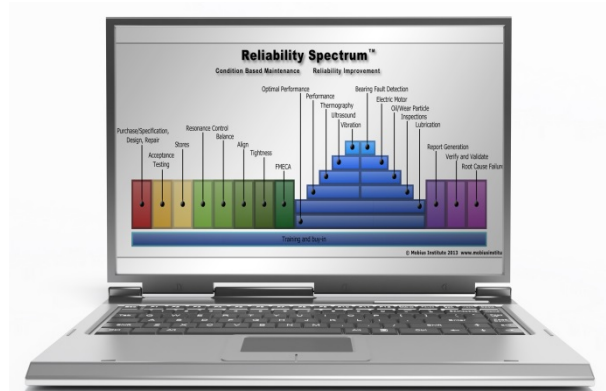




iLearnReliability™

[**Enterprise**] Topic Module Details

In the iLearnReliability™ lead brochure and overview presentation you learned about the structure of the product and how we empower you to change your plant and realize improved reliability. iLearnReliability includes four series of training that is structured for Managers, Program Management, Condition Monitoring specialists and the plant floor craftspeople and operators. Each series has a number of training modules that range from briefings to detailed training covering the topic areas of Management, Condition Monitoring and Precision Maintenance.



Manager Briefings [MB]

All Manager Briefings [MB] are short and focused. They are written for upper level managers who may not have the time to explore the intricacies of condition based maintenance, reliability improvement, and all the other topics, but do need a basic understanding of the issues, and most importantly, need to understand the financial benefits associated with the CBM program and reliability improvement initiative.

Program Management Training [MT]

The Program Management Training [MT] modules are intended for reliability engineers, PdM program managers, and other people who are charged with implementing the reliability improvement and PdM (CBM) program. These people generally do not need the same level of knowledge as the people who will actually use the condition monitoring tools and software, or the people who will work on machines (alignment, balancing, lubrication, etc.) but they do need to have a good working knowledge of those topics, and they certainly need to know how to run a successful program.

Skills Training [ST]

All Skills Training [ST] modules are very detailed and intended (primarily) for the person who is actually involved with the condition monitoring technique or craft (alignment, balancing, etc.). Of course, anyone can take the lessons in order to better understand the topic, but the detail provided is primarily intended for the practitioner.

Toolbox Talks [TT]

All Toolbox Talks [TT] are short and focused. They are written for plant floor folk – or anyone who would like a quick introduction to a condition monitoring technology or precision maintenance activity without getting into too much detail. Toolbox Talks should be given to as many people as possible in order to demystify condition based maintenance (and the associated technologies), the importance of reliability, and the techniques that can be used to improve reliability.

Of course, you can decide who receives what training

You may have upper level managers who would like to know a lot more about certain Condition Monitoring technologies and reliability improvement techniques. And you may choose to provide more detailed training to the “plant floor” personnel rather than delivering the Toolbox Talks. *It is entirely up to you.*

Manager Briefings [MB]

Manager Briefings on *MANAGEMENT* topics [MB-M]

The majority of the Manager Briefings [MB] are written on Management [M] topics. These modules are focused on strategy and financial benefits, but they also explain the philosophy of the different maintenance practices that can be taken.

Manager Briefings on *CONDITION MONITORING* topics [MB-CM]

These Manager Briefings [MB] are written on Condition Monitoring [CM] topics. The aim is to provide the upper level manager with a working knowledge of how the condition of rotating machinery and other assets can be determined using vibration analysis, infrared thermography and other technologies. The aim is to demystify the topics.

Manager Briefings on *PRECISION MAINTENANCE* topics [MB-PM]

These Manager Briefings [MB] are written on Precision Maintenance [PM] topics. The aim is to provide the upper level manager with a working knowledge of how the reliability of rotating machinery and other assets can be improved by performing precision alignment and balancing, resonance elimination, precision lubrication, optimal operation, correct fastening, and other reliability improvement areas, as well as acceptance testing and root cause failure analysis. The aim is to demystify the topics.

