

**Training Title**

**FUNCTIONAL SAFETY & SAFETY INSTRUMENTED SYSTEMS AS PER IEC AND ISA STANDARDS**

**Training Duration**

**5 days**

**Training Venue and Dates**

IC062	<b>Functional Safety &amp; Safety Instrumented systems as per IEC and ISA Standards</b>	5	<b>23 – 27 December, 2019</b>	<b>\$6,500</b>	<b>London, UK</b>
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**In any of the 5 star hotels. The exact venue will be informed once finalized.**

**Training Fees**

- **6,500 US\$** per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.

**Training Certificate**

Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.

**TRAINING DESCRIPTION**

Functional safety is an emerging field that has grown quickly during the last 20 years. It is part of the overall safety relating to the process and the correct functioning of the safety instrumented systems and other protection layers.

Functional safety implies both prevention and mitigation of loss of primary containment. Applying the latest functional safety knowledge and experience in a plant saves people’s lives, the environment, reduces down time lost in repairs and increases profit by avoiding deferment and loss of production that occur after a fire or explosion incident.

This training introduces the main topics of functional safety and safety instrumented systems over all aspects of the safety life cycle from concept to decommissioning. The training helps the attendees design, modify, operate and maintain the facility/plant in a safe manner and reduce the risk of accidents.

The training explains the main requirements in standards IEC 61508, IEC 61511 and ISA 84 and implementation worldwide.

For in-house training, a tailor-made training is available for a specific type of plants (e.g. gas plant, refinery, nuclear, offshore, etc) and using specific operator company practice.

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## **TRAINING OBJECTIVES**

- Introduce the main terminology used in functional safety and safety instrumented systems (SIS) context.
- Enable the attendees to connect and understand the relation between SIS and the process safety studies like Hazop and consequence modelling
- Enable the trainees to operate, maintain and support operation of a facility safely.
- Give real examples of incidents and case study.
- Explain SIL assessment, SIS safety requirements specifications and their use
- Enable the trainees to take the correct decisions to upgrade SIS in the facility.
- Explain the design of safety instrumented systems and SIL verification
- Enable the attendees to fulfil the SIL requirements during the operation and maintenance.

## **WHO SHOULD ATTEND?**

Engineers and technicians working in specification, design, modification, operation and maintenance of safety instrumented systems. This includes also technical safety engineers, automation and instrumentation engineers.

## **TRAINING METHODOLOGY:**

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work & Practical Exercises
- 20% Videos & General Discussions

## **DAILY OUTLINE**

### **Day 1-Overview & Determining the requirements**

- Important terms and definitions
- Examples of real Incidents where functional safety and SIS weakness was clear
- SIS life cycle & the relation with other process safety studies
- Overview of the standards used worldwide
- Layer of protection Analysis LOPA by example
- Tolerable risk criteria
- Event frequencies

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**Day 2-Determining the Requirements and Designing SIFs**

- Failure rates
- SIL assessment techniques
- Failure types (Human errors, systematic design error, random hardware failures)
- Comparison: Common cause failures/events, double/multiple jeopardy and simultaneous failures/events
- Reliability block diagrams (RBDs)
- Probability of failure calculations

**Day 3- Safety Instrumented Functions (SIFs) Design**

- Exercises on SIFs, RBDs and PFD calculations
- Proof testing as a design and operation parameter (not just an input for verification)
- Architecture, Redundancy and hardware fault tolerance
- Effect of loss of power (DTT or ETT)
- Overrides and inhibits
- Process safety time and its relation with process dynamic simulation

**Day 4- SIS SRS, Functional safety verification & validation**

- SIS SRS (Safety requirements specification)
- FS verification
- FS Validation

**Day 5-Functional Safety Verification, Management, Audit & Assessment**

- Data collection & Functional safety verification during the operation phase
- Management of change
- Functional safety management FSM
- Functional safety Audit and assessment FSA

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NOTE:

**Pre & Post Tests will be conducted**

**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**

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