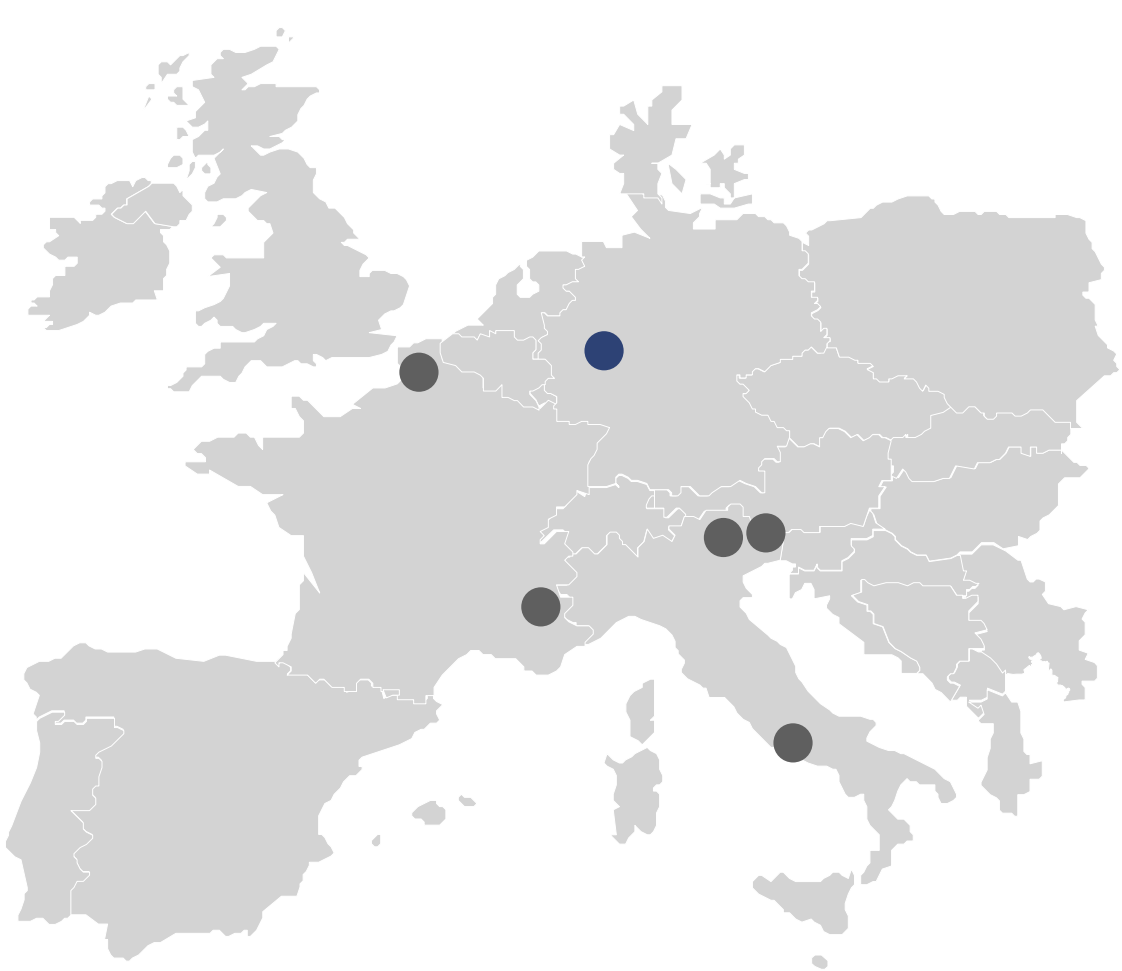
2013

Start-up of highest performing board machine for ivory board worldwide delivered by Voith

