Wet end optimization to boost white top test liner productivity

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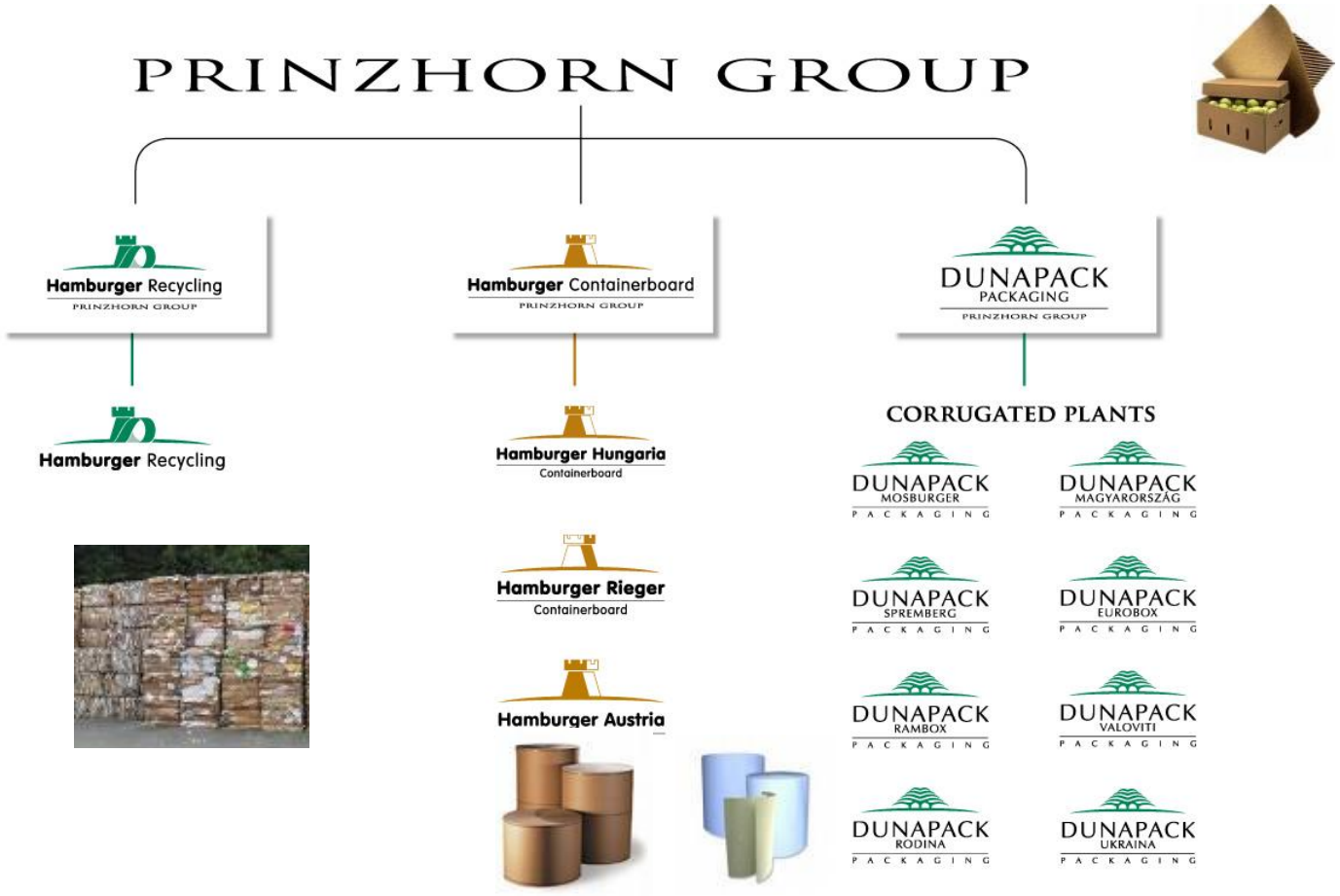
Prinzhorn Group

RAISING YOUR PRODUCTIVITY



Paper machines corrugating medium and liner

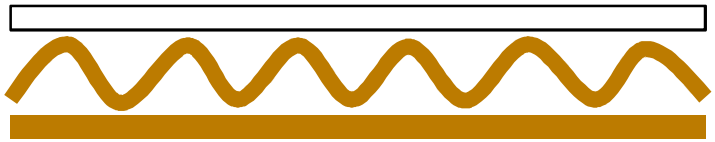
	Site	Yearly Production	Machine Width	Products
PM3	Pitten	430.000 t	2,5 m	Austrowelle Austrofluting
PM4			5,0 m	Austroliner
PM1	Frohnleiten	160.000 t	2,5 m	Austrokraft
PM2			2,5 m	Austrofluting Austrofrost SpreeGips
PM3	Dunaujvaros	590.000 t	4,3 m	Austrowelle Austrofluting
PM7			7,8 m	Austrowelle Austroliner + Light
PM1	Spremberg	310.000 t	5,3 m	RiegerTop SpreeWhite SpreeGips

