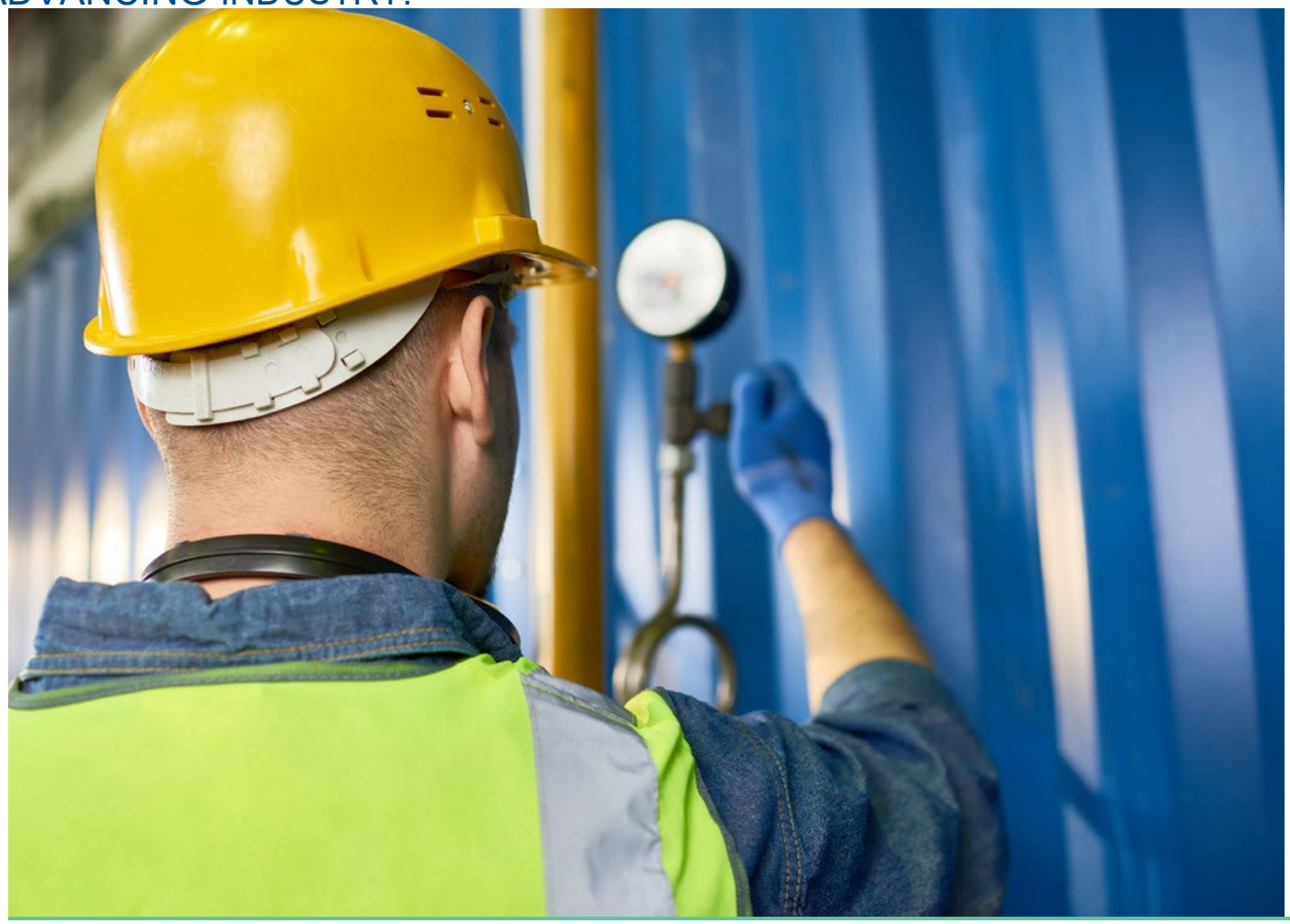
Training Catalog

EMPOWERING PEOPLE.
ADVANCING INDUSTRY.



CORNERSTONE

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Three modes of training:

AT OUR OFFICES

Our public courses are an excellent opportunity to network and share best practices with other industry professionals.

