
Condition-Based Maintenance and Asset Health Monitoring Training Course

10 – 21 October 2027
Doha





Condition-Based Maintenance and Asset Health Monitoring Training Course

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Programme Summary

Condition-based maintenance and asset health monitoring is a two-week training course for maintenance, reliability and asset management leaders at advanced level, culminating in a condition-based maintenance programme plan for their own asset base. Many organisations still rely on fixed-interval tasks inherited from manufacturers, while condition data that could warn of failure sits unused or never reaches the work order. The approach moves from failure behaviour to task selection, monitoring design, data and governance. Mars Training Centre UK delivers this programme in condition-based maintenance and asset health monitoring for oil, gas, power and process industries.

The Business Case

Time-based maintenance alone either intervenes too often, adding cost and induced defects, or too late, allowing failures that halt production. A condition-based programme matches each task to how equipment actually fails and turns early warnings into planned work.

- **Unplanned Downtime:** Falls as developing defects are detected inside the P-F interval and repaired on schedule.
- **Maintenance Cost per Asset:** Reduces as low-value preventive tasks are removed or extended.
- **Safety and Environmental Exposure:** Lowers as failures with serious consequences are monitored rather than run to failure.

Principles and Evidence Base

- ISO 17359: Its condition monitoring programme process structures technique selection and alarm setting from Session 3 to Session 6.
- ISO 13374 and ISO 13379: These standards for condition data processing and diagnostics shape the data architecture and asset health work in Session 7.
- ISO 18436: Its personnel qualification requirements inform the staffing model in Session 9.
- ISO 55001: Its asset management system requirements frame governance and performance measures in Session 9.

Intended Participants

- Leaders who decide maintenance strategy and task policy across a fleet of assets.
- Managers who sponsor or run condition monitoring and predictive maintenance programmes.
- Reliability heads who select monitoring techniques and set intervention criteria.
- Asset managers who must justify maintenance budgets with evidence of risk reduction.

The programme serves upstream oil and gas, refining and petrochemicals, power generation and utilities.



Learning Outcomes

1. Participants will be able to evaluate an existing preventive maintenance programme and identify tasks to remove, extend or convert.
2. Participants will be able to select condition monitoring techniques for each dominant failure mode.
3. Participants will be able to justify inspection frequencies and alarm limits using the P-F interval.
4. Participants will be able to construct an asset health index from condition, age and criticality data.
5. Participants will be able to design the integration of condition alerts with the CMMS and work management process.
6. Participants will be able to prioritise programme investment with a business case, staffing model and performance measures.

Programme Structure

Day 1: Condition-Based Maintenance Principles

How do equipment failures develop, and when does monitoring pay?

- Failure Patterns and the Limits of Age-Based Replacement
- Preventive, Predictive and Run-to-Failure Strategies Compared
- The P-F Curve and Detectable Potential Failures
- Asset Criticality Ranking for Programme Scope
- Maturity Assessment of the Current Maintenance Programme

Day 2: Preventive Maintenance Optimisation

Which existing preventive tasks add value, and which should change?

- Preventive Maintenance Optimisation Review Method
- Task Rationalisation: Remove, Extend, Combine or Convert
- Failure Finding Tasks for Hidden Failures
- ISO 14224 Failure Data for Task Review
- Maintenance-Induced Defects and Intrusive Task Risk

Day 3: Selecting Condition Monitoring Techniques

Which technique detects each failure mode early enough to act?

- ISO 17359 Condition Monitoring Programme Process
- Failure Mode to Symptom to Technique Mapping
- Online, Portable and Route-Based Monitoring Choices
- Technique Cost, Coverage and Detection Lead Time
- Monitoring Coverage Matrix for Critical Assets



Day 4: Vibration and Lubricant Condition Programmes

How are vibration and oil analysis run as programmes rather than tests?

