

SIL determination



Assessing target failure measure and Safety Integrity Level (SIL) for Safety Instrumented Functions (SIF).

All operators of hazardous processes have an obligation to manage the risks associated with their operations to protect both people and the environment. The management of risk associated with hazardous processes frequently involves the use of instrumented functions. These are designed to take action should the process approach the boundary of the safe operating envelope.

The application of the international standards IEC 61508 and IEC 61511 (the process sector version of IEC 61508), is seen today as representing current good practice in the management of instrumented protective functions across industry.

These standards cover the whole of the safety lifecycle - from the initial concept through to operation and maintenance. Within the requirements in the early stages of the lifecycle, relating to hazard and risk analysis, there is the need to determine for each SIF a necessary target performance - most usually related to its probability of failure on demand - and described by a SIL.

This is the target performance needed for effective management of the level of risk. The process of setting an appropriate target performance for a SIF is commonly referred to as "SIL determination". This target performance level is then used for the design of the safety instrumented function.

Failure to carry out SIL determination effectively can lead to insufficient risk reduction and in the event of an incident, likely prosecution for the organisation responsible for the operation of the process. Selecting an unnecessarily high SIL will make the SIF very costly to install and maintain.

SIL determination should be carried out as early on in the project as possible. Too often it is delayed until the design is virtually complete. This means that the design may have insufficient risk reduction. At this point, it is often too late to change the design radically enough to avoid having to use a SIF with a SIL requirement significantly higher than the organisation would normally tolerate. By looking at the SIL requirement earlier in the project, it is possible to avoid the inordinate costs associated with the design, installation and operation of a SIF with high SIL, by having the flexibility to make cost effective changes to the design.

What we offer

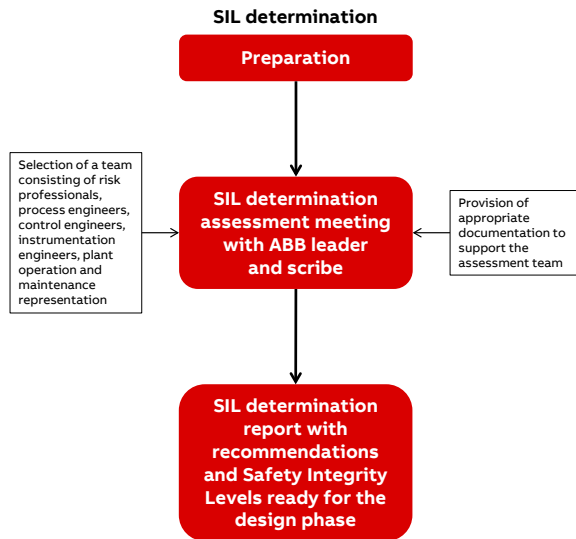


ABB offers a complete solution to enable effective SIL determination. By utilising our vast experience we are able to advise on what documents should be made available for SIL determination, such as; current P&ID's, current operating instructions, information on trip functions, pressure rating of vessels etc.

We provide guidance on the ideal team composition to ensure the maximum benefit is achieved from the studies. We can also deliver outline training for the team at the start of the session, if needed. Our experienced study leaders will guide the team to begin with the list of possible hazardous events for the facility, and develop the associated scenario sequences for each event. Each event is analysed, using an appropriate SIL determination technique according to the scope and complexity of the hazardous event scenario. This will include identification of credible causal failures and relevant safeguards. We can provide technical scribes for recording the assessments to allow the leader to concentrate on leading to ensure studies are of high quality.

ABB have the experience and competency to lead SIL determination studies using all of the recommended methodologies; risk graph, LOPA and fault tree analysis.

The studies can be recorded on our custom commercial software: TRAC (Trip Requirement and Availability Calculator). TRAC was developed in conjunction with industry and provides a repeatable means to assist companies meet IEC 61511 requirements. It provides users with a tool to efficiently record the SIL determination activity. This ensures details are held in one location and provides an audit trail. It also includes capability for the design calculations to demonstrate that a design can achieve the target SIL.

Following SIL determination, we can provide a detailed report including the target SIL requirements for all the SIF. This report can then be used as part of a demonstration of effective risk management to the regulators or company management.

Benefits

- Confidence in selecting the most appropriate SIL
- Compliance with legislation
- Demonstration that safety risks are being managed

Why ABB?

ABB is frequently chosen for SIL determination support for a variety of reasons:

- Competent and experienced leaders with wide experience across a number of industry sectors and types of processes
- Proven methodologies - we are able to apply a number of methods for SIL determination with appropriate flexibility to meet the requirements of specific situations
- We are leading process safety experts and run IChemE accredited IEC 61508 / 61511 SIL determination courses and have trained hundreds of engineers in SIL determination.
- Our consultants are able to tackle complex situations and simplify them without compromising the necessary risk reduction
- We can help implement the actions from any studies by calling upon our broad range of services