AT YOUR SITE

Optimize your time and resources with on-site training in 2 ways:

- **Formal course given on site**
- **Personalized coaching:** Applied technical training is designed for your staff to learn at their workplace, while being accompanied by an experienced specialist. It allows employees to apply the knowledge gained during the course, which improves efficiency and performance.

ONLINE

Choose one of our scheduled online courses or contact us to book a specific training for your team.

IMPORTANT: As we adapt each course to the format in which it is delivered, the actual course length and cost may vary depending on the mode of training (at our offices, at your site or remotely). Contact us for more information.

Message from the President

The success of every business depends on maximizing the return on its assets.

Improving employee skills is a key way to do so. It allows you to leverage the technologies you have invested in, improve maintenance and trouble-shooting, and see the results in optimized operations.

In addition to these key benefits, a well-trained workforce improves safety, increases employee engagement, reduces turnover and leads to increased productivity in all areas. We firmly believe that **training is one of the most important investments a company can make.**

Our clients have confirmed this belief, and the demand to train their staff is increasing year after year. To meet this demand, we have continued to invest in our training, coaching and mentoring programs with a wider range of courses offered, more certified trainers and upgraded training facilities in more regions.

We work with our clients to identify their training needs and gaps to create the best mix of theoretical and practical training in an investment plan that will meet their established goals.

We can help you design a program and find an approach that will dramatically improve the skills of your workforce for long-term success, while allowing you to reach your production and business targets in the short term.

THESE PROGRAMS CAN INCLUDE:

- A personalized learning path by role.
- Standardized training methods and tools.
- On-site or off-site training.
- Customizable course materials to suit a variety of skill levels.
- Hands-on workshops integrated into your facility.
- Sponsorship and mentoring programs that provide in-plant training support.
- Pre- and post-training evaluations to keep track of improvement and return on your investment.
- A program that is available in both official languages and tailored to your region.

Together, let's develop **the expertise and technical skills** of your staff to meet the many challenges your business may face, now and in the future!

Jenny Davis
President
Cornerstone Controls

Root Cause Failure Analysis « RCFA »

Course 6001 – 1 day

Educate employees on how to analyze **recurring organizational, environmental and physical problems to solve their repetition and implement corrective measures**. Learning is done in a methodical way, using tools such as Fishbone, Cascade and Pareto.

CONTENT

The path to reliability

Advantages to do RCA:

- ▷ Financial
- ▷ Performance
- ▷ Culture/Commitment

Success factors:

- ▷ The educational mix
- ▷ Understanding your organizational level
- ▷ Obtaining commitment
- ▷ Defining primers
- ▷ Choosing your indicators
- ▷ The importance of communication
- ▷ Ensuring the sustainability of solutions

Understand and integrate the concept of failure

Types of causes:

- ▷ Physical
- ▷ Human
- ▷ Systemic
- ▷ Latent

RCA6 process:

- ▷ Recognize pre-analysis tools and methods: example
- ▷ Gather the information
- ▷ Solve the example
- ▷ Redress selection and implementation of corrective actions
- ▷ Strengthen indicators and monitoring
- ▷ Diffuse the presentation of results

intended for

Managers, supervisors and industrial maintenance technicians who participate in the reduction of failures in business.

Following this course

The participant will be able to understand and determine the importance of performing root cause analyses. He will be able to establish the steps effectively and present the results clearly to avoid the risk of repeating failures.

AT OUR OFFICES | ONLINE | AT YOUR LOCATION

Preventive Maintenance Optimization Workshop

Course 6004 - 2 or 3 days

Review the preventive maintenance optimization process (PMO) to increase the reliability of your equipment and lighten your work management on a daily basis. Theoretical presentation with parallel application exercise.

DAY 1

- ▷ Introduction
- ▷ Preventive Maintenance and its challenges
- ▷ Practical exercise
- ▷ Visit, review and take pictures of the targeted equipment (on site only)
- ▷ Decomposition of an equipment
- ▷ The issue of failure modes
- ▷ What will happen to the existing preventives?
- ▷ Elimination of existing tasks
- ▷ Optimization of remaining tasks

DAY 2

- ▷ Optimization of remaining tasks (continuation)
- ▷ Risk analysis of non-covered failure modes
- ▷ Addition of new tasks
- ▷ Final validation of the maintenance plan
- ▷ Process performance indicator
- ▷ Creation of maintenance routes
- ▷ Success / Failures and advice
- ▷ Deliver maintenance plan and routes*

* Only if the workshop is performed at your site

Intended for

Maintenance Supervisors, engineers, plant directors, managers and reliability specialists.

