

# Functional Safety Assessment

## Safety lifecycle stages 1 to 5



Ensuring the ongoing operational integrity and regulatory requirements for asset owner Safety Instrumented Systems (SIS).

### **The importance of Functional Safety Assessments (FSAs) for your installed Safety Instrumented Systems (SIS)**

During the initial project execution and once your SIS is operational at site, it will be subject to the operating company's configuration management and change control systems in order for it to maintain functional safety performance over the life-time of its operation.

For systems that have been installed and operating for a number of years, there are expectations from both Corporate and Regulatory stakeholders that such installed systems are subject to FSAs to ensure that the SIS continues to provide the correct level of risk reduction via appropriate maintenance, operation and modification controls, including procedures and safe systems of work.

As part of maintaining sustainable operations, the FSA activity should be designed and delivered to underpin the operational basis of safety and corporate responsibility of the organization to maintain best in class process safety measures.

### **What constitutes industry good practice?**

The operation of an organizational functional safety management system will typically run in parallel with independent FSAs.

Functional Safety Audits and Functional Safety Assessments of installed safety systems are a mandatory compliance requirement in accordance with the safety standard IEC 61511.

Focusing on the process sector variant safety standard IEC 61511; there are several requirements within the standard identifying the stages in the safety life cycle at which the FSA activities shall be identified.

### **Independent FSA**

Regardless of the technology platform installed within the asset, the asset owner functional safety management system procedures should have been followed and implemented from the outset of the hazard and risk assessment to the final validation of the SIS as it was originally put into service.

By engaging the ABB Safety Lifecycle Services Team to undertake FSAs, the customer benefits from an independent and impartial assessment of ongoing compliance to the safety standards, whilst providing a review of the 'health' of the SIS at any safety life cycle stage or changes to the SIS that may have resulted from the customer's management of change processes.

The FSA can therefore form part of the customer's initial project execution, periodic safety performance reviews and for when individual modifications are undertaken to the SIS.

#### **What will be undertaken in an FSA?**

In terms of IEC 61511 assessments, the SIS(s) will be typically reviewed against relevant FSA stages to cover example areas such as:

- Adequacy of the procedures used for the specific SIS life cycle stage(s)
- Implementation and robustness of change management controls in respect of the continuing achieving of functional safety
- Assessment for management and control of safety requirements, SIS design & engineering, site acceptance testing and operation & maintenance
- Identification and prevention of systematic failures during life cycle activities which could jeopardize safety
- Assessing whether dangerous failure rates and architectural constraints of the safety instrumented system are in accordance with those assumed during the design phase
- Review and sampling of proof testing methods and test coverage including the use of overrides, bypasses and trip defeat
- Assessing the demand rate on the safety instrumented functions during actual operation to verify the assumptions
- A discussion on the how the parameters of the SIS technology platform is currently configured and if the settings of the logic solver require any immediate remediation or recommendations for maintaining functional safety performance

The objective in gathering the above example data, is to review and identify if the functional safety performance of the SIS has been compromised and if so, to recommend suitable and cost effective mitigation measures.

#### **How ABB can help**

ABB offers unparalleled experience and expertise in functional safety management, SIS design engineering, operation & maintenance, audits and assessments. Through its global IEC 61508 and 61511 third party certified Safety Execution Centers, TÜV certified FS Expert & FS Engineer functional safety consultants and competent FS auditors and FS assessors, are able to deliver a range of independent and well trusted audit and assessment services. These independent and unbiased services utilize proven methodologies designed to provide customers with confidential and structured outputs enabling them to cost effectively, implement improvements and compliance programs.



ABB works with our customers to create a workable and independent FSA service in-line with the compliance requirements of the standards. By supporting end users and/or EPC's with FS assessments we provide the following services:

- Technical support in addressing any missing information gaps in existing SIS life cycle management assumptions
- Gap assessment of the functional safety management systems deployed within the asset owners facility
- Provide clarification and reduce ambiguity to SIS project technical, management and integrity requirements
- Test key assumptions for preventative and corrective maintenance practices for SIS to determine if the SIS will continue to provide the correct level of performance and integrity



As part of the wider ABB Group, we supply a range of integrated engineering services in manufacturing operations and engineering including; consultancy, project implementation and management to customers within the process industries worldwide.

ABB offer functional safety design, engineering 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.

Our approach is holistic and includes complete life cycle management services. We understand all the dimensions relevant to functional safety management, design and maintenance including:

- Digitized FSA and FSM compliance reporting via ABB Compliance Management application software
- E-HAZOP
- Hazard and risk assessment
- Human factors
- Machinery safety
- Mechanical relief and blowdown design
- Process Safety Management (PSM)
- Provision of technical training and competency development

- Recognised industry competency and independence
- Regulatory compliance and auditing
- SIL determination, SRS development and SIL verification
- SIS design and build
- SIS life extension or replacement migration
- SIS maintenance, inspection, repair and modification
- SIS operation and alarm management
- Sub-contractor management (Client Technical Authority)

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 impartiality and independence, improvements and technical solutions in organizations and in managing the necessary changes, so our approach is to work alongside customers in fully implementing sustainable change.

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