Maximize Your Investment!

Machinery Health™ Training and Certification

Educational Services

EMERSON
Process Management
Emerson helps maximize the return on your investment in technology and people. Every year, more than 1,500 individuals attend courses on machinery health management across the country. Our instructors share their own real-world experiences and guide classes through hands-on exercises that reinforce the lesson.

Emerson’s strategy for understanding machinery health includes training courses designed to help you start up and maintain your mechanical equipment. Our goal is to provide you with the knowledge to keep your plant running smoothly.

- Defined skill paths guide you to expertise across multiple technologies.
- Lab work provides hands-on opportunity in each course.
- Certification testing is available for most technologies.
- Additional instruction is available through books, charts, pocket guides, and eLearning courses.

Companies today rely on fewer people to do more work. That’s why the need for training is more critical than ever to achieve and maintain cost-effective maintenance programs.
**Paths to Success**

Pick the curriculum of your choice or let us help guide your technicians on a path to certification. All training uses the latest equipment.

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**Category I Vibration Analyst Path** introduces students with no prior experience in vibration monitoring and analysis to the theories of vibration data and basic operation of the CSI 2130 or CSI 2140 Machinery Health Analyzer and AMS Suite: Machinery Health Manager.

**Category II Vibration Analyst Path** is for experienced students who are familiar with vibration data collection and want to advance their knowledge and ability to diagnose machinery issues.

**Category III Analyst Path** teaches students the advanced power of PeakVue™ technology and root causes of machine problems.

**Lubrication Analyst Path** explores lubrication analysis and its importance to a complete reliability program. Lubrication analysis is often the easiest way to diagnose common machine problems.

**Online Monitoring Path** is for students with the CSI online monitoring systems, including CSI XP32, CSI 2600, CSI 4500, and CSI 6500. Explore the benefits of continuous monitoring of critical machinery and how to integrate with operational plant control architecture.

**Complementary PdM Technology** instruction rounds out a full reliability program with Infrared Thermography, Balancing, Alignment and Electric Motor Diagnostic courses.
VIBRATION COURSES

FUNDAMENTALS OF VIBRATION
(CEU’S: 1.4) COURSE 2069
2 DAYS

This vibration training course is for those with no prior experience in vibration analysis. The class prepares participants for the Basic Vibration Analysis course. Students learn about causes of vibration and methods of measurement. Although the training course does not provide instruction on Emerson’s CSI technologies, the course will use them to demonstrate vibration principles.

Topics covered include:
- Introduction to vibration.
- Components of a predictive maintenance program.
- Basic fault identification.
- Vibratory fault characteristics and patterns.
- Information to help start a vibration program.

FUNDAMENTALS OF VIBRATION
E-LEARNING (CEUS: 0.2) E2069
3 MONTHS UNLIMITED ACCESS FROM ENROLLMENT DATE

This e-course provides instruction to individuals with no prior experience in vibration analysis. The course introduces the technology of vibration analysis by explaining what vibration analysis is and how it plays a critical role in any predictive maintenance program. Students are led through a self-paced discussion on how vibration analysis works with many examples of the types of faults that can be detected. Students will also gain an understanding of where and how vibration is measured with an emphasis on good data collection techniques. Students will learn important terminology that will be critical to their success as they progress to the next level of training in vibration analysis; Emerson’s Basic Vibration Analysis course.

Topics to be covered include:
- Fundamentals of vibration.
- How is vibration measured?
- Understanding the vibration signal.
- Vibration units.
- Analysis parameters.
- Data analysis: Where to begin?

BASIC VIBRATION ANALYSIS
CATEGORY I COMPLIANT
(CEU’S: 2.8) COURSE 2031
4 DAYS

This course complies with Category I Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics.

This course is intended to enable students to operate single channel machinery analyzers, dump and load routes, recognize the difference between good and bad data, and compare vibration measurements against pre-established alert settings.

Although this training course is not product specific, students will use Emerson’s CSI technologies for demonstration purposes. The class shows the student how to use the vibration analyzer in conjunction with Emerson Machinery Health Management supported software to analyze basic vibration defects.

Prerequisites: Fundamentals of Vibration or up to six months of vibration experience is recommended.

Topics covered include:
- Principles of vibration.
- Data acquisition and signal processing.
- Condition monitoring and corrective action.
- Equipment knowledge.
- Acceptance testing.
- Basic analyzer functions.
- Recognition of machine defects, including:
  - Imbalance.
  - Shaft misalignment.
  - Looseness.
  - Rolling element bearing defects.
  - Gear problems.
  - Resonance.
  - Introduction to electrical defect.
INTERMEDIATE VIBRATION ANALYSIS
CATEGORY II COMPLIANT
(CEU’S: 2.8) COURSE 2032
4 DAYS
This course complies with Category II Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics.

In addition to topics covered in this course, Category II vibration analysts are expected to select appropriate vibration measurement techniques, set up instruments for basic data collection, perform basic spectrum analysis and maintain database. Analysts will perform a variety of standard tests, evaluate results, and recommend corrective actions accordingly.