PM2 ï machine # 2 in Trostberg

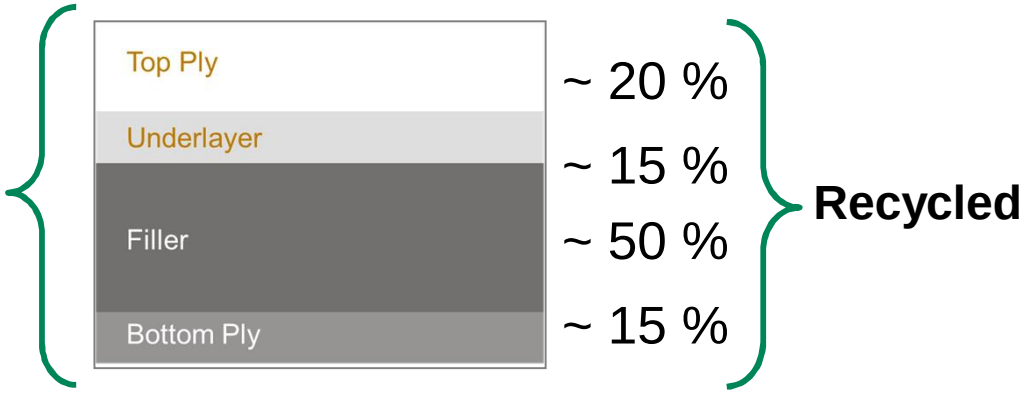
- 4 Fourdrinier wire
- Press section designed for good smoothness/printability
- Yankee cylinder
- 2 Calenders
- 3 Online coating units: 2x top layer, 1x back
- QCS/PCS online color measurement
- Web inspection system

Spremberg

Trostberg



Corrugated Board



PM2 Testliner

Reasons for investment

- Top layer
  - Up to 20% of total grammage
  - 42% of raw material costs

- Stabilization of retention and optimization of the ash content in the top layer → reduce costs by saving high quality recycled fibers
- Automatic control of fixative and retention aid chemicals
- Reduction of deposits in the pre-dryer section to improve runnability and decrease downtime
- Maintain or improve testliner qualities such as formation and printability

Approach

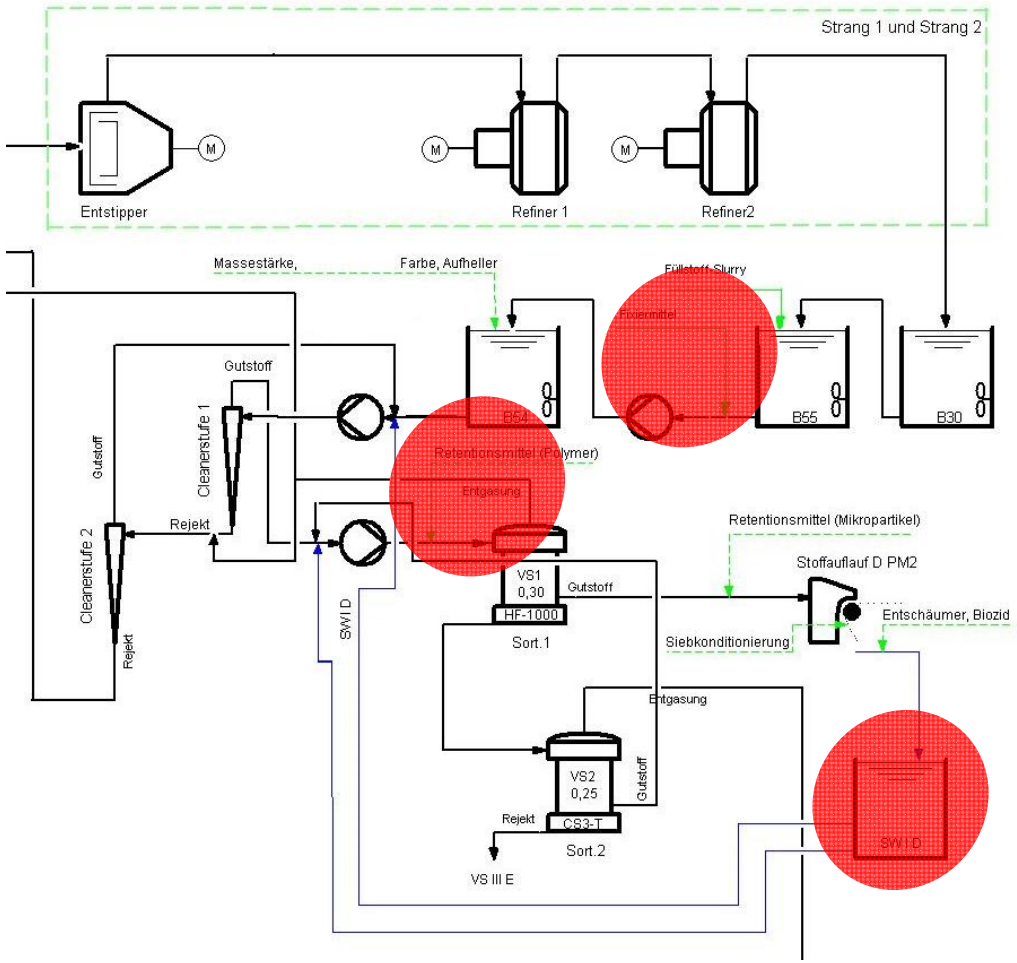
- Installation of online charge and retention measurement equipment
- Wet end surveys to understand impact of various additives and select fixing agent and dosing point with best performance
- Installation of a separate chemical pump for the fixative to the top layer
- Start automatic control of the fixing agent to stabilize charge variability
- Commission retention aid control loop
- Increase of fresh filler addition

