



2012

TRAINING SCHEDULE

Introduction to Machinery Vibrations

Basic Machinery Vibrations

Machinery Vibration Analysis

Balancing of Rotating Machinery

Advanced Vibration Analysis

Advanced Vibration Control

Rotor Dynamics

2012

TRAINING SCHEDULE

Practical Applications. Expert Knowledge. Real-World Solutions.

Though training courses have been shown to be helpful in an individuals' professional development, their value extends far beyond the classroom itself.

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, the Training 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

Taught by leading experts and instructors in the field, these courses ultimately help professionals become better analysts and provide an edge in an increasingly competitive marketplace. The Vibration Institute Training Program is a focal point for acknowledging the highest standards of knowledge and competence among professionals in the vibration field.

EXPERIENCE	COURSE
<2 years	<p>Introduction to Machinery Vibrations (IMV) This course prepares attendees to perform a range of simple channel machinery vibration condition monitoring and diagnostic activities and is partial preparation for the Vibration Analyst Category I Certification Exam.</p>
2+ years	<p>Basic Machinery Vibrations (BMV) This course prepares attendees to perform basic vibration analysis using single-channel instruments according to established procedures, set-up of instruments, and maintain a database of results and is partial preparation for the Vibration Analyst Category II Certification Exam.</p> <p>Balancing of Rotating Machinery (BRM) Explores the art and science of balancing and prepare the student for field balancing; recommended after the BMV training course.</p>
3+ years	<p>Machinery Vibration Analysis (MVA) For those who routinely use a data collector and conduct Vibration Analysis. It is partial preparation for the Vibration Analyst Category III Certification Exam.</p>
5+ years	<p>Advanced Vibration Analysis (AVA) For those who want to learn additional analytical techniques with dual-channel, FFT and computer analysis. Partially prepares for the Vibration Analyst Category IV Certification Exam.</p> <p>Advanced Vibration Control (AVC) This course prepares for solving difficult vibration problems including isolation, damping and balancing techniques. Partially prepares for the Vibration Analyst Category IV Certification Exam.</p> <p>Rotor Dynamics (RD) With a focus on modeling, calculation measurement and correction, this course also serves as partial preparation for the Vibration Analyst Category IV Certification Exam.</p>

2012

TRAINING SCHEDULE

COURSE MATERIALS

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

TRAINING EXAMINATIONS

In accordance with ISO 18436:3 the Vibration Institute offers training examinations on course content on the final afternoon of the class. These examinations are designed to help you assess your knowledge and understanding of the course materials and training and serve as partial preparation for the certification examinations for Vibration Analyst Category I - IV.

Each participant is given a score and a performance evaluation on the training examination immediately after it is administered on Friday afternoon. This information is intended to serve as an indicator of your technical strengths and weaknesses.

ON-SITE COURSES

All of the courses in this brochure can be conducted at your organization by one of our Vibration Institute instructors. The course can be customized to your needs and interests with course fees based on preparation and instruction time, course materials, number of lectures, and travel expenses.

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

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 and is not a mark of achievement.

INTRODUCTION to MACHINERY VIBRATIONS (IMV)

All registered attendees in the Introduction to Machinery Vibrations training course will receive class notes and a workbook containing examples and workshop problems, calculator and a ruler. Workshops are scheduled to illustrate theory and applications. This course provides preparation for plant data collection and limited analysis as well as partial preparation for the certification examination for the Vibration Analyst Category I.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>Vibration: Sources, Uses, Effects Background, definitions, sources, effects, uses, predictive maintenance, measurement concepts, equipment.</p> <p>Workshop I: Vibration Demonstration and Workshop Questions</p> <p>Basic Machinery Vibrations I Physics; units; properties; measurement conventions; motions; amplitude; frequencies; time, frequency, and orbital domains.</p> <p>Workshop II: Definitions, Terminology, Measurements, Demonstrations</p>
DAY TWO	<p>Basic Machinery Vibrations II Measures, conversions, analysis, excitation, natural frequencies, resonance, and critical speeds.</p> <p>Workshop III: Measure Analysis, Natural Frequencies, and Demonstrations</p> <p>Data Collection Physical observations, sensors, frequency spans, measures, triggering, sensor mounting and location, instruments.</p> <p>Workshop IV: Data Collection Demonstration and Workbook Questions.</p>
DAY THREE	<p>Machine Knowledge Fault sources, frequencies, design and function of machines.</p> <p>Vibration Testing Periodic and permanent monitoring, machine analysis (fault and condition), acceptance testing.</p>

INTRODUCTION to MACHINERY VIBRATIONS (IMV) CON'T. ...

