COURSE OVERVIEW FE0721
ASME V For Non Destructive Tests

Course Title
ASME V For Non Destructive Tests

Course/Exam Date/Venue
August 25-29, 2024/ Meeting Plus 8, City Centre Rotana Doha Hotel, Doha, Qatar

Course Reference
FE0721

Course Duration/Credits
Five days/3.0 CEUs/30 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.

Non-destructive testing (NDT) is the process of inspecting, testing, or evaluating materials, components or assemblies for discontinuities, or differences in characteristics without destroying the serviceability of the part or system. In other words, when the inspection or test is completed the part can still be used. It's a wide group of analysis techniques used to evaluate the properties of a material, part, product, weld, or system without causing damage.

Non-destructive testing is a commonly-used tool in forensic engineering, mechanical engineering, electrical engineering, civil engineering, systems engineering, aerospace and aeronautical engineering, and medical applications. The terms Non- Destructive Examination (NDE), Non-Destructive Inspection (NDI), and Non- Destructive Evaluation (NDE) are also commonly used to describe nondestructive testing methodology. It covers the various NDT methods and techniques such as liquid penetrant testing, magnetic particle testing, electromagnetic testing, ultrasonic testing method, radiographic testing, visual testing and other NDT methods and techniques.

This course is designed to provide participants with a detailed and up-up-to date overview of non-destructive testing. It covers the NDT approach including method selection, detecting discontinuities, surface, subsurface, contrast with destructive testing, interpretive technology, test variables, standards for comparison and application; the various techniques of liquid penetrant testing and its advantages, disadvantages, limitations, types, equipment, safety precaution and personnel requirements; the proper method of magnetic particle testing covering the advantages and disadvantages as well as the basic magnetic particle process, preparation of parts, magnetization, application, assessment of discontinuities and magnetic particle testing methods.

Further, the course will also cover the electromagnetic testing including the eddy current techniques and its principles as well as the factors affecting eddy current; the ultrasonic testing method including ultrasonic principles, detection of discontinuities, pulse-echo techniques and transmission techniques; the radiographic testing including the types of radiation, principles of radiography and the exposure factors; and the procedure of visual testing, other NDT methods and techniques and certification requirements.

Course Objectives

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

- Apply and gain a comprehensive knowledge on non-destructive testing
- Discuss the NDT approach including the method selection, detecting discontinuities, surface, subsurface, contrast with destructive testing, interpretive technology, certification of technicians, test variables, standards for comparison and application
- Employ the various techniques of liquid penetrant testing and recognize its advantages, disadvantages and limitations, types, equipment, safety precaution and personnel requirements
- Carryout the proper method of magnetic particle testing and evaluate its advantages and disadvantages as well as the basic magnetic particle process, preparation of parts, magnetization, application, assessment of discontinuities and magnetic particle testing methods
- Illustrate the electromagnetic testing and discuss the eddy current techniques and its principles as well as the factors affecting eddy current
- Apply ultrasonic testing method including ultrasonic principles, detection of discontinuities, pulse-echo techniques and transmission techniques
- Interpret radiographic testing and identify the types of radiation, principles of radiography and the exposure factors
- Demonstrate the procedure of visual testing and carryout the other NDT methods and techniques as well as recognize the certification requirements

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, conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of non-destructive testing for supervisors, engineers, managers, quality managers, condition monitoring technicians, engineering technicians, any non-technical (NDT) person responsible for NDT, technicians or ordering NDT techniques to maintain plant and equipment.

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

US$ 6,000 per Delegate .This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

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

.**Course Certificate(s)**

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- 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 **3.0 CEUs** (Continuing Education Units) or **30 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.

