

The next step for walking rigs

Integrated Drive Systems outlines its new patent-pending ReelRig™ distributed power and control system that enhances rig mobilisation.

THE OIL AND gas industry is drilling and completing wells faster and more efficiently than ever before. Along with hydraulic fracturing and horizontal drilling, new pad drilling techniques, coupled with advanced drilling rig designs, have been among the most important innovations driving US production growth over the last decade.

Rig manufacturers developed ‘walking rigs’ that started appearing in the Barnett Shale as early as 2004. In 2006, according to Drillinginfo statistics, multi-well pads employing walking rigs made up about five per cent of wells drilled in nine US unconventional plays. By the third quarter of 2013, the percentage had risen to 58 per cent. Today, these new mobile rigs have surpassed older conventional units in operation. The primary design purpose of this class of rigs was to decrease mobilisation complications.

Houston-based Integrated Drive Systems (IDS) has developed the new patent-pending ReelRig™ Distributed Power and Control System that it says greatly enhances walking rig mobilisation and operations.

According to Norm Myers, president of IDS, “The ReelRig system is a significant step-change in the way drilling rigs are powered. It has effectively eliminated the many maintenance, trouble-shooting and safety issues the industry has had with the standard maze of power cables required to operate walking rigs.”

Recently, Orion Drilling has added two walking rigs to its fleet that employ this new distributed power and control system. Orion has another new build planned for 2015 designed around the ReelRig concept, and has plans to retrofit an older rig with the new system.

Old problems

Drilling rigs are complex machines with many components and multiple systems that require electrical power to operate, run, lift, rotate, pump, illuminate, etc. It all starts in what is called the ‘backyard’ with the power control house, generators and electrical plug panel (see Fig. 1). Traditionally, this can be a spider web of 46 cables or more connected to the plug panel, each carrying 600v for power or control.

On a walking rig, the network of cables must ‘travel’ with the rig across the pad as the rig moves from one wellbore to the next, getting further away from the power house with each move. There are hundreds of feet of multiple cables chasing in and around and over and under the rig structure, involving sometimes more than 200 or more plugs or cable connectors and a traditional ‘festoon’ cable-handling system that unfolds like an accordion as the rig travels.

The problems with these systems are many. There are multiple connection points that can be broken or compromised, requiring wasted hours of troubleshooting and repair; not to mention safety concerns. Because of the cables, rig moves are cumbersome, often requiring extra personnel and equipment.

New solution

The new IDS distributed power and control system replaces a traditional centralised power network with a clean, streamlined power

“Drilling rigs are complex machines with many components and multiple systems”



Fig. 1: A traditional electrical power plug panel



Fig. 2: ReelRig™ power house, transformer and power cable connector

and control cable-handling system designed specifically for moving rigs over drill pad sites more safely and efficiently, says the company.

The distributed system locates variable frequency drives (VFDs) and programmable logic controllers (PLCs) near the driven equipment. It involves eliminating multiple power and control cables and connectors by adding a transformer to the backyard power house area (see Fig 2); stepping-up' the power from 600v to 4,160v, sending that power through a single medium-voltage cable, 'stepping-down' the voltage at the rig via another transformer, then distributing the power closer to where it is needed on the rig. A single control cable is backed up with a redundant wireless network, assuring uninterrupted operation and control without multiple connectors and 'noise' problems associated with long runs of cable.

“ The new system has revolutionised the way we power our rigs”

Instead of a plug panel that looks like a busy Houston freeway interconnector at rush hour on a Friday afternoon, there is a single-power cable connection point that includes ground-fault/check protection and a three-key safety lockout mechanism. There is a skid-mounted power cable spool, or 'reel', that attaches to the walking rig substructure. The spool pays out or reels in the power cable as the rig moves further away from or closer to the power house during rig moves (See Fig. 3). There is also a companion reel that handles the rig's fibre communication system's cable in a similar fashion.

From the spool, the power cable is connected to another transformer, where the 4,160V power is stepped back down to 600V and then distributed to the local equipment room (LER) and driller's cabin on the rig floor. The VFDs and motor control centres (MCCs) for the drawworks, top drives, and other rig floor equipment are housed in the LER (on the rig floor) closer to the driven equipment.

The entire ReelRig system consists of the power control house with mud system VFDs, transformers, cable and cable-handling system/skid, local equipment room VFDs, driller's cabin with integrated driller's controls, AC drawworks controls, and AC topdrive controls.

Wayne Squires, president of Orion, says, "This new system has revolutionised the way we power our rigs. It's safer, more efficient, reduces cable weight and footage, and dramatically reduces power system maintenance and troubleshooting. Our rig moves are faster, require fewer people and no cranes are needed for a move. In short, this system has solved the electrical limitations to walking a rig." ■



Fig. 3: ReelRig™ power cable and communication cable spooling skid

Orion Drilling's Aries Rig with ReelRig™ distributed power and control system skid attached to the rig's substructure.



**Gardner
Denver**

HIGH PRESSURE SOLUTIONS

BellissMorcom Reavell

Industry leading expertise -
High pressure reciprocating
compressors for demanding
applications



Gardner Denver FZE, Office No. 18202,
JAFZA View 18, P.O. Box 61146, JAFZA, Dubai, UAE
Tel: + 971(0) 4 881 17 44 Web: www.gardnerdenver.com
Email: enquiries.fze@gardnerdenver.com