Code	Title	Slides	Description
MB-M-1	Roadmap to reliability (a summary)	25	This Manager Briefing provides a summary of the PERI program, explaining how you can use iLearnReliability to transform your plant from reactive to reliable.
MB-M-2	Condition based maintenance vs. preventive maintenance	15	This Manager Briefing provides a quick overview of the philosophy of preventive maintenance and uses the results of numerous studies to demonstrate why it is flawed when applied to rotating machinery. It goes on to discuss why condition based maintenance makes more sense.
MB-M-3	Benefits of precision reliability	15	This Manager Briefing explains the benefits of the precision maintenance/reliability improvement strategy. It does this via a discussion of OEE and the financial benefits of reducing planned and unplanned downtime, increasing throughput, and improving product quality. It then goes on to discuss why precision maintenance techniques can deliver those benefits.
MB-M-4	What is classical Reliability Centered Maintenance (RCM)?	30	This Manager Briefing provides an introduction to classical RCM. It focuses on two issues: a) RCM is an excellent process, however it can take a very long time to implement fully, and b) the approach presented through iLearnReliability attacks the very issues that an RCM study will uncover (for rotating machinery and other assets), however as the culture changes and reliability improves, a focused RCM project may make sense.
MB-M-7	Why condition monitoring does not improve reliability	10	This Manager Briefing presents a “story” that illustrates the difference between condition based maintenance and reliability improvement. We use car maintenance as a way to demonstrate that condition monitoring (while very important), does not improve failure, it simply provides a warning about potential catastrophic failures (that could have been avoided).

Program Management Training [MT]

Program Management on *MANAGEMENT* topics [MT-M]

These Program Management Training [MT] modules are focused on Management [M] topics. These modules are intended to ensure that a) the benefits of condition based management and reliability improvement are fully understood, b) the steps required to successfully start and maintain a successful program are understood, and most importantly c) the steps required to gain buy-in from upper-management through to the “plant-floor” staff are fully understood.

Program Management on *CONDITION MONITORING* topics [MT-CM]

These Program Manager Management [MT] modules are focused on Condition Monitoring [CM] technology topics. These modules will provide a very strong base of knowledge on all of the condition monitoring technologies so that it is possible to speak with confidence to a sales person selling the systems, and carry on a sensible conversation with the condition monitoring specialist, whether he or she is a consultant or an in-house employee.

Program Management on *PRECISION MAINTENANCE* topics [MT-PM]

These Program Management Training [MT] modules are focused on Precision Maintenance [PM] topics. These modules will provide a very strong base of knowledge on all of the precision maintenance techniques such as precision alignment and balancing, resonance elimination, precision lubrication, optimal operation, correct fastening, and other reliability improvement areas. It is assumed that the person taking these modules does not require the knowledge to perform these tasks but does need to fully understand how they are done so that purchase decisions can be made, work practices can be established, and correct practice is recognized.

Code	Title	Slides	Description
MT-M-1	Roadmap to reliability	120	This Management Training [MT] module is the key training module in the iLearnReliability series. This learning module (and the associated PDF document) takes you by the hand and explains how to achieve the transformation from reactive to reliable at your plant using iLearnReliability. It presents the decisions you will have to make, and it will help you to determine where you are along the path. It makes recommendations regarding who should receive training and recommends which training modules should be used – however, you are free to use any lesson modules for any people.
MT-M-2	Failure Modes, Effects and Criticality Analysis (FMECA)	60	This Management Training [MT] module explains the importance of understanding the criticality of your assets and then, starting from the most critical asset and working down, determining the failure modes of your assets, the probability of failure, and the effects of the failure. The aim is to determine which assets should be part of the condition based maintenance program (and which technologies/monitoring methodologies should be applied), which assets should be part of a preventive maintenance program, and which assets should receive precision maintenance (and which techniques should be applied). All of these decisions have a technical <i>and</i> financial basis.
MT-M-3	Root Cause Failure Analysis (RCFA)	80	This Management Training [MT] module explains how to perform a Root Cause Failure analysis <i>using a common sense approach</i> . When a machine fails it is critically important to determine why it failed and take the necessary steps to ensure it won't happen again. However there are two ways to go about such a process. While a formal approach is appropriate when the failure resulted in substantial downtime and cost, and possibly even personal injury, the common sense approach utilizes observations of bearing wear patterns (for example), condition monitoring data, and observations of maintenance and operations personal to determine the root cause.

