COURSE OVERVIEW IE0543

Plant Control System & Instrumented Protection System - Advanced (E-Learning Module)

Course Title

Plant Control System & Instrumented Protection System - Advanced
(E-Learning Module)

Course Reference

IE0543

Course Format & Compatibility

SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration

30 online contact hours
(3.0 CEUs/30 PDHs)

Course Description

This E-Learning is designed to provide participants with a detailed and advanced overview of plant control system & instrumented protection system. It covers the construction industry regulations, electrical safety, OHM's law, the hazards of electricity and safety signs to prevent accidents; the risk assessment/risk reduction, system safe operation, safety measures, basic precautions, safety systems & procedures and analysis of causes of accidents; the hand-held electric tools, overhead powerline tools, personal protective equipment and electrical safety equipment's; and the firefighting and fire detection, fire prevention system, lockout – tag out, 6 step LOTO procedure, shutdown and verification procedures.

Further, the course will also discuss the ATEX product markings, temperature classes, types of protection, intrinsic safety, combination of protection methods and protection techniques recognized by IEC, NEC® and CEC; the area classification, roof tank, alternative procedure for classification and ATEX marking; the hazard identification, estimation, evaluation and reduction option analysis; and the conformity assessment procedures, safeguard clause and procedure, temperature classification, protection concept for dust classified areas and temperature measurement.

During this interactive course, participants will learn the electrical methods of temperature measurement; the effect of proportional plus integral plus derivative action on control response; the pressure measurement, level measurement, process control system, flow measurement and calibration of flow measuring devices; the SCADA (supervisory control and data acquisition), HMI (human machine interface), distributed control system (DCS) and HART (highway addressable remote transducer); the harmonics, fundamental wave, hazardous area classification, intrinsic safety, alarm handling and event handling; the alarm management system; and the risk and safety integrity according to specified standards and correctness of risk evaluation and safety integrity level.

Course Objectives

At the end of this course, the Trainee will be able to:-

- Apply and gain an advanced knowledge on plant control system and instrumented protection system
- Explain the fundaments of process control and operating principle and working of sensors, transmitters, actuators, controllers etc
- Explain control loops: simple, cascade and split-range
- Identify the different types of control structures (schemes): ratio control, feed-forward control, capacity control etc
- Explain the architecture of a distributed control system (DCS)/SCADA
- Access historical information, trends and information in DCS/SCADA
- Explain the purpose of different types of alarms and alerts
- Describe the alarm management philosophy
- Monitor and control process parameters from DCS/SCADA
- Adjust controller settings in accordance with procedures
- Simulate plant control through simulation software
- Explain safety function and safety integrity level
- Describe the different safety instruments: limit switches, position sensors, temperature, pressure, flowrate and level detectors
- Explain the working of instrumented safety systems: High Integrity protection Systems (HIPS), Emergency Shut Down System (ESD), Fire & Gas System and Emergency Depressurization
- Explain the different levels of ESD systems with reference to Oil & Gas facilities
- Discuss construction industry regulations, electrical safety, OHM's law, the hazards of electricity and safety signs to prevent accidents
- Carryout risk assessment/risk reduction, system safe operation, safety measures, basic precautions, safety systems & procedures and analysis of causes of accidents
- Identify the hand-held electric tools, overhead powerline tools, personal protective equipment and electrical safety equipment's

- Apply firefighting and fire detection, fire prevention system, lockout – tag out, 6 step LOTO procedure, shutdown and verification procedures
- Discuss ATEX product markings, temperature classes, types of protection, intrinsic safety, combination of protection methods and protection techniques recognized by IEC, NEC® and CEC
- Identify area classification, roof tank, alternative procedure for classification and ATEX marking as well as apply hazard identification, estimation, evaluation and reduction option analysis
- Employ conformity assessment procedures, safeguard clause and procedure, temperature classification, protection concept for dust classified areas and temperature measurement
- Carryout electrical methods of temperature measurement and discuss the effect of proportional plus integral plus derivative action on control response
- Apply pressure measurement, level measurement, process control system, flow measurement and calibration of flow measuring devices
- Discuss SCADA (supervisory control and data acquisition), HMI (human machine interface), distributed control system (DCS) and HART (highway addressable remote transducer)
- Interpret harmonics, fundamental wave, hazardous area classification, intrinsic safety, alarm handling and event handling
- Illustrate alarm management lifecycle and optimize alarm management system
- Apply risk and safety integrity according to specified standards and correctness of risk evaluation and safety integrity level

