

# Stuck Pipe Prevention Training in Focus

Are we preventing incidents or reacting to them? In the ongoing battle for reducing stuck pipe events, a shift in focus is needed.

## The Issue

With over thirty years of experience in supplying specialist training to the oil and gas industry, Aberdeen Drilling School has become accustomed to the changing needs of its clients. Training objectives move with the times, as should the training, but the requests for “stuck pipe prevention training including fishing techniques” remain a constant.

Statistics backed by conversations with our clients indicate that stuck pipe is by far the greatest cause of **lost time** during drilling operations. Feedback from Operators suggests that the right type of training, focusing on the causes of stuck pipe and the importance communication can significantly reduce the incidence. Industry professionals will agree that addressing the root cause of a problem is an effective long-term strategy for success. If we know this to be true, why then is the incidence of stuck pipe on the rise?



A closer look at the available stuck pipe courses will tell you that, even with the inclusion of “prevention” in the title, the bulk of the course is about stuck pipe events. That is, the industry tends to emphasise what to do when the pipe has become stuck rather than how to prevent the event in the first place. We react to the problem rather than prevent it. The combination of an apparent lack of training effectiveness and the need to develop well engineering and drilling operations competence intuitively suggests that a different approach to stuck pipe prevention training is required.



The increase in new build rigs, both at the high technology end of MODU’s and the new-build land drilling rigs for unconventional hydrocarbons, requires the recruitment, development and retention of more drill crews. The industry is not only moving into more complex and challenging environments such as Deepwater and HPHT, but also moving into low-cost, high-volume environments where a key success factor is repeatable performance.

In the current low-cost drilling environment, the upfront costs of the well are emphasized and maintenance costs are often neglected or unappreciated. As a result, the potential cost-saving opportunities available during well maintenance are unrealised. This particular issue could be one of conflicting priorities when it comes to well design and operations. The well designed by the engineer has sometimes lacked the focus on reducing stuck risk. The drilling supervisor’s focus on the budget of the well during the drilling phase has sometimes over ridden other concerns. While, drill crews are taught to observe for well control but are surprised when the string becomes stuck.

The oil industry has recently been through one of its most prolonged downturns in a number of years with the drilling industry effectively on hiatus for three years. As the number of operations shut down and jobs were lost, a number of the “baby boomer” generation of rig crew and well engineers took their retirement and divested to the next generation. In most cases, the knowledge and skills of the retiring generation have not been passed over.



As the requirement for new wells becomes apparent there is likely to be a new period of hiring and promotion. While new entrants into the industry are intelligent and well educated, they are disadvantaged by their lack of experience. It is unknown how many of the “old hands” will return and pass on their knowledge as the industry starts drilling again. Those not fortunate enough to have decades of knowledge and experience shared with them through on-the-job training, are going to have to learn from scratch and repeat mistakes of old.

## The Solution

A holistic approach to stuck pipe training is required that takes stuck pipe prevention into account right from the well concept, to completing the well.

The focus of stuck pipe prevention training on the design phase of the project is critical. It is at the design stage, and subsequent peer review/DWOP exercises that the potential for free pipe assurance can be evaluated.

**Free pipe assurance** is here defined as the process by which the drillstring always remains free to rotate and reciprocate. We are all aware that the success of a drilling operation depends on robust planning, risk identification, and risk mitigation. Inadequate well design and planning leaves the onus for stuck pipe prevention on the drill crew, their reaction time, and their correct first actions.

If “planning stuck pipe out” is a key part of reducing the incidence and the cost of stuck pipe, then training needs to focus on the well design and planning and so the attendees of training courses must include the well engineer and drilling supervisor.

Within such a course those aspects of well design that have a critical impact on free pipe assurance such as rock mechanics, drilling fluids, hole cleaning, well bore hydraulics, drillstring design and optimization, and well profile need to be considered. These subjects need to be reviewed and explored, not independently, but in terms of how a design decision in one area affects and impacts on the design constraints and decisions in the other areas.

**We should think about free pipe assurance in the same way as we think about well planning for a complex Deepwater or HPHT well.**



Training of drill crews either in the classroom or on the rig should aim to develop the drill crews' understanding of what is going on beneath the drill floor. The aim should be to develop their ability to "see" what is happening downhole and, from the data that they have, predict what is likely to occur in the future. For example, it is better to deal with indications of poor hole cleaning than to continue drilling until the drillstring is stuck.

At Aberdeen Drilling School we refer to this type of training as developing a "downhole camera in your head". To develop this camera requires that the training moves beyond indications of stuck pipe and first actions and more towards interpreting the data and understanding what is happening and why it is happening.

## The Method

While the content of training needs to change, benefit can also be gained from using different teaching methods and styles. Some of the changes that have been developed at Aberdeen Drilling School include the understanding that it should be **learner centric**. We need to understand what the course participant needs and deliver the information in a way in which the participant identifies. Training should draw on the learner's own experience and knowledge to develop deeper understanding. It should become interactive in order to engage and personalise the training in such a way that it is understood and remembered. Specific field and regional case histories render the problem more real and disclose real-world planning and operations decision-making which can be challenged by participants.

**Drilling simulators** used for well control training have the potential to be a significant game-changer in stuck pipe prevention training. Currently simulators follow the same pattern as most training courses, in that they focus on dealing with being stuck. Simulator exercises should allow course participants to identify the potential for stuck pipe and then recommend the appropriate actions to be taken to prevent stuck pipe occurring. Making the exercises team-based allows for group decision-making. It encourages individuals to interact and discuss all scenarios.



There is always the possibility that a stuck pipe event will occur regardless of the level of well planning, and so training in first actions should not be neglected. However, the danger in treating stuck pipe as inevitable is that preventive action will be deemed futile. This mentality of inevitability needs to change.

Stuck pipe prevention training or free pipe assurance training cannot be a one-off event. If we are serious about removing stuck pipe from our top three causes of lost time, then a more systematic approach to training and development is required. Training should include the integration of the various training methodologies, from the classroom, to the simulator, and with a hands-on approach to practical on-the-job coaching.