Following this course

The participant will understand and apply the Preventive Maintenance Optimization process.

Duration

- 2 days if exercise on fictive equipment.
- 3 days if exercise on equipment of your choice, at your plant.

AT OUR OFFICES

AT YOUR LOCATION

Work Management Simulation

Course 6005 - 1 day

Through the game, participants are led to understand **how each employee in an organization has a role to play in the path to reliability**.

OBJECTIVES

- Eliminate over 80% of reactive maintenance
- Overcome situations where all problems are emergencies
- Develop the history of the equipment by adequately completing the documentation
- Develop backlog management affecting work schedules and priorities
- Take control of spare parts inventories that diverge from your maintenance needs
- Convince production to release equipment to perform a PM when overall equipment effectiveness (OEE) is low
- Take advantage of freed up work time to set up a reliability team
- Evolve to planning work according to the «P-F» curve instead of just «fixing what is visible»

AGENDA

- Work management: Beyond planning and scheduling
- Applying LEAN to everyday maintenance
- Simulation of a real maintenance process
- Establishing a planning organization
- The impact of a support system on job productivity
- Measuring and capturing business productivity
- Understanding and managing maintenance backlogs
- Daily planning and weekly dispatch
- Defining Planning Gaps: Comparison of Planned vs. Actual Outages
- Work Prioritization: Overview
- The impact of reactive maintenance on planning & scheduling
- Develop an effective information history
- Developing a work management strategy

Intended for

The Reliability Simulator is an awareness activity that affects everyone involved in maintenance and leads to a new vision and willingness to change for the better.

Following this course

The participant will be able to understand and apply the reliability process in his or her work environment. The participant will learn to organize and assemble a strategy that takes any program to the next level.

AT OUR OFFICES

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Failure Analysis

Course 6006 – 1 day

Theoretical and practical training to learn the failure modes to **eliminate recurrences and therefore optimize the quality of assemblies** and **reach a proactive level of competence**. Participants will practice the theoretical knowledge acquired on real industrial parts and components.

COURSE CONTENT

- Introduction to failure analysis
  - Root cause analysis (RCA)
  - Human Error
  - Benefits and savings
- General considerations for failure analysis
  - Mechanisms causing defects
- Sources of equipment fatigue
  - Stress, elasticity, plasticity, tenacity and fatigue
- Overload defects
  - Unusual defects
- Fatigue defects
  - Categories of failure due to fatigue
- Interpretations of types of fatigue
  - Analysis of different types of equipment fatigue
- Understanding and recognizing corrosion
  - Types of corrosion
  - Effects of pH and temperature
- Lubrication and wear
  - Type of contact
  - Lubricant manufacturing and function
- Analysis of belt transmission systems
  - Design and efficiency
  - Defect analysis
- Analysis of antifriction bearings
  - Bearing and equipment parts
  - Deterioration mechanisms
  - Detailed bearing analysis procedures
- Gear Analysis
  - Types of gear
  - Load and stress fluctuation
  - Useful life, design and degradation mechanisms
  - Defect analysis
- Analysis of attachment and parts
  - Bolts / Defect analysis

Intended for

Technicians, engineers and professionals working in the field of industrial maintenance and equipment design.

Following this course

The participant will understand the concepts of equipment and mechanisms likely to cause parts to break, to identify the causes of defects and take the necessary corrective action to reduce and eliminate defects.

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CMRP - Training and Workshop

Course 6007 - 4 days

This 4-day training covers the breadth of knowledge in maintenance and reliability as defined by the SMRP (Society for Maintenance and Reliability Professionals) and offers a good balance between theoretical courses and practical workshops.