Who Should Attend

This course provides an advanced overview of plant control system and instrumented protection system for power station operators, technicians, engineers and managers, electrical and mechanical engineers of different competency levels, project engineers and project managers, power station maintenance crew, university graduates, site engineers and technical crew.

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- USA International Association for Continuing Education and Training (IACET)

  Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 1-2013 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Fee

As per proposal

Course Contents

- Construction Industry Regulations – Electrical Safety
- Severity
- How Does Electricity Work
- Ohm's law applied to direct current
- Ohm's law applied to AC current
- Alternating current
- Ohm's law applied to AC
- How is electrical energy produced?
- Power in AC Circuit
- "Power losses" and "Voltage drop "
- Definitions
- Safety
- Hazard
- Harm
- Risk
- What are the Hazards of Electricity
- Safety Signs – Prevent Accidents
- Risk Assessment / Risk Reduction:
- System safe operation
- Safety measures
- Equipment life cycle
- Basic precautions
- Types of Hazardous Energy
- But is it enough???
- Hazardous Energy
- Body behavior according to current level crossing over
- Our body conducts electricity - Body behaviour
- Damages from shock are mainly internal
- Damages due to Electrical Arc
- Burns from LV short circuits arcs….!
- HV or MV ARC Impact

- Direct and indirect contact
- Protection against DIRECT contacts
- TT Scheme – Earth leakage Monitoring
- Protection against INDIRECT contacts
- Root causes of Electrical Accidents
- Accidents causes generated by non-strict Electrical Maintenance
- Accidents causes generated by insufficient Training
- Defects in Safety Systems & Procedures
- Management Commitment
- Analysis of causes of accidents
- Preventing Electrical Accidents
- Electrical panels and distribution
- Hand Held Electric Tools
- Overhead Powerline Tools
- Wrong methods, wrong end
- Wrong gear, major burns
- Lesson
- Never approach bare MV or HV
- Boundaries
- Personal Protective Equipment:
- Electrical safety equipment's
- Safety kits
- Guarding
- Working at height Personal Fall Protection Systems-Common Pieces of Equipment
- Safety Line Systems (Static Lines)
- Avoid bad contacts
- Protection Relays
- Internal Arc Withstanding Switchgear
- LV Current Limitation
- Summary
- Good Work Practice
- Electric Shock
- Lightining

- How does lightning form?
- Lighting devices to prevent strike
- Electricity is one of the most common causes of fire both in the home and workplace
- Firefighting and fire detection
- Fire In Electrical Equipment
- Fire Prevention System
- Pumps and sprinkles for fire fighting
- Lockout – Tag out
- Overview
- Types of Energy
- 6 Step LOTO Procedure
- Prepare for Shutdown
- Shutdown Equipment
- Isolate the Equipment
- Attach the Lock and Tag
- Group lockouts
- Release or Block all Stored Energy
- Verify Equipment Isolation
- Verification procedures
- Lockout Steps
- Release from LOTO
- Contractors
- Who can remove Locks & Tags?
- A piece of equipment already has a lock and tag. Do I have to place my own locks & tags?
- Shift changes
- Restoring energy to the equipment/machine
- Potentially Explosive Atmospheres (ATEX)
- The ATEX Sector
- EU legislation: the ATEX Directive 94/9/EC
- Basic elements
- Equipment: Groups and Categories
- Essential Health and Safety Requirements

