Backgrounder

Reaping the Rewards of Strategic Maintenance

Rockwell Automation

Global Manufacturing Solutions

There's much discussion these days about the need for strategic maintenance, but what does it really mean and more importantly, how can it benefit your organization? While most maintenance professionals understand the massive amount of untapped value hidden in plant assets, the concept of strategic maintenance is typically not on the radar of those making plant-wide business decisions. This oversight is difficult to reconcile, especially when you consider that automation control system components – controllers, drives, motors, interfaces – are the lifeblood and productivity engine in most manufacturing plants.

Nevertheless, maintenance remains one of the few business areas where even a modest improvement can provide a significant boost to the bottom line, as well as product quality. In this sense, maintaining uptime has become the fundamental value proposition of the maintenance department. In relative terms, the value of uptime can be calculated by using the following formula: minimize unplanned downtime + maximize quality + minimize time to implement changes / the cost of maintaining uptime at the desired level. If any of the components of the uptime formula are not at the desired level, business performance can be impacted in the form of reduced revenue, decreased customer satisfaction, ongoing recovery costs and increased maintenance and capital costs. The bottom line: maintenance has never been more directly tied to business performance than it is today.

The life of most equipment requires periodic maintenance. At ChiRex Ltd's multi-product facility in Annan, Scotland, a process operator monitors solvent distribution pipework.

Strategic Maintenance — Predict, Prevent, React

The life of most equipment requires periodic maintenance. Any time we fail to perform necessary maintenance, we shorten the equipment's operating life. Over the years, industry has developed a number of different maintenance approaches. In addition to waiting for a piece of equipment to fail (reactive maintenance), manufacturers can apply preventive and predictive methods. But it's more than just having the tools, technology, personnel and processes to maximize performance and longevity. An effective maintenance strategy seeks to maximize asset performance by applying the right activities to the right asset at the right stage in its lifecycle.

Predictive maintenance involves monitoring the condition and operation of equipment to assess whether the equipment will fail during some future period, and then taking action to avoid the consequences of that failure. Predictive maintenance is often measured in terms of cost or downtime avoidance. Unlike preventive maintenance, the need here is based on the actual condition of the asset rather than on some preset schedule. An effective predictive program allows you to make necessary changes before a catastrophic equipment failure occurs. Moreover, the ability to schedule maintenance activities helps minimize overtime costs, and also helps optimize inventory by allowing companies to order spare parts well ahead of time to support maintenance needs.

Predictive programs require an investment in order to effectively implement, operate and maintain them. Though more expensive up front, if applied strategically to critical equipment where a failure would interrupt a continuous process or impact quality (i.e., power generation, semiconductor chip manufacturing or petrochemical refining), the actual cost is substantially lower than the lost production resulting from failure. This strategy works well if maintenance personnel are properly trained and have the time to perform the necessary maintenance work to address the potential problem. In fact, the speed and effi-

ciency in which a company can implement to a predictive methodology often depends on whether or not it has the in-house expertise and resources needed to analyze and apply the knowledge gained from predictive-based activities. Of course, success also is maximized by having an integrated, information-enabled control architecture with intelligent devices capable of collecting the required data.

Preventive maintenance is a time-based strategy where actions are performed on a pre-determined, periodic basis to detect, prevent or mitigate degradation of a component or system. While this approach can help reduce equipment failure and extend component life, the process can be labor intensive, since maintenance is performed based on a preset schedule regardless of the condition of the equipment at the time (similar to the practice of changing your car oil every 3,000 miles).

In a plant environment, preventive maintenance activities are performed on a monthly, quarterly, bi-annual or annual basis depending on the type of equipment, performance against specifications and operating conditions. However, preventive maintenance of automation systems and related equipment can be overlooked due to the unique and complex nature of the components involved. Still, this approach works well for capital-intensive equipment and production processes, and with personnel who have the knowledge, skills and time to perform the required tasks.

Reactive maintenance is essentially the "run-it-till-it-breaks" mode. There are no routine maintenance tasks to perform, and equipment is repaired or replaced only when obvious problems occur. Since companies do not incur any maintenance expense until something breaks, reactive maintenance may appear to be the least expensive approach. The reality is that relying solely on reactive methods often incur higher maintenance costs because without basic preventive measures in place, they are actually shortening the mean time between failure (MTBF) of production equipment. The result is more frequent replacement

Maintenance has never been more directly tied to business performance than it is today.