DAY 1

Management and business

- Creation of strategic plan for Maintenance and Reliability activities
- Implementation of the strategic plan, performance measurement and management of the organizational plan
- Communication with different actors
- Environmental and safety risk management

Reliability for industrial production

- Application of process improvement techniques
- Change management of processes and equipment
- Maintenance of processes in accordance with laws and standards
- Understanding of applicable processes

DAY 2

Reliability of equipment

- Determining expectations
- Assessment of equipment reliability and identification of improvement opportunities
- Establish a strategic reliability plan for new and existing equipment
- Cost justification of implementation plan
- Implementation of reliability plans
- Review and adjustment of reliability strategies

DAY 3

Work management

- Work identification, validation and approval
- Prioritization, planning, scheduling and execution of work
- Documentation, analysis and follow-up of the work
- Performance measurement
- Project planning and execution
- Effective use of information technologies
- Resource and material management

DAY 4

Work management (continued)

- Determination of organizational requirements
- Analysis of organizational capacities
- Development of the organizational structure and personnel
- Management and staff commitment

Intended for

Engineers, technicians, reliability specialists, supervisors, planners, maintenance managers, production managers, plant managers

Following this course

The participant will gain an in-depth understanding of reliability and maintenance management, as well as asset performance. They will also learn how best practices can be applied. The participant will be able to compare his skills with world class standards.

AT OUR OFFICES

Oil Analysis

Course 1020 - 3 day

COURSE CONTENT

Maintenance philosophies

- The steps to follow to achieve world-class status
- Costs and benefits: What to expect ?
- The elements to integrate to improve equipment reliability

Basic concepts of lubrication

- The functions of a lubricant
- The properties of basis oils
- Minerals and synthetic oils
- Hydrodynamic and elasto-hydrodynamic lubrication
- Additives

The basics of oil analysis

- Listen to your oils
- Types of oil analysis and their applications

Oil sampling

- Cleanliness of sampling bottles
- Options for sampling lubricants
- Ideal sampling locations
- Effective sampling practices
- Sampling intervals

Analyzing wear debris

- How is wear debris measured?
- How to set limits and alarms
- Possible sources of metals in oil
- Analytical ferrography

Analysis of fluid properties

- Oil oxidation
- Viscosity and the viscosity index
- The oil acidity and alkalinity index
- Following AN and BN trends
- FTIR and RPVOT
- How to assess the presence of varnish
- How to monitor the deterioration of additives

Contamination control

- Contamination by particles
- Filters and snifter valves
- Contamination (glycol, moisture, water, air)

Intended for

Industrial maintenance technicians, managers and engineers who are interested in learning about oil analysis.

Following this course

the participant will be able to read, understand and interpret oil analysis reports to maximize the return on investment for an industrial oil analysis program.

Certification

Certification exam (optional) available through ICML (International Council for Machinery Lubrication) for an additional fee. Exams for the MLA II certification will be available the day after the 3-day course. Visit www.lubecouncil.org to register.

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Interpretation of Oil Analysis Reports

Course 1021 - 1 day

COURSE CONTENT

- Review of lubrication fundamentals (lubricant manufacturing, key additives)
- Oil sampling - best practices
- Oil chemistry analysis (review and laboratory tests)
- Contamination control and proactive maintenance (recalls and lab tests)
- Failure detection and wear particle analysis (review and lab tests)
- Practical exercises on case studies

Intended for

This one-day training is designed for industrial maintenance technicians, managers and engineers interested in increasing their knowledge of oil analysis.

Following this course

The participant will be able to read, understand and interpret oil analysis reports to maximize the return on investment for an industrial oil analysis program.

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Machinery Lubrication I

Course 2001 – 3 days

Did you know that the majority of failures in the industry are caused by **poor lubrication practices, moisture and contamination**? While it may seem simple at first glance, keeping lubricant clean, dry and at the right temperature is no easy task.

This course provides a comprehensive overview of practices used in modern industry that will put you on the path to lubrication excellence. **Use the right lubricant, in the right place, at the right time!**

COURSE CONTENT

- How lubrication affects machine reliability
- Fundamental concepts of lubrication
- Using additives, basic oils and greases
- Lubricant properties and performance
- Food grade and ecological lubricants
- Grease lubrication methods
- Oil lubrication methods
- Selecting the appropriate lubricant based on the application
- Contamination control
- Emptying the oil, cleaning and managing the reservoir
- Lubricant storage, handling and management
- How to achieve excellence in lubrication
- Introduction to oil analysis

Intended for

Industrial maintenance technicians, managers and engineers who are interested in learning lubrication techniques and establishing an effective lubrication program.

