2015
Training Schedule

Vibration Institute

PRACTICAL APPLICATIONS.

EXPERT KNOWLEDGE.

REAL-WORLD SOLUTIONS.

Vibration Institute Training Courses provide unique opportunities to study vibration principles in a way that goes beyond the textbook and provides real-world applications. In addition to understanding theories and techniques our courses:

- provide procedures to add to your practical knowledge of machines;
- offer case studies to help analyze various types of equipment;
- include demonstrations and workshops that illustrate methods to solve vibration problems;
- have been developed using the body of knowledge compliant with ISO 18436-2 Vibration Condition Monitoring and Diagnostics; and
- follow ISO 18436-3 Requirements for Training Bodies and the Training Process which defines the requirements for bodies operating training programs in the non-intrusive machine condition monitoring, diagnostic and correction technologies.

WHICH COURSE IS BEST FOR YOU?

Vibration Analyst Category	ISO 18436-2 Required Experience for Exam Eligibility	Courses Recommended as Partial Preparation for Certification Exams* **						
		IMV	BMV	BRM	MVA	AVC	RDM	AVA
Category I	≥ 6 months	1						
Category II	≥ 18 months		2					
Category III	≥ 3 years			3	4			
Category IV	≥ 5 years					5	6	7
** A candidate is not required to take Vibration Institute courses to sit for a certification exam; however, we recommend taking equivalent 18436-3 compliant classes.*								
*** The numbers show the recommended order to take Vibration Institute courses.*								

The Vibration Institute Training Courses offer the highest standards of knowledge and competence among professionals in the vibration field today. All Institute courses are taught by Category IV Vibration Analysts who have extensive field and industry experience, and are the leading experts in the industry. Their goal is to help all attendees become better analysts and provide them with an edge in an increasingly competitive marketplace.

COURSE MATERIALS

Each registered attendee will receive course notes, PowerPoints, workbook, and training materials specific to their class. These materials are intended to stimulate and assist in the learning process, as well as provide a permanent reference of information in the practice of machinery vibration analysis, balancing, and alignment.

TRAINING EXAMINATIONS

In accordance with ISO 18436-3 the Vibration Institute offers a *training examination* on the course content on the final afternoon of the class. These examinations are designed to help assess your knowledge and understanding of the training and course materials.

Each participant is given a score and a performance evaluation study guide on the training examination immediately after it is administered, in addition to a class review of the training exam. This information is intended to serve as an indicator of your technical strengths and areas for improvement. Please note that completion of the training exam in no ways qualifies the candidate for the Vibration Analyst Certification Exam. This is meant solely as a review of the materials covered during the training course. A combination of education, training and experience are recommended for a student to sit for a Certification Exam.

CORPORATE COURSES

All of the courses listed in this brochure can be held at your company by one of our expert Vibration Institute instructors. The courses can be customized to meet your needs and interests, with course fees based on preparation and instruction time, course length, course materials, and associated travel expenses.

There is no limit to the number of individuals who can attend any corporate course. If you would like additional information on any Vibration Institute training course, please contact the Institute directly at (630) 654-2254 or **information@vi-institute.org**.

CONTINUING EDUCATION UNITS

The Vibration Institute awards Continuing Education Units (CEUs) to registrants at any Institute training course. One CEU represents ten hours of classroom time, but is not a mark of achievement.

Vibration Institute

INTRODUCTION TO MACHINERY VIBRATIONS (IMV)

The Introduction to Machinery Vibrations (IMV) course prepares attendees to perform a range of simple, single channel machinery vibration condition monitoring and diagnostic activities. It is recommended for individuals as an introduction to machinery vibrations and is partial preparation for the Vibration Analyst Category I Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Introduction to Machinery Vibrations* training course will receive the following:

- Course PowerPoint follow-along deck in color
- Class notes
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Calculator and a ruler
- Certificate of completion

The IMV training course will begin at 8:00 a.m. and conclude at 5:00 p.m. every day.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Vibration: Sources, Uses, Effects
Background, definitions, sources, effects, uses, predictive maintenance, measurement concepts, equipment.

Workshop I: Vibration Demonstrations and Workshop Questions

Introduction to Machinery Vibrations I
Physics; units; properties; measurement conventions; motions; amplitude; frequencies; time, frequency, and orbital domains.

Workshop II: Definitions, Terminology, Measurements, Demonstrations

Introduction to Machinery Vibrations II
Measures, conversions, analysis, excitation, natural frequencies, resonance, and critical speeds.

Workshop III: Measure Analysis, Natural Frequencies, and Demonstrations

Introduction to Data Collection
Physical observations, sensors, frequency spans, measures, triggering, sensor mounting and location, instruments.

Workshop IV: Data Collection Demonstration and Workbook Questions

Introduction to Machine Knowledge
Fault sources, frequencies, design and function of machines.