Investment top layer

- PCT-20
  - Charge Control WW1

- RET-5503
  - Consistency and Ash Control WW1

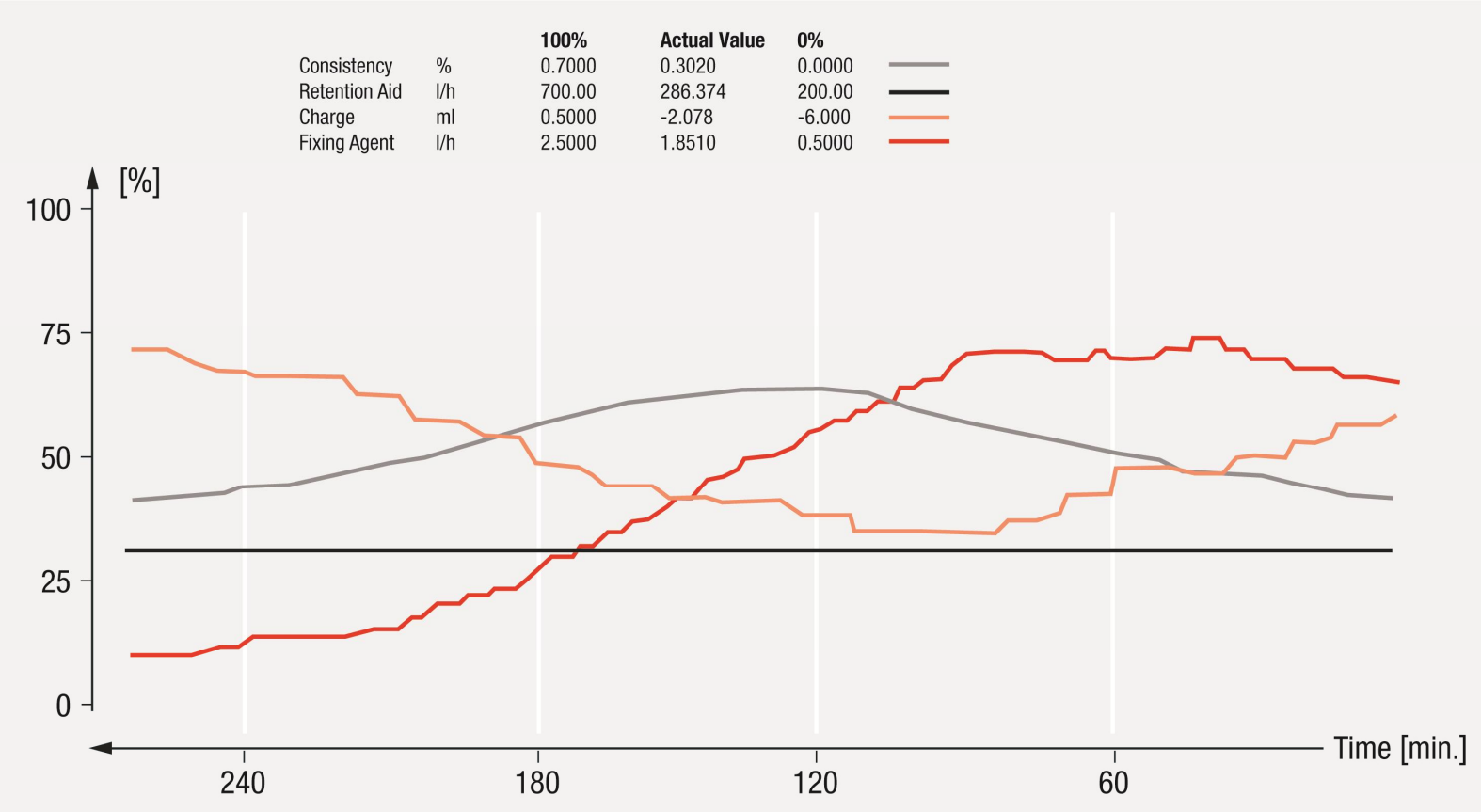
Installation top layer



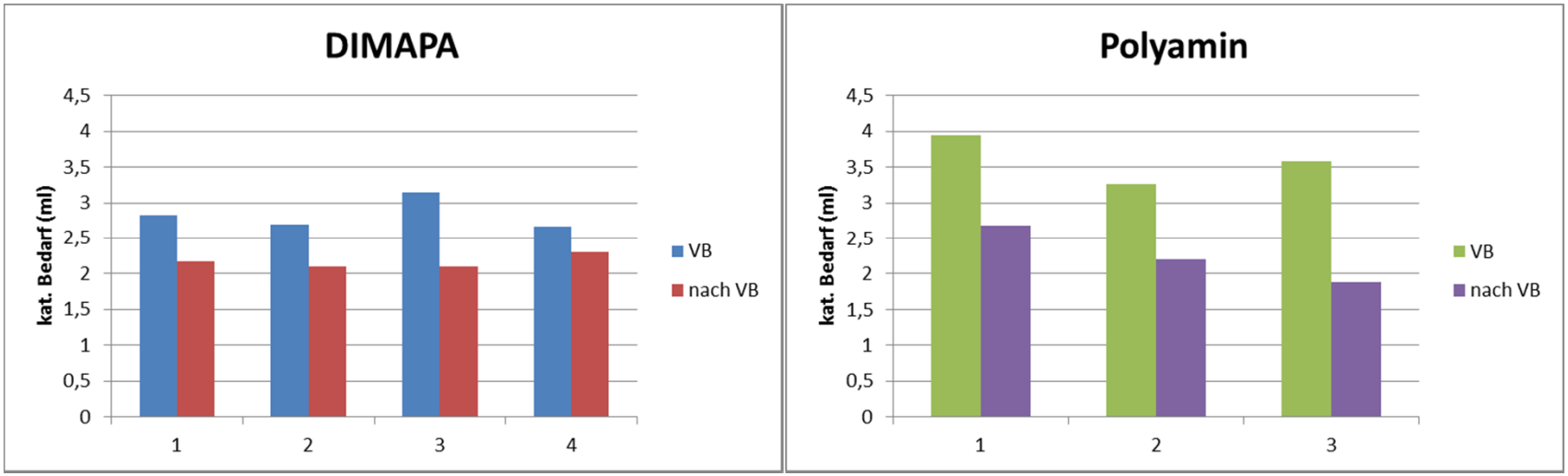
Charge Control in white water and automatic fixing agent control