Following this course

The participant will be able to apply and develop best practices by following the fundamentals of lubrication.

CERTIFICATION

- Exams for the MLT I certification (optional) will be available the day after the 3-day course, for an additional fee.
- Visit www.lubecouncil.org to register.

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Machinery Lubrication II

Course 2002 – 3 days

It is generally accepted that the investment made to prevent dirt particles from entering a lubricated system is less than 10% of the cost of the effort generated to remove them.

By showing in detail what a world-class lubrication program should look like, our Advanced Machinery Lubrication - Level II course provides the ultimate expertise needed to achieve lubrication excellence in your plant. **Achieve lubrication excellence!**

COURSE CONTENT

- How lubrication affects machine reliability
- Fundamental concepts of lubrication
- The value of basic oils and grease soaps
- Oil properties and performance
- Food grade and ecological lubricants
- Accessories for achieving excellence in lubrication
- New lubricants
- Design and optimization of preventive maintenance
- Leak management
- Lubricant selection and application
- Resolution of lubrication problems
- Assessing the advancement and efficiency of a lubrication program

Intended for

Industrial maintenance technicians, managers and engineers who are interested in learning lubrication techniques and establishing an effective lubrication program.

Following this course

The participant will be able to acquire knowledge about lubricants and lubrication techniques to develop an effective lubrication program.

CERTIFICATION

- Exams for the MLT II certification (optional) will be available the day after the 3-day course, for an additional fee.
- Visit www.lubecouncil.org to register.

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Lubrication Basics

Course 4005 – 1 day

Theoretical and practical training to demystify the terms and processes of lubrication. Learn about good practices, oil types and filtration methods to be able to start the development of a lubrication program.

COURSE CONTENT

Introduction

- ▷ Friction caused by slipping and rolling
- ▷ Causes and coefficients of friction
- ▷ Liquid film
- ▷ Definition and indicators of viscosity

Characteristics of lubricants

- ▷ Composition and properties of industrial oils
- ▷ Grease types and properties
- ▷ Grease selection and application

Selecting lubricants and lubrication methods according to machine type

- ▷ Bearing lubrication
- ▷ Gearbox lubrication

Contamination control

- ▷ Filtration methods
- ▷ Filtration according to standards

Storing and handling lubricants

- ▷ Lubricant storage and maintenance

Design and inspections necessary to achieve excellence in lubrication

- ▷ Oil analysis
- ▷ Leaks
- ▷ Contamination
- ▷ Developing a lubrication program

Intended for

Technicians whose duties include carrying out mechanical maintenance operations in an industrial setting.

Following this course

The participant will be able to understand the basic principles and the importance of the proper lubrication of mechanical parts.

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Initiation to Thermography

Course 1022 - 1 day

Since the **handling of a thermographic camera** is very similar to that of a photographic camera, too often they are not used to their full potential. The omission of certain anomalies, the lack of knowledge of its multiple applications, and the inaccuracy of the sources of failure are only a few examples of problems that an operator may have to face.

COURSE CONTENT

Introduction

- ▷ Indicator of a temperature-related breakage
- ▷ Usage
- ▷ Return on investment

Basic Concepts

- ▷ Infrared radiation
- ▷ Electromagnetic spectrum
- ▷ LW and SW (long waves and short waves)
- ▷ Heat transfer
- ▷ Temperature scales
- ▷ Black bodies, real bodies, emissivity, “E” value
- ▷ Tools used to measure temperature

Usage

- ▷ Electrical
- ▷ Mechanical
- ▷ Refractory
- ▷ Steam systems
- ▷ Buildings
- ▷ Fluid transportation/storage
- ▷ Miscellaneous applications

Intended for

Industrial maintenance technicians, managers and engineers who are interested in learning infrared thermography techniques.

Following this course

The participant will be able to master the use of a thermal camera, perform an accurate infrared thermography diagnosis and interpret the results with maximum precision.

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Ultrasound Certification SNT–TC–1A Level 1

Course 1041 - 4.5 days

In accordance with the theoretical and practical requirements recommended by ASNT, SNT-TC-1A and in accordance with ISO 18436-8, this course provides 32 hours of instruction followed by a written examination. This is a comprehensive classroom course in which the theory, principles and practices of **airborne ultrasound technology** are taught.