This course also features Emerson machinery health analyzers in conjunction with advanced machinery analysis techniques. Discussions of case histories on machinery faults are one of the focal points of this course.

Prerequisites: Basic Vibration Analysis course and a cumulative 18 months of field experience are recommended.

Topics covered include:

- Equipment testing and diagnostics.
- Reference standards.
- Reporting and documentation.
- Fault severity determination.
- Analyzer averaging techniques.
- Sensor selection guidelines.
- Introduction to PeakVue technology.
- Sideband analysis.
- Rolling element bearing failure modes.
- Advanced electrical analysis techniques.
- Phase analysis using single and dual channel.
- Basic single-plane field balancing.

ADVANCED VIBRATION ANALYSIS
CATEGORY III COMPLIANT
(CEU’S: 2.8) COURSE 2033
4 DAYS
This course complies with Category III Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics.

This course expands on the subjects covered in the Intermediate Vibration course (Category II), especially in the areas of fault analysis and corrective actions. The class details advanced analysis techniques. The dual channel machinery health analyzer features are introduced, including the use of AMS Machinery Manager to set up the advanced analyser features and powerful downloadable programs for data collection.

Transient machinery health analyzer capabilities are covered, including long-term time waveform. The class covers advanced resonance detection using a variety of testing methods, such as triggered data collection.

Prerequisites: Intermediate Vibration Analysis course and a cumulative three years of field experience are recommended.

Topics covered include:

- Appropriate vibration instrumentation hardware and software for both portable and permanently installed systems.
- Spectrum and time waveform analysis under both steadystate and unsteady operating conditions.
- How to establish vibration monitoring programs.
- Specifications for vibration levels and acceptance criteria for new machinery.
- Measurement and analysis of basic operational deflection shapes.
- Measurement and analysis of PeakVue measurements.
- Machinery condition reports.
- Slow Speed Technology (SST).
- Zoom analysis.
- Transient techniques.
- Triggered data capture.
- Resonance detection.
PEAKVUE™ MYSTERY AND AUTOCORRELATION
(CEU’S: 2.1) COURSE 2035
3 DAYS

The combination of these courses provides insight into advanced functionality of Emerson’s unique PeakVue technology and autocorrelation.

PeakVue technology provides early, accurate and trendable roller bearing and gearbox anomaly detection unmatched by all other bearing health tools on the market. PeakVue’s method of processing preserves the peak amplitude of the stress wave emitted from a bearing or gear defect. Preserving this peak amplitude allows trendable bearing health diagnostics.

The autocorrelation section of the course will teach the power of the autocorrelation coefficient function for the analysis of vibration induced time waveform data. The autocorrelation function data generally are computed from the same time waveform data used to compute the spectrum. The strength of autocorrelation data is complementary to the strength of spectral data.

Both courses make use of case studies from real-life examples of common faults and live demonstrations illustrating specific mounting procedures. The difference between PeakVue techniques and demodulation will also be demonstrated.

Prerequisites: Students should be familiar with vibration data collection and analysis techniques and the use of AMS Machinery Manager.

Topics covered include:
- Proper PeakVue set-up for all speeds (as low as 1 rpm).
- Sensor selection and sensor mounting.
- Setting alarm levels and choosing trend parameters.
- Analyzing PeakVue spectra and waveforms.
- Uses of the circular waveform plot.
- Autocorrelation coefficient and how it relates to time waveform and spectral data.
- Unique patterns of autocorrelation function data for certain classes of bearing faults, gearing faults, etc.

INTRODUCTION TO WINDOWS- BASED
ODS/MODAL
(CEUS: 2.8) COURSE 2039
3 DAYS

This 4-day course is designed to teach Operating Deflection Shape (ODS) and Modal Analysis software. This course uses the CSI 2130 single- and dual-channel Machinery Health Analyzers to teach the practical concepts of ODS/modal measurement techniques and display options.

The modal course is introductory and will not cover theory or mathematical background.

Prerequisites: Knowledge of dual-channel analyzers and at least one year of full-time vibration analysis experience is recommended.

Topics covered include:
- Building of the wireframe model.
- Measurement considerations.
- Collecting ODS data with and without a tachometer reference.
- Utilizing an impact hammer with the CSI 2130 Advanced Dual-Channel DLP.
- Interpretation of results.
ISO COMPLIANT VIBRATION CERTIFICATION EXAM

CATEGORY I EXAM
COURSE 2021EX (AVAILABLE AT THE END OF COURSE 2031)
TEST FORMAT: WRITTEN EXAM
DURATION: 2 HOURS
PASSING GRADE: 70%

Eligibility for Examination:
• Recommended Minimum Duration of Cumulated Training: 32 hours.
• Recommended Minimum Duration of Cumulated Experience: 6 months.

CATEGORY II EXAM
COURSE 2022EX (AVAILABLE AT THE END OF COURSE 2032)
TEST FORMAT: WRITTEN EXAM
DURATION: 3 HOURS
PASSING GRADE: 70%

Eligibility for Examination:
• Recommended Minimum Duration of Cumulated Training: 70 hours.
• Recommended Minimum Duration of Cumulated Experience: 18 months.
• Passing Category I exam is NOT a prerequisite for taking Category II exam.

