

Functional Safety Consulting Services

Safety Instrumented Systems



Safety Instrumented System (SIS) Functional Safety Consulting performed by Emerson-certified specialists will help ensure conformance with the IEC 61511 Safety Life Cycle.

- Ensure safety standard conformance.
- Enable regulatory compliance.
- Enable Owners/Operators to reduce risk.
- Maximize Return-on-Investment (ROI).

Introduction

The development of international safety standards, IEC 61508 and IEC 61511, was a direct result of plant accidents that occurred in the industrial world. Studies of these incidents show that Safety Instrumented System design and maintenance are critical to a safe process. Safety Instrumented Systems can fail in one of two ways; random hardware failures, where a component of the SIS stops performing its design objective, and systematic failures, where the system fails to perform the required function due to a latent fault in the design.

Applying the lifecycle approach of IEC 61511 to your process will significantly reduce the likelihood of failures and hence make your process more reliable and increase uptime.

The comprehensive and correct application of IEC 61511 will ensure that:

- All the risks in the process are understood, measured and minimized.
- Safety Instrumented Functions (SIFs) are allocated with specific performance targets.
- Process safety needs are clearly documented and maintained.
- Safety Instrumented Functions are designed using appropriate equipment.
- SIF functionality is interpreted, modeled and verified to meet the performance target.
- Performance is monitored against assumptions throughout the lifecycle.

To achieve these goals the process designer/ operator must maintain rigorous processes implemented by people competent in each task, with appropriate degrees of independent verification for each step.

A properly designed Safety Instrumented System (SIS) will:

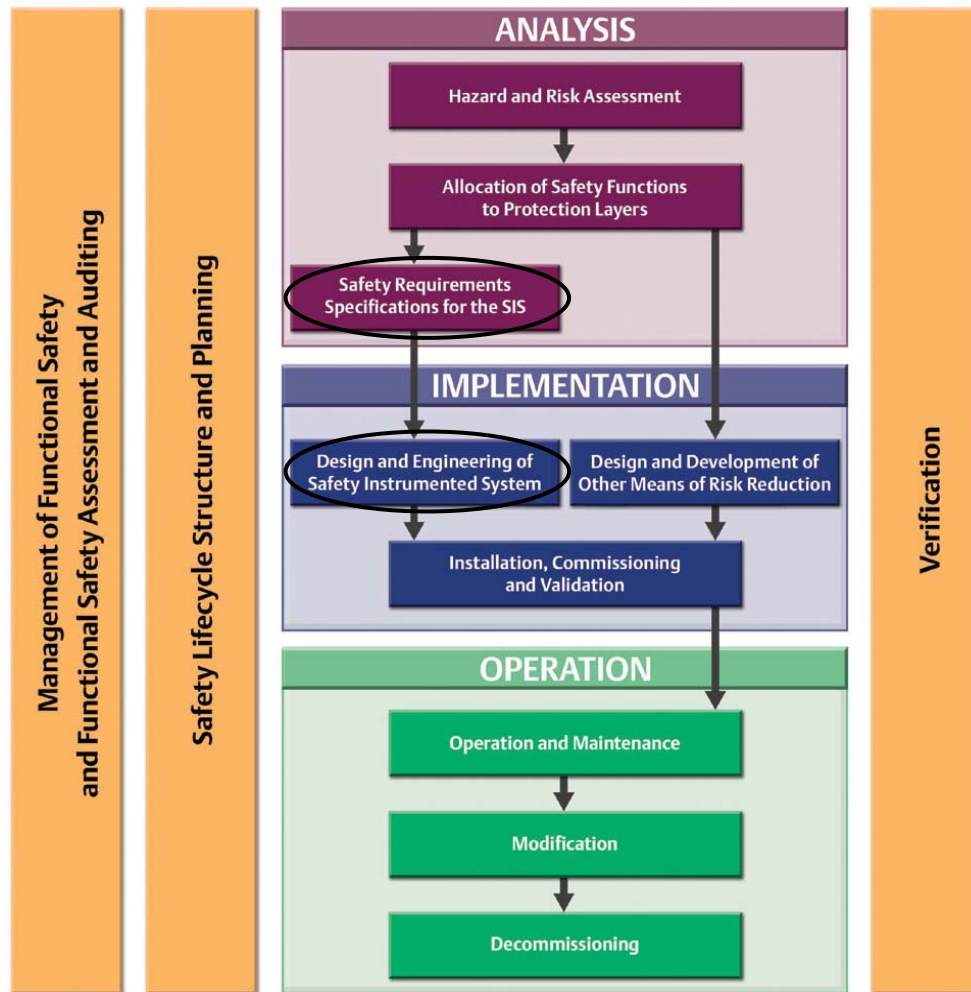
- Manage the possibility of failure (during an out of control incident) to a tolerable target.
- Direct expenditure on capital equipment to where it is needed, and eliminate over expenditure.
- Reduce operational costs. Minimize intervention for maintenance and repair activities.

