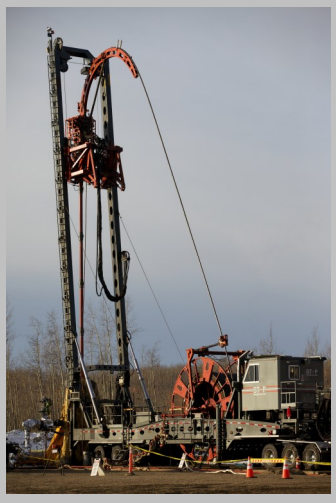
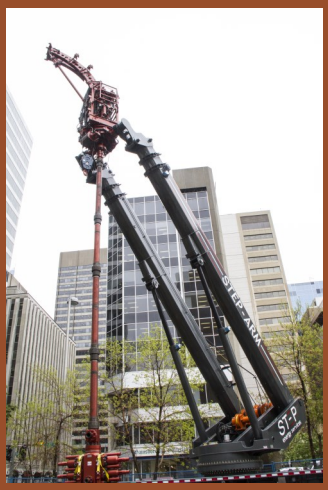
STEP energy services

BUSINESS CASE | COILED TUBING VS. SNUBBING FOR WELL INTERVENTIONS

What was once considered impossible using coiled tubing due to extended reach and set-down force is now possible thanks to STEP's fit-for-purpose equipment and operational efficiencies.





THE DIFFERENCES:

Coiled tubing (CT) is a method used to convey tools into wells under pressure. However, the main differences between CT and snubbing are the equipment design, the pipe used for the operation, the speed of operations, and the overall safety of the project. CT operations involve specialty designed rigs which use continuous metal pipe on a reel rather than jointed pipe on a rack. This is one of the main advantages of using CT over snubbing; a CT unit can complete jobs much faster because it does not require the connection of pipe joints. During CT operations, dual stripping rubbers and BHA check valves are used to control the well since the CT string has consistent OD. The string comes in sizes ranging from 3.175 mm to 73.0 mm (1/8" to 2-7/8") for horizontal well interventions. CT can be hung off the well head for production enhancement applications like a velocity string, however it is most commonly used for horizontal milling operations of debris and chemical treatments.

Snubbing is a method for inserting tools and jointed pipe into wells under pressure, ensuring the wells can be safely serviced without having to use kill weight with fluids. The process of snubbing involves the tripping (making or breaking threaded connections) of pipe in and out of a well under high pressure by opening and closing rams to stage in pipe upsets. This process is quite lengthy and takes an average of four minutes per joint of pipe (10 m / 32.8 ft). Snubbing is primarily used for projects where the well needs to be maintained in underbalanced conditions.

In the past, snubbing has been used to reach long horizontal depths that were not accessible by traditional CT units. Contrary to these pre-conceived notions, STEP's purpose-built equipment has been designed to service the deep horizontal well market, reaching a record total measured depth of 6,357 m (20,856 ft) in August 2014.

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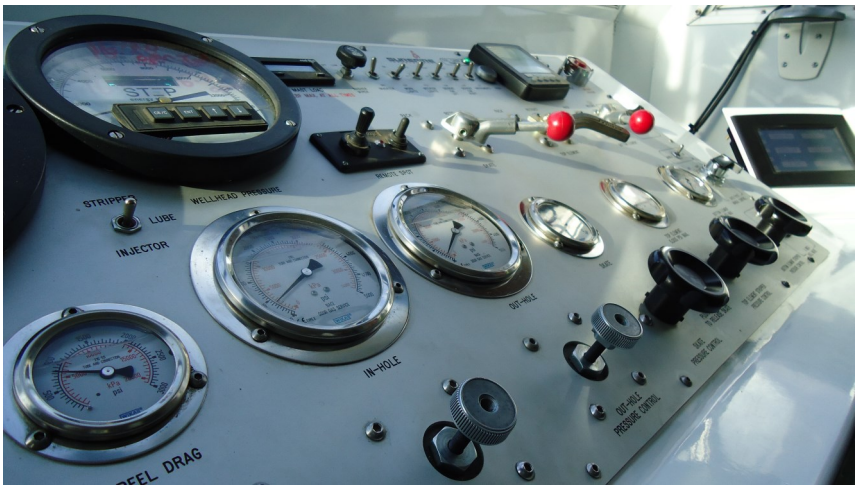

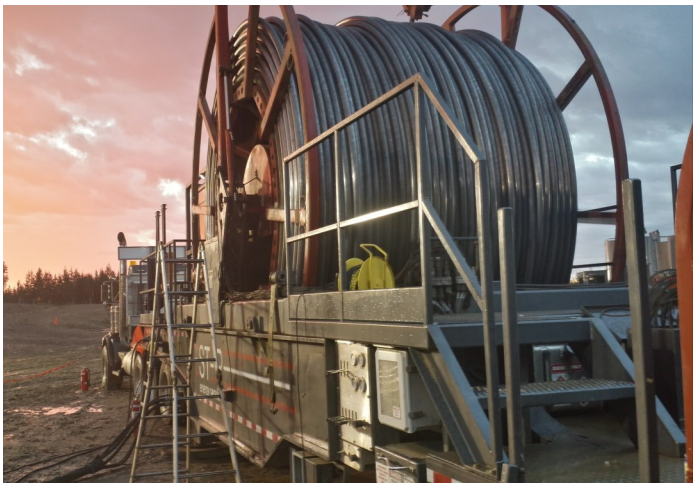

ADVANTAGES OF USING COILED TUBING VS. SNUBBING:

1. Trip Times

- It is approximately eight times faster to use coiled tubing

- CT: up to 20m/min (66 ft/min) going in, 25m/min (82 ft/min) coming out of hole

- Snubbing: 2.5m/min (8.2 ft/min)

2. Circulation

- CT allows for continuous circulation which has been proven to prevent solids from building up in the annulus, bridging, and sticking pipe.
- In snubbing an operator must stop circulation to connect the stabbing valve and circulation line, creating a discontinuous cycle. The joints of the pipe can get stuck, creating additional lag time and operational inefficiencies.

3. Safety

- CT: By using STEP's COMMAND CENTER, the operator is always out of the high pressure release zone.
- Snubbing: The snubbing "basket" is the platform where the snubbing personnel work, which is directly above the wellhead.

THE STEP WAY:

At the beginning of 2014, STEP Energy Services (STEP) performed a bridge plug milling project on five ultra-long lateral wells in northeast British Columbia. A single, custom-designed 6,600 m (21,650 ft) string of 73.0 mm (2-7/8") coiled tubing was used to mill all five wells in just under 12 days. The total measured depth (TMD) of the longest well was 6,725 m (22,060 ft) with a lateral segment of 3,600 m. (11,810 ft) STEP successfully milled up to 18 plugs per well, with limited wiper trips, spending approximately 48 hours on each of the five wells.

In a comparison, a snubbing company used their equipment to mill out bridge plugs to a TMD of 6,000 m (19,685 ft). It took on average 5.78 days per well to mill out the bridge plugs on seven wells using 73.0 mm (2-7/8") jointed pipe.

By comparing the two case studies, coiled tubing was approximately 60% more efficient than snubbing, saving the client valuable time and money.