A maintenance strategy should be developed with predetermined expectations of performance and uptime requirements and be directly tied to an organization's business goals.

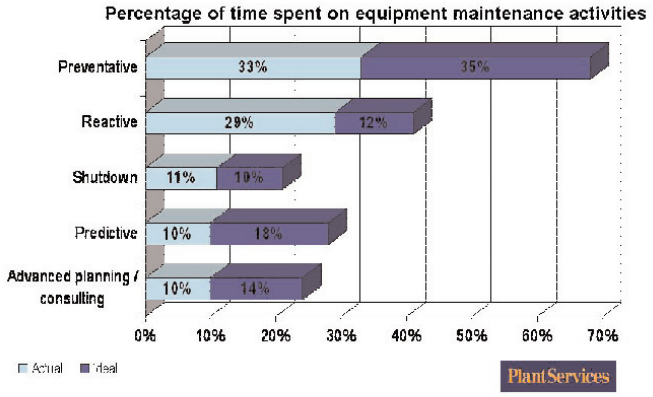
and higher capital costs. Moreover, repair costs are higher because downtime events are often unplanned, more frequent, and longer in duration. Reactive maintenance works well if equipment shutdowns do not affect product quality or revenue generation, and if higher repair/replacement costs and a longer mean time to repair (MTTR) are within an acceptable range.

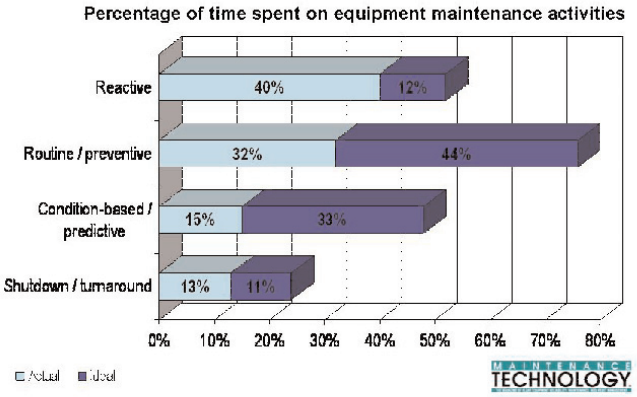
While most manufacturers have taken steps to implement a more preventive and predictive approach, one thing is clear: no matter how proactive your strategy is, there will always be a need for a certain amount of reactive activity. Unexpected problems and changes do happen, and companies need to have reactive maintenance procedures defined and ready to implement to limit emergency costs and quickly facilitate change requests.

Determining the Right Maintenance Mix

Managing plant-floor equipment and assets strategically requires every organizational function working toward the same goals. Equally important is the goal itself: the simpler, more focused the goal, the greater the chance it will be achieved (e.g. reduce the number of unplanned downtime by events 75 percent; improve equipment efficiency by 1 percent). In general,

Figure 1





your maintenance strategy should be a mix of predictive, preventive and reactive methods, depending on the desired goal and part of the process being maintained.

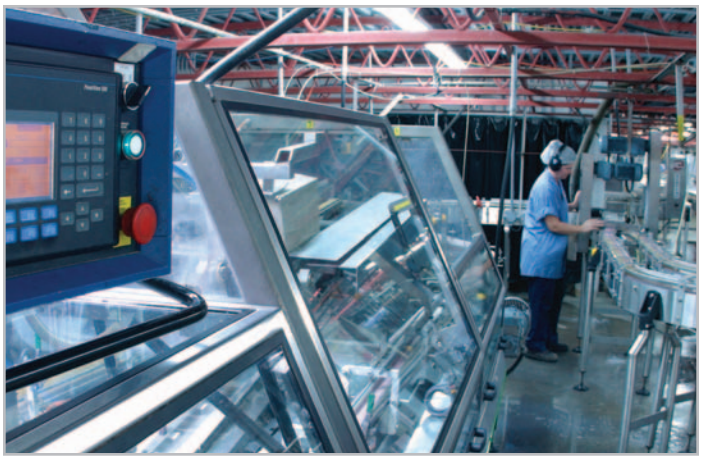
According to surveys conducted by Rockwell Automation and leading maintenance trade publications, even though companies ideally want to spend most of their time on predictive maintenance, a large percentage of their time is being spent on preventive and reactive activities. **(Figure 1)**

