STUCK PIPE PREVENTION & FISHING
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**Stuck Pipe Prevention - Overview**

With oil at such low prices, you cannot afford to get stuck on today’s wells, otherwise the budget is easy blown not just through having to fish but in many cases having to side-track, causing the well’s cost to over-run by $millions, especially on very expensive (e.g. HPHT, Deepwater & ERD wells).

This course has been written for Operators, Drilling Contractors and Service personnel who require an in-depth detailed understanding of the causes of stuck pipe (which includes drill pipe, BHA’s, casing, liners and logging tools) and how sticking can be prevented.

As compared with other “more standard” Stuck Pipe Prevention courses, we spend more time studying the latest advances in downhole rock mechanics forces (including wellbore stability / instability with respect to mud weight, mud chemistry, hole angle and azimuth), the importance of optimised drilling fluids design, BHA design, optimised well design, optimised drilling practices, jar placement, jar calculations & jar firing, why problems magnify on high angle / ERD / horizontal wells and the importance of effective teamwork & communication. This course also shows the latest industry videos to further help delegates’ understanding of stuck pipe prevention.

For the “practical session” of the course, we work through a number of advanced-level stuck pipe case histories (which were all preventable) to cement the delegates learning and understanding.

**Fishing - Overview**

With oil at such low prices, you cannot afford not catch the fish first time if you have a fish in the hole. The cost of fishing on today’s wells can be extremely expensive, especially if the rig’s day-rate is high (e.g. latest generation for HPHT, Deepwater, ERD wells). The last thing anybody needs in the current era of low oil prices is not to be able to catch the fish and to have to side-track.

This course has been written for Operators, Drilling Contractors and Service personnel who require an in-depth detailed understanding of how to catch the fish first time, thereby preventing side-tracking.

As compared with other “more standard” fishing courses, we spend more time studying the latest advances in downhole fishing techniques and stuck point determination, along with methodologies to ensure fishing success first time. This course also shows the latest industry videos to further help delegates’ understanding of the latest fishing tools, techniques, practices and procedures.

For the “practical session” of the course, we work through a number of fishing case histories (which were all successful) to cement the delegates learning & understanding.

**Aims & Objectives**

This course has been written for personnel within the drilling industry who wish to further their understanding of stuck pipe issues and how to catch the fish first time.

**Who Should Attend**

It is particularly applicable for Drilling Engineers, Senior Drilling Engineers, Drilling Superintendents, Drilling Managers, Assistant Drillers, Drillers, Toolpushers, Senior Toolpushers and Service Personnel.

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Your Dedicated Coach

Michael Gibson (PhD)

❖ Overview

❖ Seasoned professional with 35 years’ worldwide experience on drill-ships, semi-submersibles, tender-assist units, platforms, jack-ups and land rigs.

❖ Extensive experience both onshore and offshore in engineering and operations for Operators and Drilling Contractors on exploration, appraisal & development wells.

❖ Extensive risk assessment, advisory, planning and rig-site work experience ranging from Drilling Engineer through to Drilling Supervisor, Superintendent & Drilling Manager.

❖ Training

Training experience worldwide ranges across Operators, Drilling Contractors and Service Companies both in-house and public in the following areas:-

• HPHT
• Stuck Pipe Prevention & Fishing
• Deepwater Well Engineering
• Deepwater Operations
• Directional Drilling
• Horizontal & Multilateral Wells
• Accelerated Drilling Programmes for Drilling Contractors
• Graduate Drilling Engineering for Operators
• Optimised Drilling Practices
• Well Planning & Engineering
• Well Construction
• Well Control (Advanced, Understanding, Deepwater & HPHT)

❖ Consultancy

Engineering & Operations Advisor to Operators, Drilling Contractors, Banks & Insurance Companies worldwide re Drilling & Field Development, Risk & Blowouts

• Hazard Analysis
• Offshore Operations
• Technical Advisor for HPHT Developments
• Well Control
• Technical Advisor for Deepwater Operations

❖ Project

• Project Manager for HPHT Field Development; Standard Field Development
• Production Optimisation
• Risk Mitigation
• Brownfield Re-development
• Deepwater
• Well Control
• Management Systems

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STUCK PIPE PREVENTION

DAY ONE

Introduction to Downhole Forces
- Surface / Mudline
- Mobile Formation Movement
- Fractured Formation Collapse
- Reactive Clays & Shales
- Tectonic Stress
- Overburden Forces
- Overpressure
- Unconsolidation
- Contamination & Fracture
- Differential Forces