Today

Voith takes the next step towards the future of papermaking

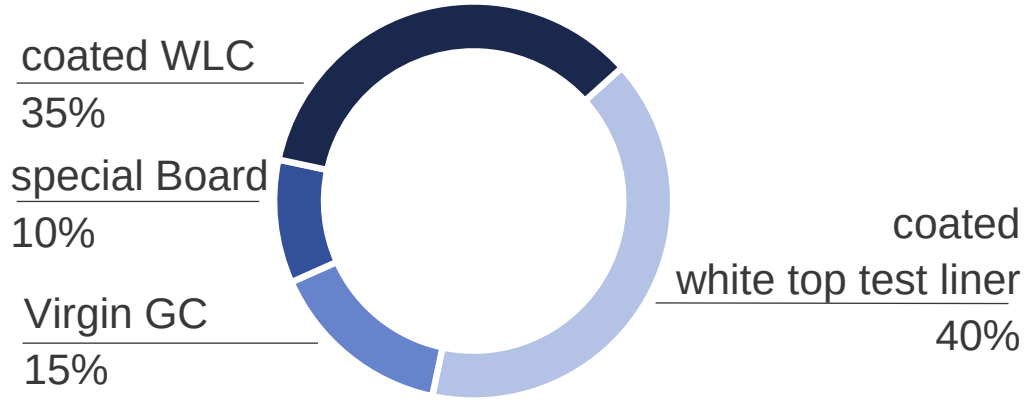
RDM Group
Locations in Europe



Figures

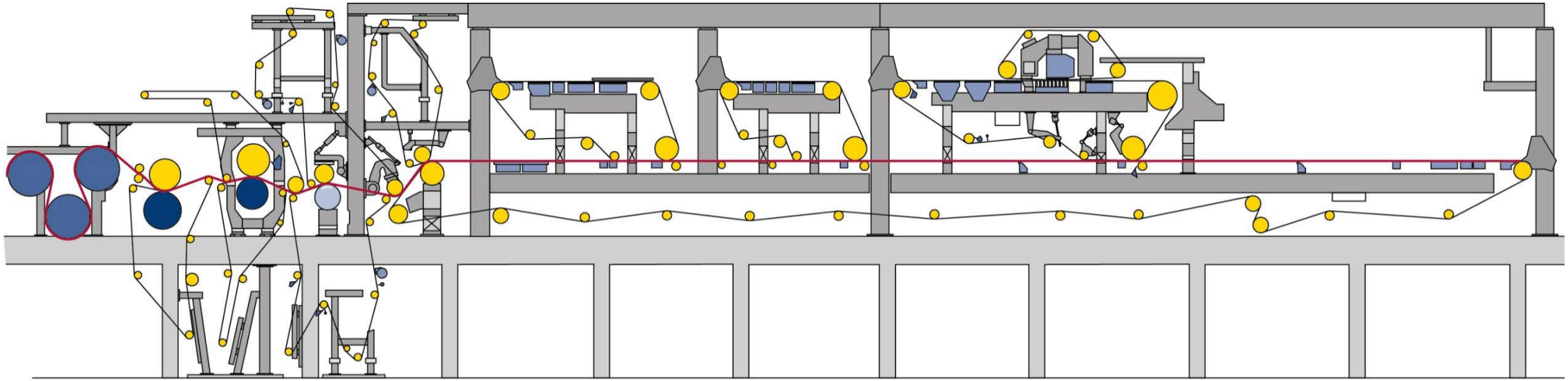
- >1 Mio. tons capacity of liner and board per year
- 4 board machines at 3 sites in Italy
- 3 board machines at 2 sites in France
- 1 machine in Arnsberg Germany
- Sheeting Center

Product split



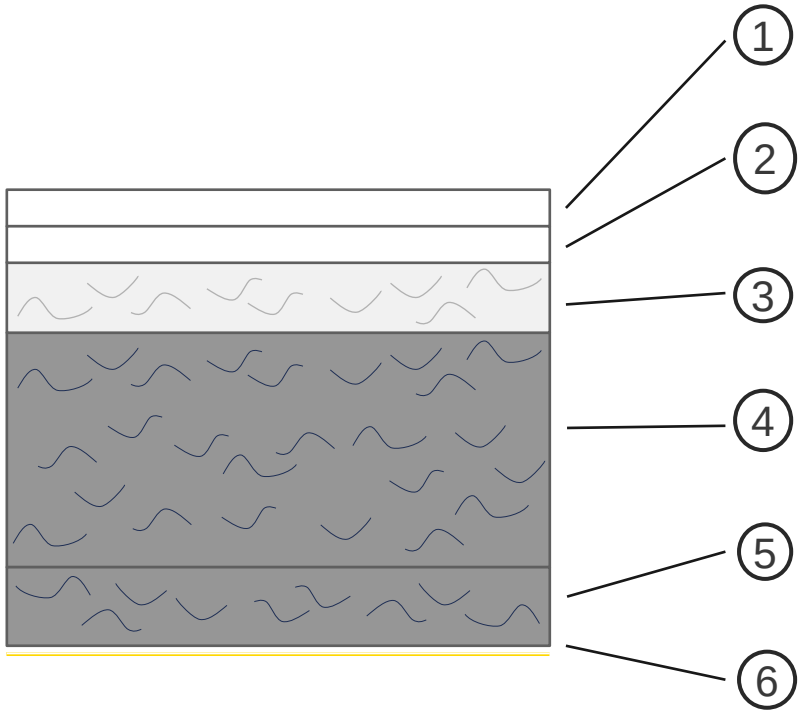
RDM Arnsberg
Wet End of Board Machine KM3 Before Rebuild

Technical Data	Wire width [mm]	Production [t/a]	Grade	Basis weight [g/m²]	V_{max} [m/min]	Start-up	Rebuild	Rebuild
	3 950	245 000	Coated WTTL / WLC	180 - 400	730	1957	1980 Fourdrinier	1998 / 2011 Shoepress



