ARC INSIGHTS

By Dave Woll

INSIGHT# 2003-15MP&H
MARCH 19, 2003

Are Your Process Automation Assets in Tune with Your Manufacturing Assets?

Keywords

Tuning, Asset Utilization, ROA, Loop Maintenance, Operational Excellence

Summary

The process industries could not survive without process automation. Sustained effectiveness in process automation is a primary factor in achieving Operational Excellence. Flawless execution, the goal of effective process automation, results in incremental business performance improvements that drop directly to the bottom line and have a major impact on Return on Assets (ROA). Ineffective automation can lead to poor quality, low throughput, environmental issues, and abuse of capital assets.

> Cost cutting is too often seen as the only way to improve performance in the process industries. In reality there is a limit to what can be eliminated before it becomes counter-productive. Using automation to add value through more effective use of manufacturing assets is a superior approach that leads to higher performance and improved overall operation.

Analysis

Process companies are severely challenged to improve their ROA. In a typical company in these industries, the majority of capital assets and cost of sales are located in manufacturing. These capital assets are under the control of process automation, which in most cases is under utilized and does not control effectively. The average performance for process plants in North America ranges below 4 sigma, while sustained steady-state performance can approach six sigma. One reason this gap exists is because, unlike many other industry segments, best practices and continuous improvement are not regularly institutionalized in process manufacturing. Effective use of process automation presents a major opportunity.

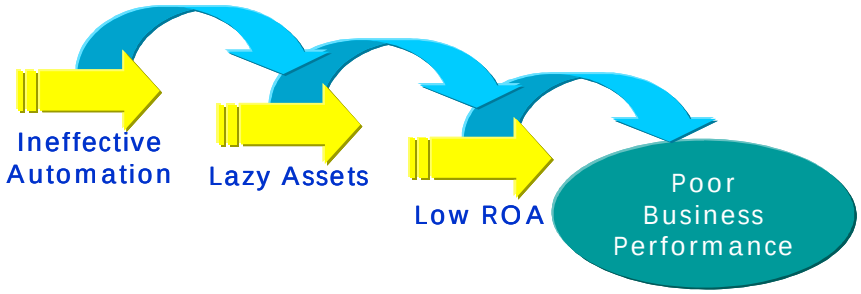
What Is OpX in Process Automation?

Process automation and process control technology are fundamental to deploying knowledge that ensures business performance. In this context, performance relies on a sustained correlation between the process and the process automation. Once this correlation is achieved it is possible to lever-

age a clear understanding of objectives and constraints against knowledge of the process behavior and process automation technology to secure the desired performance. OpX in process automation occurs when your process automation assets are in tune with your manufacturing assets.

Process Automation Is the Cornerstone of Plant Performance

ROA is a critical and challenging metric for the process industries. Fixed costs are high, operating costs are difficult to contain and maximized utilization is critical. Over 75 percent of the assets in a typical process company are manufacturing-related and 65 percent of the cost of sales is in manufacturing. The majority of these assets and costs are under the control of process automation. Under-controlled assets are lazy assets, while assets under tight control are usually performing as designed.



Ineffective Automation Leads to Poor Business Performance

Analysis has shown that in steady state, effective automation can approach the goal of "flawless execution" or six-sigma. During state transitions, however, effectiveness typically drops to two-sigma because of insufficient agility. To add perspective to this performance gap, a 1 to 2 percent improvement in overall plant performance (throughput) can represent an incremental $5 to 10 million annually for a large Ethylene plant. Unscheduled shutdowns also usually occur during transitions because, for some reason, the correlation between the automation and the process is lost. Unscheduled shutdowns are the largest contributor to diminished performance and can cost anywhere from 2 to 5 percent of production annually, but it is generally accepted that 0.5 percent is a reasonable goal. In the same large Ethylene plant referenced above, unscheduled shutdown could represent $1M per day given today's high cost of oil. If plant availability could be improved by 1 percent, an additional $3.6 million annually could drop to the bottom line.

Process automation must be viewed as a combination of human assets and technology infrastructure. In that context, strategies can be created to attack performance issues. For example, human error and flawed execution account for an average 78 percent of unscheduled plant downtime. Precise automation implementation and flawless execution strategies can address these issues and make a major contribution to business performance.

> You cannot improve performance unless you can measure it and visualize it.

Performance visualization is pivotal. The basic premise is you cannot improve performance unless you can measure it and visualize it. Automation is moving into a new era made possible by Internet technology and information at your finger tips. This enables the creation of knowledge workers empowered with a deep understanding and perspective of objectives, constraints, process behavior, and the process automation technology necessary to secure desired performance.

Sustained Performance Is a Journey, Not a Destination

Process automation is rarely effectively used or maintained. In most cases, a robust automation infrastructure is not an ongoing priority because the value automation delivers is pervasive, there is no consistently accepted measure for its value, and best practices and continuous improvement have not been institutionalized. Because it is easier to mortgage the future rather than spend money without a defined return, maintenance is usually the first to be hit with a budget cut. Ironically, the convention for the number of process loops monitored by an operator (250 to 300) has been applied to the number of loops maintained by a technician. This has proven to be unrealistic in the face of fire fighting, which takes precedence. Consequently, the philosophy of “if it’s not broke don’t touch it” is an issue in achieving process automation effectiveness. Not all problems associated with plant performance are a result of poor maintenance, but it is safe to say it is a major issue in at least 80 percent of all process plants.

Performance feedback mechanisms are missing from most plants, and the consequence is lost business performance and exponential deterioration of control. Poor maintenance is further exacerbated by skills erosion. Reversing this situation starts with effectively using existing automation infrastructure to supervise and discern the condition of automation assets. Automation performance monitoring can provide the feedback to intelli-

gently deploy recourses by both identifying independent issues and showing cause and effect relationships to reveal interdependent issues.

Typically, monitoring process automation performance helps differentiate between critical and non-critical loops, identifies loop performance and problem loops, and helps discriminate between tuning, instrumentation, and design problems. Typical benefits from monitoring process automation performance are higher asset utilization in terms of yields and capacity, reduced unscheduled downtime, more effective maintenance by eliminating unnecessary maintenance, and identifying undetected maintenance requirements.

Plant Performance as a Complementary Benefit

Plant performance monitoring is an additional benefit derived from maintaining a tight correlation between process automation and the process itself. An aggregated view of plant automation performance can be used to infer plant performance. This unique view of plant performance is possible because the control function and process model are two sides of the same coin, and a valuable indicator of capacity and condition of assets.

Recommendations

- Evaluate current and future process automation strategies in terms of precise implementation and flawless execution.
- Institute a comprehensive Continuous Improvement program for Process Automation.
- Acquire a set of monitoring tools that facilitate a 6 Sigma approach.
- Integrate process automation performance into the plant presentation strategy.

Please help us improve our deliverables to you – take our survey linked to this transmittal e-mail or at www.arcweb.com/myarc in the Client Area. For further information, contact your account manager or the author at dwoll@arcweb.com. Recommended circulation: All MAS-P and MAS-H clients. *ARC Insights are published and copyrighted by ARC Advisory Group. The information is proprietary to ARC and no part of it may be reproduced without prior permission from ARC.*