A maintenance strategy should be developed with predetermined expectations of performance and uptime requirements as the end goal. For example, if a line goes down, what is the maximum allowable downtime limit? One hour? Five hours? Two days? When equipment breaks down isn't the time to determine if working replacement parts are on hand or trained maintenance personnel are available to help solve the problem. The maintenance strategy also should be tied to specific business goals. For instance, if a company has a customer satisfaction objective for quality or on-time delivery, the maintenance component needs to be defined and implemented to meet this goal.

Key criteria to consider in determining your maintenance strategy are the cost of the equipment and the impact on quality. In many cases, the type of strategy to deploy is determined solely by how it impacts production throughput. For example, if machines aren't available, the company can't produce products and profit opportunities are missed. In this situation, the priority should be on supporting production output goals and keeping equipment up and running.

In general, companies will always rely on some form of reactive maintenance and some may utilize only a reactive strategy (e.g., applications where neither product quality nor revenue generation is significantly impacted by unplanned downtime). The key is whether you are operating reactively by design or by default. In other words, even if the only type of maintenance you employ is reactive, you still need to be strategic in terms of its execution. For example, you should have the proper resources – repair vendors, parts suppliers, technical support, etc. – in place and available to apply when you need them. It's equally important that these service providers understand your business and are equipped to meet your needs.

In applications where the criticality of the equipment and the impact of unplanned downtime and quality are high, a maintenance strategy that includes preventive or predictive components offers numerous advantages. Independent studies indicate that preventive maintenance has a 5:1 cost advantage over reactive maintenance. Still, many manufacturers underestimate the value of a proactive approach and are apprehensive in making the initial investment of time and money to implement the programs. According to a 2003 ARC Advisory report, poor understanding of the issues at stake and a lack of the right metrics are two fundamental reasons management often discounts its maintenance operations as overhead.



With today's advances in technology, companies can now fine tune almost every phase of production for maximum yield, quality and profit. At Leahy Orchards outside Montreal, Quebec, operator interface stations allow operators to quickly and easily monitor production status.

To best understand the value of a proactive maintenance approach, it is important to thoroughly document and baseline your process prior to implementation of the strategy, and then measure results against it on a continuous basis. Rockwell Automation has found that typical savings from a preventive maintenance program include a minimum total reduction in unplanned downtime, scrap and maintenance costs of 25 percent in the first year, with payback periods of less than four months. Many companies experience even better results, reducing unplanned downtime 50 percent to 95 percent in the first year. In fact, some companies that have had preventive maintenance programs in place since the equipment was installed have never experienced any unplanned downtime.

Because so many factors must be considered in a strategic approach to maintenance, companies often find it difficult to determine the right combination of predictive, preventive and reactive methods that will provide the best results. To help make this determination, many manufacturers have turned to the suppliers of automation equipment, like Rockwell Automation, for help. A collaborative relationship with an established and trusted supplier helps companies appropriately match predictive, preventive and reactive strategies to maintenance needs throughout the investment lifecycle of their people, processes, and equipment.

Strategic Maintenance Throughout the Lifecycle

A fundamental principle behind strategic maintenance is understanding that maintenance goes beyond simply keeping automation equipment running or repairing it after it has failed. Rather, it involves carefully considering maintenance needs throughout the entire lifespan of the equipment, beginning with the original design phase of the machine/system in which it is used. In other words, the physical and functional maintenance requirements should be taken into account for the life of the asset as measured by its performance, reliability and maintainability.

In a high volume consumer product category such as chocolate, maintaining uptime is critical. At the Cadbury Crunchie production line in Bournville, UK, operators have access to process information through operator interface terminals throughout the plant floor.

At the core of strategic maintenance is the ability to optimally apply the right equipment, people and processes to maximize the return of the automation investment. Generally, in the early stages of the lifecycle, there is greater emphasis on equipment, technology and control architectures, etc. In the latter stages, there is generally more focus on people, processes and services in order to maximize the return on investment of equipment by extending the service life, minimizing downtime and keeping machines operating to specifications.