- Conformity assessment: Modules
- Conformity assessment: Notified Bodies
- Markings
- CE Marking
- Epsilon-x Marking (Hexagon)
- Symbols and Letters
- Organizational Scheme for the ATEX 94/9/EC Directive
- Working Parties
- Market Surveillance
- General market surveillance obligation
- Safeguard clause procedure
- How to apply the Directive
- New legislative developments
- The NLF-aligned ATEX Directive
- Transitional period and transposition
- ATEX Contact Point
- ATEX Enclosure – Examples
- Class I, Div. 1 Enclosure Installation
- Class I, Div. 2 Enclosure Installation
- EEx e (Increased Safety) - Zone 1 & 2 Enclosure Installation
- EEx d IIB (Flameproof) - Enclosures for Zone 1 & 2, 21, 22
- EEx d IIC (Flameproof) - Enclosures for Zone 1 & 2, 21, 22
- Hazardous Area Classification And The Selection of Equipment
- ATEX
- ATEX Directive 94/9/EC
- Directive 137
- ATEX Groups and Categories
- ATEX Zones
- ATEX 137
- Hazard - Gas, Mists or Vapors
- Gases/Vapors
- Hazard – Dusts
- ATEX Product Markings

- Gas Groups
- Auto Ignition Temperature
- Temperature Classes
- Types of Protection
- Flameproof Enclosures “d”
- Enclose ignition source with a tough container
- Intrinsic Safety “i”
- Intrinsic Safety – Basic Principles
- Electric spark energy can be always smaller than the ignition energy
- Limiting Energy to the Field Device
- Intrinsically ib
- Intrinsically Ia
- Increased Safety “e”
- Powder/Sand Filled “q”
- Pressurized Apparatus “p”
- Pressurize clean air in the container
- Oil Immersion “o”
- Special Protection “s”
- Type of Protection “n”
- Type of Protection “m”:
- Combination of protection methods
- Protection Techniques Recognized by IEC, NEC® and CEC
- Selection criteria
- Selection of Equipment
- Enclosure Protection
- Ingress Protection (IP) Codes
- ATEX Concept Categories
- Area Classification
- Floating-Roof Tank
- Fixed Roof Tank
- Alternative Procedure for Classification
- Marking
- ATEX Marking

- Example of new marking
- ATEX Guidelines
- Objective of The ATEX Directive 94/9/EC
- General Concepts
- Placing ATEX products on the market
- Putting ATEX products into service
- Manufacturer
- Use of subcontractor services by a manufacturer
- Conformity Assessment Procedures based on quality assurance (Annex IV,Annex VII)
- Manufacturing of ATEX products for own use
- Authorised representative
- Other persons responsible for placing on the market
- Equipment
- Potentially explosive atmosphere
- "Own" ignition source
- Non-Electrical Equipment
- Electrical Equipment
- Assemblies
- Assemblies with various configurations
- Summary of Requirement for Assemblies
- Protective Systems
- Components
- Safety, controlling or regulating devices as defined in Article 1.2
- In Which Cases Does Directive 94/9/EC Apply?
- ATEX Analysis
- Which kinds of products are covered by Directive 94/9/EC
- Inerting Systems
- Preventing an explosive atmosphere
- Inerting systems as equipment
- Inerting systems as part of the ignition protection concept
- Paint Spray Booths
- Place of intended use
- Defining group and category

- Risk Assessment for Products
- Methods and/or techniques that could be applied
- Hazard identification
- Hazard estimation
- Hazard evaluation
- Hazard reduction option analysis
- Equipment Not in the Scope of Directive 94/9/EC
- Exclusions based on Article 1.4 of Directive 94/9/EC
- Examples for equipment not covered by Directive 94/9/EC
- "Simple" products
- Installations
- Application of Directive 94/9/EC Alongside Others That May Apply
- Electromagnetic Compatibility 2004/108/EC (EMC)
- Low Voltage 2006/95/EC (LVD)
- Machinery 2006/42/EC (MD)
- Transport of dangerous goods by road 94/55/EC and 98/91/EC (ADR)
- Personal Protective Equipment 89/686/EEC (PPE)
- Pressure Equipment 97/23/EC (PED)
- Simple Pressure Vessels 87/404/EEC
- Gas Appliances 90/396/EEC (GAD)
- Construction Products 89/106/EEC (CPD)
- Marine Equipment Directive 96/98/EC (MED)
- Used, Repaired or Modified Products and Spare Parts
- General
- Definitions
- Reconditioned (or refurbished) products
- Reconfigured products
- Substantially modified products
- Repaired products
- Spare parts
- Conformity Assessment Procedures
- Products conforming to Directive 94/9/EC
- Conformity Assessment Procedures

