Detailed analysis of the dewatering process on a CrescentFormer tissue machine

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Detailed analysis of the dewatering process

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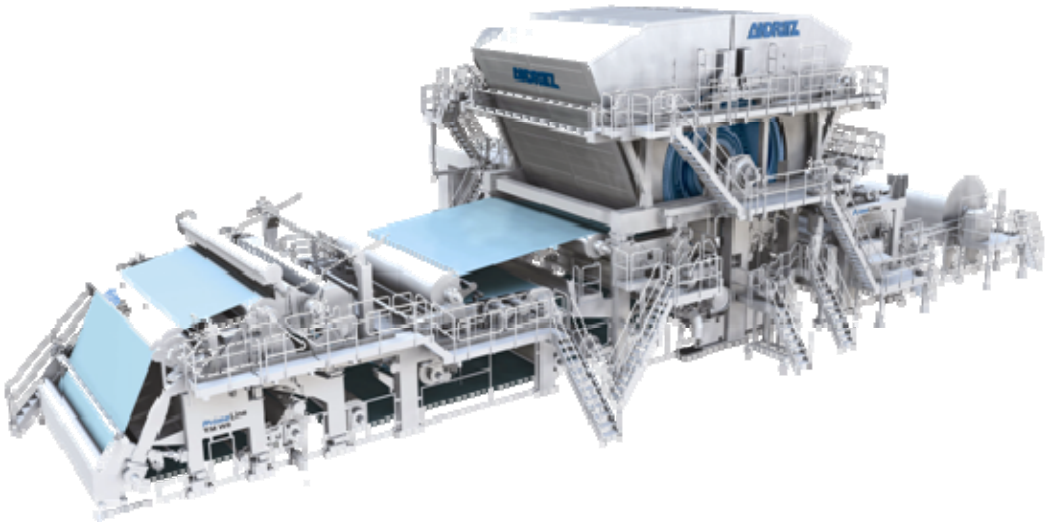
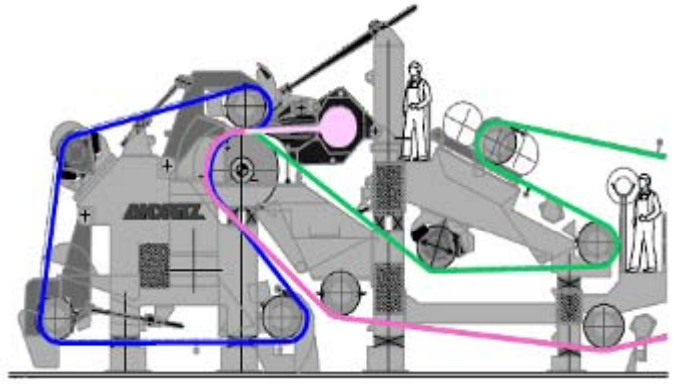


Detailed analysis of the dewatering process

Background

Starting point

- Crescent former
- Single side dewatering



Papermaker issues

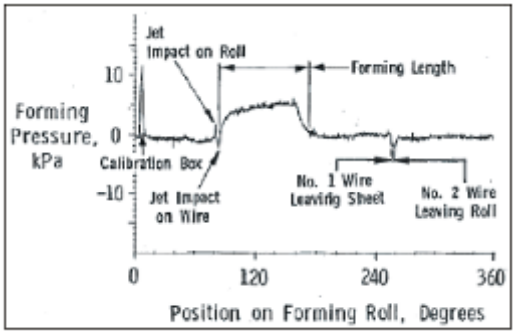
- Water handling
  - Optimized white water tray design
  - Speed up capability
- Dewatering performance of different fabrics
  - Fabric characteristics ≠ dewatering capacity

Detailed analysis of the dewatering process

Background

Approach

- Literature study
- Selection measurement equipment
- Trial methodology
- Modeling as part of master thesis



