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5 Ways Modern Integrated Automation Makes Plants Safer

Executive Summary

By upgrading their automation technology, manufacturing plants are able to integrate safety functionality into all standard components for improved system performance and productivity. Learn five ways today's most advanced integrated automation technology helps plants exceed global safety-compliance requirements quickly and cost-effectively.

Digital Factory

Integrated Intelligent Safety Solutions for Continuous Improvement and Operational Excellence

In today's competitive global environment, manufacturing plants are under constant pressure to contribute to their companies' profitability and growth. In their efforts to boost productivity and efficiency, facilities are deploying integrated, intelligent safety solutions as a lever for continuous improvement and operational excellence.

Within the past decade, advancements in automation technology have made it easier for plants to reliably protect their workers, machines and the environment while improving productivity, reducing costs, and complying with pertinent safety and environmental regulations. The highest-performing automation systems integrate safety functionality into all the standard components, and enable simpler, faster and more cost-effective implementation of safe and productive machines.

Many controllers — particularly older ones — lack safety-integration capabilities. But facilities must take the strategic opportunity to upgrade to modern automation technology that not only improves the overall performance of their systems, but also exceeds global safety-compliance requirements. Below are five ways that today's most advanced integrated automation technology makes plants safer.



1. Integrated Safety Functionality

In the past, plant engineers had to hardwire e-stops, gate interlocks, light curtains and other monitoring and safety-shutdown equipment as “bolt-on” accessories to a separate safety system. With today's most innovative automation technology, however, safety features are seamlessly integrated into all of the components. All programming — whether it's for safety or standard hardware — is done within the same software package, so safety planning is standardized throughout the system.

In addition to making plants safer, integrated safety reduces total cost of ownership, and places less strain on engineering and maintenance personnel. It also enables greater system availability — due to improved diagnostics and troubleshooting — and greater operational flexibility, as plants can reconfigure their floor layouts and machine placements more easily.

2. Compliance with Safety Standards

Unlike older or underperforming systems, today's modern, high-performing automation components maximize process safety by meeting the latest international standards for fault-tolerant applications. These standards, including IEC 61508, ANSI/ISA-84, IEC 62061, EN ISO 13849-1 and IEC 61511, cover the planning, documentation and assessment of all activities required to manage safety throughout the entire life of a system.

IEC 61508, for example, is an international standard for the functional safety of automation components that are designed to detect potentially dangerous conditions and initiate corrective or preventative action. The standard establishes criteria for a Safety Integrity Level (SIL), which describes a safety function's probability of a dangerous failure per hour.



Functional safety is the detection of a potentially dangerous condition, resulting in the activation of a device or mechanism to prevent or mitigate the effects of the hazardous event. The objective of functional safety is to reduce risk to a tolerable level, with the overarching goals of avoiding accidents and damage when faults occur, and maximizing safety for people, equipment and the environment.

3. Transmission of Safety-Related Data

With advancements in automation technology and the emergence of networked safety, it's no longer necessary to run two separate fieldbuses for safety and non-safety data. Plants can use a standard fieldbus to transmit safety-relevant data, which reduces wiring complexity, system costs and training demands while improving diagnostic capabilities and freeing up space in the control cabinet.

The emergence of PROFIsafe — an integrated safety profile developed by the global consortium PROFI International — extends the standard communications protocol to address special requirements necessary to conform to standards such as IEC 61508. For example, PROFIsafe adds elements such as message numbering and data-consistency checks to rule out typical network messaging faults, enabling networked safety devices to meet the reliability requirements of SIL 3 as prescribed by IEC 61508.

4. Deeper Visibility into Problems

Advanced diagnostic capabilities provide deeper, real-time visibility into system performance and behavior, enabling plants to be more proactive when addressing potential problems.

With integrated safety, it's no longer necessary to constantly interrogate the system to determine if e-stops and other I/O safety devices are functioning properly. Today's PLC systems conduct those validation tests automatically and report the results to the controller. Since the controller doesn't have to initiate and send the commands across the network to conduct validation tests, the process consumes less code and less bandwidth, while making the entire system more efficient and less vulnerable to programming errors.

With safety solutions integrated directly into standard control architectures, plants can leverage automation technology to address two separate issues: functional safety and system availability. Integrated safety helps to minimize accidents and downtime by enabling operators to diagnose hazardous conditions more intelligently and quickly.

5. Remote Diagnostic Capabilities

Today, modular components such as PLCs, HMIs, drives and network switches offer integrated diagnostic functions, which makes system monitoring, troubleshooting, and maintenance easier and safer than ever before. With the integration of wireless technology, plant personnel can view the status information of all components from a networked computer or mobile device. The system can send automatic alerts to the mobile devices of responsible parties, who can securely log into the system, if necessary, to assess and correct the situation.

With real-time remote diagnostic capabilities, operators and maintenance technicians are empowered to detect, report, and clear faults quickly and safely. Technicians, for example, can troubleshoot issues inside motor-control cabinets from a safe distance, minimizing the need to wear the specialized personal protective equipment at all times that may be necessary to shield them from arc-flash hazards.

Safety Integrated with Siemens Totally Integrated Automation

Through today's most advanced automation systems — which integrate safety functionality into standard control architecture — manufacturers are leveraging safety to boost productivity (by increasing system availability), reduce costs and build competitive advantage.

