COURSE OVERVIEW DE0975
Stuck Pipe Prevention (E-Learning Module)

Course Title
Stuck Pipe Prevention (E-Learning Module)

Course Reference
DE0975

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 is designed to provide participants with an up-to-date overview of stuck pipe prevention and fishing operation. It covers the mechanisms and risk factors that lead to stuck pipe incidents (wellbore instability, hole cleaning, differential sticking, and wellbore geometry); the assessment mechanics of wellbore stresses and the impact on wellbore stability; analyzing trends to identify early warning signs of developing wellbore problems; the effective drilling and tripping practices; and making cost-effective choices in planning fishing operations.

Further, the course will also discuss the fishing technology and the stuck pipe mechanisms; the workover planning and problem recognition; the water control problem and the various types of problems; drilling fluids optimization; the fishing for parted pipe and fishing cavities; the fishing options in horizontal wells and the fishing for junk; the wash-over and jarring operations; and the types of fishing jars.

During this interactive course, participants will learn the jar placement program operating instructions; the cased hole fishing and stuck tubing, causes and solutions; the functions and components of packer; the casing repair, coiled tubing fishing operations and fishing; the wire line and the methods in string recovery; as well as the job planning and its components and the economics of fishing.

Course Objectives

After completing the course, the employee will:-

- Apply and gain an in-depth knowledge on stuck pipe prevention
- Identify mechanisms and risk factors that lead to stuck pipe incidents (wellbore instability, hole cleaning, differential sticking, and wellbore geometry)
- Assess mechanics of wellbore stresses and the impact on wellbore stability
- Analyze trends to identify early warning signs of developing wellbore problems
- Implement effective drilling and tripping practices
- Make cost-effective choices in planning fishing operations
- Define fishing technology and discuss the stuck pipe mechanisms
- Determine the workover planning and recognize the problem
- Identify the water control problem and employ the various types of problems
- Explain the drilling fluids optimization
- Discuss the fishing for parted pipe and fishing cavities including milling operations and free point
- Enumerate the fishing options in horizontal wells and recognize the fishing for junk
- Illustrate the wash-over and jarring operations and identify the types of fishing jars
- Explain the jar placement program operating instructions
- Discuss the cased hole fishing and stuck tubing, the causes and solutions
- Explain the packer including its functions and components
- Distingush the casing repair, coiled tubing fishing operations and fishing
- Determine the wire line and employ the methods in string recovery
- Explain the job planning and its components including the economics of fishing

Who Should Attend

This course provides an overview of all significant aspects and considerations of stuck pipe prevention and fishing (well services) for drilling operations section leaders, drilling engineering supervisors, well engineers, petroleum engineers, well servicing/workover/ completion staff and field production staff.

Course Fee

As per proposal

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: -

- USA International Association for Continuing Education and Training (IACET)

  Haward 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, Haward 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, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 1-2013 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 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.

  Haward 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 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.

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 Contents

- What is Fishing?
- Objectives
- Observations
- Stuck Pipe Mechanisms
- Identify the Cause
- Pre-Examination
- Course Recap
- Stuck Pipe Mechanisms
- The common Causes of Stuck are:
- Stuck Pipe Mechanism Chart
- Differential Sticking
- Differentially Stuck Pipe
- Differentially Sticking Spreadsheet
- Preventative Action
- Methods used in Freeing Differentially Stuck Pipe
- Differential Sticking Force
- Differential Sticking Spreadsheet below is used to Determine the Sticking Force
- Using Lubricators
- Jarring the Pipe Loose

- "U" Tube Technique
- Differential Sticking Operational Procedures
- Unconsolidated Formations
- Preventative Actions
- Filtrate Reducers
- Key Seat
- Surface Jars
- Preventive Action
- Standard Single Clutch Key Seat Wiper
- Standard Double Clutch Key Seat Wiper
- Course Recap
- Workover Planning & Problem Recognition
- What is a Workover?
- Workover Methods
- Reasons for Working Over a Well
- Service Unit Functions
- Workover Rigs Functions
- What is the Tools used for Well Analysis?
- Well Analysis Tools
- Characteristic of Problem Wells
- Water Control Problem Identification & Solutions -Problem Types
- Water Production Mechanisms
- Well Analysis
- The Well Maintenance Requirements for a Completion
- Workover Types
- Stimulation
- Workover Involving Drilling
- Workover Operations
- Summary of Common Problems & Workover Operations
- Drilling Fluids Optimization
- In this Section
- Selection of Fluid Type
- Rheology