Detailed analysis of the dewatering process

Trial data collection

What to measure

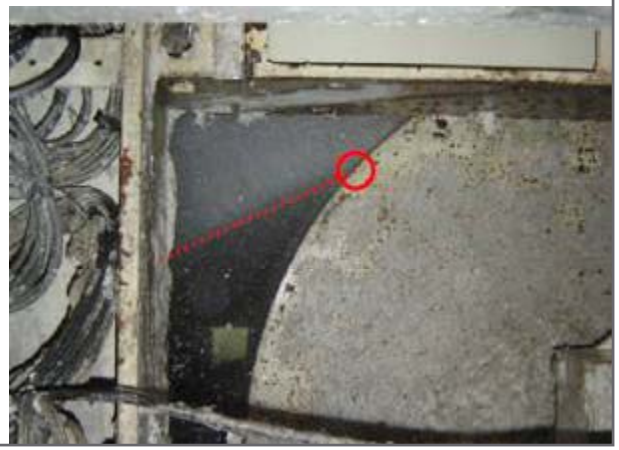
Dewatering pressure through process
Forming length

Variables

wire tension, basis weight, consistency
speed, furnish, forming fabric design

How to measure

RadiAnalyzerX (ultra thin pressure sensing)
Physical measurement
Strobe & camera



Detailed analysis of the dewatering process

Line measurement

Detailed analysis of the dewatering process

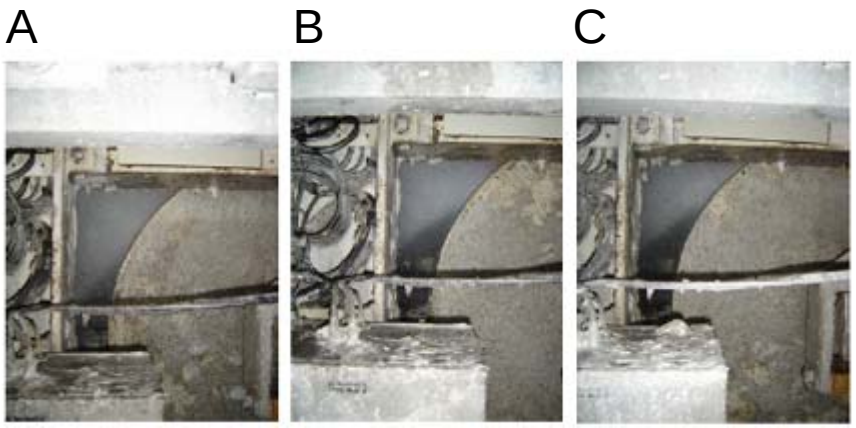
Pressure measurement

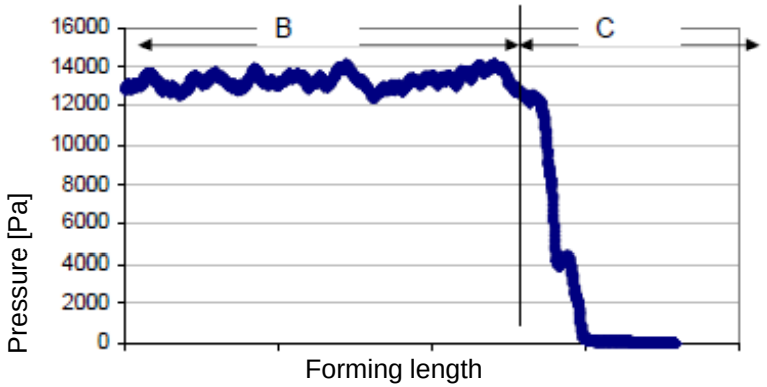
Detailed analysis of the dewatering process

