

# ABB Service Group: Operation and maintenance of Safety Instrumented Systems



ABB's capability for Safety Instrumented System Operation and Maintenance

The overall operation, maintenance, repair, modification and retrofit phases of any Safety Instrumented System (SIS) pose significant challenges for process plant operators, particularly those in heavily regulated and highly hazardous processing sectors such as the offshore oil & gas sector.

Operations and maintenance activities are a key safety lifecycle management requirement for the SIS and are essential in ensuring that the SIS is capable of responding to any demands placed upon it. It is therefore vital to conduct periodic proof tests of the safety instrumented functions (SIFs) and to inspect, monitor and maintain the SIS equipment itself.

### **Sustainable, profitable and safe operations**

Operating, maintaining and modifying a SIS which is designed and engineered in accordance with minimum industry good practice requirements, i.e. compliance with IEC 61508 / IEC 61511 (or those legacy systems installed prior to the release of these functional safety standards), poses both significant challenges and operational / process limitations onto the asset owner. One of the fundamental requirements that IEC 61511 places

upon operations and maintenance (O&M) activities is to maintain the performance of the 'designed-in' functional safety, integrity and Cyber security of the SIS throughout its installed life.

IEC 61511 and IEC 62443 stipulates the need for an operations and maintenance planning process and schedule for each SIS. Appropriate maintenance ensures each SIF continues to provide the required functionality with respect to its defined safety integrity and security level. Consistent operational management ensures that the SIS as a whole provides the required operational risk reduction.

Following the planning activities closely is the need for appropriate maintenance procedures which are required to define how to maintain and repair the SIS. Essentially this will identify the need for the 'preventative' maintenance (the scheduled activities PM) and the 'corrective' maintenance (the unplanned activities CM). An approach for each requirement will need to be established for the overall planning process including the need for suitable procedures, routines and proforma and management KPIs / reporting, as the activities differ greatly.

In addition, every aspect of the plans, the procedures and the competency of personnel involved during PM and CM must be documented, reviewed, approved and stored.

Against this background of planning, systems and competency the asset owner (including their supply chain partners) O&M teams work under continuously evolving process pressures and demands in addition to ensuring the installed SIS continues to provide its designed-in functional safety.

In doing so, the asset owners must fully understand the function the SIS serves as part of the basis of safety for the operation and its relative role in both normal and abnormal operating situations, such as what to do when it initiates a shutdown; and how to react to diagnostic alarms from SIS components.

The plant maintenance and supply chain partner teams therefore play a pivotal role in providing operators with an SIS that performs to its targeted function and integrity and thus ensures safe operation of the plant. Management also has a critical role to play in balancing the profit vs. safety equation. Everyone will appreciate that good safety is good business for maintaining profitable and sustainable business operations.

#### **ABB Service Group Operations & Maintenance functional safety management delivery model**

In today's dynamic manufacturing and regulatory climate, many operating companies require O&M services from trusted supply chain partners that encompass the following requirements:

- Integrated automation and electrical products and systems for optimised manufacturing
- Engineering, procurement and construction services that meet manufacturing requirements and cost
- Operations and maintenance services that provide a platform for sustainable and Cyber secure operational success

We understand that a processing facility cannot operate at peak efficiency and profitability without being maintained correctly. Our market-leading O&M and modification activities are therefore managed as a combined entity, enabling your SIS requirements to be planned and managed as one.

In order to meet the expectations of our customers, the ABB Service Group offers a range of industrial solutions for high hazard operating facilities,

encompassing production, processing, transportation, storage and distribution. ABB's view on this requirement is one of market differentiation for 'best in class' O&M service for SIS. To achieve this, ABB's service teams are adopting a functional safety management system that is not only aligned to the safety standards, but also has independent third party accreditation from TÜV.

The use of a structured and systematic lifecycle management model allows for safety-related O&M service activities to be planned and delivered using corrective and preventative maintenance with in-depth verification and validation activities built into the processes required.

In the context of the IEC 61508 and IEC 61511 standards, it is essential that all hardware and/or software modifications related to any SIS, which are in operation, are properly planned, reviewed and approved prior to the execution of these activities. Our TÜV Functional Safety Management System (FSMS) also includes the requirements for management of change, impact assessment and modifications to operational SIS, designed, engineered and delivered with full compliance to the safety standards.

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

ABB has a leading reputation for having a strong local business presence around the world, giving our customers access to local competent resources to deliver their operations and maintenance service support. ABB's local TÜV certified Safety Service Centres provide the following capabilities:

- ABB 'Healthcare' and 'Sentinel' agreements covering SIS operations and maintenance activities
- Periodic SIS Functional Safety Audits and Assessments in accordance with IEC 61511
- Proof testing and SIS operational system services
- IEC 61511 compliant systems of work for corrective & preventative maintenance (CM & PM)
- SIS modification processes in compliance with IEC 61511 / IEC 61508
- Industry leading ABB FS Expert back up to the in-country service teams
- Client training in IEC 61511/61508 compliance requirements regarding their responsibilities
- SIS performance reviews and collection of data trending /KPI reporting
- Existing SIS assessment, planning and retrofit and evolution delivery services
- Cyber security risk assessments and installed automation system 'Cyber security Fingerprints'

ABB is committed to providing you with the resources, technology and tools you need to help you operate your plants more safely, as well as protect your employees, the environment and the surrounding community. With the need for local reliable service engineering resources and quality safety automation solutions having exponentially grown over the past few years, the depth and scope of our regulatory, technical, project execution and service knowledge provides you with the trusted expertise you need to successfully protect the integrity of your process, plant and people.

**Assured and certified products, services, delivery and execution.**

For further information regarding our global functional safety service network, 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](mailto:oilandgas@gb.abb.com)

**[www.abb.com/oilandgas](http://www.abb.com/oilandgas)**

---

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB AG does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB AG. Copyright © 2017 ABB  
All rights reserved