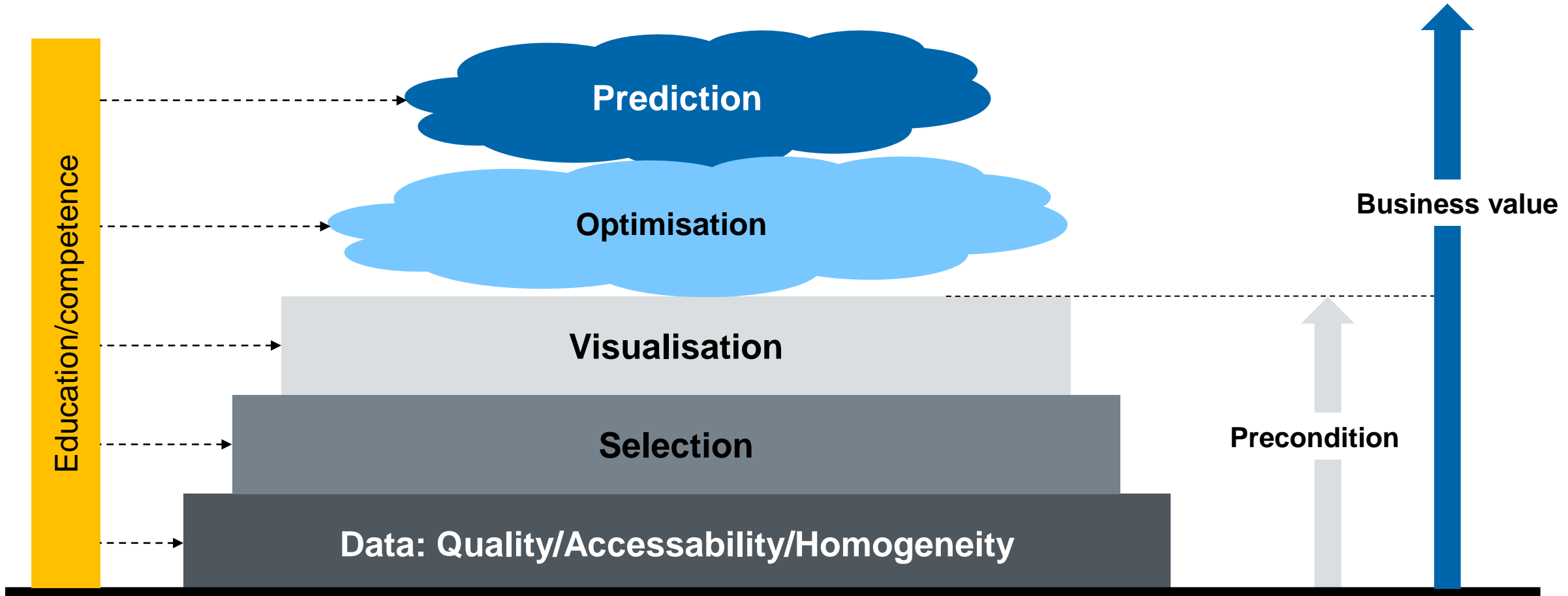


Application of digitalisation for process improvements

Hannes Vomhoff, Senior project manager, Holmen AB

