THE PROFILE: KEY TO REENGINEERED SCREENING

presented by: chandrakant.b.naik

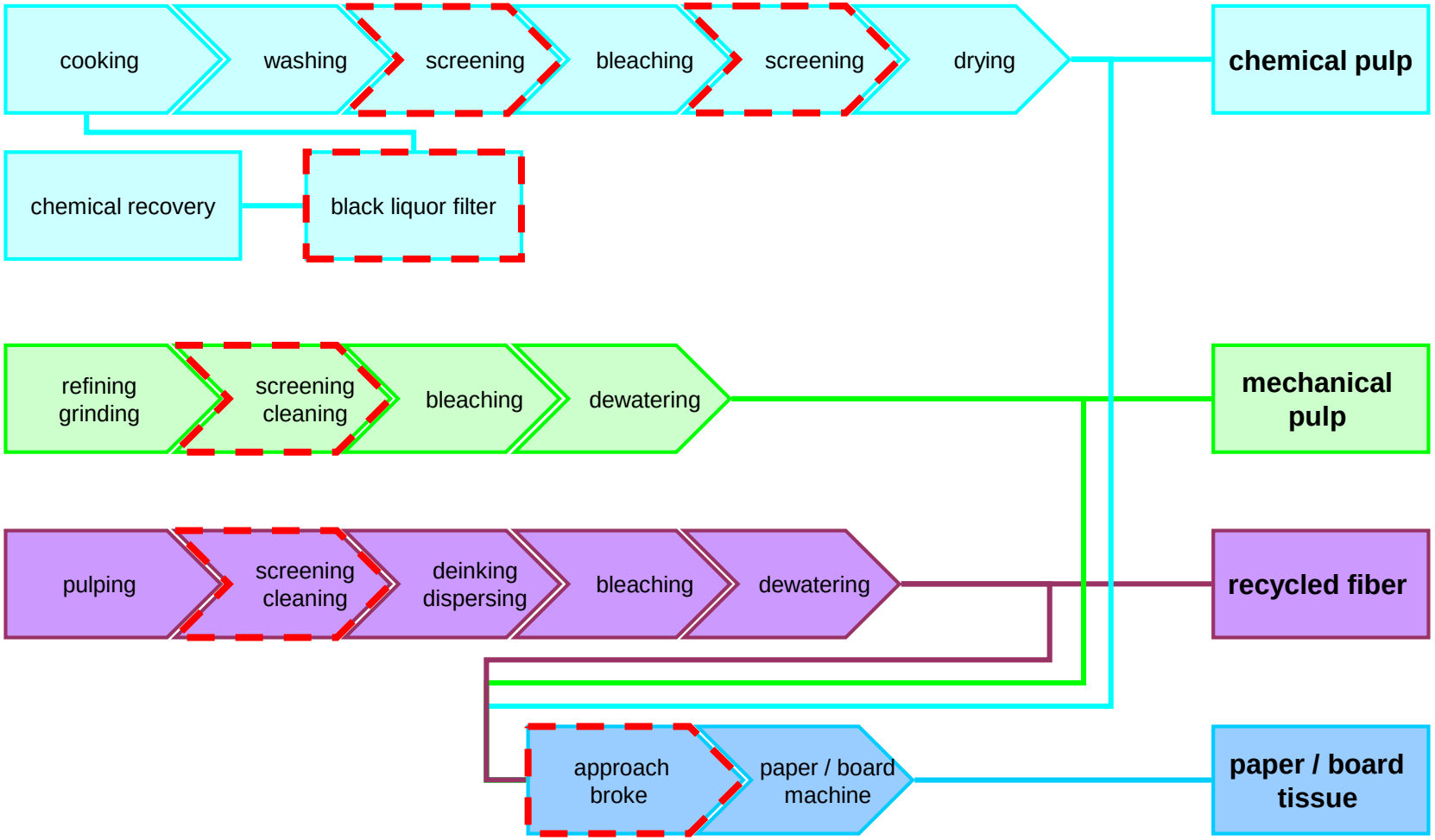
chandrakant.b.naik

- Bachelor of P&P and Master's in Marketing
- 30+ years experience
- Experience in Papermaking, Marketing in PMC, Equipment and spares
- Extensive training in PMC, Screening, Refining, Cleaning, Wet -end of Paper machine, Lab Instruments etc.
- Awardee of Bharat Seva Ratan Gold Medal from GEPRA, New Delhi.
- Presently working as Head-Marketing (PEW division) in ANDRITZ TECHNOLOGIES CHENNAI since 2012.

Naik Chandrakant
Head Marketing – PEW
ANDRITZ Technologies ,
Chennai (INDIA)
+91 875 444 2741
chandrakant.naik@andritz.com

Overview screening system

Screening location in paper making process



Overview screening system

Reason for screening

Waste paper

Wood

Final product

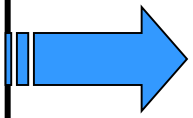
Target of a Screening Process

- Maximum Removal of Impurities with the Reject
- Maximum Fiber- respectivley Longfiber yield in the Accept
- Maximum Capacity
- Maximum Reliability of Operation
- Maximum Economy

- Minimum Energy Consumption
- Minimum Rejectrate
- Minimum Reject Thickening

Substancial Influence on the Screening Result

Raw Material	Screening Machine	Process Parameter
Primary fibers	Screen basket Parameter	Flow rate
Secondary fibers (Recycled Fibers)	Rotor Parameter	Reject rate
Long – Shortfiber content	Screening Machine,- Construction	Specific Screen Area load (kg/min/m²) Fiber slot velocity (m/s)
Impurity content (-concentration)		Screening system lay out
Impurity type		Consistency
Fiber condition (beating degree ...)		