MT-M-4	Condition monitoring and reliability	100	This Management Training [MT] module provides a detailed overview of maintenance practices. After discussing breakdown maintenance (pros and cons) and preventive maintenance (and why the strategy can be flawed for rotating machinery), the lesson moves on to the condition based maintenance strategy. We explain the benefits of basing maintenance on condition, and provide an overview of each condition monitoring technique. And finally we discuss how the greatest reductions in maintenance costs, energy consumption, inventory costs and production losses are gained through reliability improvement. We provide an introduction to RCM but then explain how most plants can make huge gains by focusing on precision alignment and balancing, proper lubrication and fastening/torqueing, resonance elimination, and other techniques.
MT-M-5	Running a successful CBM program	150	This Management Training [MT] series of lessons provides a detailed explanation on what it takes to run a successful condition based maintenance program, from the selection of people, through the selection of the correct monitoring techniques, to the importance of training/certification and the on-going reporting of KPIs and other success stories. This module describes how some companies built successful programs (along with video interviews), and how other seemingly successful programs failed completely.
MT-M-6	Establishing a new CBM program (focus on vibration)	220	This Management Training [MT] series of lessons is intended for the person who intends to start a condition monitoring program, the person who has started a condition monitoring program but wants to check that it is set up correctly, and the person who wants to better understand the vibration program in their plant. The module presents a structure plan and then goes through all the key steps: selecting the machines to monitor, determining the best measurement strategy, selecting the measurement types, choosing the best measurement locations, options for mounting the sensor, specifying and controlling test conditions, selecting the optimal measurement settings, building the database, establishing baseline data, and setting alarms. The focus is clearly on vibration analysis, but many of its messages are equally valid for other technologies.
MT-M-7	Supercharging an existing vibration monitoring program	150	This Management Training [MT] is intended for the person managing the vibration monitoring program, or anyone interested in establishing a successful program or improving an existing program. This module goes through eight major areas that should be optimized in any vibration program in order to extract the maximum benefit from the skills of the vibration analyst: acceptance testing, the detection phase, the analysis phase, the diagnostic phase, the reporting phase, the correction phase, the improvement phase, and the verification phase.
MT-CM-1	Vibration analysis and bearing fault detection	95	This Program Management Training [MT] module provides a detailed introduction to vibration analysis, describing the different types of readings that can be taken, a little about how those readings can be interpreted, and how the data is typically collected (i.e. different monitoring systems). Topics include: overall levels, spectra, waveforms, phase and orbits, plus the monitoring systems: walk-around, periodic monitoring, and protection systems. The module also covers the unique high frequency techniques designed to detect rolling element bearing defects.

MT-CM-2	Airborne and structure-borne ultrasound	50	This Program Management Training [MT] module provides a detailed introduction to the use of airborne and structure-borne ultrasound for condition monitoring. Topics include: understanding ultrasound, airborne measurements, structure-borne measurements, mechanical applications (bearings, lubrication, and other rotating machine faults), electrical faults (arching, corona, etc.), and process applications (detecting leaks and steam trap issues).
MT-CM-3	Oil analysis and wear particle analysis	70	This Program Management Training [MT] module provides a detailed introduction to oil analysis and wear particle analysis. The module starts with an introduction to the importance of lubrication and the field of oil analysis; determining if the lubricant is fit for purpose, assess the properties, detecting particles, and detecting contamination. It then discusses wear particle analysis; detecting contaminants and look for particles that indicate that wear is occurring. A range of test methods are introduced.
MT-CM-4	On-line and off-line electric motor testing	50	This Program Management Training [MT] module provides a detailed introduction to motor current signature analysis (to primarily detect broken rotor bars), electrical signature analysis (using voltage and current) to detect mechanical and power supply problems; and motor circuit analysis to detect mechanical, electrical and insulation problems. The module begins with a description of how induction motors work.
MT-CM-5	Infrared thermography	55	This Program Management Training [MT] module provides an overview of the application of infrared (IR) thermography to the condition monitoring of rotating machinery, electrical apparatus, and plant process application. Infrared energy is briefly introduced and spot radiometers and infrared cameras are described. The module does not go into a lot of theory, but important issues such as emissivity, test conditions and optical issues are explained.
MT-PM-1	Precision shaft alignment	100	This Management Training [MT] module provides a detailed introduction to shaft alignment. Topics include: why is misalignment so destructive, pre-alignment checks, soft-foot testing and correction, dial indicator techniques, laser alignment techniques, thermal growth, and moving the machine.
MT-PM-2	Field balancing	50	This Management Training [MT] module provides a detailed introduction to field balancing. Topics include: why is unbalance so destructive, the basics of unbalance, determining if a machine is out of balance, single plane balancing, and overview of two plane balancing, tolerances and the importance of precision balancing.

Skills Training [ST]

Skills Training on *CONDITION MONITORING* topics [ST-CM]

These Skills Training [ST] modules are written on Condition Monitoring [CM] topics. The aim is to provide the person collecting vibration readings and/or analyzing the data to know how to perform the job with confidence. Note that additional training will be required in order to meet the certification requirements per ISO 18436-2. These modules are also excellent reference modules.

Skills Training on *PRECISION MAINTENANCE* topics [ST-PM]

These Skills Training [ST] modules are written on Precision Maintenance [PM] topics. The aim is to provide the person who will actually balance or align the machine with the know-how to perform these tasks correctly.