- Vibration Monitoring Programme Design and ISO 20816 Evaluation Zones
- Measurement Points, Routes and Data Quality
- Oil Condition and Wear Debris Analysis
- Laboratory Selection and Sampling Practice
- Lubrication Programme Links to Machine Health

Day 5: Thermography, Ultrasound and Electrical Monitoring

Which further techniques cover static and electrical assets?

- Infrared Thermography for Electrical and Process Equipment
- Airborne and Contact Ultrasound for Leaks, Valves and Bearings
- Motor Current and Electrical Signature Analysis
- Corrosion and Wall Thickness Monitoring for Static Equipment
- Process Parameter Monitoring as a Condition Source

Day 6: Inspection Frequency and Alarm Limits

How often should assets be checked, and when should an alert trigger work?

- P-F Interval Estimation and Inspection Frequency Rules
- Statistical and Standard-Based Alarm Limits
- Trending, Rate of Change and Alarm Escalation Levels
- False Alarm and Missed Detection Trade-Offs
- Alarm Limit Review and Governance Cycle

Day 7: Condition Data, Diagnostics and Asset Health

How is condition data turned into a reliable view of asset health?

- ISO 13374 Data Processing and Information Flow
- ISO 13379 Diagnostic Approaches and Confidence
- Asset Health Index Construction and Weighting
- Remaining Useful Life Estimation and Predictive Analytics
- Health Dashboards for Operations and Management

Day 8: CMMS Integration and Work Management

How does a condition alert become timely, planned work?



- Condition-Triggered Work Requests in the CMMS
- Planning and Scheduling of Condition-Based Work
- Defect Elimination Feedback from Findings
- Spare Parts Readiness for Predicted Interventions
- Roles Between Monitoring, Planning and Operations Teams

Day 9: Programme Governance and Business Case

How is the programme staffed, funded and measured?

- In-House, Contracted and Hybrid Monitoring Models
- ISO 18436 Personnel Qualification and Competence Planning
- Business Case for Condition-Based Maintenance Investment
- Programme Performance Measures and Leading Indicators
- ISO 55001 Alignment and Management Review

Day 10: Applying Condition-Based Maintenance to the Asset Base

What programme will the organisation implement, and in what order?

- Converting Day 2 Task Review Results into a Revised Maintenance Plan
- Deploying the Day 3 Coverage Matrix with Day 6 Frequencies and Limits
- Phasing Day 8 CMMS Changes and Day 9 Staffing Choices
- Implementation Risks and Change Management for Maintenance Teams
- Condition-Based Maintenance Programme Plan Completion

Methodology

The programme combines case analysis with structured exercises on equipment registers, failure histories and condition data from oil and gas, power and process plants. Each session opens with a short briefing, moves to group work on a running case, and closes with a review of decisions against the programme design.

- Suggested activity: Reviewing a set of preventive tasks for a gas compression train.
- Suggested activity: Building a monitoring coverage matrix for a power station cooling water system.
- Suggested activity: Setting alarm limits and escalation rules from historical trend data.

Capstone Output

Each participant completes a condition-based maintenance programme plan for their own asset base or a case facility. It contains the revised task list, monitoring coverage matrix, frequencies and alarm limits, asset health approach, CMMS workflow, staffing model, business case and performance measures.



Frequently Asked Questions

Is condition-based maintenance training suitable for managers who are not monitoring specialists?

Yes. It is set at advanced level for leaders who own maintenance strategy and programme results. It assumes maintenance or reliability experience, not monitoring qualifications.

Which standards does condition-based maintenance and asset health monitoring rest on?

It rests on ISO 17359 for condition monitoring programmes, ISO 13374 and ISO 13379 for data and diagnostics, ISO 18436 for personnel competence and ISO 55001 for asset management governance.

How is the condition-based maintenance programme plan used at work?

You can use it to secure approval and funding for a new or revised programme.

How does condition-based maintenance and asset health monitoring differ from vibration analysis training?

It designs and governs the whole programme across techniques, data and work management, rather than teaching the measurement and interpretation skills of a single technique.