DAY THREE	Workshop V: Vibration Testing Basic Spectrum Analysis Frequency identification and matching and procedures. Workshop VI: Spectrum Analysis and Demonstrations
DAY FOUR	Common Machine Faults Mass unbalance, misalignment, looseness, bearing defects, and electrical defects. Workshop VII: Fault Analysis Vibration Severity Criteria, procedures, charts on housings, shafts, and bearings. Workshop VIII: Vibration Severity Course Review Training Examination on Course Content (One hour)

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

BASIC MACHINERY VIBRATIONS (BMV)

All registered attendees in the Basic Machinery Vibrations training course will receive the textbook, Basic Machinery Vibrations, a workbook containing examples and workshop problems, ruler and calculator. Workshops are scheduled to illustrate theory and applications. This course provides preparation for plant data collection and vibration analysis as well as partial preparation for the certification examination for the Vibration Analyst Category II.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>Machinery Vibrations I Period, frequency, amplitude, phase, measures, and conversions.</p> <p>Machinery Vibrations II Analysis, units, natural frequencies, forcing frequencies, resonance, critical speeds, and damping.</p> <p>Workshop I: Machinery Vibrations Period, frequency and amplitude.</p> <p>Workshop II: Basic Vibrations</p>
DAY TWO	<p>Data Collector Setup I Measure selection; frequency spans; time, frequency, and orbital displays.</p> <p>Transducers Proximity probes, accelerometers, optical pickups, selection, location and mounting.</p> <p>Workshop III: Data Acquisition</p> <p>Data Collector Setup II Data sampling, triggering, window selection, resolution, dynamic range, and averaging.</p> <p>Basic Analysis Techniques Orders, spectrum analysis – direct frequency, side bands.</p> <p>Workshop IV: Data Processing</p>

BASIC MACHINERY VIBRATIONS (BMV) CON'T. ...

DAY THREE	<p>Analysis of Operating Speed Faults Orders, mass unbalance, misalignment, looseness, distortion, rubs, resonance, bearing wear, and case histories.</p> <p>Gear and Bearing Analysis Measurement methods, frequencies, analysis techniques, and case histories.</p> <p>Motors, Fans, and Pumps Basics, frequencies, techniques, and analysis.</p> <p>Workshop V: Fault Analysis</p> <p>Evaluation of Machine Condition Measures, procedures, severity charts, and alarm settings.</p> <p>Workshop VI: Condition Evaluation</p>
DAY FOUR	<p>Machine Testing Test plans, impact testing, and acceptance testing.</p> <p>Periodic Monitoring Screening, alarm setup, frequency of measurement, trending, and reports.</p> <p>Balancing of Rotating Machinery Fundamental aspects of single-plane balancing.</p> <p>Workshop VII: Machine Analysis</p> <p>Training Examination on Course Content (1.5 hours)</p>

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

BALANCING of ROTATING MACHINERY (BRM)

All registered attendees in the Balancing of Rotating Machinery training course are provided class notes, a workbook containing problems and exercises, a scientific calculator, and balancing tools. Workshops are scheduled to illustrate theory and applications. Registrants are welcome to bring their equipment for the hands-on balancing exercises.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>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.</p> <p>Vibration Testing and Analysis Amplitude and phase measurements, orbits, Bodé plots, polar plots, casing and proximity probe measurements, whirling, transient testing, and vibration analysis.</p> <p>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.</p> <p>Workshop I: Balancing Topics Class exercises on basic principles.</p>
DAY TWO	<p>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.</p> <p>Two-Plane Balancing Techniques Influence coefficient and static/couple methods, calculator and graphical methods, one-shot balancing-single plane.</p> <p>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.</p> <p>Workshop IV: Two-Plane Balancing Static-couple method, class exercises.</p>

BALANCING of ROTATING MACHINERY (BRM) Con't ...