Consistency and **Ash** measurement in white water for automatic retention aid control, eventually automatic ash content control

Negative impact of charge on retention



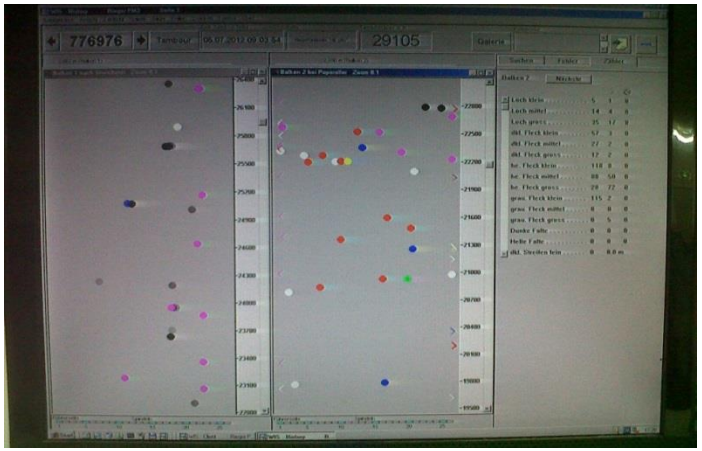
Select best performing fixative



- Existing fixing agent (DIMAPA) could not even out charge deviations and seemed unsuitable for charge control
- Polyamine had more impact on charge and therefore seemed more suitable for charge control; both in laboratory tests and in trial runs
- First assumptions that cationic DIMAPA had negative influence on retention, whereas Polyamine did not, were not confirmed in further trials

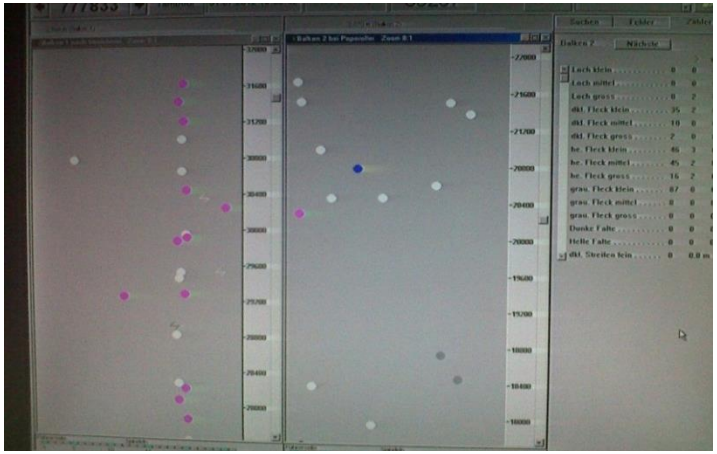
Source: Ashland

Select best dosing point for fixative



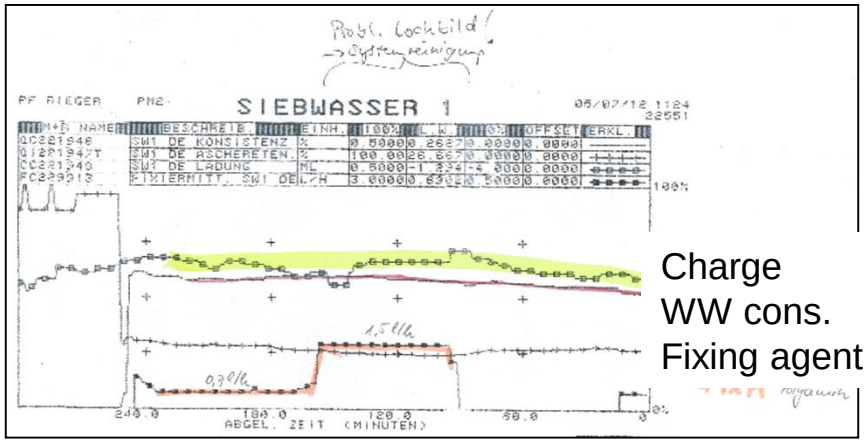
Dosing point fixing agent after machine chest

- Increased number of holes

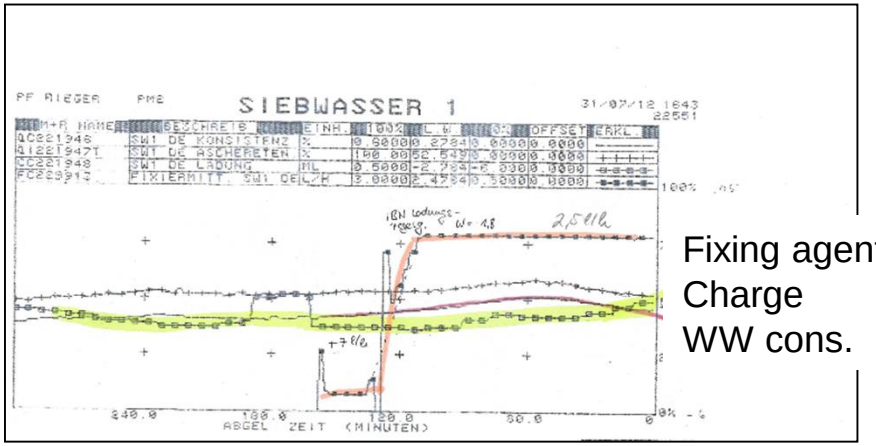


Dosing point fixing agent before machine chest

- No holes



Charge
WW cons.
Fixing agent



Fixing agent
Charge
WW cons.

