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# Maintenance and Reliability Data Analytics for Asset Managers Training Course

15 – 19 March 2027  
Tokyo





## Maintenance and Reliability Data Analytics for Asset Managers Training Course

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### Programme Summary

Maintenance and reliability data analytics for asset managers is a one-week training course for maintenance and asset leaders at managerial level, culminating in a maintenance analytics improvement case for a priority asset group. Most maintenance organisations record thousands of work orders and failure events, yet budgets and strategies are still set by habit rather than evidence. The approach structures failure data, applies life and cost analysis, selects meaningful metrics and adds condition-based prediction where it pays. Mars Training Centre UK delivers this programme in maintenance and reliability data analytics.

### The Business Case

Maintenance spend is often one of the largest controllable costs in asset-intensive organisations, and unplanned failures carry production, safety and environmental consequences. When failure history is analysed properly, managers can see which assets and failure modes drive cost and downtime, which tasks add value and where condition data would give earlier warning. Strategy, spares and replacement decisions then rest on accepted evidence.

- Equipment Availability: Rises as bad actors are identified and recurring failure modes are removed.
- Maintenance Cost per Asset: Falls when task intervals and strategies follow failure behaviour rather than habit.
- Planned Work Ratio: Increases as predictive signals convert breakdowns into scheduled interventions.

### Principles and Evidence Base

- ISO 14224 Collection and Exchange of Reliability and Maintenance Data: Provides the equipment taxonomy and failure mode coding used to structure data in Session 1.
- Weibull Life Data Analysis: Characterises failure patterns and supports interval decisions in Session 2.
- SMRP Best Practices Metrics Guidelines: Supply standard definitions for the maintenance and reliability metrics benchmarked in Session 3.
- Reliability Centred Maintenance RCM: Links analysed failure modes to the choice of preventive, predictive or run-to-failure strategies in Sessions 4 and 5.



## Intended Participants

- Managers accountable for asset availability and maintenance budgets.
- Reliability leaders who recommend strategy changes.
- Asset managers who prepare replacement and investment cases.
- Heads of maintenance planning who own work order data.
- Leaders introducing predictive maintenance programmes.

The programme serves oil and gas, utilities, manufacturing and transport infrastructure organisations.

## Learning Outcomes

1. Participants will be able to diagnose gaps in their failure and work order data.
2. Participants will be able to evaluate failure patterns using MTBF, MTTR and Weibull analysis.
3. Participants will be able to prioritise bad actors using cost and downtime analysis.
4. Participants will be able to construct a maintenance KPI set with benchmark-ready definitions.
5. Participants will be able to justify where condition monitoring and predictive analytics add value.
6. Participants will be able to construct an evidence-based improvement case for an asset group.

## Programme Structure

### Day 1: Foundations of Maintenance and Reliability Data Analytics

Can the current maintenance data support sound decisions?

- Maintenance Data Sources and Data Flows
- ISO 14224 Equipment Taxonomy and Failure Coding
- Work Order Data Quality Assessment
- Failure Event Extraction and Data Cleansing
- Maintenance Data Maturity Scorecard

### Day 2: Failure and Life Data Analysis

How do assets fail, and what does that imply for maintenance intervals?

- MTBF, MTTR and Availability Calculations
- Weibull Plotting and Shape Parameter Interpretation
- Failure Pattern Classification
- Repairable System Trend Analysis
- Optimal Replacement and Inspection Intervals

### Day 3: Maintenance KPIs and Cost Analysis

Which measures show whether maintenance is effective and efficient?



- SMRP Metric Definitions and Benchmarking
- Leading and Lagging Maintenance Indicators
- Bad-Actor Pareto Analysis by Cost and Downtime
- Maintenance Cost Breakdown and Life Cycle Cost
- Spare Parts Usage and Criticality Analysis

## Day 4: Condition Monitoring and Predictive Analytics

Where can data give earlier warning of failure, and is it worth it?

- Condition Monitoring Techniques and Data Types
- P-F Interval and Inspection Frequency
- Anomaly Detection and Remaining Useful Life Models
- RCM Strategy Selection From Analysed Failure Modes
- Business Case for Predictive Maintenance Pilots

## Day 5: Applying Maintenance Analytics to a Priority Asset Group

How are the analyses combined into a case that leadership will fund?

- Maintenance Dashboard Design for Managers
- Asset Group Data Review and Bad-Actor Selection
- Strategy and Interval Recommendations
- Peer Challenge of Improvement Cases
- Maintenance Analytics Improvement Case

## Methodology

The programme is built around data workshops. Participants analyse a sample work order and failure history from a mixed asset base, cleaning and coding the data, fitting life distributions, ranking bad actors and testing predictive scenarios in spreadsheet tools. Each analysis is then repeated on an asset group chosen by the participant.

- Suggested activity: Coding a year of pump failures against an equipment taxonomy.
- Suggested activity: Fitting a Weibull model to conveyor bearing failures at a mining site.
- Suggested activity: Building a bad-actor Pareto for a water utility's rotating equipment.

## Capstone Output

Each participant completes a maintenance analytics improvement case for a priority asset group. It contains a data quality assessment, failure and life analysis, a ranked bad-actor list, a KPI set with targets, recommended strategy and interval changes and a predictive maintenance pilot proposal, ready to present to operations and finance leaders.



## Frequently Asked Questions

### **Is maintenance and reliability data analytics suitable for managers without a statistics background?**

Yes. It is designed for maintenance and asset managers. It assumes practical maintenance experience and spreadsheet familiarity; statistical methods such as Weibull analysis are introduced step by step with worked examples.

### **Which standards underpin maintenance and reliability data analytics?**

It draws on ISO 14224 for structuring reliability and maintenance data, the SMRP Best Practices Metrics Guidelines for metric definitions, Weibull life data analysis and reliability centred maintenance for strategy selection.

### **How is the maintenance analytics improvement case used at work?**

You use it to secure approval for specific changes on one asset group: revised strategies and intervals, data fixes, new KPIs and a predictive pilot.

### **How does maintenance and reliability data analytics differ from CMMS master data programmes?**

Master data programmes build the asset register and hierarchy. This course analyses the resulting failure, cost and condition data to change maintenance strategy.