CATEGORY III EXAM
COURSE 2023EX (AVAILABLE AT THE END OF COURSE 2033)
TEST FORMAT: WRITTEN EXAM
DURATION: 4 HOURS
PASSING GRADE: 70%

Eligibility for Examination:
• Recommended Minimum Duration of Cumulated Training: 110 hours.
• Recommended Minimum Duration of Cumulated Experience: 36 months.
• Has taken and passed the Category II exam.
Educational Services

Maximize Your Investment!

MACHINERY HEALTH ANALYZER COURSES

FUNDAMENTALS OF CSI 2130
(CEU’S: 1.4) COURSE 2072
2 DAYS

This hands-on course focuses on the basic operation of the CSI 2130 Machinery Health Analyzer. Students will collect data from machines similar to those found in plants. The course was designed for students with little or no experience with CSI analyzers, but who are experienced in the field of vibration data collection and analysis. If you also need to learn vibration analysis skills, we recommend taking the Fundamentals of Vibration course.

Prerequisites: Understanding of vibration analysis.

Topics covered include:
• Analyzer/computer communication.
• Predefined route data collection.
• Job data collection and setup.
• Monitor mode measurements.
• Peak and phase measurements.

Note: You may take this course with Fundamentals of Vibration as a four-day course.

FUNDAMENTALS OF CSI 2140
(CEU’S: 1.4) COURSE 2076
2 DAYS

Specifically for users of the CSI 2140 Machinery Health Analyzer. See course description, prerequisites, and topics as listed for the Fundamentals of CSI 2130 course.

E-LEARNING: FUNDAMENTALS OF CSI 2130
COURSE E2130
3 MONTHS (UNLIMITED ACCESS)

The Fundamentals of the CSI 2130 eLearning course is designed to provide you with the tools you need to perform data collection using the CSI 2130. This course provides guided demonstrations through the processes of installing necessary drivers, uploading updated firmware, and loading updated or newly purchased programs necessary for data collection.

The course leads you through a basic introduction of the analyzer, including panel descriptions and reviews of the purpose and function of all connectors, ports, slots, keys, indicators, and buttons. The user learns how to load a pre-defined route into the analyzer, take general and specialized data, and then load data back into a computer for further diagnostic analysis.

• Analyzer-computer communication.
• Predefined route data collection.
• Job data collection and setup.
• Monitor mode measurements.
• Peak and phase measurements.
E-LEARNING FUNDAMENTALS OF THE CSI 2140  
(CEU’S: 0.6) COURSE E2140  
3 MONTHS (UNLIMITED ACCESS)  
Specifically for users of the CSI 2140 Machinery Health Analyzer.  
See course description and topics as listed for the eLearning CSI 2130 course.

CSI 2130 ADVANCED FUNCTIONS  
(CEU’S: 2.1) COURSE 2091  
3 DAYS  
This course is intended for students with single-channel vibration analysis experience and little or no multi-channel experience. It covers advanced signal processing using PeakVue technology for slow-speed analysis, transient capabilities, coherence and crosschannel phase, Operating Deflection Shapes (ODS), modal analysis, and other advanced techniques.  
Prerequisites: Single-channel vibration analysis experience is required.  
Additional topics covered include:  
• Resonance detection.  
• Dual channel data collection.  
• Orbit data collection.  
• Advanced two-channel downloadable program.  
• Zoom analysis, cascade, and overall.

CSI 2140 ADVANCED FUNCTIONS  
(CEU’S: 2.1) COURSE 2094  
3 DAYS  
Specifically for users of the CSI 2140 Machinery Health Analyzer.  
See course description, prerequisites, and topics as listed for the eLearning CSI 2130 course.

AMS SUITE: MACHINERY HEALTH MANAGER COURSES  
These courses are based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Subject matter for infrared thermography, motor analysis, online monitoring, oil analysis, and wireless technology is covered in other course offerings and is not part of AMS Machinery Manager course materials.

INTRODUCTION TO AMS MACHINERY MANAGER  
(CEU’S: 2.8) COURSE 2068  
4 DAYS  
This course is designed for the new users of AMS Machinery Manager. Students learn methods of database creation and vital features of route creation, such as collecting reference data, analyzer/computer communication, and the basic concepts of analysis parameter sets, alarm limit sets, and fault frequency sets. An Emerson machinery health analyser will be used to load routes and collect data on lab machinery for basic vibration analysis using export and diagnostic plotting.  
Prerequisites: Computer experience with the Windows operating system and the Basic Vibration Analysis course are recommended.  
Topics covered include:  
• Navigation.  
• Database creation.  
• Data collection.  
• Basic analysis and reporting.  
• Link to RBMview.
INTERMEDIATE AMS MACHINERY MANAGER (CEU’S: 2.8) COURSE 2074  
4 DAYS  
This course is designed for students who have a basic understanding of AMS Machinery Manager. Students expand their knowledge of machinery analysis techniques, focusing on analysis and reporting using vibration analysis, exception reporting, PeakVue measurements and the full version of RBMview.  
Prerequisites: Introduction to AMS Machinery Manager course, Basic Vibration Analysis course, or 6 months vibration analysis experience is recommended.  
Topics covered include:  
- Exception reporting.  
- PeakVue technology.  
- Vibration Analysis module.  
- Nspector.  
- BMview.  