Challenge

Process designers are challenged by the commercial pressures of a project environment. Process operators are challenged by the vast array of skills required to maintain process safety and meet production targets. The lifecycle approach requires that competency in each skill is consistently applied using an auditable Safety Management System (SMS). How can the operators implement and monitor all aspects of functional safety when their skills are focused on process safety, improving productivity and product quality? As well as these sometimes conflicting demands, local authorities having jurisdiction will expect that process safety, and specifically functional safety, of the SIS is consistently managed to comply with regulatory requirements.

IEC 61511 Safety Life Cycle

Meeting regulatory requirements such as the IEC61511 Safety Life Cycle requires a partner with experience, and with the best available technology and services.



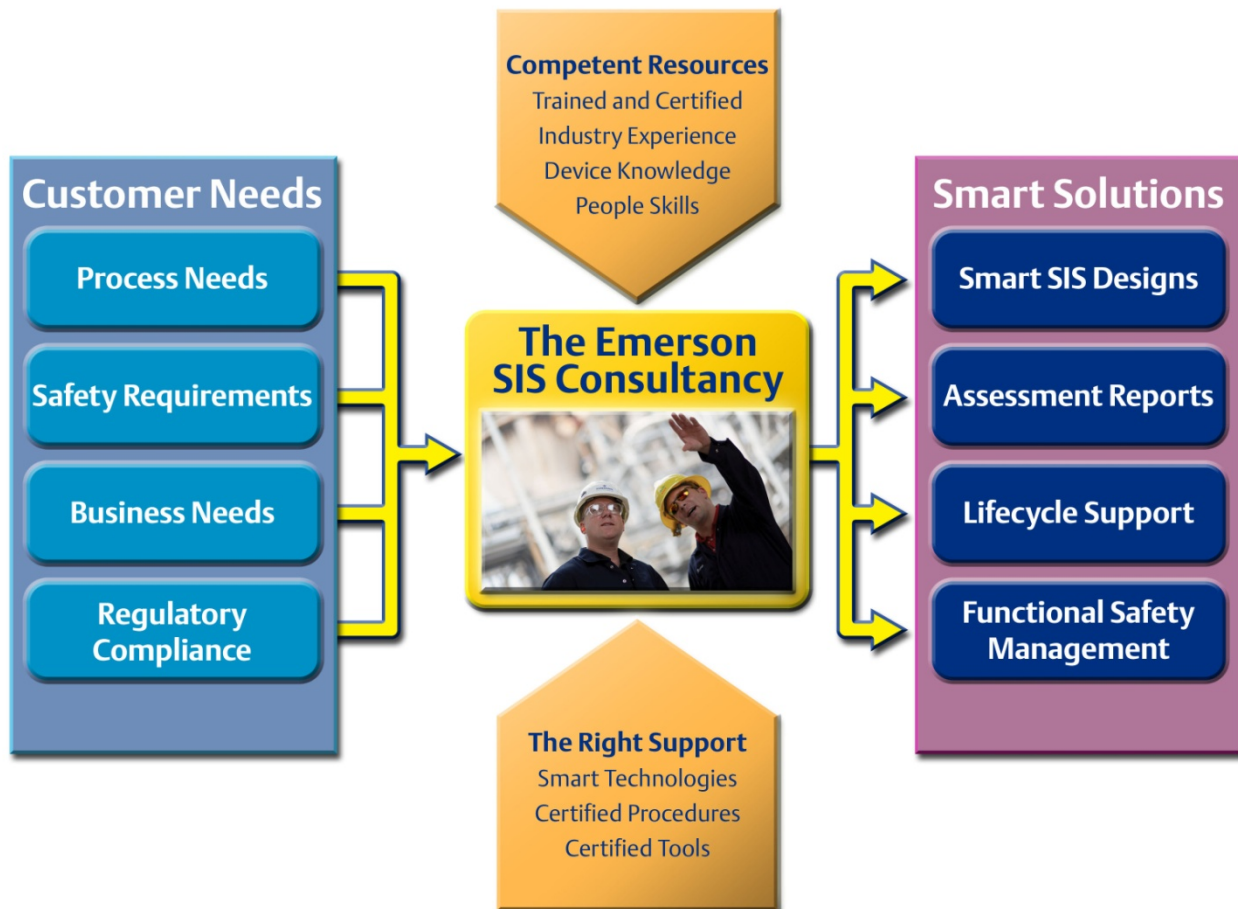
Functional Safety Consulting Services address IEC61511 during the Safety Requirements Specifications for the SIS and Design and Engineering of SIS phases of the Safety Lifecycle

