# COURSE OVERVIEW OE0878-3D

# Subsea Pipeline Repair Techniques

**Course Title**
Subsea Pipeline Repair Techniques


**Course Date/Venue**
Session 1: July 13-15, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
Session 2: September 14-16, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

**Course Reference**
OE0878-3D


**Course Duration/Credits**
Three days/1.8 CEUs/18 PDHs

**Course Description**

***This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.***

This course is designed to provide participants with a detailed and up-to-date overview of Subsea Pipeline Repair Techniques. It covers the common failure modes in subsea pipelines, degradation mechanisms and leaking detection strategies; the inspection triggers, lifecycle phases and criticality for repair strategies; the damage assessment, wall thickness and cracking depth evaluation; the structural and flow assurance considerations and failure modes and effects analysis (FMEA); and the repair planning methodologies and subsea repair design considerations.

Further, the course will also discuss the reliability, availability, maintainability (RAM) analysis and risk-based inspection (RBI) approach to repair strategy; the differences in execution scope and timelines, emergency response kit components, lessons learned from past unplanned repair events and mobilization and rapid deployment protocols; and the diver-assisted repair techniques, ROV-based repair techniques and mechanical repair systems.

During this interactive course, participants will learn the composite and epoxy-based repairs, welding and hot-tap repair techniques and isolation and pipeline preparation techniques; the clamp installation tools and guides, spool and jumper handling skids, custom-engineered support tools and tool deployment frames and alignment jigs; the vessel selection for intervention, equipment mobilization and deck layout planning; the launch and recovery systems (LARS) and weather windows, metocean data and DP systems; the NDT methods, seal pressure testing, hydrotest procedures, structural monitoring and sensor integration, post-repair validation and commissioning; the digital twins and simulation tools for repairs, subsea condition monitoring with AI analytics, real-time repair modeling and visualization; and the integration with digital asset management systems.

## Course Objectives

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

- Apply and gain an in-depth knowledge on subsea pipeline repair techniques
- Discuss the common failure modes in subsea pipelines, degradation mechanisms, leak detection strategies and inspection triggers and lifecycle phases and criticality for repair strategies
- Carryout damage assessment, wall thickness and crack depth evaluation, structural and flow assurance considerations and failure modes and effects analysis (FMEA)
- Recognize repair planning methodologies and subsea repair design considerations
- Apply reliability, availability, maintainability (RAM) analysis and risk-based inspection (RBI) approach to repair strategy
- Explain the differences in execution scope and timelines, emergency response kit components, lessons learned from past unplanned repair events and mobilization and rapid deployment protocols
- Employ diver-assisted repair techniques, ROV-based repair techniques and mechanical repair systems
- Carryout composite and epoxy-based repairs, welding and hot-tap repair techniques and isolation and pipeline preparation techniques
- Apply clamp installation tools and guides, spool and jumper handling skids, custom-engineered support tools and tool deployment frames and alignment jigs
- Implement vessel selection for intervention, equipment mobilization and deck layout planning as well as recognize launch and recovery systems (LARS) and weather windows, metocean data and DP systems
- Employ NDT methods, seal pressure testing, hydrotest procedures, structural monitoring and sensor integration, post-repair validation and commissioning
- Apply digital twins and simulation tools for repairs, subsea condition monitoring with AI analytics, real-time repair modeling and visualization and integration with digital asset management systems

## 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 subsea pipeline repair techniques for pipeline and subsea engineers as well as integrity, corrosion, inspection and maintenance engineers.

## 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$ 5,250** per Delegate + **VAT**. 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

Haward's certificates are accredited by the following international accreditation organizations:

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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 **1.8 CEUs** (Continuing Education Units) or **18 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.

