

COURSE OVERVIEW RE0801
ISO Intermediate Vibration Analyst Level II (CAT II-ISO 18436)
Training, Exam & Certification (Mobius Institute)

Course Title

ISO Intermediate Vibration Analyst Level II (CAT II-ISO 18436) Training, Exam & Certification (Mobius Institute)

Course Date/Venue

December 15-19, 2024/Tamra Meeting Room, Al Bandar by Rotana, Creek Dubai, Dubai, UAE

Course Reference

RE0801

Course Duration/Credits

Five days/3.8 CEUs/38 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the art simulators.



This course is designed to provide participants with a detailed and up-to-date overview of vibration analysis in accordance with ISO 18436 standards. It covers the maintenance practices and condition monitoring technologies; the principles of vibration covering complete review of basics, waveform, spectrum (FFT), phase, orbits, modulation, beating and sum/differences signals; the data acquisition, transducer types, transducer selection, transducer mounting and natural frequency; and the transducer mounting, natural frequency, measurement point selection, following route and test planning.



Further, the course will also discuss the common measurement errors; the signal processing, filters, sampling, aliasing, dynamic range, resolution, Fmax and data collection time; the linear, overlap, peak hold, time synchronous, windowing and leakage averaging; windowing and leakage; the vibration analysis, spectrum analysis, time waveform analysis, orbit analysis, phase analysis and enveloping (demodulation); and the fault analysis for natural frequencies, resonances, imbalance, eccentricity, bent shaft, misalignment and cocked bearing.

During this interactive course, participants will learn the soft foot and mechanical looseness; the rolling element bearing analysis including analysis of induction motors, gears, belt driven machines, pumps, compressors and fans; the equipment testing and diagnostics covering impact testing (bump tests) and phase analysis; the corrective action, general maintenance repair activities and review of balancing process and shaft alignment procedures; running a successful condition monitoring program by setting baselines, alarms, setting goals, expectations, report generation and reporting success stories; and the acceptance testing and ISO standards.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Get prepared for the next Vibration Analyst exam and have enough knowledge and skills to pass such exam in order to get certified as a *Vibration Analyst: Category II* in accordance with ISO 18436 standards from Mobius Institute
- Review maintenance practices and condition monitoring technologies
- Identify the principles of vibration covering complete review of basics, waveform, spectrum (FFT), phase, orbits, modulation, beating and sum/differences signals
- Carryout data acquisition and identify transducer types, transducer selection, transducer mounting and natural frequency
- Apply transducer mounting, natural frequency, measurement point selection, following route and test planning
- Identify the common measurement errors and illustrate signal processing, filters, sampling, aliasing, dynamic range, resolution, Fmax and data collection time
- Recognize linear, overlap, peak hold, time synchronous, windowing and leakage averaging as well as windowing and leakage
- Employ vibration analysis, spectrum analysis, time waveform analysis, orbit analysis, phase analysis and enveloping (demodulation)
- Apply fault analysis for natural frequencies, resonances, imbalance, eccentricity, bent shaft, misalignment, cocked bearing, soft foot and mechanical looseness
- Illustrate rolling element bearing analysis including analysis of induction motors, gears, belt driven machines, pumps, compressors and fans
- Carryout equipment testing and diagnostics covering impact testing (bump tests) and phase analysis
- Perform corrective action, general maintenance repair activities and review of balancing process and shaft alignment procedures
- Run a successful condition monitoring program by setting baselines, alarms, setting goals, expectations, report generation and reporting success stories
- Apply acceptance testing and review of ISO standards

Who Should Attend

This course provides an overview of all significant aspects and considerations of vibration analysis in accordance with ISO 18436 standards for maintenance, reliability, rotating equipment, process, control and instrumentation personnel who are willing to gain, improve and/or update their knowledge and skills of practical aspects of machinery vibration monitoring, analysis and predictive maintenance. Engineers, maintenance supervisors, mechanical foremen, specialists and other technical staff will also benefit from this course.

Exam Eligibility & Structure

Exam candidates shall have the following minimum prerequisites: -

- Training course completed
- 18 months of vibration analysis experience, verified by an independent person
- Pass the exam

Course Certificate(s)

- (1) Internationally recognized certificates will be issued to all participants of the course.
- (2) Mobius Institute will certify the participants who will pass the examination for **Vibration Analyst: Category II.**



- (3) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

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Haward Technology Middle East

Continuing Professional Development (HTME-CPD)



CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-21

HTME No. 74851

Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
RE0801	ISO 18436 Category II Intermediate Vibration Analyst Training & Certification	November 10-14, 2021	38	3.8

Total No. of CEU's Earned as of TOR Issuance Date 3.8

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Jaryl Castillo
Academic Director

Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2018 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2018 Standard.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking Continuing Education Units (CEUs) in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology is accredited by




P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

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Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.8 CEUs** (Continuing Education Units) or **38 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Fee

US\$ 8,000 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Khaled Ibrahim, BSc, APR-E, ARP-A, VA, is a **Senior Mechanical Engineer** and **Asset Management Specialist** with over extensive years of industrial experience within the **Oil & Gas, Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Condition Monitoring & Asset Management, Asset Reliability & Lubrication, RBI Assessment, AIV & FIV, Vibration Techniques, Advanced Vibration Analysis, Acoustic & Flow Induced Vibration, Thermal Imaging Technology, Precision Machinery Alignment, Laser Alignment, Machinery Balancing, Criticality Assessment, FMEA, Root Cause Analysis, Defect Elimination, Ultrasound Technology, Design Engineering System, Protection & Monitoring System, Static Equipment, Static Risk Assessment, Baseline Survey Analysis, Machinery Maintenance, Shutdown & Turnaround, Thermal Imaging, Oil Testing & Analysis, Borescope Inspection, Rockwell Automation, Azima, IT Concept, Metric Vibration, CTC Sensors, Artesis MCSA, Pipeline Corrosion Loops, Offshore Safety Induction & Emergency, Energy & Waste Management and BOSIET/OPITO**. Currently, he is the **Business Development Manager** wherein he is in-charge of developing market and spreading awareness of asset management solutions in MENAT region.

