



Biorisk Assessment: SIL Studies

IEC 61508 / 61511

DNV has developed a systematic approach to evaluate the safety integrity levels (SIL) required for safety related systems containment facilities, equipment and associated processes. The methodology can be applied at any stage of the design lifecycle and provides a practical way of demonstrating risk acceptability, including compliance with legislative requirements.

Our Approach

IEC61508 and IEC61511 are international standards that define the requirements for functional safety systems based upon programmable electronic systems. Although the standards primary aim towards improving technical safety via safety instrumented functions, the overall concept of risk assessment can be applied more widely through a **transparent risk assessment practices** incorporating other layers of protection.

In a SIL study the required **Safety Integrity Level** is determined of a safety instrumented function. The first step in a SIL study is to conduct a formal hazard identification study (e.g. HAZOP). This will identify hazards under both normal and abnormal operating conditions, together with any proposed risk reduction or mitigation measures and the potential for human error.

Several (semi) quantitative risk analysis methods can then be used to define the safety integrity level (SIL) of the proposed safety system and assess its appropriateness. The required SIL value depends on the level of risk considered tolerable by the safety system, with SIL 1 the lowest level of protection and SIL 4 the highest. With increasing SIL levels come an increasing degree of control and robustness in the safety measures employed.

Failure frequencies of various types of equipment and protection systems are required during the assessment. DNV has developed a databank of failure frequencies for many commonly used items of equipment to facilitate this process. However, user input and specific manufacturer's information is also used as an essential element.

Value delivered

DNV guides the organisation through the hazard identification, risk assessment and SIL process, making use of experienced personnel as well as appropriate tools and databanks. The value delivered includes:

- An overview of the layers of protection of a facility system or piece of equipment;
- A detailed, transparent risk assessment, quantifying the identified failure scenario's and mitigation measures;
- A demonstration of conformity to standards, best practices and other legislative requirements against risk-based criteria.