Code	Title	Slides	Description
ST-CM-1	Vibration fundamentals	110	This Skills Training [ST] module provides a detailed introduction to the fundamentals of vibration. The focus is on frequency and amplitude, the time waveform, and the spectrum (FFT). This module is ideal for the manager who would like a more detailed understanding of vibration analysis, and the person collecting vibration readings who is just moving into vibration analysis.
ST-CM-2	Accurate and repeatable data collection	175	This Skills Training [ST] module provides a detailed introduction to the collection of vibration readings. It provides information on eight key steps: Safety, Selecting measurement settings, selecting the measurement location, naming conventions, mounting the sensor, controlling the test conditions, recording observations, and recognizing bad data. Although some people who collect data may not have to make some of the measurement and analyzer setup choices covered in this module, it is believed that the information presented is important and useful.
ST-CM-3	Diagnosing common faults with spectrum analysis	100	This Skills Training [ST] module provides a detailed introduction to the spectrum and how five common fault conditions (unbalance, misalignment, looseness, resonance and rolling element bearing faults) can be detected via the spectrum. The module outlines a systematic approach that should be followed, and also provides an overview of common vibration analysis terms. This module is ideal for the manager who would like a more detailed understanding of vibration analysis, and the person who is relatively new to vibration analysis.
ST-CM-4	Vibration analysis	2000	This Skills Training [ST] module provides a great deal of training on vibration analysis, from the most basic topics through to diagnosing faults. This series of lessons is intended to be used by the vibration analyst; it provides all the information necessary to collect, analyze and diagnose machine faults. Formerly called iLearnVibration, this module has been used as a training tool and a handy reference system for thousands of people around the world.

ST-PM-1	Precision shaft alignment	950	This Skills Training [ST] module provides a great deal of training on precision shaft alignment. After a detailed overview of the entire process it covers the following topics: Determining if misalignment exists, pre-alignment checks, soft foot correction, dial indicators, alignment using the reverse dial and rim-and-face methods, laser alignment, dealing with thermal growth, and moving the machine. Regardless of how simple you may believe it is to use the modern laser alignment systems, every person who performs shaft alignment should complete this training. These lessons are from iLearnAlignment product.
ST-PM-2	Field balancing	600	This Skills Training [ST] module provides a great deal of training on precision field balancing. The training covers a large number of topics: understanding unbalance, causes of unbalance, understanding phase and vectors, balance theory, diagnosing unbalance, preparing for the balance job, single plane balancing, two plane balancing, static-couple balancing, trial weight selection, slitting weights, tolerances and quality (ISO, API, Navy), and more. Regardless of how simple you may believe it is to use the balancing programs in modern vibration analyzers, every person who performs field balancing should complete this training. These lessons are from iLearnBalancing product.

Toolbox Talks [TT]

Toolbox Talks on *CONDITION MONITORING* topics [TT-CM]

These Toolbox Talks [TT] are written on Condition Monitoring [CM] topics. The aim is to provide people with a working knowledge of how the condition of rotating machinery and other assets can be determined using vibration analysis, infrared thermography and other technologies. The aim is to demystify the topics.

Toolbox Talks on *PRECISION MAINTENANCE* topics [TT-PM]

These Toolbox Talks [TT] are written on Precision Maintenance [PM] topics. The aim is to provide people with a working knowledge of how the reliability of rotating machinery and other assets can be improved by performing precision alignment and balancing, resonance elimination, precision lubrication, optimal operation, correct fastening, and other reliability improvement areas, as well as acceptance testing and root cause failure analysis. The aim is to demystify the topics.

Code	Title	Slides	Description
TT-CM-1	Condition monitoring and reliability	15	This Toolbox Talk [TT] provides a quick introduction to the field of condition monitoring and reliability improvement. It paints the big picture in a brief presentation.
TT-CM-2	Vibration analysis	15	This Toolbox Talk [TT] provides a quick introduction to vibration analysis. Using lots of animations and machine sounds, this presentation demystifies why we perform vibration and basically how it works.
TT-CM-3	Ultrasound	15	This Toolbox Talk [TT] provides a quick introduction to the use of ultrasound tools for condition monitoring. The aim is to demonstrate how high frequency sounds are emitted when machines are in distress, when leaks occur, and in other situations. The aim of the presentation is to demystify the application.

