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MODERN TIMES

Upgrading an Aging Control System

By upgrading aging control systems, manufacturers and processing companies are optimizing production flow and enjoying significant gains in productivity and ROI on their control system investments.

BY ED SULLIVAN

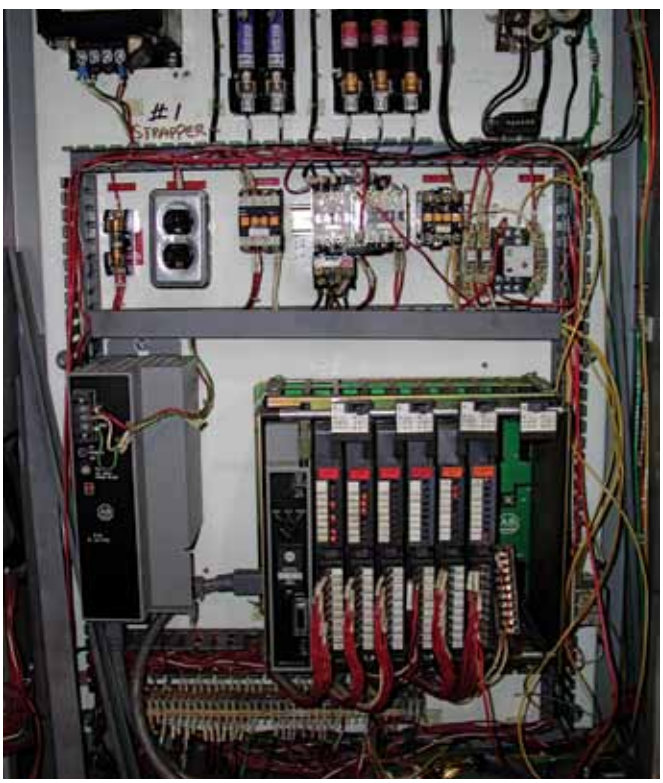
In today's no-spend environment, it may be very tempting to continue repairing your aging or even outmoded process controls, rather than upgrade to today's powerful microprocessor-based systems. Budget constraints and maintenance contracts may simply preempt any discussion about upgrading your controls until you reach the point where you simply can't fix them anymore. However, in reality, if you are trying to save money by prolonging the life of an outdated process control system, you're not only investing in false economies, but you are missing out on technology advancements that can pay you a sizable return on investment (ROI) in several forms. That ROI could be derived from savings on downtime, improved system efficiencies, remote system capabilities, energy savings, increased safety, or a combination of those benefits.

In fact, the potential ROI and system capabilities of state-of-the-art controls will likely overcome any financial illusions you may have about getting more mileage out of your aging equipment.

"Eventually, the upkeep of outmoded equipment becomes more expensive than new. So, by that point a staff engineer will have to consider retrofitting it or upgrading it with new equipment," said Michael Deitz, project manager at Graham Packaging, a company that specializes in the design, manufacture and distribution of blow-molded plastic containers. "Ironically, after they do upgrade they begin to realize several benefits they could have already enjoyed for perhaps years."

Graham Packaging has worked with several automation and controls specialists to maintain their edge as an innovator in the forefront of customized packaging. And in recent years, Connell Industries (West Caldwell, N.J.) has helped Graham identify needs and opportunities that could be addressed through system upgrades and replacements.

Connell Industries, a control system integration company, provides total control systems engineering with expertise ranging from the design of Programmable Logic Control systems and operator interfaces to overall control management of facility compressed air systems and processes.



A strapping control system upgrade from Mini-PLC/2 to Micrologix 1100. The application was palette strapping. *Photo courtesy of Connell Industries*

A compressor control system retrofit "after" picture. The application was a compressor for a plastics manufacturer. *Photo courtesy of Connell Industries*

A whole new ballgame

Using the latest in microprocessor-based control hardware, customized software and versatile communications devices, today's digital control systems give users unprecedented abilities to monitor, regulate, protect and improve processes, in virtually any industry.

"This is especially true for those who are upgrading from electromechanical and older electronic systems," said Vincent DiGangi, senior partner at Connell Industries. "The communications capabilities and improved abilities to monitor, analyze and more tightly control processes make upgrading to state-of-the-art digital control systems a powerful tool. It not only provides a big payback, but will very likely help to keep many companies highly competitive."

DiGangi added that while process system reliability is probably the most likely improvement that many of his customers seek, they should also look at the overall business improvements and ROI that control system upgrades can provide, such as improved process output. "This kind of system is a whole new ballgame," he said. "The ROI benefits transcend those that industries are used to gaining when they retrofit or upgrade equipment."

Improved system reliability

DiGangi explained that one of the primary benefits of upgrading process controls is system reliability. "That translates into other key benefits, such as product quality, uptime and production capacity," he added.

DiGangi, whose extensive prior experience includes serving as plant engineer and control system specialist at Johnson Controls, adds that reliability includes both system uptime and robustness, both of which have a direct impact not only on ROI but also the bottom line.

In some senses, improved system reliability is like an iceberg, with uptime and resulting productivity improvements representing the more visible, and to many companies, the most important cost benefits. "The productivity improvements resulting from an upgraded control system would most likely include production line output," DiGangi said. "But upgrading the control system might influence improvements on ancillary systems or equipment as well. For instance, the retrofitting of high-efficiency variable frequency drives or motors might be part of a control system upgrade or retrofit. So, productivity improvements might be a result of increased energy savings."

