

**COURSE OVERVIEW HE0187**  
**Industrial Hygiene Certification Program**  
**W503: Noise – Measurement and Its Effects**  
*(Accredited by OHTA-BOHS)*

**Course Title**

Industrial Hygiene Certification Program: W503:  
 Noise – Measurement and Its Effects *(Accredited by OHTA-BOHS)*

**Course Reference**

HE0187

**Course Duration**

Training: Five days/4.5 CEUs/45 PDHs  
 Exam: One day/3 Hours  
 Total: 6 Days



**Course Date/Venue**

Session(s)	Date	Venue
1	February 11-15, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
2	April 21-25, 2024	Business Center, Concorde Hotel Doha, Doha, Qatar
3	July 14-18, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
4	October 21-25, 2024	Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

**Courses 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 aims to provide the participant with an appreciation of the nature of noise hazards in the workplace and the effects of noise on people. It also details the approach in carrying out noise assessments in the workplace and in the general environment and to determine the significance of measurement data in relation to the various standards for compliance.



On completing this course successfully, the participants will be able to:-

- Describe the consequences to health and well-being of excessive exposure to noise
- Understand the measurement (including dosimetry) of noise in relation to current standards
- Conduct surveys in the workplace to assess risks from noise
- Advise on the need and means of control including PPE
- Appreciate and advise on environmental noise assessment and concern
- Understand current standards and good practice in these fields



The course normally run as a taught course over 5 days (minimum of 45 hours including practical/demonstration sessions, lectures, tutorials, guided reading, overnight questions and examination). There will be a 40 short answer question “open book” examination with an allowed time of 120 minutes.

This course is designed to provide participants with a detailed and up-to-date overview of noise assessment and control. It covers the physics of noise covering sound properties and definitions and measurements units of noise; the human response to noise including the ear and its response to sound, audiometry and noise exposure limits; the machinery noise and assessing noise risk covering sound level meters, frequency analysis, personal noise dosimetry, sound power and sound intensity measurements and noise measurements and assessments; the noise control and hearing protection that include engineering control of noise, control of noise generated by administrative means and hearing protection; the environmental noise comprising of propagation of sound, instrumentation, measurement and assessment; and the standards and good practice of noise and environmental noise.

### Course Objectives

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

- Achieve the OHTA-BOHS Certificate in W503: Noise – Measurement and Its Effects
- Discuss the physics of noise covering sound properties and definitions and measurements units of noise
- Determine human response to noise including the ear and its response to sound, audiometry and noise exposure limits
- Recognize machinery noise as well as assess noise risk covering sound level meters, frequency analysis, personal noise dosimetry, sound power and sound intensity measurements and noise measurements and assessments
- Carryout noise control and hearing protection that include engineering control of noise, control of noise generated by administrative means and hearing protection
- Identify environmental noise comprising of propagation of sound, instrumentation, measurement and assessment
- Employ standards and good practice of noise and environmental noise

### Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

### Who Should Attend

This course provides a complete and up-to-date overview of noise assessment and control for health and safety professionals, occupational health specialists including physicians and nurses. Specialists in subjects such as acoustics, ergonomics, human factors, occupational psychology, work organisation, biosafety, engineering, analytical chemistry and those who want a broader appreciation of how their role interfaces with other professions over health issues in the workplace will find this course beneficial.

