

Turning your partner into a Smooth Operator

Alliance program improves seal life nearly fivefold at Louisiana chemical plant

Rubicon Inc.'s Geismar, La. facility is a large chemical plant jointly owned by Huntsman International LLC and Uniroyal Chemical Co. The plant makes isocyanates—used in producing foam products for furniture and insulation—as well as other chemicals. The 75-acre facility is divided into seven operating areas, each containing several operating units. Altogether, the plant has 650 to 700 pieces of sealed equipment.

Three years ago, Rubicon's management recognized that frequent seal replacements had become a costly problem. Mean-time-between-replacement (MTBR) was running less than six months, and according to Flowserve Sales Engineer Michael Reagan, some seals were being replaced almost weekly.

The landscape

Part of the problem, Reagan says, lay in the nature of Rubicon's business. Chemical plants process a wide variety of materials under a wide range of conditions. No two plants are alike. "There are so many different types of applications, different chemicals and unknowns, that a lot of times, the people at the plant may not even know what they've got." A second factor, he says, is that chemical plants tend to use ANSI (American National Standards Institute) pumps, rather than the more rugged API (American Petroleum Institute) pumps Flowserve finds among its refinery customers.

ANSI pumps, Reagan explains, use smaller bearings and bearing housings, and have thinner casings than API pumps. They're a lot less expensive, however, and most of the time, they get the job done. "But at this plant—and at others—you do come across some hotter applications," he says. Lighter construction makes ANSI

pumps more prone to failure, but the cost of replacing them with heavier-duty equipment is prohibitive and, in most cases, it's overkill.

The big picture

Rubicon needed a seal vendor that would do more than simply supply it with replacements. "We wanted to get our seal failures under control," says Rubicon Maintenance Engineer John Kennedy. "We brought in all the seal manufacturers in our area. We went through their shops and did audits. Upper management made the decision to go with the service program offered by Flowserve."

The chemicals maker signed a five-year Alliance agreement with Flowserve, one that bound the seal manufacturer to

increase MTBR from 5.1 months at its onset in January 1998 to 24 months by the end of the contract period. The agreement covers two of Rubicon's operating areas, and the company pays a fixed fee for the parts and services Flowserve provides.

Reagan began surveying the plant three or four months before the contract went into effect to identify bad actors and estimate initial seal inventories. "We had a game plan for most everything in our area of the plant," he says. The bad actors were easy to identify and fairly easy to fix, and that yielded some impressive early results. "A lot of it was just the wrong seal, wrong materials and the wrong seal piping plans. We were able to solve those problems quickly and show some immediate improvements."

From square one

When the Alliance program with Rubicon began, there wasn't a single Flowserve seal in the plant. As seals failed, however, Flowserve replaced competitors' products with upgraded Flowserve products. The upgrades also contributed significantly to the lower failure rate.

Flowserve maintains a seal inventory worth \$55,000 to \$85,000 at the Rubicon plant. Although the seal maker owns the inventory until it's put into service, the cost of items used is included in its fee. Rubicon, however, handles inventory management. "It's treated like a regular stock item," Reagan says. "There are order points and minimums, and whenever they need something, they issue a purchase order—but there's no money attached to it because it's a fixed-cost deal. That way, Flowserve remains out of the inventory management business and is able to focus primarily on its reliability improvement process. All seal requirements use

Rubicon's normal process and systems are treated like ordinary inventory items, making this process transparent in nature."

Of course, it's in Flowserve's interest—and ultimately in Rubicon's—to keep inventories lean. Before the agreement took effect, Rubicon kept its own stock of seals and repair parts, and inventories were significantly larger than they are now. Thanks to more careful control, fewer failures and some standardization, Flowserve has been able to reduce inventory, which helps keep costs—and prices—in check. To the extent that he can, Reagan has standardized on cartridge seals. Occasionally that means using products that are beefier and costlier than the application warrants, but the inventory savings make it a good tradeoff.

Continuing education

A key element in improving seal performance at Rubicon has been operator training. Without it, operators "can definitely tear up more equipment in a day than you can fix," Kennedy says. The operators "had no idea what seals were," adds Reagan. "Not only did the training teach them how seals work and how easy it is to screw them up, but it also showed them that we were really interested in helping them do their jobs more easily, and so they took a genuine interest. Training was one of the most important things we did at Rubicon."

"Basically, I'm trying to get the operators to operate the pumps correctly, operate and maintain the seals and support systems correctly, and spot plugged flush lines and fix them," says Reagan. "A lot of them do it. Some of them don't. It's just a matter of making them aware of it, and it takes a lot of daily coaching."

The original training sessions, held after hours at the Rubicon site, took place nearly two years ago, and Reagan reckons it's probably time to repeat it. "They've had some turnover and some new people came in," he says. "Training is an ongoing thing. You can't just do it once and forget about it."

Effective leadership

Another key element in improving seal performance was the commitment by Rubicon's maintenance management team toward this program. Three years ago, Rubicon maintenance practices were very much reactive in nature. There were so many failures that few people had the time or took the time to properly perform a root cause failure analysis and enact corrective action solutions. It wasn't until management at Rubicon realized that something had to change, and their support and focus on correcting problems rather than simply replacing seals was ultimately the foundation for success and improvements. Like any successful problem resolution, a problem must be recognized before it can be solved. And certainly Rubicon's management team sup-

ported this mentality by not only allowing upgrades and changes to seal designs, seal piping plans and pumping systems, but encouraging millwrights, operators, and other craftsmen to become involved in the process and suggest fixing whatever may have been wrong at the pump site. This interactivity and renewed focus by plant personnel on improving reliability and the continuous support and encouragement of management are key components of the successful formula thus far at Rubicon.

"The existence of the Alliance established a competitive air in the plant among the five maintenance areas. We've improved our specifications on pump baseplates, we've improved our vibration monitoring. The Alliance enhances our continuous improvement program," said Greg Mancina, area Maintenance Engineer at the plant.

In the early days of the Alliance, Reagan was at the Rubicon plant daily. Over time, as seal problems were brought under control, he's scaled that back a bit, but Kennedy credits his presence at the plant, and his expertise, for much of the performance improvement. "Mike does an excellent job of going out to the unit and surveying the seal systems, the flush pipes, pressures, temperatures—he monitors all those for us," Kennedy says.

Getting close

In some of Rubicon's units, Flowserve reached the 24-month MTBR goal very quickly, says Kennedy. In others, progress has been slower. A little more than three years into the contract, overall, MTBR was around 23 months this past March and April. Reagan is confident they will reach the 24-month goal before the end of summer, and eventually exceed it. "We're close," he says, "real close."

"The Alliance has raised the capability of the workforce to a higher plane. We want to be recognized as a place that is the best. Flowserve has reached some lofty levels (of performance) and there is no telling where it will level off," Mancina added.

The ANSI pumps could eventually limit improvements, however. "If you get the right seal and install it and maintain it correctly, it lasts as long as the bearings last," says Reagan. "That's really becoming the limiting factor at this plant. We see more and more bearing failures because we're getting some seals to last as long as the bearings."

The current Alliance agreement, Kennedy says, is a trial. If all continues to go well, Flowserve will stay at Rubicon and possibly expand into other areas. A lot of things are in place that will cause seal life to continue to improve as time goes on, explained Reagan. Maintaining the program and continually looking for ways to make improvements is a never-ending process. ●