Instructors for this course have been selected for their outstanding comprehension, experience and technical expertise in the field of airborne and contact ultrasound. The course was designed by a **committee of experts**, some of whom were responsible for the development of the technology.

COURSE CONTENT

- ▷ Review of certification requirements
- ▷ Theory of sound
- ▷ Fundamental principles of ultrasound physics
- ▷ Transmission and effects of ultrasound waves
- ▷ Efficiency of airborne ultrasounds
- ▷ Overview of typical applications and integration of technology
- ▷ Overview of instruments and software
- ▷ Leak detection
- ▷ Inspection of heat exchangers
- ▷ Analysis of compressed air leaks
- ▷ Electrical inspection
- ▷ Integration of ultrasound and infrared methods
- ▷ Valve inspection
- ▷ Steam trap inspection
- ▷ Review of proactive and predictive maintenance concepts
- ▷ Inspection of compressors, gears, pumps, motors, fans
- ▷ Inspection of bearings/study of trends and lubrication
- ▷ Data recording
- ▷ Spectral sound analysis
- ▷ Examination

Intended for

Technicians and engineers in all categories who carry out airborne or conduct ultrasound inspections and who are intent on obtaining Level 1 certification.

Following this course

The participant will have acquired the theoretical knowledge as well as the practical principles applicable to airborne ultrasound technology to pass the Level 1 certification examination in accordance with an ASNT.

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Lubrication Assisted by Ultrasound

Course 1042 – 1 day

The most common causes of ball bearing failure are poor lubrication practices. Under-lubrication and especially over-lubrication cause irreversible damage to ball bearings. This significantly reduces the life of the bearings and can cause production downtime.

COURSE CONTENT

- ▷ Basics of sound and ultrasound
- ▷ Mechanical concepts (bearing)
- ▷ Damage caused by improper lubrication
- ▷ Quantity and frequency calculation
- ▷ Explanation of ultrasonic assisted lubrication
- ▷ Sound
  - Before lubrication
  - During lubrication
  - After lubrication
- ▷ Device operation
- ▷ Operation of the UP-201 and / or UP-401
- ▷ Security

Intended for

This one-day hands-on training course is designed to help lubrication engineers and technicians implement best practices in ball bearing lubrication.

Following this course

The participant will be able to:

- Prepare an inspection plan
- Set up a UP201/UP401 Grease Caddy
- Schedule an inspection plan
- use the UP201U/P401 Grease Caddy
- Establish a reading reference
- Manage the lubrication of +/- 50 bearings

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Vibration Analysis for Management

Course 1001 - 1 day

Equipment maintenance is a determining factor in a company's **profitability**: poor maintenance will eventually lead to mechanical anomalies that result in poor product quality and loss of production.

The implementation of a **vibration monitoring program** must be well structured to reach your **profitability and efficiency objectives**. As a manager, come and discover what expectations you should have of the vibration analysis department and how you can contribute to keeping it effective.

COURSE CONTENT

Machine reliability

- Good maintenance practices
- Tools for conditional maintenance
- Clarify the support that the vibration analyst can bring to the organization

Basic theory of the vibration phenomenon

- Forces created by machines
- Characteristics of the vibratory signal

Instrumentation

- Sensors
- Vibration collector and analyzer

Diagnosis and severity

- Characteristics of the equipment
- Collection and analysis method
- Severity charts
- Imbalance, shaft misalignment
- Mechanical play
- Bearing problems
- Gearbox problems
- Pulley and belt problems
- Fluid flow phenomena
- Electric motor problems
- Resonance phenomenon

Implementation and profitability of a vibration monitoring program

- Role of the managers
- Selection of equipment to be monitored
- Creation and frequency of routes
- Reports and documentation
- Potential problems related to the implementation of a program
- Costs and profitability of a vibration analysis program

Intended for

Team leaders, superintendents, engineers and decision makers working with a vibration analyst.

Following this course

The participant will be able to understand the critical role of a vibration analysis program within an industrial maintenance concept to ensure the reliability of rotating equipment.

