HAVING IT ALL–TOP QUALITY SCREEN

The main goal in the screening process is to efficiently remove debris, including stickies, shives and other contaminants from the stock. However, there are other factors to consider such as targeted capacity, reject rate, energy efficiency, and runnability. ANDRITZ UTwist adaptable screening profile wire allows a mill to have it all.

ING & HIGH LEVEL RUNNABILITY

A standard screen basket has a fixed wire profile from top to bottom. This is the norm even though the stock thickens as it flows from the feed end to the reject end – increasing the risk for plugging in the reject end where the thickening reaches its peak. What is becoming more of a challenge is to operate the screen under changing process conditions – inconsistencies in incoming raw materials, excessive amounts of contaminants, shutdowns, and other process disturbances.

Since screening efficiency and runnability are contradictory objectives, this points to the inherent compromise in basket specification; setting the wire profile height low enough to ensure good efficiency (high accept quality with minimal contaminants), yet high enough to produce enough turbulence on the basket surface to maintain throughput and high runnability.

The design of the wire in a slotted screen basket has a major effect on both screening capacity and accept quality. The profile height is determined by adjusting the angle of the wires and it affects the turbulence on the basket surface.

Turbulence has a crucial effect on the behaviour of the fiber suspension. Increasing the profile height increases turbulence on the basket surface, which is beneficial for stock fluidization and increased throughput. Higher turbulence also prevents fiber mat to build up too strongly on the basket surface, which might lead to plugging. However, if the turbulence is too strong, more contaminants will pass through the basket reducing the accept quality.

A low profile height on the contrary improves screening efficiency, but lowers the throughput of the screen. It also contributes to higher rejects thickening, especially in the reject end of the screen, which again may jeopardize runnability.

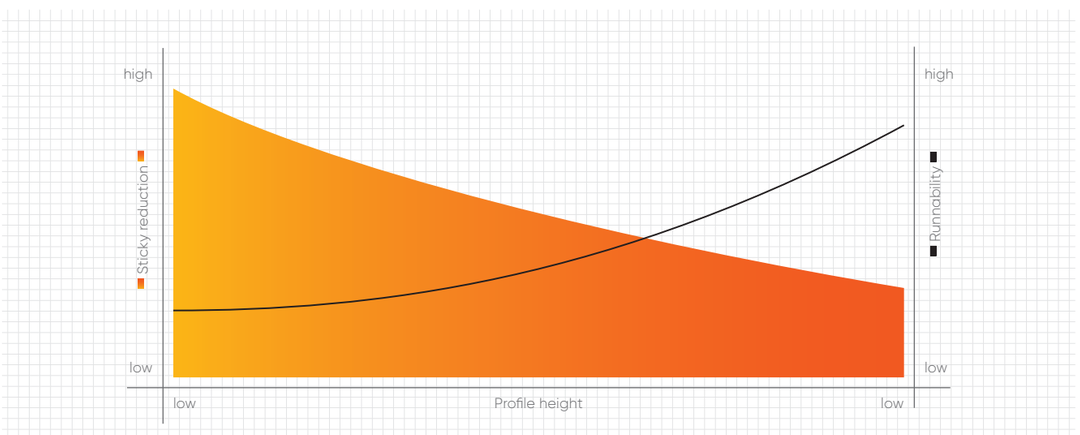


Figure 1: Effect of the profile height on sticky reduction and on runnability

PILOT PLANT TRIALS

Pilot plant trials of the UTwist were conducted on a small screen (A12) in the ANDRITZ laboratory. For the trial, two screen baskets were compared under identical process conditions and with the same rotor (tip speed 15.3 m/s):

- ANDRITZ Bar-Tec Nobilis: slot width 0.16 mm; profile height of 0.6 mm
- ANDRITZ Bar-Tec Nobilis UTwist: slot width 0.16 mm; profile height of 0.4 mm on the top and 0.7 mm on the bottom

The results of the pilot plant tests confirmed the design (Figure 2). The UTwist version of the Nobilis basket showed an approximate 10% higher reduction in stickies at the same throughput and energy consumption.

WHY NOT HAVE AN ADAPTABLE WIRE?