RESULT

ANDRITZ Pulp & Paper

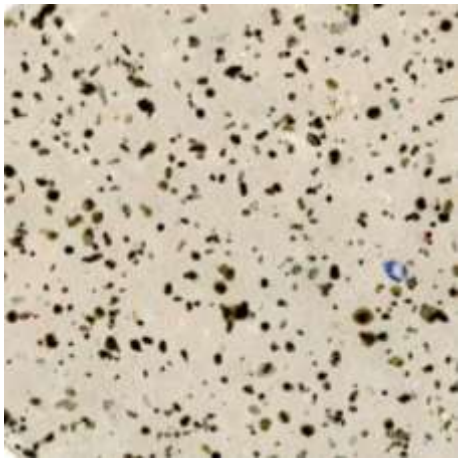
Screening rejects

Coarse screening

plastic strips / knots / stones / diverse big particles

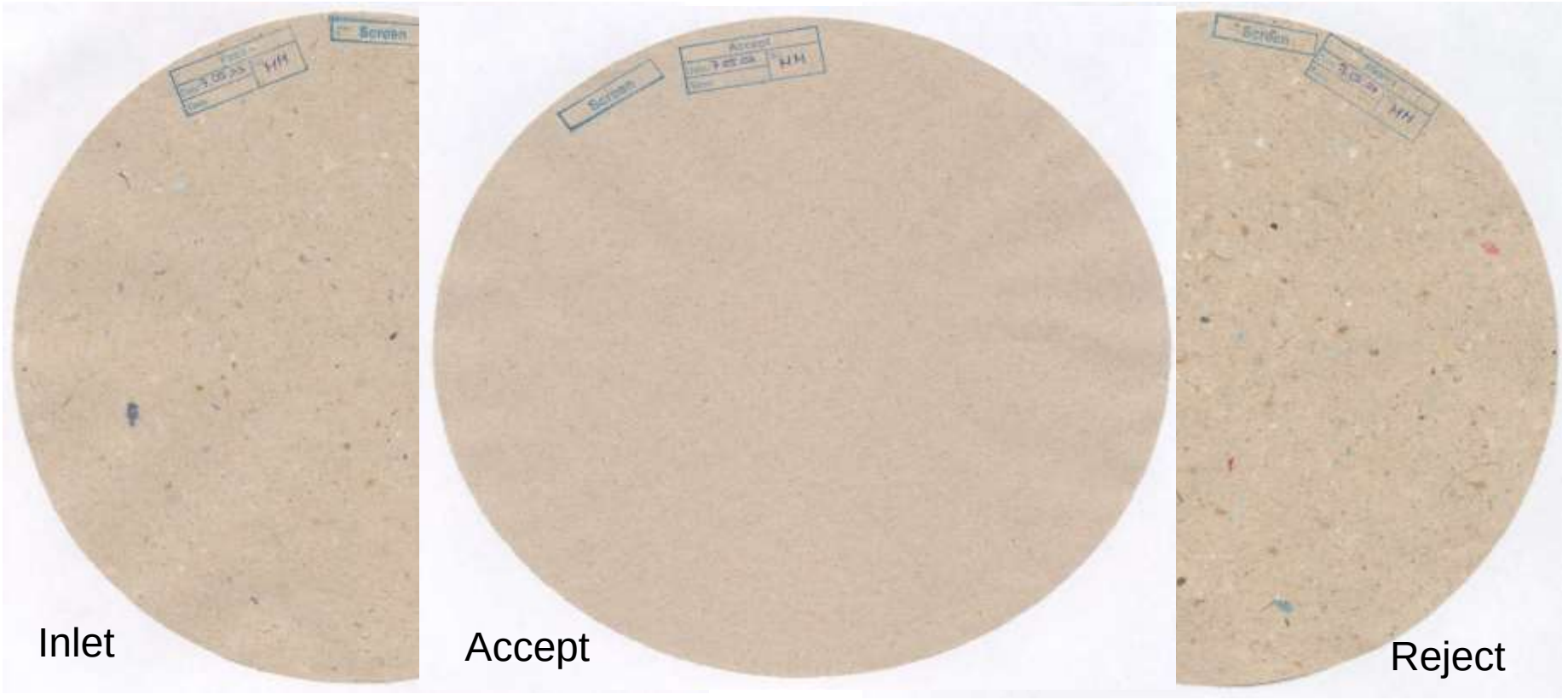
Fine screening

bark / shives / styrofoam / stickies / diverse small particles



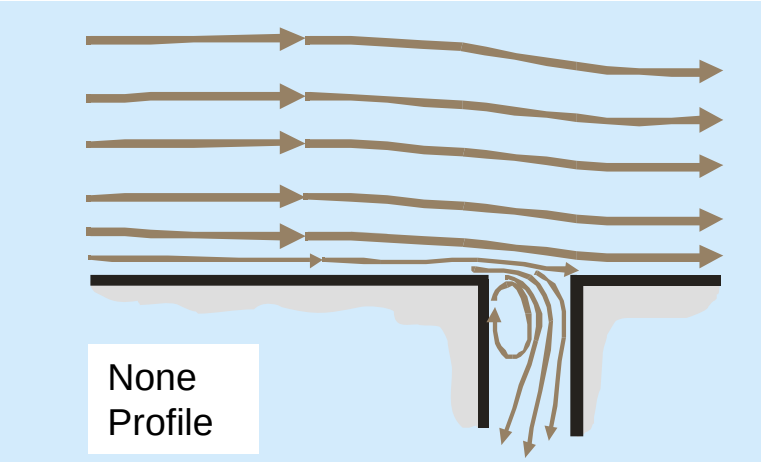
ANDRITZ Pulp & Paper

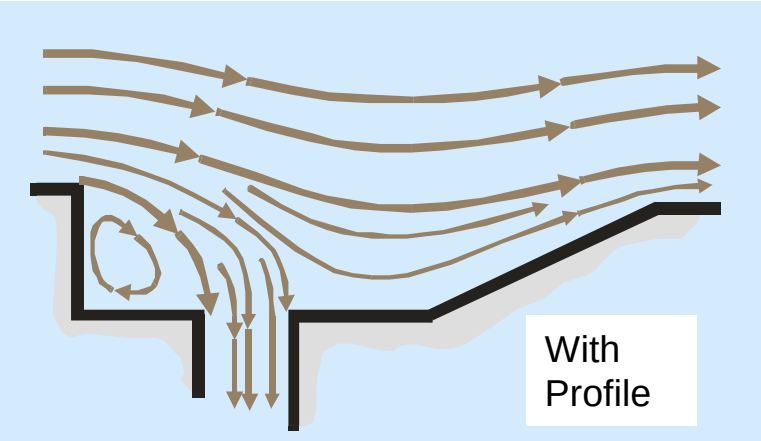
Screening Result: Board – Filler Ply



1. Stage Approach Flow Filler Ply # 0,20 mm

Screen basket :Influence of the profile



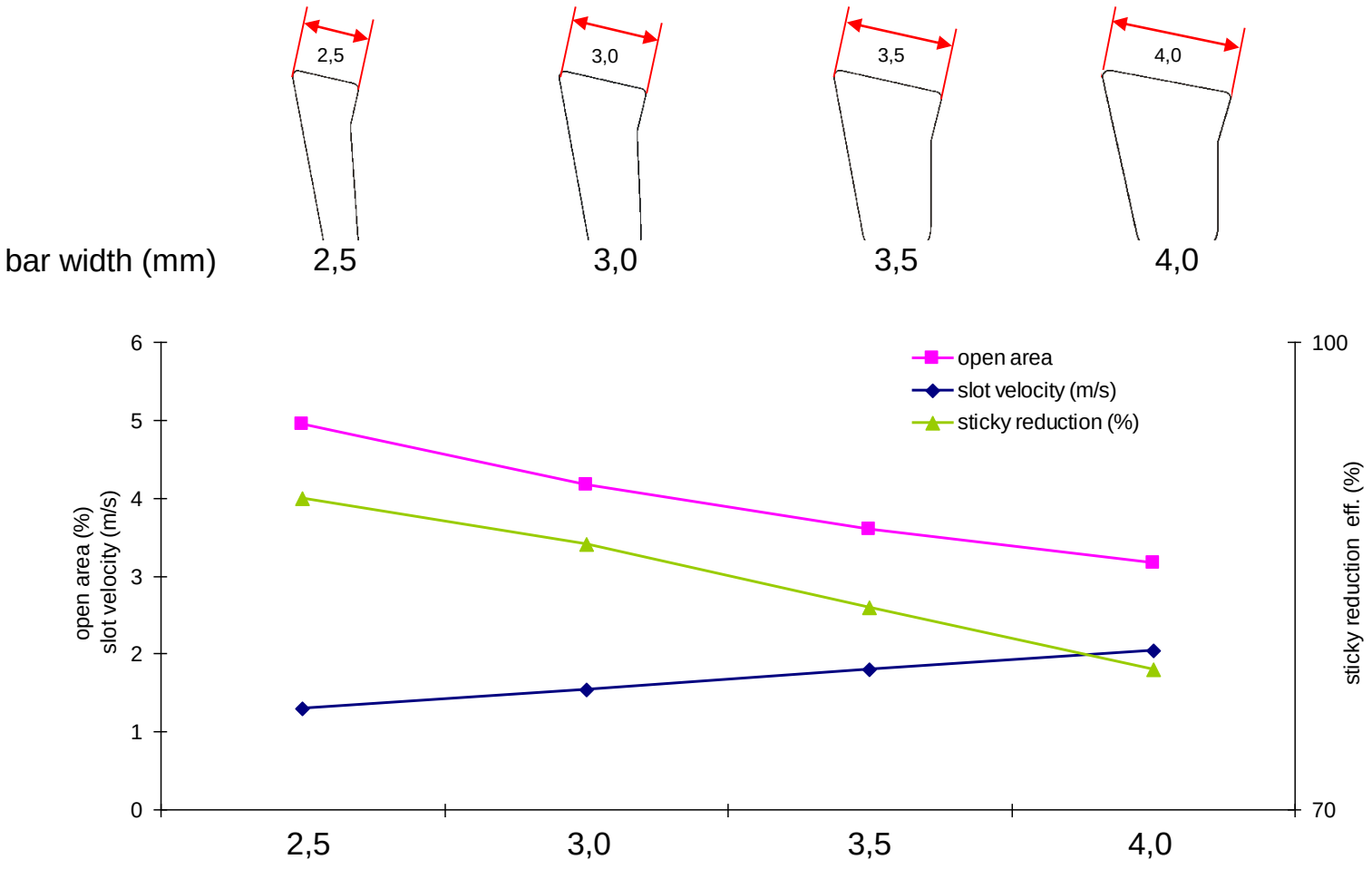


- **The basket surface is bigger**
- **“Compulsory guide“ of the fibersuspension**
- **Turbulence generated vertically to the screening area**
- **Higher Troughput**
- **Sharper Seperation of fibermaterial and Impurities**
- **Better distribution over the screen area**
- **Rejects get better discharged**
- **Lower plugging tendency**
- **Hole- slot reduction is possible**
- **Lower energy consumption**

