

Pump & Automation Technology Convergence

Crossroads to innovation and profitability. . .



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In industrial plants, centrifugal pumps are rarely considered as an integral component of the process control architecture. Other than graphical screens to change the on/off status of the pump, there is little — if any — real-time information on pump or motor performance. Historically, the fundamental building blocks of process automation have been process sensors and control valves, with little consideration given to the role of pumps. Still, one of the easiest and often overlooked ways to make a dramatic impact on process performance is through pump efficiency.

BIGGER IS NOT ALWAYS BETTER

Overall plant operation has always been tied to the proper selection, sizing, installation and maintenance of pumping systems. Standard industrial practice has been to oversize the pump to ensure adequate supply during peak demand periods. That practice was acceptable in the past when manufacturers had standing orders for their products. Today, however, it's a different story. Globalization of markets has resulted in most industry sectors having more supply than demand. Now that the table has turned, oversized pumps should be viewed differently

In 1996, a Finnish Technical Research Center report entitled "Expert Systems for Diagnosis and Performance of Centrifugal Pumps" revealed that the average pumping efficiency, across the 20 plants and 1,690 pumps studied, was less than 40%, with 10% of pumps operating below 10%. Pump over-sizing and throttled valves were identified as the two major contributors to this

sizeable efficiency loss. Besides hindering overall plant efficiency, poor pump performance can result in lower product quality, lost production time, collateral damage to equipment and inordinate maintenance costs.

THINKING OUTSIDE THE FLANGE

Pump manufacturers have made substantial improvements in mechanical efficiency over the years. Unfortunately, once a pump is installed, its efficiency is determined predominately by process conditions.

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The major factors affecting performance include efficiency of the pump and system components, overall system design, efficient pump control, efficiency of drives and appropriate maintenance cycles. To achieve the efficiencies

available from mechanical design, pump manufacturers must work closely with end-users to consider all of these factors when specifying pumps. In the future, pump selection and sizing should be considered in the context of the overall system, not just the efficiency of the individual components.

A good example of pump manufacturers thinking outside the flange to improve pump performance is the emergence of intelligent pumps, i.e., variable speed drives with algorithms to monitor and control pump performance. In recent years, automation suppliers have introduced smart sensors and valves. A smart pump is the next logical step in the evolution of intelligent field architecture. With the growing use of digital field buses to communicate device data to

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asset management software, intelligent pumps can now be seamlessly integrated into the process control system architecture, merging process control and asset management into one system for process management. Thus, islands of information will no longer exist, fulfilling the long held dream of plant-wide information integration.

A REVOLUTION IN THE INDUSTRY

The information revolution that began in the automation industry around 1975, with the advent of microprocessor-based control systems (DCS), is now impacting the pump industry. Consequently, the emergence of intelligent pumps will thrust pump manufacturers into this unfamiliar world that is increasingly driven by software rather than hardware. At the same time, automation companies — even those that manufacture variable speed drives—have limited knowledge of the fluid-handling industry. The resulting technology convergence will drive cross-industry collaboration, which will inevitably require corresponding changes in the way both pump and automation manufacturers approach industrial markets. Industry consolidation and outsourcing are major trends driven by the need to reduce cost and achieve economies of scale. Accordingly, customers are increasingly seeking new services from their suppliers. Some manufacturers have embedded the service into the product itself. However, even with these design upgrades, it is difficult to provide everything that is needed in the product or system. Increasingly, suppliers are offering the required mix of products, information, training, plus application and implementation services to fully address the customer's needs.

Outsourcing has opened the door for pump manufacturers to provide new and innovative products and services that support plant optimization. While this is the good news, as is often

the case, there are significant barriers to entry in the market.

In spite of the financial and operating benefits, industrial managers face many hurdles when implementing new technology. Among the major barriers is the lack of awareness among facility managers, plant engineers and distributors of new technologies and strategies to improve plant performance. When understood, the perceived risk from changing long established operating practices often delays decisions and project implementation. Additionally, generally low levels of staffing in maintenance, operations and engineering departments limits the time available for evaluating and commissioning new technologies. Considering these constraints, there's a common attitude among plant staffs that "if it ain't broke, don't fix it".

Alternately, on the supplier side of the equation, there are conflicting incentives for promoting efficient systems and practices. For example, pump distributors may have greater incentive to sell additional pumps to meet demand growth, rather than advise customers on how to manage load growth through more efficient pump operation. Interestingly, even when the distributor identifies opportunities and quantifies the potential benefits, many end-users continue to make buying decisions based on first cost rather than spend the incremental capital required to achieve long-term savings.

To capture the many benefits of pump optimization, end-users, manufacturers and distributors, as well as design engineers, must work together to change the way they do business. This is no easy task, but the payback for all of these stakeholders is too compelling to delay the journey. Innovation and profitability can be found at the crossroads of pump and automation technology convergence. **P&S**

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