In a traditional basket design, with a given slot width, the manufacturer must accommodate the compromise between screening efficiency and capacity with a profile height that is uniform from the top to the bottom of the basket. Prioritizing runnability when selecting the profile (i.e., no critical thickening, no plugging and no

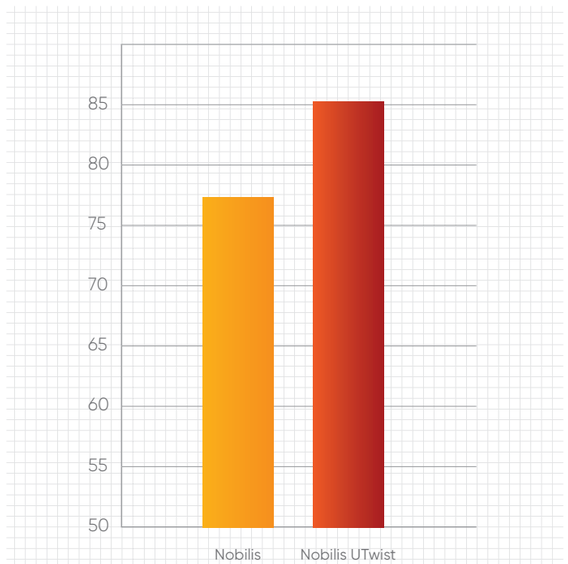


Figure 2: Pilot Plant Results

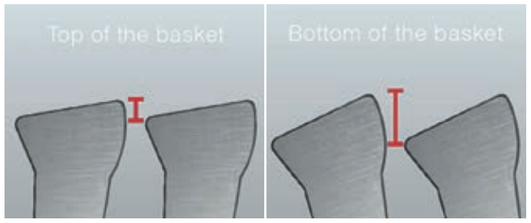


Figure 3: Different profile heights in different sections of the basket

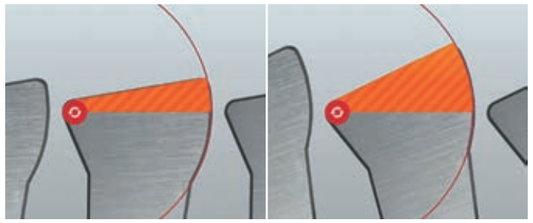


Figure 4: Tilting of UTwist wire

unexpected shutdowns) ensures that optimum screening efficiency is never achieved. This is why the ability to tailor the profile height along the length of the wire – from feed to rejects – is so desirable.

Basket suppliers often need to specify a higher profile to create enough turbulence to avoid critical thickening, which can reduce screening efficiency. Therefore, the chosen profile height is not optimum for every position of the basket – meaning that the full potential of the basket is not achieved.

ANDRITZ has solved this problem by developing UTwist, an adaptable-profile wire which ensures the lowest possible profile height at any vertical position of the basket. The ability to adjust the profile height across the basket is unique, enabling low profiles close to the feeding zone to increase screening efficiency, and a higher profile in the following zone to avoid critical thickening.

The patented profile geometry enables tilting the wire without impacting slot width. This is not possible with any other profile wire.

RESULTS FROM THE MILL

Based upon the successful pilot plant trial, the UTwist concept was introduced to the first customers.

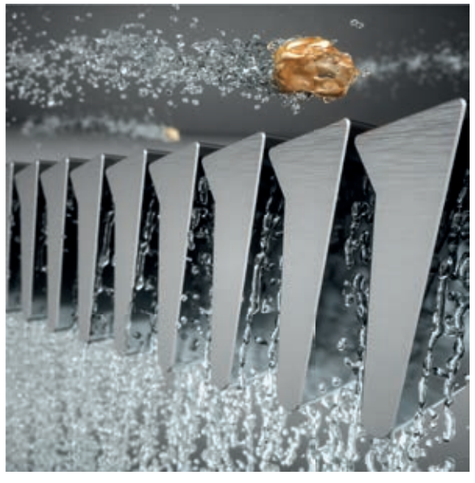
OCC FINE SCREENING

A mill in Central Europe using OCC furnish for the production of packaging paper wished to improve the accept quality. A side-by-side comparison test was done in the first stage fine screens (ANDRITZ F60) in line 1 and line 2.