Review of Recent (2014) Industry Data
- Stuck Pipe by Activity
- Stuck Pipe Cost
- Statistics re: Planning & Operations

Area 1: Solids Induced / Formation Collapse Pack-Off

Indicators
- Bridging Indicators
- Pack-off Indicators

The Driller’s First Actions on Becoming Stuck

Rock Mechanics & Problem Prevention
- Mobile Formation Problem Prevention
- Fractured & Faulted Formation Problem Prevention
- Naturally Over-pressured Shale Collapse Problem Prevention
- Induced Over-pressured Shale Collapse Problem Prevention
- Reactive Formation Problem Prevention
- Poor Hole Cleaning Problem Prevention
- Tectonically Stressed Formation Problem Prevention

Cavings versus Drilled Cuttings
- What cavings tell us

Rock Strength & Brittleness
- Effects of Increasing Inclination
- Effects of Differing BHA’s
- Borehole Tortuosity

Data & Interpretation
- Bridging
- Packing-off

Drilling Fluids
- Advances in WBM’s
- Advantages of OBM’s
- The effect of Mud Weight on solids suspension
- The effect of Viscosity on hole cleaning
- The effect of Gel Strength on solids suspension
- The effect of Filter (Mud) Cake downhole

Wellbore Stability / Instability
- Geological Forces
- Rock Stress
- Mud Weight
- Hole Inclination & Azimuth Effects
- Mud Chemistry

The Use of Expandables
- Advantages
- Solid Expandables
- Lattice Expandables

Increasing Hole Angle Effects
- Wellbore Collapse
- Barite Sag
- Hole Cleaning Difficulty
- Increasing Torque / Drag / Overpull
- Cuttings build-up on the low-side of hole
- Tripping Practices

Class Exercise

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STUCK PIPE PREVENTION

DAY 2

Area 2: Differential Sticking

How & Why It Happens
- The Driller’s First Actions on Becoming Stuck

Key Considerations
- Over-pressure & Prevention
- BHA Design & The Effectiveness of Rotary Steerable Systems
- Drillstring Movement
- Filter Cake Effects
- Formation Permeability Effects
- Pressure-Time Effect
- Calculating Sticking Forces With Respect To Over-balance
- Pressure, String Contact Area & Differing Coefficients of Friction
- Pill Composition / Spotting Pills
- The Importance of Optimal Solids Control
- Differential Sticking Flow-chart Review

Class Exercise

Area 3: Mechanical & Wellbore Geometry Sticking

How & Why It Happens
- The Driller’s First Actions on Becoming Stuck

Key Mechanisms & Prevention
- Key-seating – And How to Prevent It
- Shoe Joint Backs Off – And How to Prevent
- Under-gauge Hole – And How to Prevent
- Ledges – And How to Prevent
- Dog-legs – And How to Prevent
- Micro Dog-legs – And How to Prevent
- Collapsed Casing – And How to Prevent
- Green Cement – And How to Prevent
- Cement Blocks – And How to Prevent
- Junk – And How to Prevent

Class Exercise

Optimised Hole Cleaning

Key Considerations
- The problems associated with poor Hole Cleaning
- Those parameters which assist with Hole Cleaning that are within the rig crew’s control
- Why problems increase with increasing inclination
- Barite sag

General Factors Affecting Hole Cleaning
- Rig-site monitoring
- Vertical & Near Vertical Wells
- High Angle & Extended Reach Wells

High Angle & Extended Reach Wells
- Characteristics of Cuttings Beds
- Flow Regime: Plug Flow, Laminar Flow & Turbulent Flow

Jars & Accelerators

Mechanical & Hydraulic Jars
- Types of Drilling Jars
- Mechanical Jars – Design & How they work
- Hydraulic Jars – Design & How they work
- Successful Usage
- Forces Required to Fire
- Jar Firing Force Envelope
- Pump-open Force – What it is;
- Advantages & Disadvantages
- Jar Descriptions
- Handling

Accelerators
- What they are, what they do and how they work

Jar & Accelerator Positioning
- Key considerations
- Tension versus Compression
- Computer Programs
- Varying Neutral Point
- Considerations

Jarring Calculations
- Minimum Overpull
- Maximum Overpull
- Slack-off
- Neutral Point
- DC’s above Jars
- Down Jarring
- Up Jarring
- Limits

Communications & Teamwork

The Typical Outcomes of Poor Teamwork
- Cost to the Industry
- Cost to our Company

Teamwork Exercises
The class will be sub-divided in Teams where Case Histories will be studied regarding stuck pipe events and how each event could have been prevented. For each case, Teams will determine:-
- What caused the pipe to become stuck?
- How could the situation have been avoided?
- How would the Team get free?
- Could the mud properties have been changed in any way to prevent the problem?

