SYSTEM EXPERT

From Risks to Safety

« FUNCTIONAL SAFETY. SIS ENGINEERING AND OPERATIONS (IEC 61511) »

ANVANCED QUALIFICATION ADDITIONAL PROFESSIONAL EDUCATION PROGRAM

WE HAVE BEEN TEACHING SINCE 2015

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OUR COURSE:

- FOR OIL AND GAS COMPANIES, PETROCHEMICAL AND CHEMICAL COMPANIES
- FOR INTEGRATORS
- FOR PROJECT ORGANIZATIONS
- FOR INDUSTRIAL SAFETY EXPERTS

LEVEL:

- FUNCTIONAL SAFETY ENGINEER

RESULTS:

- EXAMINATION
- CERTIFICATE OF THE VOLUNTARY CERTIFICATION SYSTEM “SAFETY STANDARD"
- CERTIFICATE OF PROFESSIONAL ADDITIONAL DEVELOPMENT OF THE STATE STANDARD
- INCLUDING TO THE REGISTER OF FUNCTIONAL SAFETY AND HAZOP SPECIALIST “SAFETY STANDARD"
- REGISTRATION ON THE STATE EDUCATION AND QVALIFICATION REGISTER (FIS FRDO)

COST:

- AVAILABLE ON REQUEST

SIL
FS ENGINEER IEC 61511

24
HOUR’S
COURSE DURATION

Base qualification: Specialist in instrumentation and automation (40.158) or Operator of gas processing facilities (19.038)

Qualification document: **Certificate of Professional Development**

State Education Accreditation: License reg. no. L035-01298-77/01957606

Voluntary System Accreditation: ROSSTANDART reg.num. РОССRU.33109.04ВШГ0

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TRAINER:

- TUV FS Certified Engineer
- HAZOP and LOPA Facilitator. ESD expert
- Expert in certification of instrument systems on Functional Safety

Dmitrii Blokhin

Director of Sistema Expert

DAY 1

SYSTEM EXPERT
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9:30-9:45

Introduction

- Accuaintance
- Planning
- Course presentation

9:45-12:30

Goals and methods of risk-based approach

- Topic 1. Structure of the regulatory framework
- Topic 2. Risk analysis in the Federal Law, Federal Rules, GOST
- Topic 3. SIS in Federal Rules
- Topic 4. Practical assurance of compliance with the Federal Rules requirements for engineering and operating SIS systems
- Topic 5. Accidents and their causes
- Topic 6. Safety Layer model
- Topic 7. Safety and risk level
- Topic 8. Protection levels and Safety Instrument Systems (SIS)

13:00-15:30

Functional Safety Base

- Topic 1. What is Functional Safety? Principles
- Topic 2. Safety features. Instrument System Safety Function (SIF)
- Topic 3. Standards GOST R IEC 61508, GOST R IEC 61511
- Topic 4. Completeness of Safety requirements
- Topic 5. Principles Deenergized To Safe, Energized To Safe
- Topic 6. Safety loop structure
- Topic 7. Safety Integrity Level (SIL)
- Topic 8. Positioning of SIS in the structure of the Control System (DCS). Difference between SIS and DCS
- Topic 9. Reasons and types of failures
- Topic 10. Functional Safety management and documentation

15:30-17:30

Formation of SIS requirements

- Topic 1. The procedure for forming requirements for the SIS (ESD)
- Topic 2. Defining the list of Safety functions (SIF), HAZOP
- Topic 3. Risk Graph method
- Topic 4. LOPA Safety layer analysis method: objectives, preparation, required input data, research procedure, independence of Safety layers, examples, common errors

(continued-Day 2)

DAY 2

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9:30-11:30

Formation of SIS requirements (continued)

- Topic 5. Allocation of safety functions to protection layers
- Topic 6. Requirements and content of the Technical Requirements for the ESD system
- Topic 7. Requirements and content of the Safety Requirements Specification (SRS)
- Topic 8. Requirements for the volume of project documentation
- Topic 9. Requirements for the list of the bypasses
- Topic 10. Performance requirements, safety time
- Topic 11. Requirements for instrumentation of SIS

11:30-15:30

SIS hardware design and engineering

- Topic 1. Safety-related components that do not affect safety and are not related to Safety.
- Topic 2. Safe behavior on SIS failure (fail safety). Power supply of the SIS
- Topic 3. Deenergize to Safe. Energize to Safe principles.
- Topic 4. Types of redundancy. Hardware tolerance to dangerous failures (HFT)
- Topic 5. Hardware tolerance to safe failures (spurious trips)
- Topic 6. Implementation of manual initialization of Safety functions
- Topic 7. Implementation of bypasses
- Topic 8. Hardware selection. Hardware Safety Integrity and Systematic Capability
- Topic 9. The main differences between hardware with the SIL level. Hardware certification procedure
- Topic 10. Hardware information and documentation
- Topic 11: Safety PLC Solutions
- Topic 12. Safety Instrumentation Solutions

15:30-17:30

SIS software design. Application software development

- Topic 1. Types of software
- Topic 2. Software requirements
- Topic 3. Source data for application software
- Topic 4. Application Software development
- Topic 5 Measures to avoid failures
- Topic 6. Failure control measures
- Topic 7. Determining the root causes and sequence of events (SOE)
- Topic 8. Safety protocols.
- Topic 9. Protection against unauthorized access
- Topic 10. Examples of application software implementation

DAY 3

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9:30-12:30

Calculation of the achieved SIL

- Topic 1. Structural reliability schemes
- Topic 2. Markov methods of reliability analysis
- Topic 3. PFD and PFDavg, PFH
- Topic 4. Diagnostic coverage, availability parameters
- Topic 5. Example of calculating the achieved SIL
- Topic 6. Software for calculating reliability

13:00-15:30

SIS Commissioning and operation

- Topic 1. Factory Tests (FAT)
- Topic 2. Acceptance Tests (SAT)
- Topic 3. Making changes during implementation. Security impact analysis
- Topic 4. Operation planning
- Topic 5. Safety Manuals of the SIS components
- Topic 6. Requirements for the current operation of SIS systems. Periodic inspection and diagnosis
- Topic 7. Using bypasses and forcing actions
- Topic 8. SIS operation during start-up and shutdowns.
- Topic 9. SIS operation in emergency mode (faulty state)
- Topic 10. Periodic proof tests
- Topic 11. Maintenance and repair of the SIS
- Topic 12. SIS faults tracking and analysis
- Topic 13. Making changes during operation. Safety impact analysis

Questions

15:30-17:30

Examination

- a test based on the completed material.