

Why ‘Walking’ Rigs Matter

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One of the most significant advancements to reduce costs for drilling multiple horizontal wells from a single surface location or pad is the “walking” rig. A walking rig is self-propelled because it can move short distances (10 metres) without being disassembled and with pipe in the derrick. Drilling multiple wells from a single surface location is a long-established method of reducing total drilling costs.

Designed long-reach horizontal pad drilling applications for either shale gas or tight oil, walking rigs cut drilling costs by spending much more time making hole and much less moving (rig up and tear down), picking up and laying down drill strings and tools, and mixing different batches of drilling mud and cleaning mud tanks for drilling various wellbore sections.

This explanation is simplistic to drilling professionals but will serve as a basic primer for the myriad of people and dozens of suppliers involved in the drilling of pad horizontal wells.

Rig moves

Moving and rigging up a conventional drilling rig is expensive and time consuming. Cranes are often employed. A similar amount of time is required to disassemble the rig and move it to the next well, even a short distance. Much work on rig designs has been done to enable it to move in fewer loads.

The walking rig moves no loads. Using giant hydraulic systems and pads, walking rigs can pick themselves up and move short distances on their own. Moving 10 metres can take an hour or less without external trucks, cranes or additional manpower. Support systems like mud tanks, pumps, generators and boilers remain centralized tied in via flexible connectors. Drill string and tools move with it.

A rig move that used to cost \$100,000 (regardless of distance) in total costs can now be done for a tiny fraction of that amount.

Drill string and tools

Drilling requires different sizes and types of drill string and tools for each well section of the well. The hole diameter gets smaller with depth, as does the size of casing.

On conventional rigs, when surface hole is completed, some drill string components and tools are laid down and new pipe and tools picked up. The same process happens again for the horizontal section. Each string size requires different handling tools. This takes hours to change.

Walking rigs drill the same section of hole for several wells in a row. No single well is drilled from surface to total depth without interruption. When surface hole is completed on the first well, drilling is suspended and the rig moves itself and spuds the second. This process continues for as many wells as desired depending upon the shape of the pad and the size of the location.

When the rig is done drilling surface holes, this drill string is laid down and the rig is converted to drill the intermediate section with smaller pipe and tools. The rig finishes the last well in the sequence, and then starts the process of working itself back to the first well. When the intermediate sections are completed and cased, the rig is reconfigured one last time to drill the horizontal section off all the wells.

Drilling mud

The last big time saver is drilling mud. Different types of drilling fluids are used for each section of the well. The chemical properties and desired performance of each is different. Switching drilling fluids takes time and costs money. Tanks must be dumped and cleaned. The solids control equipment may be different like the shale shaker screen mesh. New mud must be hauled in and mixed.

The beauty of walking rigs is that the rig will be dedicated to drilling multiple surface holes, intermediate sections and horizontal sections before drilling fluids must be changed. Besides changing mud properties, this also requires fluid disposal and tank cleaning. This greatly reduces costs.

Walking rigs have been in big demand for several years and the major land drilling contractors in North America have spent billions of dollars building them for oil companies. Normally they are built under long-term, take-or-pay contracts that help the driller justify the investment. The total cost savings (dollars per barrel produced) are so meaningful that new generation walking rigs have rendered many older rigs obsolete, at least for horizontal drilling applications.

Quantifying the total cost reductions of using walking rigs over conventional rigs is difficult because each pad and project is different. But it is safe to say that the savings are so significant that hundreds of new rigs have been built and more are on the way.

Walking rigs are an excellent example of how oil companies and their vendors can work together to meet mutual commercial objectives. The total cost reductions generated by using special-application equipment for shale gas and tight oil exploitation are much greater than any savings extracted from vendor cost reductions alone.