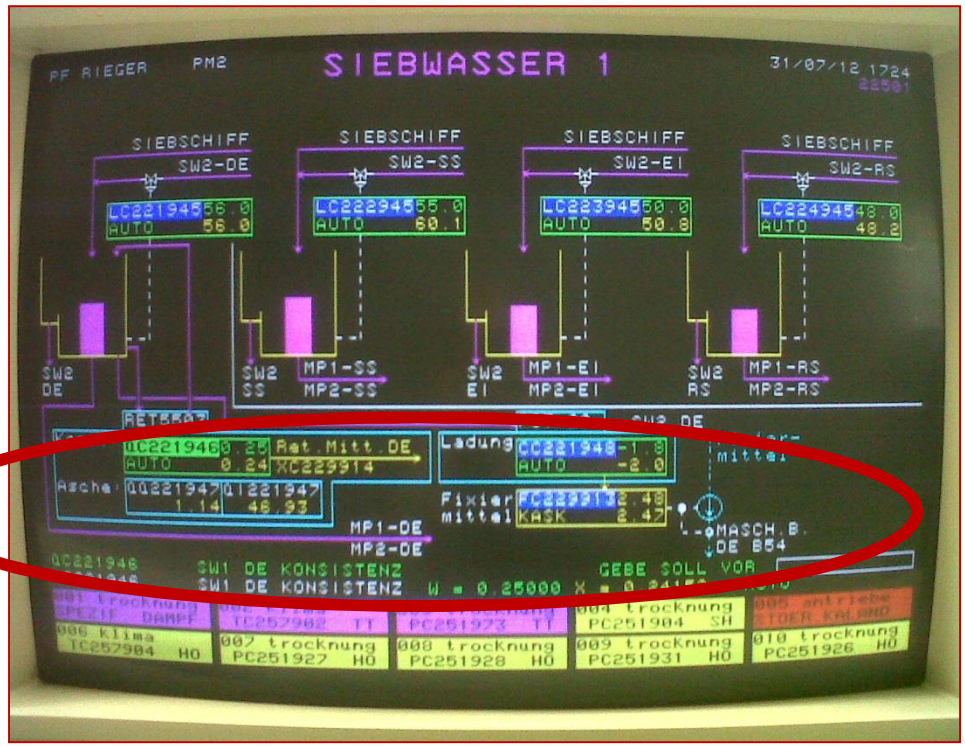
Tune cloosed loop charge control

- Bump test: Fixing agent increased from 0 to 2.5 l/h right after starting the automatic control
- At first, unexpected increase in white water (WW) consistency
- Then, reduction of cationic demand resulting in improved retention

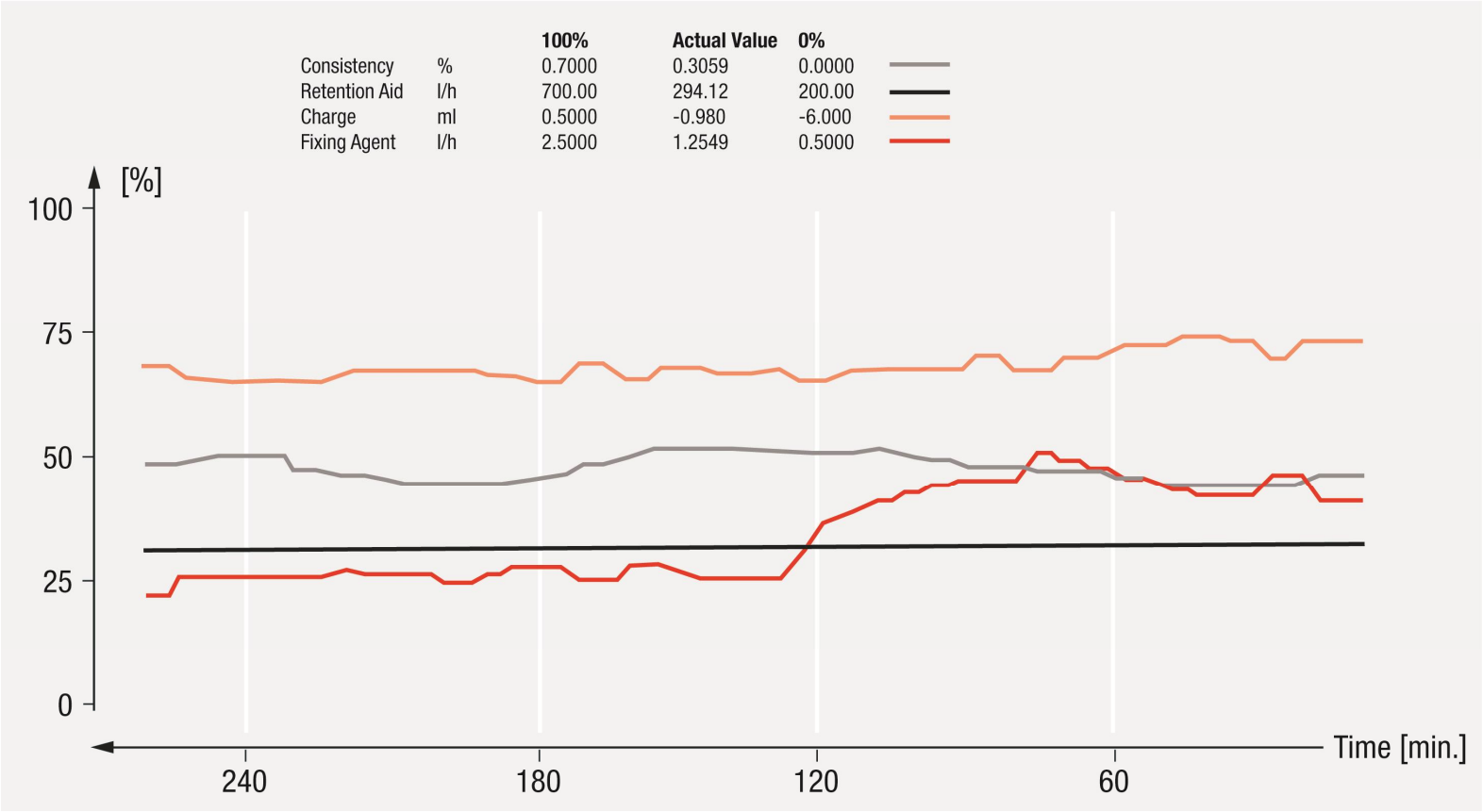
Fixing Agent (l/h)
Charge WW (ml)
Ash Content WW (%)
Consistency WW (%)