- Gels
- Inhibition
- Well Bore Stability/Inhibition
- Inadequate Hole Cleaning
- Mud Lubricity - Torque and Drag Reduction
- Filtration Control/Differential Sticking
- Solids Control Management
- Torque and Drag
- String Torque
- Mechanical Torque Factors
- Bit Torque
- Course Recap
- Fishing for Parted Pipe
- Fishing for Parted Pipe
- Causes of Parted Pipe
- Good Questions to Determine Tool Selection
- Things to Consider
- Planning the Fishing Job
- Lead Blocks Parted Pipe
- Dress and Catch Fish in Trip
- Tapered Mill Guide
- Skirted Mill
- Bottom Hole Assembly Options
- Desirable Characteristics for an Attachment Tool
- Screw In
- Screw in Accessory
- Overshots
- Overshot Series Series 10 and 20 Sucker Rod Overshots
- Overshot Series Series 70
- Overshot Series
- Bowen Series 150 - Releasing and Circulating Overshots
- Overshot Types
- Bowen Series 150 Circulating and Releasing Overshot

- Overshots – Parts Required for Bowen Series 150
- Three Outer Components of an Overshot
- Overshot Bowl and Basket Grapple
- Grapple Detail
- Grapples
- Slim Hole Grapple Tolerances
- Close Enough Isn't Good Enough
- What Size Overshot?
- Basket Grapples
- Plain Basket Grapples
- Basket Grapple – Built in Stop Long Catch
- Basket Grapple – Built in Stop Short Catch
- Built in and Floating Stop Rings
- Basket Grapples
- Shop Made Stop for Overshot
- Overshot Packoffs
- Spiral Grapple & Accessories
- Overshot Packoffs
- Overshot Packoffs –Type "D" Packer
- Packoffs
- Spiral or Basket Grapple?
- Special Grapples
- Overshot Extensions
- Overshot Accessories
- Things to Consider
- Series 150 Overshot Strengths Maximum Recommended Tightening Torques
- Spears and Accessories
- "ITCO" Type Releasing Spear
- Bowen Releasing Spears
- Spear with Stop & Packoff
- Spear Operation
- Releasing Spears
- Segment Type Grapples

- Spear Accessories
- Bowen Releasing Spear
- Reversing Tool
- H.E. Reversing Tool
- H.E. Left Hand Overshot
- Capacity of the Work String
- Capacity of the Tool
- Torque Capacity Ratio at Various Tension Levels
- Rig Requirements
- Illustration
- Tool Requirements
- Attachment Tools
- Making a Backoff
- Disconnecting from Fish
- Taps
- Box Tap or Die Collar
- Box Tap
- Taper Tap
- Taper Tap Engaging Fish
- Fish Retrieved by Taper Tap
- Drill Pipe Pin Tap
- Hollow Pin Tap
- Attachment Tools Comparison
- Section 6 -Fishing in Cavities
- Fishing in Cavities
- Too Much Weight
- Eliminates Other Options
- Getting Over Fish With Wash Pipe
- Don’t Side Track
- Fishing in Cavities
- Getting Over TOF
- Function of Trahan Bushing
- Trahan Bushing

- How to Apply
- Other Options
- Shorten Wash Pipe
- Cripple Shoe
- Re-Top Fish with Spear
- Kick Sub
- Re-Top Fish with Kick Sub
- Mule Shoe Bent Joint
- Course Recap
- Section 7- Milling Operations
- Milling Applications
- Milling Rotary Speeds
- Weight on Mills
- For Rotary Shoe the Formula is:
- Optimizing Cutting Returns
- Junk Milling Operations
- Mud Conditioning for Milling:
- How to Read Cuttings.
- Some Factors that Affect Milling Rates.
- What to do about rubber in the hole?
- Stabilizing the Mill
- What to do about rough operation?
- Mills
- Cone Buster/Flat Bottom Mills
- Cone Buster/Flat Bottom Junk Mill
- Bladed Mill
- Insert Dressed Bladed Junk Mill
- Bladed Mills/Stabilizer Pads
- Piranha Junk Mill
- Pilot Mill/Diamond Point
- Pilot Mill/Lower Connection Type
- Tapered Mills
- Watermelon/String Mills