Introduction to Vibration Testing
Periodic and permanent monitoring, machine analysis (fault and condition), acceptance testing.

Workshop V: Vibration Testing

Introduction to Spectrum Analysis
Frequency identification and matching and procedures.

Workshop VI: Spectrum Analysis and Demonstrations

Introduction to Common Machine Faults
Mass unbalance, misalignment, looseness, bearing defects, and electrical defects.

Workshop VII: Fault Analysis

Introduction to Vibration Severity
Criteria, procedures, charts on housings, shafts, and bearings.

Workshop VIII: Vibration Severity

Course Review

Training Examination on Course Content (one hour)

Training Examination Review

To register for the *Introduction to Machinery Vibrations* (IMV) training course please complete the registration form in this brochure, visit **www.vi-institute.org,** or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

*For the most up-to-date information please visit **www.vi-institute.org** and click on Professional Development.*

BASIC MACHINERY VIBRATIONS (BMV)

The Basic Machinery Vibrations (BMV) course prepares attendees to perform basic vibration analysis on industrial machinery using single-channel measurements, with or without trigger signals, according to established and recognized procedures. It covers basics of sensors, database and data collector setup, data collection, signal processing, fault analysis, and basics of single plane balancing. It is partial preparation for the Vibration Analyst Category II Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Basic Machinery Vibrations* training course will receive the following:

- Course PowerPoint follow-along deck in color
- *Basic Machinery Vibrations* textbook
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Calculator and a ruler
- Certificate of completion

The BMV training course will begin at noon and conclude at 6:00 p.m. on Monday; then will begin at 8:00 am and conclude at 5:00 pm Tuesday through Friday. Subject to change.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Basic Machinery Vibrations I
Period, frequency, amplitude, phase, measures, and conversions.

Basic Machinery Vibrations II
Analysis, units, natural frequencies, forcing frequencies, resonance, critical speeds, and damping.

Workshop I: Machinery Vibrations
Period, frequency and amplitude.

Workshop II: Basic Vibrations

Basic Data Collector Setup I
Measure selection; frequency spans; time, frequency, and orbital displays.

Transducers
Proximity probes, accelerometers, optical pickups, selection, location and mounting.

Workshop III: Data Acquisition

Basic Data Collector Setup II
Data sampling, triggering, window selection, resolution, dynamic range, and averaging.

Basic Analysis Techniques
Orders, spectrum analysis – direct frequency, side bands.

Workshop IV: Data Processing

Analysis of Operating Speed Faults
Orders, mass unbalance, misalignment, looseness, distortion, rubs, resonance, bearing wear, and case histories.

Gear and Bearing Analysis
Measurement methods, frequencies, analysis techniques, and case histories.

Motors, Fans, and Pumps
Basics, frequencies, techniques, and analysis.

Workshop V: Fault Analysis

Evaluation of Machine Condition
Measures, procedures, severity charts, and alarm settings.

Workshop VI: Condition Evaluation

Machine Testing
Test plans, impact testing, and acceptance testing.

Periodic Monitoring
Screening, alarm setup, frequency of measurement, trending, and reports.

Balancing
Fundamental aspects of single-plane balancing.

Workshop VII: Machine Analysis

Course Review

Training Examination on Course Content (1.5 hours)

Training Examination Review

To register for the *Basic Machinery Vibrations* (BMV) training course please complete the registration form in this brochure, visit **www.vi-institute.org**, or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

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BALANCING of ROTATING MACHINERY (BRM)

The Balancing of Rotating Machinery (BRM) course covers single and two-plane balancing techniques for both rigid and flexible rotors. It includes both field balancing and shop (balancing machine) balancing. Topics such as pre-balance checks, influence coefficients, balance quality and tolerances, residual unbalance testing and case histories are included. It is partial preparation for the Vibration Analyst Category III and IV, and Balancing Specialist Certification Exams.

All registered attendees in the *Balancing of Rotating Machinery* training course will receive the following:

- Course PowerPoint follow-along deck in color
- Class notes
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Scientific calculator, ruler and balancing tools.
- Certificate of completion

The BRM training course will begin at 8:00 a.m. and conclude at 5:00 p.m. every day.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Basic Aspects of Machine Balancing
Purpose, mass unbalance force and causes, rotor classification, techniques, equipment, pre-balancing checks, critical speeds, trial weight selection/placement, and pitfalls.

Single-Plane Balancing Techniques
Vector and four-run methods, critical speeds, modes, heavy spot high-spot relationship, balance sensitivity, phase lag, trial weight selection, weight splitting, criteria and standards.

Workshop I: Balancing Topics
Class exercises on basic principles.

Workshop II: Single-Plane Balancing
Hands-on exercises using a rotor kit, vector method, single-plane balancing; registrants can bring an instrument or use the Institute's equipment.