- Exceptional derogations of the Conformity Assessment Procedures
- Notified Bodies
- Designation
- Co-ordination and Co-operation
- Subcontracting
- Retention of documentation
- Notified Bodies having knowledge of faulty products* on the market
- Documents of Conformity
- Documents issued by the manufacturer
- EC Declaration of Conformity
- Written Attestation of Conformity for components
- Documents accompanying the product
- Retention of documentation - Quality assurance
- Acceptance of test results of manufacturers by a Notified Body
- Documents issued by the Notified Body
- Minimum content of a European standardised ATEX Test and Assessment Report
- EC-Type Examination Certificate and the responsibilities of stakeholders
- Marking
- CE Marking
- Supplementary/Specific Marking
- Additional marking for standards
- Marking of components
- Marking of assemblies
- Safeguard Clause and Procedure
- European Harmonised Standards
- European Harmonised Standards published in the Official Journal
- Standardisation Programme
- Useful Websites
- Annex I: Specific Marking of Explosion Protection (Ex) Drawn from Directive 84/47/EEC
- Annex II: Borderline List - ATEX Products
- Hazardous Locations Overview
- Hazardous Locations Overview, Ignitions Sources, and Protection Concepts

- What is Potentially Explosive Atmosphere Certification and why might you need it?
- Deepwater Horizon
- Facts about Disaster
- What is an explosion?
- The Fuel
- Fuel Properties
- Explosion Properties
- Temperature classification
- Temperature Class
- Gas Grouping
- Combustible Dust
- Potential Ignition Sources
- Protection Concepts
- Flameproof (Explosion-proof) Ex d
- Intrinsic Safety
- Purged and Pressurized
- Increased Safety Ex e
- Oil Immersion Ex o
- Powder Filling Ex q
- Encapsulation
- Encapsulation Ex 'm'
- Type 'n' Protection for Zone 2
- Protection Concept for Dust Classified Areas
- Classification Schemes,Certification, and Design Guidelines
- An Explanation of ATEX, NEC and IEC Systems
- Equipment Groups
- Equipment Categories
- Zone Definitions
- Hazardous Area Classification: Europe
- Class/Division Definitions
- Hazardous Area Classification: North America
- Correlation – Somewhat?
- Gas Groups (ATEX, IEC and NEC 505)

- IEC Zone System
- Apparatus Grouping
- Designing for Hazloc
- Certification Differences
- Equipment that needs ATEX
- North America
- ETL & cETL Listing For Hazloc
- Listing vs. Classification
- Other Evaluations Required
- IEC Ex Scheme
- Service Line Review
- Our Hazardous Location Credentials
- Definitions
- NEC
- CEC
- IEC
- CENELEC
- ATEX
- Who Needs to Comply with the ATEX Directive?
- ATEX Directive Scope
- ATEX Groups and Categories
- ATEX Zones
- Hazard - Gas, Mists or Vapors
- Hazard – Dusts
- ATEX 137
- Mandatory
- Coverage
- CE Marking of Equipment
- Temperature Measurement
- Objectives/ introduction
- Describe the temperature variable
- Heat transfer
- Temperature scales

