



Bit Performance

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TRAINING ON DESIGN, OPERATION, AND INTEGRITY OF GEOTHERMAL WELL

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- **The performance of a bit may be judged on the following criteria:**
 - How much footage it drilled (ft)
 - How fast it drilled (ROP)
 - How much it cost to run (the capital cost of the bit plus the operating costs of running it in hole) per foot of hole drilled .
- **The aim of bit selection is to achieve the lowest cost per foot of hole drilled.**

$$C = \frac{C_b + (R_t + T_t)C_r}{F}$$

where,

C = cost per foot (\$/ft)

C_b = cost of bit (\$)

R_t = rotating time (hrs)

T_t = round trip time (hrs)

C_r = cost of operating rig (\$/hrs)

F = hole drilled (ft)

- This equation relates the cost per foot of the bit run to the cost of the bit, the rate of penetration and the length of the bit run.
- It can be used for:
 - Post drilling analysis to compare one bit run with another in a similar well.
 - Real-time analysis to decide when to pull the bit.

Exercise

The following bit records are taken from the offset wells used in the design of the well shown in Appendix 1 of Chapter 1.

Assuming: that the geological conditions in this well are the same as those in the offset wells below; that the 12 1/4" section will be drilled from around 7000ft; an average trip time of 8 hrs; and a rig rate of £400/hr. select the best bit type to drill the 12 1/4" hole section.

WELL	BIT	COST (£)	DEPTH IN (FT.)	DEPTH OUT (FT.)	TIME ON BOTTOM (HR.)
I	A	350	7100	7306	14.9
II	B	1600	7250	7982	58.1
III	C	1600	7000	7983	96.3