Strategic maintenance is defined as applying the right equipment, people and processes to maximize ROI.

Reaping the Rewards

With today's advances in technology, companies can now fine-tune almost every phase of production for maximum yield, quality and profit. But technology is only part of the equation; the knowledge and expertise to apply it in the proper levels and at the proper time is the missing link. This is where a strategic approach to maintenance pays dividends – with a carefully orchestrated, well-devised plan that begins in the engineering department at the design phase and incorporates the right combination of predictive, preventive and reactive maintenance methods throughout the equipment lifecycle. Using this approach will help manufacturers optimize production, maximize uptime, reduce costs and increase profits.

DESIGN/INSTALL

One of the biggest barriers to optimizing asset performance is the failure to develop a maintenance strategy during the project design stage. In many cases, corporate managers often equate maintenance to simply extending the life of older equipment. The sophistication of today's plant-floor technologies often makes this "strategy" ineffective and costly. By considering maintenance in the design/install phases, companies can determine and implement the right maintenance methodology for each piece of production equipment based on the type of process and the role of that equipment in the process.

For example, equipment used in a non-critical aspect of the process may only require a reactive maintenance approach. On the other hand, equipment employed in a critical part of the process, and with a high cost of unplanned downtime, may require preventive and/or predictive (and reactive) methods to eliminate or significantly reduce the occurrence and duration of unexpected equipment failures. By determining the correct maintenance methodology for each segment of the production process during the design phase, companies can reduce the time and costs to implement the correct methodologies, maximize equipment performance and lifespan, and optimize the ROI for equipment and the program to maintain it.

One of the best ways to help ensure that maintenance strategy is considered early in the design phase involves closely aligning the engineering and maintenance functions within a production operation. In many instances, maintenance and plant engineering

During the design, installation and startup phases, phone and electronic support from Rockwell Automation can provide timely and accurate information to help shorten design cycles and reduce installation time.

are not involved in the design phase of a project and are left to determine the proper maintenance responsibilities and techniques after installation and startup. As a result, the performance and lifespan of equipment may be reduced, and business and production goals may go unmet.

Conversely, when companies bridge the gap between engineering and maintenance functions during system design, all aspects of equipment maintenance can be considered during the specification process. Equipment can then be selected based on performance goals for that equipment and the ability to define and apply the right maintenance strategy to keep it operating within the desired parameters. With the proper maintenance strategy in place, and communicated through both departments, it can be effectively implemented at the time of system startup to provide maximum performance and financial benefits throughout the equipment lifecycle.

A key measurement of product reliability, and a maintenance-related factor that should be considered during the design phase, is Mean Time Between Failure (MTBF). MTBF is a statistical value or average time (normally measured in hours) expected between failures of a given device. Engineers can use this basic measure of reliability in making design calculations and component specifications that can have a major impact on maintenance and repair costs and, most importantly, continuity of operation. By carefully comparing and specifying compo-

nents with high levels of reliability, and taking into account the necessary quantity and availability of spares, designers can reduce maintenance costs and maximize returns over the life of the investment.

Another opportunity for designers to optimize maintenance efforts (and the benefits from them) is by utilizing integrated control architecture. For example, the Logix™ integrated architecture from Rockwell Automation can provide significant maintenance advantages at many different stages of the machine and system lifecycle – from faster installations and fewer compatibility problems to improved sharing and access to production data for reactive, preventive and predictive system support. Additionally, a single control architecture allows designers to more easily integrate different automation domains, whether it's a PC-based controller, motion controller, distributed controller, or an embedded controller. The result: greatly improved management decision making through better access to plant and production data, quicker response to changing customer or market demands, and reuse of engineering and maintenance solutions to reduce development time and costs across the enterprise.

The following paragraphs illustrate how predictive, preventive and reactive maintenance methods can be incorporated at the design/install phase.

Predict

Depending on the specific business and performance requirements, integrated condition monitoring technology can be specified during the design phase to monitor rotating equipment conditions such as vibration, temperature and lubricant state. This technology is often utilized in more critical parts of the process where throughput, uptime and operator safety cannot be compromised. Additionally, the specification and integration of condition monitoring equipment during this stage helps to ensure proper installation and operation with the industrial communication network and control architecture utilized for the machine or system.

