Inspec Solutions delivers cost effective, small-scale process safety solution using Compact GuardLogix safety controller from Rockwell Automation

Leading steel producer addresses safety concerns and gains easily expandable solution, with less cost and engineering effort

Challenge

Inspec Solutions was tasked with designing and installing a cost effective small process safety solution at a leading European steel producer

Solutions

A Rockwell Automation solution was installed, which included:

- Allen-Bradley Compact GuardLogix programmable automation/safety controller
- POINT Guard I/O modules
- CIP protocol
- CIP Safety Protocol
- EtherNet/IP

Results

- Simpler and more cost effective than widely available large-scale process safety solutions
- Far more flexible and feature rich than hard-wired solutions
- Best fit solution – not over engineered
- Less maintenance than larger systems
- Complies fully with customer's Safety Requirement Specification documents

Inspec was asked by a leading European steel producer to develop, design, test and deliver several small emergency shutdown systems to SIL 1 for process applications at a foundry

Background

Inspec Solutions Ltd, founded in 2000, has worked in a variety of industries, with many of its customers coming from the steel, petrochemical and energy sectors, as well as many smaller specialist manufacturers all over the UK and Europe.

It provides complex, high quality electrical, control and safety systems to a wide variety of clients and industries, specialising in PLC/SCADA, DCS and high-integrity safety systems for both process and machine safety-related applications. In addition to system implementation, Inspec Solutions also offers full lifecycle consultancy services to assist clients achieve their safety-related requirements.

Inspec assists companies looking to either install new automation infrastructures, or upgrade existing ones. Upgrades are generally required to either replace older, less reliable legacy control systems, for which it is hard to find spares and engineering support, or simply to make use of more accurate and more efficient contemporary automation equipment.

In a recent project Inspec was asked by a leading European steel producer to develop, design, test and deliver several small emergency shutdown systems to SIL 1 for process applications at a foundry. The request was in response to internal safety audits that revealed the requirement for

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several safety-related systems for applications, including cooling water and gas containment control.

Inspec selected the Allen-Bradley® Compact GuardLogix® programmable automation/safety controller and POINT Guard I/O™ modules, which proved to be ideal for the requirements and were less complex and costly than either a hard wired or large-scale process safety solution.

Inspec Solutions is a member of the Rockwell Automation PartnerNetwork™ program as a System Integrator Partner. Recognised System Integrators are competent and committed to lead with Rockwell Automation and have a mutually supportive relationship with the Rockwell Automation sales and distributors that Inspec Solutions works with.

Challenge

The primary requirement was for Inspec to source and implement E/E/PE systems capable of executing between 1 and 20 (low) demand mode safety-related functions as defined in the customer's Safety Requirement Specification (SRS) documents.

There were numerous secondary requirements, including delivering a secure system that was resistant to unauthorised changes and one that could easily evolve to cater for additional safety related functions – a level of ease that discounted a hard-wired solution. The customer also wanted the ability for its operators to interact with it via a familiar platform on HMI/SCADA terminals.

Last but not least, it had to be cost effective. Many process safety solutions tend to be aimed at large-scale installations where the cost of the processor unit can be spread across multiple I/O. This application, on the other hand, comprised several small, discrete safety systems, with just one or two safety loops each. So an investment in a larger dedicated process safety controller was simply not financially justifiable.

Solution

According to Daniel Adams, Project Engineer at Inspec: "After considering all platforms available on the market, we narrowed it down to two suppliers, and finally opted for the Compact GuardLogix programmable automation/safety controller from Rockwell Automation.