Product Spectrum in Arnsberg on Board Machine 3

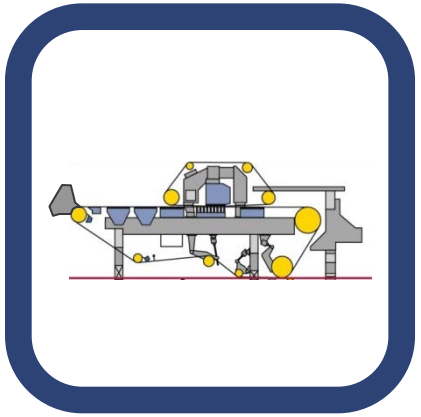
Cross section form BM3 grade



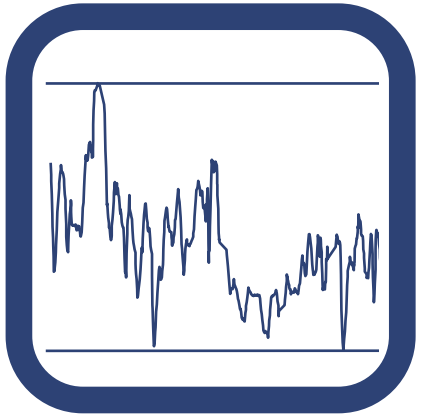
Grade		GD-Liner Coated WTTL	GD-2 Coated WLC
1	Top-Coat	Pigmentcoating	Pigmentcoating
2	Pre-Coat	Pigmentcoating	Pigmentcoating
3	Top Layer	Selected white paper for recycling	Selected white paper for recycling
4	Middle Layer	Mixed paper for recycling	Mixed paper for recycling / Ground wood
5	Back Layer	Mill Broke	Mill Broke
6	Backside-Treatment	Sizing / Pigmentation	Pigmentcoating