TT-CM-4	Thermography	15	This Toolbox Talk [TT] begins by relating high temperature to changing condition in mechanical and electrical applications, and explains how spot radiometers and infrared cameras can be used to detect the higher-than-normal temperature.
TT-CM-5	Oil analysis and wear particle analysis	15	This Toolbox Talk [TT] introduces the topic of lubrication and explains how important it is that the lubricant maintains its essential properties and remains contaminant free. It goes on to explain how tests can be performed to analyze the lubricant and check for contaminants, and how additional tests can detect wear particles that indicate that a fault condition exists.
TT-CM-6	Electric motor testing	15	This Toolbox Talk [TT] provides an introduction to the field of electric motor testing using on-line tests (voltage and/or current) and static/off-line tests. This presentation demystifies the testing techniques and reveals how important it is to detect mechanical, electrical and insulation faults before failure occurs.
TT-PM-1	The benefits of precision maintenance	15	This Toolbox Talk [TT] provides an overview to the benefits of precision maintenance, explaining that it is better to fix the machine once correctly (and operate the machine correctly), rather than having to incur unplanned downtime and risk failure that could result in injury or environmental harm.
TT-PM-3	Shaft alignment	15	This Toolbox Talk [TT] delivers a very brief introduction to precision shaft alignment using dial indicators and laser alignment systems. After explaining what misalignment is, and why it is destructive, the lesson uses animations to demonstrate how the alignment is performed.
TT-PM-6	Precision balancing	15	This Toolbox Talk [TT] delivers a brief introduction to the destructive forces associated with unbalance, and the techniques that can be used in the field (using vibration analyzers) and with balance machines to precision balance a rotor.
TT-PM-7	Precision lubrication	15	This Toolbox Talk [TT] explains how important lubrication is, and highlights critical it is that the lubricant is in a fit state with the correct viscosity and other properties and free of contaminants. The focus is rolling element bearing lubrication, and the 3D animations make it clear that contaminants damage the bearing surface and too much or too little lubrication will greatly reduce the life of the bearing.

Need more information?

We have a number of resources to help you better understand what Plant Empowered Reliability Improvement (PERI) means to you and your plant, and how iLearnReliability will provide you a clear roadmap to reliability improvement success. If we have not already sent you any of the following pieces, please email or call us and we will be happy to provide them to you.

- Plant Services Special Report; *“Common-sense Reliability Improvement – Creating a Learning, Bridge-Building, Precision Maintenance Organization”*
- iLearnReliability lead brochure
- *“iLearnReliability Training Module Sampler”* e-Presentation
- *“Why you need iLearnReliability”* overview presentation by Jason Tranter, Mobius Institute Founder and Managing Director

Contact us today!

Contact us today to learn more or to get started with your iLearnReliability subscription. Call us toll free in the US & Canada at **(877) 550-3400**. Call us outside of North America at **(+1) 615-216-4811** (GMT - 5). Or you can send us an email at learn@MobiusInstitute.com. We look forward to hearing from you.

DISTANCE LEARNING COURSES

Web-based, self-paced Category I, II, III & IV (Part 1) Mobius Institute vibration training courses, ISO accredited certification through Mobius Institute Board of Certification (MIBoC). Machine Balancing and Alignment courses are also available.

PUBLIC COURSES & ON-SITE COURSES

Category I, II, III, IV (Part 2) Mobius Institute Vibration Training Courses, ISO accredited certification through Mobius Institute Board of Certification (MIBoC). Machine Balancing and Alignment courses are also available. Courses are available at training centers in more than 50 countries worldwide, or may be provided at your site.

PC-BASED e-LEARNING TRAINING PRODUCTS

- iLV – iLearnVibration™ – Vibration analysis training for beginner and intermediate vibration analysis.
- iLA – iLearnAlignment™ – Machine coupling alignment training for vibration analysts and machinists.
- iLB – iLearnBalancing™ – In-place machine dynamic balancing for vibration analysts and machinists.
- iLR – iLearnReliability™ - Reliability Improvement training for management, reliability champions, craftspeople and the plant floor.

ABOUT US

MOBIUS INSTITUTE offers unique and easily understandable vibration analysis, precision maintenance and reliability training to Condition Monitoring technicians and Reliability Engineers, allowing companies to operate at higher levels of availability, profitability and safety. Mobius delivers vibration analysis and precision maintenance training through classroom and onsite courses via Authorized Training Centers and through Web-based distance learning courses. Training is also available through our online computer-based iLearn™ products. Mobius' key advantage is its use of highly visual 3D animations and advanced simulation tools that make complex concepts easy to understand and remember. Mobius Institute Board of Certification is ISO 9001 certified and is an ISO/IEC 17024 accredited certification body that provides globally recognized certification to personnel in accordance with ISO 18436-1 and 18436-2. Mobius Institute trains more analysts than any other vibration analysis training organization. Learn more at www.MobiusInstitute.com.

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