The rotors in both screens were identical (RO-TEC LRsR with a tip speed of 20.6 m/s):

- Line 1: Bar-Tec Valeo, slot width 0.15 mm; PG wire with 0.9 mm profile height
- Line 2: Bar-Tec Valeo UTwist, slot width 0.15 mm; PGR wire with a profile height of 0.7 mm (top) to 0.9 mm (bottom)

Figures 5, 6, and 7 show the results.



IMPROVEMENTS ACROSS THE PROCESS

The efficiency and effectiveness of the screening process relies to a great extent on the performance of the screen basket. The development of the UTwist basket, a key and patented technology from ANDRITZ, allows improving the operation of virtually any screening system, regardless of the original manufacturer. With this basket design, the wire profile can be adjusted to account for variations in stock thickening as it flows from the feed end of the screen to the reject end.

The design allows setting the wire profile height low enough to ensure good accept quality by capturing rejects, and yet high enough to maintain throughput without plugging, ensuring high runnability. This feature has been tested and verified at ANDRITZ's pilot plant and is now installed in approximately 60 mill applications.

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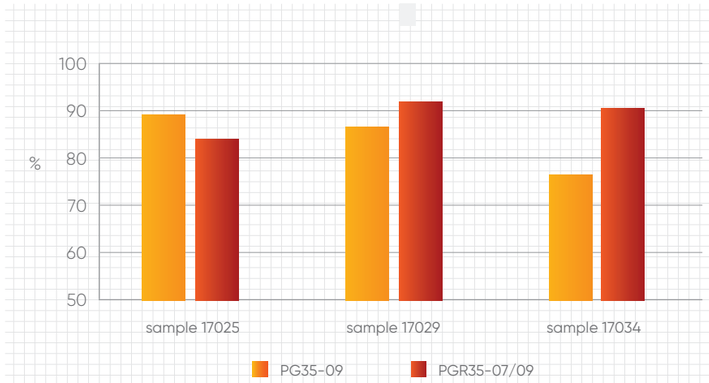
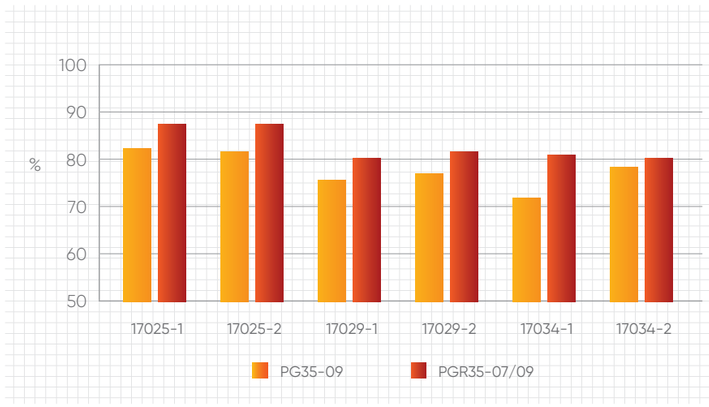


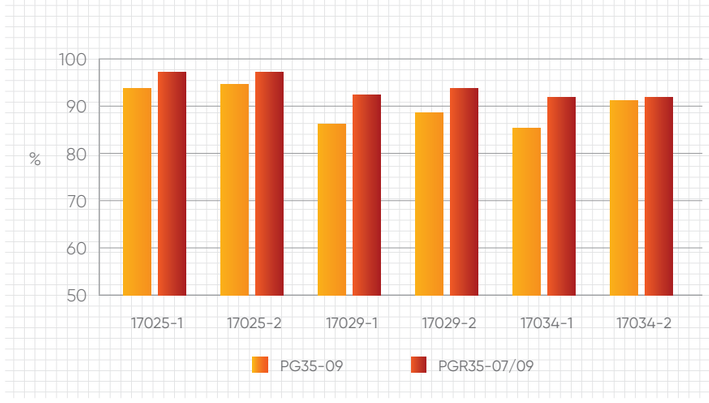
REDUCTION OF IMPURITIES
(# 0.15 slot plate)

Figure 5: Reduction of impurities (measured with 0.15 mm slot plate). Average with a standard basket 84%, with UTwist 89%



STICKY REDUCTION
[%No./kg]

Figure 6: Sticky (no's/kg) reduction. Average with a standard basket 77%, with UTwist 83%



STICKY REDUCTION
[%mm²/kg]

Figure 7: Sticky (mm²/kg) reduction. Average with a standard basket 90%, with UTwist 94%