ANDRITZ Pulp & Paper

Influence of profile wire

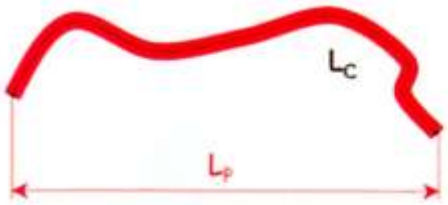
Effects of bar width



Influence of profile wire

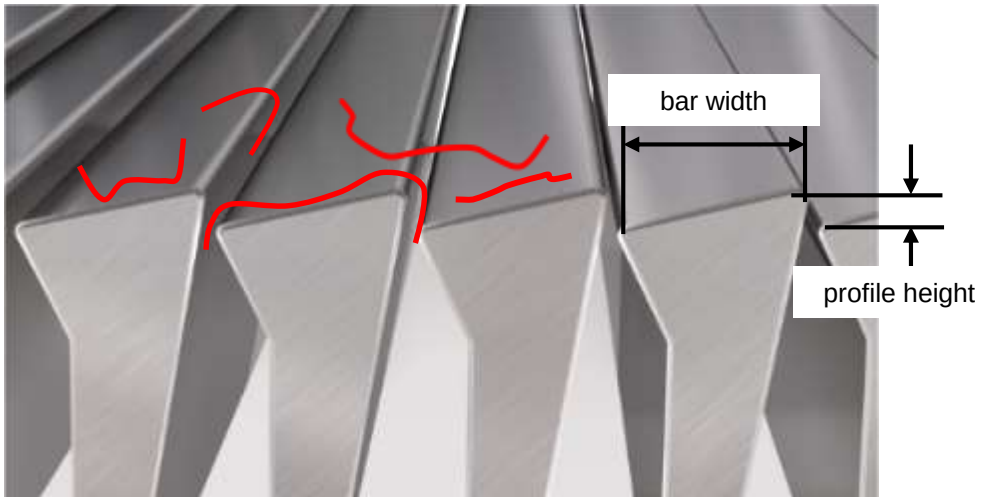
Limitation of bar width

fiber length (L_P) > bar width + profile height = stapling



L_c = contour length

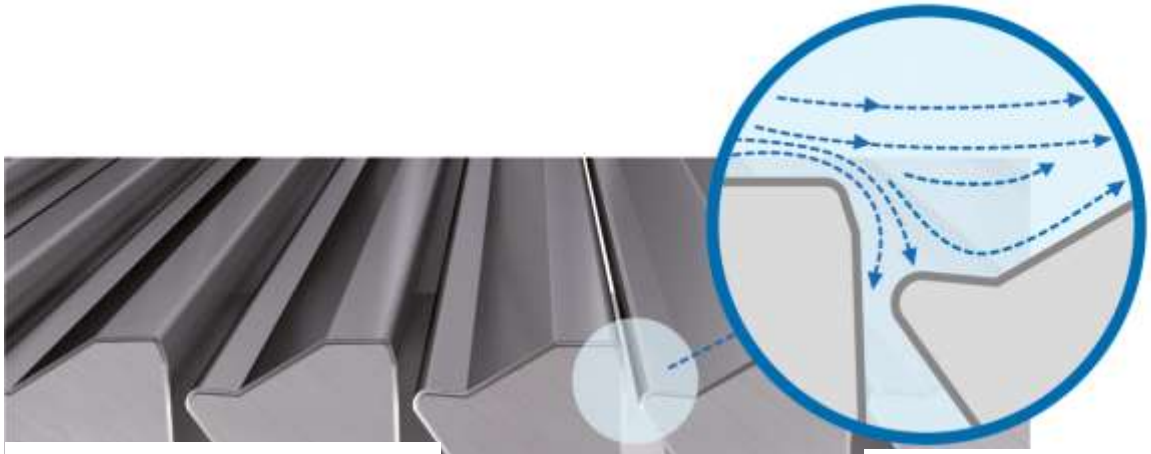
L_p = projected length (eff. length)