Two-Plane Balancing Techniques
Influence coefficient and static/couple methods, calculator and graphical methods, one-shot balancing-single plane.

Workshop III: Two-Plane Balancing
Vector and four-run methods, critical speeds, modes, heavy spot high-spot relationship, balance sensitivity, phase lag, trial weight selection, weight splitting, criteria, and standards.

Workshop IV: Two-Plane Balancing
Static-couple method, class exercises.

Workshop V: Two-Plane Balancing
Class exercises.

Workshop VI: Two-Plane Balancing Coefficients
Class exercises.

Turbine/Generator Balancing
Procedures, static/couple method, influence coefficient method, plane/sensor selections, strategy for least runs.

Roll Balancing
Weight placement, critical speeds, bow effects.

Fan Balancing
Balancing techniques (single- and two-plane), overhung fans, balance sensitivity, critical speeds, case histories.

Shop Balancing Techniques
Balance machine procedures and calibration.

Balancing Case Histories
Balancing in the field, procedures, strategies, and pitfalls.

Course Review

Training Examination on Course Content (1.5 hours)

Training Examination Review

To register for the *Balancing of Rotating Machinery (BRM)* training course please complete the registration form in this brochure, visit **www.vi-institute.org**, or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

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MACHINERY VIBRATION ANALYSIS (MVA)

The Machinery Vibration Analysis (MVA) course provides more in-depth discussions of single channel time waveform, FFT, and phase analysis techniques for the evaluation of industrial machinery. It includes acceptance testing, machine severity assessment, use of demodulation and HFE techniques, basic rotor dynamics, basic ODS, and single plan balancing. This course is partial preparation for the Vibration Analyst Category III Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Machinery Vibration Analysis* training course will receive the following:

- Course PowerPoint follow-along deck in color
- Two-volume text, *Machinery Vibration Analysis: Diagnostics, Condition Evaluation, and Correction*
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Certificate of completion

The MVA training course will begin at noon and conclude at 6:00 p.m. on Monday; then will begin at 8:00 am and conclude at 5:00 pm Tuesday through Friday. Subject to change.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Machinery Vibration Review
Natural frequency, mode shape, resonance, critical speed, damping, instability sampling time, resolution, windows, and dynamic range.

Time and Frequency Analysis I
Display, use, and analysis of time domain, FFT analysis, modulation, clipping, pulsation, beats, side bands, spectrum shape, synchronous and nonsynchronous signals, and case histories.

Time and Frequency Analysis II

Phase and Orbit Analysis
Phase measurement and analysis, orbit evaluation, loop rules, orbit analysis, case histories.

Workshop I:
Machinery Vibration Analysis Techniques.

Resonance and Critical Speed Testing
Interference diagrams, analyzer setup for impact and transient tests, test procedures, Bodé/polar plot evaluation, case histories.

Machine Condition Evaluation
Criteria, levels, maintenance actions, standards, evaluation of overall band, spectral, orbital, and time waveform, setting alarms, and examples.

Basic Vibration Control
Isolation, damping, resonance elimination, concepts, hardware, foundations, and pedestals.

Field Balancing Techniques
Single-plane, trial weight size and location, balance sensitivity, and phase lag.

Workshop II: Balancing Exercises

Workshop III: Vibration Control and Correction

Condition Monitoring
Objectives, program development, permanent and periodic monitoring, and alternative techniques.

Rolling Element Bearing Analysis
Analytic techniques, identification of defects on balls/cages/races, corrosion, fatigue, excessive clearance, lack of lubrication, demodulation methods, condition evaluation.

Operating Speed Diagnostics
Unbalance, sub-synchronous instability, coupling problems, misalignment, oil whirl/whip, mechanical looseness, rubs, rotor bow, resonance, fluid-film bearings, and condition evaluation.

Pumps, Fans, Blowers, and Compressors
Pump impeller/casing/piping vibrations, natural frequencies, clearances, recirculation, cavitation, performance curves, impellers, casings, shafts, foundations, isolated bases, piping, ducting, structural/acoustic resonance.

Workshop IV: Machine Analysis

Motor and Generator Diagnostics
Mechanisms, vibration/current measurements, stator/rotor faults, shorted end rings, broken rotor bars, air-gap variation, and variable-speed motors.

Gears and Gearboxes
Measurement and analysis, gear mesh, cracked/broken/chipped teeth, gearbox evaluation.

Workshop V: Fault and Condition Exercises

MACHINERY VIBRATION ANALYSIS (MVA) continued...

