Solvay Advanced Polymers, L.L.C.

Augusta, Georgia

Reduced conveyance system blowouts — significantly decreasing labor, parts, and lost-product costs.

The Challenge

When Solvay Advanced Polymers began plastics compounding operations in its Augusta, Georgia facility 16 years ago, they faced unexpected conveyance line failures caused by severe abrasion and erosion. The plant experienced multiple elbow and pipeline blowouts throughout their dilute phase pneumatic conveyance system less than two weeks after their first compounding line began.

The facility extrudes, pelletizes, and packages polymers for advanced industrial applications. The most abrasive products that the plant produces are AMODEL polyphthalamide pellets, which are composed of up to 50% glass. The high-velocity pellets are conveyed through hundreds of feet of equipment, wearing through line piping and causing severe pipe and elbow blowouts. The abrasive pellets travel up to 5,000 FPM through piping straight sections and around elbows, which are particularly susceptible to blowouts.

Undetected blowouts plagued the conveyance system, costing the plant more than $200,000 annually in lost product, with each hour of undetected blowout costing $4,000. The plant spent an additional $60,000 a year on labor to repair the daily equipment blowouts. Eventually, the blowouts began to create significant yield reductions, affect process distributions, and cause safety and housekeeping issues.

> *"Kennametal was the only walk-away-from solution."*
>
> **— Ken Bowles,**
> Compounding Equipment Asset Coordinator,
> Solvay Advanced Polymers

Elbow and pipeline blowouts were common before Solvay installed Kennametal conveyance components.

Alternative Methods Tested

Shortly after the plant began experiencing piping blowouts, Ken Bowles, compounding equipment asset coordinator at Solvay, began searching for a permanent solution. Bowles tested numerous fixes with unsatisfactory results.

Standard Type 304/316 short radius stainless steel pipes had a service life from 7 to 21 days in low pressure (4 psi) conveying service. The plant experimented with long radius bend elbows, pocket back deflection elbows, ceramic lined elbows, glass and glass-lined elbows, and chrome coatings with tungsten carbide flame spray. They also considered altering the system to accommodate a dense phase product pneumatic conveying system or spiral conveyors with vibratory feeders.

Each method produced unacceptable outcomes, including excessive pellet degradation and undetectable product contamination. Some approaches used elbows that required removal and cleaning between product and color changes. These methods were not feasible because of the large number of elbows installed throughout the system.

Cyclone clad with Kennametal infiltration brazed tungsten carbide wear protection.

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The Result

The Solvay plant had used the popular WPR-29 cladding from Kennnametal to prevent severe wear on their extruder barrels for several years. Bowles contacted Kennametal, hoping they could offer an equally successful solution to Solvay's conveyance system wear problems. In 1995, Bowles installed his first Kennametal conveyance components — short radius 45° and 90° elbows — on his dilute phase 4, 6, and 8" conveyance lines.

The elbows performed well, and Bowles quickly realized that he had found a permanent wear solution. He gradually began cladding additional conveyance system components.

First, Bowles installed clad pneumatic conveying lines, which experienced the most aggressive wear. Then, he moved on to attacking less aggressive wear issues. The original Kennametal elbows lasted from two to three years, and some are still in operation after nine years of service.

Solvay paints Kennametal components yellow to distinguish them from unprotected piping.

In 1997, Bowles installed 30" downstream clad pipe sections after elbows and turns. He installed clad diverter valves in 2001. Next, he installed clad extruder transition chutes and pelletizer strand guides. Clad cyclones were installed in 2002. In 2003, he added clad pipe sections to the gravity systems and began rotating straight sections 90° to increase wear life. Today, he continues to install additional clad parts and keeps spare field repair components on hand. According to Bowles, "Kennametal was the only walk-away-from solution." He now exclusively uses Kennametal cladding on all new equipment.

Bowles is particularly pleased with the active role that Kennametal engineers take in his projects. "We've faced a few challenges over the past nine years," says Bowles, "but Kennametal took joint ownership of the projects and we worked together to solve them. They want to understand our wear problems and are accountable. This has made all of the difference."

Mike Clark and Stan Branham spent most of their time weld repairing pipeline blowouts before Kennametal.

Bowles admits that, at first, it was a challenge to convince top management to invest in the cladding. He collected data demonstrating labor, parts, and lost-product savings resulting from the significant reduction in blowouts. The company quickly realized that the up-front cladding expenditures would eventually reduce expenses. Now, Bowles specifies Kennametal cladding as a standard on all new projects. The plant recoups the cladding expense in four to five months through yield improvements and reductions in product loss.

Solvay's Mike Clark and Stan Branham used to spend their time making daily weld repairs on elbow and piping blowouts throughout the plant. Today, they concentrate on proactive projects instead of reacting to unexpected blowouts. Branham says, "Every time an unprotected pipe blows, we replace it with one from Kennametal. We paint all of the Kennametal parts yellow. One day, we'd like to paint the whole line yellow."

Kennametal is a leading provider of severe wear solutions for industrial applications involving extreme abrasion, corrosion, and erosion. Kennametal components are effective in high wear environments where equipment failures are persistent problems.

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Kennametal Technology

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Our proprietary infiltration-brazed tungsten carbide cladding is metallurgically bonded to component surfaces. The Kennametal cloth delivery system enables densely packed tungsten carbide to be uniformly applied to complex geometries, providing a protective layer that wears at a uniform and predictable rate. The result is a durable cladding that is extremely abrasion- and corrosion-resistant.

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