Riser tensioner system offers several advantages

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RISER TENSIONERS are critical components in offshore drilling operations. Tensioner systems traditionally have used wireline assemblies arranged around the drill floor and substructure, but this arrangement can result in a congested moon pool.

Wire and sheaves limit access to areas where other drilling operations are conducted.

Wireline riser tensioning systems also have other disadvantages:

• Maximum capacity is limited from a practical point of view by wire and sheave diameters;

• These systems are maintenance intensive (wire maintenance, cut and slip);

• Handling the wire while doing cut and slip operations is difficult, especially for the larger wire sizes.

For these reasons, the patented N-Line™ Drilling Riser Tensioner System (DRTS) was developed using technology from other **Hydralift Inc** deepwater drilling, export and production riser tensioning systems.

This system has many advantages over traditional wireline systems including: lower cost, direct control of the riser, less long-term maintenance, system redundancy and a simple design.

It also provides portable system potential, increased safety, increased allowable deck space, direct riser recoil control, less weight and a lower VCG.

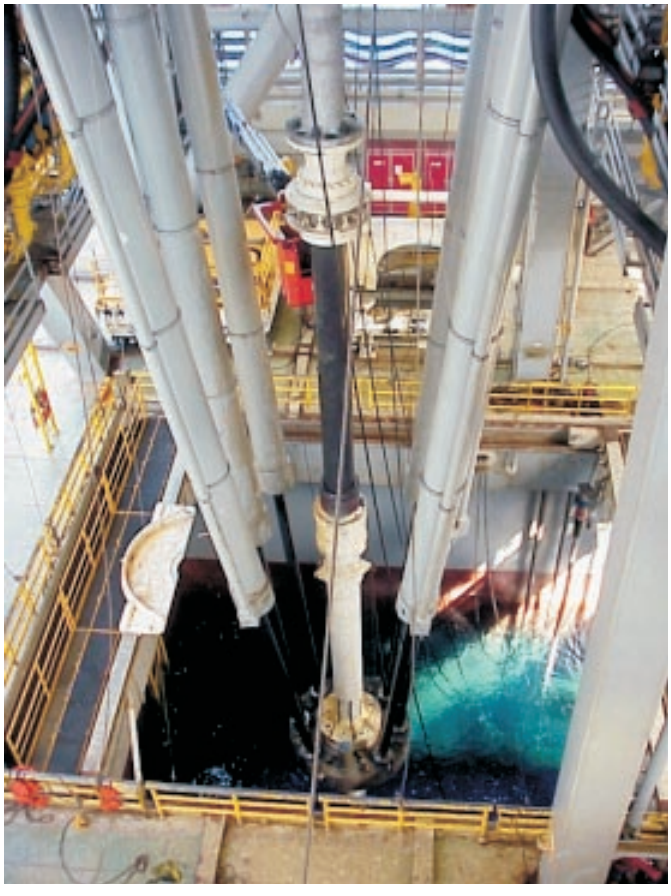
THE N-LINE SYSTEM

The N-Line DRTS consists typically of 6 cylinders with 50 ft stroke, although it is possible to fabricate cylinders with a stroke length of up to 65 ft. System maximum total capacity is generally 4,800,000 lb.

The 6 cylinders are suspended from beneath the drill floor and substructure and connected to the slip joint's tension ring by either ball and socket connectors or shackles.

The connection to the slip joint is with a split ring, which can be either hinged or consist of two halves.

The slip joint's load ring rests on the split ring, and normally has a fluid bearing to minimize friction and avoid twist in the riser on dynamically positioned vessels.



N-Line Drilling Riser Tensioning System increases allowable deck space and reduces weight. It also lowers operating and maintenance costs.

This type of RTS has proven extremely reliable during production riser tensioning operations, and is normally designed to operate at 100% level with one or two tensioners out of service.

The geometry and component design of the concept has a great deal to do with accomplishing this long term reliability.

Another significant advantage is in the emergency disconnect scenario. This system allows continuous direct control of the riser in operation and during a planned or unplanned disconnect.

The system can be designed to control the potentially large instantaneous loads and rapid riser up-stroke by using a riser recoil flow shut-off valve, coupled with additional control using a bypass valve.

FLEXIBILITY

Due to the flexibility of the system design, it is possible to arrange the cylinders in many configurations to fit the specific layout of the substructure and the layout of pipe/BOP handling equipment.

To increase efficiency and expand the capabilities of a single derrick rig, the option of mounting the cylinders on sliding beams makes it possible to slide the deployed riser and BOP from under the well center.

Named Trip-Saver™, this allows offline operations such as making up casing while drilling, then running it without having to trip the riser.

Other possible offline operations include tree installation and subsea activity.

Time saved in running the riser results in large cost savings that can pay for the equipment many times over.

TRIP-SAVER

The N-Line DRTS Trip-Saver sliding mechanism lets all tensioners travel between their main location at well center to a standby position.

Moving the DRTS also allows other operations, such as deploying the BOP, to be completed without interference from the long cylinders.

The system is designed with a traveling speed of approximately 1.5 ft/min. The main beams are attached to the bottom of

the drill floor substructure by either welding or bolting, and control of the system is fully automatic.

Typically, the system is designed for a maximum static vertical load of up to 4,800 kips at well center, and sliding with 1,600 kips.

The tensioners are attached to sliding plates which ride on composite bearing material.

This type of bearing material is ideal for minimizing corrosion and friction, while maintaining the long term integrity of the system.

Slides are pushed or pulled by three heavy duty hydraulic cylinders, each of which has a maximum capacity of 150 kips at 3,000 psi hydraulic pressure.

A total of 10 cycles is needed to translate 300 in. (25 ft), a typical travel distance from well center to standby position.

Each sliding plate is secured in the well center or standby position by four locking pins. The sliding plates must be in locked position before operating the DRTS.

Semisubmersible Stena Tay has been outfitted with the N-Line DRTS and Trip-Saver systems.

RECENT INSTALLATIONS

The N-Line DRTS and Trip-Saver systems have been included on several new rigs and conversions for deepwater operations.

Deliveries of the systems include those to the **Transocean Sedco Forex** drillships Enterprise, Spirit and Deep Seas and to the **Stena Drilling Ltd** semisubmersible Stena Tay.

The Stena Tay also features Hydralift's Cylinder Hoisting Rig.

In addition, two new **RB Falcon** semisubmersibles—the Deepwater Nautilus and Deepwater Horizon—use the Trip-Saver system and can perform numerous offline activities.

The success and interest generated to date with these innovative systems is proof of the need for continued improvement in offshore drilling performance.

This is especially true in today's deepwater drilling operations where high riser tensioner capacity and offline capabilities are needed.

These systems offer a very cost effective, lightweight and safe solution.