Training Course on Onshore Pipeline Engineering Design, Construction and Maintenance

Professional Development Training Course Outline

Category	Development	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The efficient and safe transportation of hydrocarbons and other fluids via **onshore pipelines** is a cornerstone of modern energy infrastructure. This comprehensive training course delves into the critical aspects of **pipeline engineering**, encompassing the entire lifecycle from initial **design and route selection** through meticulous **construction and installation**, to proactive **maintenance and integrity management**. Participants will gain a thorough understanding of industry best practices, relevant **codes and standards**, and the latest technologies employed in ensuring the reliability and longevity of these vital assets. Mastering these principles is crucial for professionals aiming to excel in the dynamic field of **pipeline infrastructure**.

This intensive program addresses the multifaceted challenges inherent in **onshore pipeline projects** . It provides a robust foundation in **mechanical design principles**, including stress analysis and material selection, alongside practical insights into **pipeline construction techniques** such as welding, coating, and trenching. A significant emphasis is placed on **pipeline integrity**, covering corrosion control, inspection methodologies (including **intelligent pigging**), and effective repair strategies. By integrating theoretical knowledge with real-world case studies, this course equips participants with the essential skills to contribute effectively to the planning, execution, and upkeep of **safe and efficient pipeline systems**.

Programme Curriculum

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Course Objectives

This Onshore Pipeline Engineering: Design, Construction & Maintenance training course has the following key objectives:

1. **Understand Onshore Pipeline Design Fundamentals**: Gain a comprehensive understanding of the principles and processes involved in **onshore pipeline design**.
2. **Master Route Selection and Surveying**: Learn the methodologies for effective **pipeline route selection** and the importance of **geotechnical surveys**.
3. **Apply Relevant Codes and Standards**: Become proficient in identifying and applying key **pipeline codes and standards** (e.g., ASME B31.4, ASME B31.8).
4. **Comprehend Pipeline Hydraulics and Flow Assurance**: Understand the principles of **fluid flow in pipelines** and techniques for ensuring **flow assurance**.
5. **Analyze Mechanical Design and Stress**: Learn to perform basic **mechanical design calculations** and understand **stress analysis in pipelines**.
6. **Select Appropriate Pipeline Materials**: Gain knowledge in **pipeline material selection** and considerations for corrosion resistance.
7. **Understand Onshore Pipeline Construction Techniques**: Develop a strong understanding of various **onshore pipeline construction** methodologies.
8. **Master Welding and Non-Destructive Testing (NDT)**: Learn about **pipeline welding procedures** and the application of **non-destructive testing methods**.
9. **Implement Effective Corrosion Control Measures**: Understand different **corrosion protection methods**, including coatings and cathodic protection.
10. **Apply Pipeline Inspection and Integrity Management**: Gain expertise in **pipeline inspection techniques** and the principles of **pipeline integrity management systems (PIMS)**.
11. **Understand Pipeline Maintenance and Repair Strategies**: Learn about various **pipeline maintenance practices** and effective **pipeline repair techniques**.
12. **Address Pipeline Integrity Threats**: Identify and understand common **threats to pipeline integrity** such as corrosion, mechanical damage, and third-party interference.
13. **Learn About Pipeline Commissioning and Decommissioning**: Understand the processes involved in **pipeline pre-commissioning, commissioning, and decommissioning**.

Organizational Benefits

Organizations that invest in this Onshore Pipeline Engineering training course will realize several key benefits:

- **Enhanced Project Efficiency**: Trained personnel can contribute to more efficient planning, design, and execution of **pipeline projects**, minimizing delays and cost overruns.
- **Improved Safety Performance**: A thorough understanding of safety protocols and integrity management practices leads to a safer working environment and reduces the risk of **pipeline incidents**.
- **Reduced Operational Costs**: Effective maintenance and integrity management strategies minimize downtime and reduce the costs associated with **pipeline repairs and replacements** .
- **Compliance with Regulations**: Trained employees ensure adherence to relevant **industry standards and regulatory requirements**, avoiding potential penalties and legal issues.
- **Increased Asset Longevity**: Proper design, construction, and maintenance practices extend the lifespan of **pipeline assets**, maximizing return on investment.
- **Better Decision Making**: A strong understanding of **pipeline engineering principles** empowers employees to make informed decisions regarding project development and operational activities.
- **Enhanced Problem-Solving Capabilities**: Trained professionals are better equipped to identify, analyze, and resolve technical challenges related to **pipeline systems**.
- **Improved Team Collaboration**: A shared understanding of **pipeline engineering concepts** fosters better communication and collaboration across different engineering disciplines.

Target Audience

This training course is specifically designed for a wide range of professionals involved in the onshore pipeline industry, including:

1. Piping Engineers
2. Pipeline Engineers
3. Project Engineers
4. Construction Managers
5. Maintenance Engineers and Technicians
6. Integrity Engineers
7. Inspection Personnel
8. HSE Professionals

Course Outline

This comprehensive training course is divided into 15 modules, each focusing on a critical aspect of onshore pipeline engineering:

Module 1: Introduction to Onshore Pipeline Engineering

- Overview of the onshore pipeline industry and its importance.
- Lifecycle of an onshore pipeline project.
- Key stakeholders involved in pipeline projects.
- Basic terminology and definitions in pipeline engineering.
- Historical overview and future trends in pipeline transportation.