Course Review

Training Examination on Course Content (2 hours)

Training Examination Review

To register for *Machinery Vibrations Analysis (MVA)* training course please complete the registration form in this brochure, visit **www.vi-institute.org,** or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

*For the most up-to-date information please visit **www.vi-institute.org** and click on Professional Development.*

ADVANCED VIBRATION CONTROL (AVC)

The Advanced Vibration Control (AVC) course is targeted at solving complex vibration problems involving transient and forced vibrations; resonance, isolation and damping; and field and shop balancing. It is partial preparation for the Vibration Analyst Category IV Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Advanced Vibration Control* training course will receive the following:

- Course PowerPoint follow-along deck in color
- Class notes
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Balancing Tools
- Certificate of completion

The AVC training course will begin at 8:00 a.m. and conclude at 5:00 p.m. every day.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Transient Free Vibrations
Damped and undamped free vibrations, impact testing, log decrement calculation, and natural frequency calculation.

Workshop I: Transient Vibrations

Forced Vibrations
Constant and unbalanced forced response, damping analysis, base motion response, critical speeds, modes, mass unbalance response, rotor bow, gyroscopic effects, torque effects, support and rotor stiffness asymmetry, cracked rotor, oil whirl/whip, hysteresis, and trapped fluid.

Workshop II: Forced Vibrations

Vibration Control Methods
Isolation, tuning, damping, isolator selection, dynamic absorber design, and case histories.

Workshop III: Vibration Control

ADVANCED VIBRATION CONTROL (AVC) continued...

Workshop IV: Journal Bearings

Static/Couple Flow Induced Vibration Balancing Techniques
Techniques, strategy, transient testing, static/couple methods, and balancing limits.

Workshop V

AVA and Rotor Dynamics and Balancing Review

Course Review

Training Examination on Course Content (2 hours)

Training Examination Review

To register for *Advanced Vibration Control (AVC)* training course please complete the registration form in this brochure, visit **www.vi-institute.org,** or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

*For the most up-to-date information please visit **www.vi-institute.org** and click on Professional Development.*

PRACTICAL ROTOR DYNAMICS AND MODELING (RDM)

The Practical Rotor Dynamics and Modeling (RDM) course teaches both practical diagnostic and theoretical modeling of rotating systems using journal and rolling element bearings. It is partial preparation for the Vibration Analyst Category IV Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Rotor Dynamics and Modeling* training course ***will need to bring a laptop to the course*** and will receive the following:

- Course PowerPoint follow-along deck in color
- Class notes
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Rotor Dynamics and Modeling program
- Training course examination study guide
- Certificate of completion

The RDM training course will begin at 8:00 a.m. and conclude at 5:00 p.m. every day.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Introduction to Rotor Dynamics
Rotor types, natural frequencies, modes, critical speeds, mass unbalance response, whirling, rotor bow, gyroscopic effects, torque, support stiffness asymmetry, rotor stiffness asymmetry, cracked rotor, instabilities, oil whirl/whip, aerodynamic cross coupling.

Transient and Forced Vibrations as Related to Rotor Dynamics

Workshop I: Rotor Dynamics

API RP 684 Review

Workshop II: Journal Bearings
Lubrication basics, bearing dynamics and design.

Rotor/Bearing Instabilities
Oil whirl/oil whip, aerodynamic cross-coupling, hysteresis, rubs and parametric instability.

Rotor/Bearing Modeling
Modeling techniques, discrete mass/stiffness models, distributed parameter models, rolling element and fluid-film bearing stiffness and damping, mass allocation, computer program interface, and examples.

PRACTICAL ROTOR DYNAMICS AND MODELING (RDM) continued...

Workshop III: Modeling Lab

Simple Engineering Calculations
Stiffness, mass, influence coefficients, natural frequency formulas, and examples.

Workshop IV: Natural Frequency and Unbalance Response

Computer Calculation Techniques
Application of models to computer programs, forces, and damping.

Workshop V: Modeling and Computation

Rotor-Dynamic Model Validation
Transient tests, two-channel tests, and applications.

Advanced Vibration Analysis and Advanced Vibration Control Review

Course Review

Training Examination on Course Content (2 hours)

Training Examination Review

To register for *Rotor Dynamics and Modeling (RDM)* training course please complete the registration form in this brochure, visit **www.vi-institute.org,** or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

*For the most up-to-date information please visit **www.vi-institute.org** and click on Professional Development..*

ADVANCED VIBRATION ANALYSIS (AVA)

The Advanced Vibration Analysis (AVA) course teaches a wide array of advanced vibration analysis techniques such as two-channel analysis, advanced signal processing, orbits, natural frequencies, modal analysis, isolation, and damping. It is partial preparation for the Vibration Analyst Category IV Certification Exam. The workshops and demonstrations scheduled throughout the training course are used to illustrate theory and applications.

All registered attendees in the *Advanced Vibration Analysis* training course will receive the following:

- Course PowerPoint follow-along deck in color
- Class notes on signal processing and dual-channel analysis
- Workbook containing examples, workshop problems and the Body of Knowledge found in ISO 18436-2 Annex A
- Training course examination study guide
- Certificate of completion

The AVA training course will begin at 8:00 a.m. and conclude at 5:00 p.m. every day.

