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- AGL Loy Yang's new conveyors
- In discussion with Nepean's Miles Fuller
- Q&A with stockyard automation guru
- TUNRA on DEM's evolution
- New column: Ask an engineer

US plant cuts maintenance with switch to pneumatic deflection elbows

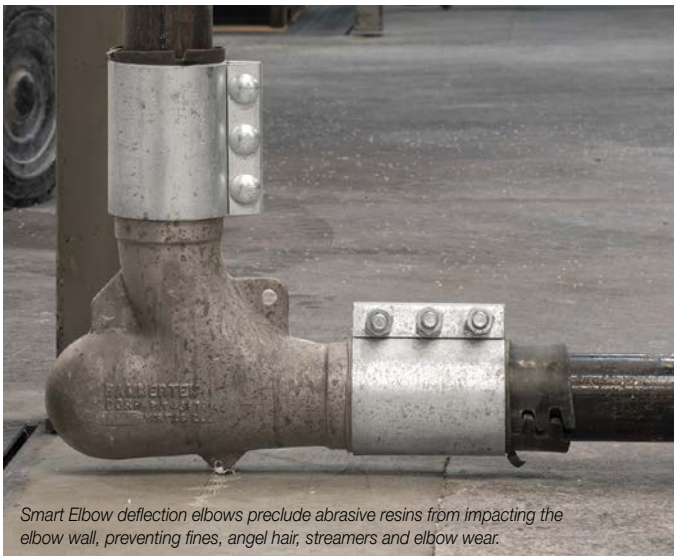
At The Plastics Group of America, pneumatic conveying of reinforced Polifil polypropylene compounds caused 90 degree sweep elbows to fail monthly, a problem the company solved by installing Smart Elbow deflection elbows from HammerTek, a Flexicon company.

Ed Joanis, maintenance director at the Rhode Island company, says the company's proprietary resins, reinforced with up to 40% glass fibre and minerals such as calcium carbonate and talc, were wearing away the elbows, whose 90 degree angles created impact points for the pellets traveling through the lines.

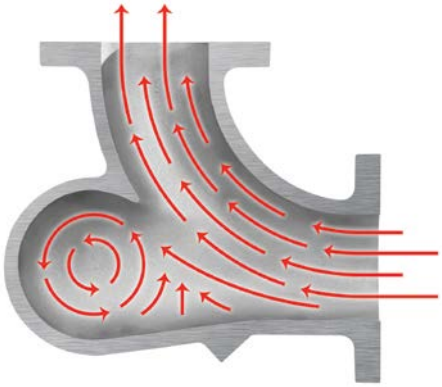
"The impact of the abrasive resins hitting the inside walls of the elbows at high speed not only created fines, but heated the elbows, causing pellet surfaces to melt and form angel hair and streamers, creating quality issues downstream in our compounds," he explains.

It was costing the company one hour of downtime to replace each of the six elbows, along with labour costs. The price of buying 72 or more elbows a year, moreover, ran well into the tens of thousands of dollars.

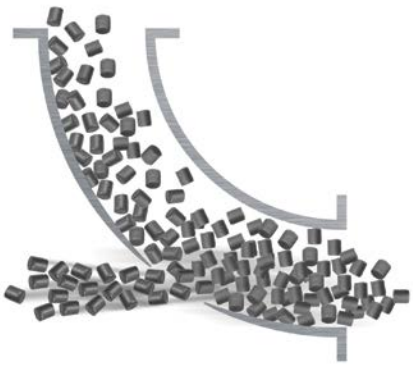
To avert these problems, the company replaced six 90 degree sweep elbows with the deflection elbows — two per line.



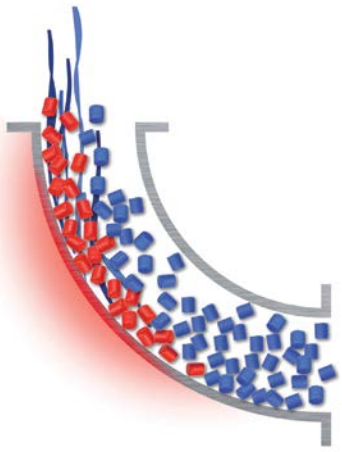
Smart Elbow deflection elbows preclude abrasive resins from impacting the elbow wall, preventing fines, angel hair, streamers and elbow wear.



The vortex chamber of the HammerTek deflection elbow protrudes partially beyond the 90-degree flow path, causing a sphere of material-in-air to rotate in the same direction as the air stream that powers it, gently deflecting incoming material around the bend without impacting the elbow wall.



Conventional sweep elbows can blow out as a wear point develops from abrasive materials impacting the elbow wall.



Plastic pellets skidding against the outside radius of conventional sweep elbows create friction and heat that can melt pellet surfaces, forming streamers and angel hair.

