



New Controls Improve Plant Productivity

By upgrading aging control systems, manufacturers and processing companies can gain productivity and payback with a better window into their operations.

By Adam Abelew

In today's no-spend environment, it may seem economical to continue repairing outmoded process controls, but it's a false economy. It deprives companies of technology advancements that could result in savings on downtime, improved system efficiencies, remote system capabilities, energy savings, increased safety, or a combination of these benefits.

"Eventually, the upkeep of outmoded equipment becomes more expensive than buying new," says Michael Deitz, project manager at Graham Packaging, a designer, manufacturer and distributor of blow-molded plastic containers. "By that point a staff engineer will have to consider retrofitting it or upgrading it with new equipment. Ironically, after they do upgrade they begin to realize several benefits they could have already enjoyed for perhaps years."

Graham Packaging has worked with automation and controls specialists to maintain its competitive advantage in customized packaging. In recent years, Connell Industries, a control system integrator, has helped Graham identify needs and opportunities that could be addressed through system upgrades and replacements.

From Old to New

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," says 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 keep many companies competitive."

DiGangi adds 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 says. "The ROI benefits transcend those that industries are used to gaining when they retrofit or upgrade equipment."

Improved System Reliability

"One of the primary benefits of upgrading process controls is system reliability," says DiGangi. "That translates into other key benefits, such as product quality, uptime and production capacity."

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.

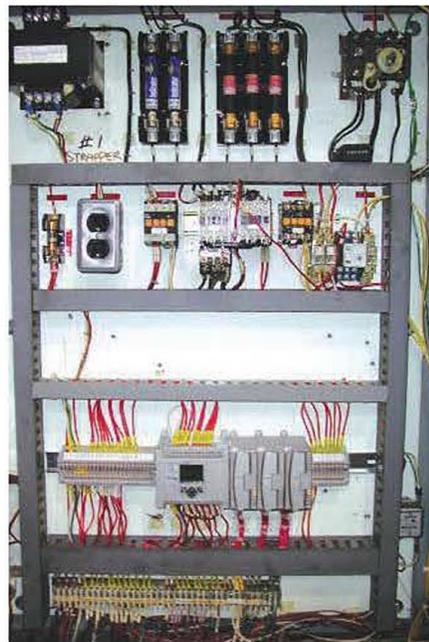
“The productivity improvements resulting from an upgraded control system would most likely include production



This DeviceNet control system panel governs a distribution center's pallet conveyors.

line output” DiGangi says. “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.



The panel above is a compressor control system retrofit for a plastics manufacturer. The panel to the left is a system upgrade for a pallet strapping operation.

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 explains, “whether preventive maintenance or corrective maintenance. This information also gives you added flexibility in maintaining your equipment”

Deitz adds 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. By knowing that trend, you can more accurately schedule maintenance and thereby improve system reliability and uptime.

Improved Communications

Some of the feedback that enables maintenance savings and uptime comes from

advanced network communications, including SCADA (supervisory control and data acquisition) systems.

Deitz mentions 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. 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. For managers and senior officers it is very useful 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 explains. “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. This message can inform you of a problem situation, whether it is an abnormally high temperature condition at a remote site, or an 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.

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 perception-based,” Deitz says. “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. If you had five people looking at the same situation with the same equipment, you could very easily get five different interpretations and five

different proposed 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. It will also streamline the ability to integrate, troubleshoot, identify and evaluate process efficiencies and opportunities. More advanced process controls will 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 ensure an appealing ROI on future equipment as well.

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