Introduction to Vibration Analysis

Course 1003 - 2 days

This 2-day course allows participants to master the **basic knowledge of vibration.**

COURSE CONTENT

Types of maintenance

- Different types of maintenance
- Technologies for conditional maintenance

Theory of vibration

- Concept of forces created by machines
- Definition of vibration
- Characteristics of a sinusoidal curve
- Calculation of frequency
- Unit of vibration amplitude
- Vibration spectrum
- Temporal analysis in addition to spectral analysis
- Resolution
- Harmonics
- Basic modulation and demodulation

Instrumentation

- Sensor characteristics
- Types of collectors and vibration analyzers
- Software

Programming

- Machine characteristics
- Frequency range and resolution
- Setting alarm levels

Diagnosis

- Collection and analysis method
- Imbalance
- Shaft misalignment
- Mechanical play
- Bearing problems
- Gearboxes problems
- Pulley and belts problems
- Oil whip and oil whirl phenomena
- Electrical motors problems
- The resonance phenomenon

Vibration monitoring program

- Understanding the key elements of a successful vibration program

Intended for

For technicians, engineers and industrial maintenance managers wishing to work in the field of vibration analysis. .

Following this course

The participant will be able to understand the basic concepts of the vibration analysis technique.

AT YOUR LOCATION

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Bearing Vibration Analysis

Course 1007 - 1 day

This course is a **theoretical training with case analysis**. Each participant will have to prepare different cases on bearing problems. The different cases can be studied directly from the vibration analysis software or extracted to standard formats such as Word or PDF. They must be well documented in history.

COURSE CONTENT

- Description and characteristics of bearings
- Principles of bearing deterioration
- Diagnosis of a BPFO
- Diagnosis of a BPFI
- Diagnosis of a BSF
- Diagnosis of an FTF
- Diagnosis of poor lubrication
- Diagnosis of mechanical play
- Diagnosis of bearing problems for a low speed shaft
- Physical analysis strategy for bearing defects

Intended for

For technicians and managers who have taken the course 2032 - Vibration Analysis Level II.

Following this course

The participant will be able to identify the characteristics of a vibration signature and evaluate the progression and severity for different bearing problems.

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Vibration Diagnosis Technique

Course 1009 - 2 days

This course is a **theoretical training with case analysis**. Each participant will have to prepare different cases on different machines. The cases can be studied directly from the vibration analysis software or extracted to standard formats such as Word or PDF. They must be well documented in history.

COURSE CONTENT

- Analysis and diagnosis of mechanical problems: dynamic imbalance, shaft misalignment, bearing misalignment, bent shaft, mechanical play of parts, structural mechanical play
- Analysis and diagnosis of bearing problems: BPFO, BPFI, BSF, FTF, lubrication
- Analysis and diagnosis of electrical problems: AC motor: soft foot, rotor problem, stator problem
- Analysis and diagnosis of fluidic problems: blade frequency, cavitation
- Analysis and diagnosis of gearing problems
- Analysis and diagnosis of resonance problems: structural and shaft
- Analysis and diagnosis of transmission problems: pulley-belt system
- Analysis and diagnosis of journal bearing problems
- Analysis and diagnosis of reciprocating machine problems

Intended for

For experienced vibration analysis technicians and engineers who want to develop a logical analysis method.

Following this course

The participant will be able to develop an efficient vibration analysis method to make accurate diagnoses on different types of rotating machines.

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Demystifying the Peakvue Technology

Course 1015 – 1 day

Emerson's PeakVue technology reduces the complexity of machine analysis to provide a simple and reliable indication of equipment health via a single trend.

This technology filters out traditional vibration signals to focus on impact, a much better indicator of the overall health of any type of machine mounted on anti-friction bearings.

COURSE CONTENT

- Vibratory theory of Peakvue
- Programming of the Peakvue
- Taking measurements
- Autocorrelation
- Analysis technique
- PeakvuePlus

During the training, there will be case study presentations based on real examples of common defects.

PREREQUISITE:

- The participant must have completed the 2032 -Vibration Analysis Level II training, be familiar with vibration data collection and analysis techniques, and know how to use AMS Machinery Manager software.

Intended for

Technicians and engineers who practice vibration analysis and want to understand the Peakvue technology.

Following this course

The participant will be able to become more efficient, since he will better understand the use and the strength of this technology. This will also help to improve the accuracy of his diagnosis.

