

# Maintaining Control Of Costs

TO ENSURE THE HIGHEST LEVEL OF PRODUCTION, SELECT PUMPING TECHNOLOGIES THAT WILL REDUCE MAINTENANCE COSTS WHILE INCREASING UPTIME

By Tom Stone



## The Challenge

Writing recently on the MaintenanceWorld.com Web site, John Piotrowski, author of the seminal industry resource, “Shaft Alignment Handbook,” and Founder and President of Turvac, Inc., Oregonia, OH, USA, opined that “keeping pumps operating successfully for long periods of time requires careful pump selection, proper installation, careful operation, the ability to observe changes in performance over time and, in the event of a failure, the capacity to thoroughly investigate the cause of the failure and take measures to prevent the problem from re-occurring.”

Citing the thoughts of a maintenance supervisor at a pharmaceutical company, Piotrowski noted that “when a failure occurs on a piece of machinery, it should be treated as a police crime scene where corrective action is not initiated until all the evidence is gathered by the crime-lab personnel to find the primary source of the malady.” The point is that until the conditions that caused the failure are identified and corrected, the failure will occur again and again.

This introduces the role of maintenance into the equation. Piotrowski explains that there are four basic maintenance philosophies, or styles:

- **Breakdown or Run-to-Failure Maintenance** — This philosophy allows the machinery to run to failure and only repair or replace damaged equipment when obvious problems occur.
- **Preventive or Time-Based Maintenance** — This philosophy consists of scheduling maintenance activities at predetermined time intervals where equipment is either repaired or replaced before obvious problems occur.
- **Predictive or Condition-Based Maintenance** — This philosophy involves scheduling maintenance activities only if mechanical or operational conditions warrant by periodically monitoring the machinery for excessive vibration, temperature, lubrication degradation or by observing any other unhealthy trends.

### ■ Pro-Active of Prevention Maintenance —

This philosophy utilizes all of the predictive/preventive maintenance techniques combined with root-cause failure analysis to detect and pinpoint precise problems that occur. In addition, advanced installation and repair techniques also are performed, including potential equipment redesign or modification to avoid or eliminate future problems.

Much like Piotrowski, the U.S. Department of Energy's Energy Efficiency and Renewable Energy (EERE) program's plan for pump maintenance says that most pump-maintenance activities should rely on a proactive program that centers on "checking packing and mechanical seals for leakage, performing preventive or predictive maintenance on bearings, assuring proper alignments, and validating proper motor condition and function." EERE also points out that any pumps that require excessive maintenance are probably guilty of one of the following conditions: oversizing that requires heavy throttling; cavitation; extreme wear; or misapplication with regards to the required parameters of the application.

Taking all of this into account, the third installment of the Pump Solutions Group's (PSG™) "Production Stimulus Guide" series of white papers—with a theme of "Maintaining Control Of Costs"—PSG will offer specific examples of how the pumping technologies offered by its operating companies can help reign in and control maintenance costs.

## The Solution

PSG's six companies are industry leaders in the design and manufacture of many types of pumping technologies—from air-operated double-diaphragm (AODD) pumps to sliding-vane pumps, eccentric disc pumps to centrifugal pumps, and air-operated plastic diaphragm pumps with solid housings. In addition to a wide array of operational efficiencies, these pumping technologies have been designed to have a major positive impact on maintenance activities.

Knowing the harsh conditions under which the pumps may operate and the stresses to which they may be subjected, the design engineers at PSG's operating companies are encouraged to develop pumps that take future maintenance concerns into account before the pumps complete their first revolution or pump their first gallon. This designed-in attention to maintenance makes these pumps "Reliable By Design," with all wear parts—including bearings, seals and shafts—created with minimal maintenance in mind.

For instance:

- **Sliding-Vane Technology** — Invented by Robert Blackmer in 1899 as an alternative to the gear-pump technology that was prevalent at the time, sliding-vane technology not only offers more efficient, reliable operation, but also ease of maintenance. Blackmer®, Grand Rapids, MI, sliding-vane pumps are designed with vanes that move into or out of slots in the pump rotor, meaning that required flow rates are constantly maintained. When the vanes eventually wear, maintenance is easy as they can be replaced without removing the pump from the piping system.
- **Air-Operated Double-Diaphragm Technology** — Invented by PSG's Wilden® Pump & Engineering LLC, Grand Terrace, CA, AODD pumps operate by displacing fluid from one of their two liquid chambers upon each stroke completion. Since there are few wetted parts in an AODD pump, general maintenance is easily and efficiently performed. (Routine maintenance checks generally focus on the air valve piston/spool casing, the actual diaphragms and the balls/seats/O-rings.)
- **Eccentric Disc Technology** — Developed in France and offered by Mouvex®, C-Series eccentric disc pumps have been designed with special radial and axial self-adjusting design features that make them perfect for use as metering pumps. The pumps come standard with clean-in-place (CIP) or sanitize-in-place (SIP) technology. The CIP/SIP design does not require a bypass valve or special mechanical seal, meaning that these pumps do not need to be bypassed to clean in place. This ensures that the pump does not need to be taken out of service for an extended period of time while it is being cleaned or flushed.
- **Pneumatic Diaphragm Technology** — Perfected by Almatec®, Kamp-Lintfort, Germany, pneumatic diaphragm pumping technology is used in a wide range of markets. The technology has provided solutions to a large variety of challenges in applications throughout the world. One of Almatec's latest products, the E-Series line of air-operated plastic diaphragm pumps, is designed with optimized flow patterns and an innovative ring tightening structure in the pump housing which result in significantly reduced maintenance issues.