- Expansion type thermometers
- Electrical methods of temperature measurement
- Thermowells
- The electrical/electronic temperature transmitter
- Summary
- Single Loop Controller
- Introduction
- What is a control loop?
- Control Modes
- Two Step Control
- Proportional Control
- Integral Action (Reset)
- Integral Action Time (Reset Time)
- Proportional Plus Integral Action Conclusion
- Derivative Action (Pre-Act)
- Combination of P + I + D Action
- Typical Applications
- The Effect Of Proportional Plus Integral Plus Derivative Action On Control Response
- Pressure Measurement
- Introduction
- Describe Process Variables
- Pressure Scales
- Pressure Measuring Devices
- Pressure Transmitters And Transducers
- The Pneumatic Signal Loop
- The Air Pressure Regulator
- The Electrical Pressure Transmitter
- Electrical Series Loop
- Summary
- Level Measurement
- Course Objective
- Introduction
- Types Of Level Measuring Devices

- Summary
- Introduction to Process Control System
- Process Control System
- Measuring Element
- Flow Measurement
- Objectives / Introduction
- Describe The Flow Variable
- Units Of Flow
- Basic Properties Of Fluids
- Selecting A Flow Measuring System
- Quantity Meters
- Rate Of Flow Measurement
- Calibration Of Flow Measuring Devices
- Other Methods Of Flow Measurement
- Summary
- Control Systems & Equipment
- Unit Control Panel (UCP)
- Remote Control Panel
- SCADA (Supervisory Control And Data Acquisition)
- HMI (Human Machine Interface)
- Distributed Control System (DCS)
- HART(Highway Addressable Remote Transducer)
- Abbreviations
- Density Measurement
- Specific Gravity-Density
- Viscosity And Density (Metric Si Units)
- Density Measurements
- Engineering Basics
- Motion Control Basics
- Cylinder Inertia
- Gear Drive
- Leadscrew Drive
- Movement Profile

- Acceleration Torque
- Analysis Equipment
- Watercut Meter
- Base Sediment & Water
- Gas Chromatograph
- Definition of SCADA
- SCADA in the 'Real World'
- Citect's SCADA Product
- Citect Configuration Environment
- The Vijeo Citect Environment
- System Requirements
- Licensing
- Runtime System
- Citect Explorer
- Include Projects
- Project Editor
- Cicode Editor
- Citect Configuration Environment
- Managing Projects
- New Projects
- Clusters and Servers
- Defining Clusters and Servers
- Computer Setup Wizard
- Backup & Restore
- Backup Options
- Backup to Removable Media
- Backup is a Zip File
- Backup Management
- Restore as a New Project
- Include Projects
- Managing Projects
- Setting Up Communications
- Vijeo Citect I/O

- Communications Wizard
- Wizard Via the Project Editor
- Communications Database Files
- I/O Device Types
- Internal Disk, External I/O Dev
- After the I/O Wizard
- Forms
- Show Deleted Entries in Forms
- Accessing Help and Knowledge Base
- Help
- Knowledge Base
- Test Communications
- Structured Tag Names
- Tag Naming
- Backup, Backup & Think Again
- Save DBF Macro
- Graphics
- Include Templates
- Drawing Objects
- Pasteuriser Graphic Layout
- Useful Drawing Tips
- Expression Wizard
- Object Display at Runtime
- Symbol Sets
- Symbol Set Libraries
- Troubleshooting Tip
- ActiveX Controls
- Importing Graphics Images
- Adjust Colours
- Luminance vs. Saturation
- Create Image as Background
- Commands and Controls
- Slider Controls

- Touch Commands
- Keyboard Commands
- Keyboard Command Levels
- Understanding ArgValue
- User Privileges
- Genies
- Developing a Genie
- What is a Genie?
- Viewing Genie Properties
- Creating Genies
- Substitutions for Genies
- Locating the Genies
- Troubleshooting Tip
- Popup Pages and Super Genies
- Super Genies
- Anatomy of a Pop-up Page
- Super Genie vs Popup Page
- Viewing System Pages or Popups
- HELP - AssWin Modes
- Popup Pages
- Super Genie - Animation Point
- Using the Cicode Editor
- OFS Server
- What is OPC?
- Troubleshooting Tip
- Vijeo Citect OPC Client
- OPC Access Paths
- Devices
- What are Devices?
- Device History Files
- Why Doesn't it Work?
- Events
- Configuring Events