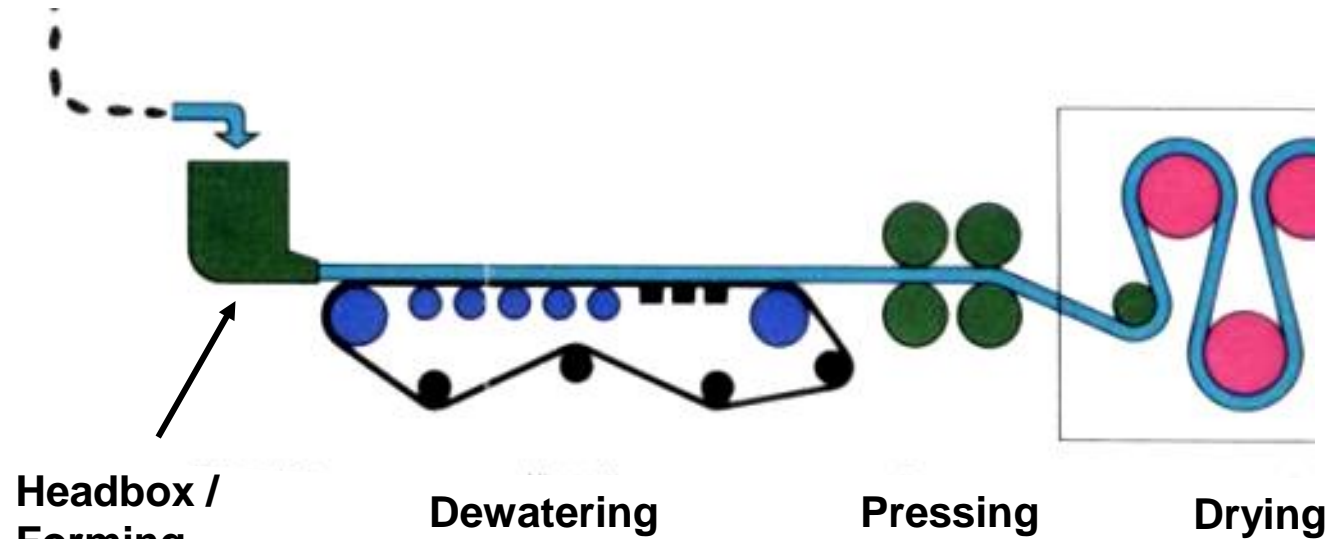


Digitalisation activities



Reduction of pressure variation in headbox

Fibre/water mixture



