Automatic driller, dual drawworks reduce costs

ROTATING SEPARATOR

Occupational hygiene requirements for operations on the Norwegian shelf when drilling with oil based drilling fluids favors the use of an enclosed system for solids control. Personnel working with shale shakers are often exposed to a base oil mist and vapor at an unacceptable level.

A principle with the use of rotating separators as an alternative to shale shakers was therefore developed. The separator principle is to feed the drilling fluid with cuttings from the mudline into a slowly rotating separator that forces the cuttings to move along a very long screen section with selected screen sizes.

The drilling fluid is effectively removed from the cuttings since the area underneath the screen is slightly vacuumed.

The paper focuses on a field test where the rotating separator efficiency was compared with the efficiency from conventional shakers while drilling.

Field Evaluation of a Rotating Separator as an Alternative to Shale Shakers (SPE/IADC 79823) by **A Saasen**, **Statoil**; **K Botnmark**, **K Mikalsen**, **Rotashanke**; **O D Jensen**, **Altinex**; **J F Dale**, **Dolphin**.

CONTINUOUS CIRCULATION

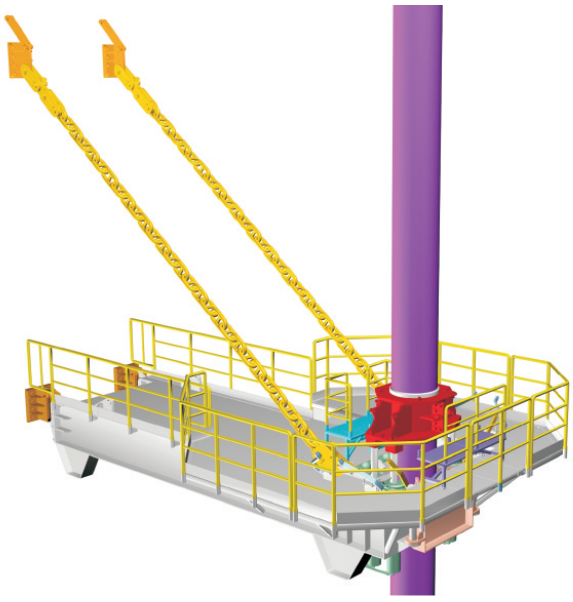
The Continuous Circulation System (CCS) can be retro-fitted to any drilling rig equipped with a top drive.

It allows drill pipe connections to be made up or broken out while drilling and tripping without stopping circulation to the well thereby maintaining a steady circulating pressure environment within the wellbore.

The Continuous Circulation System - An Advance in Constant Pressure Drilling (SPE/IADC 79824) by **J Jenner**, **L Ayling**, **Maris International**; **H Elkins**, **Varco Shaffer**.

CONDUCTOR TENSION SYSTEM

The need to place proper top tension on the drilling conductor for exploration wells drilled by jackups has become more critical as water depths increase, weight of the BOPs and wellheads increase, and environmental loads on the jackup and conductor become more of a factor. In the past and for shallower water depths, four-wire rope 'bazooka' lines tensioned by manual winches laterally helped keep the conductor from excessive horizontal movement and possible collapse.



Atwood Oceanics will present a 500,000 lb motion compensated conductor tension system (CTS) that will be installed below the cantilever substructure on the 400 ft water depth jackup Atwood Beacon

However in some cases due to rig and conductor pipe motion, the lines broke, especially during a hurricane, resulting in the conductor sometimes collapsing with the BOP and wellhead on top of the conductor. This usually resulted in loss of the well.

Jackup Conductor Tension System (SPE/IADC 79825) by **M A Childers**, **Atwood Oceanics**; **K H Sadberry**, **Innovative Drilling Systems**.

DUAL DRAWWORKS

Dual drawworks is a new concept based on the AC gear driven Active Heave Drawworks. As the name indicates, two independent and relatively small sized drawworks are used, one in each end of the drilling line.

Under normal conditions the two units run synchronously to provide a high reeving efficiency and a high heave compensation capacity. If one fails, the other will still operate and fully compensate for moderate rig heave motions. The single drawworks mode has full load capacity and roughly 50% speed and heave compensation capacities. This redundancy is critically important during production testing when a loss of heave compensation capability can damage the tubing.

Dual Drawworks Provide Operational Redundancy and Reduce Cut and Slip Costs (SPE/IADC 79826) by **A Kyllingstad**, **National Oilwell**.

AUTOMATIC DRILLER

Automatic Drillers have been used for decades. However, most of these systems did a poor job of controlling weight on bit, resulting in equally poor performance.

The paper examines the development and field performance of an advanced automatic drilling system, illustrating how the entire system needs to be designed from a control system point of view.

Design Considerations and Field Performance of an Advanced Automatic Driller (SPE/IADC 79827) by **G I Boyadjieff**, **D Murray**, **M Porche**, **Varco**; **A Orr**, **Helmerich & Payne**.

SUBSEA ABANDONMENT

Baram 8 (BA-8) consists of a single well supported by a wellhead protection jacket in the Baram Field.

The well was drilled in 1968 and the jacket was installed later in the same year, both of which collapsed in 1975, pulling both conductor and the riser with it.

The collapsed structure resulted in distortion of conductor and casing strings at the sea bed. The well was in normal

production mode, producing at less than 0.2 MMscf/d gas at the time of collapse. The subsea safety valve closed, thus preventing hydrocarbon release after the collapse.

In September/October 2001, the conductor and casing strings were cut to a depth of 18 ft below the seabed.

The remaining casing shape is non-circular. Deeper excavation was not possible at that time due to limitations of the jack-up in use.

In July 2002, the semisubmersible Atwood Falcon was equipped to excavate some 30 ft below the seabed using latest in seabed excavation equipment, the 75 series Jet Prop.

The Jet Prop tool utilizes a large propeller to push a high volume column of water vertically downwards onto the work area. This brings the seabed material into suspension and disperses it from the work area.

Subsea Abandonment with Surface BOP (SPE/IADC 79828) by **E B Norwood Jr**, **Atwood Oceanics**; **N Chinonyerem**, **V Ranyis**, **Sarawak Shell**.

ENHANCED DRILLING

Yemen Masila Block 14 has been actively explored and developed since 1987. Previous drilling optimization initiatives have reduced typical well drilling times at Masila from over 30 days in 1991 to 12 days in 2002.

Presently, a leap-frog drilling rig system is being used to drill development oil producers and water injection wells at the Masila Block.

This system uses two complete drilling rig units (Nabors Rigs 98 and Nabors Rig 217) in addition to a third partial drilling rig system (Nabors Rig 126).

Enhanced Drilling Capability and Reduced Rig Move Time Using a Leap-Frog Drilling Rig System at Yemen Masila Block 14 (SPE/IADC 79830 - Alternate) by **T Mills**, **Nexen; O C Frail**, N**abors Drilling International**..

HEX MUD PUMP

The Hex mud pump is a new axial piston pump with six vertical pistons driven by two AC motors via a gear and a specially profiled cam.

In contrast to crankshaft driven triplex pumps, the Hex pump delivers a nearly pulsation free flow. As a consequence, vibration problems and the need for pulsation dampeners are very much reduced.

Other major advantages are compactness (less weight and footprint)and no need for exchanging liner sizes. The 1,500 HP version with four liners has a pressure capacity of 7,500 PSI and a flow capacity of 817 GPM.

Development and Performance Testing of the Hex Mud Pump (SPE/IADC 79831 - Alternate) by **H Kverneland**, **A Kyllingstad**, **MM Moe**, **National Oilwell**.