*Continued on page 4*



Tim Kreitz, Mechanical Production Engineer for Rock-Tenn, kneeling next to the Mouvex® C-Series eccentric disc pump that has been maintenance-free for years.

## Production Stimulus Case Study:

*Rock-Tenn Company  
Norcross, GA*

To some, the definition of insanity is doing the same thing over and over but expecting a different result. For Tim Kreitz, the Mechanical Production Engineer at the Norcross, GA-based Rock-Tenn Company's St. Paul Mill Recycling Center in St. Paul, MN, the amount of money he was spending to constantly repair an ill-running lobe pump was becoming insane.

"It was an older pump and the seals would start to leak, then the pump would start to go," explained Kreitz. "It would cost us \$3,500 to rebuild it each time, and it would go out every couple of weeks sometimes."

Knowing that this was a maintenance habit that the company could no longer support, Kreitz went in search of a reliable replacement for the pump, whose sole task was to incorporate a starch-based compound into the recycling process by moving it from a five-foot-by-five-foot tank through a series of pipes. Working with his distributor,

Power Process Equipment, Chanhassen, MN, Kreitz found the perfect solution to his dilemma in a C-Series C8I Model eccentric disc pump from Mouvex®.

The C-Series fit the bill because it met the parameters of Rock-Tenn's recycling application, which includes continuous-duty operation at flow rates of 20 U.S. gpm, temperatures up to 160°F and differential pressures of as much as 40 psi. The pump is able to meet these operating conditions because of its stainless-steel construction, Viton® O-rings and elastomers, 2-inch port openings and speeds up to 394 rpm. Also, its clean-in-place (CIP) capability eases routine maintenance concerns—though the pump has yet to need any maintenance, even though it was installed back in 2006.



In 2006, Tim Kreitz decided to replace the problematic lobe pump with a Mouvex® C-Series eccentric disc pump. The pump pictured here was originally purchased as a back-up to the one that was installed in March 2006. This "back-up" pump has never been used due to the superior performance of the C-Series.

"It paid for itself in the first two months after we installed it," Kreitz said. "It's been in there for so long now, and it's never been touched, that I can't even remember when I installed it. I put it in and forgot about it."

For the entire case study, please go to [www.mouvex.com](http://www.mouvex.com)

The Mouvex case study appeared in the February 2009 issue of Pumps & Systems magazine. To view the article, go to: (<http://www.pump-zone.com/pumps/pumps/eccentric-disc-pump-roi.html>)

Continued from page 2

■ **Hydraulic Diaphragm Metering Technology**— Offered by Neptune™, Lansdale, PA, hydraulic diaphragm metering pumping technology is typically used for chemical metering in process and agricultural industries. A key maintenance element in Neptune's metering pumps is its EZE-CLEAN™ valves whereby the cartridges can be removed for cleaning without disturbing the piping.

## Conclusion

Setting up a pumping system in a manufacturing or liquid-storage facility is an exacting, time-consuming process. Many variables must be taken into consideration when designing the arrangement, and only when a large number of parameters are met, can the actual equipment be selected and installed. After all that work, facility managers and operators do not want to be troubled by a series of constant maintenance problems, problems that are not only irritating, but also have a deleterious affect on the bottom line.

The pumping technologies developed and perfected by the companies of the Pump Solutions Group have been designed to not only offer the operational efficiencies that manufacturers demand and desire, but to also do it in a fashion that requires the least amount of maintenance. With pressures to get budgets and expenses in check, savvy manufacturers are taking potential maintenance costs into account when designing their facilities. Oftentimes, this means turning to the companies of PSG for the technologies that not only provide the flow rates for which they are looking, but also the operational reliability and—when necessary—ease of maintenance that keep their facilities humming along at targeted capacity.

*Tom Stone is the Director of Marketing for Blackmer® an operating company within the Pump Solutions Group (PSG™), Redlands, CA. He can be reached at stone@blackmer.com. PSG is comprised of six leading pump companies—Wilden®, Blackmer®, Griswold™, Neptune™, Almatec® and Mouvex®.*

*You can find more information on PSG at [www.pumpspsg.com](http://www.pumpspsg.com).*



[www.pumpspsg.com](http://www.pumpspsg.com)



[www.blackmer.com](http://www.blackmer.com)



[www.wildenpump.com](http://www.wildenpump.com)



[www.neptune1.com](http://www.neptune1.com)



[www.mouvex.com](http://www.mouvex.com)



[www.almatec.de](http://www.almatec.de)



[www.griswoldpump.com](http://www.griswoldpump.com)

**World Headquarters**  
Pump Solutions Group (PSG™)  
1461 Ford Street, Suite 205  
Redlands, CA 92313-5607 USA