ADVANCED AMS MACHINERY MANAGER (CEU’S: 2.8) COURSE 2070  
4 DAYS  
This course expands students’ understanding of AMS Machinery Manager. Gain hands-on experience through the creation of a class database with example machines and collection of vibration data for problem analysis and reporting. Students will learn to use the advanced analysis and reporting functions of AMS Machinery Manager.  
Prerequisites: Intermediate AMS Machinery Manager course, Intermediate Vibration course, or one year vibration analysis experience is recommended.  
Topics covered include:  
- Advanced analysis features in vibration analysis module.  
- Problem reporting.  
- Status-at-a-glance operation and reporting.  
- Nspector® reporting techniques and modification/addition of set up information.  
- RBMwizard reporting techniques and modification/addition of set up information.  
- Advanced database editing.
COURSE# 2070C: AUTOSTAT FOR AMS MACHINERY MANAGER  
(CEU’S: 1.4)
AustoStat is included in the standard curriculum of the 4-day Advanced AMS Machinery Manager course (course # 2070). This 2-day session only covers AutoStat in the AMS Machinery Manager software.

Alarms are an important part of any analysis program. Properly setting alarms allows the user to quickly identify an abnormal machine condition and reduces time spent analyzing machines that are running in acceptable or “normal” condition.

AMS Machinery Health Manager provides the user the ability to create up to 12 parameter bands with alarms in addition to the Overall value. Calculating ideal alarm values for these parameters can be very complicated. Autostat uses statistical analysis to provide limit values for the individual parameter bands by analyzing the data associated with similar pieces of equipment.

This two day session is designed for students have a basic understanding of AMS Machinery Health Manager and will guide these user’s through the process of using Autostat for the generation of both Analysis Parameter sets and Statistical narrowband Envelope generation.

Topics covered will include:

• Analysis Parameter Alarms vs Narrowband alarms – What’s the difference?
• Database Setup Requirements and reports.
• Creating and Editing Analysis Groups.
• Modifying and Creating New Parameter Alarms.
• Creating and Editing Statistical Envelopes.
• Using these alarms within the Vibration Analysis Plotting application.

VIBRATION ANALYSIS MODULE FOR AMS MACHINERY MANAGER  
V5.2 OR V5.3 E-LEARNING  
(CEUS: 0.1)
COURSE E2074V
3 MONTHS UNLIMITED ACCESS
This e-course provides thorough introduction to the Vibration Analysis module in AMS Machinery Manager v5.2 and v5.3 software. With this version of the Vibration Analysis module, powerful tools for the analysis and comparison of multiple types of data are right at your fingertips.

Prerequisites: Familiar with the AMS Machinery Manager.

Topics covered include:

• Introduction of the new Vibration Analysis module.
• Learn to display spectra, waveform, and trends displays.
• Data manipulation.
INTRODUCTION TO AMS SUITE: MACHINERY HEALTH MANAGER VIRTUAL CLASSROOM (CEUS: 2.8) COURSE 2068V 4 DAYS

Designed for the new users of AMS Machinery Manager. Students learn methods of database creation and vital features of route creation such as collecting reference data, analyzer/computer communication, and the basic concepts of Analysis Parameter Sets, Alarm Limit Sets, and Fault Frequency Sets. A machinery analyzer is used to demo the process of loading routes for data collection. This course will also include a basic overview of the vibration plotting application and reporting functions.

Prerequisites: Computer experience with the Windows operating system and some vibration analysis experience are recommended.

Topics covered include:
- Navigation.
- Database creation.
- Data collection.
- Basic analysis and reporting.
- Link to RBMview.

INTERMEDIATE AMS SUITE: MACHINERY HEALTH MANAGER VIRTUAL CLASSROOM (CEUS: 2.8) COURSE 2074V 4 DAYS

Teaches some of the more advanced machinery analysis techniques available in AMS Machinery Manager Software. This course focuses on analysis and reporting with the use of Vibration Analysis module, Reporting module, Exception Analysis, PeakVue technology and a full version of RBMview.

Prerequisites: Introduction to AMS Machinery Manager (course # 2068), Basic Vibration Analysis course or 6 months vibration analysis experience are recommended.

Topics covered include:
- PeakVue technology.
- Vibration Analysis module.
- Reporting Module.
- Exception Analysis.
- Nspectr.
- BMview.
ADVANCED AMS SUITE:  
MACHINERY HEALTH MANAGER  
VIRTUAL CLASSROOM  
(CEUS: 2.8) COURSE 2070V  
4 DAYS

The third in our series of AMS Machinery Manager courses. Its focus is on the management, modification and optimization of the existing AMS Machinery Manager database. Students will learn how to modify existing Wizard configurations, add and edit users, statistically adjust alert and fault levels, make global database changes, and many other very useful database functions. This course is intended for the advanced user who has already created a machinery database and has been acquiring, storing and analyzing data for six months or more.