A maintenance strategy should be a mix of predictive, preventive and reactive methods.

Predict/Prevent

The communication network and architecture also are important if other monitoring technologies or services, such as In.Site Continuous Support™ from Rockwell Automation, are specified during the design phase. In.Site Continuous Support uses a high-speed broadband connection to the plant floor to provide companies with around-the-clock troubleshooting support and comprehensive analysis of real-time production data for the entire process line. This off-site monitoring service allows Rockwell Automation engineers to proactively identify potential problems, suggest corrective action and respond immediately. The ability of support specialists to proactively respond to a problem, combined with their extensive product knowledge and industry experience, makes this solution the ideal choice for companies that risk potentially significant revenue losses if a highly complex or mission-critical process unexpectedly fails or goes down.

In highly complex or mission-critical processes, manufacturers can add an extra layer of protection against downtime by augmenting on-site staff capabilities with off-site monitoring support for round the clock troubleshooting support and comprehensive analysis of real-time production data for the entire process line.

Services from Rockwell Automation help supplement staff in performing preventive maintenance activities. Through the Embedded Engineer and PerformancePlus Annual Preventive Maintenance programs, an experienced field engineer is dispatched on-site full-time, or for a scheduled number of visits through the year to help meet immediate and long term goals.

Prevent

Product reliability data should be considered when designing a process to determine the need for extended warranties on equipment. Extended warranties can help simplify warranty administration while stabilizing or lowering the cost of spare parts, repair labor and overall maintenance. Similarly, designers can incorporate the appropriate maintenance software based on system needs. For example, Rockwell Software Maintenance Automation Control Center (RSMACC™) offers an integrated, modular approach that lets users address immediate maintenance concerns first, (e.g., change management) and then add functionality later as needs and priorities change. Because all of the RSMACC-enabled solutions share the same client/server architecture, the same underlying automation platform, and the same central databases, they integrate together seamlessly to offer a complete, in-depth view of the current and historical operation and maintenance of the system.

Another preventive maintenance approach that can be incorporated into the design phase is a network design review by a qualified service provider such as Rockwell Automation. A design review checks all network drawings and specified components and performs a comprehensive analysis to determine if a new network design will meet functional requirements. During the install phase, service vendors also can manage network installation and perform a network validation to ensure all components are installed properly and operating within industry-accepted standards.

Proper installation can help prevent operating problems and reduce long-term maintenance costs. If installing equipment using internal resources, it is vital that personnel have the appropriate technical knowledge required. In some instances, personnel may need to learn a new technology or simply refresh existing knowledge on a technical subject through training courses. A wide variety of training options are available today ranging from on-site instructor-led training to e-learning tools including RSTrainer® products, job aids, and workstations.

Finally, the availability of spare parts should be considered during the design phase. Throughout the lifecycle, inventory – as it relates to spare parts for the automation system – should be a key component of your maintenance strategy. As elementary as it may sound, simply planning and preparing to have the right part at the right place at the right time, especially for your most critical processes, can be the difference between meeting production goals and an unplanned downtime event of significant duration.

However, for many companies, maintaining an inventory of spares is a significant expense — especially as equipment ages and more parts must be kept on hand. Companies can minimize the cost of carrying spares by taking advantage of a Rockwell Automation Parts Management Agreement (PMA). A PMA transfers ownership and management of certain critical spare parts to Rockwell Automation, significantly reducing carrying-costs (e.g., space, utilities, accounting and insurance) associated with maintaining a complete inventory of spare parts. A PMA also assures the availability of critical spares, increases availability of a company's production assets by reducing the MTTR, and frees working capital for new investment.

Integrated condition monitoring can proactively identify changes in a condition of rotating equipment — sometimes weeks or months before any problems become visibly apparent. The use of handheld data collectors such as the Entek Enpac, provide fast and accurate monitoring of machine performance.

React

During the design, installation and startup phases (as well as throughout the equipment lifecycle), phone and electronic support from equipment vendors can provide timely and accurate information to help shorten design cycles, reduce installation time, configure equipment and software, obtain updated software and flash firmware versions, diagnose and fix startup problems, and perform basic programming tasks. Rockwell Automation TechConnect™ support, a multi-tiered phone support program, lets customers select the product coverage and service level that are most appropriate for their application and business requirements.