DAY THREE	<p>Workshop V: Two-Plane Balancing Class exercises.</p> <p>Workshop VI: Two-Plane Balancing Coefficients Class exercises.</p> <p>Turbine/Generator Balancing Procedures, static/couple method, influence coefficient method, plane/sensor selections, strategy for least runs.</p> <p>Roll Balancing Weight placement, critical speeds, bow effects.</p>
DAY FOUR	<p>Fan Balancing Balancing techniques (single- and two-plane), overhung fans, balance sensitivity, critical speeds, case histories.</p> <p>Shop Balancing Techniques Sensor selection, plane selection, and procedures.</p> <p>Balancing Case Histories Balancing in the field, procedures, strategies, and pitfalls.</p> <p>Training Examination on Course Content (1.5 hours)</p>

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

MACHINERY VIBRATION ANALYSIS (MVA)

All registered attendees in the Machinery Vibration Analysis training course are provided the two-volume text, Machinery Vibration Analysis: Diagnostics, Condition Evaluation, and Correction, a workbook containing problems and exercises and a ruler. Workshops are scheduled to illustrate theory and applications. This course provides preparation for routine vibration analysis and condition evaluation as well as partial preparation for the certification examination for Vibration Analyst Category III.

It is strongly recommended that individuals review the BMV text Basic Machinery Vibrations before attending the MVA course.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>Machinery Vibration Review Natural frequency, mode shape, resonance, critical speed, damping, instability sampling time, resolution, windows, and dynamic range.</p> <p>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.</p> <p>Time and Frequency Analysis II</p> <p>Phase and Orbit Analysis Phase measurement and analysis, orbit evaluation, loop rules, orbit analysis, case histories.</p> <p>Workshop I: Machinery Vibration Analysis Techniques</p>
DAY TWO	<p>Resonance and Critical Speed Testing Interference diagrams, analyzer setup for impact and transient tests, test procedures, Bodé/polar plot evaluation, case histories.</p> <p>Machine Condition Evaluation Criteria, levels, maintenance actions, standards, evaluation of overall band, spectral, orbital, and time waveform,; setting alarms, and examples.</p> <p>Basic Vibration Control Isolation, damping, resonance elimination, concepts, hardware, foundations, and pedestals.</p> <p>Field Balancing Techniques Single-plane, trial weight size and location, balance sensitivity, and phase lag.</p>

MACHINERY VIBRATION ANALYSIS (MVA) CON'T. ...

DAY TWO	Workshop II: Balancing Exercises Workshop III: Vibration Control and Correction
DAY THREE	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, re-circulation cavitation, performance curves, impellers, casings, shafts, foundations, isolated bases, piping, ducting, structural/acoustic resonance.
DAY FOUR	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 Training Examination on Course Content (2 hours)

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

ADVANCED VIBRATION ANALYSIS (AVA)

Signal Processing, Dual-Channel, FFT, and Vibration Control

All registered attendees in the Advanced Vibration Analysis training course are provided class notes on signal processing, dual-channel analysis, and vibration control. A workbook containing problems and exercises for use during the class is also included. Workshops are scheduled to illustrate theory and applications.

This course provides preparation for solving difficult vibration problems. It is recommended that attendees participate in either the Advanced Vibration Control (AVC) and/or the Rotor Dynamics and Balancing (RBD) in addition to this course as partial preparation for the certification examination for Vibration Analyst Category IV.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>Signal Processing RMS, coherent and non-coherent signals, peak detection, vector addition, filters, signal-to-signal noise ratio, and FFT calculations.</p> <p>Signal/Noise Demonstration</p> <p>Workshop I: Signal Processing</p> <p>Introduction to the FFT A/D converters, dynamic range, FFT batch process, buffer fill times, averaging and overlap.</p> <p>Workshop II: FFT Basics and Filters</p> <p>FFT Topics Aliasing, windows, resolution, and demonstrations.</p> <p>Workshop III: Aliasing, Windows, and Resolution</p>
DAY TWO	<p>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.</p> <p>Workshop IV: Window Function and Order Spectra</p> <p>FFT Response Time domain of digitized signals, beats, AM and FM modulation, suppressed carrier signals and enveloping, Hilbert transform, case histories.</p>

ADVANCED VIBRATION ANALYSIS (AVA) CON'T. ...