Set-up requires time and experience

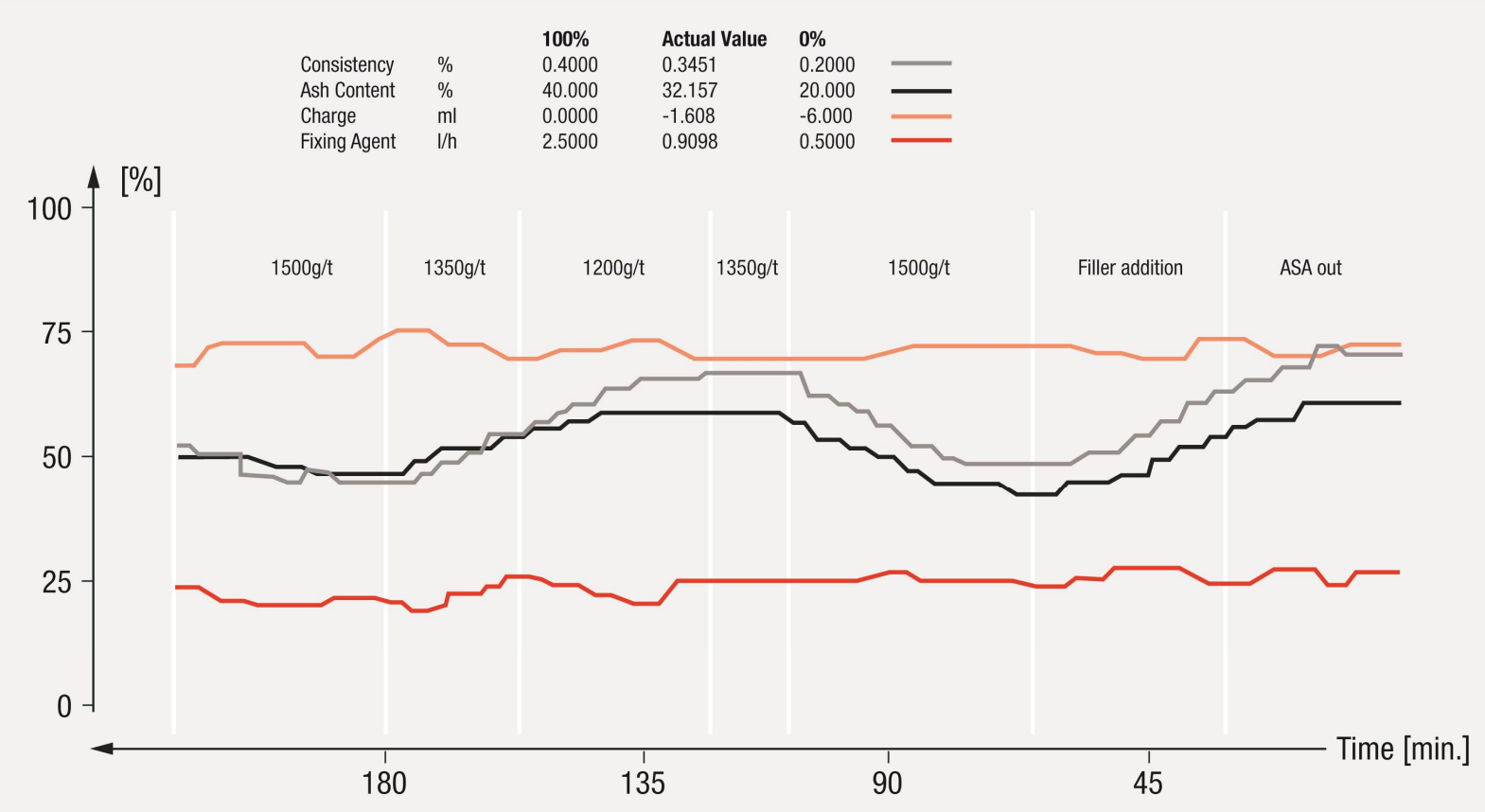
- Measurex-screen showing automatic charge and retention control
- Operators view
- Cascades control