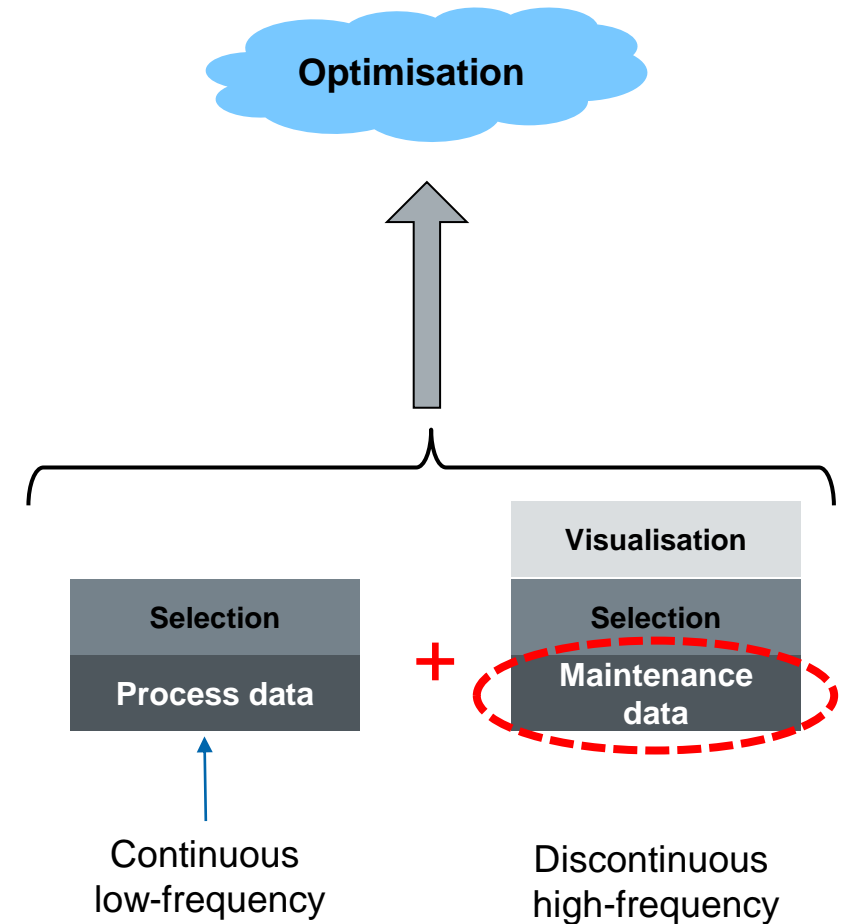
Headbox /
Forming

Dewatering

Pressing

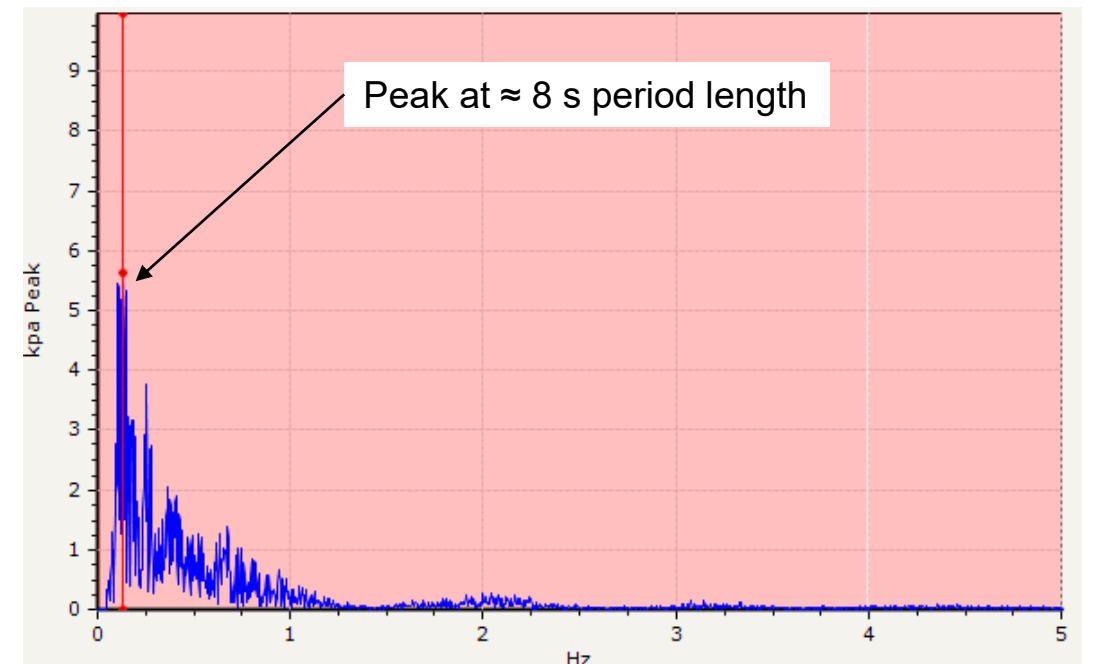
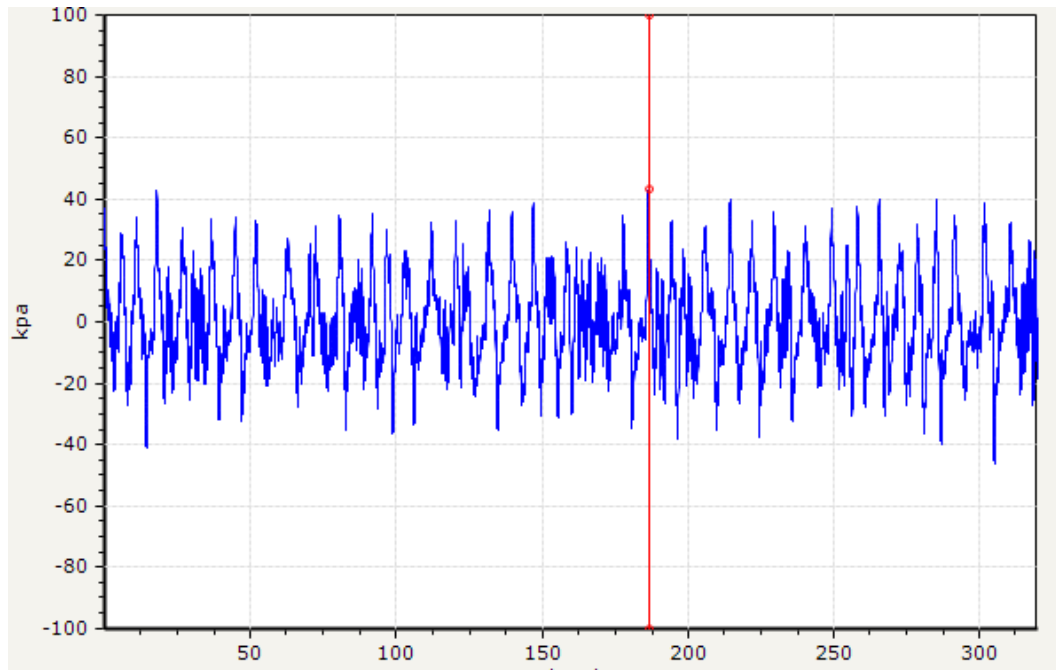
Drying