It is recommended that attendees review the Body of Knowledge found in ISO 18436-2 Annex A, which can be found at www.vi-institute.org under Certification, prior to the training course.

Training Course Content Includes:

Signal Processing
RMS, coherent and non-coherent signals, peak detection, vector addition, filters, signal-to-signal noise ratio, and FFT calculations.

Signal/Noise Demonstration

Workshop I: Signal Processing

Introduction to the FFT
A/D converters, dynamic range, FFT batch process, buffer fill times, averaging, and overlap.

Workshop II: FFT Basics and Filters

FFT Topics
Aliasing, windows, resolution, and demonstrations.

Workshop III: Aliasing, Windows, and Resolution

FFT Accuracy
Side-lobe areas; accuracy of rectangular, Hanning, and flat-top windows, window resolution, order spectra, correction of amplitude and frequency from bin location.

Workshop IV: Window Function and Order Spectra

ADVANCED VIBRATION ANALYSIS (AVA) continued...

Beats and Modulation
Time domain of digitized signals, beats, AM and FM modulation, suppressed carrier signals and enveloping, case histories.

Workshop V: Beats and Modulation

Time Series Averaging
Frequency synthesizers, averaging one signal and noise, averaging two signals, effect of synchronous time averaging on bearing defects and modulation, digital filers and the FFT as a brick wall filter, case histories of synchronous time averaging.

Workshop VI: Time Series Averaging

Transient and Forced Harmonic Vibration

Dual-Channel Basics
Test methods, transfer functions, coherence, mass/spring model, real and imaginary displays, Nyquist and Bodé plots, basic mode shapes, and operating deflection shapes.

Full Spectrum

Introduction to the Hilbert Transform

Torsional Vibration

Workshop VII: Dual-Channel Analysis

Damping Measurement and Calculation
Half-power, real or imaginary plots, slope of phase shift, log decrement, dB decay of waterfall data, and demonstrations.

Workshop VIII: Damping Measurement

Modal Testing
Testing, analysis, natural frequencies, damping, and modes.

Structural Measurements
Vertical pumps, machine supports, floors, phase leads, turbine blades and fans, axial resonance on motors with sleeve bearings.

Workshop IX: Modal Testing

Course Review

Training Examination on Course Content (3 hours)

Training Examination Review

To register for *Advanced Vibration Analysis (AVA)* training course please complete the registration form in this brochure, visit **www.vi-institute.org,** or contact the Vibration Institute directly at (630) 654-2254. Upon receipt of your registration and payment you will receive a confirmation letter with additional information and details for your specific training course.

*For the most up-to-date information please visit **www.vi-institute.org** and click on Professional Development.*

CORRESPONDENCE COURSES

For those individuals who are not able to attend scheduled Vibration Institute Training Courses, or prefer the flexibility to study at their own pace, the Vibration Institute provides correspondence courses for the following topics:

- **Introduction to Machinery Vibrations**
- **Basic Machinery Vibrations**
- **Machinery Vibration Analysis**
- **Advanced Vibration Analysis**
- **Advanced Vibration Control**
- **Practical Rotor Dynamics and Modeling**

For each course, the participant is provided with class notes, workbook, and study guide. The class notes cover the principles, procedures, example problems, and case histories in machinery vibration analysis, rotor dynamics, and advanced vibration control.

The workbook contains practical industrial problems and exercises designed to provide the participant training in basic principles of the subject, as well as some experience in solving problems.

The study guide is divided into lessons that lead the participant through the material in an organized manner. Each lesson contains a reading assignment in the textbook that is followed by assigned problems in the workbook.

The participant is expected to return the workbook to the Institute at periodic intervals during the course of study for review and help with challenging problems. Contact the Institute at **information@vi-institute.org** or (630) 654-2254 for assistance and clarification of technical concepts.

Upon completion of a correspondence course the participant receives a Certificate of Completion including CEUs.

Correspondence courses also provide training points toward re-certification as a Vibration Analyst, and they satisfy necessary prerequisites for scheduled Vibration Institute training courses. For additional details please contact at the Institute (630) 654-2254 or **information@vi-institute.org**.

INSTRUCTORS

Vibration Institute instructors are integral in the development and application of vibration technology and have extensive experience as industry speakers and instructors. Our instructors draw on their extensive industrial experience for case histories and examples to illustrate measurement and computational techniques. All instructors are certified by the Vibration Institute as Category IV Vibration Analysts.

