

Achieved SIL assessment

Meeting the challenge of ensuring the integrity and regulatory requirements for your specific safety application.

The Importance of achieved SIL assessment:

With increasing acceptance and implementation of 'smart' safety automation technologies, the process industries are experiencing a rapid evolution of the techniques and measures to apply in order to meet their functional safety management requirements.

Given the increasing focus on safety performance improvement, end-users now require closer integration of their safety and control systems, safety functions at varying process states, and flexibility, scalability, and reusability of their safety components.

With a wide variety of options available to the end user, the challenge to determine the safest, most reliable and cost effective safety instrumented system (SIS) appropriately. Not every combination proposed by the supply chain will meet the safety integrity and regulatory requirements of your specific application.

However as the end users delegate their functional safety management obligations into the supply chain, there is a need to ensure that the various elements of the safety lifecycle are delivered in compliance with industry good practice.

Even before selecting the elements for a safety system, it is first important to understand what safety related data is required. Ultimately for end users to demonstrate compliance to industry good practice standards such as IEC 61508 and IEC 61511, they will need to ensure that the SIS systems that are about to be installed meet in all respects the specific details of the Safety Requirements Specification (SRS) established at the outset of the project.

What should be undertaken in this assessment?

In terms of IEC 61508 - 61511 SIL Capability, each element should have the following information available:

- Safe Failure Fraction (SFF)
- Hardware Fault Tolerance (HFT)
- Type Classification (A or B)
- Target Failure Measure, expressed as either:- PFDavg, or Dangerous Failure Rate [hour]
- Systematic Capability



The objective of gathering the data above for each element of the logic solver sub-system and the corresponding field instrumentation, is to enable the SIL Achievement process to be fully undertaken for the end to end safety function and in doing so provide demonstrable evidence that SIL has (or in some cases, has not) been achieved. Consideration must be given to the availability and supportive evidence of these parameters for each element when selecting those elements on the basis of their functional safety suitability.

In the case of elements being supplied from a third party organisation, a validated claim that the elements supplied have the claimed parameters should be a key verification activity. Sound judgment should be used in the selection of IEC 61508 Ed 2 'route to compliance' equipment without substantiated data.

The demonstration of SIL Achievement for a safety function could be considered ineffective if elements are selected that have no available safety data sets. In such circumstances, the question could be asked as to why the element was originally selected for design at the outset?

How ABB can help:

ABB can support the project during the FEED study or as part of a modification management of change process, for setting out the requirements for SIL Achievement linked to your safety requirements specification (SRS) documentation. In addition ABB can provide an independent assessment of Achieved SIL during the detailed design & engineering of the SIS as part of the verification and validation requirements in accordance with IEC 61508/61511.

ABB works with our clients to create a workable and robust Achieved SIL report in line with the compliance requirements of the standards. By supporting end users and/or EPC's develop the Achieved SIL documentation we provide the following benefits:

- Provision of a structured Achieved SIL document skeleton that can be reused
- Technical support in addressing any missing information - gaps in existing component data set assumptions
- Test key assumptions and calculations against the SRS requirements to ensure individual SIF's will provide the correct level of performance and integrity
- Provide clarification and reduce ambiguity to technical, management and integrity requirements
- Provide independent assurance that the Achieved SIL assessment meets the intended risk reduction to be afforded by the complete SIS



ABB Process Automation supplies a range of integrated engineering services in manufacturing operations and engineering, including, consultancy, project implementation and management, to customers within the process industries worldwide.

We offer functional certified 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
- Independent Functional Safety Assessment
- Development and assessment of Safety Requirement Specifications

- SIL Determination using ABB's TRAC software tool
- Safety Instrumented System Auditing
- Development of Functional Safety Management systems
- Design and execution of SIS projects in compliance with IEC 61508 - 61511 requirements via accredited TuV certified safety execution centres

Our approach is holistic - we understand all the dimensions relevant to functional safety management, design and maintenance including:

- Hazop and risk assessment
- SIS design and build
- SIS maintenance, inspection and repair
- Regulatory compliance and auditing
- SIS life extension or replacement migration
- Functional safety management, standards and procedures
- Sub-contractor management
- Competency and Independence

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 so 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 Safety Lead Competency Centre

Howard Road, Eaton Socon, St Neots

Cambridgeshire, PE19 8EU

Phone: +44 (0)1480 475321

E-Mail: oilandgas@gb.abb.com

www.abb.com/oilandgas

Power and productivity
for a better world™