ANDRITZ Pulp & Paper

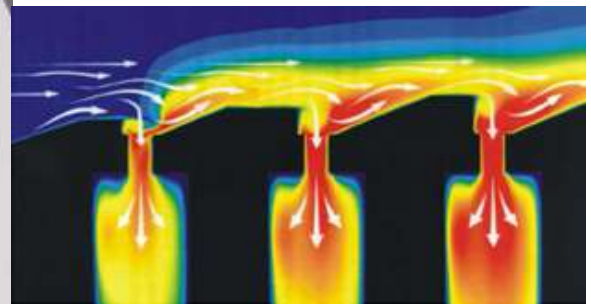
Influence of profile wire

Effects of profile height



Profile step creates turbulence

Turbulence increases with the profile height



ANDRITZ Pulp & Paper

Influence of profile wire

Effects of profile height

increase of profile height

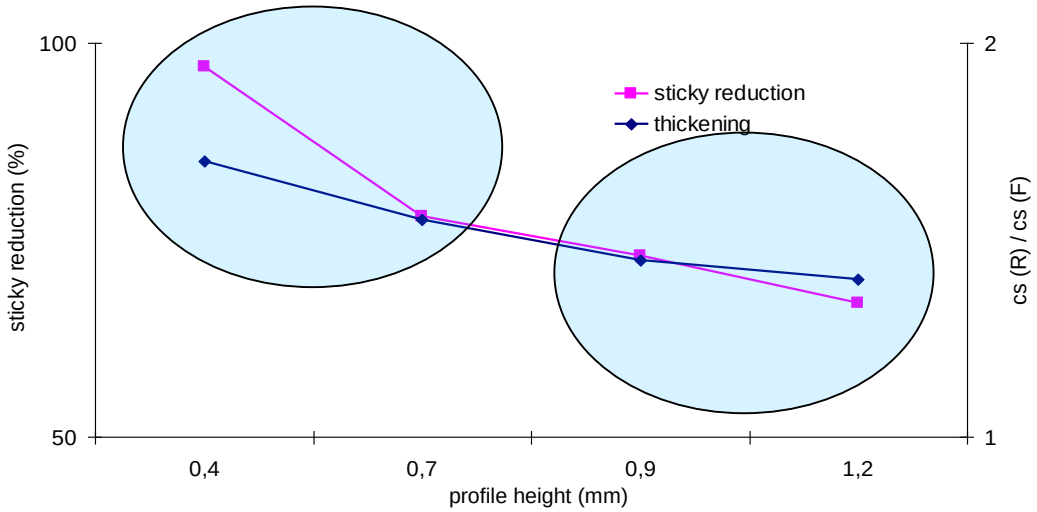
higher turbulence on the basket surface