NELSON L. BAXTER is President of ABM Technical Services, Inc. and co-founder of Machinery Health Monitoring and Electro-mechanical Diagnostic Services. His 34 years of experience in the utilities industry include trouble-shooting rotating equipment, structural testing, and balancing. He is a contributing editor of Sound & Vibration Magazine, a Registered Professional Engineer, a Level IV Certified Vibration Analyst and Instructor for Level IV Class. Baxter holds an M.S. in Nuclear Engineering from Purdue University. He is a member of the Institute's Board of Directors and ASME .

WILLIAM BRANCA is Technical Director of Renewable Energy Systems. He was previously Director of Engineering for TECO-Westinghouse Motor Company. Branca has more than 20 years of experience in the vibration analysis of rotating equipment. He holds a B.S. in Mechanical Engineering from Clarkson University and an M.S. in Mechanical Engineering from the University of Buffalo. He is a registered professional engineer in the state of Texas and a member of ASME.

KEVIN R. GUY is a Senior Field Analyst for Delaware Analysis Services, Inc. and the former President of C. J. Analytical Engineering Inc., a company specializing in Predictive Maintenance and Vibration Analysis. His experience spans more than three decades. Mr. Guy holds a B.S. in Mechanical Engineering Technology from Purdue University and is a member of the Purdue MET Department Industrial Advisory Committee. He is a member of the American Society of Mechanical Engineers (ASME) and the Vibration Institute, where he teaches ISO Category I-IV certification classes and the balancing certification class. Guy has served on both the VI and MFPT Boards of Directors, and the Board of Editors of the Shock and Vibration Digest.

RAY KELM, P.E is owner and Chief Engineer of Kelm Engineering, LLC located in Friendswood, Texas. The company specializes in numerical modeling and field testing of dynamic systems including rotating and reciprocating machinery as well as piping systems and other equipment. He has 30+ years of experience in the oil & gas, power, manufacturing and petrochemical industries. He holds a B.S. in Mechanical Engineering from Texas A&M University and a M.S. in Mechanical and Aerospace Engineering from the University of Virginia. He is a registered professional engineer in the State of Texas.

JACK D. PETERS is the Vice President of International Sales for Connection Technology Center, Inc. (CTC), and his international responsibilities include Asia-Pacific, Canada, and India. He has more than 30 years of experience in measuring, monitoring, and analyzing vibration problems on process manufacturing machines for photographic films and papers. He currently provides international sales management, vibration engineering support, training for distribution partners, applications engineering, and technical support at CTC. He holds an AOS degree from Alfred Agricultural & Technical College in Automotive Technology and an AAS degree from Monroe Community College in Electrical Technology. Mr. Peters is an associate instructor for the Vibration Institute (U.S.A.) Vibration Analyst Category IV in accordance with ISO 18436-2. Certified Maintenance and Reliability Professional (CMRP) as recognized by the SMRP Certifying Organization a member of the Vibration Institute Board of Directors, and ASME.

ALLEN PLYMON is President of Plymon & Associates, LLC and former General Manager of a large Electro-Mechanical repair facility and Engineered Services Division. Mr. Plymon has over 20 years of experience in the field of predictive and corrective maintenance. Over these years, he has had many opportunities to present case histories and technical papers at various technical meetings including local Chapters of the Vibration Institute, Vibration Institute Technical Symposium, Emerson Global Users Exchange, and PdMA. He has been a member of the Vibration Institute since 1999 and served on the Certification Committee for 5 years.

BILL PRYOR is the Technical Director for PDM Solutions, Inc. He has over 35 years experience in the vibration analysis and rotating machinery field. Field experience includes machinery troubleshooting, balancing, alignment, structural analysis, transient testing, and commissioning of rotating equipment. In addition, he has assisted in the establishment of many PdM programs throughout industry. Before joining PDMS, Mr. Pryor was with PSEG Power from 1986 to 1999 as a Sr. Test Engineer and Bently Nevada Corporation from 1977 to 1986. He has an AAS in Product and Machine Design from the State University of New York at Alfred. He sits on the Board of Directors of the Vibration Institute. Before joining the Institutes Training department Bill was actively involved in the Vibration Institutes certification committee. He is certified Vibration Analyst Category IV.

DAVID B. SZROM is President & CEO of Mechanical Consultants, Inc., a technical service company providing machinery repair, reliability improvement designs, vibration analysis and balancing, optical and laser alignment and other state of the art technologies to heavy industrial clients. A graduate of Purdue University, he has over 30 years of experience in vibration-based technical support to a broad range of industries. He previously served as Maintenance Manager for one of the first high-speed, recycled newsprint mills in the country. Mr. Szrom has been training with the Institute for over 20 years, is a Category IV Analyst, a member of ASME , the Secretary-Treasurer of the Institute and a member of the Board of Directors.