**Accommodation**

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

**Training Methodology**

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

**Course Fee**

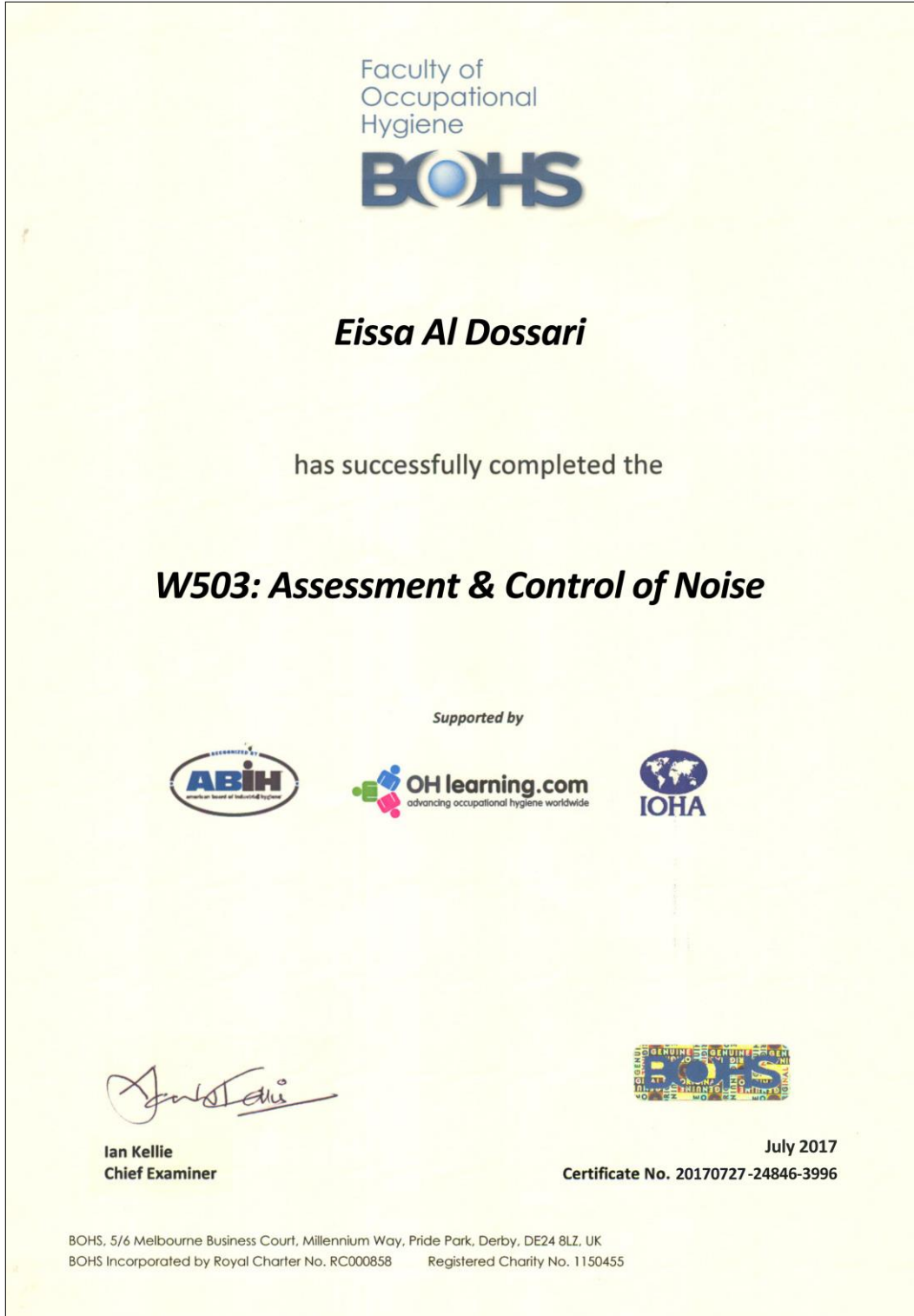
Dubai	<b>US\$ 7,500</b> per Delegate + <b>VAT</b> . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Doha	<b>US\$ 7,500</b> per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Abu Dhabi	<b>US\$ 7,500</b> per Delegate + <b>VAT</b> . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

**Course Certificate(s)**

- (1) BOHS Certificates will be issued to participants who have successfully completed the course and passed the exam of the course.

**BOHS Certificate(s)**

The following certificate is a sample of the BOHS certificates that will be issued to successful candidates:-








- (2) 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.

Official transcript document for CEU0187, Industrial Hygiene Certification Program: Module 4: Noise - Measurement and Its Effects. Includes participant name Eissa Al Dossari, dates, and accreditation logos.