Prerequisites: Intermediate Vibration (course #2032) or one year vibration analysis experience are recommended. Experience with the Windows operating system is recommended.

Topics covered include:

- Advanced analysis features in Vibration Analysis Module.
- Problem reporting.
- Status-at-a-Glance operation and reporting.
- Nspector.
- Wizard - reporting techniques and modification/addition of setup information.
- Autostat.
- Database Utility.
- Database Zip Utility.
- Network Administration.
- Data Locker Management.

COURSE 2070CV:  
AUTOSTAT FOR AMS MACHINERY MANAGER, VIRTUAL CLASSROOM  
(CEU’S: 1.4) COURSE 2070CV  
2 DAYS

AutoStat is included in the standard curriculum of the 4-day Advanced AMS Machinery Manager course (course # 2070). This 2-day session only covers AutoStat in the AMS Machinery Manager software.

Alarms are an important part of any analysis program. Properly setting alarms allows the user to quickly identify an abnormal machine condition and reduces time spent analyzing machines that are running in acceptable or “normal” condition.

AMS Machinery Health Manager provides the user the ability to create up to 12 parameter bands with alarms in addition to the Overall value. Calculating ideal alarm values for these parameters can be very complicated. Autostat uses statistical analysis to provide limit values for the individual parameter bands by analyzing the data associated with similar pieces of equipment.

This two day session is designed for students who have a basic understanding of AMS Machinery Health Manager and will guide these user’s through the process of using Autostat for the generation of both Analysis Parameter sets and Statistical narrowband Envelope generation.

Topics covered include:

- PeakVue technology.
- Analysis Parameter Alarms vs/ Narrowband alarms – What’s the difference?
- Database Setup Requirements and reports.
- Creating and Editing Analysis Groups.
- Creating and Editing Statistical Envelopes.
- Using these alarms within the Vibration Analysis
- Plotting application.
**BLENDED LEARNING**

**COURSE# 2008B: AMS MACHINERY MANAGER: VIBRATION ANALYSIS WORKSHOP FOR THE PDM PROFESSIONAL**

(CEU’S: 1.4)

The purpose of this workshop is to provide the vibration analysts with an interactive learning environment that enhances their understanding of the features of the Vibration Analysis program using Emerson’s AMS Machinery Manager Software. This workshop was designed as a self-paced blended learning training experience. The student will be provided with a workbook, access to a Virtual Training Computer and an eLearning module.

The workbook contains eleven topical exercises for use with the Vibration Analysis tab in AMS Machinery Manager Software. The student will also be given a link to a Virtual Training Computer to complete the exercises using AMS Machinery Manager Software. If there are questions on how to complete steps in the exercise, an eLearning module will provide assistance to the student. If questions cannot be answered with the assistance of the eLearning module, students will also be able to email questions to an instructor at mhm.training@emerson.com. Instructors will respond to students as quickly as possible.

Objectives: Provide the student with self-paced exercises to advance his/her knowledge and proficiency with the use of AMS Machinery Manager Vibration Analysis tools.

Prerequisite: Some knowledge of AMS Machinery Manager Software and basic vibration analysis is recommended.

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**CSI ONLINE TECHNOLOGIES COURSES**

**ONLINE PROTECTION, OPERATIONS AND MAINTENANCE**

(CEU’S: 2.8) COURSE 2080

4 DAYS

This course is a hands-on training for anyone involved with operating and maintaining a CSI 6000/6500 system. Workshops include practice with “live” monitors and racks.

Topics covered include:
- Overview of hardware components.
- Rack configuration.
- Operator display software.
- Data acquisition software.
- Interface with the CSI online prediction system.
- System troubleshooting and maintenance.
ONLINE PREDICTION, OPERATIONS
AND MAINTENANCE
(CEU’S: 2.8) COURSE 2088
4 DAYS

This course is best suited for those who have a CSI 4500, CSI 6500, or CSI XP32 system installed and operational prior to attending the course.

Topics covered include:

• Vibration basics and terminology.
• System overview: functionality and system components.
• Online Watch — used to monitor the system daily.
• Online Config — adding a new machine to an existing database.
• Vibration analysis module — spectrums, waveforms, and trend data.
• PeakVue processing.
• Review of databases.

Prerequisites: Knowledge of vibration and industrial machinery is helpful, but not necessary.

The course is designed for:

• System operators or analysts.
• Operations personnel using the CSI 4500, CSI 6500, or CSI XP32 daily.
• Those responsible for configuring databases and analyzing data.

CSI 6300 SIS OPERATIONS AND MAINTENANCE
(CEU’S: 2.1) COURSE 2087

This three day course is designed for System Users, Projects, Services and Support personnel for Emerson and its representatives. This course offers a Q&A section, practical exercises and troubleshooting.

Prerequisites: Participants should be familiar with vibration analysis, have basic computer skills and have a basic knowledge of electrical test equipment.