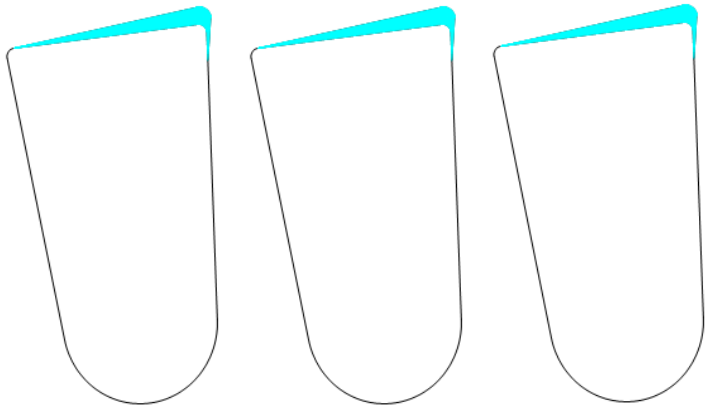
decrease of ~ 10 % screening efficiency

increase of ~ 10 % capacity

QUALITY

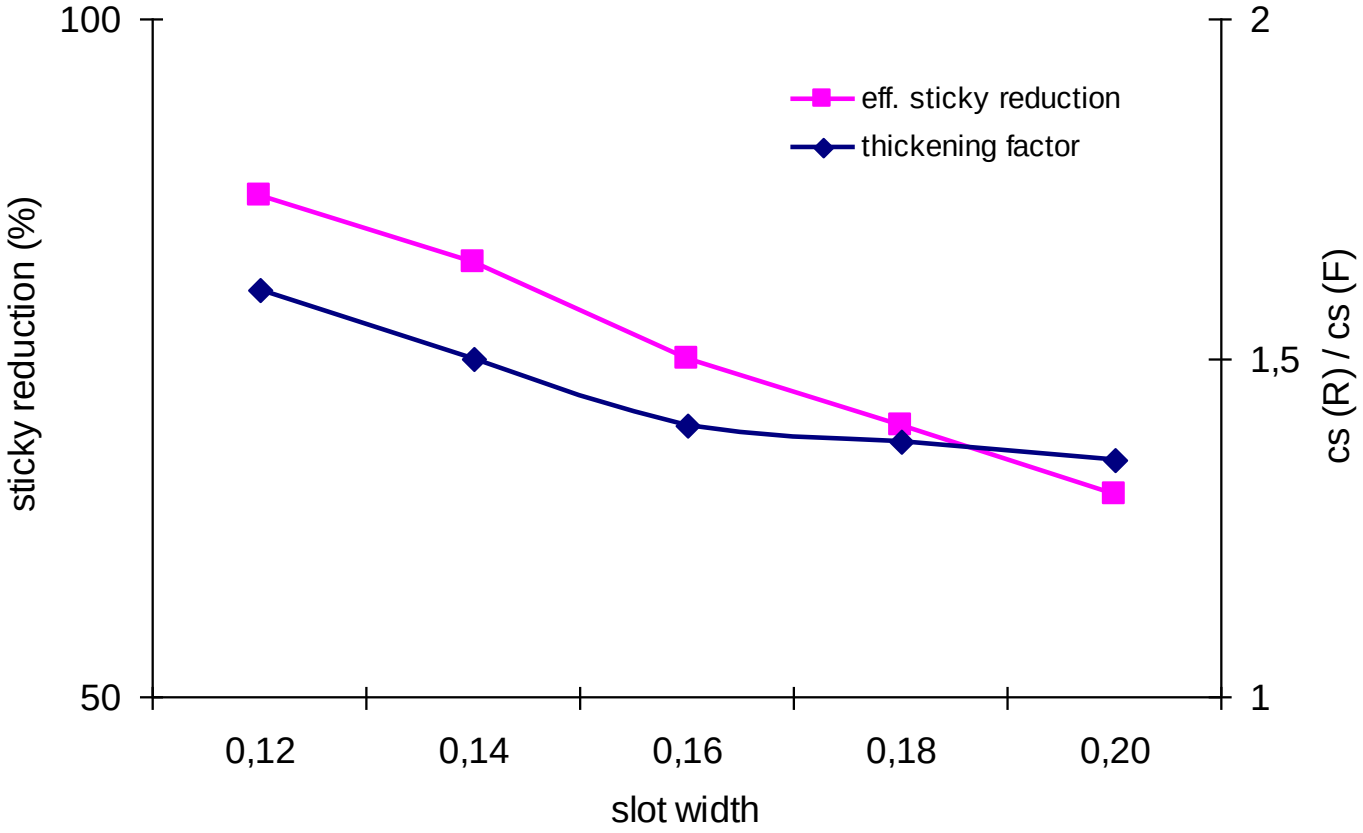
CAPACITY





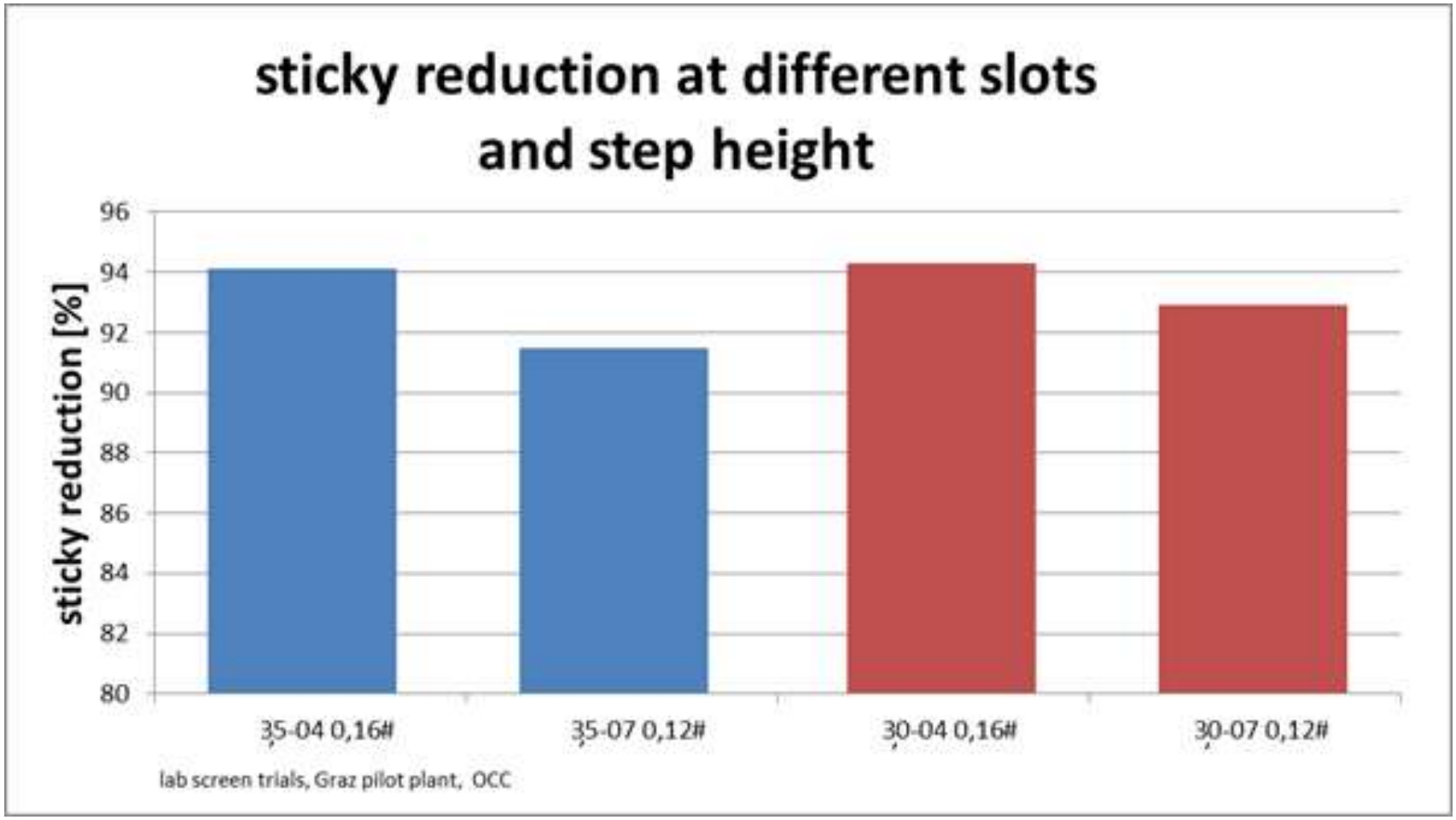
Influence of profile wire

Effects of slot width



Influence of profile wire

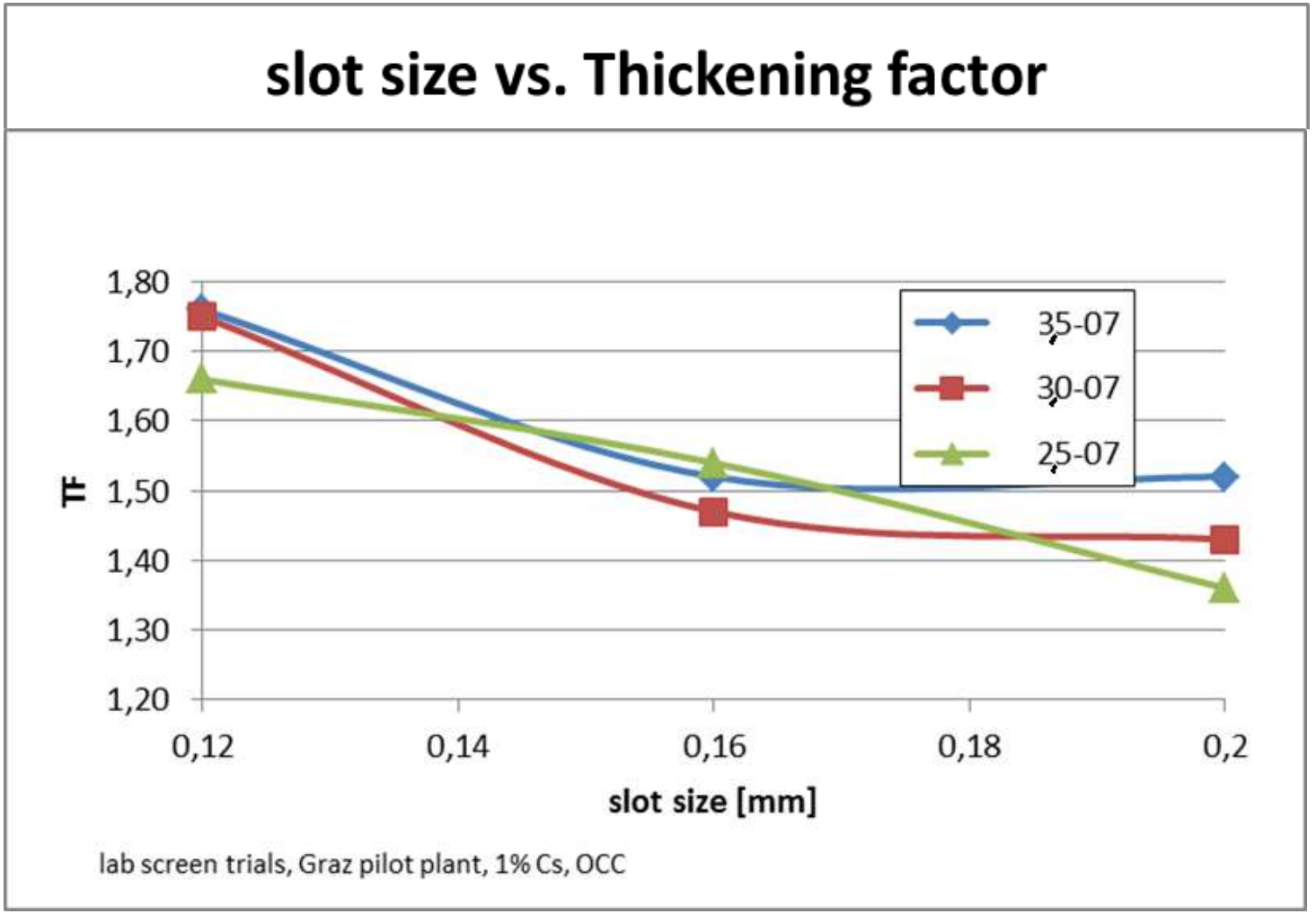
Comparison step height versus slot width



