

Training Title

EMERGENCY SHUTDOWN SYSTEMS (ESD)

Training Duration

5 days

Training Venue and Dates

Emergency Shutdown Systems (ESD)	5	2 - 6 September 2024	\$5,500	Dubai, UAE
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Trainings will be conducted in any of the 4 or 5 star hotels.

Training Fees

- 5,500 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch.

Training Certificate

Prolific Consultants FZE Certificate of Course Completion will be issued to all attendees.

COURSE OVERVIEW

Functional process safety involves identifying potential hazardous events that can trigger a chain reaction that could lead to serious or catastrophic consequences. This Emergency Shut-down Systems training seminar explains the requirements of the international standards IEC 61508 and IEC 61511, for functional safety instrumented system and, covers the entire life cycle of safety instrumented systems, from determining what risk control systems are required through to decommissioning. This also includes the separation of basic process control systems and safety instrumented systems (SIS), layers independent protection (LOPs), how to determine safety integrity levels (SILs), technology choices and field device issues.

This Emergency Shut-down Systems training seminar primarily focuses on establishing conceptual and detailed design requirements, hazard analysis techniques, safety requirements specification, and the commissioning, operating and maintenance procedures.

COURSE OBJECTIVES:

- 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 minimize 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 the presentation of effective training solutions.*

SUITABLE FOR:

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

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.

COURSE OUTLINE :-

1. 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*

2. 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*

3. 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*

4. 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*

5. 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*

6. 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)*

7. 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*

8. 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*

9. ISSUES RELATING TO FIELD DEVICES

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

10. ENGINEERING A SYSTEM

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

11. 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*

12. FUNCTIONAL TESTING

- *The Need for Testing*
- *Establishing Test Frequencies*
- *Responsibilities for Testing*

- *Test Facilities and Procedures*

13. 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*

Studies, Last Day Review, Discussions & Pre & Post Assessments will be carried out.

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