

MAINTENANCE TROUBLESHOOTING AND PROBLEM SOLVING



GENTEX[®]

TRAINING CENTER



Introduction

Equipment failures cost far more than the repair; they cost production, safety, and credibility. The Maintenance Troubleshooting and Problem Solving Training Course teaches technicians and engineers how to diagnose faults systematically instead of by trial and error. Participants study root cause analysis, fault tree logic, condition monitoring data, and structured decision methods for complex failures. Furthermore, the programme covers preventive and predictive maintenance strategy, reliability-centred thinking, and how to stop repeat failures. Delivered by Gentex Training Center over five days, this programme suits maintenance, reliability, and operations professionals. As a result, participants reduce downtime and repair the cause, not the symptom.

Maintenance Troubleshooting and Problem Solving Course Objectives

- Explain failure modes and the difference between symptom and root cause.
- Apply the Five Whys and fishbone (Ishikawa) diagrams to maintenance faults.
- Use fault tree analysis and cause-and-effect logic for complex failures.
- Apply the Kepner-Tregoe problem analysis method to equipment faults.
- Interpret condition monitoring data including vibration, temperature, and oil analysis.
- Apply reliability-centred maintenance (RCM) principles and FMEA.
- Distinguish preventive, predictive, and corrective maintenance strategies.
- Use 5S and visual management to support reliable maintenance operations.
- Apply the PDCA cycle and A3 problem-solving reports to improvement work.
- Document findings, spare parts needs, and corrective actions clearly.

Course Methodology

- Technical sessions grounded in reliability and maintenance standards.

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- Hands-on troubleshooting exercises on simulated and real fault scenarios.
- Root cause analysis workshops using the Five Whys, fishbone, and fault trees.
- Condition monitoring data interpretation labs.
- Case studies of repeat failures, breakdowns, and reliability improvement projects.
- Action planning with a corrective and preventive action plan.

Who Should Take This Course

- Maintenance engineers, supervisors, and technicians.
- Reliability engineers and asset management professionals.
- Mechanical, electrical, and instrumentation maintenance staff.
- Operations and plant engineers in industrial facilities.
- Facilities and building services maintenance managers.
- Condition monitoring and vibration analysis specialists.
- Maintenance planners and spare parts coordinators.

Maintenance Troubleshooting and Problem Solving Course Outlines

Day 1: Maintenance Fundamentals and Failure

- Maintenance types: preventive, predictive, corrective, and reactive.
- Failure modes, effects, and the bathtub curve.
- Symptom versus root cause in equipment faults.
- Cost of failure: downtime, safety, and quality impact.
- Maintenance strategies and their selection criteria.
- Maintenance documentation and work order discipline.



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- Self-assessment: current troubleshooting practice and gaps.

Day 2: Systematic Troubleshooting and RCA

- Structured troubleshooting methodology and logic trees.
- The Five Whys technique applied to equipment failures.
- Fishbone (Ishikawa) diagrams for cause categorisation.
- Fault tree analysis and barrier analysis.
- The Kepner-Tregoe problem analysis method.
- Distinguishing root causes from contributing factors.
- Workshop: running an RCA on a repeat equipment failure.

Day 3: Condition Monitoring and Diagnostics

- Vibration analysis fundamentals and signature interpretation.
- Thermography and temperature-based diagnostics.
- Oil analysis, wear debris, and lubricant condition.
- Ultrasound and acoustic monitoring techniques.
- Electrical diagnostics: insulation testing and motor current analysis.
- Setting alarm limits and trend interpretation.
- Practice: diagnosing a fault from monitoring data.

Day 4: Reliability Improvement Techniques

- Reliability-centred maintenance (RCM) principles.
- Failure mode and effects analysis (FMEA) and FMECA.
- Total productive maintenance (TPM) and autonomous maintenance.
- Criticality analysis and asset prioritisation.



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- Spare parts strategy and critical spares identification.
- Root cause elimination and design-out maintenance.
- Workshop: building an FMEA for a critical asset.

Day 5: Problem Solving, Reporting, and Action Planning

- The PDCA cycle for maintenance improvement.
- A3 problem-solving reports and visual documentation.
- 5S and visual management in maintenance operations.
- Corrective and preventive action planning with ownership.
- Measuring maintenance performance with MTBF, MTTR, and OEE.
- Building a 90-day reliability improvement plan.
- Final case presentations, peer review, and consolidation.

Conclusion

By successfully completing the Maintenance Troubleshooting and Problem Solving Training Course, participants will have acquired practical knowledge of failure modes, root cause analysis, fault tree logic, the Kepner-Tregoe method, condition monitoring diagnostics, RCM and FMEA, and structured corrective action planning. In addition, they will diagnose faults systematically and prevent recurrence. Gentex Training Center delivers this programme through hands-on fault scenarios and structured RCA workshops, so participants apply their new knowledge on the next shift.

FAQs





Q1 What is the "Maintenance Troubleshooting and Problem Solving" course about?

The course teaches technicians and engineers how to diagnose equipment faults methodically and eliminate their causes. It covers failure modes, root cause analysis, fault tree logic, condition monitoring, reliability-centred maintenance, and corrective action planning.

Q2 What are the key benefits of the "Maintenance Troubleshooting and Problem Solving" course?

Participants find faults faster and stop the same failure returning. Furthermore, they reduce unplanned downtime, use condition data to plan work, and justify reliability investment with evidence. As a result, plants run more safely and at lower maintenance cost.

Q3 What skills will I gain from the "Maintenance Troubleshooting and Problem Solving" course?

Participants gain systematic troubleshooting and root cause analysis, condition monitoring and fault diagnostics, reliability improvement with RCM and FMEA, and corrective action planning and maintenance reporting. These four skills combine to raise asset reliability and availability.



Q4 What tools, methods, or standards are covered in the "Maintenance Troubleshooting and Problem Solving" course?

The programme covers the Five Whys, fishbone (Ishikawa) diagrams, fault tree and barrier analysis, the Kepner-Tregoe problem analysis method, vibration and thermography diagnostics, oil analysis, ultrasound monitoring, reliability-centred maintenance (RCM), FMEA and FMECA, TPM, criticality analysis, the PDCA cycle, A3 problem-solving reports, 5S, and MTBF, MTTR and OEE measures.

Q5 How is the "Maintenance Troubleshooting and Problem Solving" course applied in real-world practice?

Professionals apply it after a pump or motor failure, a recurring electrical trip, a bearing seizure, a compressor breakdown, or a repeated quality defect traced to equipment. In addition, they use it to build preventive maintenance schedules and to justify spare parts and reliability projects.