

Direct AC top drive drilling system can increase torque, reduce maintenance

A NEWLY DEVELOPED top drive drilling system that utilizes a variable AC motor can increase performance and reduce maintenance time associated with top drives, according to the manufacturer.

The **LeTourneau Ellis Williams Company (LEWCO)** top drive, dubbed **DirectDrive**, uses a variable AC motor developed by its sister company **Oilfield-Electric-Marine (OEM)** that eliminates the need for a gearbox, lubrication system and associated problems and fluid leaks.

The result, says LEWCO, is a low maintenance, high performance top drive that delivers more torque than any other system of its kind. The top drive will be available in 500, 750 and 1,000 ton models.

LEWCO's prototype top drive system, a 750 ton design, has been installed on **Rowan Companies'** jackup rig **Bob Keller** that was delivered in late August.

Additionally, LEWCO is building six smaller 500 ton systems for use on Rowan's land rigs and another 750 ton unit that will be installed on **Perforadora Central's Super 116E** class jackup presently under construction by **LeTourneau**.

The OEM motor used in the top drive is built with high density magnetic steel and windings that result in twice the peak torque as conventional AC motors from zero rpm to rated rpm.

The motors also include more copper and iron to provide additional thermal mass that allows the motor to withstand higher temperatures associated with continuous top drive operations.

The through-shaft designed motor supplies a constant 72,000 ft/lbs of torque from 0-150 rpm and an intermittent torque of 108,000 ft/lbs. The horsepower remains continuous from 50-300 rpm.

A unique feature of the top drive is that it allows drilling fluid to pass through the hollow shaft of the AC motor rather than around it.

Additionally, the main stem assembly can



LEWCO's **DirectDrive Top Drive** utilizes a variable AC motor, eliminating the need for a gearbox, lubrication system and associated bearing problems and fluid leaks. The motor is built with high density magnetic steel and windings that result in twice the peak torque as compared with conventional AC motors from zero to rated rpm. The motors also include more copper and iron to withstand high temperatures associated with top drive drilling systems.

be replaced without having to remove the motor or unrig, reducing the downtime required for servicing.

The units also have positive driven redundant speed sensing capabilities. The top drive is manufactured and tested to API 8C PSL1 standards.

The hoisting and drilling capacity of the various models are 500, 750 or 1,000 short tons, with direct drive variable AC motor performance of 55,000 ft/lbs, and 72,000 ft/lbs for the 500 and 750 tons models.

AC motor performance for the 1,000 tons hoisting and drilling capacity model is still being determined through testing.

The hook weight capacity for the 500, 750 and 1,000 ton models is 40,000 lbs, 100,000 lbs and 125,000 lbs, respectively. Height of the models is 24 ft, 30 ft and 32 ft, respectively.

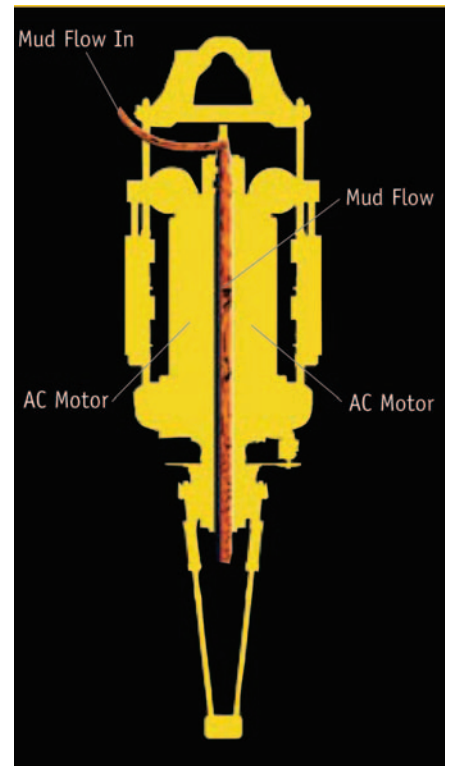
Width and depth is 5 x 5 ft for the 500 ton model, 9 x 6 ft for the 750 ton unit and 9 x 6 ft for the 1,000 ton ton capacity top drive.

Air actuated upper and manual eactivated lower IBOPs are rated for 15,000 psi

for each model. Circular grab assembly capacity for the 500, 750 and 1,000 ton models is 75,000 ft/lbs, 108,000 ft/lbs and 110,000 ft/lbs, respectively.

The system features:

- Counterbalance system;
- OEM through-shaft design AC motor;
- Integral disc brake system;
- Motor cooling system;
- Pneumatic rotary head system with locking clamps;
- Pipe handling system featuring dual drive 360° rotational capacity;
- IBOP system;
- Electrical/control service loop kit;
- Derrick termination kit;
- Top drive dolly;
- Block dolly;
- Elevator links;
- 1,000 ton hook load capacity main beam. ■



A unique feature of the DirectDrive system allows drilling fluid to pass through the hollow shaft of the AC motor instead of around it.