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Channel Chat

Four key benefits of integrated safety control networks

By Jay Cross, CAP

There has always been some form of safety systems implemented in industrial manufacturing automation. However, the manually driven, hardwired safety systems of the past are losing their place in the modernized plant to networked safety systems. This is a new approach; in the past five to six years you would not have seen these integrated systems in applications.

Today, the trend is to make safety more methodical and more integrated into the core of the control systems—not just added as an afterthought. Integrating safety systems into the line control systems at the plant floor is now a part of the safety system design and a requirement in the electrical specifications of most of our clients. We certainly encourage all customers to follow this methodology.

In the old-style architecture, there were hardwired safety systems that were functional, but they lacked key features and functions to protect against possible failure, creating an unsafe situation. For example, there is now redundancy in the devices, the mechanics, the electronics, and the software and hardware. Now, we can centrally manage all the safety devices, such as push-button E-stops, pull cords, and light curtains. They are integrated directly into the line control system and programmed for flexibility to easily control these devices in zones while maintaining safety ratings.

The safety system converges with the line control systems and is held separately and managed based on safety-level requirements. This allows the safety system to be validated separately and to provide plantwide consistency. Key benefits of an integrated system include the following:

Tamperproof

Some operators tend to use the E-stop as a convenient method to stop the machine. E-stops are designed for emergencies, but are used in nonemergency scenarios all too often to stop the line. This generally causes longer downtime and affects production related to restarting the machines.

An integrated safety system allows plants to create safety zones to control how the line is stopped or the areas of machines that are safe to access to clear jams without stopping the machines or the entire line. Now criteria can be developed and programmed into the integrated safety software for safe access and to maintain productivity on the line. Before, those changes had to be made with hardwiring and machine changes.

Control

Disparate controls and data slow down operations. By integrating all of the safety controls, plant managers and operators can easily view the data, identify the problems, and decide the best course of action. Diagnostics and alarms can be designed from collected safety information. The customers determine how they want to monitor the system and what data they want to see, such as downtime monitoring.

Before, it was nice to have data; now it is required to have data. Supervisory software can drill down to interrogate each device. This gives the engineering staff the data to access the device and monitor the equipment for failures and frequent incidents. They can make adjustments to improve overall equipment effectiveness. The fault codes provided tell engineering exactly what happened. Our objective is to provide a data-rich environment.

Flexibility

Flexibility on a line has become increasingly important for manufacturers to meet changing customer demands. Whereas hardwired safety systems were analogous to casting concrete or carving stone, digitally integrated safety systems are designed to be nimble. Standardized design allows for changes on the line and expansion efficiencies. The installations typically only require a couple wires, and new parts and old parts can be swapped out in minutes.

OSHA/ISO-13849-1

In general, the Occupation Safety and Health Administration (OSHA) requires the employer to provide a safe work environment and to use a proven method to assure that one exists. Therefore OSHA relies on ISO-13489-1 to define what makes an integrated safety system safe.

The ISO-13849-1 standards help define the safety (performance) level, the safety functions required, the safety control system to be used, and the safety devices to be used. This is all done by identifying the hazards defined in a risk assessment.

By understanding these requirements, designing and integrating the system to these standards, and properly documenting the safety system, customers can be assured that OSHA requirements are met and that a safe system has been integrated.

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