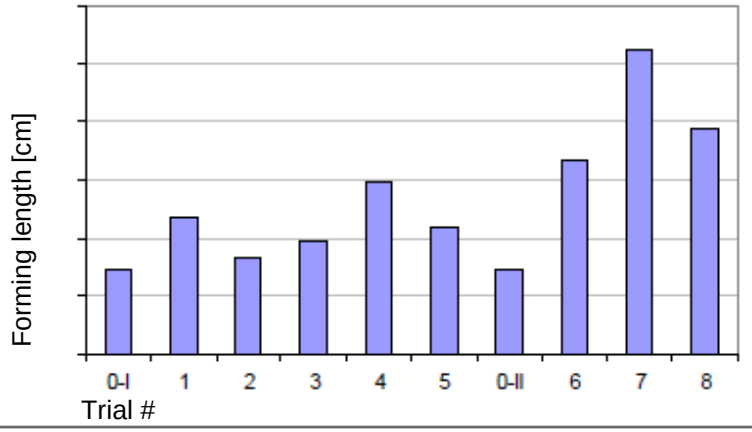
Trial data collection

How to measure

- RadiAnalyzerX
- Physical measurement
- Strobe & camera





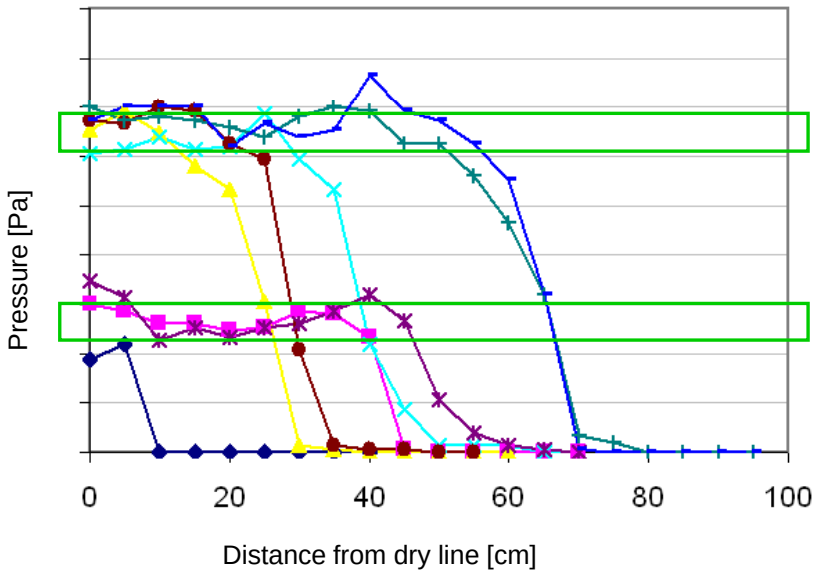


Detailed analysis of the dewatering process

Experimental findings

Dewatering pressure

- 2 wire tension levels
- Good correlation with theoretical model (p=T/r)

