

Course No. 1536

DCS Control Systems, Troubleshooting & Production Operations Training Course

INDUSTRIAL AUTOMATION & DIGITAL TECHNOLOGIES
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The DCS Control Systems, Troubleshooting & Production Operations Training Course is a specialized professional program designed to develop advanced knowledge and practical capabilities in distributed control systems, industrial process control, troubleshooting, and production operations. The course provides participants with an integrated understanding of how DCS platforms support safe, stable, and efficient operation of complex industrial processes across oil and gas, petrochemical, chemical, power generation, water treatment, and other process industries.

The program focuses on the relationship between control system architecture, field instrumentation, process variables, control loops, alarms, operator interfaces, and production performance. Participants will examine how a DCS receives process information, processes control strategies, and communicates operating conditions to control room personnel. The course also emphasizes the importance of accurate process monitoring, effective control actions, and disciplined operating procedures in maintaining production continuity and minimizing operational disturbances.

A major component of the DCS Control Systems, Troubleshooting & Production Operations Training Course is practical troubleshooting. Participants will develop systematic methods for identifying abnormal operating conditions, distinguishing between instrument, control, equipment, and process-related problems, and interpreting alarms and trends to determine likely causes. The course addresses common problems involving pumps, tanks, valves, transmitters, control loops, process equipment, communication networks, and DCS-related failures.

The course also connects DCS operation with real production requirements. Participants will explore process optimization, production constraints, equipment performance, operating parameters, start-up and shutdown considerations, alarm management, and response to process deviations. This enables operators, engineers, supervisors, and maintenance professionals to make better technical decisions while maintaining operational stability and supporting production targets.

Through practical exercises, troubleshooting scenarios, process simulations, and operational case studies, participants will strengthen their ability to analyze DCS information and respond effectively to production problems. The overall approach is designed to improve operational awareness, troubleshooting discipline, process reliability, equipment availability, and coordination between control room, production, maintenance, instrumentation, and engineering teams.

Objectives

- Analyze the architecture and operating principles of distributed control systems and identify the role of major hardware, software, communication, and control components within the course.
- Evaluate process variables, control loops, alarms, trends, and operator displays to determine abnormal operating conditions and their potential causes.
- Apply systematic troubleshooting methodologies to DCS-related control, instrumentation, equipment, and process problems using structured diagnostic techniques.
- Assess the interaction between field instruments, final control elements, process equipment, and DCS control strategies during normal and abnormal operating conditions.
- Develop practical approaches for troubleshooting common problems involving pumps, tanks, valves, transmitters, sensors, and control loops.
- Analyze process trends and historical operating data to identify deviations, recurring problems, performance deterioration, and potential production constraints.
- Apply appropriate operating and control strategies to support stable production, efficient process performance, and reliable plant operation.
- Evaluate alarm conditions and prioritize operator responses according to process impact, urgency, and potential operational consequences.
- Strengthen coordination between control room operators, production personnel, instrumentation specialists, maintenance teams, and process engineers when resolving operational problems.
- Assess start-up, shutdown, and process upset conditions and determine appropriate control and operating responses.
- Improve the identification of root causes behind recurring DCS and production problems through structured analysis and evidence-based troubleshooting.
- Develop an action-oriented framework for improving DCS performance, production reliability, troubleshooting effectiveness, and operational decision-making.

Who Should Attend

This course is designed for control room operators, DCS operators, process control engineers, instrumentation and control engineers, automation engineers, production engineers, process engineers, operations engineers, and technical specialists responsible for monitoring and controlling industrial processes. It is particularly relevant to professionals working with continuous or batch production systems where process stability, equipment reliability, and operational response are critical.

The program is also suitable for production supervisors, operations supervisors, shift supervisors, control room supervisors, maintenance engineers, instrumentation technicians, electrical and automation technicians, process technicians, and reliability professionals who need a stronger understanding of the interaction between DCS control systems and production operations. Professionals involved in commissioning, plant start-up, process optimization, technical support, and operational troubleshooting will also benefit from the practical focus of the course.

Managers and decision makers responsible for production, operations, maintenance, process control, automation, and plant performance can use the course to strengthen their understanding of DCS-based operations and improve coordination between technical functions. The course is especially applicable to organizations operating oil and gas facilities, refineries, petrochemical plants, chemical facilities, power plants, water treatment facilities, and other process-intensive industrial environments.