Rebuild Motivation and Targets to Improve for RDM

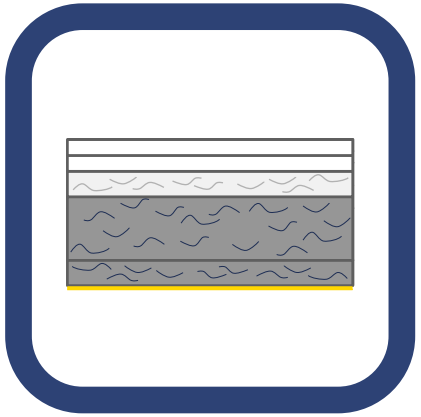
Cloudy formation
3% HB consistency



range of CD basis
weight profile



Undertop layer
not required



Challenging
control of WEP

Limited access
safety concerns

Limited Machine Speed due to Defects in Middle Layer

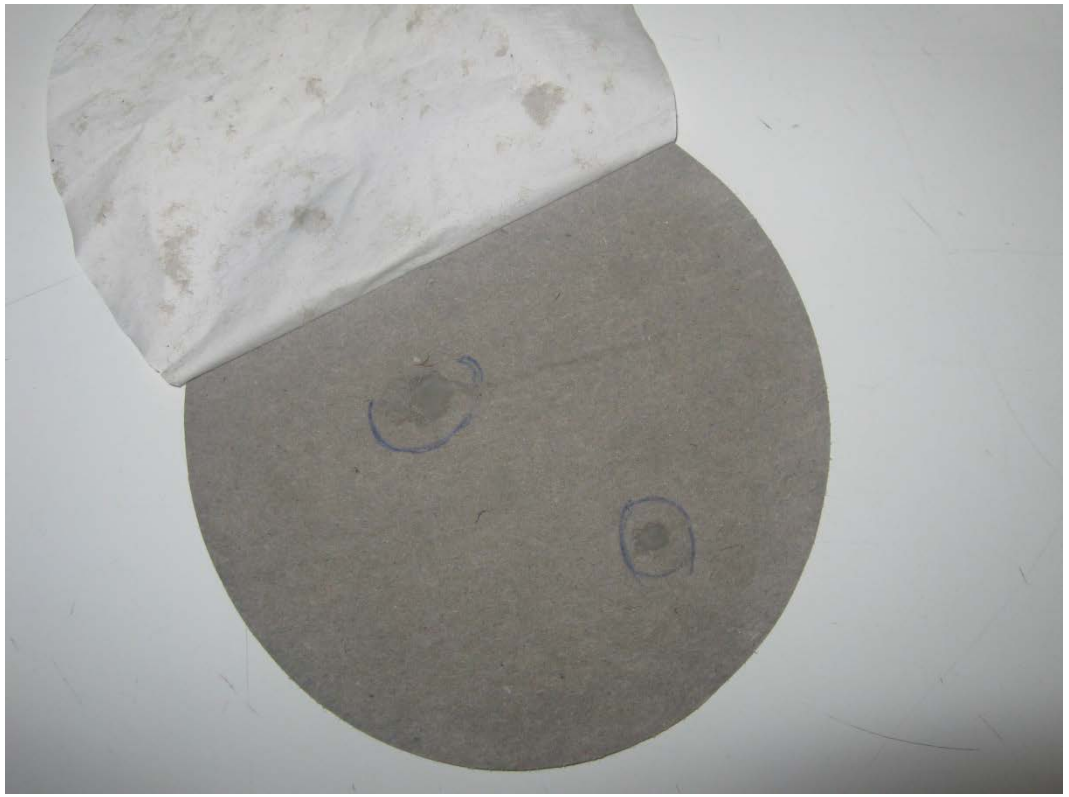
Defect due to high consistency

Picture from wire section

Sample from Reel

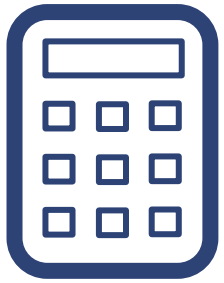
Middle layer defect

Sample of layer split

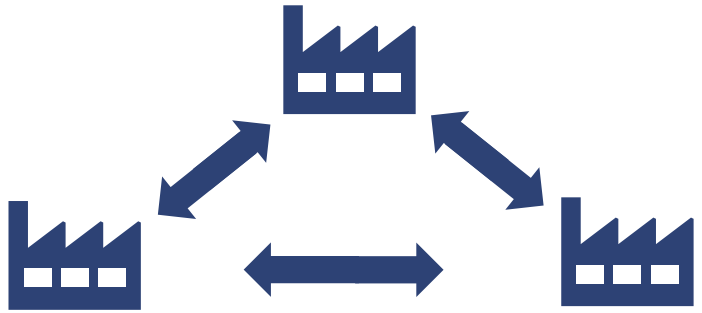


Using the Paper Machine Audit Process to identify the best Wet End Configuration

Machine and Dewatering Calculation



Benchmark with other Mills



3 Rebuild Proposals

3 Proposals

Technical and feasibility evaluation

1 Solution

Approach Flow System Audit Process
Focus Areas to find the Most Economical Solution

Calculated flow, doubled White Water amount

31.820 l/min

Think the other way around

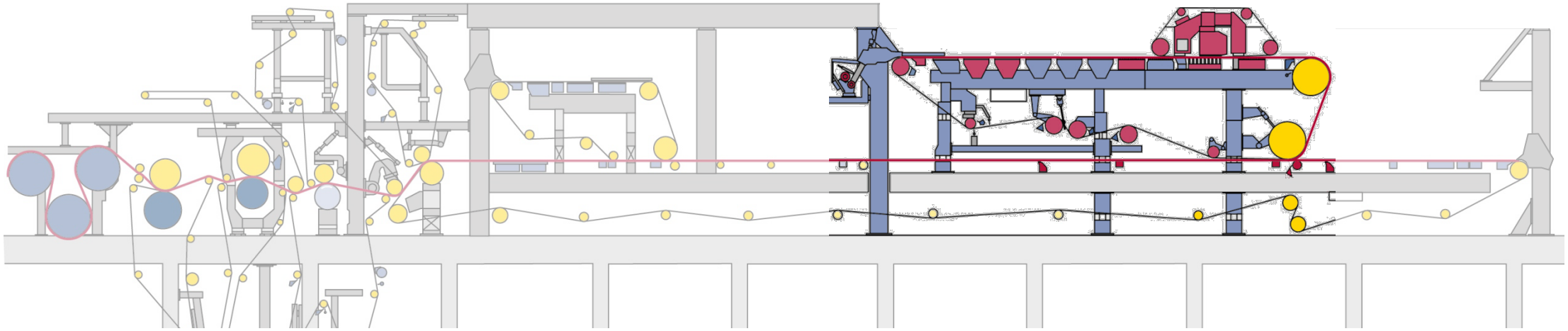
Maximize reuse of existing equipment

Keep or improve the high level of cleaning

RDM Arnsberg Board Machine KM3
Implemented Rebuild Solution of Middle Layer

new equipment
new rolls
reused equipment

Technical data	Wire width [mm]	Production [t/a]	Grade	Basis Weight [g/m²]	v_{Design} [m/min]	Start-up
	3 950	245 000	WLC / coated WTTL	180 - 400	1 000	Mai 2016



Leading Technology for RDM
Key Components and their Main Benefits

MasterJet Pro

- Proven design without external heating
- Perfect CD-Profiles with ModuleJet dilution control with reduced spacing
- Energy savings by cross header without circulation
- Highest board quality through lamella technology

Clean Design in Wet Section

- Less contamination with CeraGuide B cover for guide rolls
- Reduced cover wear and extended fabric performance
- Less breaks through add pans

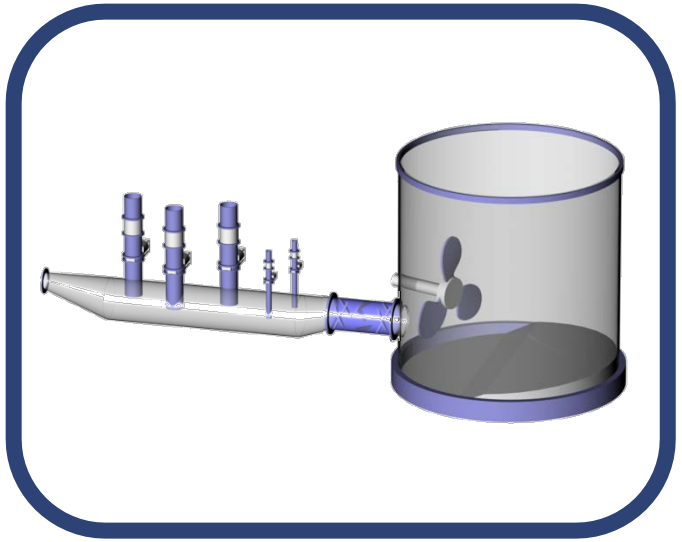
New Turning and Couch Roll

- Higher runability with bigger roll diameter
- Prepared for further speed increase