ANDRITZ Pulp & Paper

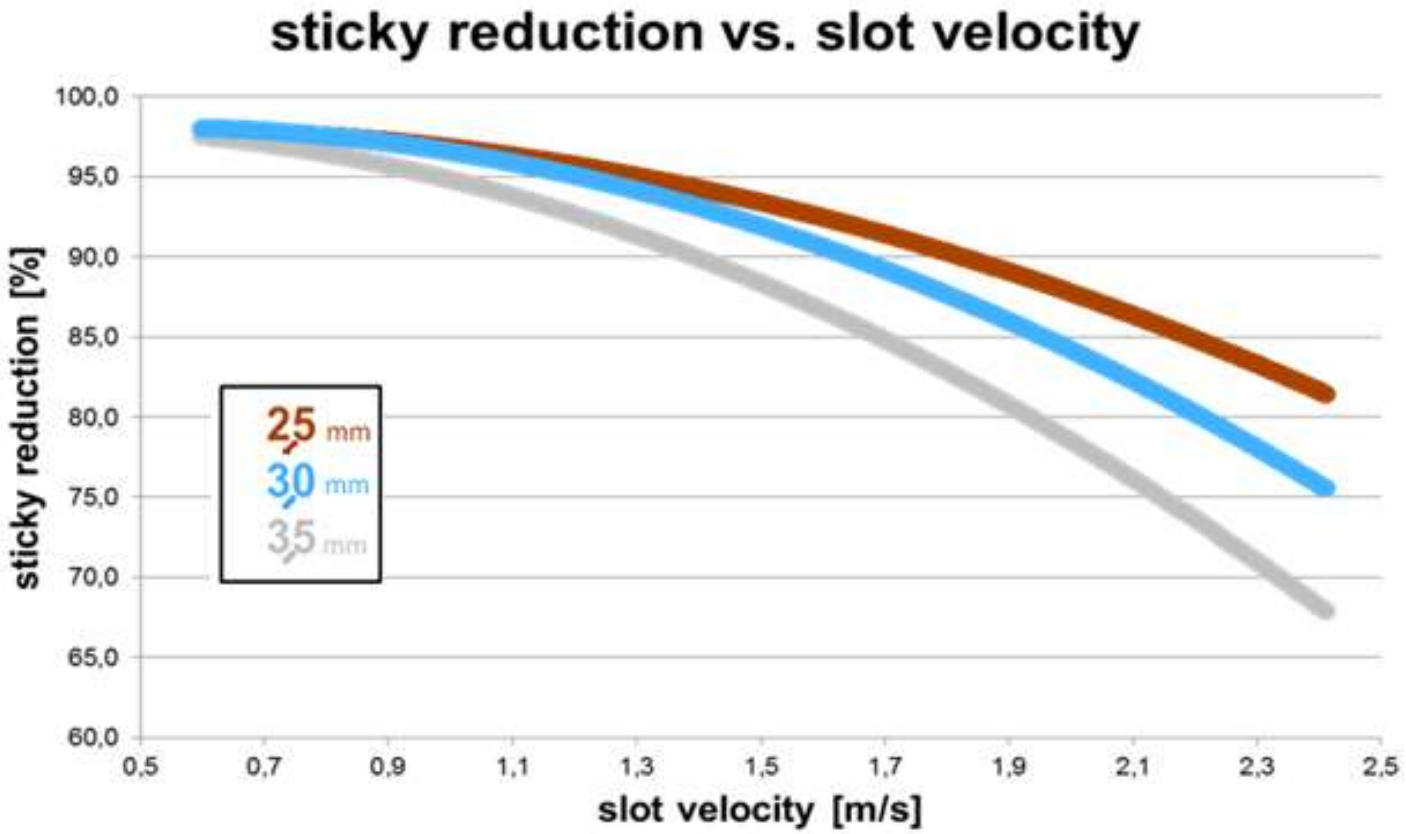
Influence of profile wire

Effects of profile wire



Influence of profile wire

Effects of slot velocity

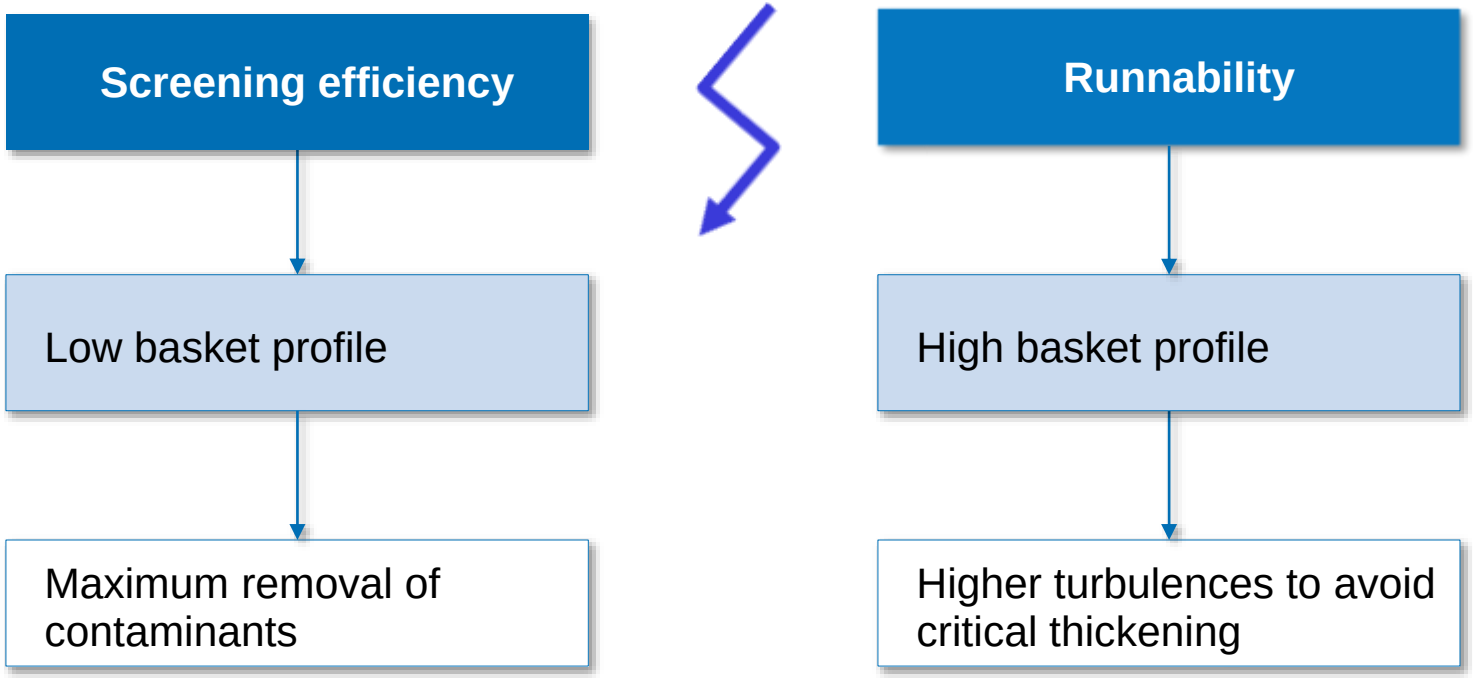


lab screen trials, Graz pilot plant, 0,16 mm #; 0,4mm step height, 1% Cs, OCC

ANDRITZ Pulp & Paper

Screening efficiency vs. Runnability

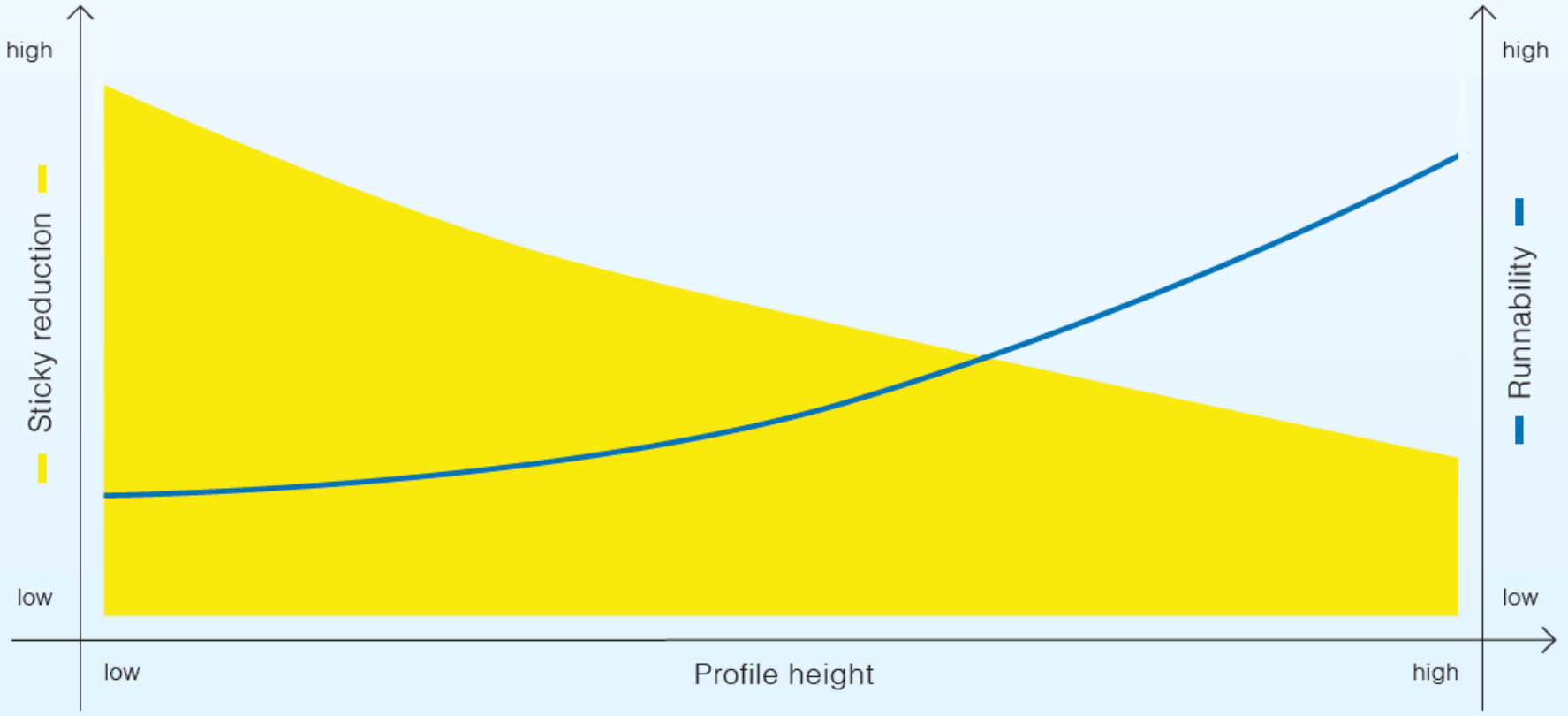
Screening efficiency and Runnability are contradictory objectives in traditional baskets:



ANDRITZ Pulp & Paper

Finding a balance between efficiency and runnability

Effect of the profile height on sticky reduction and on runnability



Standard performance

Uniform profile height

In a traditional basket design the profile height is uniform from the top to the bottom of the basket.