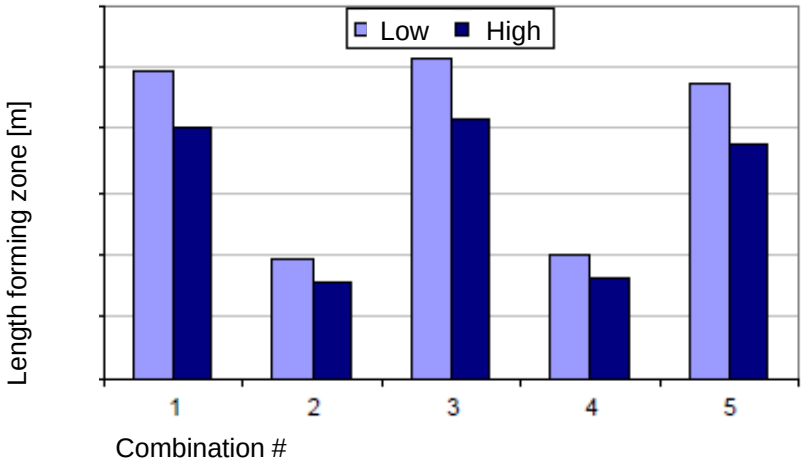


Detailed analysis of the dewatering process

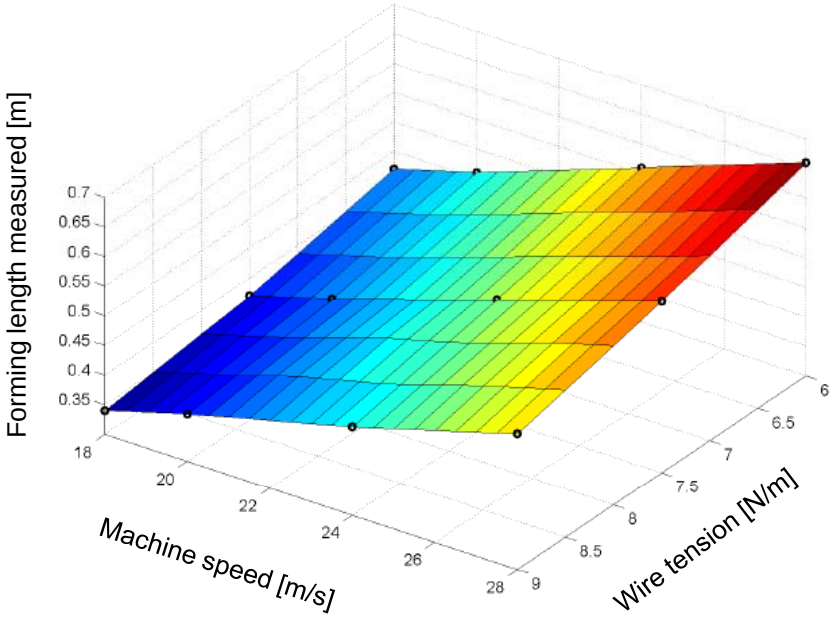
Experimental findings

Forming length

Wire tension



Forming length vs. machine speed and wire tension



Detailed analysis of the dewatering process

Experimental findings

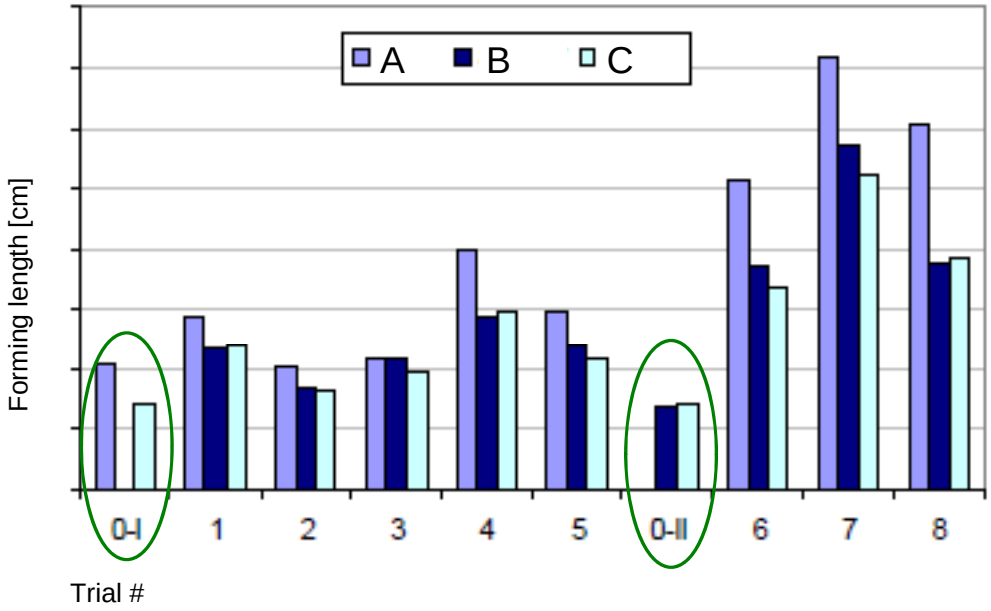
Forming length

Fabric comparison

A…triple layer, 500 cfm

B…triple layer, 530 cfm

C…triple layer, 440 cfm