Learning Outcomes

- Explain the architecture, functions, and operating principles of a distributed control system within an industrial process environment.
- Identify the roles of controllers, input and output modules, operator stations, engineering stations, communication networks, and field devices.
- Interpret DCS graphics, process displays, alarm indications, trends, and operating parameters to assess plant conditions.
- Analyze control loops and determine the relationship between process measurements, controller actions, and final control elements.
- Diagnose common problems involving transmitters, valves, sensors, control loops, and process signals.
- Troubleshoot operating problems associated with pumps, tanks, valves, and other major process equipment using DCS information.
- Use process trends and historical data to investigate deviations and identify potential causes of production problems.
- Evaluate alarm conditions and determine appropriate operational responses while maintaining process stability.
- Identify differences between instrumentation faults, control-system faults, equipment problems, and actual process disturbances.

- Apply structured troubleshooting techniques to reduce unnecessary intervention and improve problem-resolution efficiency.
- Support stable production through appropriate monitoring, control, process adjustments, and communication with relevant technical teams.
- Develop practical recommendations for improving DCS reliability, production performance, troubleshooting processes, and operational coordination.

Course Outline

DAY 01

DCS Control Systems Architecture and Industrial Process Control

- Fundamentals of industrial automation and process control
- Principles and applications of distributed control systems
- DCS architecture and major system components
- Controllers, input and output modules, operator stations, and engineering stations
- Communication networks and data exchange within a DCS environment
- Field instruments and their relationship with the control system
- Process variables including pressure, temperature, flow, and level
- Control loops and basic feedback control principles
- Operator interfaces, process graphics, trends, and system indications

PRACTICAL APPLICATION

Analysis of a representative DCS architecture and identification of system components and process signals

DAY 02

Control Loops, Instrumentation and Troubleshooting Techniques

- Fundamentals of measurement and process instrumentation
- Pressure, temperature, flow, and level measurement systems

DAY 02 — CONTINUED

- Transmitters, sensors, control valves, and final control elements
- Understanding controller modes and control-loop behavior
- Proportional, integral, and derivative control principles
- Identifying unstable, slow, oscillating, or poorly performing control loops
- Signal failures, abnormal readings, communication problems, and instrument faults
- Distinguishing instrumentation problems from process and equipment problems
- Structured troubleshooting methodology and fault isolation

PRACTICAL APPLICATION

Troubleshooting simulated control-loop and instrumentation problems using DCS indications, alarms, and trends

DAY 03

DCS-Based Production Operations and Process Performance

- Relationship between DCS control and production operations
- Monitoring production parameters and operating limits
- Process stability and maintaining consistent operating conditions
- Production constraints and their impact on process performance
- Monitoring pumps, tanks, valves, and associated process equipment
- Understanding equipment behavior through DCS trends and operating data
- Managing changes in process conditions and production requirements
- Start-up, normal operation, shutdown, and transition conditions
- Responding to process deviations and abnormal operating conditions
- Coordination between control room operations and field personnel

PRACTICAL APPLICATION

Analysis of a production operating scenario and development of appropriate control and operating responses

DAY 04

Advanced Troubleshooting, Alarms and Production Problems

- Alarm management principles and operator response
- Prioritizing alarms according to process significance and operational impact
- Analysis of recurring alarms and abnormal process trends
- Troubleshooting pump performance and tank-level problems
- Diagnosing valve response and control problems
- Identifying causes of pressure, temperature, flow, and level deviations
- DCS communication and system-related troubleshooting considerations
- Process upsets and systematic response strategies
- Root cause analysis for recurring control and production problems
- Using historical DCS data to investigate incidents and operating disturbances

PRACTICAL APPLICATION

Integrated troubleshooting workshop involving DCS alarms, process deviations, equipment problems, and production constraints

DAY 05

DCS Optimization, Reliability and Operational Excellence

- Improving DCS monitoring and operator decision-making
- Optimizing control-loop performance and process stability
- Using trends and operating data to identify performance improvement opportunities
- Improving production reliability through effective process control
- Integrating DCS troubleshooting with maintenance and reliability activities
- Coordination between operations, instrumentation, maintenance, and engineering teams
- Developing preventive approaches to recurring DCS and production problems
- Improving operating procedures and response to abnormal situations
- Performance indicators for DCS reliability and production operations
- Developing practical strategies for continuous improvement in control and production performance

DAY 05 — CONTINUED

FINAL WORKSHOP

Comprehensive DCS troubleshooting and production optimization case study followed by an operational improvement action plan

Register or Request More Information

Course page: <https://quest-training.com/courses/dcs-control-systems-troubleshooting-production-operations-training-course>

Website: <https://quest-training.com>

Email: info@quest-training.com

Phone: +905016771440