

# Modern Stuck Pipe Prevention & Fishing Operations



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## **Introduction:**

This Stuck Pipe Prevention & Fishing Operations course provides a comprehensive coverage in the industry for understanding and preventing the underlying causes of Stuck Pipe, Wellbore Instability, Loss Circulation, and other sources of Non-Productive Time (NPT) in drilling operations.

The course also focuses on correct responses by individuals and teams, early warning signs, and minimizing the impact to drilling operations. Through world-class presentations, practical discussion, and the best reference and instructional materials available, delegates hone their knowledge of basic drilling technology and how it relates to avoiding NPT.

Preventing stuck pipe incidents can save thousands of dollars in non-productive time. Stuck Pipe Prevention covers topics to eliminate or greatly reduce stuck pipe incidents on your rig. This course emphasizes on the prevention of stuck pipe and the team concept is used throughout the course, explaining the contribution and value of every crewmember in the goal of keeping the pipe free.

### **This course will feature:**

- How to predict and make the contingency plan to prevent the stuck pipe
- How to write the proper report for the stuck pipe incidents

## Objectives:

By the end of this course, delegates will be able to:

- Identify mechanisms and risk factors that lead to stuck pipe incidents (Wellbore Instability, Hole Cleaning, Differential Sticking, and Wellbore Geometry)
  - Implement effective drilling and tripping practices
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- Assess mechanics of wellbore stresses and the impact on wellbore stability
  - Analyze trends to identify early warning signs of developing wellbore problems Make cost-effective choices in planning fishing operations

## Who should attend?

Drilling Engineers, Senior Drilling Engineers, Drilling Supervisors, Drilling Superintendents, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Reservoir Engineers, Geologists, Production and Completion Engineers, Foremen, Workover Engineers, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Industry Personnel, Lifting Personnel, Maintenance Engineers, Technologists, Mud Engineers, Well Site Supervisors, Drilling Contractors, Drilling Supervisors, Completion Engineers, Completion Supervisors, Drilling Managers, Drilling Technical Support Personnel, Trainee Drillers, Rig Engineers, Industry Personnel

## **Course Outline:**

### **Rock Mechanics**

- Stress, strain diagrams
- Geo-mechanics and structural geology
- Mechanics and causes of folding
- Mechanics and causes of faulting and fractures

- Factors affecting the bore hole stability
- Induced factors affecting bore hole stability
- Drilling fluid effect on bore hole stability
- Shale stabilization

### **Wellbore Stability**

- Mechanical conditions
- Shale deposition and sedimentary rocks
- Clay Chemistry
- The Earth's stresses
- Mechanical stress failure

- Chemical interactions
- Physical interactions
- Well site Analysis

### **What is Stuck Pipe?**

- Primary cause of downtime
  - See warning signs and respond
  - Stuck pipe is almost always preventable
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- Definition
  - Causes
  - Mechanical
  - Formation problems
  - Human error—lack of communication

### **What Causes Stuck Pipe?**

- Human factors
- Lack of team work
- Lack of communication
- Lack of planning

- Failure to read warning signs
- Failure to follow procedures
- Most stuck pipe situations happen at tour change
- Use tour change form to record conditions and identify trends

## **Types of Sticking**

- Formational sticking
- Differential sticking
- Cause for most stuck pipe situations
- Drilling overbalance most common cause
- Geopressured formations
- Reactive formations
- Unconsolidated formations
- Mobile formations
- Fractured or faulted formations
- Mechanical sticking
- Key seating

- Wellbore geometry
- Under-gauge hole
- Inadequate hole cleaning
- Junk in the hole
- Cement problems
- Casing problems

## **Differential Sticking**

- Definition
- Most common in sandstone and high permeability formations
- Why circulate fluids in hole?
- Remove cuttings
- Seal the wellbore
- Control well pressure
- Mud formulation
- Drilled overbalanced defined
- Filter cake defined
- Drill string flexing defined

- Avoiding differential sticking
- Rotate
- Circulate
- Move drill string up and down
- Communicate
- Differential sticking definition

## **Warning Signs**

- Three mechanisms, definitions and causes
- Hole pack off or bridge mechanism
- Differential mechanism
- Geometry mechanism
- The hole is talking, definitions and descriptions
- Torque changes
- String weight changes
- Circulation rate changes
- Pump pressure changes
- Mud properties

- Changes at the shakers
- Your records indicate changes
- Name the mechanism—simulation
- Talk to others around the rig
- Gather clues
- Come up with a diagnosis

### **Prevention Plan**

- Review three sticking mechanisms, definitions and causes
- Differential
- Wellbore geometry
- Hole pack off/bridging

### **Have a Stuck Pipe Prevention Plan**

- Team work and communication
- Mud must be ready and conditioned properly when it returns to the surface
- Chemicals and mixing agents must be on hand to avoid delays
- Hydraulics are important
- Shaker hand should communicate what's shaking to the driller
- Mud logger examines cuttings communicate with the driller

- Free point indicator
- Reserve twist
- Small explosive charge
- Addition of jars in the fishing string
- Washing over
- Plugging the hole
- Side tracked hole (dog-leg)

### **Fishing Operations**

- Twist Off Cases
- Fracture of the drill pipe
- Fracture of the threads joining the drill collars or the drill pipe
- Overshot

### **Broken Bit Cases**

- Break away of one of the conical cutters & leg down the hole with all the bearing
- Using magnet for fishing
- Using hollow basket
- Using explosive charge for too large pieces of metals
- Using another bit