Leading Technology for Approach Flow
Main Benefits of Key and Reused Equipment

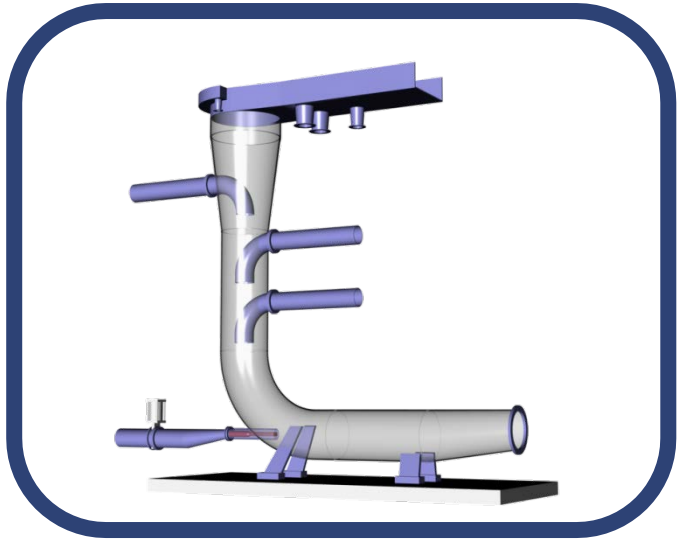
Commix with Static Mixer

- Best mixing effect
- Reduced working volumes
- Fastest reaction time



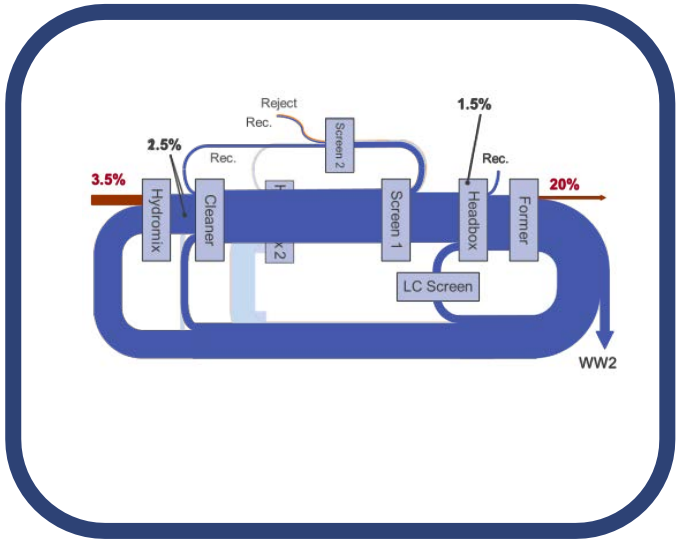
Hydromix

- Small and efficient rebuild solution
- Best mixing thru extended mixing zone
- Suitable for large volumes



2 Pump system

- 2 fan pumps for better control of approach flow
- State-of-the-art system
- Less energy consumption