## Certificate Accreditations


Haward Technology is accredited by the following international accreditation organizations:-

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The British Occupational Hygiene Training Association (OHTA-BOHS)

Haward Technology is an OHTA Approved Training Provider under the W201 and W500 series modules that promote better standards of occupational hygiene practice throughout the world. OHTA is the British Occupational Hygiene Training Association.

Haward Technology supports hygiene professionals who wanted people around the world to enjoy the benefits of healthy working environments.


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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 **4.5 CEUs** (Continuing Education Units) or **45 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 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. Peter Jacobs**, OTHA-BOHS is a **Senior HSE Consultant** with almost **25 years** of extensive experience within **Oil & Gas, Refinery and Petrochemical** industries. His wide experience covers in the areas of **Measurement of Hazardous, Incident Command & Report Writing, HAZOP, HAZMAT, HAZID, Health Risk Assessment, Modern Safety Risk Management, Process Risk Management, Root Cause Analysis Techniques, , Industrial Hygiene, Occupational Health, Safety & Environment, HSE Management System**

**Development & Implementation, Handling Hazardous Chemicals, Industrial Safety & Housekeeping, Job Safety & Hazard Analysis, Hazardous Substances Measurement, Workplace Control, Physical Agents, Emergency Response, Chemical & Biological Operations, Basic Safety & Loss Prevention, Safety in Chemical Laboratory, Confined Space Safety, Industrial Hygiene, Occupational Health & Hygiene, Ergonomics, Biological Assessment, Radiation with Radon/Thoron Assessment, Radiation Protection Safety, Radiation Monitoring, Natural Radiation Sources, Nuclear Regulatory Act, Industrial Ventilation, Air Pollution Dispersion Modelling, Basic Clandestine Drug Laboratory Investigation, Chemical Engineering, Fire Safety & Evacuation, Evacuation Safety, Safety Orientation, Hand & Power Tools Safety, Isokinetic Stack Sampling, Dust Exposure, Quantifying Workplace Stressors, Noise & Airborne Pollutants, Thermal Stress, Illumination, Mine Health & Safety, Statistical Method Validation, Legal Audit Compliance, Riot & Crowd Control, ISO 14000, OHSAS 18000, ISO 17025 and ISO 9000.**

During his career life, Mr. Jacobs has gained his practical and field experiences through his various significant positions and dedication as the **Forensic Science Laboratory Manager, Occupational Hygienist, Radiation Protection Officer, Lead Practitioner, Safety, Health & Environmental (SHE) Specialist, First Responder, OHS Inspector, Ambulance Assistant and LPG Distributor Auditor** from various international companies like the Sedulitas, Richards Bay Minerals, Sasol and South African Police Service.

Mr. Jacobs has a **Master's degree in Public Health – Occupational Hygiene**, a **National Diploma in Purchasing Management** and held an Intermediate Certificate in Mine Environmental Control. Further, he is a **Certified Instructor/Trainer**, an Appointed Commissioned Officer, a SAIOH/ IOHA President, an Assessor/Moderator of Health & Welfare SETA, a **Registered Occupational Hygienist** of the Southern African Institute for Occupational Hygiene, awarded as a SAIOH **Occupational Hygienist of the Year Award** and a well-regarded member of the British Occupational Hygiene Society (**BOHS**), Mine Ventilation Society of South Africa (MVSSA) and South African Radiological Protection Association (SARPA). He has further delivered numerous trainings, courses, seminars, workshops and conferences worldwide.