Benefits

The Emerson offers personnel specifically trained in the application of IEC 61511. Emerson SIS consultants follow processes to comply with IEC 61511 using our TÜV certified Safety Management System. We invest in people and tools to provide services where customers traditionally have the least resources available, and where diversity in the process is most valuable.

- **The processes.** Emerson SIS Consultants operate within the same third-party certified Safety Management System and follow the same procedures as all other SIS personnel including independent verification.

- **The people.** Emerson SIS Consultants are trained in the application of functional safety and certified by Emerson or accredited third parties such as TÜV and/or the Certified Functional Safety Expert Governance Board. In addition to certification, our consultants have experience in many aspects of functional safety and automation.
- **The object.** Emerson SIS Consultants develop designs which address personnel safety, environmental, and commercial implications. Proper application of today's smart technologies can significantly benefit the user by reducing interventions (in both duration and frequency). By maximizing use of our SIS Consultants, you will reduce the need to maintain specific competencies and processes, and reduce systematic failures. Using Emerson SIS Consultants provides diversity of people and provides an extra set of eyes to help our clients with project visioning and conceptual design.



Service Description

Emerson SIS Consultants are able to assist in all aspects of *Safety Instrumented Function (SIF)* design and application. We leave the job of hazard analysis and risk assessment to the process experts. Once the safety integrity levels for the SIFs have been set by the client, our SIS Consultants have a range of specific services aimed at optimizing the SIF design and simplifying the job of regulatory compliance.

The location and application may require specific regulatory compliance. Emerson has local expertise to help meet your requirements.

All customers have a unique balance of needs and our services are tailored to suit. Specific services that we offer are:

- **Design your Safety Instrumented Functions.** Selection of appropriate field devices and their architecture is crucial to meeting the performance requirements. Emerson SIS Consultants will work with our SIS field equipment engineering personnel to advise on technology selection and provide complete designs for the safety functions. The design will target increased availability where mission critical processes are identified.
- **Verify Safety Instrumented Function Design.** Our services interpret the Safety Instrumented Function (which may have been designed by others) into a suitable model that can assess the theoretical SIL Level and Spurious Trip Rate that can be achieved. Calculated items include average PFD, RRF, MTTFs/STR and response time. The consultant will verify the performance against project targets and provide a comprehensive assessment report with recommendations for maintaining compliance.
- **Verify Safety Instrumented Function Performance** As operational experience grows, the actual SIS performance must be carefully monitored for performance against the assumptions made during design. Emerson provides the procedures and resources to inspect, monitor, audit and report on system integrity. This enables the customer to prove suitability of the safety system at any point in the operational life of the process plant.
- **Compile your Safety Requirements Specification (SRS).** To minimize error during implementation and operation phases, IEC61511 requires that the process safety requirements are clearly and concisely documented and maintained. It is the primary reference for the mandatory activities of validation and functional safety audits, as well as modification and maintenance activities. Our SIS Consultants will develop a customer specific SRS format that ensures data is captured, interpreted and presented in a user friendly way.

Ordering Information

Description	Model Number
SIS Functional Safety Consulting Services	Please consult your local Emerson Process Management office for availability

To learn how comprehensive service solutions address your process management needs, contact your local Emerson sales office or representative today or visit our web page at <http://www.EmersonProcess.com/ProcessAutomationServices/>.

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