Safety Instrumented Systems (SIS) For Process Industries Using IEC 65 and IEC 6508 Course

Venue Information

Venue: London UK

Place:

Start Date: 2026-05-12

End Date: 2026-05-16

Course Details

Net Fee: £4750.00

Duration: 1 Week

Category ID: EAPET

Course Code: EAPET-59

Syllabus

Course Description

This 5 day course focuses on the management, planning and execution of automatic safety systems in accordance with IEC 61511, the newly released international standard for process industry safety controls.

The course manual provided with this course includes all material presented in the course and provides details beyond the scope of 5 days of training.

The modular format of the manual allows our presenters to adjust the subject material covered in the 5 day course to meet the needs of participants whilst the manual will serve as a reference for future studies.

Course Objective

Upon completion of this course, you will gain the following:

- Practical understanding of key sections of IEC 61511 and IEC 61508
- Determine required SIL ratings using three different IEC 61511 methods
- Configure safety systems to minimize spurious trips and reduce production losses
- Understand PLC and smart sensor limitations and applications
- Utilize smart positioners and self-testing devices to reduce downtime
- Apply key design and procedural requirements of IEC 61511
- Set up functional safety management procedures for international compliance
- Plan and integrate all stages of a safety system project
- Define safety system requirements during Hazop studies
- Allocate safety tasks to both instrumented and non-instrumented layers
- Estimate feasibility and costs of safety measures during Hazop studies
- Understand IEC 61511 and IEC 61508 standards without unnecessary complexity
- Demonstrate competency in international safety standards
- Reduce installation costs and improve financial efficiency
- Gain insights from an independent training provider with proven expertise

Who Should Attend?

- Instrumentation and control engineers and technicians
- Design, installation, and maintenance engineers in process industries
- Sales professionals employed by end users
- Engineering firms
- System integrators
- System consultants

Course Outline

Introduction

- What Is a Safety Instrumented System?
- Confusion in the Industry
- Technology Choices
- Redundancy Choices
- Field Devices
- Test Intervals
- Certification vs. Prior Use
- Industry Guidelines, Standards, and Regulations
- IEC 61508

- Findings of the HSE
- Design Lifecycle
- Hazard & Risk Analysis
- Allocation of Safety Functions to Protective Layers
- Develop Safety Requirements Specification
- SIS Design & Engineering
- Installation, Commissioning, and Validation
- Operations and Maintenance
- Modifications
- Decommissioning

Process Control vs. Safety Control

- Control and Safety Defined
- Process Control - Active/Dynamic
- Safety Control - Passive/Dormant
- Separation of Control and Safety Systems
- Common Cause and Systematic/Functional Failures

Protection Layers

- Prevention Layers
- Process Plant Design
- Process Control System
- Alarm Systems
- Procedures
- Shutdown/Interlock/Instrumented Systems (SIS)
- Physical Protection
- Mitigation Layers
- Containment Systems
- Scrubbers and Flares
- Fire and Gas (F&G) Systems
- Evacuation Procedures
- Diversification

Developing the Safety Requirement Specifications

- Accidents Caused by Incorrect Specifications

- Participation of Key Personnel
- Responsibilities Not Well Defined
- Training and Tools
- Complexity and Unrealistic Expectations
- Incomplete Documentation
- Inadequate Final Review
- Unauthorized Deviation
- IEC 61511 Requirements
- Documenting the Specification Requirements

Determining the Safety Integrity Level (SIL)

- Who’s Responsible?
- Which Technique?
- Common Issues
- Evaluating Risk
- Safety Integrity Levels
- SIL Determination Method #1 (ALARP)
- SIL Determination Method #2 (Risk Matrix)
- SIL Determination Method #3 (LOPA)

Choosing a Technology

- Pneumatic Systems
- Relay Systems
- Solid-state Systems
- Microprocessor/PLC (Software-based) Systems
- System Size and Complexity
- Communications with Other Systems
- Certified vs. Prior Use

Initial System Evaluation

- Why Analyze Systems Before Construction
- Sources of Failure Rate Information
- Failure Modes
- Modeling Accuracy
- Modeling Methods

- Fault Tolerance Requirements
- Engineering Tools for Performance Analysis

Issues Relating to Field Devices

- Importance of Field Devices
- Sensors
- Final Elements
- Redundancy
- Design Requirements
- Installation Concerns
- Wiring of Field Devices

Engineering a System

- Management Considerations
- Hardware Considerations
- Software Considerations

Installing a System

- Factory Acceptance Testing (FAT)
- Installation
- Validation/Site Acceptance Tests (SAT)
- Functional Safety Assessment/PSSR
- Training
- Handover to Operations
- Startup
- Post Startup Activities

Functional Testing

- The Need for Testing
- Establishing Test Frequencies
- Responsibilities
- Test Facilities and Procedures

Justification for a Safety System

- Safety System Failure Modes

- Optimizing Safety, Reliability, and Lifecycle Costs