

# Safety project - post implementation Functional Safety Review

## Helping you meet your regulatory and company compliance requirements through our offering: Functional Safety Review

### Background

Functional safety is undoubtedly dependent on having the right equipment, designed and installed by a reputable company, with competent people following agreed practices and procedures. This, though, is just part of the story. Optimal functional safety is achieved throughout the entire safety lifecycle, not only from the end users of safety-related systems but also back up through the supply chain.

In other words, the global functional safety standard (IEC 61508) and the sector specific standard for the process industries (IEC 61511) are performance-based standards. They're not about having the right kit per se. Instead they're about achieving the right level of overall functional safety throughout the safety lifecycle, which includes specification, design, implementation and operation.

The safety lifecycle of equipment or other assets can span many years. It will involve different organizations and a variety of client-supplier contractual relationships that demand clearly specified responsibilities, activities and deliverables. It is therefore essential that all those organizations involved in implementing different phases of the safety lifecycle can demonstrate their competence and ability to work to the relevant standards.

Achieving the organizational capability needed to implement the requirements of IEC 61508 and IEC 61511 across the supply chain can be onerous and tricky. Each organization must be fully conversant with the standards and clarify which clauses apply to its areas of responsibility. Many of today's regulatory authorities effectively require companies to show this level of familiarity with the standards when they are checking for good practice.

That's why the latest versions of IEC 61508 and IEC 61511 make Functional Safety Assessments (FSAs) a mandatory requirement. This is in addition to the traditional activities of verification, validation and Functional Safety audits.



However for many organizations timely and phased Functional Safety assessments are not the modus operandi and it is not until installation and commissioning of the safety-related system that the client or the regulatory authorities ask for suitable and compliant Functional Safety assessment reports. Many clients are naturally concerned by the costs, resource requirements and project impact of a full blown IEC 61508 Functional Safety assessment. This is particularly true if they are not fully conversant with the detailed requirements of the standards.

To address these issues, ABB has developed a pragmatic Functional Safety review methodology which is performed 'post safety project design and implementation' but prior to installation and commissioning of the safety-related system on the client's site, enabling critical issues in achieving Functional Safety to be addressed and rectified at this critical stage whilst engineering and design resources are still assigned to the project. This provides confidence to the client that any major concerns regarding the achievement of Functional Safety have been addressed by the supplier/systems integrator before delivery of the system to the client's site.

### Scope of a Functional Safety review

This Functional Safety post implementation review focuses on the safety instrumented system (SIS) often seen as a critical part of the end user/process operator's risk reduction strategy. The SIS consists of the input subsystem, logic solver subsystem and final element subsystems.

One of the first review activities to be performed is to understand and agree the scope of supply for the organization that wishes to implement the Functional Safety review in the context of the SIS.

Which elements of the overall safety-related system are included in the scope of supply will vary significantly between different organizations.

So, for example, the scope of supply for a typical systems integrator is limited to the provision of the logic solver sub-system within the end-to-end safety-related system. In contrast, for an engineering procurement and construction (EPC) company, the scope typically includes the end-to-end safety-related system and all three subsystems.

The Functional Safety review aims to take a pragmatic approach to measure compliance against the requirements of IEC 61508 and IEC 61511. This is more acceptable to clients as opposed to a 'blind compliance' for the sake of compliance.

### Functional Safety Review methodology

The specific elements of the management system that are the most relevant are those relating to the management of Functional Safety. It is appreciated that many organizations do not have a fully compliant Functional Safety Management System (FSMS) already in place, but this is not a 'blocker' to the Functional Safety review, as the review looks at the key areas of:

- Availability and use of in-house Functional Safety management procedures, adequacy and completeness.
- Project start-up, processes used in the bid and proposal activities and compliance to clients requirements.
- Interfacing with the client, roles and responsibilities re: Functional Safety.
- Competencies of project personnel, how these competencies were managed and discharged.
- Third-party resources, roles and responsibilities, ownership, interfaces.
- Adequacy of safety requirements, transposition and traceability through design, engineering and factory acceptance testing.
- Safety management planning.
- Project Functional Safety processes, inputs and outputs.
- Configuration management.
- Management of change.
- Suitability and declaration of compliance of safety elements.
- SIL achievement against the target SIL's.

This Functional Safety review process is tailored to phase 10 of IEC 61508 (E/E/PE safety-related systems realization) and Phase 4 of IEC 61511 (design and engineering of safety instrumented systems) of the safety lifecycle being implemented by the client. The ABB Functional Safety review methodology uses checklists developed directly from IEC 61508 and IEC 61511.

### People are the key

People are the real key to achieving an efficient and effective Functional Safety review. Assessors should be looking to collect evidence from those who have been involved with the project, while the most significant contribution to the breadth and depth of coverage of the Functional Safety review comes from the knowledge and experience of the assessors themselves.

Once the evidence has been gathered and sifted and judgements have been made, the results of the functional safety review cover a spectrum, rather than delivering a simple yes/no answer.

### Output of the FS review

The Functional Safety review will deliver a report identifying shortfalls in the achievement of functional safety, prioritising the shortfalls into actions plans with a list of 'quick wins' for the client. The report is designed to be easily understood by different project engineering disciplines such as C&I engineers, quality engineers and project management and so facilitating an effective corrective action programs.

### Why ABB

ABB offers a Functional Safety review service which is truly independent from the client's management and technical organization and activities and meeting the independence requirements stated within IEC 61508 Ed2: Part 1, clause 8.2.15. The service provides a pragmatic and cost-effective approach to establishing if Functional Safety has been achieved, particularly in those instances where stakeholders are not fully up-to-speed with the detailed technical nuances of IEC 61508 and IEC 61511.

ABB has a global pool of competent Functional Safety Assessors who will deliver the functional safety review activity. These personnel have a comprehensive background in the design and engineering of SIS in accordance with the requirements of IEC 61508 and IEC 61511. In addition, they are employed in ABB's global Safety Execution Centers, which are certified by TÜV as having 61508/61511 compliant functional safety management systems. Our Functional Safety Assessors are also TÜV certified Functional Safety Engineers and Functional Safety Experts.

In the wider context, ABB has been in the safety systems global market for over 30 years and as such is a major and reputable supplier of safety-related Functional Safety consultancy, design, and engineering, full service support and lifetime maintenance, making ABB your ideal partner in Functional Safety.

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

For further information please contact:  
**ABB Safety Lead Competency Center**  
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)