Module 2: Pipeline Route Selection and Survey

- Factors influencing pipeline route selection (environmental, social, economic).
- Different types of surveys (topographical, geotechnical, environmental).
- Use of GIS in pipeline routing and mapping.
- Right-of-way acquisition and permitting processes.
- Considerations for pipeline crossings (roads, rivers, railways).

Module 3: Pipeline Codes, Standards, and Regulations

- Introduction to major international and regional pipeline codes (e.g., ASME, API, ISO).
- Understanding regulatory requirements and compliance.
- Importance of standards in design, construction, and operation.
- Overview of relevant safety and environmental regulations.
- Case studies of code and standard application in real projects.

Module 4: Pipeline Hydraulics and Flow Assurance

- Fundamentals of fluid flow in pipes (laminar vs. turbulent flow).
- Pressure drop calculations and pipeline sizing.
- Pump and compressor selection and operation.
- Flow assurance challenges (hydrates, wax, scaling).
- Strategies for maintaining efficient flow in pipelines.

Module 5: Pipeline Mechanical Design

- Stress analysis in pipelines (hoop stress, longitudinal stress).
- Wall thickness calculations and pipe grade selection.
- Design considerations for internal and external pressure.
- Load analysis (dead loads, live loads, thermal loads).
- Design of pipeline supports and anchors.

Module 6: Pipeline Materials and Corrosion

- Types of materials used in onshore pipelines (carbon steel, stainless steel, etc.).
- Material properties and selection criteria.
- Mechanisms of internal and external corrosion.
- Corrosion prevention methods (coatings, cathodic protection, inhibitors).
- Material testing and quality control.

Module 7: Onshore Pipeline Construction - Part 1

- Pre-construction planning and site preparation.
- Pipeline stringing, bending, and welding processes.
- Quality control in pipeline construction.
- Non-destructive testing (NDT) methods and their application.
- Safety procedures during pipeline construction.

Module 8: Onshore Pipeline Construction - Part 2

- Trenching, pipe laying, and backfilling techniques.
- Pipeline lowering and tie-in procedures.
- Crossing construction (road, river, railway).
- Horizontal Directional Drilling (HDD) techniques.
- Construction equipment and machinery.

Module 9: Pipeline Welding and Joining

- Different welding processes used in pipeline construction.
- Welding procedures and qualification.
- Inspection and testing of welds.
- Importance of welding quality for pipeline integrity.
- Emerging welding technologies.

Module 10: Pipeline Inspection and Testing

- Hydrostatic testing procedures and requirements.
- Leak detection methods and technologies.
- In-line inspection (ILI) using intelligent pigs.
- Direct assessment techniques for corrosion.
- Regulatory requirements for pipeline inspection.

Module 11: Pipeline Integrity Management Systems (PIMS)

- Principles of risk-based integrity management.
- Data collection and analysis for integrity assessment.
- Development and implementation of PIMS.
- Fitness-for-service (FFS) assessments.
- Integrity management planning and scheduling.

Module 12: Threats to Pipeline Integrity and Safety

- External corrosion, internal corrosion, and stress corrosion cracking.
- Mechanical damage (dents, gouges).
- Third-party interference and vandalism.
- Natural hazards (earthquakes, floods, landslides).
- Emergency response planning and procedures.

Module 13: Pipeline Maintenance and Repair

- Types of pipeline maintenance activities (preventive, corrective).
- Pipeline cleaning and pigging operations.
- Methods for pipeline repair (sleeves, clamps, replacement).
- Hot tapping and in-service welding techniques.
- Management of aging pipelines.

Module 14: Pipeline Commissioning and Decommissioning

- Pre-commissioning activities (cleaning, gauging, pressure testing).
- Pipeline start-up and commissioning procedures.
- Considerations for pipeline decommissioning and abandonment.
- Environmental aspects of decommissioning.
- Regulatory requirements for decommissioning.

Module 15: Emerging Technologies and Future Trends in Pipeline Engineering

- Smart pipelines and sensor technologies.
- Digitalization and data analytics in pipeline operations.
- Use of drones and robotics for inspection and maintenance.
- Pipelines for transportation of new energy sources (hydrogen, CO2).

- Sustainability and environmental considerations in future pipeline development.

Training Methodology

This Onshore Pipeline Engineering training course will utilize a blended learning approach to maximize knowledge retention and practical application:

- **Interactive Lectures**: Engaging presentations covering theoretical concepts and industry best practices, incorporating real-world examples and case studies.
- **Group Discussions**: Facilitated discussions to encourage peer-to-peer learning and the sharing of experiences and perspectives.
- **Case Studies**: In-depth analysis of real pipeline projects and challenges to illustrate key principles and problem-solving techniques.
- **Practical Exercises**: Hands-on exercises and simulations to reinforce understanding and develop practical skills in areas like design calculations and integrity assessment.
- **Visual Aids**: Extensive use of diagrams, videos, and simulations to enhance comprehension of complex concepts.
- **Q&A Sessions**: Dedicated time for participants to ask questions and clarify doubts.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org **or call** *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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