AT YOUR LOCATION

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ONLINE

Vibration Analysis Basics - Preparation for Level I Certification

Course 2031 - 4 days (30 hours)

This 30-hour course allows participants to **master the basic knowledge** of vibration.

COURSE CONTENT

- ▷ Vibration principles
- ▷ Data collection
- ▷ Signal acquisition process
- ▷ Continuous monitoring
- ▷ Fault analysis
- ▷ Corrective action
- ▷ Equipment knowledge
- ▷ Acceptance tests

Intended for

For technicians, engineers and industrial maintenance managers wishing to develop their skills in the technique of vibration analysis and wanting to obtain their level 1 certification.

Following this course

The participant will be able to understand and use an analyzer collector, transfer routes, recognize the difference between correct and incorrect data readings and compare vibration measurements taken to preset alert parameters.

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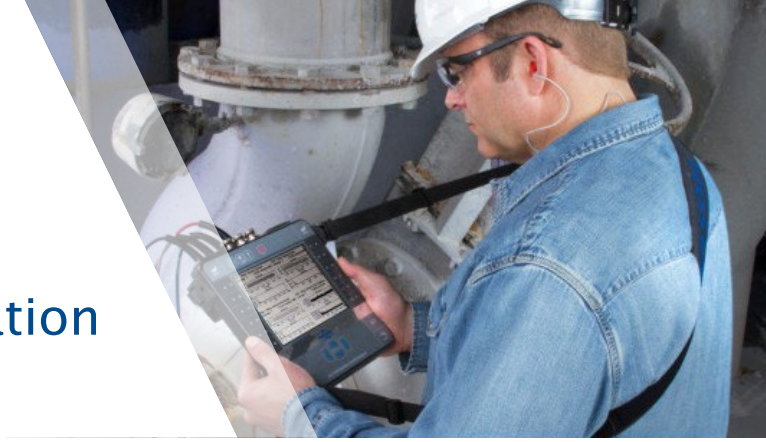

Intermediate Vibration Analysis- Preparation for Level II Certification

Course 2032 - 4 days (38 hours)

This 38-hour course provides participants with the necessary knowledge of **vibration analysis** to obtain their **Level II certification.** During the course, the participant will use an **Emerson vibration collector** in conjunction with advanced analysis techniques. Discussions of past machine case studies are a highlight of this course.

COURSE CONTENT

- ▷ Vibration principle
- ▷ Data acquisition
- ▷ Signal processing
- ▷ Fault analysis
- ▷ Corrective action
- ▷ Knowledge of equipment
- ▷ Acceptance tests
- ▷ Tests and diagnostics of machines
- ▷ Reference standards
- ▷ Reports and documentation
- ▷ Determination of defect severity

Intended for

Technicians and engineers who have acquired a minimum of 18 months of experience in vibration analysis techniques and wanting to obtain their level II certification.

Following this course

The participant will be able to select appropriate vibration measurement techniques, program collection instruments for basic measurements, perform basic spectrum analysis, and maintain their databases effectively. The analyst will be able to perform a variety of standard tests, evaluate the results, and recommend corrective actions accordingly.

ONLINE

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Dynamic Balancing

Course 4009 – 2 days

Mass imbalance is a primary cause of failure in rotary machinery. Every time a machine shaft makes a revolution, unbalance forces are transmitted through the bearings and machine structure, causing premature wear and shortening equipment life. Dynamic balancing is one of the key components for a predictive maintenance program in the plant.

COURSE CONTENT

The vibration phenomenon

- Understanding the vibration phenomenon
- Frequency and amplitude measurements
- Temporal signal versus vibration spectrum
- Phase concepts
- Resonance concepts

Imbalance

- Definition and cause of imbalance
- Types of imbalance
- Confirmation of imbalance with vibration analysis

Balancing

- Learning what instruments are necessary for balancing
- Understanding the balancing technique using the vector method
- Balancing on 1 plane
- Balancing on 2 planes
- 3-point method without phasing
- Special balancing methods

Balancing tolerance

- ISO 1940 standard
- API 670 standard
- Acceptance based on vibration level

Intended for

All managers, engineers and technicians whose duties entail improving the reliability of rotating machines.

Following this course

The participant will be able to develop an effective method for the dynamic balancing of various plant rotors.

AT YOUR LOCATION