- 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:

Dr. Faysal Eliyan, PhD, MSc, BSc, is a **Senior Engineer** with extensive years of experience within the **Oil & Gas**, **Petroleum** and **Refinery** industries. His expertise widely covers in the areas of **Concrete Structural Design**, **Concrete Maintenance & Reliability Analysis**, **Civil Engineering** Drawings, Standards & Codes, **Civil Engineering** Design, Petrochemical Plant Structure Design & Remediation, Elements of **Applied Civil Engineering**, **Dynamic Analysis of Rotating Equipment** Foundations **& Structural Steel Piperacks**, **Concrete & Structural Steel Design**, **Steel Structure Design**, Advanced **Building Construction Technology**, **Structural Engineering** Techniques, **Structural Renovation of Buildings**, **Earthwork & Structural Maintenance**, **Surface Drainage**, **Drainage System**, **Building Envelopes & Finishes**, **Landscaping & Roofing** System, **Seismic Design** for Buildings, **AutoCAD**, Advanced **Seismic & Wind Design of Reinforced Concrete**, **Structural** Systems & Components, Design of **Concrete Columns & Beam Frames**, Design of **Foundations & Equipment Footings**, **Maintenance of Concrete Structure**s, **Structural Reliability Assessment**, **Codes & Structural Reliability**, Probabilistic Evaluation of Existing Structures, **Structural Steel**, **Precast Concrete** and **Reinforced Polymer Layered Steel**. Further, he is also well-versed in **Gas Turbines**, **Steam Turbines, Heat Exchangers** Inspection, Testing & Overhaul Cleaning, Heating, Ventilation & Air Conditioning (**HVAC**), **Fans & Blowers**, **Heaters** & **Boilers**, **Compressors**, **Maintenance Planning & Scheduling**, **Pumps & Compressors** Operation & Maintenance, **Valves Technology** Selection, Installation & Troubleshooting, **Cooling Towers**, **Rotating Equipment**, **Turbomachinery**, **Condition Monitoring** & **Diagnostics**, **Hydraulic** & **Pneumatic Systems** Maintenance & Troubleshooting, **Piping Systems**, **Corrosion Control** & **Materials Selection** in Oil and Gas and Water Systems, **Machinery Alignment** & **Balancing**, **Maintenance Management**, **Operational Problems & Failure Analysis**, **Energy Performance Assessment** of **Powerplants**, **Plant Operations**, **Project Management**, **Six Sigma** and **Health**, **Safety** & **Environment**.

During his career life, Dr. Faysal has gained his practical and field experience through his various significant positions and dedication as the **Assistant Professor**, **Senior Consultant**, **Laboratory Instructor**, **Lecturer**, **Tutor**, **Mentor**, **Advisor**, **Trainer**, **Engineering Manager**, **Senior Engineer**, **Senior Project Engineer**, **Engineer** and **Adjudicator** from various institutions and universities such as the Community College of Qatar, American University of the Middle East, McMaster University, The University of British Columbia, The University of British Columbia, Qatar University and General Electric, just to name a few.

Dr. Faysal has **PhD**, **Master's** and **Bachelor's** degree in **Engineering** from the **University of British Columbia** (**Canada**). He is a **Certified Instructor/Trainer**, a member of the **Chamber of Civil Engineers**, **Structural Stability Research Council**, **American Institute of Steel Construction** and **American Society of Civil Engineers** (**ASCE**), **USA**. He also **published numerous books**, **researches** and **scientific papers** and received several awards and recognitions for **Journal of Materials Engineering and Performance** and has further delivered numerous trainings, courses, seminars, workshops and conferences internationally.

