

Predictive Maintenance Program and Condition Based Maintenance Program Training Course

Condition based maintenance (CBM), known as Predictive Maintenance (PdM), is a maintenance strategy that involves monitoring and testing vital machine and equipment parameters for their state. This is done in order to predict machine failures and to do restoration to avoid hazards which could otherwise occur if minimum requirements are surpassed.

| Module 1 Content: Developing Condition Based Maintenance Strategy | |
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| Session 1 | <p>Machine Failure</p> <ul style="list-style-type: none"> • Explain Physics of Failure and why machines fail • The six component failure curves and their implications • Introduce the P-F degradation curve and how equipment exhibits its condition • Reliability prediction methods and analysis • Where suitable data can be collected from machines and equipment • <i>Activity:</i> FMEA <p>Machine Reliability</p> <ul style="list-style-type: none"> • Failure history distributions and analysis methods • Analyse parts and component risks • Examine equipment for assembly and component level risks • Using creative disassembly during maintenance to collect history on parts condition <p>Maintenance Strategies</p> <ul style="list-style-type: none"> • Explain types of maintenance strategy • Explain reasons for each type of strategy • Explain objectives of each strategy • Explain how to select appropriate KPIs to monitor the use and effectiveness of the strategy • <i>Activity:</i> Case Study of Maintenance Strategy Selection |
| Session 2 | <p>Monitoring Equipment Condition</p> <ul style="list-style-type: none"> • Decide relevant predictive data to collect • Explain how to select the equipment items from which condition data will be collected • Show how to select suitable predictive strategies, techniques and chose tools • Selecting and setting the pass/fail standards for CM parameters • Make clear when Condition Based Maintenance is not the right strategy to use <p>Collecting Machine Condition Data</p> <ul style="list-style-type: none"> • Explain how the required data for collection is determined from the predictive maintenance strategy for an item of equipment • Show how to select locations on equipment to collect suitable predictive data • Explain how to identify required resources and necessary additional training • Technical expertise required for each type of condition monitoring technology <p>Setting CM Inspection Frequency</p> <ul style="list-style-type: none"> • Explain how to analyse the maintenance frequency from maintenance history analysis • Selecting CM frequency using statistical analysis • <i>Activity:</i> Case Study in Setting optimal CM Frequency |
| Session 3 | <p>Condition Monitoring Techniques</p> <ul style="list-style-type: none"> • Explain the selection of predictive techniques and tools suited to the PdM strategy intending to be used |



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| | <ul style="list-style-type: none"> • Overview the common machine CM techniques—Thermography, Vibration, Non-destructive Testing, Tribology, Process Performance Monitoring • Understand the inherent inaccuracies and risk of false analysis in the common CM techniques <p>Selecting Suitable Condition Monitoring Hardware</p> <ul style="list-style-type: none"> • Describe the selection of suitable condition monitoring hardware • Explain the storage of information and data required by the techniques selected | |
| Session 4 | <p>Analysing Condition Monitoring Data</p> <ul style="list-style-type: none"> • The range of methods for representation of data • Explain how to use run charts for machine condition trending • Introduce how to set alarm limits using statistical analysis • Setting warning and action limits on run charts • <i>Activity:</i> Develop a suitable run chart to track equipment condition parameter <p>Tracking and Trending Machine Condition</p> <ul style="list-style-type: none"> • Identify the Key Performance Indicators (KPIs) to use to track effectiveness of predictive maintenance program • How to present KPIs for easy observation and trending to management and the workforce • Techniques for predicting failure using CM data | |

| Module 2 Content: Justify and Implement a Condition Based Maintenance Program | | |
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| Session 1 | <p>Proving the Cost Effectiveness of a Condition Based Maintenance Program</p> <ul style="list-style-type: none"> • Identifying where CBM will make major improvements to reliability and operating performance • Achieving cost effective CBM includes ensuring the strategy reduces operating risk • Analysing factors that allow measurement of CBM cost effectiveness • Explain how to compare predictive strategies, techniques and tools against organisational needs • Propose and justify adoption of recommended predictive maintenance strategy <p>Presenting a Sound Business Case for Condition Based Maintenance Strategy</p> <ul style="list-style-type: none"> • Explain how to review preferred predictive maintenance (PdM) strategy against current operational situations to confirm suitability • Explain how to present a business case to management for adoption of proposed predictive strategies and requirements • Explain how to present a case to the workforce for adoption of CM program • Write a sound business case to support required changes and identifying major benefits to the organisation | |
| Session 2 | <p>Confirming Your CM Program is Delivering Value to the Business</p> <ul style="list-style-type: none"> • Measures used to monitor reliability improvement • Select the information required to monitor the implementation and subsequently the use of predictive maintenance to improve business performance • Identify the Key Performance Indicators (KPIs) to use to track effectiveness of predictive maintenance program • Describe how to assess program performance for evidence of problems <p>Monitoring Your CM Program</p> <ul style="list-style-type: none"> • Explain how to use maintenance KPIs to gauge program performance • Select relevant KPIs to measure equipment reliability and work compliance to requirements of the PdM strategy • Identifying unfavourable variances | |



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| | <ul style="list-style-type: none"> • Investigate the issues causing problems • Recognising areas of weaknesses companies overlook • <i>Activity:</i> Develop a ‘dashboard’ showing the key KPIs | |
| Session 3 | <p>Implementing a Condition Based Maintenance Program</p> <ul style="list-style-type: none"> • Explain how to develop an implementation plan • Identify change management factors that impact implementation and how to manage them <p>Managing the Implementation of a CM Program</p> <ul style="list-style-type: none"> • Explain project management principles • Show how to plan and prepare for implementation • Show how to include and prepare stakeholders • Explain implementation roll-out process • Show how to track implementation progress | |
| Session 4 | <p>Improving Your CM Program</p> <ul style="list-style-type: none"> • Show how to keep stakeholders informed and get their input • Show how to value and prioritise the issues to address • Take people through development of a improvement plan to address issues • Explain how to implement the improvement plan <p>Introducing CM Program Improvements</p> <ul style="list-style-type: none"> • Develop a performance improvement strategy and plan including its implementation • Tracking the effectiveness of the improvement initiatives • Identify the need to reward achievement and ways it can be done • <i>Activity:</i> Plan implementation of a CM based maintenance improvement strategy | |