Deflection elbows cushion pellets around bends

The Smart Elbow design incorporates a spherical vortex chamber that extends partially beyond the 90 degree flow path, causing a ball of pellets to rotate in the same direction as the air stream, gently deflecting incoming pellets around the bend.

In addition to preventing pellets from impacting the elbow wall, the vortex chamber causes the material to exit the elbow evenly and return rapidly to a laminar, steady-state flow within the conveying line. The airstream sweeps the vortex chamber clean after the material feed is shut off.

"None of the deflection elbows has needed replacing after being installed in May 2013 eliminating the cost of replacements, labour and downtime," says Joanis, adding, "The gentle deflection action also reduces the formation of fines, dust and angel hair, improving the quality of our compounds and finished products.

"Maintaining structurally sound elbows also minimises potential injury due to blowouts and material spills."

Installing deflection elbows

The Smart Elbow replacements are cast of ductile iron and measure 46 x 46 cm x 7.6 cm in diameter. The elbows cost more than the sweep versions they replace, Joanis acknowledges, but yield a rapid return on investment due to long life and reliable performance.

The Plastics Group conveys about 1,497 kg per hour of reinforced resin through two of the lines during

The Plastics Group replaced conventional sweep elbows with HammerTek deflection elbows, none of which has needed replacing. By preventing material impact with the elbow wall, the company has prevented elbow wear, the generation of fines and the frictional heat that previously caused the formation of angel hair and streamers.

Abrasive reinforced polypropylene resins caused wear and failure of traditional long-sweep pneumatic elbows. Impact of material against the elbow wall also created fines and frictional heat that partially melted the resin.

compounding operations, and 544 to 680 kg per hour through the third line. These resins and others (including reprocessed materials) used in the company's Polifil compounds end up in a range of consumer and industrial products.

The compounder began operations in 1973 in a small plant. It now processes materials in a 23,225 sq m facility, and plans to add another material conveying line that will also be equipped with Smart Elbow deflection elbows.

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The Plastics Group conveys approximately 1,497 kg per hour of reinforced resins through two pneumatic lines, and between 544 to 680 kg per hour through a third line.

Technology monitors motors and drives

Bearings specialist, Schaeffler, is introducing to Australia and New Zealand condition monitoring and predictive maintenance technologies that use advanced digital services to look into the future of motors and drives.

Schaeffler says its Drive Train 4.0 – part of a broader suite of digitally integrated products – expands conventional condition monitoring approaches by linking diverse digital information sources into a single platform.

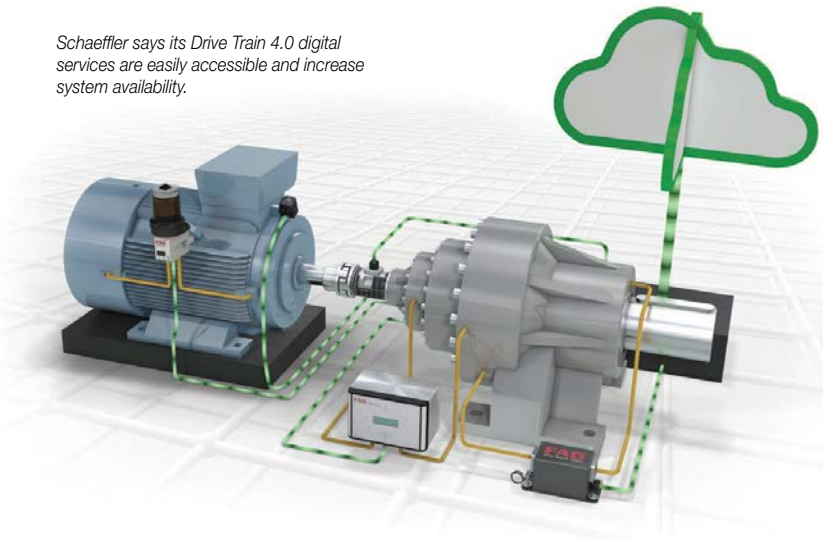
"Schaeffler's Drive Train 4.0 links existing technology with new digital services to take a big step further into the digitalised production and machine monitoring of the future," says Mark Ciechanowicz, industrial services manager, Schaeffler Australia.

Drive Train 4.0's latest innovations include two newly-developed micro services which focus on optimum machine capacity, longer machine operating times, data-based predictive maintenance, and reduced overall operating costs, says Ciechanowicz.

The new micro services include the calculation of rolling bearings' nominal remaining useful life during operation based on real load spectra, and automated rolling bearing diagnostics with the FAG SmartCheck vibration analysis system.

Both services connect to the Schaeffler cloud, where the corresponding big data and software solutions are implemented. Software installations on the end devices of customers are not required; an internet browser and a network connection are sufficient.

Schaeffler says its Drive Train 4.0 digital services are easily accessible and increase system availability.



Drive Train 4.0 is part of the Schaeffler Smart EcoSystem, which is attuned to the digital revolution and the linking of components and systems that increase the efficiency of machines and equipment.

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