

Advanced Refinery Troubleshooting Engineering Training Course

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Overview

Advanced Refinery Troubleshooting Engineering Training Course is a one-week advanced course for refinery process, operations, technical-services, and reliability teams who leave with a Refinery Troubleshooting Engineering Casebook. Participants use plant-wide refinery troubleshooting, refinery upset investigation, process data validation, root cause analysis, and safe corrective action to resolve cross-unit problems. The course connects process, equipment, control, laboratory, utility, and safety evidence. Agile Leaders Training Center presents refinery troubleshooting engineering practice.

Who Should Attend

- Refinery process functions responsible for unit performance, balances, and operating constraints
- Operations functions responsible for abnormal-condition response and safe stabilization
- Technical-services functions responsible for cross-unit investigations and engineering recommendations
- Maintenance and reliability functions responsible for equipment-condition evidence and recurrence controls
- Control and instrumentation functions responsible for trends, alarms, loops, interlocks, and data quality
- Unit supervision functions responsible for escalation, change control, and corrective-action follow-through

The course assumes participants already interpret refinery process flows, operating data, control trends, laboratory results, and safe operating limits, and it leaves out introductory refining, AI model development, predictive-maintenance system design, and detailed equipment design.

Departments and Industries

The course supports departments and industries that diagnose interacting process, equipment, control, and utility problems in continuous operations.

- Petroleum refining and downstream processing
- Petrochemical and chemical manufacturing
- Gas processing and industrial energy facilities
- Operations, process engineering, and technical services
- Maintenance, reliability, inspection, and instrumentation
- Process safety, laboratory, utilities, and production planning

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Learning Objectives

By the end of this course, participants will be able to:

- Apply a structured refinery troubleshooting workflow
- Analyze trends, balances, samples, alarms, and equipment evidence
- Diagnose cross-unit causes within safe operating limits
- Compare hypotheses through targeted checks and test runs
- Prioritize corrective actions, escalation, and change controls
- Build a verified engineering case and recurrence plan

Course Agenda

Day 1: Frame the Troubleshooting Case

- Refinery Symptom Definition and Boundary Sheet
- Safe Operating Envelope and Escalation Matrix
- Event Timeline and Shift Evidence Map
- Process Flow, Control, and Cross-Unit Interaction Diagram
- Troubleshooting Hypothesis and Evidence Register

Day 2: Validate Process Evidence

- DCS Trend Quality and Time-Alignment Checklist
- Mass and Energy Balance Closure Method
- Laboratory Sample and Analyzer Reconciliation Table
- Alarm, Interlock, and Control-Loop Behavior Review
- Data Confidence and Contradiction Ranking Matrix

Day 3: Diagnose Units and Equipment

- Distillation and Fractionation Deviation Decision Tree
- Fired-Heater and Heat-Exchange Constraint Analysis
- Conversion-Unit Severity, Yield, and Fouling Causal Map
- Treating, Hydrogen, and Sulfur-System Interaction Review
- Rotating-Equipment, Instrument, and Utility Failure Matrix

Day 4: Select and Control Solutions

- Root Cause Analysis and Barrier-Failure Map
- Corrective Option Safety and Feasibility Screen
- Temporary Change and Management-of-Change Decision Log
- API RP 754 Precursor and Recurrence Indicator Review
- Solution Verification and Learning Action Plan

Day 5: Practice Refinery Troubleshooting

- Suggested Exercise: Reconstruct a Cross-Unit Upset Timeline
- Suggested Exercise: Close a Balance and Challenge Instrument Data
- Suggested Exercise: Test Competing Equipment and Process Causes
- Suggested Exercise: Select, Control, and Verify a Corrective Action
- Capstone Exercise: Complete the Refinery Troubleshooting Engineering Casebook

Practical Exercises

The course uses suggested activities to turn refinery operating evidence into controlled diagnosis and documented engineering decisions.

- Suggested activity: define the symptom, boundaries, timeline, operating envelope, and escalation triggers for an abnormal condition.
- Suggested activity: reconcile trends, balances, samples, alarms, and equipment evidence before ranking causes.
- Suggested activity: test competing hypotheses, select a controlled action, and define verification evidence.
- Suggested activity: record causes, safeguards, actions, ownership, and recurrence indicators in a refinery case file.

FAQs

Who suits advanced refinery troubleshooting engineering training, and what does it assume?

Advanced refinery troubleshooting engineering training suits process, operations, technical-services, reliability, control, and unit-supervision functions. It assumes practical use of process flows, operating data, control trends, laboratory evidence, and safe operating limits.

How does refinery troubleshooting engineering differ from refinery operations fundamentals?

Refinery troubleshooting engineering tests competing causes across process, equipment, control, utilities, and connected units. Refinery operations fundamentals explain unit purposes, normal flows, routine controls, and standard operating practices.

How should a refinery upset investigation begin?

A refinery upset investigation should begin by defining the symptom, time window, affected boundary, safe operating envelope, sequence of changes, data quality, and immediate stabilization needs before assigning a cause.

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How are refinery troubleshooting hypotheses verified?

Refinery troubleshooting hypotheses are verified by predicting observable evidence, checking independent data, closing balances, testing contradictions, conducting controlled checks, and confirming that the selected action removes the cause without creating another risk.

When does refinery troubleshooting require management of change?

Refinery troubleshooting requires management of change when a proposed temporary or permanent change affects process chemicals, technology, equipment, procedures, facilities, or other controlled conditions beyond an approved replacement in kind.

Conclusion

Participants take back a Refinery Troubleshooting Engineering Casebook linking symptoms, timelines, balances, trends, samples, hypotheses, causes, actions, and verification. It changes isolated observations and quick fixes into a traceable diagnostic path. The casebook supports safer decisions, stronger cross-discipline coordination, validated corrective action, recurrence monitoring, and operational learning.

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