DAY TWO	<p>Workshop V: FFT Response to Mechanically Generated Signals</p> <p>Torsional Vibration Analysis Description, natural frequencies, measurement, response</p> <p>Time Series Averaging Frequency synthesizers, averaging one signal and noise, averaging two signals, effect of synchronous time averaging on bearing defects and modulation, digital filters and the FFT as a brick wall filter, case histories of synchronous time averaging.</p> <p>Workshop VI: Time Series Averaging</p>
DAY THREE	<p>Damping Measurement and Calculation Half-power, real or imaginary plots, slope of phase shift, log decrement, dB decay of waterfall data, and demonstrations.</p> <p>Workshop VII: Damping Measurement</p> <p>Dual-Channel Basics Test methods, transfer functions, coherence, mass/spring model, real and imaginary displays, Nyquist and Bode plots, basic mode shapes, and operating deflection shapes.</p> <p>Workshop VIII: Dual-Channel Analysis</p>
DAY FOUR	<p>Modal Testing Testing, analysis, natural frequencies, damping, and modes.</p> <p>Workshop IX: Modal Testing</p> <p>Structural Case Histories Vertical pumps, machine supports, floors, phase leads, turbine blades and fans, axial resonance on motors with sleeve bearings.</p> <p>Training Examination on Course Content (2 hours)</p>

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

ADVANCED VIBRATION CONTROL (AVC)

Isolation, Damping, and Balancing Techniques

Participants in the Advanced Vibration Control training course are provided class notes, a workbook containing problems and exercises, and balancing tools. Workshops are scheduled to illustrate theory and applications.

This course provides preparation for solving difficult vibration problems. It is recommended that attendees participate this course or Rotor Dynamics and Balancing (RBD) in addition to Advanced Vibration Analysis (AVA) as partial preparation for the certification examination for Vibration Analyst Category IV.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>Transient Vibrations Damped and undamped free vibrations, impact testing, log decrement calculation, and natural frequency calculation.</p> <p>Workshop I: Transient Vibrations</p> <p>Forced Vibrations Constant and unbalanced forced response, damping analysis, base motion response, critical speeds, modes, and mass unbalance.</p> <p>Workshop II: Forced Vibrations</p>
DAY TWO	<p>Vibration Control Methods Force removal, isolation, tuning, and damping.</p> <p>Field and Shop Balancing Techniques Techniques, strategy, transient testing, lag angle calculation, influence coefficient and static/couple methods, shop balancing, and balancing limits.</p> <p>Workshop III: Balancing Exercises Participants are welcome to bring their data collectors or use equipment provided by the Institute.</p>

ADVANCED VIBRATION CONTROL (AVC) CON'T. ...

DAY THREE	<p>Dealing with Resonance Amplifications, tuning, stiffening, weight addition, dynamic absorbers.</p> <p>Workshop IV: Resonance</p> <p>Isolation Transmissibility, base motion, isolator selection, multimode isolation.</p> <p>Workshop V: Isolation</p>
DAY FOUR	<p>Damping Viscous, friction, hysteretic damping, structural damping, linear dampers, fluid film bearing damping.</p> <p>Workshop VI: Damping</p> <p>Review</p> <p>Training Examination on Course Content (2 hours)</p>

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

Participants in the Rotor Dynamics training course are provided class notes, a workbook containing problems and exercises, and ShaftVibA computer program (participants will receive a copy of the software for their own use following the training). Workshops are scheduled to illustrate theory and applications.

This course provides preparation for solving vibration problems. It is recommended that attendee's participate in this course, or Advance Vibration Control (AVC) in addition to Advanced Vibration Analysis (AVA) as partial preparation for the certification examination for Vibration Analyst Category IV.

DAY ONE	<p>Registration/Continental Breakfast</p> <p>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, and trapped fluid.</p> <p>Workshop I: Rotor Dynamics</p> <p>Understanding Journal Bearings Lubrication basics, bearing dynamics and design.</p> <p>Workshop II: Journal Bearings</p> <p>Rotor/Bearing Instabilities Oil whirl/oil whip, aerodynamic cross-coupling, hysteresis, rubs and parametric instability.</p> <p>Workshop III: Instabilities</p>
DAY TWO	<p>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.</p> <p>Workshop IV: Modeling Lab</p> <p>Simple Engineering Calculations Stiffness, mass, influence coefficients, natural frequency formulas, and examples.</p> <p>Workshop V: Natural Frequency and Vibration Response</p>

ROTOR DYNAMICS (RD) CON'T. ...