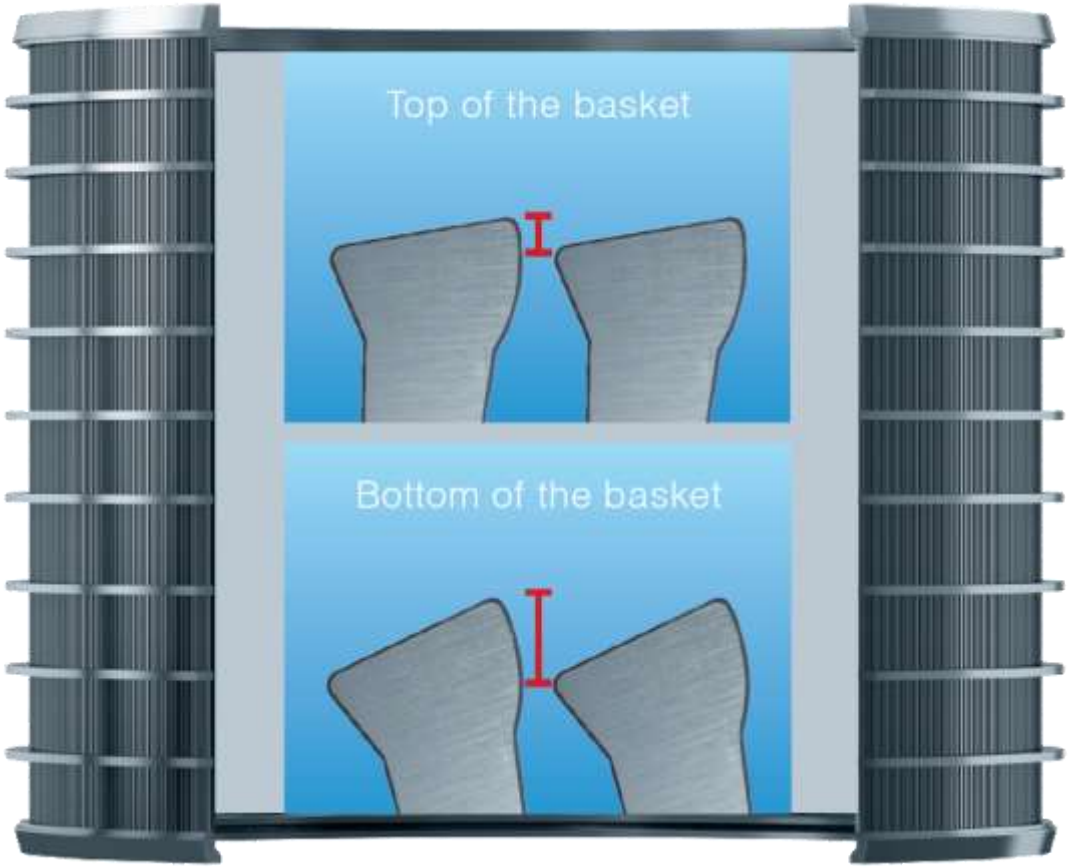
To avoid critical thickening, often a high profile is chosen.

But: the high profile can reduce screening efficiency.

The full potential of the basket is not achieved.

ANDRITZ Pulp & Paper

Adaptable profile – constant slot width

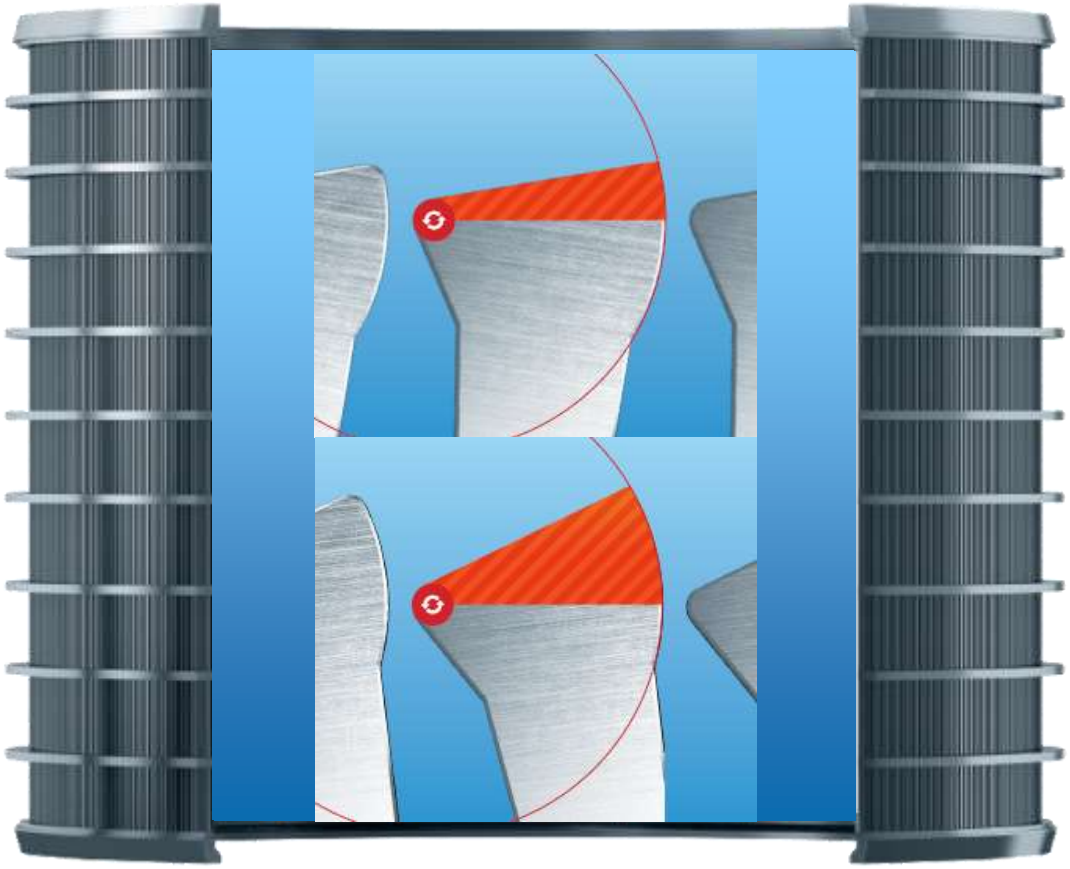


The ability to adjust the profile hight within the ANDRITZ U-Twist basket is unique.

The twisted wire allows us to get an optimum profile height at any position of the basket

ANDRITZ Pulp & Paper

Tilting of U-Twist wire



The patented profile geometry enables tilting the wire without impacting slot width.

This is not possible with any other profile wire.

ANDRITZ Pulp & Paper

Case study (1) - Pilot plant trials

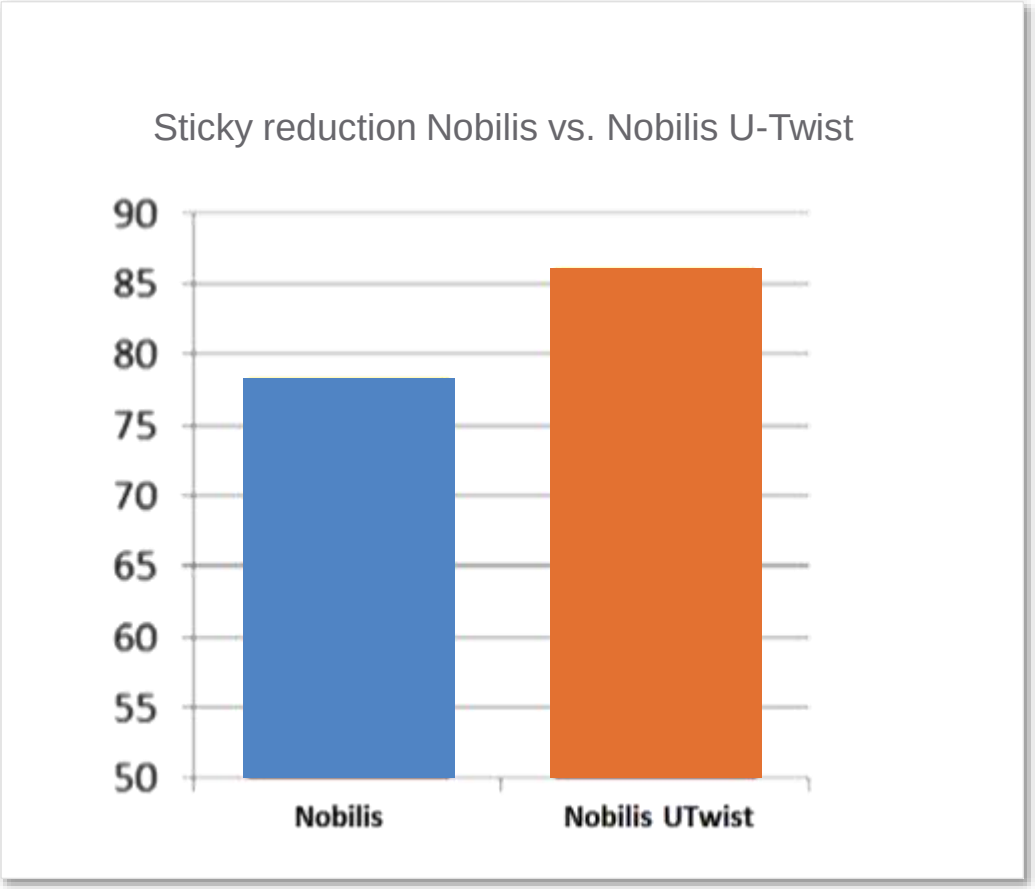
Pilot plant trials

Pilot plant trials on a small screen (A12) in the ANDRITZ laboratory under identical process conditions and with the same rotor (tip speed 15.3 m/s):