Topics covered include:

• How to implement the CSI 6300, and use the manuals for integration.
• System safety philosophy.
• Overall safety calculations of the complete chain.
• A basic explanation about SIL (why is it done, what are the reasons for doing it, history, what do the different safety related numbers mean).
• A description of:
  • HW Components.
  • Sensors.
  • Configuration SW.
  • Different System Variations.
  • Measurement and Safety Functionalities.
  • System Configuration.
  • Sensor and System Installation.
  • Implemented System and Safety Routines.
  • In & Output Functionalities.
MACHINERY HEALTH TRANSMITTERS

WIRELESS SELF-ORGANIZING NETWORK
(CEU’s: 1.4) Course 2375
2 days

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, set up, configure, maintain, and troubleshoot wireless Self networks. This course explains how wireless networks function and emphasizes planning, proper installation and startup, configuration, maintenance, and integration. The course uses lectures and labs to maximize the hands-on experience.

Topics covered include:
- Correct installation of the Smart Wireless.
- Gateway.
- Proper installation and configuration of wireless transmitters (including the CSI 9420 Wireless Vibration Transmitter).
- Proper integration of host interfaces to the Smart.
- Wireless Gateway.

Prerequisites: Some experience in networks and host integration would be helpful.

CSI 9420 OPERATIONS & MAINTENANCE
(CEUs: 0.7) Course 2025

This 1-day course is intended for technicians, engineers and other plant personnel who need to know how to setup, maintain, troubleshoot, and view data from the CSI 9420 Wireless Vibration Transmitter. The course uses lectures and labs to maximize the hands-on experience for the students.

Prerequisites: Course 2375 (Wireless Self Organizing Network) and some experience in Networks and Host integration would be helpful.

Topics to be covered:
- Overview of CSI 9420 hardware components.
- Vibration basics and terminology relating to CSI 9420.
- Import data into AMS Machinery Manager.
- View data using AMS Machinery Manager.
- Troubleshooting and maintenance.
LUBRICATION COURSES
(LEVEL I AND II LUBRICATION COURSES CAN BE TAKEN TOGETHER AS COURSE 2082)

LEVEL I LUBRICATION WITH CERTIFICATION COURSE
(CEU’S: 1.05) COURSE 2082A
1.5 DAYS

This course is designed for individuals who have limited or no oil analysis experience. Guidelines and instruction for starting an oil analysis program are provided. The course focuses on the basic properties of lubricants and lubricant specifications, including additive packages, and gives an overview of laboratory testing methods and interpretation of test data.

In addition, instruction will be provided on proper storage and handling of unused lubricants, sample point identification, and best practices for collecting samples from machinery. Basic contamination control, wear debris analysis, and identification will be covered.

Topics covered include:
• Starting a productive lubricant analysis program.
• Analyzing oil data.
• Identifying common types of wear debris, their origins, and corrective actions.
• Importance of contamination control.
• Designing sampling, storage, and handling procedures.

Optional Level I Lubrication Certification is available at no additional charge.

LEVEL II LUBRICATION WITH CERTIFICATION
(CEU’S: 1.05) COURSE 2082B
1.5 DAYS

Learn about the use of oil analysis with other predictive technologies to enhance your machinery health program. Machine life extension and reduction of unscheduled downtime will be covered in depth.

Training includes introduction to lubricant engineering, failure concepts, and failure prevention. Information will be provided on greases and synthetic lubricants, including advantages and applications.

Guidelines and step-by-step procedures will be offered for consolidating lubricants, setting alarm limits, and managing and enhancing existing lubrication programs.

Prerequisites: Basic understanding of lubrication.

Topics covered include:
• Components of RBM lubrication program.
• Methods for extending machine life.
• Importance of wear debris analysis and contamination control.
• Lubricant consolidation.
• Establishing alarms.

Optional Level II Lubrication Certification is available at no additional charge.
OILVIEW™ FOR AMS MACHINERY MANAGER
(CEU’S: 2.8) COURSE 2083
4 DAYS
The course is designed for those who are new to onsite oil analysis instruments and experienced users who wish to use advanced OilView features in AMS Machinery Manager. Students learn database creation and modification, analysis parameter, and alarm limit sets.

The course demonstrates how to set up and configure the OilView software module, discusses calibration and use of OilView instruments (including the Spectro 5200) for analysing oil samples onsite, and explains data interpretation and basic reporting.

Topics to be covered include:
- Introduction to oil analysis.
- Onsite analysis.
- Reference oil database management.
- Database Construction and Modification.
- Analysis parameter sets.
- Alarm limit sets.
- Best practices for onsite analysis using OilView.
- Importing laboratory data.
- Basic wear debris analysis.

DATA ANALYSIS AND REPORTING.
WEAR DEBRIS ANALYSIS
(CEU’S: 1.4) COURSE 2084
2 DAYS
Wear debris analysis (WDA) is often referred to as the most important form of oil analysis. This course teaches how to apply environmental conditions and other outside factors to make an accurate root cause analysis. Attendees will gain a basic understanding of wear particle generation, sample preparation techniques, and identification of wear particles.

