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FE038:
Advanced Sub-Sea Pipeline Engineering

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Training Description:

This course covers the whole subject of subsea pipeline engineering from system design, and route selection through detailed engineering to construction, inspection, maintenance and decommissioning. It includes a large number of actual case studies and examples, some from the Gulf and others from the North Sea, North America and Africa. The course does not require previous experience of marine pipelines, but it is not a superficial overview, and it goes into detail about current thinking and recent developments. It includes a design exercise carried out by the delegates, working in small groups and under the guidance of the lecturer.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Apply and gain an in-depth knowledge on subsea pipeline engineering
- ✓ Discuss marine pipeline construction, route selection, hydraulics and flow assurance
- ✓ Demonstrate the design exercise including pipeline configuration, diameter and route selection
- ✓ Explain the design for strength as well as insulation and temperature control
- ✓ Recognize the marine environment and discuss the carbon steel line pipeline, material of service and increasing corrosion resistance
- ✓ Differentiate the internal corrosion, external corrosion and coatings as well as the significance of cathodic protection
- ✓ Implement the correct process of lateral and upheaval buckling including pipelaying codes, microbiological corrosion and spans

Training Designed for:

This course is intended for anyone with responsibility for pipeline design work or who has to approve pipeline design, including Pipeline Engineers responsible for design calculations, Project Managers and Project Engineers, Managers and Supervisors responsible for Design Engineers and Pipelines.

Training Requirement:

"Hands-on practical sessions, equipment and software will be applied during the course if required and as per the client's request".

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ Overview – Marine Pipeline System Configuration
  - Introduction to design sequence and its interaction with the different topics covered in the course. Film on construction and connection of an offshore pipeline
- ❖ Route Selection
  - Principles of route selection. Constraints imposed by oceanographic, geotechnical, environmental, safety and political factors. Case studies

- Shore Approaches
  - Influence of coastal topography, geotechnics, tides and waves. Alternative construction techniques. Horizontal drilling and tunnels. Case studies
- Marine Pipeline Construction
  - Construction methods. Laybarge, S-Lay and J-Lay. Reelship. Mid-depth tow, bottom tow and surface tow. Advantages and disadvantages of different methods

DAY TWO:

- Hydraulics and Flow Assurance
  - Single-phase flow, oil and gas; calculation of pressure drop and effect on optimal line size; influence of compressibility, temperature change and profile, two phase flow; flow regimes, correlations, profile effects, terrain-induced slugging, slugging in risers. Surge. Hydrates and wax.
- Pipeline Structural Analysis
  - Sulfate-reducing bacteria. Microbiological corrosion mechanisms. Water injection pipelines. Evaluation of the problem. Housekeeping and treatment.
- Internal Inspection and Corrosion Monitoring

DAY THREE:

- Introduction to Design Exercise
- Design Exercise Phase 2
- Presentation of conclusions of design exercise
- Discussion of design exercise and worked example

DAY FOUR:

- Mishaps, Risk and Repair
  - Failure incidents. Incidents during construction. Inherent defects. External factors. Old age. Repair and modifications. Reliability theory. Minimizing risk. Integrity management. Repair techniques, case studies of repair after incidents described under risk and safety assessment.
- Project History: Shell's Experience with Hurricanes Ivan, Katrina and Rita - Response and Lessons Learned
- Pipelaying and Trenching
  - Alternative Construction methods. Trenching and burial methods jetting, mechanical cutting, plowing, rock dumping, backfill, dredging. Case studies and construction films

DAY FIVE:

- Welding
  - Welding of carbon manganese pipeline steels. Welding of duplex and clad pipe. Inspection of weldments
- Span Assessment and Correction
  - Description of span occurrence and possible systems. Analysis; vortex-excited oscillation, overstress, hooking. Span monitoring and correction

- ❖ Decommissioning
  - Legal framework. Legislation. Decay mechanisms. Re-use. Methods of recovery. Alternatives to Recovery. Disposal materials. Costs.
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
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