Priority access to support specialists with a more intimate knowledge of a company's specific systems is available through the Rockwell Automation TeamSupport™ program. It provides companies with a direct 24x7x365 phone number to the same support specialists for every call. TeamSupport can be custom-designed to include additional support features that may be needed for efficient and effective maintenance of plant floor assets.

Bottom line: Maintenance should be an important consideration during the design and installation phase. Failure to do so often results in a greater occurrence of operating problems and equipment failures, ultimately increasing long-term maintenance costs, reducing equipment life span and preventing achievement of business goals.

OPERATE/MAINTAIN

During the operate/maintain phase, the focus is on maintaining an optimal production environment — from the storeroom to the plant floor to the loading dock. The predictive, preventive and reactive strategies put in place during the design/install phase are used to achieve this objective.

Predict

To sustain consistent human and equipment performance on the plant floor, a good first step is to conduct a broad-based assessment. Through the results of assessment tools such as the Rockwell Automation Integrated Performance Assessment™ and Installed Base Evaluation™, manufacturers can identify gaps in skills or processes and take corrective action before issues manifest themselves as prolonged downtime. The goal of an Integrated Performance Assessment is to establish a performance standard for plant-floor personnel and identify where additional support, training, or staffing may be necessary to assure that each employee has all the tools necessary to perform at the desired level. At the engineering and maintenance level, an assessment may examine technical competencies, readiness levels, ability to add new responsibilities, recruiting and/or hiring methods, and staff retention policies. This information also will help to identify and recruit the best candidates for each skill profile.

Even in situations where human and equipment performance have been optimized, equipment failures can and do still occur. A major factor in limiting the duration of unplanned downtime is

the availability of spare parts. However, as we know, maintaining an inventory of spare parts can be a large, and often unnecessary, expense for many companies. In many plants, parts are automatically sent for repair and then returned to inventory, regardless of the number of spare parts already available, the type of part, or the MTBF. In others, spare parts are available but are not in working order or are obsolete.

There is a better approach. Through an Installed Base Evaluation from Rockwell Automation, the proper inventory of spares can be determined based on the type of equipment, its function and expected MTBF – ultimately reducing capital investment in spare parts and ongoing maintenance costs. Taking this one step further, the analysis can be used to build a reliability-centered maintenance strategy which tracks and identifies the root-cause of equipment failure.

Companies also can significantly reduce long-term maintenance costs through the use of machine monitoring equipment and services. Integrated condition monitoring can proactively identify changes in the condition of rotating equipment — sometimes weeks or months before any problems become visibly apparent. These monitoring systems give manufacturers the ability to monitor dozens of process line parameters and alert plant staff to changing conditions. Once a problem is detected, it often can be remotely corrected before a machine or process fails. When applied on a plant-wide basis, such technologies can help companies dramatically cut maintenance costs by providing greater foresight of impending machine failures, reducing unplanned downtime and minimizing wear on critical equipment.

Empowering employees with the right level of technical skills and access to valuable job aids or tools necessary to effectively operate and maintain equipment is an important component of a strategic maintenance program. Operators at Unilever's Raeford, North Carolina, facility use Rockwell Software RSView human-machine interface software to monitor the batch operation in real-time.

Products like the Allen-Bradley® Entek® XM Series™ condition-monitoring modules integrate machine monitoring and protection by leveraging an organization's existing industrial communication network. And for facilities with limited capital and human resources for maintaining effective on-site condition monitoring, Reliability Online™ allows companies to outsource the analysis of machine condition data to Rockwell Automation via the Internet. Reliability Online provides maintenance employees with access to critical machine condition data, along with expert analysis, without adding to your organization's infrastructure.

Prevent

An area often overlooked in executing a maintenance strategy is training. After all, manufacturers can have the most advanced automation technology available, but if people are unable to properly use and maintain it, the technology could become a liability rather than a net gain. The bottom line is this: a well-trained employee helps prevent problems and can better react to them when they occur, including when to request technical support from an outside service provider if the issue cannot be resolved within a reasonable amount of time.