Charge controller at work



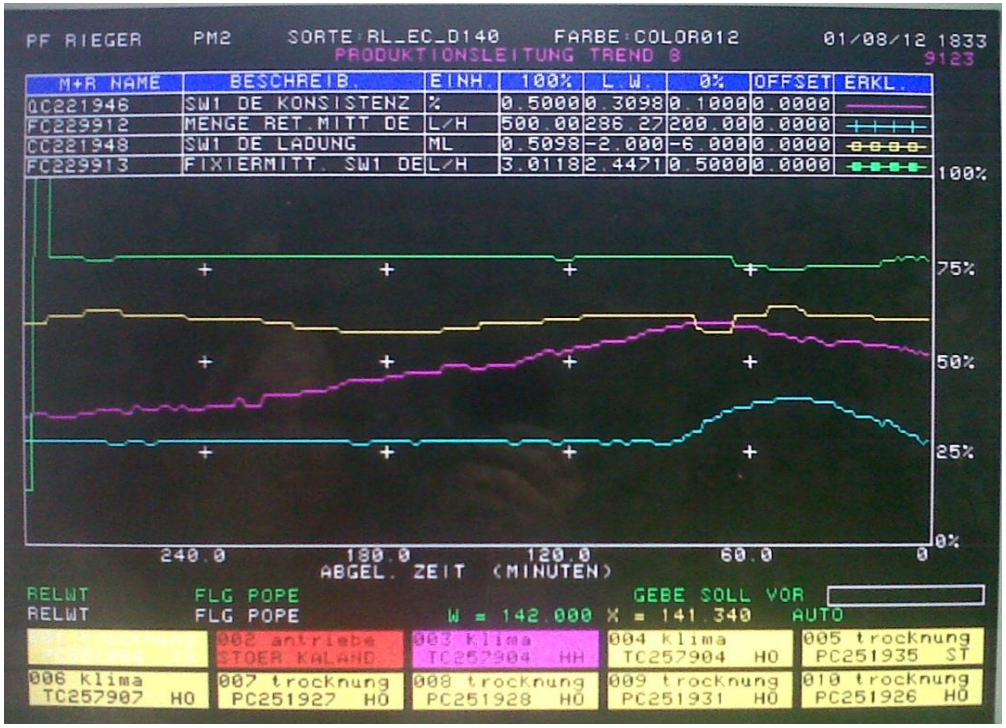
Tuning of retention controller



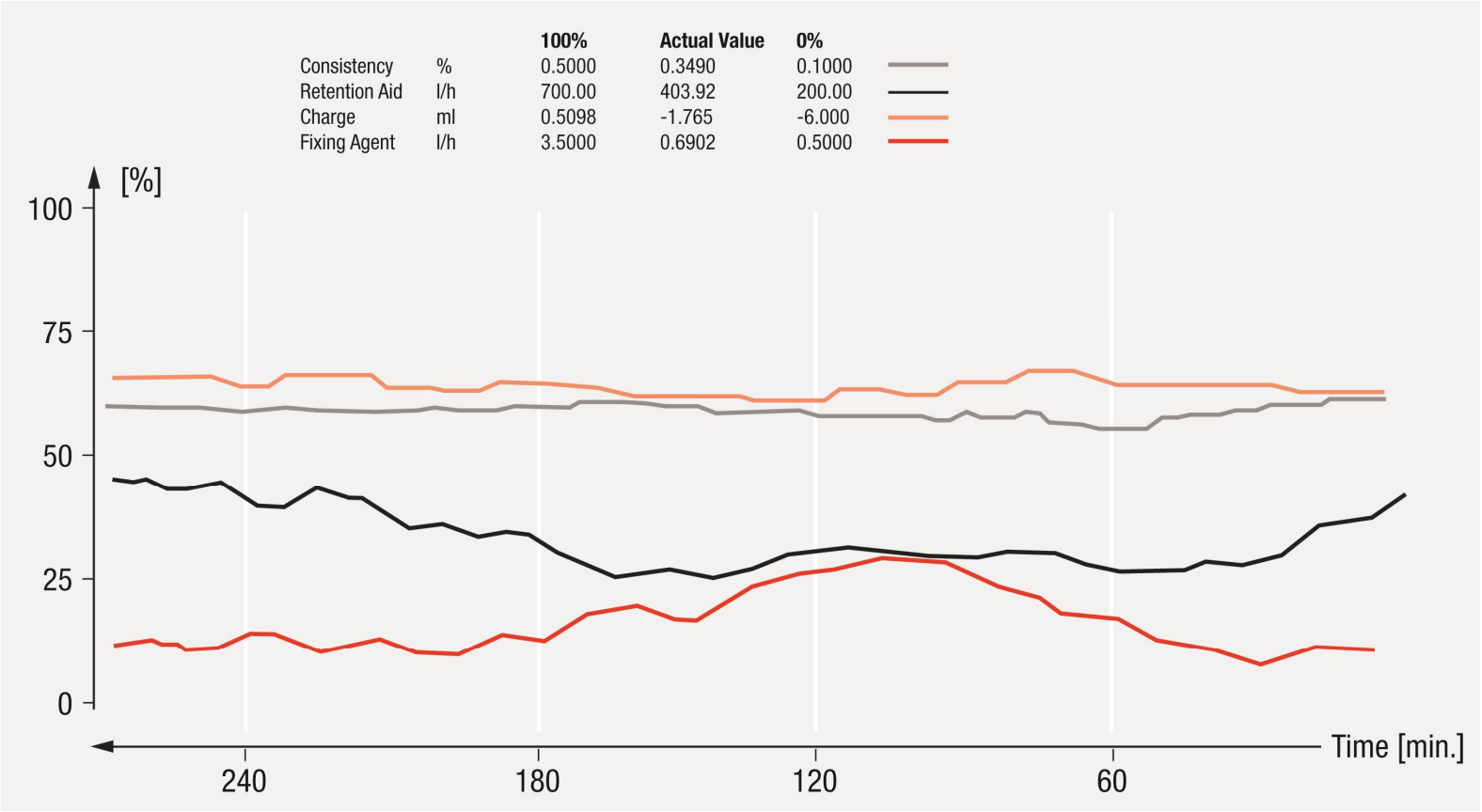
Choose the ideal set points

- White water consistency set point = 0.33 %
- With increasing white water consistency the retention aid increased and the consistency decreased as expected