- Pressure has to be very stable
- Affected by many processes upstream



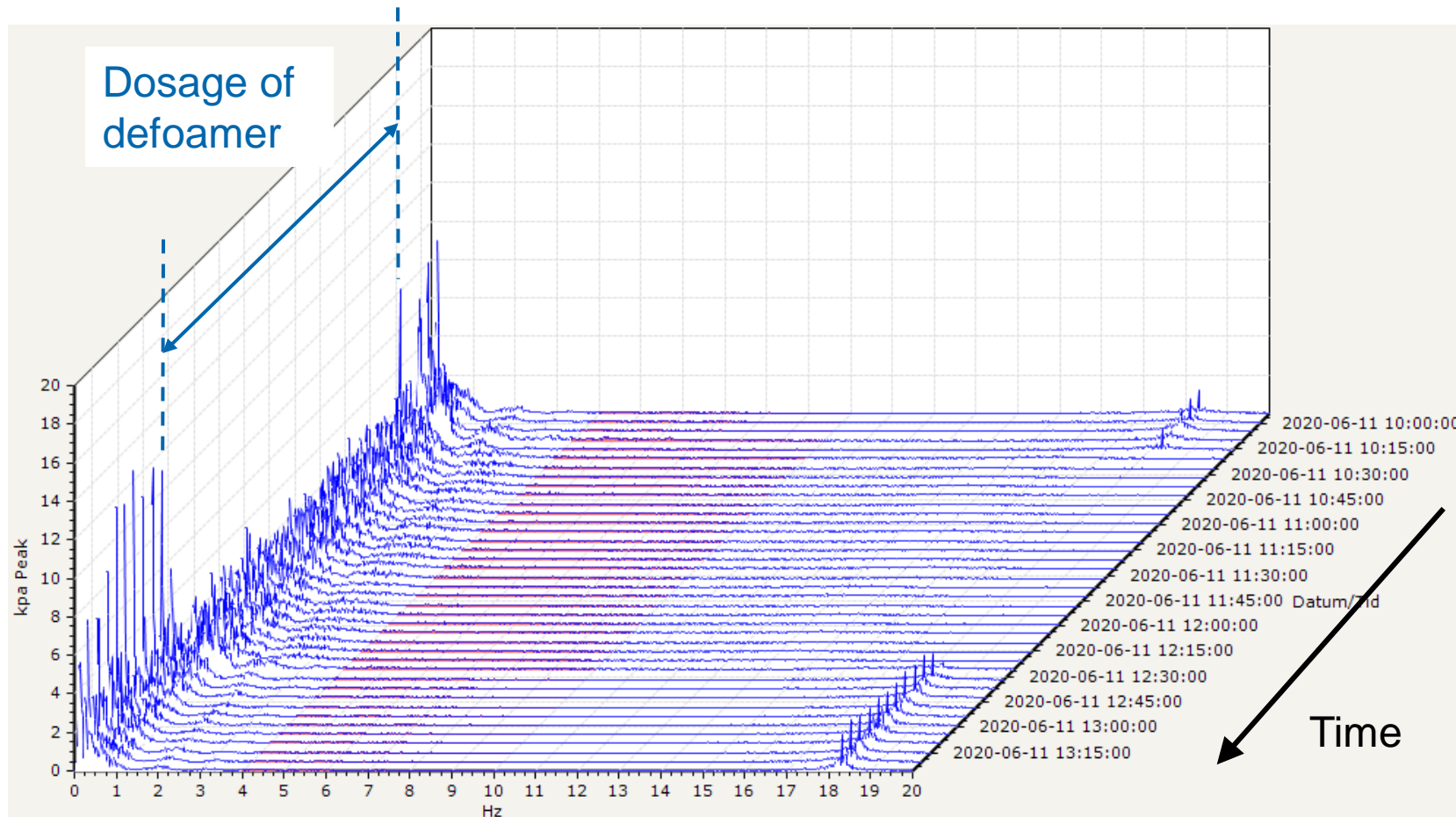
Pressure variations analysed using predictive maintenance system

Frequency analysis



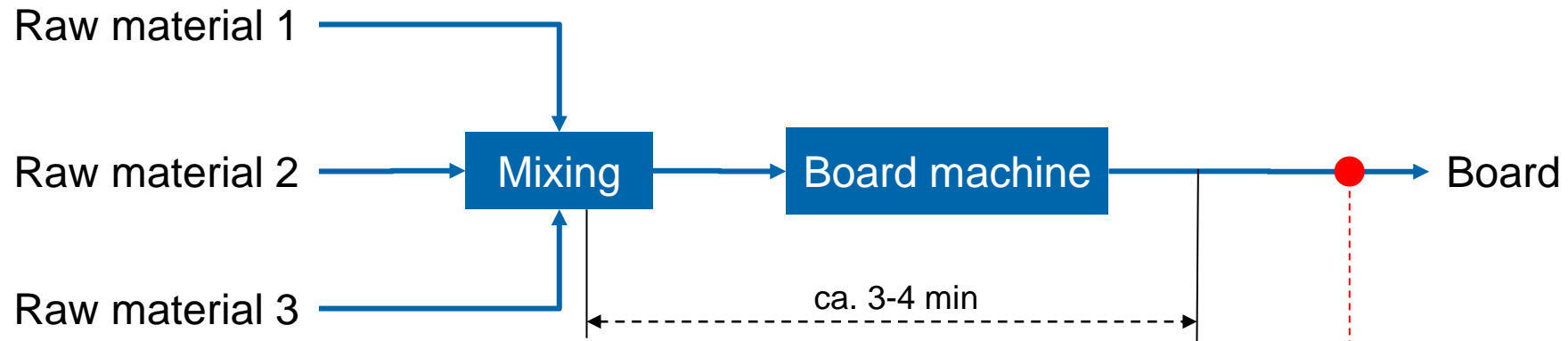
Pressure deviation after a pump in whitewater system
(ca. 50 Hz sampling frequency)