Topics covered include:
- Theory presentation.
- Wear particle generation.
- Tribology, friction, and wear.
- Lubrication fundamentals.
- Sample screening: Using preliminary data and equipment type to select WDA candidates and sample preparation techniques.
- Interpretation of oil analysis results related to WDA, such as OilView indices and commercial oil laboratory data.
- Sample preparation techniques: grease, oil, hydraulic fluid, and synthetics.
- Disciplined and systematic approach to WDA: overview of the OilView WDA module.
- Particle identification and characterization exercise.
- Identification and characterization using photographs and/or live samples.

E-LEARNING OILVIEW FOR AMS MACHINERY MANAGER
(CEU’S: 1.4) COURSE E2083
3 MONTHS (UNLIMITED ACCESS)
The course is designed for those who are new to the OilView oil analysis module/instruments and experienced users who wish to use advanced OilView features in AMS Machinery Manager. Students learn database creation and modification, analysis parameter, and alarm limit sets.

The course demonstrates how to set up and configure the OilView software module, discusses calibration and use of OilView instruments (including the Spectro 5200 Machinery Health Oil Analyzer) for analyzing oil samples onsite, and explains data interpretation and basic reporting.

Topics covered include:
- Introduction to oil analysis.
- Onsite analysis.
- Reference oil database management.
- Database construction and modification.
- Analysis parameter sets.
- Alarm limit sets.
- Best practices for onsite analysis using OilView.
- Importing laboratory data.
- Basic wear debris analysis.
- Data analysis and reporting.

Access the eLearning course anytime within 3-months after registration. Available at your home, office, or anywhere you can access the Internet!
THERMOGRAPHY COURSES

INFRARED ANALYSIS FOR AMS MACHINERY MANAGER (CEU’S: 2.1) COURSE 2018
3 DAYS

This course is designed for maintenance personnel who want to learn how to incorporate infrared-related data into AMS Machinery Manager. Infrared (IR) Analysis establishes the foundation and provides the tools required for a sound thermography inspection program. It identifies the equipment to be scanned, the monitoring schedule, and other information needed to construct a database that defines the monitoring procedures for your program.

Topics covered include:
- Overview of AMS Machinery Manager.
- Thermographic database set up management.
- Thermographic route management.
- File transfer to/from IR imager.
- IR event collection.
- Image viewing and event reporting.
- IR analysis tools.
- IR reporting.
- Case history compilation.

IR THERMOGRAPHY LEVEL I WITH CERTIFICATION (CEU’S: 2.8) COURSE 2019
4 DAYS

This class is intended for students who have limited or no experience in infrared thermography analysis and diagnostics. Emerson thermography courses meet or exceed Level 1 ASNTTC-1A recommended practices. Successful completion of the courses and passing of optional examinations can lead to Level I certification.

Topics covered include:
- Physics of infrared energy.
- Components of infrared light.
- System components and data collection.
- Setting acceptance criteria for electrical and mechanical components.
- Data storage, trending, and reports.
- System coordination with other PdM technologies.
- Built-up roofs.

Optional IR Level I Certification Exam is available at no additional charge.
BALANCING COURSES

BALANCING THEORY AND APPLICATION
FOR THE CSI2130
(CEU’S: 2.8) COURSE 2015
4 DAYS (MAY BE TAKEN AS TWO 2-DAY CLASSES)

This class teaches how to perform single- and dualplane balancing using both graphical and analyzer-based balancing methods. The class uses the CSI 2130 Machinery Health Analyzer.

Topics covered include:
• Imbalance identification.
• Use of vectors.
• How to calculate influence coefficients.
• Use of the auxiliary analyzer balance functions.
• Use of UltraMgr module.
• Calculate a system lag.
• Estimate trial weights.
• Balancing flexible rotor systems.
• Balancing overhung rotors.
• Balancing techniques in an industrial setting.

BALANCING THEORY AND APPLICATION
FOR CSI 2140
(CEU’S: 2.8) COURSE 2016
4 DAYS

Specifically for users of the CSI 2140 Machinery Health Analyzer.
See course description and topics as listed under Balancing Theory and Application for CSI 2130.

ALIGNMENT COURSES

LASER ALIGNMENT FOR CSI 2130
(CEU’S: 1.75) COURSE 2092
2½ DAYS

This class is intended for students who have limited or no alignment experience. It provides training on shaft alignment using CSI technologies, focusing on the CSI 2130. This course includes hands-on training with horizontal alignment demonstrators and covers management of an alignment program using AMS Machinery Manager.

Topics covered include:
• Alignment.
• Required pre-shutdown checks.
• Pre-alignment checks and corrections.
• Science and art of alignment.
• Tools and techniques for moving equipment.
• Time-savers.
• Alignment information management.
• Management systems: methods and advantages.
COURSE# 2096: LASER ALIGNMENT FOR CSI 2140  
(CEUS: 1.8)
This 2.5-day class is intended for personnel who have limited or no alignment experience. The course provides training on shaft alignment using CSI laser alignment product line with focus on the CSI 2140 Machinery Health Analyzer. This course includes hands-on training with horizontal alignment and vertical alignment demonstrators and covers management of an alignment program using the AMS Machinery Health Manager software.
Prerequisites: None
Topics:
• Alignment: What is it? Why?
• Required pre-shutdown checks.
• Pre-alignment checks and corrections.
• The science and art of alignment.
• Tools & techniques for moving equipment.
• Time-savers.
• User of CSI laser alignment product line with CSI 2140 Machinery Health Analyzer.
• Alignment information.
• Management systems: methods and advantages.