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FISHING

DAY FOUR & DAY FIVE

DAY 4

PLANNING

Overview of the Planning Process
- Determining the Causal Problem
- Evaluating Downhole Conditions: Are they stable or are they deteriorating?
- The Value of Team / Toolbox Talks
- Evaluating the Condition of the Top of the Fish
- Junk run?
- Milling Run?
- Hole Clean-out Run?
- Tools
- BHA
- Jarring
- Catching
- POOH

Assessing the Downhole Situation
- Introduction: How is the Fish Stuck?
- Formation-Related Sticking Mechanisms
- Hole Cleaning Sticking Mechanisms
- Differential Sticking Mechanisms
- Mechanical Sticking Mechanisms

Determining Where the String is Stuck
- Calculation Method
- Use of Tables Method
- Use of Free-Point Indicator Method: Overview
- Use of Free-Point Indicator Method: Detailed
- Use of Magnetic Flux Tool

DOWNHOLE OPERATIONS

Upper String Recovery
- Backing-off: Overview
- Backing-off: Detail
- Cutting Pipe – Methods; Advantages & Disadvantages
- Determining the Condition of the Top of the Fish

Lower String (Fish) Recovery
- Cleaning the Top of the Fish
- Washing Over the Fish
- Circulating the Hole / Top of the Fish Clean
- Catching the Fish
- Retrieving the Fish

DAY 5

Junk
- Junk Magnets
- Poor Boy Catcher
- Junk Subs / Baskets
- Junk Shots
- Mechanical Coring Junk Baskets
- Hydraulic Junk Retriever
- The VACS System

Lost Side-Wall Sample Bullets
- How to Deal With Them

Freeing Stuck Logging Tools & Stuck Wireline
- Overview
- Procedural Guidelines
- Fishing Logging Tools
- Procedure for Stripping Over Wireline Cable
- Key Points for Stripping Over Wireline with Drill Pipe
- Case History

Packer Fishing
- Packer Milling & Recovering
- Equipment Requirements
- Pulling a Typical Production Packer

Stuck Casing
- General Stuck Casing
- Maximum Pull on Stuck Casing

Casing Milling Guidelines
- Mill Design
- Milling Assemblies
- Milling Discussion
- Methods & Parameters

Milling – General
- Use of Different Types of Mills
- Milling Fluids
- Swarf Problems

Fishing Practices Summary
- Fishing Assemblies
- General Fishing Procedure
- Fishing with Spears
- Fishing with Overshots
- Specialist Tools
- Notes on Jarring

INVENTORY

Listing
- Fishing Tools for 26” – 17 1/4” – 12 3/4” Hole
- Fishing Tools for 8 1/2” Hole
- Fishing Tools for 6” Hole

TEAMWORK EXERCISES

The class will be sub-divided in Teams where Case Histories will be studied regarding fishing events. For each case, Teams will determine:
- The optimal overshot and spear
- The optimal BHA
- Optimal hole conditioning
- Catching the fish first time

Course Close

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All delegates will receive a copy of the IDEAS Stuck Pipe Prevention & Fishing Handbooks

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Independent Drilling Engineering Associates

IDEAS (Independent Drilling Engineering Associates) is a thinking company. It focuses its in-depth and holistic knowledge, breadth of experience and expertise onto operators, drilling contractors and service companies’ drilling engineering and related work requirements, to provide top quality fast turnaround bespoke work packages on either an ad-hoc or long term basis, 24 hrs per day / 365 days per year, worldwide.

Through applying creative thought, ingenuity, experience, integrative life-cycle considerations, fully focused dedication and commitment to problem-solving, IDEAS aim to provide the most professional, solution-oriented, cost-effective drilling engineering and related services anywhere around the world at any time.

Objectively.

Independently.

Quickly.

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For more information, please email us at info@wellideas.com
## Contact Details

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- [ ] I would like to contact IDEAS for In-House Training Solutions
- [ ] I would like to contact IDEAS for In-House Consultancy Solutions
- [ ] Other enquiry

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