Given the current shortcoming of the national power grid, the combination of more efficient process equipment and digital controls can also help protect process equipment from incurring catastrophic damage and downtime resulting from power sags and outages.

Related maintenance savings

Savings on system maintenance and repair can be tied to appropriate upgrading of automation control programs due to the ability to get system-wide feedback.

"This gives you new opportunities to institute improved maintenance programs," Deitz explained, "whether preventive maintenance or corrective maintenance. This information also gives you added flexibility in maintaining your equipment."

He added that being able to pull down the data from a specific period of time will show when a trend occurs. "When these trends require action you can schedule the appropriate type of maintenance accordingly. You can also trend how differently that product affects the same production equipment, and quantify how some products cause more wear and tear than others," said Deitz. "By knowing that trend, you can more accurately schedule maintenance and thereby improve system reliability and uptime."

Improved communications

Some of the feedback that empowers maintenance savings and uptime comes from advanced network communications, including SCADA (supervisory control and data acquisition) systems. Deitz reported that "higher system integration" is becoming more attainable through Internet-based automation and control systems using the existing Ethernet communication network already installed in most facilities, as well.

"With web browser-based connectivity you can control equipment at remote locations, whether the equipment is a camera or any other type of remote processing unit. We have worked with Connell to put together a couple of SCADA packages where we as a company can access any

terminals through a secure web browser," said Deitz. "It is low cost and the dashboards available are highly effective in terms of viewing equipment anywhere in the world where you can get an Internet connection," he continued.

"For managers and senior officers it is very useful in having that real-time connectedness to the equipment because they can see, control and react to what is going on in real time."

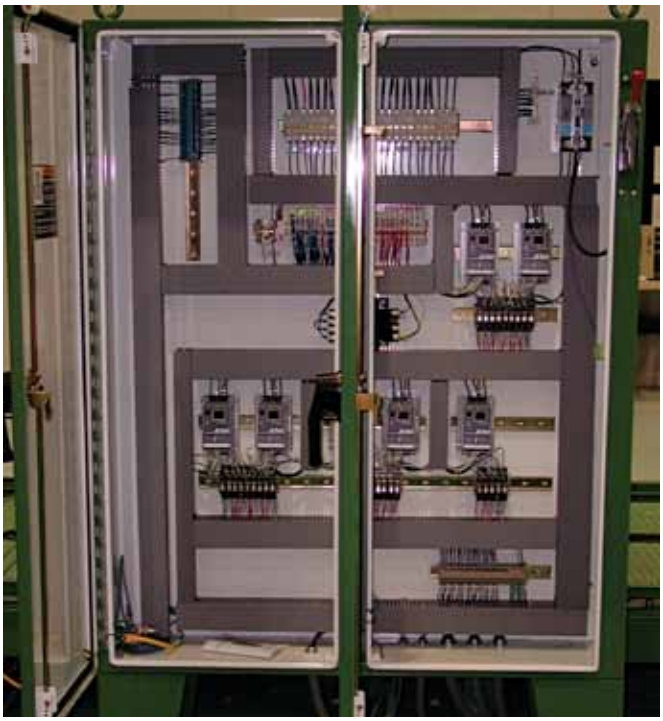
Smarter interfaces

Today's HMI (human-machine interface) terminals add to the SCADA and Internet-based communications power. "The continuous retrieval of information keeps the interface updated on automation and other device activities," DiGangi explained.

"So, when any equipment malfunctions or even becomes exposed to a potential problem, an alarm can be communicated in the form of a text message, email, voice mail or any appropriate combination of alarms," he added.

"This message can inform you of a problem situation, whether it is an abnormally high temperature condition at a remote site, or a operating problem that is developing on a particular machine on the factory floor."

In some instances, such as with electric power substations, remote control also provides the benefit of added safety, because technicians do not have to enter areas where there may be a hazard due to a fault or some other unanticipated event. Instead, the technician can monitor, measure and correct the situation right from his control console or his laptop while he is in the field.



A Devicenet conveyor control system panel.The application was a distributed palette conveyor for warehousing. *Photo courtesy of Connell Industries*

Avoiding misperceptions

The automated delivery of reliable information via advanced interfaces such as an HMI also enables more accurate and appropriate system support. "With this capability you don't have to rely on human interpretation of status, which is a perception-based interpretation," Deitz said. "Important functions such as troubleshooting and failure analysis can suffer from an individual looking at a machine, as in the old days, and developing analyses and solutions."

But "intelligent" equipment, such as today's process controls, will be able to tell you very accurately what the problem is, and very possibly the sequence of events that led up to the problem.

More advanced process controls will also provide critical information regarding when new process equipment is needed, and the parameters that will help develop the specifications for that equipment. The outcome of those types of process control improvements will help to ensure an appealing ROI on future equipment as well. FEJ

Ed Sullivan is a Hermosa Beach, Calif-based writer. He has researched and written about high technologies, healthcare, finance and real estate for over 25 years. For more information about Connell Industries, please visit the website www.connell-ind.com.