Detailed analysis of the dewatering process

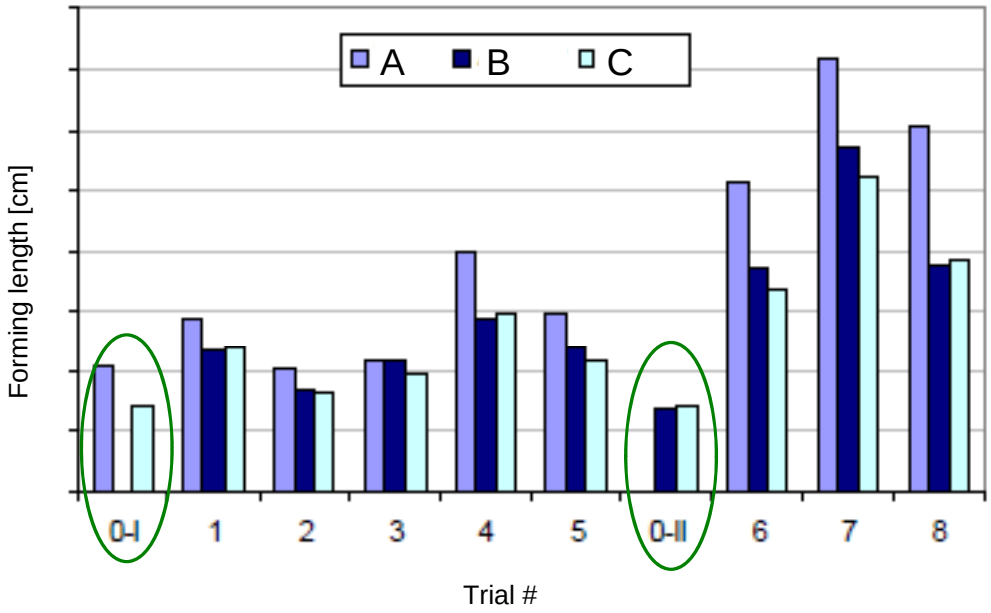
Experimental findings

Forming length

Furnish, wire tension

Speed, basis weight

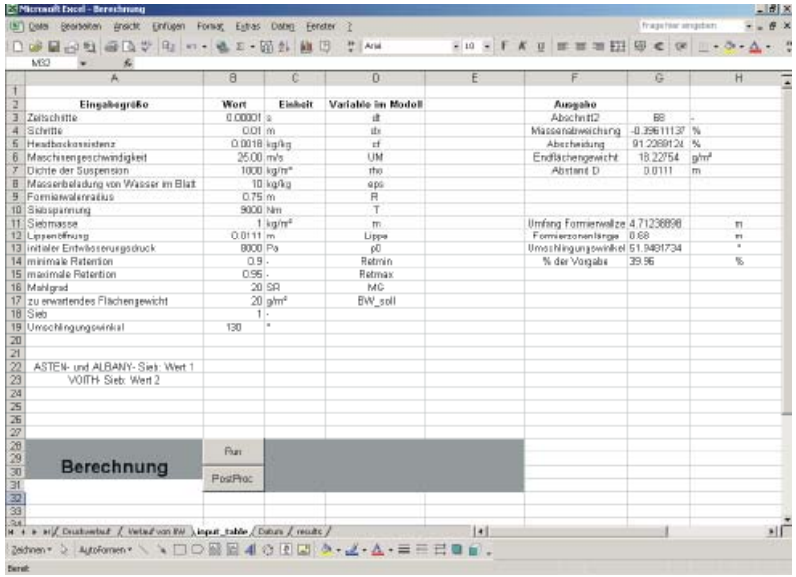
Trial #	Wire tension	V jet [m/min]	v wire [m/min]	BW Y. [g/m²)
0-1	Low	Low	Low	Water
1	Low	Low	Low	Low
2	High	Low	Low	Low
3	High	Middle	Middle	Low
4	Low	Middle	Middle	Low
5	High	High	High	Low
0 -11	High	High	High	Water
6	High	Low	Low	High
7	Low	Low	Low	High
8	High	Middle	Middle	High