**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**

0730 – 0800	Registration & Coffee
0800 – 0830	Welcome & Introduction
0830 – 0845	<b>PRE-TEST</b>
0845 – 0930	<b>Physics of Noise: Properties of Sound</b> Propagation of Sound by Longitudinal Wave Motion • Relationship Between Frequency, Wavelength & Velocity • Velocity of Sound - Dependence on Temperature & Bulk Modulus • Infra Sound & Ultra Sound - Definitions & Common Sources • Simple Harmonic Motion)
0930 – 0945	Break
0945 – 1045	<b>Physics of Noise: Definitions &amp; Measurements Units – Noise</b> Sound Pressure & Sound Pressure Level • Sound Intensity & Intensity Level, Reference Values • Range of Sound Pressures in Audio Range • Definition & Application of Decibel Scale • Relationship Between Sound Pressure & Sound Power Level • Time Varying Sources, Definition & Use of Equivalent Continuous Sound Level
1045 – 1200	<b>Physics of Noise: Definitions &amp; Measurements Units – Noise (cont'd)</b> Characteristics of Impulse & Impact Noise • Equivalent Continuous Sound Level & Usage • Understanding of Weighting Scales A & C, Comparison with Linear Levels & Awareness of Other Weighting Scales • Frequency Characteristics of Sound • Octave, Third Octave & Narrow Band Spectra • Summation of Sound Pressure Levels & Calculation of Sound Power Levels
1200 – 1300	Lunch
1300 – 1430	<b>Human Response to Noise: The Ear &amp; its Response to Sound</b> Structure of the Ear - Outer, Middle & Inner Ear • Frequency Selectivity & Auditory Filter, Masking, Stereo Cilia, Aural Reflex • Trauma, Tinnitus, Damage to Hair Cells • Temporary Threshold Shift & Recovery Times, Permanent Threshold Shift • Noise Induced Hearing Loss • Relationship Between Hearing Loss, Noise Exposure Levels & Exposure Times • Speech Frequencies • Speech Interference Levels, Loudness & Phon Scales
1430 – 1445	Break
1445 – 1650	<b>Human Response to Noise: Audiometry</b> (The Role of Audiometry in Industry • A Guide to Audiometric Testing Programmes • Audiometer Types - Screening, Diagnostic, Research • Test Signal Frequencies, Pure Tone & Bone Audiometry • Audiogram Accuracy - Sources of Error, Ambient Noise in Audiometer Booths • Non-Organic Hearing Loss, Organic Hearing Loss • Presbycusis, Noise Induced Hearing Loss - 4 kHz Dip • The Significance of Hearing Loss Levels
1650 – 1730	<b>Recap</b>
1730	End of Day One



**Day 2**

0730 – 0830	<b>Human Response to Noise: Noise Exposure Limits</b> The Significance of Exposures for Daily & Weekly Personal Noise Exposures & the Risks of Hearing Damage • The Significance of Exposures to Infra Sound & Ultra Sound
0830 – 0930	<b>Machinery Noise</b> Power Sources (Electrical Motors) • Fluid Movers (Air Movers, Pumps, Sources of Noise Generation, Hydraulic Noise) • Valve Noise, Jet Noise, Duct Noise • Impact Noise & Sources
0930 – 0945	Break
0945 – 1200	<b>Machinery Noise (cont'd)</b> Compressor Types & Characteristics • Machine Tools, Hand Held Power Tools, Wood Working Machinery • Tonal Components from Rotating Machinery, Fan Blade Passage, Gear Meshing Frequency • Near Field & Far Field, Implications for Sound Measurements
1200 – 1300	Lunch
1300 – 1430	<b>Assessment of Noise Risk: Sound Level Meters</b> Basic Principle of Operational Components with Consideration of Simple Digital Processing Techniques • Different Classifications of Sound Level Meters, Type & the Accuracy at Reference & in Field Conditions • Microphone Types; Polarised, Pre-Polarised, Piezoelectric & Knowledge of Others & Limitations • Directional Characteristics of Sound Level Meter & Microphones • Operational Considerations, Battery Checks, Calibration, Wind Effects, Body Reflections
1430 – 1445	Break
1445 – 1650	<b>Assessment of Noise Risk: Frequency Analysis</b> Octave Band & Third Octave Band Analysis - Characteristics & Filter Band Widths • Analogue & Digital Filters • Narrow Band Analysis • Current Instrumentation for Real Time Analysis • Uses of Frequency Analysis for Noise Source Identification • Time History Analysis & Techniques
1650 – 1730	<b>Recap</b>
1730	End of Day Two

