SAFE AUTOMATION IN THE PROCESS INDUSTRY – Virtual Class

Audience: Instrument and Controls, Operations, and Process Safety personnel
Time: 16 hours: 8:00 am to 12:30 pm, Monday-Thursday
CEUs: 1.5

Overview

Safe Automation in the Process industry is a 16-hour virtual course designed to orient users in the principles of safe automation, including the practices and terminology used in the design and implementation of instrumented protective systems (IPS). Experienced personnel will also benefit from awareness of more recent developments in safe automation terminology, updated standards, and techniques on sharing these concepts with newer employees.

This course will introduce the key concepts and practices necessary to design and implement safe automation, including the following topics:

- Safe Automation Lifecycle Process
- Safe Automation Fundamentals, including Application Program, HMI, Procedure and Personnel systems
- Instrument Justification and Alarm Management
- Control and Safety System Hardware Selection (e.g., instrumentation, logic solvers, auxiliaries)
- Safe Automation Metrics
- Controlling Systematic Error in Automation Systems, including Designing for Security

Objective

The course participants will gain an understanding of the following:

- Relationship between inherently safer design and functional safety.
- Key instrumented protective system management practices, including bypass management, change management, maintenance planning, automation organization planning, auditing, etc.
- How safe automation is included in the standard project work process.
- Fundamentals of safety function specification.
- Selecting automation devices that are fit for purpose and reliable.
- Essentials of alarm management, including instrument and alarm justification.
- Establishing metrics for automation performance

Course Outline:

Session 1:

1. Foundation of Safe Automation
    a. Industry standards associated to functional safety
    b. Functional safety plan
    c. Safety lifecycle and project management workflow
    d. Organization to support safe automation
2. Automation Basics
    a. Relationship between automation and Recognized and Generally Accepted Good Engineering Practices (RAGAGEP)
    b. Impact of operating plan on automation design
    c. Effective human machine interfaces
    d. Identification of safety functions
    e. Justification for alarms and instrumentation

Session Two:

3. Fundamentals of Industrial Automation and Control System (IACS) Security
    a. Separation and independence
    b. Automation data access levels
    c. Network architecture impact on difficulty of security
    d. Difference between objectives of IACS security and office network (IT) security
    e. Bypass management
4. Procedures and People for Functional Safety
    a. Operations procedures
    b. Maintenance procedures
    c. Change management
    d. Competency management
5. Safe Automation Metrics
    a. Functional safety KPIs
    b. Reliability monitoring
    c. Performance Assurance
6. Implementing for SCAI success – Alarm IPLs
    a. Alarm management

Session Three:

7. Hazard and Risk Assessment (H&RA)
    a. Basic steps
    b. Hazardous vs harmful events
    c. H&RA complexities: lack of independence, limits on Low Integrity Protection Layers (LI-PL)
    d. Risk reduction allocation
8. Instrumented Protective System (IPS) Functional Specification
    a. Setpoint and response time
    b. Maximum allowable leak rate
    c. Compensating Measures
    d. Features for safe operation
9. Safety Requirement Specification (SRS)
    a. Mode of operation
    b. Hardware fault tolerance
    c. Planning for failure

Session Four:

10. IPS Equipment Selection
    a. Fit for purpose (LI-PL and SIS)
    b. Prior use and certification (SIS)
11. Design Performance Verification
    a. Performance is the SUM of the parts
    b. Impact of dependencies with other functions
12. Controlling Systematic Error in Automation Systems
    a. Functional Safety Assessments
    b. Functional Audits