- Factors Effecting Milling Rates
- Maintain Consistent Parameters
- Small Curled Chips:-Easy Removal
- Milling Rates: Surface Feet/Minute
- Bowen Ditch Magnets
- Mills Review
- Course Recap
- Section 8 -Free Point
- Calculation for free point in stuck drill Pipe single or Tapered Strings
- Est. Stuck Pt. = Tapered String
- Formula for Tapered String
- Example Estimated Stuck Point
- Observation
- Results of Formula
- Method # 2
- Example
- Results of Formula
- Section 9- Fishing Options In Horizontal Wells
- Economics - When to Quit Fishing? Economics - When to Quit Fishing?
- Free-point and Pipe Recovery
- Fishing horizontal Wells – Hard Formation
- Fishing horizontal Wells – Soft/ Medium Formation
- Catching a Fish in a Horizontal Well
- Jarring Options and Placement
- Fishing horizontal Wells
- Jar Placement and Impact/Impulse Calculations
- Fishing Tool B.H.A
- Wash-over Operation in Horizontal Wells
- Section 10- Fishing for Junk
- Questions to Determine Best Fishing Procedures
- Exercise 1
- Ways to Fish for Junk
- Exercise 2

- Fishing Magnet
- Running Magnets
- Boot Basket
- Weatherford Type P Boot Basket
- Bowen Itco Type Junk Basket
- Finger Catchers
- Operation: Core Basket
- Core Type Basket
- Reverse Circulation/Jet Junk Basket
- Venturi Jet Junk Basket
- Venturi Jet System
- Venturi Jet Assembly – 4-3/4''
- Petro China Job in Indonesia
- BP Job in England
- Junk Shot
- Poor Boy Basket
- Finger Type Shoe
- Dimple Type Shoe
- Spring Tine -Type Shoe
- Spring Tine Basket
- Wire Catcher Shoe
- Exercise 3
- Section 11- Wash Over Operations
- Stuck Pipe Flowchart
- Jar or Wash Over?
- Wash Over Operations
- Running Washpipe
- Wash Over Pipe
- Hole Conditions
- Weatherford Enterra Wash Pipe Standard
- Washpipe Comparison Chart
- Standard Washover Assembly
- Washover Safety Joints

- Equipment List for a Wash Over
- Stripping Fish From a Wash Pipe Using a Backoff Connector
- Stripping Stand with Bowl and Slips
- Wash Over Crooked Pipe
- Hydril 511 Connections
- Weatherford Washpipe Comparison Chart
- True Circle Tong Bushing
- Closed: True Circle Tong Bushing
- Shoe Selection
- Tooth Type Washover Shoe
- Flat Bottom Washover Shoe
- Scalloped Bottom Washover Shoe
- Five Tooth Type L Rotary Shoe
- Carbide Dressed Drag Type A Shoe
- Type J Tooth Type Shoe
- Type K Tooth Type Shoe
- Type B Scallop Bottom Shoe
- Type F Scallop Bottom Shoe
- Type F Flat Bottom Shoe
- Flat Bottom Type M Shoe
- Type E Flat Bottom Shoe
- Type D Flat Bottom Friction Shoe
- Mule Shoe
- Only Tool Joints Stuck
- Kick Pad in Shoe
- Rotary Shoe
- Review
- Course Recap
- Section 12- Jarring Operations
- Jarring Force
- Preferring Impact or Impulse?
- The Force of the Jarring Blow is Influenced by the Following Factors
- In Hydraulic Jar

