



Training Course :

## Safety Instrumented Systems (SIS) for Process Industries Using IEC 60511 and IEC 61508

Training Course For One Week In

Thailand , Bangkok , Grande Centre  
Point Hotel Ploenchit

Which Be Held As Under Details :



Abar Solutions Petroleum Consultancy Invite Your Employee To Participate With Us In Special Training Course As Under Details :

Course Name		Safety Instrumented Systems (SIS) for Process Industries Using IEC 60511 and IEC 61508			
Code	Period	Language	Start	End	Location
ICT 012	5 Days	English	07/08/2017	11/08/2017	Thailand , Bangkok , Grande Centre Point Hotel Ploenchit
			04/09/2017	08/09/2017	
			09/10/2017	13/10/2017	
			13/11/2017	17/11/2017	
			18/12/2017	22/12/2017	
			15/01/2018	19/01/2018	
			12/02/2018	16/02/2018	
			12/03/2018	16/03/2018	
			23/04/2018	27/04/2018	
			14/05/2018	18/05/2018	
			11/06/2018	15/06/2018	
09/07/2018	13/07/2018				

**\*\* The Fees Includes : Lecturer , Training Material , Training Room With One Coffee Break Daily , Certificate Of Attendance In Last Day Training Course \*\***

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 Objectives

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

- Take away a checklist that you can use to quickly access if your plant complies with the latest international safety standards
- Walk away with a solid fundamental knowledge of IEC 61511 and IEC 61508 which you can apply immediately to your plant
- Ability to comply with the IEC 61511 and IEC 61508 standards thus signifying that your company is following the best available safety practices for a process company
- Get a practical understanding of the key sections of IEC 61511 and 61508 without wading through hundreds of pages of standards documents
- Be able to determine required SIL ratings using at least 3 different methods as listed in IEC 61511 This has the potential to save costs by avoiding needlessly high specifications for your trip systems
- Be able to configure safety systems to minimise or avoid spurious trips and create the potential to reduce production losses.
- Know what can be done and what should not be done with PLC's and smart sensors
- Know how to take advantage of smart positioners and other self testing devices to reduce down time needed for proof testing
- Have overall knowledge of the key design and procedural requirements of IEC 61511 to ensure your safety systems comply with the best international codes of practice.
- Know how to set up function safety management procedures to meet international standards and be well prepared for independent assessments.
- The ability to plan and integrate all stages of a safety system project.
- Know how Hazop studies are performed and be able to define safety system requirements during Hazop studies.
- Know how to allocate safety tasks to both instrumented and non-instrumented protection layers to reduce dependency on a single method of protection.
- Be able to quickly estimate feasibility and costs of safety measures during Hazop studies.
- Take the mystery out of the IEC 61511 and 61508 Standards
- Demonstrate personnel competency in the latest international standard
- Gain financial advantage for your company by eliminating high installation costs

- Gain insight into these valuable topics from an independent, unbiased, company with a significant track record in presentation of effective training solutions.

## Course Content & Outlines

### ⇒ **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, 9
- IEC 61511

### ⇒ **DESIGN LIFECYCLE**

- 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 (Safety 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
  - Management Systems
  - Procedures
  - Scheduling of Assessment
  - Participation of Key Personnel in the Review Process
  - Responsibilities Not Well Defined
  - Training and Tools
  - Complexity and Unrealistic Expectations
  - Incomplete Documentation
  - Inadequate Final Review of Specification
  - Unauthorized Deviation from Specification
- 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
- Issues Related to System Size
- Issues Related to System Complexity
- Communications with Other Systems
- Certified vs. Prior Use

⇒ **INITIAL SYSTEM EVALUATION**

- Why Systems Should be Analyzed Before They're Built
- Where to Get Failure Rate Information
- Failure Modes
- Degree of Modeling Accuracy
- Modeling Methods
- The Real Impact of Redundancy
- Analysis of a Relay System
- Analysis of a Non-redundant PLC System
- Analysis of a TMR System
- Field Devices
- Fault Tolerance Requirements
- Engineering Tools Available for Analyzing System Performance

⇒ **ISSUES RELATING TO FIELD DEVICES**

- Importance of Field Devices
- Sensors

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

⇒ **ENGINEERING A SYSTEM**

- General Management Considerations
- General Hardware Considerations
- General Software Considerations

⇒ **INSTALLING A SYSTEM**

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

⇒ **FUNCTIONAL TESTING**

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

⇒ **JUSTIFICATION FOR A SAFETY SYSTEM**

- Safety System Failure Modes
- Responsibilities for Justification
- How to Justify
- Lifecycle Costs
- Lifecycle Cost Analysis
- Optimizing Safety, Reliability, and Lifecycle Costs

⇒ **SIS DESIGN CHECKLIST**

⇒ **CASE STUDY**

Tel. : (965) 22610021 , (965) 99600277

Fax : (965) 22630021

Email : [info@abarsolutions.com](mailto:info@abarsolutions.com) , [abar-solutions@hotmail.com](mailto:abar-solutions@hotmail.com)

Wsite : [www.abarsolutions.com](http://www.abarsolutions.com)