

Stabberless casing handling gear is safe, efficient

SAFETY AND EFFICIENCY objectives were behind the development of a casing stabbing system that has now proved itself in commercial use on both land and offshore conventional rigs.

Weatherford International Inc first installed a mechanized “casing modem” design in 1994 that incorporated remote controlled casing tongs mounted on a hydraulic roughneck. That system used a programmable logic controller to link five mechanized component groups—mechanized power tongs, tong positioning system, remote control systems, stabberless positioning system and a circulating head. This technology evolved into more sophisticated systems in the past 6 years.

One result of this evolution is the StabMaster™, which now has been operated on a land rig in the US and on a floating rig in the US Gulf of Mexico.

In Wyoming, the system was used to run almost 15,000 ft of 14-in. heavy wall casing and install other casing strings and tubing in a deep gas well.

On its first job on a floating rig in the Gulf of Mexico, StabMaster ran 3,100 ft of 16-in. casing in 4 hours, a job that takes 6-12 hours when run conventionally.

GOALS: EFFICIENCY, SAFETY

Weatherford now offers the stabberless system as an efficient, safe method of running casing and tubing.

Casing and tubing operations can represent a large investment in drilling and completing a well.

According to Weatherford, more than 30% of the time a rig is on location is spent tripping drill pipe or running casing and tubing.

And stabbing operations are the hardest and most dangerous tasks to perform while casing is being run.

Working in an awkward position high above the rig floor, the stabber is exposed to weather and works under extremely demanding physical conditions.

Because of these conditions it is difficult to achieve 100% repeatability.

In developing the stabberless system, Weatherford set some simple objectives. Goals were to increase safety, improve cycle time, reduce rig personnel and decrease costs.

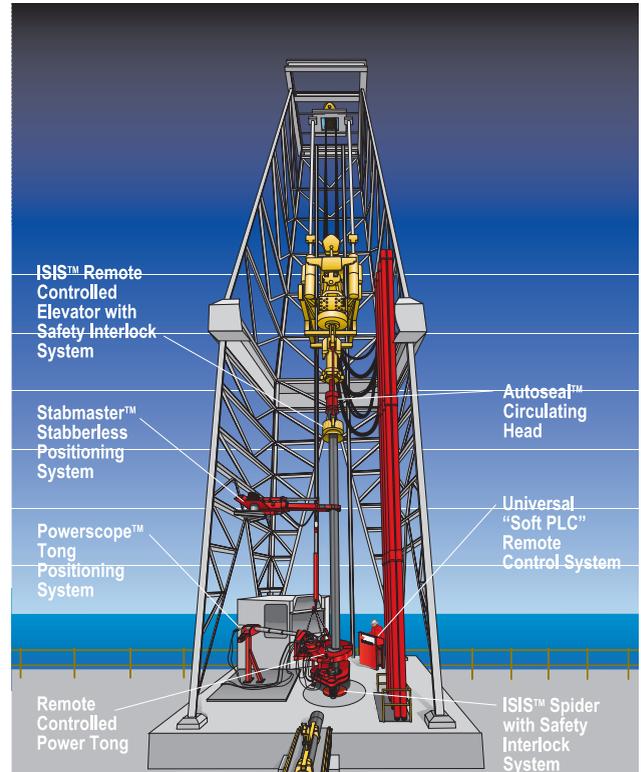
CAPABILITIES

The StabMaster is a remote-controlled hydraulic stabbing arm that:

- Allows the operator to control the StabMaster from the rig floor;
- Reduces the risk of rig-floor and stabbing-board accidents and eliminates the need for a stabber;
- Allows the pipe to be moved horizontally to find the well center;
- Stores the exact center position of the well bore in memory and with the “Stab-set” feature can move each joint to this well center automatically;
- Retracts to a vertical parked position once connection makeup has begun;
- Allows pipe makeup to be repeatable.

THE PROCEDURE

The first step in the using the Stabberless System is to perform a thorough analysis of the rig. Because adequate preparation will help ensure the safety and success of



Weatherford’s rig mechanization system can reduce the risks involved in “manhandling” casing in the derrick and in handling tongs.

the operation, a training and communication session with the rig crew should be held before the job begins.

When the job does begin, the system works in the following sequence.