- BAR-TEC Nobilis
  slot width 0.16 mm
  profile height 0.6 mm

- BAR-TEC Nobilis U-Twist
  slot width 0.16 mm
  profile height 0.4 mm on the top and 0.7 mm on the bottom

Case study (1) - Pilot plant trials



The result:

app. 10% higher reduction of stickies with the U-Twist at the same throughput and energy consumption

ANDRITZ Pulp & Paper

Case study (2) – DIP fine screening

Customer mill in CE, DIP fine screening

Customer mill wanted to improve the screening efficiency in fine screening of deinked pulp line (OMG/ONP furnish)

The challenge: improve screening efficiency

- BAR-TEC Nobilis:
  slot width 0.18 mm,
  profile height 0.9 mm

The solution:

- BAR-TEC Nobilis U-Twist:
  slot width 0.18 mm,
  profile height 0.7 mm (top) to 1.0 mm (bottom)

Case study (2) – DIP fine screening

Writing/Printing mill in Europe

- DIP fine screening
- Primary stage
- Lamort CH7 fine screen
- Similar basket with UTwist

Basket	Nobilis # 0.15 mm	Nobilis UTwist # 0.15 mm
Profile Ht. (mm)	0.9	0.7-1.0
Sticky reduction (%)	**76.3%**	**84.7%**

Lamort CH 7	Nobilis	Nobilis U-Twist
Position	Primary fine screen	Primary fine screen
Rotor	RO-TEC LCs (Foil120)	RO-TEC LCs (Foil120)
Tip speed, m/s	19.7	19.7
Profile height, mm	0.9	0.7/0.8/0:9/1.0
Slot width, mm	0.18	0.18
Feed consistency, %	2.8	2.8
Thickening factor (after reject dilution)	1.05	1.00
Reject rate RRw, %	31.7	30.0
V Slot, m/s	0.65	0.65
Sticky reduction, %	**76.3**	**84.7**

The result:

- Sticky removal efficiency: + 11% (from 76.3% to 84.7%)

ANDRITZ Pulp & Paper

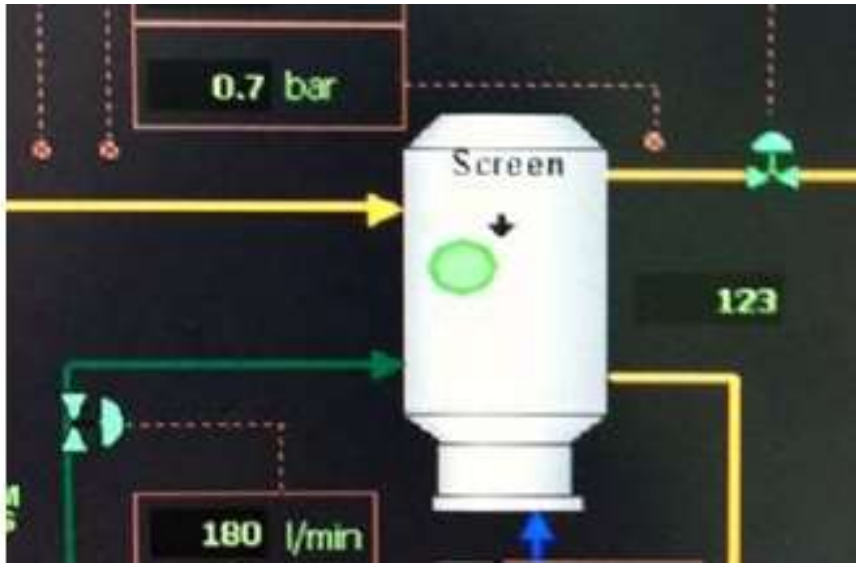
Case study (3) : OCC fine screening

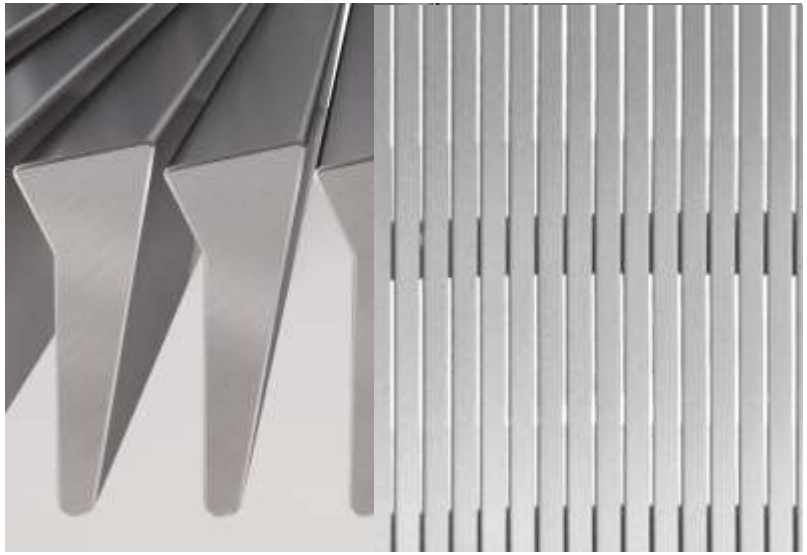
High efficiency screening

Board mill in Europe

- OCC fine screening
- Primary stage
- Andritz-F60 screen
- Basket with one profile replaced with basket with two different profiles

Basket	Bar-Tec Valeo # 0.15 mm slot	Bar-Tec Valeo # 0.15 mm slot
Profile height (mm)	0.9	0.7/0.9
Tip speed m/s	20.6	20.6
Reduction of impurities	**74%**	**91%**





Case study (4) ANDRITZ U –TWIST In different baskets

P&W grade in Europe

- DIP
- Primary stage
- VOITH Size30 screen

Basket	Voith C-bar	Andritz U-Twist
Profile	C-Bar QE	PGR30 04-07
Profile height, mm	0.5	0.4(top) – 0.7(bottom)
Thickening factor	1.25	1.29
Sticky reduction	**63.4%**	**70.6%**

Primary screens Voith Size 30	Primary screen (1)	Primary screen (2)
Screen basket	Voith C-bar	ANDRITZ U-TWIST
Profile	C-Bar QE	PGR30 04-07
Profile height, mm	0.5	0.4 (top) - 0.7 (bottom)
Slot width, mm	0.15	0.15
Accept flow, l/min	~ 11000	~ 11000
Accept consistency, %	1.2	1.2
Reject flow, l/min	~ 2100	~ 2100
Reject consistency, %	1.5	1.5
Reject rate (RRw), %	20.4	20.9
Thickening factor	1.25	1.29
Sticky removal efficiency (mm^2/kg), %	**63.4**	**70.6**

ANDRITZ Pulp & Paper

Conclusions

1. Profiled basket influences significantly on efficiency of screening, throughput, runnability, energy consumption.
2. Profile height, Profile width, Slot width are crucial in screening.
3. Low Profile height facilitates higher sticky removal in spite of higher slot width confirming role of micro turbulence created by profile height.
4. Profile influences barrier screening and probability screening to yield positive results..
5. Profile adaptability at different portion of basket ensures high screening efficiency without compromising on runnability and throughput.
6. Ability to adjust Profile height within the basket is unique.
7. And finally…The profile: Key to reengineered screening