

SIS Development and the Safety Requirements Specification



Developing a safety requirement specification (SRS) prior to design and engineering.

Challenges for End Users within the functional safety marketplace:

Dedicated functional safety resources can be difficult to source within operating companies in today's lean manufacturing operations. In many cases dedicated functional safety (FS) specialists just do not exist and the halcyon days of 30 years ago, when teams of engineers were available in-house and are no longer the norm. Such in-house functional safety specialists have since either moved on, or retired and have not been replaced. Companies are now suffering from a loss of corporate memory as internal expertise has fragmented.

However the expectations both from Industry and the Regulators to improve both process and functional safety in light of recent significant industry incidents, has meant that the management of functional safety is an ever increasing imperative for the End Users (and their chosen EPC partners) to continue to operate their plants safely under their duty of care requirements.

The basis of safe operation includes the provision of layers of systems and procedures that reduce operating risks to a minimum, or "ALARP" (As Low as Reasonably Practicable). Alignment with industry good practice standards such as IEC 61508, IEC 61511 and IEC 62443 can support the End User in

terms of functional safety and cyber security management structure and deliverables that are robust and traceable.

Development of a Safety Requirements Specification:

We have learnt there is a significant disjoint between current processes for the design and execution of a Safety Instrumented System (SIS) and robust compliance to the relevant safety standards. This divide is particularly manifest between the life cycle phases of Hazard and Risk Assessment as the source of the Target Safety Integrity Level (Target SIL) and the development of a robust, meaningful SRS.

When it comes to allocating risk reduction requirements to instrumented protective layers, it is the responsibility of the End User to provide an SRS to the engineering/equipment supplier. This is identified as Phase 4, Overall Requirements, and Phase 9 for E/E/PES in the IEC 61508 safety life cycle models. Guidance is provided in IEC 61511 Ed 2 Part 1 clause 10.3 regarding the content of the SRS and the requirements at clause 8.2.4 for inclusion of any cyber security measures.

The performance and detailed information coming out of the earlier life cycle phases must align with these IEC recommended sections in the SRS development document.

If the details do not follow recommendations, there can be major consequences for both safety performance and the expansion of commercial, contractual and requirement responsibilities.

Well specified safety requirements reduce the risk of under or over specification, affecting both safety risk reduction requirements and capital to be deployed. This means that the SRS meets the desired scope, performance criteria, size and complexity of the application.

How ABB FSM Technical Authority can help:

Developing an SRS is normally possible using essential information found within the earlier Hazard and Risk Assessment life cycle phase and aligning this with the performance criteria, reliability and expected operating regime of the end user organisation. ABB works with our clients to create a workable and robust SRS in line with the compliance requirements of the standards.

By supporting End Users and/or EPC's to develop the SRS document we provide the following benefits:

- Technical support in addressing any missing information gaps in existing assumptions
- Test key assumptions to reduce cost, complexity in design and installation and expected maintenance regimes to ensure adequate provision is in-built
- Remove any ambiguity to technical, management and integrity requirements
- Independent assurance that the SRS meets the intended risk reduction to be afforded by the SIS
- Provide a robust basis for traceability and audit trail throughout later safety life cycle phases

ABB Safety Execution Centres supply a range of integrated engineering services in process industries, including, consultancy, project management and implementation to customers worldwide. We offer functional safety design and verification management and broader technical consultancy services. As part of our integrated automation engineering management portfolio we offer functional safety management consultancy services for new and existing assets.

Services include:

- Independent Functional Safety Authority for both new and Brownfield projects
- Hazard and risk assessment
- Independent Functional Safety Audit & Assessment
- Safety Function SIL Determination and SIL Verification
- Design and execution of SIS projects in compliance with IEC 61508 - 61511 requirements via accredited TUV certified Safety Execution Centres, using TUV certified products and TUV certificated FS Expert & FS Engineer competent safety engineers
- SIS maintenance, inspection and repair
- Regulatory compliance and auditing
- SIS life extension or replacement migration
- Functional safety management, standards and procedures
- Industry lading technical training
- Recognised Industry competency and independence

Our approach is holistic we understand all the dimensions relevant to functional safety management, design, operation and maintenance.

Our solutions are proven to deliver technical robustness, operational excellence and sustainable business improvement. We prefer to work in partnership with our customers where we deliver benefits together and we transfer relevant skills to our customer for ongoing improvement.

We have extensive experience of introducing improvements and technical solutions in organisations and in managing the necessary changes. Our approach is to work alongside customers in fully implementing sustainable change.

Assured and certified products, services, delivery and execution.

For further information please contact:
ABB FSM Technical Authority
Howard Road, Eaton Socon, St Neots
Cambridgeshire, PE19 8EU
Phone: +44 (0)1480 475321
E-Mail: oilandgas@gb.abb.com

www.abb.com/oilandgas
www.functionalsafetyinsights.com

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