



*TECHNICAL ARTICLE SERIES*

HH-0743

## Foundry Resists Pneumatic Line Abrasion with Deflection Elbows



**HAMMERTEK®**

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# Foundry Resists Pneumatic Line Abrasion with Deflection Elbows

WAUPACA, WI — Waupaca Foundry, a Hitachi Metals company, casts automotive, semi-truck, home-heating and agricultural parts of gray iron, ductile iron, austempered ductile iron and compacted-graphite iron in seven plants.

At plants 2 and 3, a shared cupola furnace melts 120 tons (109 tonnes) of iron per hour. To maintain that pace, several pneumatic conveying systems are routed throughout the 665,850 sq ft (61,860 sq m) facility.

"We use pneumatic conveying systems to move metallic additives into ladles, and transport sand and sand additives to our core rooms," says Mike Hemmila, assistant plant manager. "We also use pneumatic conveying to transport metallic waste and waste sand back into the silos, and we use it in our dust collection systems." The pipelines are 2 or 4 in. (50 or 100 mm) in diameter and 30 to 300 ft (9 to 90 m) long.

With a near-constant stream of abrasives moving through the lines at high speed, wear is a major design and maintenance consideration. Line integrity is especially critical at the bends, where a change in direction can cause the material to impact and wear-through elbow walls resulting in blowouts.

## Extending the service life of pneumatic system elbows

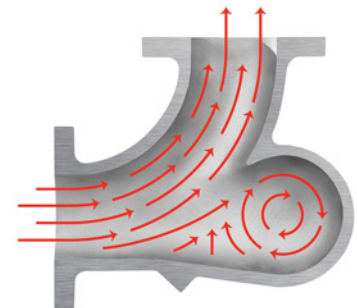
To extend the service life of the pipeline bends and minimize downtime, Waupaca deploys deflection elbows from HammerTek Corp., Bethlehem, PA. The company's Smart Elbow® design features a spherical vortex chamber protruding from the elbow. When material passes into the elbow, part of the flow is automatically diverted into the vortex chamber, where it forms a loosely packed mass that slowly rotates in the direction of flow. This gently deflects incoming particles around the bend.

"We've found applications where the HammerTek elbow works really well and is the better solution (over other types of short-radius bends and 90-degree sweeps)", Hemmila says. "For the system I designed for moving waste sand, I put in the HammerTek deflection elbows because they worked really well with that particular material." Hemmila also noted that this system has provided reliable service since 2004.

The Smart Elbows are also suited to applications at Waupaca in which materials are diverted downward into silos and bins. "Dead-end stops are a good application for them as the material absorbs the impact as direction changes."

Dale Harris, maintenance foreman at Plant 2/3, says, "We have some HammerTek 45° elbows that can last two years."

Replacing a Smart Elbow bend is simple, Harris says, being a matter of changing eight bolts, with most jobs taking several minutes. If the leak occurs in a very high area or is otherwise difficult to access, it might take an hour to replace because of the time needed to round up a lift, hoist and other equipment.



*A spherical vortex chamber protruding from the elbow diverts part of the flow where it forms a loosely packed mass that slowly rotates in the direction of flow, gently deflecting particles around the bend.*

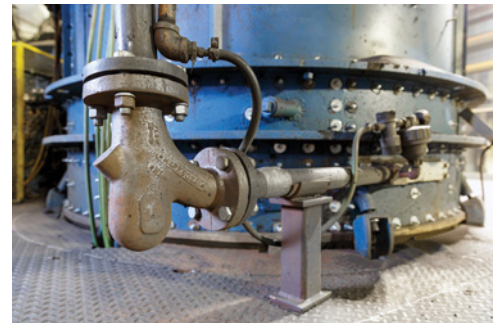


Whatever the application, the goal is to minimize downtime, and Hemmila says that his company will always opt for the bend that lasts the longest. "If we can find something that is going to last longer and save us the trouble of changing it out, we will choose that product without even thinking about it." In many cases, that means a HammerTek Smart Elbow® deflection elbow.

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*Waupaca Foundry deploys Smart Elbow® deflection elbows to avoid leaks, blowouts and downtime from wear by abrasive materials speeding through the pneumatic lines.*



*Among several applications, short radius deflection elbows at Waupaca Foundry find use at dead-end stops where materials are diverted downward into silos and bins.*





*A near-constant high velocity stream of abrasives, such as metallic additives and sand, make wear of pneumatic lines a concern.*