Success Factors for Excellent Project Execution
In Cost, In Time and Quality

Rules
defined guideline for cooperation

Time Schedule
detailed preparation and review

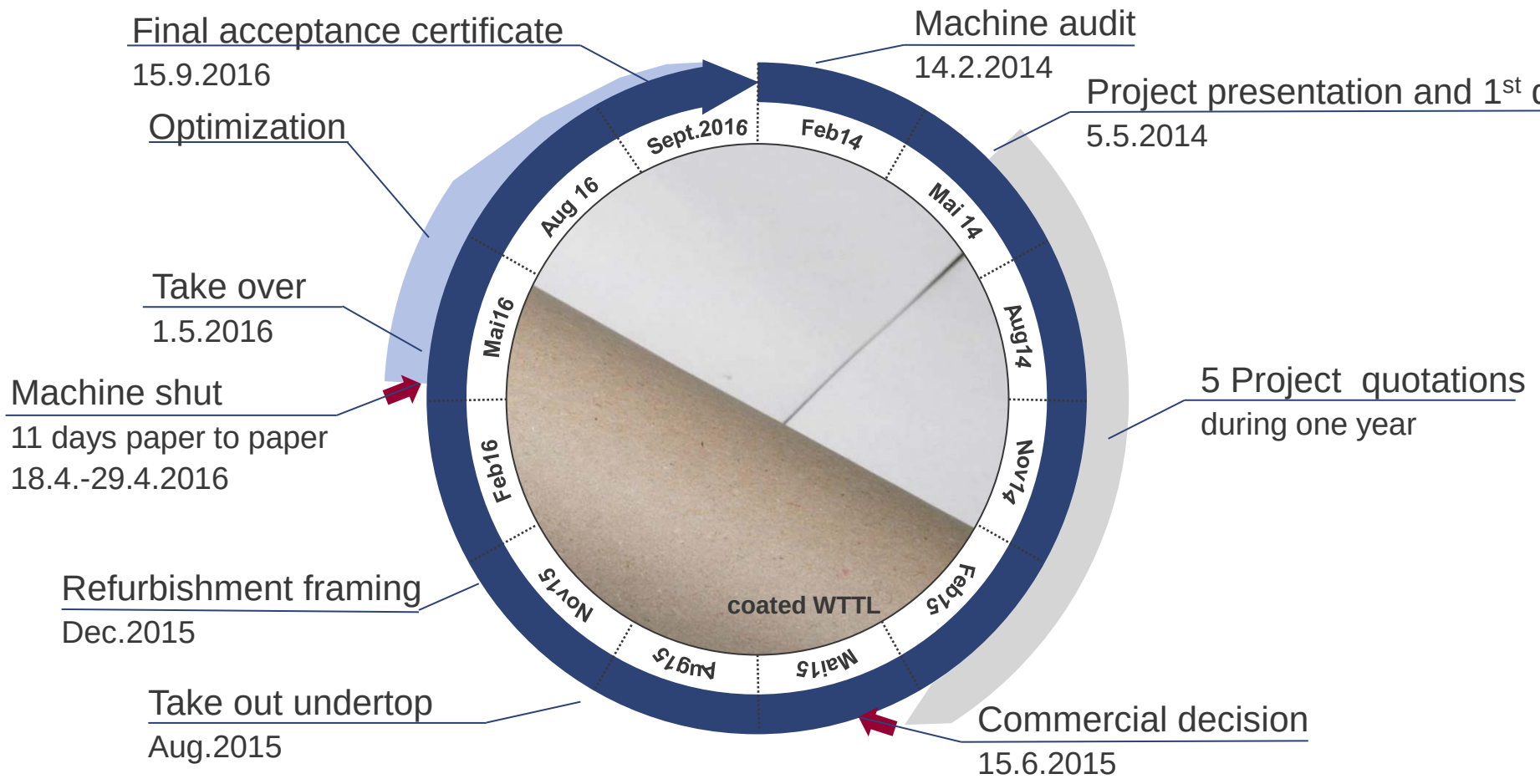
Openness
the whole team worked together

Human Factor
right people worked together

Planning & Preparation
for all interfaces and in all sections

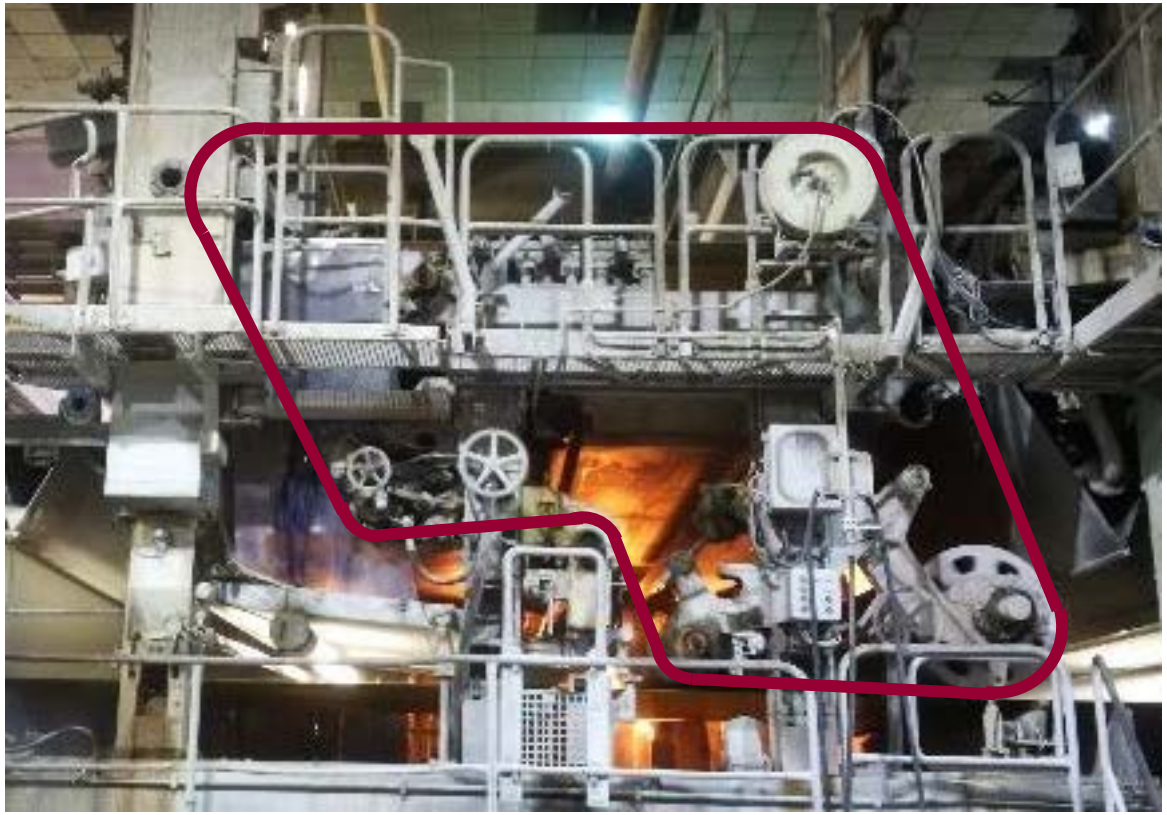
Project meetings
regular site visits

Professional Project Planning and Scheduling
Key to success are clear defined and fixed project targets