Online evaluation enables optimization of defoamer



- **Combination** of process and maintenance data analytics
 - **Continuous analysis** of high frequency pressure variations
 - **Statistical process control (SPC)** can be applied

Prediction of grammage variation during board production

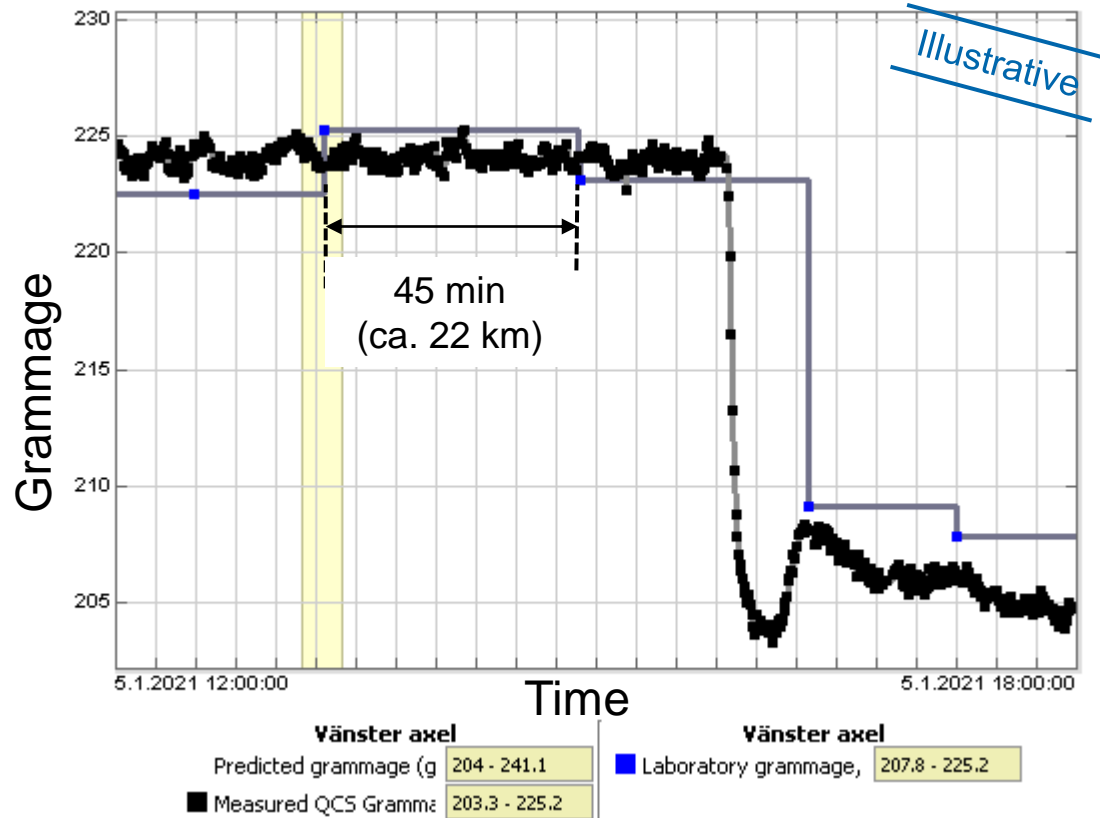


Grammage measurement
(during standard operations):