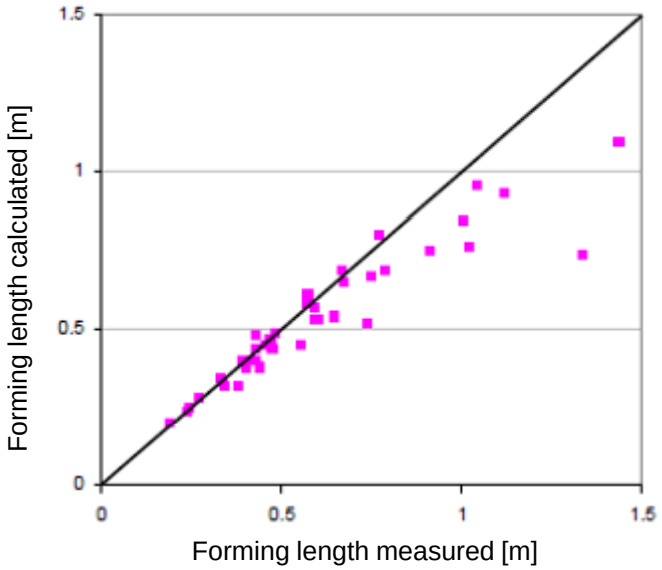
Detailed analysis of the dewatering process

Modeling

Creation of a dewatering calculation tool based on fundamental physics



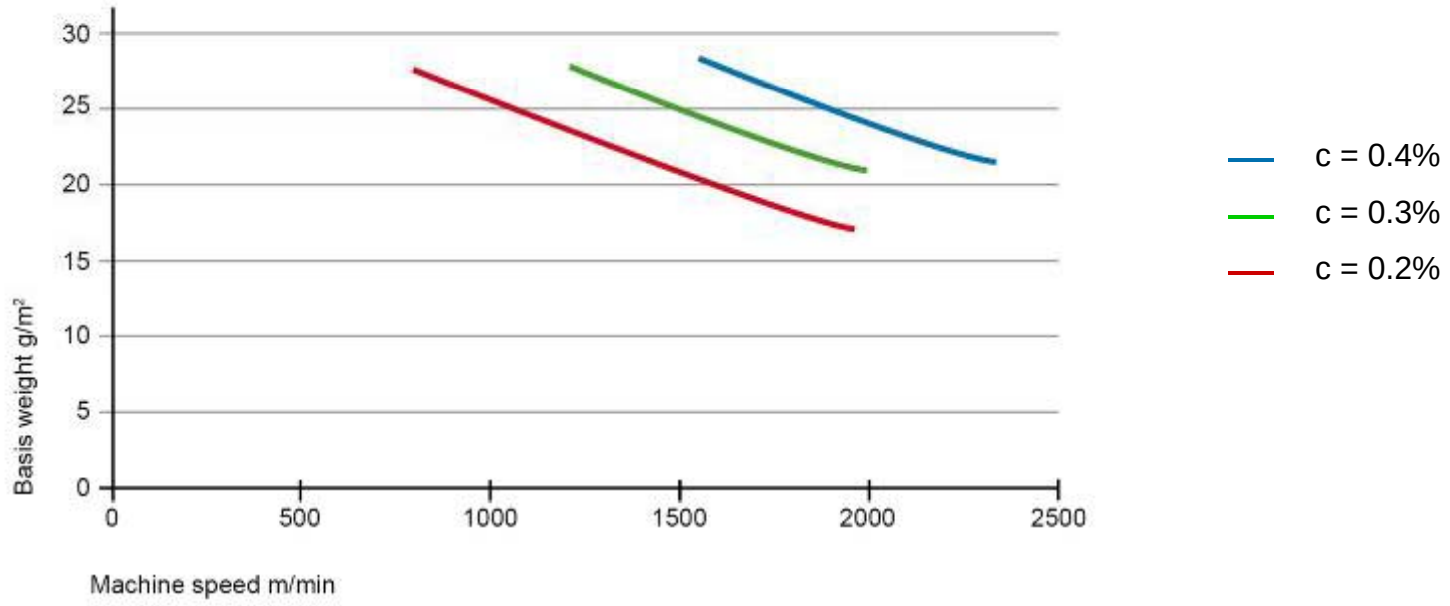
Good correlation of measured and calculated values