2015 TRAINING COURSE SCHEDULE OVERVIEW

INTRODUCTION TO MACHINERY VIBRATION

February 17-20, 2015	DoubleTree by Hilton, Tempe, AZ
April 14-17, 2015	Emerson Process Mgmt Center, Knoxville, TN
June 16-19, 2015	Graves Mountain Lodge, Syria, VA
August 18-21, 2015	Vibration Institute Headquarters, Oak Brook, IL
October 13-16, 2015	Emerson Process Mgmt Center, Knoxville, TN

BASIC MACHINERY VIBRATION

March 23-27, 2015	Emerson Process Mgmt Center, Knoxville, TN
July 13-17, 2015	Crowne Plaza Downtown, Indianapolis, IN
September 21-25, 2015	The Hawthorne Hotel, Salem, MA
Nov. 30 – Dec. 4, 2015	Four Points Sheraton French Quarter, New Orleans, LA

BALANCING OF ROTATING MACHINERY

March 23-27, 2015	Emerson Process Mgmt Center, Knoxville, TN
October 12-16, 2015	Emerson Process Mgmt Center, Knoxville, TN

MACHINERY VIBRATION ANALYSIS

February 16-20, 2015	DoubleTree by Hilton, Tempe, AZ
April 13-17, 2015	Emerson Process Mgmt Center, Knoxville, TN
September 21-25, 2015	The Hawthorne Hotel, Salem, MA
Nov. 30 – Dec. 4, 2015	Four Points Sheraton French Quarter, New Orleans, LA

ADVANCED VIBRATION CONTROL

Dec. 1-4, 2015 Hilton Garden Inn Westbelt, Houston, TX

PRACTICAL ROTOR DYNAMICS AND MODELING

June 16-19, 2015 Graves Mountain Lodge, Syria, VA

ADVANCED VIBRATION ANALYSIS

May 12-15, 2015 Hilton Garden Inn Westbelt, Houston, TX

REGISTRATION

REGISTRATION

The registration fee covers the cost of all training course sessions, course materials, demonstrations, breakfasts, breaks and luncheons. Please register with the Institute in advance of your course by using the registration form in this brochure or the Institutes' website. Registrations received less than ten business (10) days before the scheduled first day of a training course will be charged an additional $100 registration fee. Participants will receive confirmation of registration and payment by e-mail. Make checks payable to the Vibration Institute. All amounts are payable in U.S. currency only.

CANCELLATION POLICY

Cancellation of a training course registration and transfer to another course within the same calendar year will be honored provided written notification is received by the Institute office via e-mail or mail no later than ten (10) business days before the first day of the scheduled training course. If cancelling a training course registration and not transferring to another course within the same calendar year a $100 cancellation fee will be assessed. A $350 administrative fee will be charged for cancellations and attendee no-shows received less than ten (10) days from the start date of the registered training course. Please contact the Vibration Institute staff directly regarding discounts for multiple registrations from the same organization.

HOTELS

Attendees are responsible for making their own hotel reservations (with the exception of courses held at Graves Mountain Lodge in Syria, Virginia – contact VI headquarters for reservations) . The Institute reserves blocks of rooms at the hotel(s) where all the courses are scheduled if applicable. Room blocks are available for attendees of Institute training courses until approximately one month before a course begins. If you need accommodations, please contact the hotel directly and inform them that you are attending a Vibration Institute-sponsored training course to receive the special room rate. All rates are single occupancy unless otherwise noted.

AIRLINE TRAVEL

The Vibration Institute is not responsible for the purchase of non-refundable airline tickets or the cancellation/charge fees associated with canceling a flight. Please confirm that the course will be held before purchasing an airline ticket. The Vibration Institute retains the right to cancel a course up until three weeks before the first day of any scheduled class.

February 16-20, 2015
Course: MVA

February 17-20, 2015
Course: IMV

DoubleTree by Hilton
2100 S. Priest Drive
Tempe, AZ 85282
(408) 967-1441
Rates: $149/night single/double

March 23-27, 2015
Courses: BMV, BRM

Emerson Process Mgmt Center
835 Innovation Drive
Knoxville, TN 37932

Country Inn & Suites
9137 Cross Park Drive
Knoxville, TN 37932
(865) 693-4500
Rates: $92/night single/double

April 13-17, 2015
Courses: MVA

April 14-17, 2015
Courses: IMV

Emerson Process Mgmt Center
835 Innovation Drive
Knoxville, TN 37932

Country Inn & Suites
9137 Cross Park Drive
Knoxville, TN 37932
(865) 693-4500
Rates: $92/night single/double

May 12-15, 2015
Course: AVA

Hilton Garden Inn Westbelt
6855 W Sam Houston Pkwy
Houston, TX 77072
(713) 270-6100
Rates: $129/night single/double

June 16-19, 2015
Courses: IMV, RDM

Graves Mountain Lodge
Route 670
Syria, VA 22743-999
Rates: Contact the Institute at 630-654-2254

*** Reservations MUST be made by contacting the Vibration Institute headquarters 630-654-2254.*

July 13-17, 2015
Course: BMV

Crowne Plaza Downtown
123 Louisiana Street
Indianapolis, IN
(317) 631-2221
Rates: $125/night single/double

August 18-21, 2015
Course: IMV

Vibration Institute HQ
2625 Butterfield Road
Suite 128N
Oak Brook, IL 60523

Holiday Inn Oak Brook
17 West 350 22nd Street
Oakbrook Terrace, IL 60181
877-410-6667
Rates: Contact VI headquarters for details.