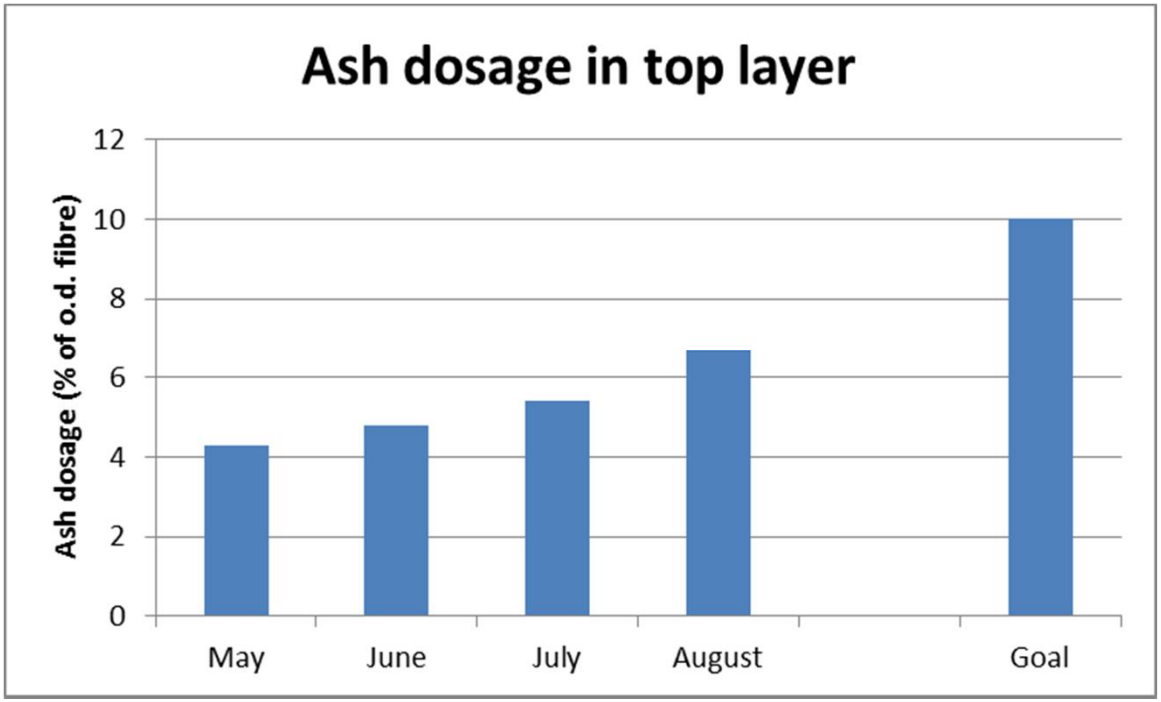
Fixing Agent (l/h)
Charge WW (ml)
Ash Content WW (%)
Consistency WW (%)

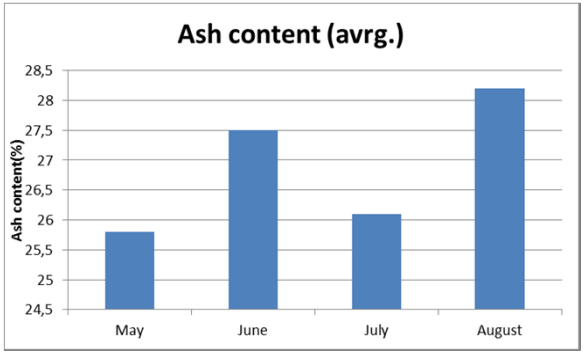


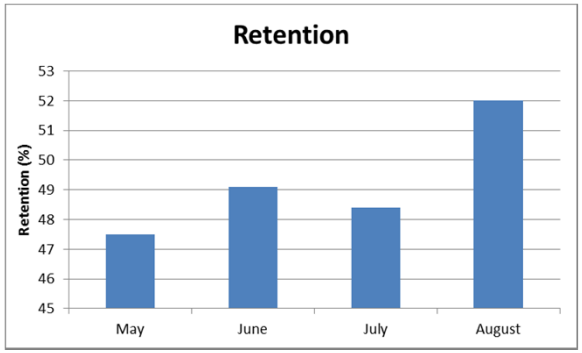
Charge and retention controller at work



Impact on ash level ï fiber savings







Results upon project closure

- Replacement of 1% fiber by filler, results in 86.000 ú/y savings
- Chemical savings result in 23.000 ú/y

	Before Control	After Control
Fixing Agent Use, l/day	50	32
Retention Aid Use, g/t	750	650

Outlook

- Further optimization of set points - both for automatic retention and charge control
- Using white water ash content and thick stock ash measurement for an automatic ash control and fresh filler addition
- Further increase ash dosage and define limits to not impact paper quality (streaks, brightness and printability)
- Ratio control of PAM and Silica for further chemical savings
- Approach middle layer