The Stabberless Single-Joint Elevator (SSJE) is attached to the joint of tubing or casing in the V-door and the joint lifted into the derrick.

The StabMaster arm is lowered with the head opened.

After the thread protector on the pin end of the joint is removed, the operator presses the “stab set” switch.

The StabMaster head closes around the joint of casing or tubing and the head extends in the horizontal plane to the well centerline position that has been stored in

the system's memory. This stored well centerline position can be changed manually during operation from the remote-control panel.

During final makeup of the joint, the "home" switch is pressed on the control panel, the head is released and the arm retracts to the vertical (parked) position.

The casing elevator is lowered over the box end of the casing or tubing joint until the flagging device indicator illuminates on the driller's console.

The driller closes the elevator with the ISIS remote-controlled system. The ISIS also opens the spider once the elevator slips are properly set.

Finally, the casing elevator is lowered and the SSJE is pulled to the V-door side of the rig by the positioning straps attached to the slings of the swivel and the casing elevator.

ISIS SYSTEM

The Weatherford Integrated Safety Interlock System remote-controlled spider/



Stabberless system was used to run a long string of heavy wall casing in Wyoming well.

elevator system (ISIS™) system prevents inadvertent opening or closing of the spider and elevator.

The ISIS system:

- Detects correct slip engagement on the casing or tubing joint;
- Ensures that the elevator slips are over the casing collar and are locked into place below the coupling;
- Enables the spider and elevator to be run in an interlocking mode, which prevents the accidental simultaneous opening of the spider and elevator;
- Allows the operator to control the spiders and elevators from a safe position on the rig floor or from the driller's cabin.

The elevator position-flagging device signals the driller when the casing elevator is in the correct position to be closed.

A sensor located on top of the elevator is connected to a pneumatically operated lamp on the driller's console.

When the casing elevator is in the correct closed position, the lamp changes from red to green.

The Stabberless Single-Joint Elevator

(SSJE) has two hinges, enabling it to be opened or closed from either side. The positioning straps are connected between the single-joint elevator slings and casing elevator to guide the swivel to the V-door side of the rig floor.

The SSJE stays on the pipe when the main elevator is being lowered.

WYOMING JOB

Weatherford has considerable success with the StabMaster stabberless system both on land and offshore.

In Wyoming, the system set an installation record running 14,814 ft of 14-in. heavy wall casing using the power tong positioning and stabberless systems. It was the first time a "major string" of pipe has been run without the use of a stabber, according to Weatherford.

Burlington Resources Inc drilled the ultradeep gas well in the Wind River Basin.

As the size of the pipe increases, the safety risks of running and handling that pipe

also rise. That's why Weatherford recommended that its power tong positioning and stabberless systems be used to run the heavy wall casing in this Wyoming well.

These systems allow one person to operate the large, heavy power tongs and eliminate the need for a stabber in the derrick.

In a typical, non-automated rig casing operation, the two most dangerous running situations include manhandling the casing in the derrick and handling the power tongs, says Weatherford. Weatherford's mechanized systems at Wind River included:

- The Stabberless System that eliminates the need for the stabber and remotely aligns the casing for makeup;
- The Integrated Safety Interlock System that allows remote control of the spider and elevator, guides the swivel and signals the driller;
- The PushMaster™ tong positioning system that moves the power tong into the proper position for makeup;
- Hydraulically operated doors on the

tong and backup allow the large casing tongs to be operated without any assistance from other rig floor personnel.

After running the 14-in. heavy wall string to almost 15,000 ft, a 12 1/4-in. hole was drilled to 20,700 ft.

Weatherford Tubular Services then ran 6,400 ft of 10 3/4-in. oversized OD liner from 14,300 ft to 20,700 ft. The liner weighed 330,000 lb.

Then a tapered (10,000 ft of 7 3/4-in. by 13,500 ft of 10 3/4-in.) casing string was run using the Stabberless and PushMaster Systems.

Finally, a corrosion-resistant alloy liner that required the special handling tools to prevent damage to this very expensive pipe was installed. And the same equipment was used to run 23,000 ft of 4-by-4 1/2-in. corrosion-resistant alloy tubing.

A key to the success of these operations, said a Burlington spokesman, is Weatherford's post-job reviews. These reviews help further improve performance and coordination. ■