**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:

**Captain Sergey Kole**, is an **International Expert** in **Port Operations & Logistics Management** with over **25 years** of **onshore** and **offshore** experience within the **Oil & Gas**, **Petroleum** and **Refinery** industry. His expertise widely covers in the areas of **Anatomy of Shipping**, **Logistics & Transportation Planning** Methods, **Forecasting Logistics** Demands, Visual Network Model, **Logistics Operations**, **Tanker Vetting & Inspection**, **Marine Vetting & Audit Criteria Manual** for **Tank Ships**, **Marine & Ship Vetting**, **Vetting Process & Marine Safety Criteria**, **Tanker Vetting** for **Terminals**, **Ship Vetting**, **Marine Terminal** Operations & Management, **Marine Hazards** Prevention & Control, **Marine Communication** Systems, **Marine Safety**, **Ship** Management, **Oil Terminal** Planning, **Vessels** Operations, **Terminal** Management & Support Operations, **Oil Spill Contingency & Emergency Response Plan**, **Qualitative & Quantitative Risk** Assessments, **Terminal** Planning, **Oil Tanker Storage** Planning, **Cargo Transfer** Handling, Loading & Discharging, **Ballasting**, **Tank** Cleaning, **Crude Oil Washing**, **Ship** Handling, **Radar** Navigation, **Navigational** Aids, **Meteorological** Data Review, **Sea & Weather** Condition Monitoring, **ERT Vessel** Coordination and **Transport & Distribution Carrier**. Further, he is well-versed in **Sea-going** Personnel Human Resource Management, **Survival Craft & Rescue Boats**, Dynamic Positioning, Anti-Piracy Preparedness & Response, **Shipping** Maintenance System, **Oil & Chemical Tanker**, **Liquefied Gas Tanker**, **Inert Gas** System, **Crude Oil** Tanker & Gas Carrier, Offshore Logistics & Supply Management, **Marine Fleet** Management & Operations, **International Maritime Conventions & Codes**, **Marine Radar**, **Port Traffic Control** Systems & Instrumentation, **$H^2S$** Hazard Awareness, **Firefighting**, Medical Care Onboard, Carriage of Dangerous & Hazardous Substances and **Ballast Water & Sediment** Management.

During his career life, Captain Sergey has gained his technical and marine expertise through various challenging key positions such as being the **Captain**, **Operations Director**, **Project Manager**, **Port Supervisor**, **Master** of General Cargo Ship, **Master** of Container Ship, **Chief Officer**, **Marine Operations Specialist**, **Marine Coordinator**, **On-call Duty Officer**, **Crewing Consultant**, **2nd Officer**, **Ship Chandler** and **Senior Instructor/Trainer** for several international companies such as **ZADCO**, **AMEC Foster Wheeler**, Fircroft Engineering Services, Ltd., Rusalina Yacht Company, Van Oord Offshore, Exxon Neftegaz Ltd (ENL), Jr Shipping, Carisbrooke Shipping, Unicorn Petrol ve Kimya, Q Shipping BV, m/v Tradeport, Miedema Shipping CV, Rah Management BV, Petrobulk Maritime Inc., Empross Lines Ship Management, Melcard Ltd., Aquarian Shell Marine Inc., Mercy Baaba and Square Ltd.

Captain Sergey has a **Bachelor's** degree in **Navigation** in **Nautical Studies** from the **Kiev State Academy** of **Water Transport**, **Ukraine** and holds a **Master Mariner** (Unlimited) Certificates of Equivalent Competency from the MCA, UK and NSI, Netherlands. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and has delivered various 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***

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| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Overview of Subsea Pipeline Integrity***<br>*Common Failure Modes in Subsea Pipelines • Degradation Mechanisms (Corrosion, Fatigue, Freespans) • Leak Detection Strategies & Inspection Triggers • Lifecycle Phases & Criticality for Repair Strategies* |
| *0930 - 0945* | *Break* |
| *0945 – 1045* | ***Root Cause Analysis & Defect Characterization***<br>*Techniques for Damage Assessment (Visual, NDT, ROV-Based) • Wall Thickness & Crack Depth Evaluation • Structural & Flow Assurance Considerations • Failure Modes & Effects Analysis (FMEA)* |
| *1045 - 1145* | ***Repair Planning Methodologies***<br>*Decision-Making: Replace versus Repair • Regulatory & Class Requirements (DNV-ST-F101, ISO 24817) • Environmental & Safety Constraints • Planning Interface with Operations & Logistics* |
| *1145 - 1230* | ***Subsea Repair Design Considerations***<br>*Design of Clamps, Sleeves & Structural Reinforcements • Load Transfer & Stress Redistribution Principles • Material Compatibility & Corrosion Allowance • Hydrodynamic & Thermal Considerations* |
| *1230 – 1245* | *Break* |
| *1245 – 1330* | ***Risk Assessment & Repair Prioritization***<br>*Risk Matrix for Subsea Systems • Repair Urgency Grading System • Tools: RAM (Reliability, Availability, Maintainability) Analysis • Risk-Based Inspection (RBI) Approach to Repair Strategy* |
| *1330 - 1420* | ***Emergency versus Planned Repairs***<br>*Differences in Execution Scope & Timelines • Emergency Response Kit Components • Lessons Learned from Past Unplanned Repair Events • Mobilization & Rapid Deployment Protocols* |
| *1420 – 1430* | ***Recap***<br>*Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow* |
| *1430* | *Lunch & End of Day One* |