Siemens Totally Integrated Automation (TIA) — an open system architecture that covers the entire production process and maximizes the interoperability of all automation components — seamlessly integrates safety technologies into the standard automation system. The Siemens TIA portfolio covers all safety requirements, supports flexible architectures, and reduces the costs and complexities of configuration, training, wiring and maintenance by integrating safety, control and predictive maintenance into one engineering framework.

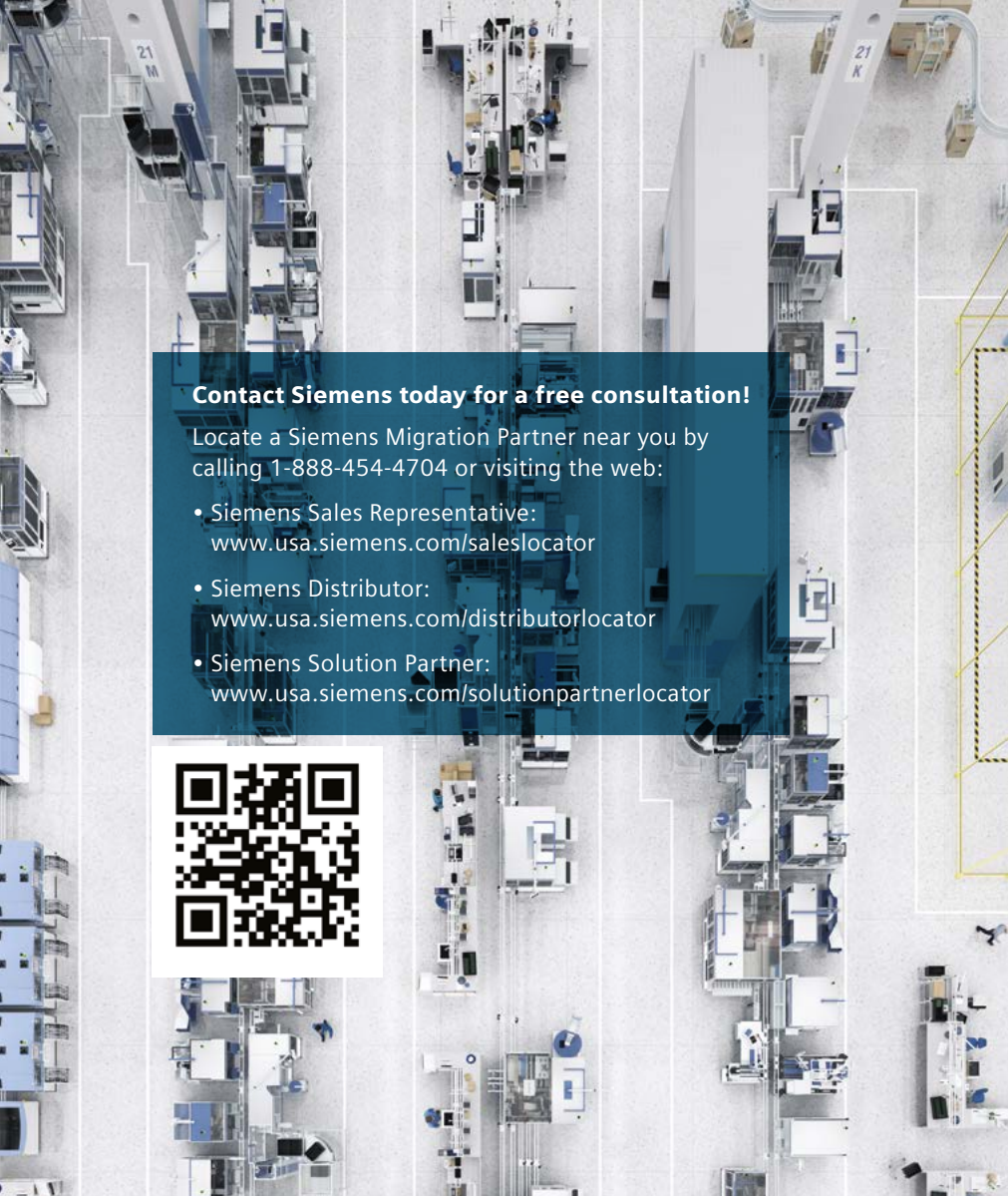
Siemens TIA offers a number of safety-related benefits to manufacturing plants, including:

- One controller, bus and engineering framework for standard and fail-safe automation;
- Uniform diagnostic functions for standard and safety hardware;
- Improved engineering efficiency due to the integration of safety technology into the standard automation software;

- The ability to transmit safety-related data via a standard fieldbus, which minimizes wiring complexity, reduces system costs and simplifies safety architectures;
- A comprehensive portfolio of PROFIsafe-compatible components that maximize process safety and comply with international standards, such as IEC 61508, IEC 62061, EN ISO 13849-1; and
- Comprehensive service and support, including onsite training, technical assistance, application examples, references and access to a global network of trusted Solution Partners who have expertise in Siemens Safety Integrated automation systems.

Once perceived as a burdensome cost of doing business, safety has evolved into a strategic activity that can improve a facility's productivity, efficiency, flexibility, quality, profitability and safety. With state-of-the-art integrated safety technology backed by world-class support, Siemens can help your plant turn safety into a competitive advantage that increases your productivity like never before.

Learn more about the benefits of modern integrated automation by visiting www.usa.siemens.com/modernize.



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