DAY THREE	Computer Calculation Techniques Application of models to ShaftVibA computer program, forces, and damping (bring you own drawing or use class supplied examples). Workshop VI: Modeling and Computation Modeling Industrial Machines Fans, pumps, motors, turbines and rolls.
DAY FOUR	Rotor-Dynamic Model Validation Transient tests, two-channel tests, and applications. Case Histories Training Examination – (2 hours) Rotor Dynamics and Balancing Review of Training Examination

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

CORRESPONDENCE COURSES

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

- Introduction to Machinery Vibrations (IMV)
- Basic Machinery Vibrations (BMV)
- Machinery Vibration Analysis (MVA)
- Rotor Dynamics (RD)
- Advanced Vibration Control (AVC)
- Advanced Vibration Analysis (AVA)

For each course, the participant is provided 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 balancing, 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 for review and help with challenging problems. The participant may contact the Institute by e-mail or phone 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 Vibration Analyst. In addition, they satisfy necessary prerequisites for scheduled Vibration Institute training courses. For additional details please contact at the Institute (630) 654-2254 or e-mail at vibinst@att.net.

SPEAKERS

Speakers for Vibration Institute training courses have played an important role in the development and application of vibration technology and have extensive experience as speakers and instructors. Our speakers draw on their extensive industrial experience for case histories and examples to illustrate measurement and computational techniques.



NELSON L. BAXTER is President of ABM Technical Services, Inc. and co-founder of Machinery Health Monitoring and Electro-mechanical Diagnostic Services. His 25 years of experience in the utilities industry include trouble-shooting rotating equipment, structural testing, and balancing. Baxter holds an M.S. in Nuclear Engineering from Purdue University and is a Category IV Vibration Analyst. He is a member of the Institute's Board of Directors and ASME.



WILLIAM BRANCA is Technical Director of Renewable Energy Systems and is a Category IV Vibration Analyst. 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 Senior Field Analyst for Delaware Analysis Services, Inc. and former President of C.J. Analytical Engineering, Inc., a company specializing in predictive maintenance and vibration analysis. He has more than 35 years of experience in vibration analysis and holds a B.S. degree in Mechanical Engineering Technology from Purdue University. Mr. Guy is a Category IV Vibration Analyst, member of the Vibration Institute Board of Directors and is the Training Committee Chair, and a member of ASME.



RAY KELM is owner of Kelm Engineering in Danbury, Texas and is a Category IV Vibration Analyst. The company specializes in numerical modeling and field testing of dynamic systems including rotating, reciprocating, and static machines. He has 25 years of experience in the petrochemical industry and consulting. Kelm holds a B.S. in Mechanical Engineering from Texas A&M University and an M.S. in Mechanical and Aerospace Engineering from the University of Virginia. He is a registered Professional Engineer in the State of Texas and a member of the Institute's Board of Directors.



MALCOLM E. LEADER is owner of Applied Machinery Dynamics and is a Category IV Vibration Analyst. He has more than 30 years of experience in modal testing, vibration control, and analyzing problems in rotating equipment. Leader holds an M.S. in Mechanical Engineering from the University of Virginia. He was a Senior Engineer in the Central Engineering Division at Monsanto. Leader is a Registered Professional Engineer in the State of Texas and a member of ASME and the Institute's Board of Directors.



JACK D. PETERS is a Regional Manager for Connection Technology Center, Inc. (CTC). His responsibilities include Asia, Pacific Rim, Canada, and South Africa. Peters has more than 25 years of experience in analyzing vibration problems, including those of process manufacturing machines for photographic films and papers. He holds an AOS degree from Alfred Agricultural & Technical College, an AAS degree from Monroe Community College and is a Category IV Vibration Analyst.



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.