Throughout the operate/maintain phase – and especially toward the end when production begins to experience equipment and process failures – preventive maintenance plays an important role. However, as mentioned earlier, performing preventive maintenance can be labor intensive. Rockwell Automation offers two services to help supplement staff in performing preventive maintenance activities: Embedded Engineer™ and PerformancePlus™ Annual Preventive Maintenance programs. These services are designed to compensate for staff shortages and skill gaps by providing an experienced field support engineer on-site full-time, or for a scheduled number of visits throughout the year to help meet immediate and long-term goals. During scheduled visits through a PerformancePlus

Managing inventory can be a time-consuming task, but a Rockwell Automation Parts Management Agreement can reduce the time and expenses associated with maintaining a complete inventory of spare parts.

program, the engineer performs a predefined set of preventive maintenance activities to help maximize the availability, reliability and efficiency of automation equipment.

Depending on the extent to which they are applied and used, Maintenance Repair and Operations (MRO) management programs can be an important proactive solution that can help companies capture unnecessary maintenance costs. To that end, many of the world's most successful companies have boosted their bottom line with the Rockwell Automation Asset Management Portfolio (RAAMP™). RAAMP provides spares parts inventory management and reliability-centered maintenance and procedures, delivered through an on-site MRO management professional. The program helps MRO departments track assets from purchase to installation and into the repair loop while providing end-to-end visibility of all repairable assets. Additionally, RAAMP's product warranty tracking component helps ensure companies are not paying for repairs or failed components currently under warranty. RAAMP is fully modular and can be customized to meet specific customer needs.

A well-trained employee helps prevent problems and can better react to them when they occur.

React

In the operate/maintain stage, when repair and replacement are a high priority, it may be more economical to repair a part than to replace it. However, it's imperative that companies use a reputable repair vendor to assure that repairs are performed by qualified technicians using advanced diagnostic equipment and quality replacement parts. Rockwell Automation offers numerous remanufacturing and repair services that can restore operation of malfunctioning automation equipment to original operating specifications — often at fraction of the cost of a new unit.

During the operate/maintain phase, phone and electronic support from equipment vendors play an important role in maintaining an optimal production environment. For example, when a problem occurs or when production goes down, do you have sufficient resources (internal or external) to quickly and accurately resolve the issue without taking key staff away from their primary responsibilities? If not, problems may take days, or even weeks, to correct — and other operations may be impacted while corrective action is performed. To help maintenance and plant-floor staff identify and resolve problems quickly, a TechConnect or TeamSupport program from Rockwell Automation can provide the technical resources and experience needed, allowing maintenance engineers more time to focus on core activities that drive business revenue and growth.

REPLACE

In the latter lifecycle stages, the value of maintenance lies in how cost-efficiently equipment stays up and running before having to replace it. For many companies, the maintenance strategy in the replace stage is predominantly reactive. Often this is not by design, but because a preventive and/or predictive maintenance program was never implemented from the beginning. As a result, in the replace stage many companies face more frequent, unplanned breakdowns, and a lack of technical resources makes it difficult and costly to extend equipment life. Had the appropriate preventive or predictive program been specified and implemented in the design/install phase of the life cycle, it would have included a plan to replace aging equipment at the most cost-effective time, as opposed to during an emergency breakdown.

Compounding the situation, management often asks engineering and maintenance departments to "make do" with what they already have (even if replacement has been planned), while in the same breath, demanding increased productivity levels. This puts maintenance in a precarious situation: Do you implement new technology with long-term ROI in mind? Or do you delay capital investment and increase the ROI on your current equipment? It doesn't have to be a no-win situation. Rockwell Automation understands the delicate position facing many companies. Through its Renewal Parts-Legacy and Custom Classics programs, Rockwell Automation provides companies with the tools and support to maximize ROI on existing applications, while preparing for the implementation of newer technology as appropriate. These programs provide a security blanket that helps manufacturers efficiently maintain current operations while leveraging existing capital.

www.rockwellautomation.com

Corporate Headquarters
Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions
Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36-BP 3A/B, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Headquarters for Dodge and Reliance Electric Products
Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433
Europe: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741
Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 351 6723, Fax: (65) 355 1733

Publication Number GMSG10-WP001A-EN-D October 2004