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ViewPoint

CONSIDER CERTIFIED SIL DEVICES TO IMPROVE SAFETY WHILE REDUCING COST OF COMPLIANCE

Installing supplier certified SIL Rated instrumentation can reduce the cost of IEC 61511 safety compliance in lieu of employing “prior use” certification commonly practiced by many end users.

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One Series Safety Transmitter

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Summary

Keeping plants safe requires huge investments in Safety Instrumented Systems (SIS) while balancing the high cost of regulatory compliance. Since the end user is ultimately responsible for compliance to IEC 61511, installing supplier certified SIS instrumentation can reduce the total cost of ownership in lieu of supplying proof of “prior use” data commonly practiced by self-certifying end users and suppliers.

Issues

The IEC 61511 standard was developed for end users, designers, and system integrators. This standard and the identical ISA-84.01 standard were developed for process safety equipment. Devices (pressure and temperature transmitters, level meters, flow meters, switches, etc.) can meet IEC 61511 by either end user certification under “prior use” provisions or installing Safety Integrity Level (SIL) rated SIS devices certified to IEC 61508. IEC 61508, (Functional Safety of Electric/Electronic/Programmable Electronic Safety-Related Systems) is a companion standard that specifies the criteria that suppliers must follow to claim a SIL certification for their devices. The cost savings realized by users self-certifying installed equipment under “prior use” can be enticing. However, when the administrative cost, time and dedicated personnel are considered, opting for IEC 61508 SIL certified instruments may be a significantly lower-cost approach despite the potentially higher initial purchase price of SIL rated devices.

Prior Use Certification Can be Costly

IEC 61511 provides general guidelines requiring interpretation by end users certifying functional safety systems for compliance particularly when “prior use” is deployed. The “prior use” provision was included to help users economically certify thousands of existing SIS devices

in service. The “prior use” method requires the end user, not the supplier, to certify and validate the reliability of the SIS hardware and software of the product under actual operating conditions. End users must determine if their applications are appropriate by taking into account the installation, process, and environmental conditions and their effects on the installed equipment.

Prior use certification is difficult, especially when you consider that the installed devices can be old and the maintenance technicians may have varying degrees of experience and documentation. The lack of end user knowledge and experience in prior use certification procedures will add hidden costs when compared to purchasing SIL-certified devices. For example, end users do not understand the impact resulting from the need for comprehensive historical documentation, especially when required from the device manufacturer. Plant safety upgrades that require dedicated manpower to track historical equipment data will strain existing limited resources.

Deploying “prior use” will have long-term drawbacks that can increase costs and can reduce plant safety. Deploying “prior use” will block the installation of newer technologies leading to a competitive disadvantage compared to other similar plants. This would perpetuate the use of older SIS devices that lack the diagnostics and intelligence of newer products that help operators identify

Prior Use Requirements
Similar Operating Process Conditions
Similar Safety Applications
Similar Operating Process Conditions
Similar Physical Environment
Multiple Years of Documented Safe Operation
Sufficient Operating Experience
No Significant Design Changes to software and hardware (unlikely)
Level of Documented Evidence Should be in Accordance with the Complexity of the Device
Evaluate product revisions and changes

End User “Prior Use” Requirements are Ambiguous and Costly to Implement

product and process problems of safety devices without shutting down the plant. In older devices, problems and safety issues can only be discovered by proof testing, typically once a year or longer since many can delay testing for up to three years.

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Online Diagnostics Increases Safety

Safety Related Diagnostics

Plugged Pressure Transmitter Impulse Lines

Alarm and Emergency Shut-down

Measurement Faults

Electronic Component Faults

Software Faults

Process Over-range Damage

Mechanical Faults

Online Device Diagnostics

Newer certified SIS devices provide improved performance and embedded diagnostics that continuously monitor device health. Embedded device diagnostics are automated and perform continuously. Continuous automated testing lowers compliance cost and has a significantly higher probability of detecting product and application problems when they happen. As diagnostics prove themselves, it is likely that automated diagnostic testing will complement the existing testing requirements and replace or reduce the periodic proof test required by the standard in the future.

Recommendations

- Users should consider total cost of ownership benefits of adopting certified SIL rated devices over the lower initial cost of “prior use” and employ “prior use” only when certified devices are unavailable.
- Solicit help from suppliers with safety device expertise. Consultants and system integrators can also provide unbiased services to help users determine the best course of action for their unique goals and objectives.
- Consider the new SIL-certified One Series Safety Transmitter for pressure and temperature monitoring with diagnostics that can provide warnings, protect equipment and/or shutdown the process without a safety PLC in the event of an abnormal situation.