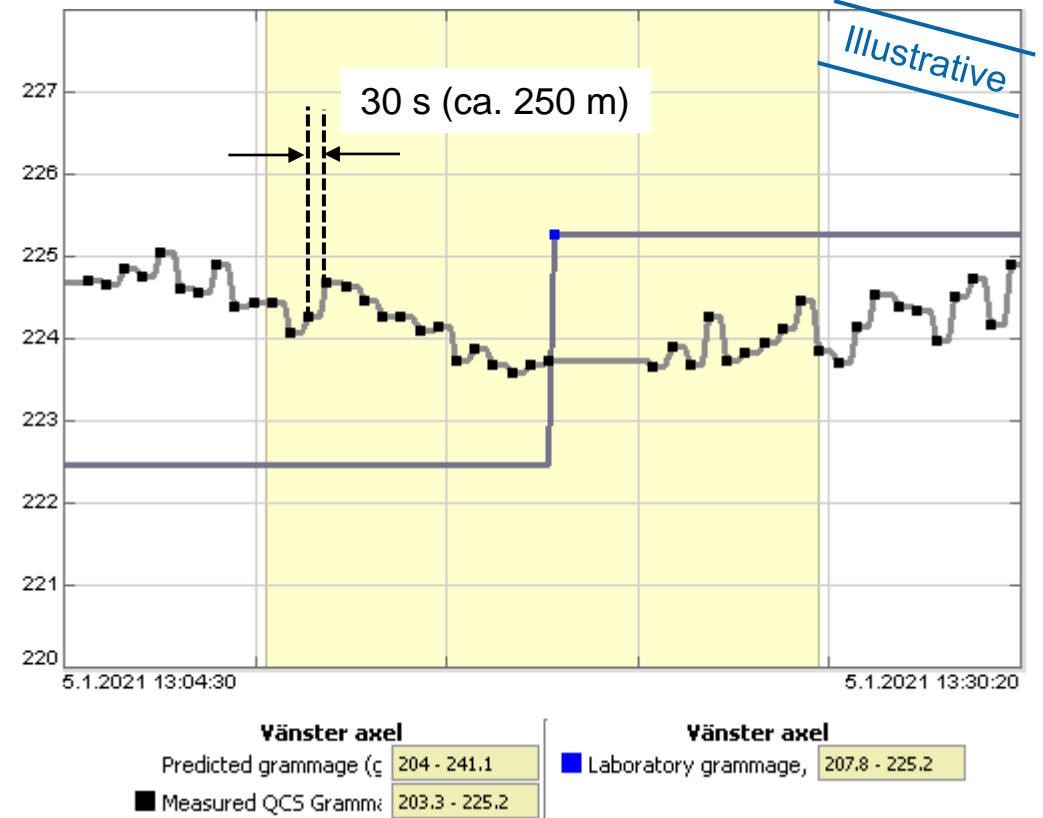
- On-line sensor: every 30 s (CD-profile)
- Laboratory measurement: every 45 min
(corresponds to 15 ms process time)