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, 25th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***An Overview of Nondestructive Testing*** *The NDT Approach • The Need for Testing • NDT Methods • Method Selection • Detecting Discontinuities • Surface • Subsurface • Contrast with Destructive Testing • An Interpretive Technology • Certification of Technicians • Test Variables • Improving Test Results • Standards for Comparison • Automation • Applications of NDT • New Parts Manufacturing • Inservice Applications • Industrial Sectors*
0930 - 0945	*Break*
0945 – 1130	***Liquid Penetrant Testing*** *Selecting Liquid Penetrant Testing • Advantages • Disadvantages & Limitations • Basic Technique • Leak Detection • Types of Liquid Penetrant • Sensitivity • Sensitivity Categories • Test Panels • Methods of Removal • Developers • Equipment • Portable Equipment • Stationary Testing Equipment • Small Parts Testing Unit • Automated Testing Systems • System Concept Precautions • Safety Precautions • Personnel Requirements*
1130 - 1145	*Break*
1145 – 1230	***Magnetic Particle Testing*** *Advantages • Disadvantages • Basic Magnetic Particle Process • Preparation of Parts • Magnetization • Application of Particles • Assessment of Discontinuities • Demagnetization • Cleaning & Surface Protection • Magnetic Particle Testing Methods*
1230 - 1250	*Prayer Break*
1250 - 1420	***Magnetic Particle Testing (cont'd)*** *Continuous • Residual • Properties of Magnetic Particles • Dry Powders • Wet Suspension • Comparison of Wet and Dry Methods • Advantages of the Dry Method • Advantages of the Wet Method • Methods of Magnetization • Longitudinal Magnetization • Induced Current Magnetization*
1420 - 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 26th of August 2024***

0730 – 0930	***Magnetic Particle Testing (cont'd)*** *Circular Magnetization • Equipment • Magnetizing Equipment • Coils and Insulated Conductors • Yokes • Prods & Clamps • Bench Testing • Magnetic Field Indicators • Interpretation of Indications • Spurious Indications • Discontinuity Indications • Meter Readings & Current Flow • Personnel Requirements*
0930 – 0945	*Break*
0945 – 1130	***Electromagnetic Testing*** *Eddy Current Technique • Advantages • Limitations • Basic Eddy Current Principles • Applications • Capabilities • Factors Affecting Eddy Currents • Coils and Probes • Surface Probes*
1130 - 1145	*Break*

1145 – 1230	***Electromagnetic Testing (cont'd)*** *Internal Probes • Encircling Coils • Hybrid Coils • Probe Precautions • Bridge Circuits • Detection of Discontinuities • Reference Standards • Scan Paths • Flat Surfaces • Areas Around Fasteners*
1230 - 1250	*Prayer Break*
1250 - 1420	***Electromagnetic Testing (cont'd)*** *Radii • Holes • Corrosion Detection • Subsurface Crack Detection • Paint • Displays • Analog • Digital • Impedance Plane • Operating Point • Other Electromagnetic Approaches*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 27th of August 2024***

0730 – 0930	***Ultrasonic Testing*** *Advantages • Disadvantages • Ultrasonic Principles • Acoustics • Transducers • Piezoelectric Effect • Detection of Discontinuities • Pulse-Echo Technique • Resonance Technique • Through-Transmission Technique • Displays*
0930 – 0945	*Break*
0945 – 1130	***Ultrasonic Testing (cont'd)*** *A-scan Presentation • B-scan Presentation • C-scan Presentation • Factors Affecting Ultrasonic Testing • Effects of Temperature Changes • Sensitivity • Resolution • Dead Zone • Propagation of Ultrasonic Waves • Near Field and Far Field • Sound Attenuation in the Far Field • Ultrasound and Material Interfaces*
1130 - 1145	*Break*
1145 – 1230	***Ultrasonic Testing (cont'd)*** *Acoustic Impedance • Couplant • Probe Designs • Normal Angle Compressional Probe • Shear & Surface Wave Probes • Twin Crystal Probes • Paintbrush Transducers • Water Immersion Probes • Thickness Gages • Gates • Phased Arrays • Calibration of Equipment*
1230 - 1250	*Prayer Break*
1250 - 1420	***Radiographic Testing*** *Advantages • Limitations • Types of Radiation • X-rays • Gamma Rays • Principles of Radiography • Processing the Radiographic Image • Processing Units • The Darkroom • Exposure Factors • Film Speed*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Wednesday, 28th August 2024***