Detailed analysis of the dewatering process

Model outputs - limits

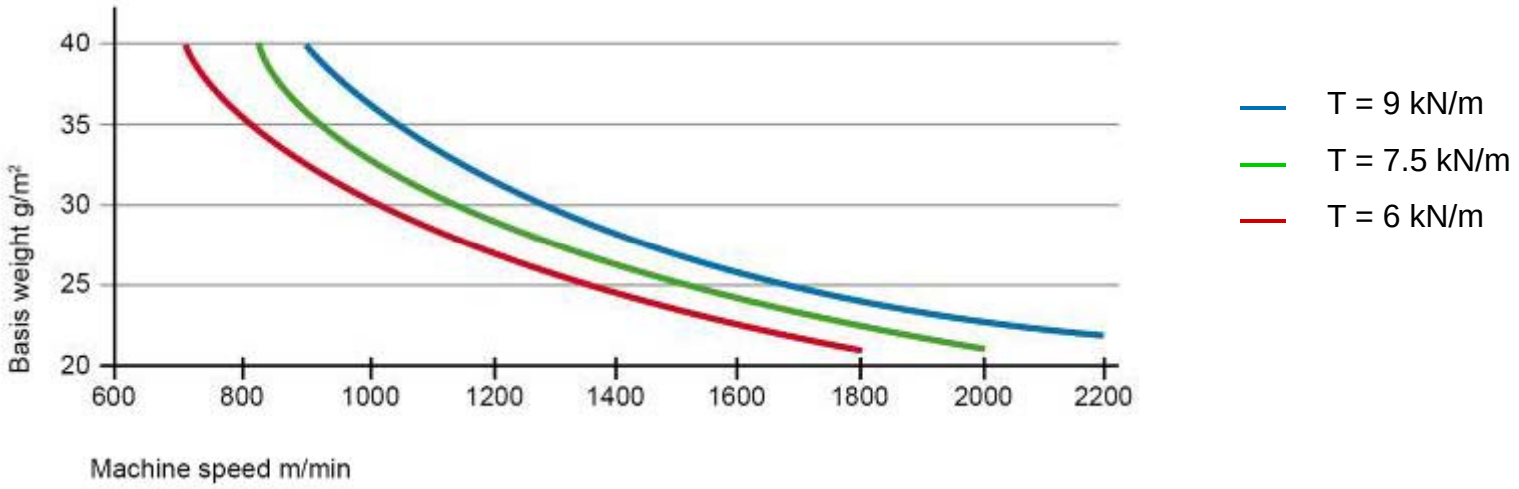
Consistency



Detailed analysis of the dewatering process

Model outputs - limits

Wire tension



Detailed analysis of the dewatering process

Conclusions

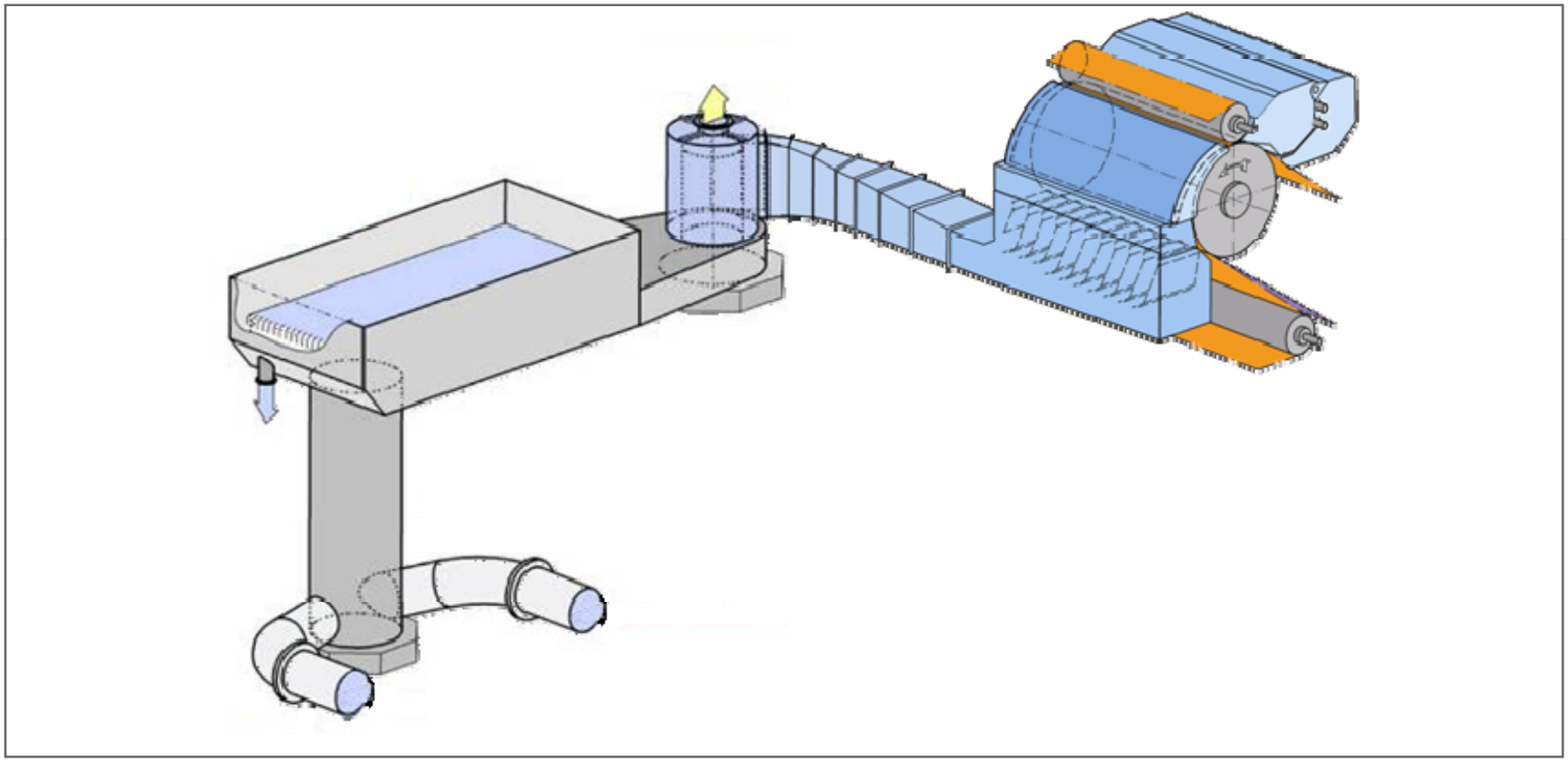
Insight to the crescent dewatering characteristics

Measured dewatering pressure fits conventional theory for roll forming

Increased:	required forming length:
Wire tension	(↓)
Speed	(↑)
BW	(↑)
Freeness	(↓)
Retention	(↓)
Consistency for given BW	(↓)

Detailed analysis of the dewatering process

Saveall Optimization



Thank you for your attention

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