***Day 2***

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| *0730 – 0830* | ***Diver-Assisted Repair Techniques***<br>*Depth & Visibility Considerations • Habitat Installation & Hot-Tapping Under Diver Support • Riser & Spool Piece Repair by Diver Welding • Diver Safety & Communication Systems* |
| *0830 – 0930* | ***ROV-Based Repair Techniques***<br>*Capabilities & Limitations of Work-Class ROVs • ROV-Manipulated Bolted Clamp Installation • Subsea Cutting, Grinding & Cleaning by ROV • Integration of Sensors & Feedback Tools* |
| *0930 - 0945* | *Break* |

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| *0945 – 1130* | ***Mechanical Repair Systems***<br>*Pipeline Repair Clamps (Standard, Custom, Split Sleeves) • Repair Sleeves with Elastomeric Seals • Mechanical Bolt-Torque Systems for Deepwater • Design & Seal Integrity Verification Methods* |
| *1130 - 1230* | ***Composite & Epoxy-Based Repairs***<br>*Cold Repair Using Composite Wraps (e.g., ClockSpring) • Epoxy Injection Methods & Qualification Requirements • Repair Envelope & Pressure/Temperature Limits • Surface Preparation & Curing Time Underwater* |
| *1230 - 1245* | *Break* |
| *1245 - 1330* | ***Welding & Hot-Tap Repair Techniques***<br>*Hyperbaric Welding Types (Wet, Dry, Habitat Welding) • In-Situ Sleeve Installation & Welding Sequence • Hot Tapping Live Subsea Pipelines: Safety & Integrity • Case Studies of Successful Field Welding* |
| *1330 - 1420* | ***Isolation & Pipeline Preparation Techniques***<br>*Pipeline Pigging, Dewatering & Drying • Isolation Tools: Plugs, Smart Tools, Inflatable Barriers • Leak Containment & Pressure Control • Pressure Testing, Flushing & Chemical Cleaning* |
| *1420 – 1430* | ***Recap***<br>*Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow* |
| *1430* | *Lunch & End of Day Two* |

***Day 3***

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| *0730 – 0830* | ***Repair Tooling & Installation Aids***<br>*Clamp Installation Tools & Guides • Spool & Jumper Handling Skids • Custom-Engineered Support Tools • Tool Deployment Frames & Alignment Jigs* |
| *0830 – 0930* | ***Mobilization, Logistics & Support Vessels***<br>*Vessel Selection for Intervention (DSV, MSV, CSV) • Equipment Mobilization & Deck Layout Planning • Launch & Recovery Systems (LARS) • Weather Windows, Metocean Data & DP Systems* |
| *0930 - 0945* | *Break* |
| *0945 – 1100* | ***Quality Assurance & Validation of Repairs***<br>*NDT Methods: ACFM, UT, Eddy Current for Subsea • Seal Pressure Testing, Hydrotest Procedures • Structural Monitoring & Sensor Integration • Post-Repair Validation & Commissioning* |
| *1100 – 1200* | ***Digital Technologies & Monitoring Tools***<br>*Digital Twins & Simulation Tools for Repairs • Subsea Condition Monitoring with AI Analytics • Real-Time Repair Modeling & Visualization • Integration with Digital Asset Management Systems* |
| *1200 - 1215* | *Break* |
| *1215 – 1230* | ***Lessons Learned from Global Repair Projects***<br>*Deepwater Clamp Repair in West Africa • Pipe Rupture Intervention in North Sea • Unmanned Intervention in Gulf of Mexico • Failures Due to Poor Seal Compatibility – Case Lessons* |

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| *1230 - 1345* | ***Interactive Case Study & Workshop***<br>*Group Exercise: Repair Planning for a Leaking 18" Gas Export Line at 110m Depth • Damage Assessment with Data Sets Provided • Team Decision-Making on Repair Option Selection • Tooling, Deployment & Validation Planning* |
| *1345 – 1400* | ***Course Conclusion***<br>*Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course* |
| *1400 – 1415* | ***POST-TEST*** |
| *1415 – 1430* | *Presentation of Course Certificates* |
| *1430* | *Lunch & End of Course* |

## Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

## Course Coordinator

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