Quality control of existing production

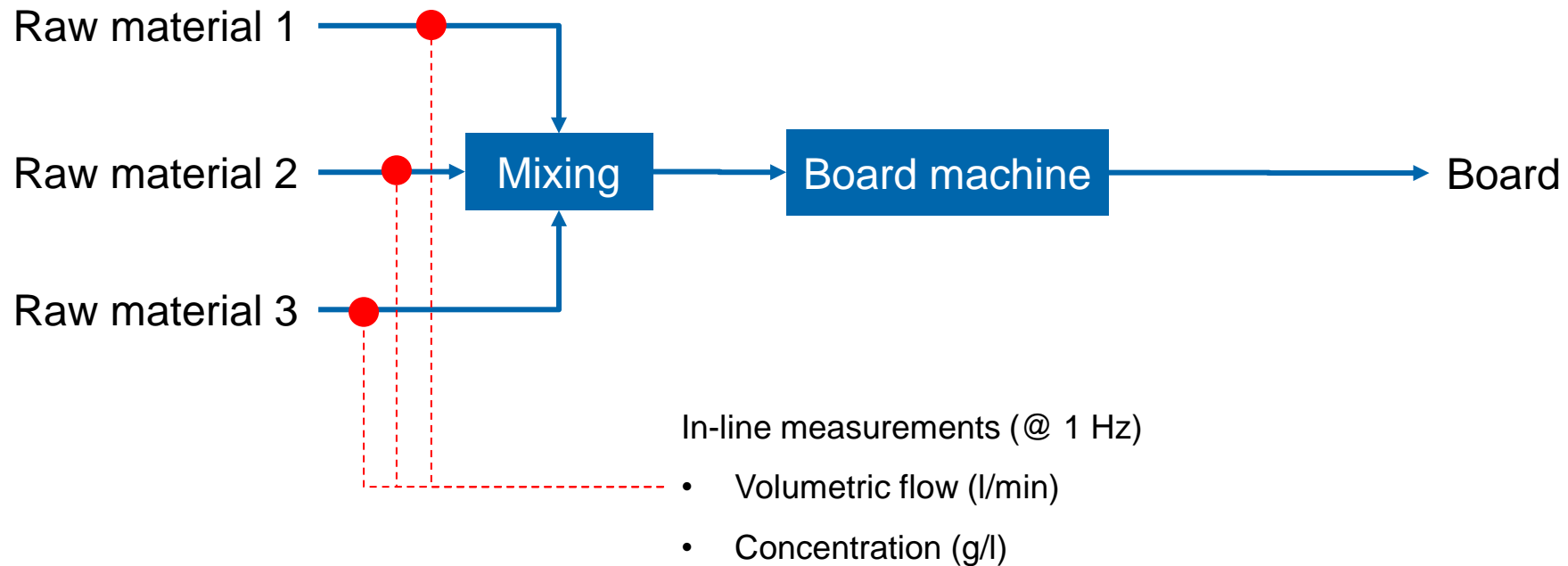
Laboratory measurement



QCS measurement



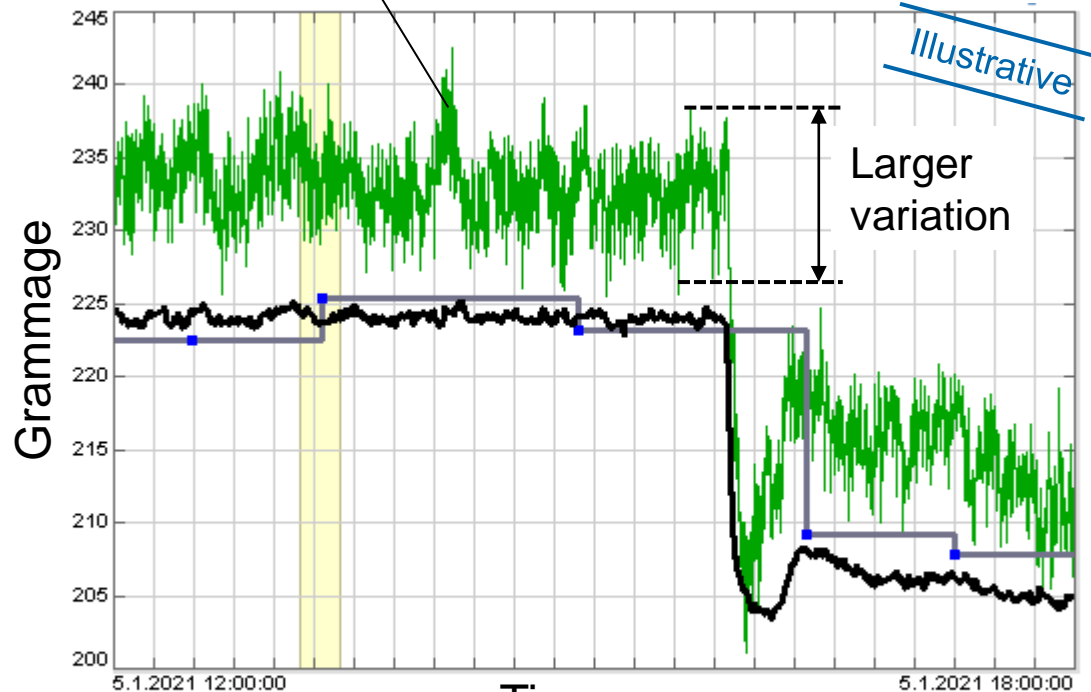
Prediction of grammage during board production



- Calculation of fibre mass flow (kg/l)
- Prediction of grammage

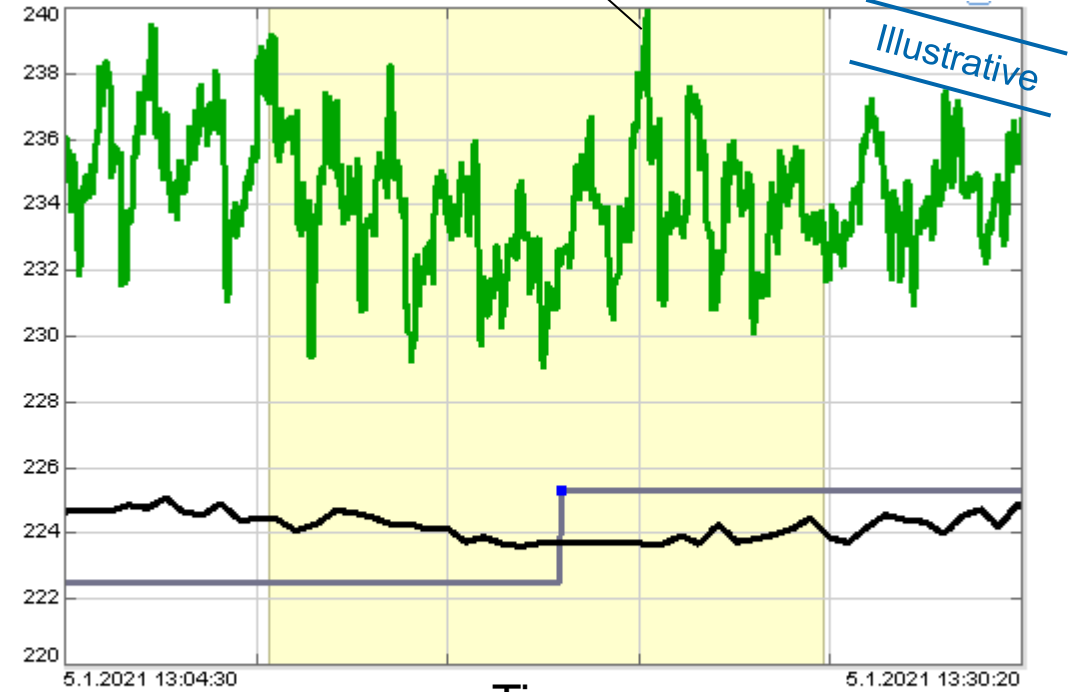
Prediction of grammage during board production

