



COURSE OVERVIEW PE0357 Dynamic Simulation for Pipeline Slug Calculations (E-Learning Module)

Course Title

Dynamic Simulation for Pipeline Slug Calculations (E-Learning Module)

Course Reference

PE0357

Course Format & Compatibility

SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration

30 online contact hours
(3.0 CEUs/30 PDHs)



Course Description



This E-Learning course is designed to provide participants with a detailed and up-to-date overview of dynamic simulation for pipeline slug calculations. It covers the piping engineering, piping design, surge pressure, piping system and corrosion resistance; the material toughness, pipe fittings, welding outlet fitting and typical flange assembly; the various types of flange attachment, flange facing types, flange rating class, head loss and hydraulic design; the piping considerations, suction and discharge side, NPSH calculation and causes of pipe strain; and the correct and incorrect pipe systems including piping codes and pipeline transportation systems for liquid hydrocarbons and other liquids.

Further, the course will also discuss the refrigeration piping, heat transfer components, gas transmission and distribution piping systems; managing gas pipelines system integrity; the slurry transportation piping systems; the material selection division of the codes, aboveground codes and codes for buried materials; the buried piping requirements and testing of buried pipe; the rules for testing and examination in aboveground codes; and the leak testing, precautions in hydrostatic test, requirements for procedures qualification and operation and maintenance procedures.



During this course, participants will learn the condition assessment; the basis for determining extent of assessment and re-inspection interval; the desuperheater supply piping failure, brittle fracture, construction welding and assembly and welding processes; the standard welding symbols; the destructive testing, hot tapping, fabrication, hydro testing and pigging; the pipeline engineering studies using dynamic simulation; setting up the model; and the test facility, instrumentation and data processing.

Course Objectives

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

- Apply and gain an in-depth knowledge on dynamic simulation for pipeline slug calculations
- Discuss piping engineering, piping design, surge pressure, piping system and corrosion resistance
- Recognize material toughness, pipe fittings, welding outlet fitting and typical flange assembly
- Identify the various types of flange attachment, flange facing types, flange rating class, head loss and hydraulic design
- Explain piping considerations, suction and discharge side, NPSH calculation and causes of pipe strain
- Recognize correct and incorrect pipe systems including piping codes and pipeline transportation systems for liquid hydrocarbons and other liquids
- Identify refrigeration piping, heat transfer components, gas transmission and distribution piping systems
- Manage gas pipelines system integrity and recognize slurry transportation piping systems
- Apply material selection division of the codes, aboveground codes and codes for buried materials
- Recognize buried piping requirements and carryout testing of buried pipe, rules for testing and examination and inspection in aboveground codes
- Employ leak testing, precautions in hydrostatic test, requirements for procedures qualification and operation and maintenance procedures
- Carryout condition assessment as well as basis for determining extent of assessment and re-inspection interval
- Determine desuperheater supply piping failure, brittle fracture, construction welding and assembly and welding processes
- Discuss standard welding symbols and illustrate destructive testing, hot tapping, fabrication, hydro testing and pigging
- Discuss pipeline engineering studies using dynamic simulation, setup the model and apply test facility, instrumentation and data processing

Who Should Attend


This course covers systematic techniques on dynamic simulation for pipeline slug calculations for managers, engineers, process engineers marketing staff and manufacturer's representatives as well as those who are involved in sales and services to the natural gas industry.

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: -

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USA International Association for Continuing Education and Training (IACET)

Howard Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Howard Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Howard Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 1-2013 Standard**.

Howard 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.

Howard 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 Howard Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Howard Technology. Howard 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)

Howard 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.

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Fee

As per proposal

Course Contents

- Dynamic Simulation for Pipeline Slug Calculations
- General Piping Engineering
- Piping Design
- Barlow's Formula
- Calculation Example
- Existing Systems
- New Systems
- Class 1
- Class 2
- Class 3
- Class 4
- What is Surge Pressure?
- Controlling Surge Pressures
- Piping System
- ASME B31.3
- For Process Plants including

- Scope of ASME B31.3
- Strength
- Corrosion Resistance
- Piping System Corrosion
- Material Toughness
- Pipe Fittings
- Elbow and Return
- Tee
- Reducer
- Welding Outlet Fitting
- Cap
- Typical Flange Assembly
- Types of Flange Attachment and Facing
- Flange Facing Types
- Gaskets
- Flange Rating Class
- Material Specification List
- Pressure – Temperature Ratings
- Head Loss and Hydraulic Design
- Piping Considerations
- Suction Side
- Discharge Side
- What is NPSH?
- NPSH Available
- NPSH-Problems
- NPSH Margins
- Calculation of NPSHA
- Causes of Pipe Strain
- Correct & Incorrect Pipe Systems
- Piping Codes
- Codes v/s Standards
- Organizations for Piping Codes
- ASME Codes

- Power Piping
- Process Piping
- Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids
- Refrigeration Piping and Heat Transfer Components
- Gas Transmission and Distribution Piping Systems
- Managing System Integrity of Gas Pipelines
- Building Services Piping
- Slurry Transportation Piping Systems
- Material Selection
- Materials
- Division of the Codes
- Materials Aboveground
- Aboveground Codes
- New Material Addition
- Codes for Buried Materials
- Nonmetallic Materials
- Inspection, Examination, & Testing
- Buried Piping Requirements
- Testing of Buried Pipe
- Rules for Testing
- Examination and Inspection in Aboveground Codes
- Code B31.3 Required Examination
- Leak Testing
- Precautions in Hydrostatic Test
- Design
- Allowable Stresses
- Welding (Fabrication)
- Requirements for Procedures Qualification
- Special Considerations for Pipelines (Categories)
- General
- Operation and Maintenance Procedures
- Covered Piping Systems (CPS)
- Condition Assessment

- Basis for Determining Extent of Assessment and Re-Inspection Interval
- O&M Procedures
- Operation and Maintenance Procedures
- Records
- Records (Recommended)
- Desuperheater Supply Piping Failure
- Fracture
- Brittle Fracture
- Construction Welding and Assembly
- Overview
- Welding Processes
- Welding Basics
- Welding Positions
- SMAW Welding Basics
- SAW Welding Basics
- Welding Procedure
- Standard Welding Symbols
- Welding Symbols
- Destructive Testing
- Hot Tapping
- Hot Tap Configuration
- Non-Standard Taps
- Hot Tap Fittings
- Rules of Thumb
- Fabrication
- In-Service Welding for Hot Taps
- The Main Concerns for In-Service Welding
- API 2201 Requires
- Welding Sequence of Split Tee Fitting (Split Sleeves)
- Pressure Testing of a Hot Tap Fitting or Split Tee
- Hydro Testing & Pigging
- Pipeline Engineering Studies Using Dynamic Simulation
- Setting up the Model

- Going to Dynamics
- Pigging
- Horizontal Slug Flow in a Large-Size Pipeline: Experimentation and Modeling
- Introduction
- Nomenclature
- Test Facility, Instrumentation and Data Processing
- Results
- Gas-Water Mixtures
- Gas-Oil Mixtures
- Conclusions

