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Gain Agility and Expertise Through Flexible Staffing

Introduction

For many process plants, there are three distinct tasks with respect to their control, instrumentation and information systems — otherwise known as the automation system. The first task category is operations and maintenance. The plant must be kept up and running with minimal downtime, with maintenance performed as needed.

The second task includes continuous improvements. The existing automation system must be made to increase throughput, reduce downtime, cut energy costs, improve quality and make other enhancements to the production processes. These improvements are necessary to stay competitive in worldwide markets, and firms that neglect this task will fall hopelessly behind.

Third, capital projects must be planned and executed for a variety of reasons, from adding capacity to regulatory compliance to changing the range of products produced.

In many process plants, operations and maintenance tasks can consume all the available automation professional man-hours from on-site staff, leaving little or no time for continuous improvements and capital projects. In the worst cases, many plants find it difficult to recruit and maintain even the minimal staffing required for operations and maintenance.

There are two possible approaches to address these staffing issues. The first is to add more permanent staff at the plant level, and the second is to seek assistance from an outside service provider such as a systems integrator — also known as staff augmentation or outsourcing. Adding permanent staff can be problematic at many process plants for a number of reasons as explained below.

As detailed in a recent *Control* magazine cover story, demand for experienced automation personnel relative to supply is at an all-time high by many indicators. A quote from the article illustrates the point.

"The demand for process automation professionals is high, and the talent pool is small and shrinking," said Alan Carty, president of recruiting firm Automationtechies in Minneapolis. "Systems integrators, end users and process control product manufacturers are all seeking these people. I've been recruiting for 12 years, and I feel that current demand relative to supply is at an all-time peak."

Exacerbating the situation, many process plant managers have trouble recruiting workers to their specific locales, which are almost always far from the urban areas favored by many automation professionals, particularly recent graduates.

Another significant issue primarily affects staffing for plant automation operations and maintenance positions, and that's the requirement for 24/7/365 support. When faced with the choice between working regular hours versus being on-call around the clock — including weekends and holidays — many automation professionals opt for the former.

Even if these problems are overcome with sufficient staffing for operations and maintenance, providing sufficient personnel for continuous improvement and capital projects remains an issue.

This task in particular often requires specialized skills that existing plant operations and maintenance staff may not possess. Furthermore, many continuous improvement projects and larger capital projects often require relatively high staffing levels for implementation, then much lower staffing levels for ongoing operations and maintenance.

These two characteristics — the requirement for specialized skills and the spike in required automation personnel during implementation — can make continuous improvement and large capital projects ideal candidates for staff augmentation.

But first, let's look at how staff augmentation can help with the most basic of all plant automation tasks, performing the required operations and maintenance tasks on a 24/7/365 basis.

The operations and maintenance staff at a modern large process plant is often charged with keeping the facility operating smoothly on a 24 / 7 / 365 basis, a task that can be eased by engaging an outside service provider such as a systems integrator.

Outside Assistance Can Minimize Downtime

Automation professionals in process plants are charged with the difficult task of keeping their facilities operating smoothly. Most plant problems that can lead to downtime, reduced throughput or safety concerns show up first in the automation system as some type of an alarm or event.

Plant operators are usually the first to spot these issues, but plant automation professionals must often determine the root cause of the problem. Once the correct root cause is identified, proper corrective action must be taken to resolve the issue.

For example, a high-level alarm in a tank could be caused by actual high levels, or by a faulty level instrument. If the level is actually high, the cause is typically an imbalance in infeed and outflow rates, with further analysis required to determine the actual root cause of the problem. These types of problems crop up on a 24/7/365 basis, often at very inconvenient times.

In the past, these types of issues could only be effectively addressed by on-site personnel because remote access options were limited and field instruments provided very limited data to the automation systems via their 4–20 mA output.

But today, remote access can give off-site personnel a view into the process that nearly equals that available to on-site staff. In addition, smart instruments can provide a host of diagnostic information to the automation system and, by extension, to off-site personnel through remote access. For further information on how remote access is implemented in modern process plants, see the April 2012 *Control* magazine cover story, "Remote Access Goes Mainstream."

With remote access and smart instruments, it often makes sense for a process plant to augment in-house staff with contract personnel located at a third-party operations center. These operations centers are typically manned around the clock, allowing many issues to be resolved without having to call off-duty automation personnel.

Another operations and maintenance issue is becoming more prevalent — software maintenance. All process plants have various types of control and monitoring software applications. In almost all cases, at least some of these software application packages are provided by different vendors. Again, in virtually all instances, these applications are connected and continuously interact with each other.