Pre-work before Rebuild to minimize Downtime
Take out of Undertop Layer

Undertop Layer not in operation



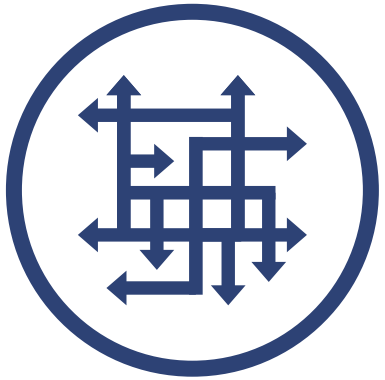
Undertop Layer take out of machine

Pre-work before Rebuild to minimize Downtime
Frame Refurbishment in Wire Section

Wire section framing corroded especially on drive side

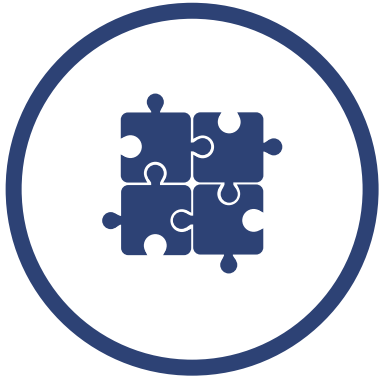
Refurbished framing with special painting

Reasons why this Project has been Successful



Identify and simplify a complex task

Economic solution



Combination of proven products

Professional and experienced team

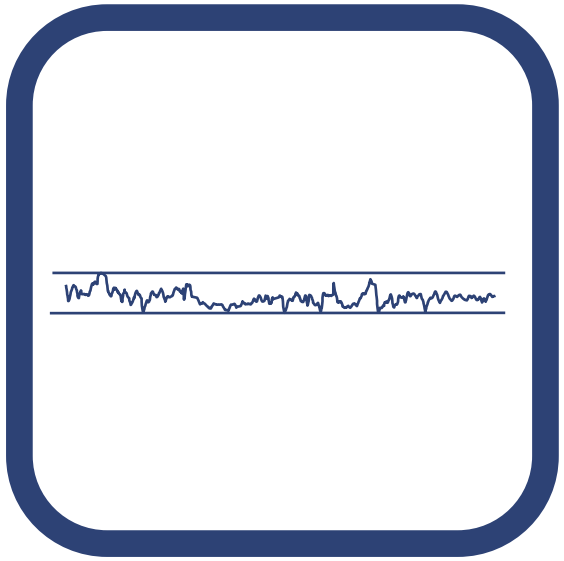
Work as a team on one target

KM3 Middlelayer with
extended dewatering length

Additional Production, Quality and Reduced Raw Material and Energy Costs

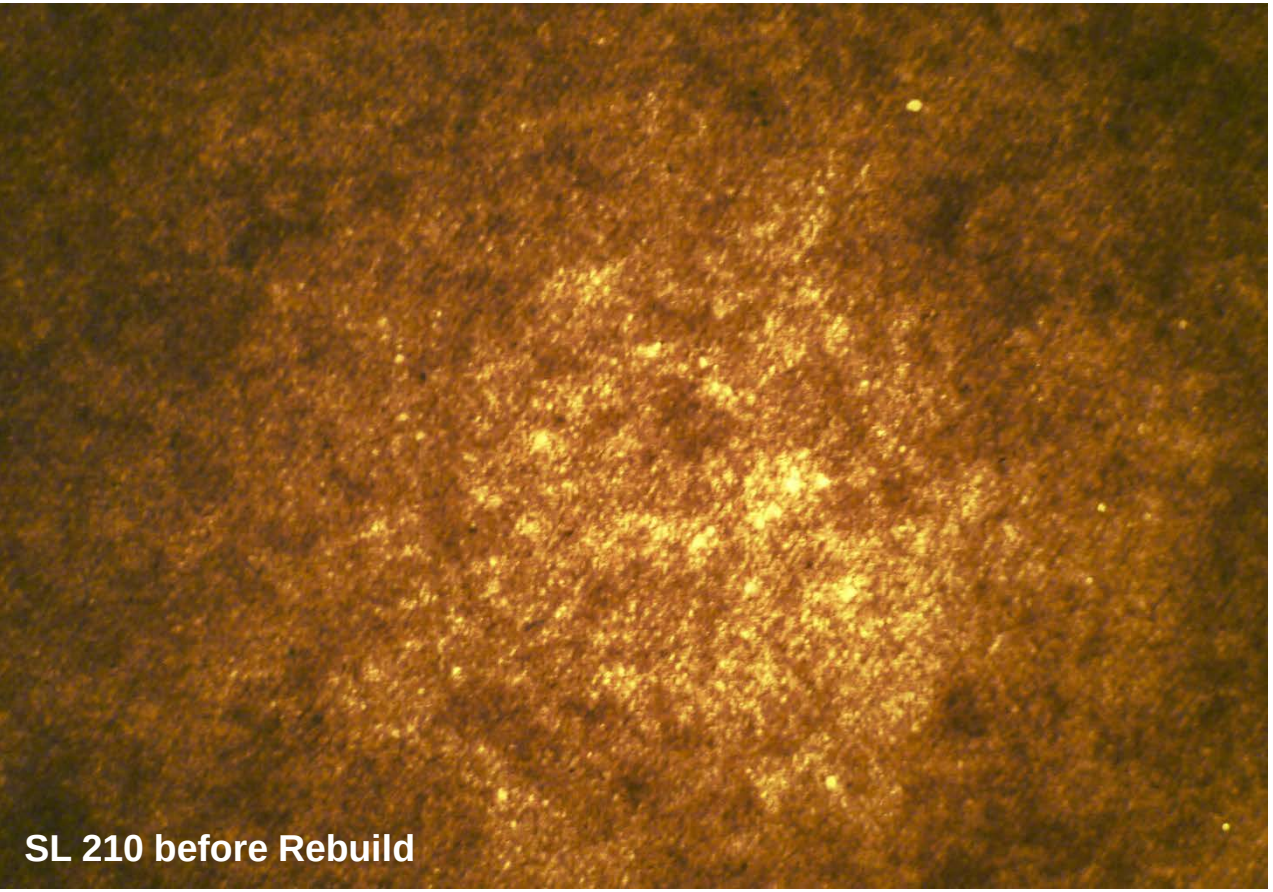
>3% Production increase 4 months after start-up

