



## CHALLENGE

Reduce operator's project cost over three wells using a higher-priced and higher-spec rig

## SOLUTION

Predictive cost savings resulting from in-depth well and rig time analysis with use of Alpha™ technologies

## RESULTS

Saves operator 3.8 days over plan

Tangible and intangible cost savings of \$113K over 3-well project

## *AlphaAnalytics™ Helps in Rig Selection and Improved Performance*

### **Valhalla Region Case Study**

#### **OVERVIEW OF CASE STUDY**

One of our operators drilling in the Valhalla region of Canada had been using a tele-double rig for one year with plateaued performance. Our sales and optimization teams met to evaluate technical improvements and the commercial viability of using a high-spec Alpha™ Super Triple pad rig for an upcoming 3-well project.

Our teams reviewed various datasets from the Valhalla area to assess optimized solutions when comparing operations using a tele-double versus a super triple rig. The technical and commercial review studied drilling time, flat time, and cost to provide a feasible offering for the operator with a focus on: moving rig with setback; move time between wells; drilling time reduction; reduced BHA and pipe handling time; intangible cost including reduced transportation, reduced fuel; and, use of technology to achieve time savings.

Our solution was accepted by the operator and a contract for the upcoming project was signed. On execution of the project our analytics study and proposal paid off with a reduction of 3.8 days in drilling time and flat time over three wells (Fig 1). The resultant intangible cost savings when added to the time savings resulted in a total of \$113k for the operator. This was a win-win for the operator who paid more to save more, and an advantage of a high-spec super triple rig as compared to a tele-double.

#### **PROJECT EXECUTION**

As a part of the proposed solution, the sequence of events called for batch drilling the surface section to save time when compared to a tele-double. As seen in Figure 1, the batch drilling surface operation consumes upfront operational time, while the resultant time savings from walking and tubular handling allowed for time savings on the overall project. The walking system proved its efficiency where the rig would walk from well to well with a full setback load. This operation alone saved an estimated 32.5hrs (1.4 days).

**AFE RESULTS**

**91.2**

Hours estimated drilling and flat time savings\*

**AlphaAutomation™**

**96%**

Utilization in the intermediate and lateral sections

\*Based on like for like tele-double operations.

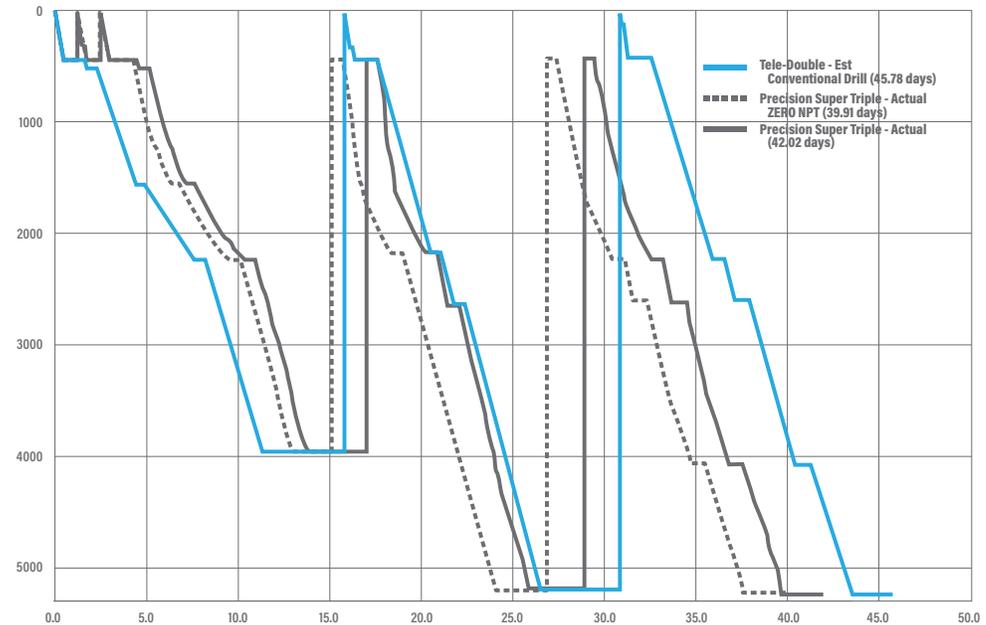
The intermediate and lateral sections of the wells were programmed to drill with the automation system and applications. The automation system with its digital well plan and configurations helped in consistently reducing the overall drilling and connection time. The primary focus was aimed at optimizing reaming, survey, and connection times. The automation system controlled 96% of the drilling and connection processes automating 97% and 91% of the surveys and reaming sequences, respectively. This resulted in an overall drilling connection time reduction of 20.3hrs (0.85 days), as well as trip connection time reduction of 25.5hrs (1.1 days) by comparison with the capabilities of a tele-double, totaling 1.95 days in total connection time savings.

