Alarm Management for Process Control Systems: Philosophy, Rationalisation and Performance

12 – 16 April 2027
Amsterdam - Zuidas business district hotel



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Introduction:

Alarm management fails quietly: control rooms accumulate standing alarms, chattering points and floods of low-value notifications until operators miss the one alarm that matters during an upset. This Core Concept course gives control, process and operations engineers a working method to run the alarm management life cycle, from writing an alarm philosophy through rationalising each alarm by consequence and operator response time to monitoring alarm rates and auditing the system. Participants build an Alarm Philosophy Extract, Rationalisation Record and Alarm Improvement Programme Plan from alarm data of their own plant.

Course Objectives:

- Apply the alarm management life cycle described in ANSI/ISA-18.2-2016 and IEC 62682 to an existing control system
- Draft an alarm philosophy document defining alarm criteria, priority matrix, class, HMI conventions and roles
- Rationalise alarms by recording cause, consequence, corrective action, allowable operator response time and priority in a master alarm database
- Specify suppression and design techniques such as deadband, on-delay, state-based alarming and shelving for nuisance and flood-prone alarms
- Analyse alarm journal data for alarm rate, floods, chattering, standing alarms and top bad actors, and report performance against the philosophy targets
- Plan management of change, periodic audit and an alarm improvement programme that keeps alarm performance from drifting back

Target Audience:

- Control engineers who configure alarms in DCS, SCADA and PLC operator stations
- Process engineers who define the consequence of deviations and the corrective actions operators must take
- Operations engineers and control room shift leaders who respond to alarms and report nuisance alarms
- Alarm coordinators who maintain the master alarm database and monthly alarm performance reports
- Process safety and technical integrity engineers who review alarm changes under management of change

Course Outline:

Day 1: Alarm System Problems and the Alarm Management Life Cycle

- Alarm, Event and Notification Definitions with Operator Action as the Alarm Test
- Alarm Flood, Standing Alarm and Nuisance Alarm Failure Patterns in Past Incidents
- Alarm Management Life Cycle Stages from ANSI/ISA-18.2-2016 and IEC 62682
- EEMUA Publication 191, API 1167 and NAMUR NA 102 Guidance Compared
- Alarm System Current-State Benchmark from a Sample Alarm Journal

Day 2: Alarm Philosophy Document and Master Alarm Database

- Alarm Philosophy Contents Using ISA-TR18.2.1-2018 as the Structure
- Priority Matrix from Consequence Severity and Allowable Operator Response Time
- Alarm Classes, Highly Managed Alarms and Safety-Related Alarm Handling
- Roles and Responsibilities: Alarm Owner, Alarm Coordinator and Operations Sign-Off
- Master Alarm Database Field Structure and Configuration Export Reconciliation

Day 3: Alarm Identification and Rationalisation Workshop Method

- Alarm Identification Sources: P&IDs, HAZOP Actions, LOPA Records and Operating Procedures
- Rationalisation Meeting Method Following ISA-TR18.2.2-2016
- Cause, Consequence, Corrective Action and Confirmation Record for Each Alarm
- Alarm Setpoint Placement Against Process Dynamics and Response Time Margin
- Duplicate, Redundant and Informational Alarm Removal Decision Criteria

Day 4: Alarm Design, Suppression, HMI and Performance Analysis

- Deadband, On-Delay and Off-Delay Settings for Chattering Alarm Removal
- State-Based Alarming, Logical Suppression and Flood Suppression Methods in ISA-TR18.2.4-2012
- Shelving and Out-of-Service Controls with Time Limits and Authorisation
- HMI Alarm Presentation: Alarm Summary, Colour Conventions and Audible Tones
- Alarm Performance KPIs in ISA-TR18.2.5-2022: Alarm Rate per Operator, Floods, Chattering and Standing Alarms

Day 5: Alarm Data Case Study and Improvement Programme Build

- Alarm Journal Case: Top Ten Bad Actor Analysis and Pareto of Alarm Load
- Alarm Flood Case: Upset Sequence Reconstruction and Root Alarm Identification
- Alarm Management of Change Checklist and Periodic Audit Protocol
- Alarm Improvement Programme Roadmap with Milestones and Monthly KPI Report
- Alarm Philosophy Extract, Rationalisation Record and Programme Plan Peer Review

Skills You Will Gain:

- Alarm Philosophy Drafting
- Alarm Rationalisation Facilitation
- Priority Matrix Design
- Master Alarm Database Management
- Nuisance Alarm Diagnosis
- Alarm Flood Analysis
- Alarm Performance Reporting
- Alarm Change Control

Why Attend This Course:

- Return with an Alarm Philosophy Extract, Rationalisation Record and Alarm Improvement Programme Plan built from your own plant's alarm data
- Reduce operator alarm load by removing chattering, duplicate and standing alarms with evidence from the alarm journal
- Defend every alarm priority and setpoint change to operations and safety reviewers with a documented consequence and response time
- Compare alarm practice with control room peers from oil and gas, petrochemicals, power, water and pharmaceutical plants

Conclusion:

An alarm system serves the operator only when every alarm needs a response, carries the right priority and arrives at a rate an operator can handle. The course moves from alarm failure patterns and the life cycle, through the alarm philosophy and master alarm database, to rationalisation, then to design and suppression techniques, HMI presentation and performance analysis. Participants leave with an Alarm Philosophy Extract, Rationalisation Record and Alarm Improvement Programme Plan ready for their next alarm review.