

# CASE STUDY

## WELL COST OPTIMIZATION BY AI WELL PLANNER

Trajectory of a well significantly impacts its construction costs, with one key aspect being the expense associated with casing and drilling. Due to multi-level structure of the wellbore geometry, some sections incur a substantially higher cost per meter compared to another sections. However, this aspect is frequently overlooked during the design phase, resulting in considerable overspending. This case study highlights the effectiveness of integrating AI technology into well design, showcasing substantial cost reductions. In this instance, savings on well construction **over \$700,000**.

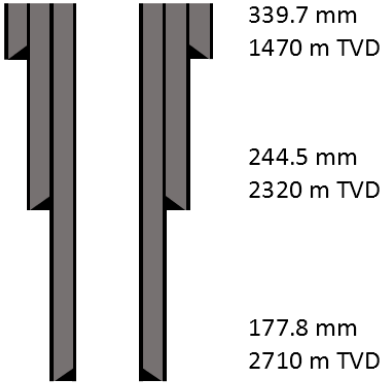


Figure 1a. Wellbore geometry

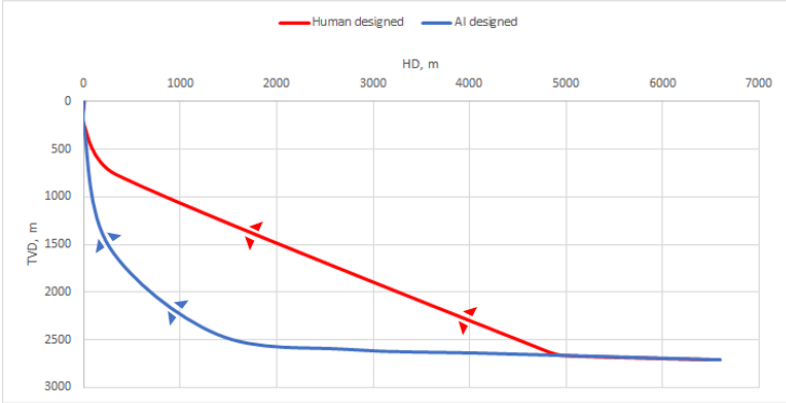


Figure 1b. Red trajectory designed by DE; blue one designed by AI

Originally, a **red trajectory** (Figure 1b) was designed by a drilling engineer for the transport section of an ERD well. We utilized **the AI Well Planner by MWD STD** to plan a new trajectory aimed to minimize well construction costs. The AI Well Planner used the wellbore geometry (Figure 1a) and approximate prices for drilling per meter, casing, drilling fluid, cement slurry, drilling time, and cutting disposal. The AI modeled torque-and-drag to ensure casing running feasibility in each section. The **result trajectory** represented in **blue** in Figure 1b. The well construction cost for this trajectory was **\$745,000** less than that for the initial trajectory designed by the drilling engineer. A detailed cost breakdown is provided in Table 1 and 2.

Table 1. Cost breakdown for the human-designed well

Human-designed trajectory									
#	Drilling			Casing			Cement		
	Length (m)	Price (\$/m)	Cost (\$)	Length (m)	Price (\$/m)	Cost (\$)	Vol (m3)	Price (\$/m3)	Cost (\$)
1	2,600.10	130	338,014.00	2,600.10	315	819,033.93	215.2	300	64,565.42
2	2,280.90	130	296,514.63	4,881.00	175	854,173.16	157.3	300	47,190.44
3	2,660.00	130	345,801.24	7,541.00	70	527,869.93	103.2	300	30,961.34
<b>Subtotal</b>	980,329.87			2,201,077.02			142,717.20		
#	Cuttings			Mud			Time		
	Vol (m3)	Price (\$/m3)	Cost (\$)	Vol (m3)	Price (\$/m3)	Cost (\$)	Time (hr)	Price (\$/hr)	Cost (\$)
1	450.9	120	54,109.48	450.9	400	180,364.93	43.3	2,100.00	91,003.77
2	173.4	120	20,811.99	386.4	400	154,573.11	50.7	2,100.00	106,441.15
3	97.4	120	11,685.83	290.4	400	116,174.97	88.7	2,100.00	186,200.67
<b>Subtotal</b>	86,607.30			451,113.01			383,645.59		
<b>Total</b>	<b>4,245,489.98</b>								

Table 2. Cost breakdown for the AI designed well

AI designed trajectory									
#	Drilling			Casing			Cement		
	Length (m)	Price (\$/m)	Cost (\$)	Length (m)	Price (\$/m)	Cost (\$)	Vol (m3)	Price (\$/m3)	Cost (\$)
1	1,577.10	130	205,021.61	1,577.10	315	496,783.12	101.8	300	30,531.48
2	1,283.90	130	166,912.09	2,861.00	175	500,679.98	92.5	300	27,754.58
3	5,200.80	130	676,101.18	8,061.80	70	564,326.47	103.4	300	31,018.65
<b>Subtotal</b>	1,048,034.88			1,561,789.57			89,304.70		
#	Cuttings			Mud			Time		
	Vol (m3)	Price (\$/m3)	Cost (\$)	Vol (m3)	Price (\$/m3)	Cost (\$)	Time (hr)	Price (\$/hr)	Cost (\$)
1	244.7	120	29,367.77	244.7	400	97,892.56	26.3	2,100.00	55,198.12
2	97.6	120	11,715.35	97.6	400	39,051.16	28.5	2,100.00	59,917.16
3	190.4	120	22,847.82	303.6	400	121,423.77	173.4	2,100.00	364,054.48
<b>Subtotal</b>	63,930.93			258,367.48			479,169.77		
<b>Total</b>	<b>3,500,597.34</b>								