- Mechanical Jars Tripping
- The Combined Effect of the Load and Duration is Called Impulse
- Changing impact and impulse
- Bottom Hole Assembly Design and Usage
- Types of Fishing Jars
- Hydraulic Fishing Jars
- Fishing Bumper Jar
- Dailey HyPulse Jar Slinger
- Example of Dailey HyPulse Jar Slinger
- Mechanical Drilling Jars
- Dailey® L.I. Mechanical Drilling Jar
- Dailey L.I. Mechanical Drilling Jar
- Fishing String
- Jar Placement: Vertical Hole or Less Than 30°
- Directional Hole > 30°
- Pump Open Force
- Calculating Trip Load-Mechanical Jar
- Reasons for Jar Failure Answers
- Rules of Thumb for Drilling Jars
- Exercise 2: Jar Case Study
- Jarring While WO O
- Stuck B.H.A.
- Free Point, Backoff, and Jar
- Running Free Point and Jar
- Jarring on Fish
- Trip # 2 @ 5:00 a.m. 11-25-97
- Jarring on Fish
- Course Recap
- Section 13 -Weatherford Jar Placement Program Operating Instructions.
- Menus and Action Buttons
- General Data Entry
- Date
- Customer

- Well Name/No.
- Analyst
- Case Number
- Measured Depth
- Depth Remaining
- Drill String Data Entry
- Tool
- Type
- OD
- ID & Weight
- Angle
- Length
- Add a Component
- Adding a Jar
- Delete a Component
- Edit a Component
- General Jarring Analysis Data
- General Jarring Analysis Tab
- Weight on Bit
- Mud Weight
- Side Wall Coefficient
- Jarring Direction
- Jar Tripping Forces
- Select Stuck Locations
- Time Step
- Jar Placement Optimization
- Optimization Methods
- Fixed Anvil Length
- Initial Hammer Length
- Hammer Length Increment
- Number of Increments
- Run Analysis
- Progress Bar & Stop Button

- Output
- Output Page 1
- Output Page 2
- Result Graph and Table
- Jarring Dynamics
- Important Concepts
- Example #2 Placement
- Example #2 – Drill String Entry
- Example #2 – Optimization
- Example #2 – Recommended Assy.
- Example #2 – Output Calculated Data
- Example #2 – Check
- Final Placement Notes
- Jar Placement Basics
- Course Recap
- Section 14-Cased Hole Fishing.
- Potential Problems in Cased Hole
- Stuck Tubbing: Cause and Solution
- Mud Stuck Tubing
- Free Point Readings
- Sand Stuck Tubing
- Tubing is Plugged on the Inside
- Inside-Outside Backoff Collar
- Washover Operations in Cased Hole
- H.E. Washover External Cutter
- Cutter Capacity
- Blind Backoff
- Bowen External Cutter
- Bowen Outside Cutter
- Bowen External Cutter
- Bowen Hydraulic External Cutter
- What is a Packer?
- Function of Packer

- Packer Components
- Mechanical Set Packer is Stuck
- Setting Packers
- Packer Types
- Packer Retrieving Tools
- Mill Out Extension, Seal Bore and No Extension
- Packer Retrieving Tools
- Packer Retrieving Spear
- Bottom Catch Packer Retrieving Spear
- Top Catch Packer Retrieval Spears
- Pioneer Slick Bore Packer Retrieval Spear
- Pioneer Hydraulic-Release Packer Retrieval Spear
- Things to Consider
- Rotary Shoes
- Know Your Dimensions and Lengths
- Well Schematic
- Multiple Strings
- Mule Shoe Joint with “No-Go”
- Milling Over Otis RDM Packers
- 2 3/8” O.D. Special Washdown Mill
- Clean out Between Packers
- TripSaver Bushing
- A-5 Packer
- Course Recap
- Section 15-Casing Repair
- Causes of Casing Failures
- Types of Casing Failures
- Collapsed & Parted Casing
- Decision Chart: Collapsed or Parted
- Identify
- Casing Inspection Logs
- RTTS Packer
- Lead Impression Block