Predicted grammage (1 Hz)



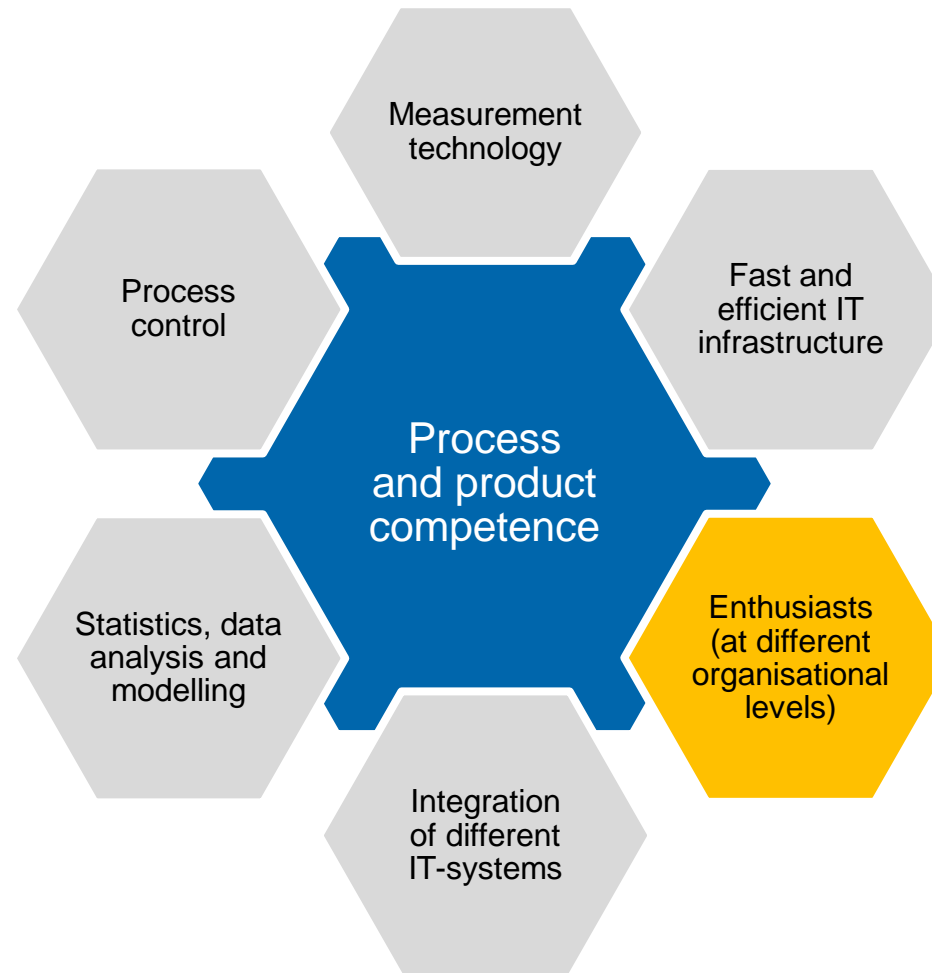
Vänster axel	Vänster axel
■ Predicted grammage (g) 201.1 - 242.4	■ Laboratory grammage, 207.8 - 225.2
■ Measured QCS Gramme: 203.3 - 225.2	

New tool for process optimization:
1 Hz prediction contains much more information



Vänster axel	Vänster axel
■ Predicted grammage (g) 201.1 - 242.4	■ Laboratory grammage, 207.8 - 225.2
■ Measured QCS Gramme: 203.3 - 225.2	

Digitalisation requires focus and collaboration ...



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