2012 TRAINING COURSE SCHEDULE OVERVIEW

INTRODUCTION to MACHINERY VIBRATIONS (IMV)

March 20-23, 2012:	Hyatt Regency Indianapolis, Indianapolis, IN
June 19-22, 2012:	The Woodlands Hotel & Suites, Williamsburg, VA
September 11-14, 2012:	The Hawthorne Hotel, Salem, MA
November 6-9, 2012:	Marriott by Courtyard-Historic District, Charleston, SC

BASIC MACHINERY VIBRATIONS (BMV)

February 21-24, 2012:	Fiesta Resort and Conference Center, Tempe, AZ
April 10-13, 2012:	Graves Mountain Lodge, Syria, VA
May 15-18, 2012:	Hilton Garden Inn – Westbelt, Houston, TX
July 24-27, 2012:	Chicago Marriott Southwest, Burr Ridge, IL
October 1-4, 2012:	Emerson Management Center, Knoxville, TN
December 4-7, 2012:	Holiday Inn-Fisherman's Wharf, San Francisco, CA

BALANCING of ROTATING MACHINERY (BRM)

December 4-7, 2012:	Holiday Inn-Fisherman's Wharf, San Francisco, CA
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MACHINERY VIBRATION ANALYSIS (MVA)

February 21-24, 2012:	Fiesta Resort & Conference Center, Tempe, AZ
May 15-18, 2012:	Hilton Garden Inn – Westbelt, Houston, TX
October 1-4, 2012:	Emerson Management Center, Knoxville, TN
November 6-9, 2012:	Marriott by Courtyard-Historic District, Charleston, SC

ADVANCED VIBRATION ANALYSIS (AVA)

April 10-13, 2012:	Graves Mountain Lodge, Syria, VA
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ADVANCED VIBRATION CONTROL (AVC)

July 24-27, 2012:	Chicago Marriott S.W., Burr Ridge, IL,
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ROTOR DYNAMICS (RD)

September 11-14, 2012:	The Hawthorne Hotel, Salem, MA
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REGISTRATION

The registration fee covers the cost of all sessions, demonstrations, luncheons, breaks, and course notes and materials. Please register with the Institute in advance of your course by using the registration form in this brochure or the Institute's Web site. Participants will receive confirmation of registration by e-mail. Make checks payable to the Vibration Institute – U.S. dollars only.

Cancellation of a course registration will be honored, less a \$75 administrative fee, provided written notification is received by the Institute office via mail or e-mail no later than ten (10) calendar days before the first day of each training course. A \$200 administrative fee will be charged for cancellations received after that date. Please contact the Vibration Institute staff directly regarding discounts for multiple registrations from the same organization.

2012 TRAINING COURSE REGISTRATION FORM



Name: _____

Title/Position: _____

Company: _____

Address: _____

City/State/Zip: _____

Phone: _____

Fax: _____

E-mail: _____

2012 Vibration Institute Training Course(s) you are registering for (check all that apply):

INTRODUCTION to MACHINERY VIBRATIONS (IMV) – Registration Fee \$1,025

- Indianapolis, IN, March 20-23 Salem, MA, September 11-14
 Williamsburg, VA, June 19-22 Charleston, SC, November 6-9

BASIC MACHINERY VIBRATIONS (BMV) – Registration Fee \$ 1,200

- Tempe, AZ, February 21-24 Burr Ridge, IL, July 24-27
 Syria, VA, April 10-13 Knoxville, TN, October 1-4
 Houston, TX, May 15-18 San Francisco, CA, December 4-7

BALANCING of ROTATING MACHINERY (BRM) – Registration Fee \$1,400

- San Francisco, CA, December 4-7

MACHINERY VIBRATION ANALYSIS (MVA) – Registration Fee \$1,400

- Tempe, AZ, February 21-24 Knoxville, TN, October 1-4
 Houston, TX, May 15-18 Charleston, SC, November 6-9

ADVANCED VIBRATION ANALYSIS (AVA) – Registration Fee \$1,500

- Syria, VA, April 10-13

ADVANCED VIBRATION CONTROL (AVC) – Registration Fee \$1,500

- Burr Ridge, IL, July 24-27

ROTOR DYNAMICS (RD) – Registration Fee \$1,500

- Salem, MA, September 11-14

CERTIFICATION EXAMINATION – OPTIONAL

Please check exam fee and exam category

- \$250 Certification Examination Fee Vibration Analyst Category I
 Vibration Analyst Category II Vibration Analyst Category III
 Vibration Analyst Category IV Balancing Certification Exam – Category I

If applicable, please check certification fee (U.S. or International):

- \$75 Certification Fee - U.S. \$120 Certification Fee - International

METHOD of PAYMENT (all fees U.S. Currency only)

- Check enclosed Credit card: telephone or Website Only
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Vibration Institute

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