- Global Events
- Cicode Functions Used
- Entering Cicode
- Cicode Functions Used
- Entering Cicode
- Alarms
- Alarm State Diagram
- Alarm Types
- Create Alarms
- Alarm Categories
- Logging Alarms to a Printer
- Device Groups
- Alarm Pages
- Standard Alarm Pages
- Alarm Groups
- Audible Alarms
- Alarm Properties as Tags
- Creating Alarm Property Tag
- Troubleshooting Tip
- Trends
- Displaying Trends
- Trend Tags
- Creating Trend Tags
- Types of Trends
- Trend History Logging
- Trend Template Styles
- Trend History Display
- Trend Groups
- Trend History Management
- Instant Trends
- Process Analyst
- Configure Process Analyst
- Displaying in Process Analyst

- Selecting Pens
- Analyst Help File
- Analyst View
- Process Analyst View
- Process Analyst vs Trends
- Alarm Display
- Cursor & Labels
- Process Analyst Properties
- Course Summary
- SCADA Training Roadmap
- Harmonics
- What are harmonics?
- Fundamental Sine wave
- Non fundamental Sine wave
- Effects of 3rd harmonic on fundamental wave
- Presence of different types of harmonics in fundamental wave
- Effects of the Harmonics
- Sources of harmonics
- Harmonics in VSD's
- Harmonics due to six pulse converter
- Harmonic elimination methods for VSD's
- By using Line reactor
- By using DC link inductor
- By using multi-pulsed converters
- By using phase shifting transformers
- By using passive filters
- By using passive filters
- Instrumentation Gas Aalyser – Inspection
- Probe
- Filters
- Heated line
- Pump
- Flow detection

- Condensate bottle
- Analyser
- Faults
- In situ
- Hazardous Area Classification
- Introduction
- Hazardous Area Classification
- Selection of Apparatus According To Zones
- Zone Suitable Apparatus
- Spark or Transmitted Flame ignition
- Gas Group & Representative Gas
- Intrinsic safety
- Area Classification
- Temperature Classification In ‘Iec’ Standard
- Methods Of Protection
- Conclusion
- WOIS General Specification
- WOIS in General
- WOIS Hardware
- WOIS Software
- Starting of the WOIS Workstation
- System security
- Restarting of the WOIS Workstation
- Displays
- Display hierarchy
- Display layout and functionality of toolbars
- Plant codes
- Alarm handling
- Event handling
- Colours
- Symbols
- WOIS displays
- Common pop-up windows

- General
- System Overview
- Conclusion
- Revisions
- Automation layout, WAPCO 4x18V50DF, NIGERIA
- Automation layout, Engine, based on UNIC C3
- Control systems for ESD
- Purpose
- Action
- Background
- The role of ESD systems
- Legal requirement in PFEER
- Function - cause and effect requirements
- Performance - safety integrity levels
- ESD system hardware
- Sensors
- Final control elements
- Computation
- Minimum provision of ESD functions
- ESD system operation
- Questions and answers
- References
- Alarm Management for SCADA control rooms
- Definition of the term “alarm”
- Alarm configuration seems to be an easy task
- Permanent high alarm rates indicate bad alarm quality
- Human capacity is limited
- Guidelines and standards
- EEMUA 191
- EEMUA 191 – Performance Level (Ed3)
- Overall alarm system performance level
- ISA SP 18.2
- ABB’s alarm management vision

- Alarm management lifecycle
- Optimizing the alarm management system
- Alarm management system
- Alarm philosophy document
- Alarm engineering
- Alarm analysis
- Alarm optimization
- Alarm management lifecycle
- Improving Operator effectiveness
- Alarm summary data values
- State-based alarm hiding removes unnecessary alarms
- Alarm shelving
- Alarm grouping replaces long lists
- Consistent alarm-response navigation gives fast access to essential information
- Implementation of the alarm system
- Modern alarm management - bringing together safety and effectivity
- Safety integrity level (SIL) versus full quantitative risk value
- Risk and safety integrity according to specified standards
- Correctness of risk evaluation and safety integrity level
- Conclusion