Examples of automation software applications include human machine interfaces (HMIs), database and historian, asset management, alarm and event handling, data analysis, enterprise resource planning, simulation, non-linear loop tuning, plant performance monitoring and specialized vertical market process control packages, such as distillation column control.

For reasons such as bug fixes and address security issues, software vendors are continually providing patches, updates and upgrades to their applications. It can be dangerous to ignore these because they're usually issued to address significant problems like security threats. But blindly accepting all such updates and upgrades can be even more precarious — a change to one application can cause serious communications issues with another. For example, upgrading an HMI application may cause faulty communications with the plant's real-time controllers, leading to a variety of serious issues.

Software maintenance is a task uniquely suited to a large systems integrator with a well-equipped operations center. Ideally, the systems integrator will have a range of software applications installed, communicating at their operations center and often duplicating the automation system architecture of the process plant.

Some system integrators can test software updates and upgrades at their off-site operations centers, assuring process plant personnel that software changes won't adversely affect ongoing operations.

Using this off-site test bed, the systems integrator can test all software updates and upgrades offline, then forward the results to plant automation personnel. This allows the plant operators to accept updates and upgrades with confidence, knowing these changes won't negatively affect existing plant operations.

Table 1 (left) lists benefits of staff augmentation. These benefits apply to not only operations and maintenance, but also to continuous improvement and larger capital projects.

Table 1

Benefits of Staff Augmentation

1   Can provide 24/7/365 support

2   Easier and quicker than adding full-time, in-house staff

3   Can be less expensive than hiring and retaining full-time staff

4   Often better at providing specialized expertise

5   Can be ramped up and down as required

6   Can provide off-site testing of software changes prior to implementation

7   Can introduce ideas and technologies from outside the plant walls

8   Can afford to keep highly specialized process experts on staff

Making Continuous Improvement a Reality

Burdened with the day-to-day pressures of keeping the plant up and running, it's easy for plant automation professionals to neglect the necessary task of continuous improvement. In contrast to operations and maintenance, continuous improvement often involves careful, long-term study and analysis of existing operations. These characteristics can make continuous improvement an ideal candidate for staff augmentation.

Off-site analysis by a well-qualified systems integrator can produce suggestions for improvement, which can then be implemented and tested by on-site personnel in conjunction with the systems integrator, to determine expected results.

In many cases, larger systems integrators will have experience with similar process plant operations, and can offer specialized expertise that can be difficult to duplicate at the plant level. Process plant automation personnel need to be generalists so they can effectively address a wide range of problems, but continuous improvement often requires a specialist. For example, a systems integrator may have a distillation column automation expert on staff, while a single plant or company may be unable to justify this full-time employee.

Continuous improvements to plant processes and equipment, such as this distillation column, can often be performed more efficiently by a third-party service provider specialist at an off-site operations center.

Systems integrator experts can be particularly well-suited to spot the most fertile areas for continuous improvement projects, such as relatively inexpensive modifications to controller programming that can yield substantial benefits.

Many continuous improvement projects are fairly small scale in terms of required on-site personnel needed for implementation, but this isn't the case for large-scale capital projects. These projects are typically undertaken to add capacity, change the product mix or comply with regulations — and are often best executed with assistance from outside service providers, such as engineering firms and system integrators.

Effective Execution of Capital Projects

Large capital projects require substantial numbers of automation professionals for execution, and relatively few professionals for ongoing operations at the completed facilities. For that reason, even the largest process plants and companies find it hard to financially justify the retention of staff required for large capital projects after the job is completed. Because of this, large capital projects are an ideal candidate for staff augmentation from an engineering firm or a systems integrator. This is by far the most widely accepted method for the execution of large capital projects in process plants.

When selecting a systems integrator, a company should look for a partner who understands its plants and processes, and is the right size for the job. It's particularly helpful if the company already has prior experience using a certain systems integrator for other services, such as support for operations, maintenance and continuous improvement projects.

In this case, the systems integrator will have intimate knowledge of the plant's automation systems and processes — an invaluable resource when executing a brownfield project in an existing plant. Plus, the company and the systems integrator will have established relationships at multiple levels, from executive to engineer to technician. Then, because the systems integrator was intimately involved with the construction and commissioning of the project, they will be able to provide a high level of support for ongoing operations when the capital project is complete.

In summary, staff augmentation can provide a number of benefits to process plants, such as improved operations and maintenance, and needed expertise for continuous improvement and capital projects. Using the same systems integrator to augment staff in all three of these areas can be the most mutually beneficial solution for both the process plant and the systems integrator.

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