

SIL Verification of Safety Instrumented Systems

Time: 2-Days, Date TBD

CEUs: 1.4

Audience: Control system specialists, instrumentation and electrical personnel, and SIS design specialists

Description: This course covers the verification of SIL and spurious trip rate for safety instrumented functions implemented per IEC 61511-1-1:2018. Course covers calculation methodology, failure rate data and key design parameters. The course is 60% lecture and 40% hands on practice. Attendees will complete workshops on determining the target failure measure, defining the mode of operation, determining the required HFT, identifying SIF and creating failure models of varying complexity. Participants must have access to a web browser. Two display screens are preferable so that the participants can see the function being modeled on the instructor's screen and being modeled by themselves.

- 1) Why Verification?
 - a) SIS, SIF, and SIL
 - b) Calculation Overview
 - c) Target Failure Measure - Workshop
 - d) Mode of Operation - Workshops (3)
 - e) Hardware Fault Tolerance - Workshop
 - f) Low Pass Flow - Workshop
- 2) Selecting Data and Determining What to Model
 - a) Failure Types, Classifications, Metrics
 - i) Data Sources
 - ii) Using Your Data
 - iii) Manufacturer Data
 - b) Database Structure
 - i) Database Examples
 - c) Building and Promoting Custom datasheets
 - d) Determining What to Model
 - i) Back Flow – Workshop
 - ii) Hot Spots - Workshop
- 3) Equations and Configuration Parameters
 - a) Calculation Methods
 - b) Success and Failure using Fault Tree gates (Boolean logic)
 - c) Voting
 - d) Diagnostics and MTTR
 - e) Testing, Test Interval, Test Coverage
 - f) Common Cause
 - g) Surge Drum - Workshop
- 4) Beyond the P&ID and Cause & Effect
 - a) Independence
 - b) Non-safety Functions
 - c) Hidden Devices
 - d) Pump Protect - Workshop
 - e) Support Systems
 - f) Final Elements - Workshop

Instructors:

Dr. Angela Summers is the president of SIS-TECH. She holds a PhD in chemical engineering and has over 30 years of experience in instrumentation and controls. Dr. Summers is a fellow of AIChE, CCPS, and ISA and is a distinguished engineering fellow of Mississippi State University and the University of Alabama. Recently, she was awarded IEC's 1906 award for her contribution to the development of standards and practices covering the use of automation to prevent loss events in the process industry.