- Down Hole Video
- Bowen Casing Rollers
- Eastman Whipstock Casing Rollers
- Swage Construction
- Swaging Tool
- Casing Swage
- Chasing Repair video
- External Casing Patches
- External Casing Patch
- Lead Seal Casing Patch in Engaging Position
- Bowen Lead Seal Casing Patch Components
- Bowen Packer Type Casing Patch
- Bowen Packer Type Casing Patch – Exploded View
- Dressing Mill
- Calculated Strength Data-Lead Seal Casing Patches std. Data
- Calculated Strength Data-Lead Seal Casing Patches H2S Data
- Mechanical Internal Cutter
- Inside Mechanical Cutter
- If Casing is Collapsed Severely
- Lace/Kick Joint
- Casing Parted at 3,450
- Enter & Dress Parted Casing
- Homco Internal Casing Patch
- Standard Patch Features
- Patch Selection
- Prior to Running a Patch
- Picking up the Patch
- Exercise 2: Casing Repair Case Study
- Operating Procedures
- Section 16- Coiled Tubing Fishing Operations.
- What Is Coiled Tubing?
- CT Usage
- Advantages of Coiled Tubing

- Advantage of Fishing with CT
- Fishing
- Overshot
- Spear
- Wire Line Catcher
- Recovering Tools with Downhole Vibration Technology
- Recovering Tools with Hydraulically Activated Fishing Tools
- Well Cleaning
- Debris Catching
- Under-reaming
- Mechanical Scale Removal
- Fishing with Downhole Vibration Technology
- Cutting Pipe
- Wireline
- Wireline - Open Hole
- Wireline - Cased Hole
- Types of Wireline Fishing
- Procedures in Wire Line Fishing
- How to Get Started?
- Perform Test Pull
- Cable Guide Method – Attach Clamp and Derrick
- Cable-Guide Fishing Method
- Cable-Guide Fishing Assembly
- Tool Caught In Overshot
- Cable Guided Method - Dress Fishing Overshot
- Cable Guided Method -Operating Procedure
- Cable Guided Method - Line Only Stuck
- Cable Guided Method – Procedure
- Pressure Required to Rupture Disks in Pump Out Sub
- Cable Guided Method -Government Requirements
- Side Door Overshot Method
- Side Door Over shot Method - Inserting the Grapple
- Side Door Over shot Method - Don’t have to cut Line

- Side Door Over shot Method – Running Procedure
- When not to use the Side Door Overshot Method
- Fishing for Parted Wire Line
- Rope Spear
- Fishing for Parted Wire Line -Engagement With Spear
- Cable Specifications
- Stretch Example
- Determining the top of wire line
- The amount of fall is measured from the level where the wire would be if it was standing straight.
- Fishing for Parted Wire Line - Engagement With Spear
- Fishing for Parted Wire Line - Stop Rings
- Fishing for Parted Wire Line - Balled Up Wire
- Fishing for Parted Wire Line – Precautions
- String Recovery Methods
- Freeing Stuck Pipe
- When to Give Up Attempts to Free Pipe
- Determining the Estimated Stuck Point
- Procedures to Measure Stretch
- Using the Tapered String Formula
- Calculation of free point in stuck Drill Pipe – Single or Tapered Strings
- Procedures for Making a Blind Back-off
- Determining More Precise Stuck Point
- Making a Wash-over and Back-off
- Choosing the Wash Over Pipe
- Selection a Rotary Shoe
- Typical Washover Bottom Hole Assembly
- Various types of Fishing Bottom Hole Assemblies
- Where to Back-off?
- Example Calculation
- What is the Maximum Pull on 5” DP @ Surface?
- Job Planning
- Job Planning & Record Keeping
- Components of Job Planning

- Fishing Cost Analysis
- Ascertaining the Difficulty of the Job
- Determining How Long to Fish
- Cost of Fishing
- Cardinal Rules of Fishing
- Cardinal Rules of Fishing
- Fish in Hole
- Maximum OD of Tools That Can be Washed Over
- In and Out Method
- K.B. Measurements/Elevation
- K.B. Measurements
- Official Well Depth
- Tally Book Rules
- Tally Book Well Data
- Tally Book: Window Milling
- Example: Tally Book Trip# 1 @ 2:00 pm 2-4-98 Union Oil
- Poorly Written Job Resume
- Course Recap
- Economics of Fishing
- Options/Cased Hole/Open Hole
- Example
- Trips - 4:00 p.m. 2-17-97
- Trips - 4:00 PM 2/18/97
- Trips - 10:00 PM 2/19/97
- Trips - 11:00 AM 2/22/97
- Economics of Fishing
- Matter of Economics
- Course Recap