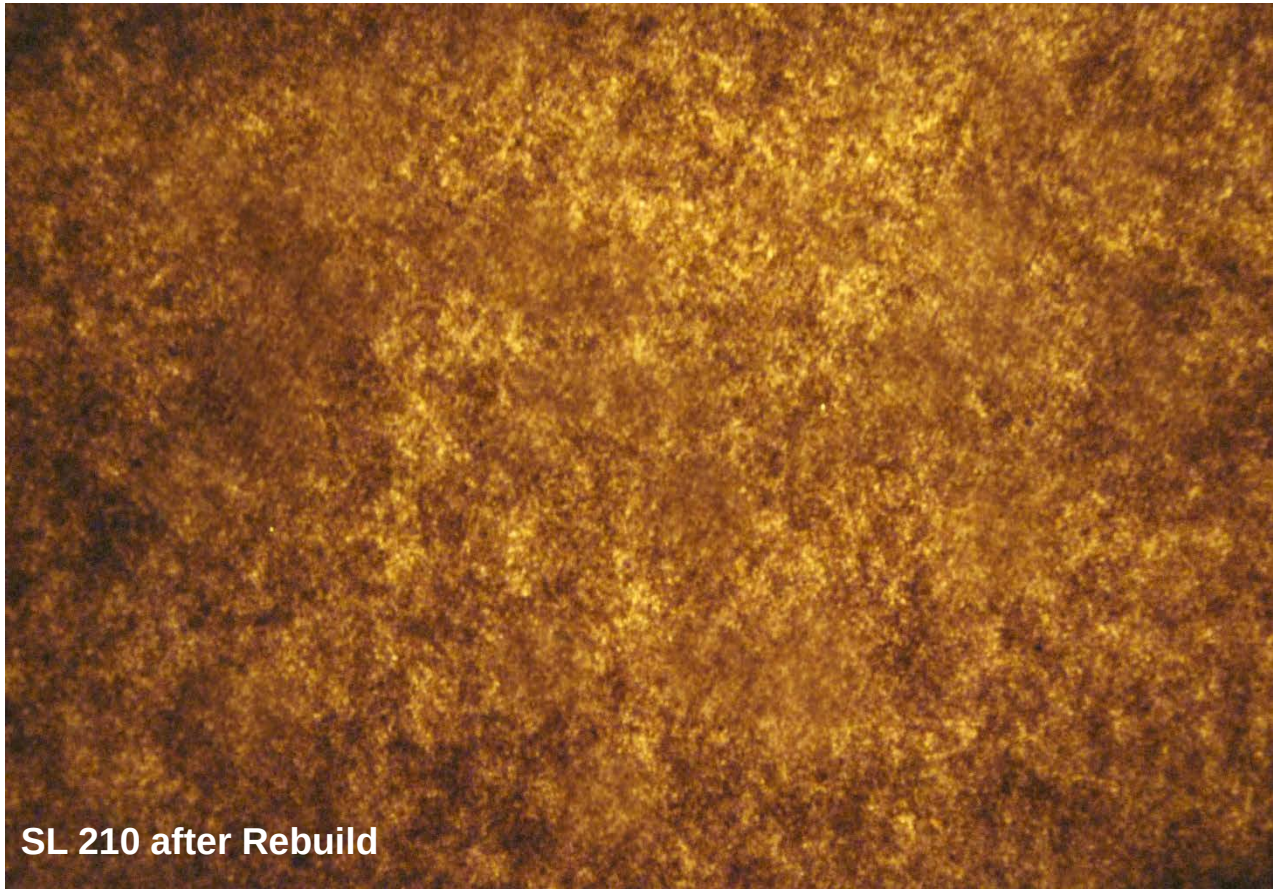
Improved formation: reduced top layer- and coating basis weight



Significant improvement of CD basis weight profile

Improved Formation Serviliner 210 g/m^2
Better Formation and less “Pinholes”





“This was our best project in Arnsberg we´ve experienced in the last 37 years.”

Joachim Corthum, RDM Production Manager

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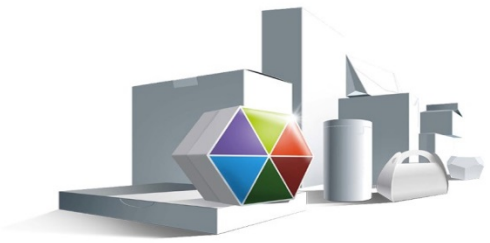

Born to be converted

Inspiring Technology for Generations