

'Mixed fleet' approach to land drilling allows rigs, big or small, to perform in optimum range

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THERE'S AN OLD adage in the oil patch: "If a rig's drill isn't turning to the right, it isn't making money."

If you consider what a rig does from the time it's mobilized to reach a location until it is moved to the next location, there is much time and money spent on non-drilling functions. Still, these complex and time-consuming non-drilling activities are necessary for achieving productive drilling.

Until recently, drilling a well was considered a continuous process where a single rig was employed to drill from the surface to TD. In reality, wells are drilled and completed in segments, and each of these well segments requires different rig capacities to achieve optimum performance and cost control. A contractor's profitability depends on maintaining maximum performance and efficiency from the equipment in each segment of the well-drilling process.

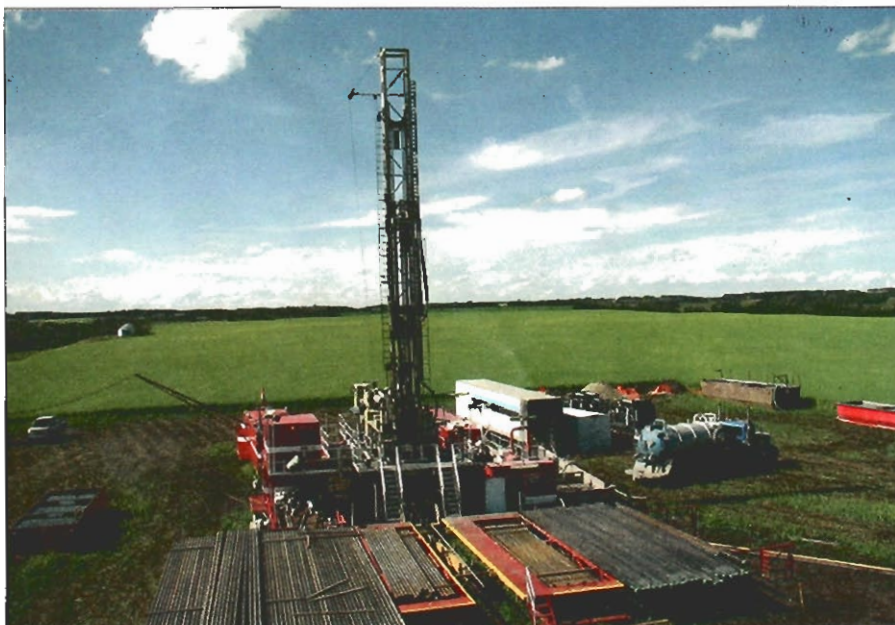
One way land-based drilling contractors can reduce operating costs is to adopt a "mixed fleet" approach – use lightweight hydraulic top-drive rigs to perform pre-set casing work and drill shallow E&P wells. Then, when the larger rig moves on location, it can nipple up and immediately begin drilling the deeper segments of the well.

With this approach, both rigs perform at maximum efficiency, while each completes their parts of the drilling plan.

OPTIMUM RANGE

Every drilling rig has a range of optimum performance. Outside that range, performance drops off and cost-per-foot increases. For example, a 1,000-hp to 1,500-hp triple is designed to drill holes in the 10,000-ft to 20,000-ft depth range. When it drills shallower holes, it is less efficient because it has more capacity and manpower (and the associated cost) than is required for the job.

With lighter weight, mobile drills in the 700-hp to 900-hp class, contractors can drill shallow wells from spud to TD and support larger rigs by drilling pre-sets for deeper holes. These smaller rigs and their related equipment mobilize quickly,



The Atlas Copco RD20, seen above on a gas well location in Alberta, Canada, has been used to drill pre-sets for larger rigs. Using a "mixed fleet" approach has the potential to help contractors save time and money.

Fewer trailer loads to bring on location can translate into a lower cost. Typically, within one to three hours upon reaching the site, lightweight, mobile drills can be effectively drilling.

In many instances, contractors are able to drill and set surface with these "pre-set" rigs in less time and with less personnel than it takes to mobilize and rig up a larger conventional rig. With pre-sets complete, a large rig can move on location and start drilling within its range of optimum performance and efficiency.

IN THE FIELD

Some contractors have been able to save time and money by drilling surface and intermediate holes with air drilling. In the Uintah Basin, Pro Petro Services has been using an Atlas Copco RD20 rig to drill pre-sets for larger rigs. "We typically drill 200 ft to 1,500 ft cased at 13 3/8 in., and 1,500 ft to 3,500 ft cased at 8 3/8 or 9 3/8 in.," said operations manager W.D. Martin. These wells are typically drilled with air using the rig's on-board compressor with an auxiliary compressor and a booster.

"Prior to using the Atlas Copco RD20, our conventional rigs were drilling down to the birds-nest zone and losing 80% of

their water or mud circulation pressure," Mr. Martin said. Using high-pressure air, the RD20 drills through the birds-nest zone without losing circulation. When the surface and intermediate holes are cased and cemented, the conventional rigs come in to drill the wells to 6,500- to 8,000-ft TD. Mr. Martin reports that his company has saved five to six days per well and drilled 10 to 15 more wells per year using the mixed fleet approach.

INCREASING EFFICIENCY

Lightweight, top-drive rigs can offer improved performance and cost efficiency in several areas:

- Mobilization cost: Carrier-mounted, self-contained rigs are highly mobile and can generally transport to and from location with simple highway permits. They can attain highway speeds and are excellent in off-road conditions, even in mountainous and remote terrain. For pre-set work, they usually require six to 10 loads to complete the location. They create a relatively small footprint and can work in tight locations.

A conventional rig may consist of up to 30 loads to build a location. Many of these loads require special weight and dimensional permits and are restricted to specific routes and times of day.