While drilling the intermediate and lateral sections of Well 1, significant drilling dysfunction was seen from stick-slip resulting in lower than planned penetration rate (Fig 2). The Z-Torque app was then turned on in the lateral section (Well 1) along with the Weight Compensator app, which delivered reduction in stick-slip and improved penetration rates. The Z-Torque app was then turned on in the intermediate and lateral sections of the other wells significantly improving penetration rate while reducing stick-slip. Overall average drilling productivity improved by 50m per day averaging a 25% improvement by using the AlphaAutomation™ and AlphaApps™ (Fig 3).

**FIGURE 1**

Shown below is time vs depth curve for a tele-double rig (light blue line) vs the PD Actual with and without NPT time. The chart shows the original plan for the tele-double set at 45.78 days. The super triple rig drilled at 3.8 days faster than the tele-double plan at 42 days. Well NPT accounted for 2.11 days.

**MULTI-SCENARIO DRILL CURVE**



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**HIGH  
 PERFORMANCE  
 HIGH VALUE**

**STICK-SLIP**

22%

Average reduction with Z-Torque turned on

**RATE OF PENETRATION**

25%

Improvement using Z-Torque app



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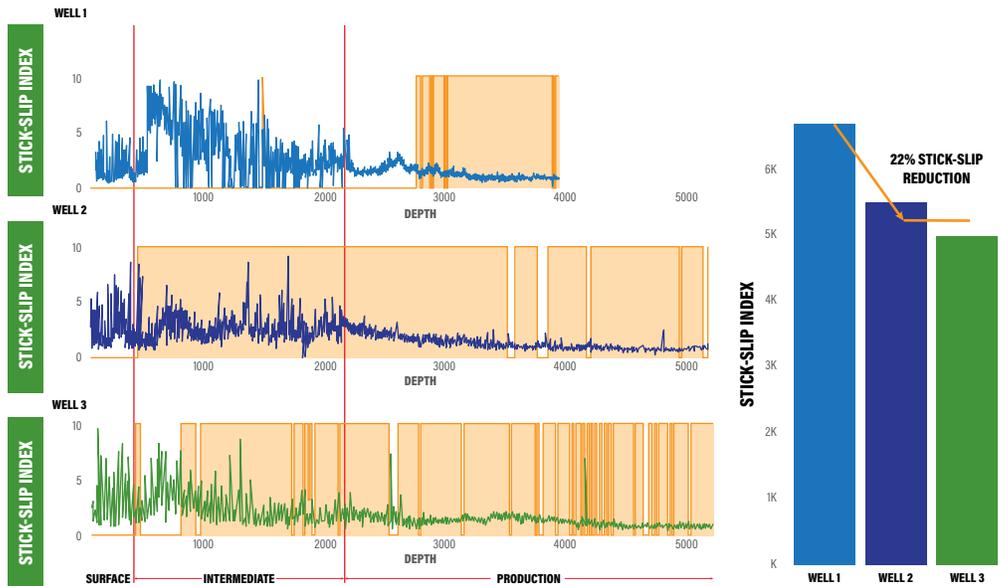
HIGH PERFORMANCE  
HIGH VALUE

**FIGURE 2**

Figure 2a shows the Stick-Slip Index for each well. The yellow-shaded background indicates areas where the Z-Torque app was turned on, and the red lines mark the surface, intermediate and production sections. There is a notable reduction in the magnitude and erratic fluctuations of the stick-slip measurement where Z-Torque is turned on.

Figure 2b shows the Stick-Slip Index for each well, an average stick-slip reduction of 22% was achieved through Z-Torque.

**CUMULATIVE SURFACE STICK-SLIP**



**FIGURE 2A**

**FIGURE 2B**

**FIGURE 3**

Shown below are the penetration rate improvements for the intermediate and lateral sections where Z-Torque controlled much of the drilling dysfunction. Well 1 is indicative of similar penetration rates as using a tele-double rig. Wells 2 and 3 show the full versatility of automation and Z-Torque over the intermediate and lateral sections.

**ROTATE ROP (m/hr)**