During his career life, Mr. Khaled has gained his practical and field experience through his various significant positions and dedication as the **Asset Manager, Technical Services Manager, Senior Condition Monitoring Consultant, Condition Monitoring Team Leader, Senior Rotating Engineer** and **Senior Instructor/Trainer** for numerous multi-billion companies including the UDPS, KMT, Veolia, PROACT Engineering, PETROFAC and PETROMAINT.

Mr. Khaled has a **Bachelor's degree in Power Mechanical Engineering**. Further, he is a **Certified Asset Reliability Practitioner ARP-E & ARP I&II** from the **Mobius Institute**, **Certified Level 1 Machinery Lubrication Analyst (MLA-1)**, **Certified ISO Vibration Level IV Global Instructor**, **Certified Level 1 Ultrasound**, **Certified Reliability Leader (CRL)**, **Certified Basic Offshore Safety Induction & Emergency BOSIET** and **Certified ISO ARP-A Global Instructor**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 15th of December 2024

0730 - 0800	Registration & Coffee
0800 - 0815	Introduction & Welcome
0815 - 0830	PRE-TEST
0830 - 0945	Review of Maintenance Practices
0945 - 1000	Break
1000 - 1200	Review of Condition Monitoring Techniques
1200 - 1300	Lunch
1300 - 1500	Principles of Vibration Complete Review of Basics • Waveform, Spectrum (FFT), Phase & Orbits
1500 - 1215	Break
1515 - 1720	Principles of Vibration (cont'd) Understanding Signals: Modulation, Beating, Sum/Differences
1720 - 1730	Recap
1730	End of Day One

Day 2: Monday, 16th of December 2024

0730 - 0945	Data Acquisition Transducer Types: Non-Contact Displacement
0945 - 1000	Break
1000 - 1200	Proximity Probes, Velocity Sensors & Accelerometers Transducer Selection • Transducer Mounting & Natural Frequency
1200 - 1300	Lunch
1300 - 1500	Proximity Probes, Velocity Sensors & Accelerometers (cont'd) Measurement Point Selection • Following Routes & Test Planning
1500 - 1215	Break
1515 - 1720	Proximity Probes, Velocity Sensors & Accelerometers (cont'd) Common Measurement Errors
1720 - 1730	Recap
1730	End of Day Two

Day 3: Tuesday, 17th of December 2024

0730 - 0945	Signal Processing Filters: Low Pass, Band Pass, High Pass, Band Stop • Sampling, Aliasing, Dynamic Range • Resolution, Fmax, Data Collection Time
0945 - 1000	Break
1000 - 1200	Signal Processing (cont'd) Averaging: Linear, Overlap, Peak Hold, Time Synchronous • Windowing & Leakage
1200 - 1300	Lunch



1300 – 1500	Vibration Analysis Spectrum Analysis • Time Waveform Analysis (Introduction) • Orbit Analysis (Introduction) • Phase Analysis: Bubble Diagrams & ODS • Enveloping (Demodulation), Shock Pulse, Spike Energy, PeakVue
1500 - 1215	Break
1515 - 1720	Fault Analysis Natural Frequencies & Resonances • Imbalance, Eccentricity & Bent Shaft • Misalignment, Cocked Bearing & Soft Foot • Mechanical Looseness • Rolling Element Bearing Analysis • Analysis of Induction Motors • Analysis of Gears • Analysis of Belt Driven Machines • Analysis of Pumps, Compressors & Fans
1720 - 1730	Recap
1730	End of Day Three

Day 4: Wednesday, 18th of December 2024

0730 – 0945	Equipment Testing & Diagnostics Impact Testing & Bump Tests • Phase Analysis
0945 – 1000	Break
1000 – 1200	Corrective Action General Maintenance Repair Activities • Review of the Balancing Process • Review of Shaft Alignment Procedures
1200 – 1300	Lunch
1300 – 1500	Running a Successful Condition Monitoring Program Setting Baselines • Setting Alarms: Band, Envelop/Mask, Statistical • Setting Goals & Expectations (Avoiding Common Problems) • Report Generation • Reporting Success Stories
1500 - 1215	Break
1515 - 1720	Acceptance Testing
1720 - 1730	Recap
1730	End of Day Four

Day 5: Thursday, 19th of December 2024

0730 - 0930	Review of ISO Standards
0930 - 0945	Break
0945 - 1045	Review of ISO Standards (cont'd)
1045 – 1145	Review & MOCK EXAM
1145 – 1245	Lunch
1245 – 1345	Review & MOCK EXAM (cont'd)
1345 – 1400	Break
1400 – 1700	Mobius COMPETENCY EXAM
1700 – 1715	Course Conclusion
1715 – 1730	Presentation of Course Certificates
1730	End of Course

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the state-of-the-art simulator “iLearnVibration”.



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org