September 21-25, 2015
Courses: BMV, MVA

The Hawthorne Hotel
On the Common
Salem, MA 01970
(978) 744-4080
Rates: $159/night

October 12-16, 2015
Courses: BRM

October 13-16, 2015
Courses: IMV

Emerson Process Mgmt Center
835 Innovation Drive
Knoxville, TN 37932

Country Inn & Suites
9137 Cross Park Drive
Knoxville, TN 37932
(865) 693-4500
Rates: $92/night single/double

Nov. 30 - Dec. 4, 2015
Courses: BMV, MVA

Four Points Sheraton
541 Bourbon Street
New Orleans, LA 70130
(504) 524-7611
Rates: $139/night single/double

Dec. 1-4, 2015
Course: AVC

Hilton Garden Inn Westbelt
6855 W Sam Houston Pkwy
Houston, TX 77072
(713) 270-6100
Rates: $129/night single/double

2015 Vibration Institute
Training Course Registration

Name: _____

Title/Position: _____

Company: _____

Address: _____

City/State/Zip: _____

Phone: _____ **Fax:** _____

Email: _____

VI Member? ☐ Yes ☐ No (If yes, VI membership number: _____)

2015 Vibration Institute Training Course(s) you are registering for
(Check all that apply):

Introduction to Machinery Vibration (IMV) - Registration Fee: $1,525 USD

□ February 17-20, Tempe, AZ
□ August 18-21, Oak Brook, IL
□ April 14-17, Knoxville , TN
□ October 13-16, Knoxville, TN
□ June 16-19, Syria, VA

Basic Machinery Vibration (BMV) - Registration Fee: $1,675 USD

□ March 23-27, Knoxville, TN
□ September 21-25, Salem, MA
□ July 13-17, Indianapolis, IN
□ Nov. 30—Dec. 4, New Orleans, LA

Balancing of Rotating Machinery (BRM) - Registration Fee: $1,725 USD

□ March 23-27, Knoxville, TN
□ October 12-16, Knoxville, TN

Machinery Vibration Analysis (MVA) - Registration Fee: $1,875 USD

□ February 16-20, Tempe, AZ
□ September 21-25, Salem, MA
□ April 13-17, Knoxville , TN
□ Nov. 30—Dec. 4, New Orleans, LA

Advanced Vibration Analysis (AVA) - Registration Fee: $2,185 USD

□ May 12-15, Houston, TX

Advanced Vibration Control (AVC) - Registration Fee: $2,185 USD

□ Dec. 1-4, New Orleans, LA

Practical Rotor Dynamics and Modeling (RDM) - Registration Fee: $2,185 USD

□ June 16-19, Syria, VA

Optional –Certification Examination—Please check applicable exam category and fee below:

□ Vibration Analyst Category I—$275

□ Vibration Analyst Category II—$300

□ Vibration Analyst Category III—$350

□ Vibration Analyst Category IV—$450

□ Balancing Certification Category I—$275

Method of Payment (All fees payable in US Currency only) **TOTAL:** _____

□ Check Enclosed □ Purchase Order # _____

□ Credit Card:

□ AMEX □ Discover □ MasterCard □ Visa

Credit Card #: _____

Expiration Date: _____ Name on Card: _____

Signature: _____

Provide billing information, regardless of method of payment:

Company (if applicable): _____ Name:_____

Billing Address: _____

Billing City/State/Zip: _____

Billing Country: _____

Email address for Payment Receipt/Invoice: _____

Please provide the Institute with any dietary restrictions in advance of your course:

_____

_____

Payment must be received prior to arriving at your chosen course.
The Vibration Institute does not accept Purchase Orders as confirmation of payment.

Mail or Fax this form to the Institute at:
Vibration Institute
2625 Butterfield Road, Suite 128N
Oak Brook, IL 60523

Phone: 630-654-2254
Fax: 630-654-2271
Email: information@vi-institute.org
Online registration available at:
www.vi-institute.org

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Oak Brook, IL 60523
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Fax: 630-254-2271
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2015
Training Schedule

Tempe, AZ
Oak Brook, IL
Indianapolis, IN
New Orleans, LA
Salem, MA
Knoxville, TN
Houston, TX
Syria, VA