0730 – 0930	***Radiographic Testing (cont'd)*** *Graininess • Contrast • Alternatives to Film • Image Enhancement • The X-ray Tube • Special Electron Accelerators • Intensifying Screens • Cassettes and Film Holders • Scatter Radiation • Reduction of Scatter • Geometric Unsharpness • Measuring Quality*
0930 – 0945	*Break*
0945 – 1130	***Radiographic Testing (cont'd)*** *Image Quality Indicators (Penetrameters) • Radiographic Film Interpretation • Illuminators • Analyzing the Image • Identification of Radiographs • Health Issues • Permissible Radiation Dose • Protection against Radiation • Film Badges • Dose Rate Meters (Survey Meters) • Procedures, Specifications and Codes • Computerized Radiography*
1130 - 1145	*Break*

1145 – 1230	***Visual Testing*** *Need for Adequate Lighting • Optical Enhancements • Mirrors • Magnifying Devices • Handheld Lenses • Pocket Microscopes • Self-Supporting Magnifiers • Eye Attachments*
1230 - 1250	*Prayer Break*
1250 - 1420	***Visual Testing (cont'd)*** *Illuminated Magnifiers • Borescopes & Fiberscopes • Borescopes • Fiberscopes • Charge Coupled Devices • Digital Imaging • Metallographic Replication • Photoelastic Coatings • Dimensional Inspection*
1420 - 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Thursday, 29th of August 2024***

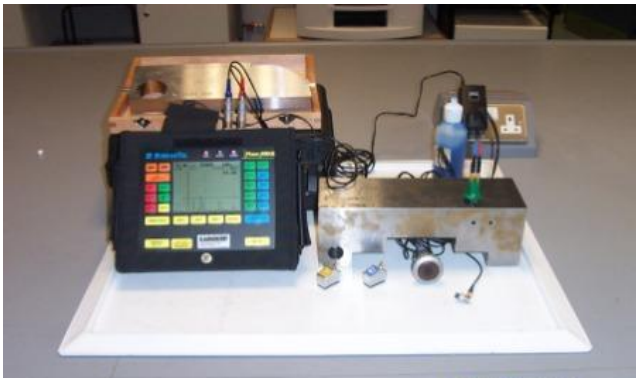
0730 – 0930	***Other NDT Methods & Techniques*** *Liquid Penetrant Related • Temper Etch • Magnetic Particle Related • Magnetic Barkhausen Effect • Electromagnetic Related • Strain Gages (Eddy Current) • Microwave Testing • Acoustic Based • Acoustic Emission • Vibration Analysis • Radiographically Derived Techniques • Neutron Radiography • Stereoradiography • X-ray Fluorescence • Fluoroscopy*
0930 – 0945	*Break*
0945 – 1130	***Other NDT Methods & Techniques (cont'd)*** *Image Intensifier (Amplifier) • Fluorography • Color Radiography • Microradiography • Xeroradiography • X-ray Computed Tomography • Radiometry • Laser Methods • Stress-Inducing Methods • Leak Testing • Thermal/Infrared Testing • Dynamic Techniques • Passive Techniques • Optical Holography*
1130 - 1145	*Break*
1145 – 1240	***NDT Certification*** *Employer-Based Certification • Central Certification • Choice of Certification System*
1230 - 1250	*Prayer Break*
1250 - 1330	***NDT Certification (cont'd)*** *Program Documentation • NDT Specifications • NDT Terminology • Discontinuity Guide*
1330 - 1400	***POST-TEST***
1400 - 1415	***Course Conclusion***
1415 - 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will carryout NDT inspection using our "Liquid Penetrant Testing (PT) Equipment", "Magnetic Particle Testing (MT) Equipment", "Ultrasonic Testing (UT) Equipment", our specifically designed flawed specimen test components and "American Welding Society (AWS) Tool Kit".

Liquid Penetrant Testing (PT) Equipment

Magnetic Particle Testing (MT) Equipment



Ultrasonic Testing (UT) Equipment

Flawed Specimen Test Components

American Welding Society (AWS) Tool Kit

Course Coordinator

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