"There were multiple reasons for this choice," he continues. "Firstly, we considered the equipment lead times and customer familiarity. Allen-Bradley equipment, a Rockwell Automation brand, was already widely used across the customer's site and its engineers were comfortable with the Logix programming environment and the use of RSView® software. Communication to the SCADA solution was easier too, as was interfacing to the process control system, which was already running Allen-Bradley ControlLogix® PACs and older Allen-Bradley PLC-5® PLCs. This was because we could use the native CIP™ protocol between the Compact GuardLogix controller and the existing Allen Bradley controllers and software for any non-safety communications over EtherNet/IP™. The Compact GuardLogix PACs communicate with the POINT Guard I/O™ modules using the CIP Safety™ protocol, which is used to achieve assured safety communications over a standard Ethernet infrastructure. If we had used an alternative platform we may have also had to use an alternative protocol such as Modbus, which is not as

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powerful in terms of communications and is not as easy to use for transferring messages around the system."

"There are other products at the same mid-range scale as Compact GuardLogix that cover machinery safety," he adds, "but they cannot really be considered effective for use in the process-control domain. Their certifications generally meet the IEC13849 and IEC62061 machinery safety standards, but none of them claim to meet IEC61511 – the process industry standard for functional safety – however Compact GuardLogix does."

Adams continues: "The Compact GuardLogix-based solution was just what we were looking for. It was a perfect size for the job in hand and was not over engineered compared to a larger-scale process safety solution – this means that the ongoing costs were far more palatable too. It excels over hard-wired system as well. It is far easier using programmable system feedback and it is much more flexible in terms of system evolution, especially when changing or adding logic sequences. And, of course, you can interrogate the system to get data for real-time and historic decision-making processes."

Results

The system has been fully installed at the steel company's foundry and the customer is happy with its operation. The customer has since been subjected to audit visits from the national safety executive and there have been no further flags.

"We are all tying the paperwork together now," Adams continues, "but in terms of meeting the requirements of

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what the customer needed from a Logix solution, there have been no issues and it is doing what it is intended to do. All systems tests supported our solution and all the calculations meet the original safety requirements.

"You generally have no problems with Logix-based solutions and their associated I/O," Adams concludes, "because they are so well engineered. We also carried out

A test rig developed by Inspec for factory acceptance testing

a separate assessment independent to the project to the requirements of IEC 61511 to investigate the use of the Compact GuardLogix and POINT Guard I/O to the claimed SIL 3 level. The results of our assessment demonstrated that the Compact GuardLogix and POINT Guard I/O can be used in safety-related process applications up to SIL 3, but potential users must be aware of its calculated availability level and the fact that it is a de-energised to safe state system – this doesn't mean its application base is limited, it just means that safety system designers have to take this into account when designing safety solutions."

According to Gunther Sälzler, Product Manager at Rockwell Automation: "The typical use case for Compact GuardLogix and even for GuardLogix is factory automation – in high-demand mode. Both systems are also qualified to be used in process applications. This is recognised with the TÜV certification we have in place for both systems. For low-demand applications, such as this one, specific safety calculations are performed by the system integrator to prove the safety loop design (sensor/logic/actuator) meets the required levels. For that purpose we provide failure rate data for both systems according to IEC61508."

Additional Information
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The Rockwell Automation PartnerNetwork™ program offers global manufacturers access to a collaborative network of companies mutually focused on developing, implementing and supporting best-in-breed solutions to achieve plantwide optimization, improve machine performance, and meet sustainability objectives.For more information on the Rockwell Automation PartnerNetwork, visit www.rockwellautomation.com/partners

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Inspec Solutions Ltd is a leading independent automation supplier to the UK's energy, metals, chemicals, oil & gas and manufacturing industries. It designs, manufactures, tests, installs and commissions Safety, PLC, SCADA, drive, DCS systems and web-enabled database applications, for projects ranging from simple, small-scale standalone systems to large complex integrated multi-platform solutions. Inspec has extensive experience of upstream Oil & Gas safety systems (ESD/F&G) and is expanding increasingly into this area with UK-based Oil / Energy / Chemical companies. It also offers the provision of HAZOP, SIL Determination (LOPA), Alarm Prioritisation and Rationalisation (to EEMUA191) and Hazardous Area Equipment selection and supply.

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