

COURSE OVERVIEW FE0080-4D Piping Vibration Analysis & Practical Engineering Solutions

Course Title

Piping Vibration Analysis & Practical **Engineering Solutions**

Course Date/Venue

December 16-19, 2024/Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA

Course Reference

FE0080-4D

Course Duration/Credits

Four days/2.4 CEUs/24 PDHs

Course Description



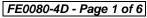


This practical and highly-interactive course includes practical sessions and exercises. Theory learnt will be applied using our state-ofthe-art simulators.

This course provides a thorough review of a wide variety of causes of piping vibration from the point of view of an engineer that must identify the cause of vibration, determine if vibration is excessive, and correct the problem if it is. It provides a background on fundamental causes of piping vibration and how to identify source of vibration, rules of thumb and simplified methods for evaluating vibration severity, and methods of treatment.

A wide variety of causes of vibration are covered in order to enable the course participant to properly evaluate the variety of piping vibration problems that can occur in piping systems. The causes of vibration, where possible, are discussed with respect to very basic energy and momentum principles that enable the participant to understand what is happening within and to the piping system. Screening and simple vibration limits are provided.

Many actual examples of typical plant piping vibration problems that the course instructor has solved are reviewed to illustrate the concepts covered. In addition, participants are encouraged to bring examples of troublesome vibration problems thev have experienced experiencing in their plants for class discussion.





















Course Objectives

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

- Analyze the vibration of piping system and implement the correct predictive maintenance method
- Discuss the concepts of mechanical vibration including high frequency vibration and learn what acoustic resonance is as well as its application on piping vibration analysis
- Identify the parts of the reciprocating compressor systems and be able to review its features and functions
- Describe what an acoustic fatigue is and become familiar with the concept of slug flow and surge including their features
- Distinguish piping systems with reciprocating pumps and recognize their role on vibration analysis
- Determine the other sources of vibration and be able to learn their features and application
- Improve the practical methods for evaluating piping vibration using simple rules and recognize their importance in piping vibration analysis and practical engineering solutions
- List down the various piping restraints and have a good overview of the different solutions to vibration problems
- Demonstrate sample piping vibration problems to become more acquainted on the techniques of piping vibration analysis and its engineering solutions
- Present case studies and practical sample scenarios to further understand the concepts of vibration analysis in piping.

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 wide understanding and deeper appreciation of piping vibration analysis and practical engineering solutions for engineers who are responsible for operating existing piping systems. However, designers of new piping systems will also find the broad coverage of potential vibration problems a time saving briefing on the variety of vibration problems that can occur in piping systems.

Course Fee

US\$ 4,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.





















Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course.

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 2.4 CEUs (Continuing Education Units) or 24 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.

Accommodation

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

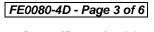
















Course Instructor(s)

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. Reda Hassan is a Senior Inspection Engineer with over 20 years of extensive experience within the Oil, Gas, Refinery and Petrochemical industries. His expertise widely evolves in Vibration System & System One/Bentley Nevada, Risk Based Inspection (RBI) API 580/581, Fitness For Service (F.F.S), Life Extension Analysis, Risk-Based Inspection (RBI); Tank Inspection; Pressure Vessel Inspection; Piping Inspection; Construction, Installation

Fabrication, Erection, Inspection, Maintenance, Operation, Rating, Repair, Alteration, Reconstruction, Pigging, Integrity Assessment, Flaw Evaluation, fitness-for-service (FFS) of Piping, Piping Inspection, Pipelines, Tanks, Fuel Storage Tanks, Boiler, Pressure Vessel, Pigging, Pump & Valve Technology, Centrifugal Pump, Machinery Bearings & Lubrication, Hydraulics, Welding Technology, Non-Destructive Testing (NDT), Cathodic Protection of Pipelines, Maintenance of Rotating Machinery and Maintenance Management & Planning. Further, he is also well-versed in various international codes and standards such as API 570, API 620, API 650, API 653, API 510, API 580, API 598, API 1104, ASME B31, ASME B31.3 and ASME B31.8. Currently, he is the Engineering Head of GUPCO BP (British Petroleum).

During his career life, Mr. Reda has worked with numerous multi-national companies such as GUPCO BP, Saipaim Engineering, Tractebel Engineering Suez, Story TransGas (STG) and SGC for international clients as the Technical Consultant &Trainer, Section Head Projects Engineer, Maintenance & QC Engineer, Mechanical Supervisor and NDT Supervisor.

Mr. Reda has a Bachelor degree in Mechanical Engineering. He is a Certified Tank Inspector (API-653), a Certified Pressure Vessel Inspector (API-510), Certified Piping Inspector (API-570), a Certified Risk Based Inspector (API-580) as well as a Certified ASNT Level II in Radiographic Testing (RT), Ultrasonic Testing (**UT**), Magnetic Particle Testing (**MT**) and Liquid Penetrate Testing (**PT**). Further, he is on the process of completing the PMP-PMI certification and he has delivered numerous technical courses, trainings and workshops worldwide.

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

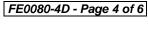
In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.



















Course 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:

Monday, 16th December 2024 **Day 1:**

| 0730 - 0800 | Registration & Coffee |
|-------------|--|
| 0800 - 0815 | Welcome & Introduction |
| 0815 - 0830 | PRE-TEST |
| 0830 - 0930 | Introduction |
| 0930 - 0945 | Break |
| 0945 - 1100 | Vibration Fundamentals & Definition |
| 1100 – 1215 | Mechanical Vibration Concepts |
| 1215 – 1230 | Break |
| 1230 - 1420 | Mechanical Vibration Concepts (cont'd) |
| 1420 - 1430 | Recap |
| 1430 | Lunch & End of Day One |

Tuesday, 17th December 2024 **Day 2:**

| 0730 - 0930 | Source of Piping Vibration |
|-------------|------------------------------------|
| 0930 - 0945 | Break |
| 0945 - 1100 | Flow Induced Vibration |
| 1100 – 1215 | Slug Flow (Water Hammer) |
| 1215 - 1230 | Break |
| 1230 – 1420 | Surge (Pressure Wave Water Hammer) |
| 1420 - 1430 | Recap |
| 1430 | Lunch & End of Day Two |

Wednesday, 18th December 2024 **Day 3:**

| 0730 - 0930 | Piping Vibration Involving Control Valves |
|-------------|---|
| 0930 - 0945 | Break |
| 0945 - 1100 | Other Sources of Vibration |
| 1100 – 1215 | Practical Methods for Evaluating Piping Vibration |
| 1215 - 1230 | Break |
| 1230 - 1420 | Acceptance Criteria (ASME B31 Series) |
| 1420 - 1430 | Recap |
| 1430 | Lunch & End of Day Three |

Thursday, 19th December 2024 Dav 4:

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| 0730 - 0930 | Methods of Piping Vibration Damping |
| 0930 - 0945 | Break |
| 0945 - 1100 | Sample Piping Vibration Problems |
| 1100 - 1215 | Case Studies |
| 1215 - 1230 | Break |
| 1230 - 1345 | Open Session with Student Vibration Problems |
| 1345 - 1400 | Course Conclusion |
| 1400 - 1415 | POST-TEST |
| 1415 - 1430 | Presentation of Course Certificates |
| 1430 | Lunch & 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".



iLearnVibration Simulator

Course Coordinator

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















