

TRAINING

FUNCTIONAL SAFETY FOR END-USERS

1 Course objective

The objective is to provide instrument engineers, application engineers, site engineers, project managers, operation engineers, maintenance engineers and all those who are involved in the design, realisation, maintenance and operation of safety systems with elementary and necessary knowledge about functional safety, based on the international standards IEC 61508 and IEC 61511.

2 Course information

Duration: 2 days
- training program: 09:00–12:00, 13:00–17:00

Trainers: either
- Mr. Ton Beems
- Mr. Jeff Beijck
- Mr. Arian Slagt

Language: English

Location:

3 Course agenda overview

Day 1: morning 09:00 – 12:00

Module 1: Introduction to Functional Safety

- What is safety?
- Why safety?
- What is a safety system?
- Position of SIS in the total equipment under control

Module 2: International safety standards IEC 61508 and 61511

- The five main pillars of the standards

Day 1: afternoon 13:00 – 17:00

Module 3: HAZOP - SIF - SIL

- Hazard and risk assessment
- Determine Safety Instrumented Functions (SIF)
- Determine Safety Integrity Levels (SIL)
- Group exercise

Module 4: Safety Engineering

- De-energize To Safe state
- Energize To Safe state
- Redundancy
- Safety architectures
- Sensor validation
- Overrides, by-passes, inhibits
- Process safety time and system response time

Day 2: morning 09:00 – 12:00

Module 5: Functional Safety Management

- Implications for organizations involved throughout the safety life cycle

Module 6: Failures and Hardware Fault Tolerance

- Random hardware failures and their modes
- Failure mode effect analysis
- Safe Failure Fraction
- Hardware Fault Tolerance
- Group exercise on HFT

Day 2: afternoon 13:00 – 17:00

Module 7: Common cause influences and other failure types

- The beta factor
- Systematic failures
- Human Failures

Module 8: Safety calculations

- Safety parameters
- Formulas
- Proof testing
- Group exercises on PFD_{AVG} calculations