**Day 3**

0730 – 0930	<b>Assessment of Noise Risk: Personal Noise Dosimetry</b> Principles of Instrumentation Operation, Field Accuracy & Sources of Error • Supporting Dosimeter Assessments with Appropriate Sound Level Meter Measurements • Instrument Types & Facilities, Supporting Software • Sampling Techniques & Sources of Error
0930 – 0945	Break
0945 – 1045	<b>Assessment of Noise Risk: Sound Power &amp; Sound Intensity Measurements</b> Uses & Significance of Sound Power & Intensity • Sound Power - Reference Sources & Field Measurement • Sound Intensity, Instrumentation for Measurement
1045 – 1200	<b>Assessment of Noise Risk: Noise Measurements &amp; Assessments</b> Observation of Work Practices & Processes • Types of Noise Measurements - Sound Level Meter, Dosimeter, Octave Bands • Survey & Sampling Techniques • Role & Application of Noise Dosimetry • Significance of Measurement Periods • Use & Significance of Terms dB(A), dB(C), dB(lin), SPL, Leq, Lmax, LEp,d, LEpw)
1200 – 1300	Lunch
1300 – 1430	<b>Assessment of Noise Risk: Noise Measurements &amp; Assessments (cont'd)</b> Measurement & Calculation of Daily Exposures • Role & Application of Octave Band Analysis • Calculation of dB(A) Values from Octave Band Analysis • Interpretation of Noise Measurements - Source Identification, Noise Contouring, Hearing Protection Zones • Report Requirements & Presentation

1430 – 1445	Break
1445 – 1650	<b>Noise Control &amp; Hearing Protection: Engineering Control of Noise</b> (Controlling the Noise Generated at Source by) • Avoiding Impacts • Increasing Damping & Use of Flexible Material to Reduce Spread of Sound Through a Machine/Pipework • Use of Silencers to Minimise Air Noise at Exhausts • Use of Low Noise Air Nozzles, Pneumatic Ejectors & Cleaning Guns • Matching Air Supply Pressure to Needs of Air Powered Equipment • Optimising the Design of Fans, Fan Casings & Compressors
1650 – 1730	<b>Recap</b>
1730	End of Day Three

**Day 4**

0730 – 0930	<b>Noise Control &amp; Hearing Protection: Engineering Control of Noise (cont'd)</b> (Modification of the Routes by Which Noise Reaches Workplaces) • Reverberation • Use of Sound Absorbing Material to Control Reflections • Use of Silencers to Reduce Noise Transmitted Along Pipes/Ducts • Use of Anti-Vibration Mountings Under Machines & Non- Rigid Couplings • Use of Full or Partial Enclosure of Machines • Local Use of Screens Faced with Sound-Absorbing Material • Use of “Noise Refuge” (Use of Distance and Time to Minimize Noise Exposure) • Relocate Noisy Fans, Exhausts, Compressors Away from People • Use of Remote Control or Automated Equipment to Minimise Noise Exposures • Segregation of Noisy Areas & Limit to Essential Personnel
0930 – 0945	Break
0945 – 1200	<b>Noise Control &amp; Hearing Protection: Control of Noise Generated by Administrative Means</b> Good Housekeeping • Planning • Maintenance • General Good Management
1200 – 1300	Lunch
1300 – 1430	<b>Noise Control &amp; Hearing Protection: Control of Noise Generated by Administrative Means (cont'd)</b> The Necessity of Noise Reduction Measures for Machines, Tools, Plant & Equipment to be Considered at the Design Stage • The Preparation of a Specification Outlining Acceptable Noise Levels Generated by New Equipment Particularly Where the Noise May Affect Personnel)
1430 – 1445	Break
1445 – 1650	<b>Noise Control &amp; Hearing Protection: Hearing Protection</b> Various Types Available • Performance Attenuation • Individual Variability in Attenuation, Mean Attenuation, Standard Deviation & Assumed Protection Including Calculations • Evaluation of Performance Against Workplace Noise Spectra • Selection of Protection, Weight, Cost, Comfort, Adjustability
1650 – 1730	<b>Recap</b>
1730	End of Day Four

