



ABERDEEN DRILLING INTERNATIONAL

Stuck Pipe Prevention & Solutions

OVERVIEW

The purpose of this course is to provide well engineers, drilling supervisors and drilling personnel with the knowledge and understanding of the causes of stuck pipe and the means to reduce or eliminate stuck pipe as a significant cause of lost time incidents and related costs.

Stuck pipe is the primary cause of non-productive time and should not be considered as an inevitable drilling hazard. This short course develops an understanding of how stuck pipe prevention can be managed through the well design and construction process.

The last day of the course concentrates on solutions (fishing techniques and equipment), pre-planning and the economics of fishing operations.

DESIGNED FOR

This course is designed for well planners, well engineers, drilling supervisors and drill crew.

COURSE DELIVERY

The course is delivered over 3 days and is taught through presentation of a series of interactive lectures, case studies, worked examples, knowledge assessments, group discussion, and drilling simulation exercises. An optional fourth day can be added to the course in order to include team-based scenario training on a full-size rig-floor simulator. The 4-day course is known as Operational Stuck Pipe Prevention & Fishing.

CERTIFICATION

Successful completion of the course will result in an Aberdeen Drilling School certificate which is valid for 2 years.

ENTRY REQUIREMENTS

There are no formal pre-requisites for this type of training; however, candidate suitability and assumed base knowledge will be discussed and agreed with the client in the early stages of course development.

LEARNING OBJECTIVES

At the end of this course, participants will be able to:

- Understand the importance of hole cleaning in avoiding stuck pipe and be able to describe hole cleaning practices for vertical, deviated and horizontal wells
- Explain the essential principles of rock mechanics as it relates to stuck pipe
- Describe and explain the various mechanisms of stuck pipe
- Identify the symptoms leading to stuck pipe using a range of case studies
- Understand and describe how stuck pipe can be avoided through good well design
- Understand and describe the various techniques and equipment used in fishing operations



INDICATIVE COURSE CONTENT

The course covers the following modules:

Communications – Almost all examples of non-productive time are to a lesser or greater extent due to poor communications. This section of the course looks at models of communication and how to communicate effectively. The idea of the “downhole camera in your head” is used to explain how awareness and visualising downhole conditions help in identifying the conditions leading to stuck pipe.

Well design and operations – A basic premise throughout the course is that stuck pipe can be avoided through sound planning and operations. The variables that influence the wellbore conditions that lead to stuck pipe at the planning stage and during operations are explained and discussed.

Hole cleaning – Poor hole cleaning exacerbates stuck pipe conditions. Poor hole cleaning is a function of poor well planning and poor observation and awareness. The different transport mechanisms along the wellbore are explained and guidelines for effective hole cleaning discussed.

Essentials of rock mechanics – The basic principles of rock mechanics and wellbore failure are explained. The implications of rock stress and well planning, and the outcome in terms of hole cleaning and well integrity, are examined.

Stuck pipe mechanisms – There are mechanisms of stuck pipe. While the course is about stuck pipe prevention, an understanding of the mechanisms leading to stuck pipe are essential in interpreting the signs indicating that stuck pipe conditions are developing and in understanding how stuck pipe can be avoided.

Recognising cuttings and cavings – Drilled cuttings and cavings have distinctive characteristics that are key markers of downhole conditions. Identifying cuttings and cavings, in conjunction with monitoring cuttings volume over the shakers, are good lead indicators of pending stuck pipe problems.

Drill crew actions – While the driller’s first actions in the event of becoming stuck are crucial in minimising the time spent getting free, the observations and actions taken by mud loggers, roughnecks, derrickman, assistant driller and mud engineer are equally as important.

Recognising trends – Being aware of changes in drilling trends such as cuttings volume, torque and drag, ROP and changes in ECD are extremely important in preventing stuck pipe.

Getting free – In the event that stuck pipe occurs, the mechanisms to get free are explained including the principles of operation of drilling jars. A stuck pipe freeing worksheet will be provided and used with examples.

Solutions – following on from unsuccessful attempts to free stuck pipe, various fishing techniques are used to recover the situation. The solutions section of this course explains the economic analyses to be employed prior to attempting to fish, the equipment and techniques available and the methodology that might be used. Emphasis is placed on the planning stages of any fishing job, to maximise the chances of recovery.



COURSE ASSESSMENT

The course has been designed to include continuous assessment in a variety of formats:

Pre-Course/pre-module Test – these tests use a student response system from TurningPoint. This system uses electronic response devices to record the students response to questions embedded within a presentation to provide instant individual and group feedback. This assessment technique is used to highlight the areas of strengths and weaknesses of the group or individuals to allow the instructor to tailor the course content and teaching techniques to provide additional support where required.

Worked Examples – the course contains a number of worked examples that complement the learning modules, to allow the students to demonstrate their understanding of the subjects covered.

Case Studies – the course contains a number of Case Studies, gleaned from various sources and made relevant to the course structure and learnings. Students are invited as individuals or in teams to review the case studies, discuss the issues and to make any conclusions as to the learnings, what could be done better and how they might have reacted to the situations.

Simulation – using one of Aberdeen Drilling School's fleet of simulators, stuck pipe scenarios can be demonstrated in real-time to aid the students understanding of the subject.