



PE320: Troubleshooting & Problem- Solving in Refinery Operations

Training Description:

This intensive training course is designed to equip refinery professionals with the knowledge, tools, and techniques to effectively troubleshoot and solve operational problems in refinery process units. It covers both systematic troubleshooting methodologies and real-world refinery case studies to strengthen participants' analytical and decision-making capabilities. The training course emphasizes process safety, root cause analysis, and equipment reliability.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Understand the fundamentals and importance of troubleshooting in refinery operations
- ✓ Apply systematic methods and logical thinking for diagnosing and solving refinery problems
- ✓ Identify root causes of common process upsets and equipment failures
- ✓ Utilize data analysis, trending, and instrumentation feedback in troubleshooting efforts
- ✓ Improve reliability and minimize downtime through proactive problem-solving
- ✓ Apply best practices and lessons learned from real refinery incidents

Training Designed for:

This training course is intended for Process Engineers and Technicians, Operations and Maintenance Supervisors, Control Room Operators, Refinery Managers and Shift Leaders, Reliability and Safety Engineers and Anyone involved in daily operations and process optimization in refineries.

Training Requirement:

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

❖ Introduction to Troubleshooting in Refinery Operations

- Overview of refinery operations and critical process units
- Importance of troubleshooting in refinery safety, reliability, and efficiency
- Types of problems: operational, mechanical, instrumentation, human error
- Key principles and mindset for troubleshooting
- The troubleshooting cycle: symptoms → diagnosis → root cause → solution
- Structured problem-solving frameworks (5 Whys, Fishbone, DMAIC, PDCA)
- **Case Study:** Minor process upset in a CDU (Crude Distillation Unit)

DAY TWO:

❖ Troubleshooting Process Units – Distillation & Separation

- Common issues in atmospheric and vacuum distillation units
- Fouling, flooding, foaming, entrainment, pressure and temperature imbalance

- Decanter and separator troubleshooting
- Stripping and reflux system problems
- Troubleshooting flow diagrams and process indicators
- **Tools:** pressure surveys, temperature profiling, infrared thermography
- **Workshop:** Analyze a distillation column upset and determine corrective actions

DAY THREE:

❖ Troubleshooting Reactors, Heat Exchange and Combustion Systems

- Catalytic reactors (hydrotreating, reforming): temperature runaways, catalyst deactivation
- Troubleshooting heat exchangers: fouling, leaks, temperature cross
- Furnace and boiler troubleshooting: flame instability, coking, incomplete combustion
- Energy efficiency problems and heat integration issues
- **Case Study:** Reactor temperature deviation and impact on downstream units
- **Group Exercise:** Fault tree analysis for reactor outlet temperature drop

DAY FOUR:

❖ Mechanical & Instrumentation Troubleshooting

- Mechanical equipment problems: pumps, compressors, valves, and rotating equipment
- Instrumentation faults: sensors, transmitters, control loops, false readings
- DCS and control loop malfunction diagnostics
- Vibration analysis and predictive maintenance basics
- **Hands-on session:** Diagnosing a pump cavitation scenario
- **Workshop:** Troubleshooting a faulty flow control loop in a product line

DAY FIVE:

❖ Integrated Problem-Solving and Case Study Workshop

- Combining operational, mechanical, and instrumentation diagnostics
- Root Cause Failure Analysis (RCFA) techniques
- Developing corrective and preventive action plans
- Communication and documentation of troubleshooting activities
- **Case Study:** Major refinery upset scenario – cross-functional troubleshooting
- Lessons learned and best practices in refinery troubleshooting

❖ Course Conclusion

❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Group and Corporate Discounts:

- We offer group and corporate discounts on many courses. These discounts are available for clients who want to maximize their return on investment.

Individual Discounts:

- We offer individual discounts on many courses for people who are self-sponsored and make their payment in full and upfront at the time of registration

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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