MAINTENANCE STRATEGY  
ROOT CAUSE FAILURE ANALYSIS  
CEU’S: 2.1) COURSE 2053  
3 DAYS
This course provides participants with the tools they need to begin the process of identifying Root Cause Failure Analysis (RCFA). The course was designed for managers, engineers, and technicians who are looking to establish a RCFA program to enhance an existing predictive/preventive maintenance program. The course introduces the various facets of benchmark RCFA programs.
Prerequisites: One to two years of experience with a predictive maintenance program is recommended. No specific knowledge of predictive technologies is required.
Topics covered include:
• Failure definitions and types of failure.
• Establishing a RCFA program.
• When to initiate investigation.
• Investigation methodology.
• Cost/benefit evaluation and performance metrics.
• Review of machinery and component failure modes.
• Case histories.
ONSITE TRAINING

Training is vital for getting the most out of your reliability program, but traveling to an offsite class can sometimes be an issue for you or your staff. Today we have a solution.

Emerson instructors can bring the benefits of classroom training to your plant. Most Emerson reliability training classes can be held in your facility where more of your reliability staff can learn the most effective techniques using the equipment you have available now. Training can be tailored to your needs to address the issues that affect your operations every day.

Call now to inquire about onsite classes: 1-800-675-4726.

REGISTRATION FORM

Click here to download a PDF form, or go to www.assetweb.com/mhm and select Training Courses. Choose either Online or PDF Registration Form.

Tips for Easy Registration:
1. For a list of current class schedules, go to www.assetweb.com/mhm.
2. Make one copy of the registration form for each student.
3. Carefully and legibly complete the registration form(s), including purchase order/check number, credit card information, or certificate. Your Registration cannot be processed without this information.
4. Fax the registration form to Emerson Education Services at 1-865-218-1764. The scanned registration form can also be emailed to Mong-ching.Lin@Emerson.com or MHM.Training@Emerson.com. If paying with a PURCHASE ORDER, a copy of the PO is required. If paying with a CERTIFICATE, please include a copy of it with your registration form and bring the original to class.
5. Watch for a confirmation within 72 hours of faxing your registration. If you do not receive a confirmation, please call 1-800-675-4726.
6. Register as early as possible to get into your preferred classes. Payment must be received prior to class.
7. Do not purchase nonrefundable airline tickets. If for some reason a class is cancelled, Emerson is not responsible for non-refundable tickets.
8. Take advantage of our moneysaving discounts. We offer a 10% discount if you do any of the three things listed below:
   • Attend two classes in one week.
   • Attend two full consecutive weeks of classes.
   • Submit your complete registration at least four weeks in advance of the class.

NOTE: Only one discount per registration.
EDUCATION CERTIFICATES WITH PRODUCT PURCHASES

Training certificates are provided with some product purchases. The certificates are included with your product shipment. If you qualify for a certificate and did not receive one, contact your sales coordinator.

When you mail or fax your registration form, be sure to include a copy of the certificate and bring the original with you to class.

WHAT TO BRING

If you attend IR Thermography Level I, you must bring your own IR camera. We will provide equipment and software needed for all other courses.

WHEN TO ARRIVE

For courses that begin at 8:30 AM, the door opens at 7:30 AM. For courses that begin at 1:00 PM, plan to arrive no earlier than noon.

FOOD ARRANGEMENTS

We provide light breakfast food, such as pastries and juice on all course days that begin at 8:30 AM. We also provide lunches on all full course days. If your class begins at 1:00 PM or ends at noon, no lunch is provided. Beverages are available throughout the day.

DIRECTIONS TO OUR TRAINING FACILITIES AND RECOMMENDED HOTELS CAN BE PROVIDED UPON REQUEST. THIS INFORMATION IS ALSO LISTED ON OUR WEBSITE.

CANCELLATION POLICY

If you cancel before the deadline, we will either refund the cost of the course or reschedule at your convenience. The cancellation deadline is no later than two weeks before the start of the course. If you cancel after the deadline but before the course begins, we will refund 50% of the cost or reschedule at your convenience. If you cancel after the course begins or do not show up, you forfeit the entire cost of the course.

In case of a sudden, serious illness or a death in your immediate family, you or your company must notify us within 24 hours that you cannot attend. This will give another person an opportunity to attend the course.

If you do not notify us within 24 hours after an emergency arises, you must pay the 25% penalty for late cancellation. We will reschedule any late cancellation upon request, but you must first pay any penalty you may owe.

If you register for a course attendance with a certificate, you may cancel before the deadline and reschedule. If you cancel after the deadline but before the course begins, you will owe the 25% cancellation fee. If you cancel after the course begins, however, you forfeit the course attendance. To reschedule a course, you must pay full price.