**Day 5**

0730 – 0830	<b>Noise Control &amp; Hearing Protection: Hearing Protection (cont'd)</b> Explanation of When & Why Protectors are Necessary • Limitations of Ear Protectors (Partial Use in Noisy Areas)
0830 – 0930	<b>Introduction to Environmental Noise: Propagation of Sound</b> Sources of Environmental Noise - Factory & Machinery Emissions, Traffic, Trains, Aircraft • Attenuation with Distance, Spherical Wavefronts & Point Sources, Inverse Square Law, Free Field Radiation • Propagation of Noise from Line Source • Effects of Wind, Temperature Gradients, Humidity & Precipitation, Absorption by Natural Features, Ground Absorption, Air Absorption & Absorption by Vegetation
0930 – 0945	Break

0945 – 1100	<b>Introduction to Environmental Noise: Instrumentation</b> Sound Level Meters with Ln Facility • Noise Data Loggers, Environmental Analysers • Tape Recorders - Data Recorders & Analogue, Dynamic Range • Frequency Analysis Octave, Third Octave, Narrow Band • Protection of Instrumentation, Temperature, Wind, Humidity, Calibration Requirements
1100 – 1200	<b>Introduction to Environmental Noise: Measurement &amp; Assessment</b> Appropriate Techniques for Assessing Environmental Noise • Selection of Measurement Locations • Specific Noise Level LAeq & Background Noise LA90 • Measurement Periods; Sources of Errors & Variation in Measured Levels • Influence of Environmental Conditions; Consideration of Tonal Components • Reporting Protocol & Presentation
1200 – 1300	Lunch
1300 – 1430	<b>Standards &amp; Good Practice: Noise</b> Relevant Exposure Standards for Noise, All Aspects of a Good Hearing Conservation Management Programme Including Assessment, Control, Training, Hearing Protection Inspection, Audit, Audiometry & How these Combine to Provide Effective Employee Protection, Specification of Equipment at Design & Purchase to Limit the Impact on the Noise Levels in a Working Environment
1430 – 1445	Break
1445 – 1645	<b>Standards &amp; Good Practice: Environmental Noise</b> How to Interpret Environmental Noise Measurements Including the Impacts of Intermittent or Tonal Components in the Noise
1645 – 1700	<b>Course Conclusion</b>
1700 – 1715	<b>POST-TEST</b>
1715 – 1730	Presentation of Course Certificates
1730	End of Course

**Day 6: OHTA BOHS Online Exam (to be scheduled within 30 days of course completion)**

0900 - 0915	OHTA-BOHS Exam Registration/Briefing
0915 - 1145	OHTA-BOHS Exam
1145 - 1200	Closing Ceremony
1200	End of Exam

**MOCK Exam**

Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward’s Portal. Each participant will be given a username and password to log in Haward’s Portal for the MOCK exam during the 7 days following the course completion. Each participant has only one trial for the MOCK exam within this 7-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.



**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 our state-of-the-art “Sound Level Meter”, “Industrial Hygiene Virtual Laboratory” and “CIHprep V9.0 ” simulators.



**Sound Level Meter**



**Industrial Hygiene Virtual Laboratory Simulator**



CIHprep V9.0  
Tools Help  
Questions in set: 2538

Question Number: 894  
Engineering Controls/Ventilation

A room 50 x 20 x 10 feet contains 100 ppm of CCl<sub>4</sub>. How much time is required to lower the concentration to 25 ppm if a blower generating 300 cfm is used to clear the room?

A) 46.0 min  
B) 11.1 min  
C) 7.5 min  
D) 54.0 min

You did not answer this question.

The correct answer is: A

$t = \log(C/C_0) \cdot (-2.303) \cdot (P/Q)$

Substituting we get:  
 $t = \log(25/100) \cdot (-2.303) \cdot (10,000 \text{ ft}^3 / 300 \text{ cfm})$   
 $t = 46 \text{ min}$

Where:  
P = Room volume  
C<sub>0</sub> = Beginning concentration  
C = Ending concentration  
Q = Flow

CIHprep V9.0  
Copyright 2010, DataChem Software, Westboro, MA

**CIHprep V9.0 Simulator**

**Course Coordinator**

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