

Down Hole Tooling

Session 4 and 5



Down Hole Tooling

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SESSION			
4	Mixed formations, gravelly sandy (stable) borehole)	- Soft rock/hard ground slanted bit	- Combined - Compacting reamers
5	Coarse to very coarse unconsolidated formations (unstable) borehole)	- Casing pipe - Soft rock/hard ground slanted bit - DTH hammer: TCI hammer bits (slanted, eccentric)	Combined

Down Hole Tooling

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SESSION			
4	Mixed formations, gravelly sandy (<u>stable</u> borehole)	- Soft rock/hard ground slanted bit	- Combined - Compacting reamers
5	Coarse to very coarse incoherent formations (<u>unstable</u> borehole)	- Casing pipe - Soft rock/hard ground slanted bit - DTH hammer: TCI hammer bits (slanted, eccentric)	Combined

Down Hole Tooling

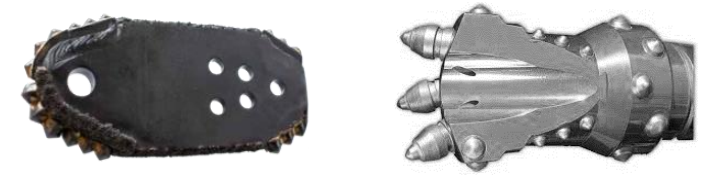
Session 4 and 5

SESSION			
4	Mixed formations, gravelly sandy or Rock formations 25% < RQD < 50% (<u>stable</u> borehole)	- Soft rock/hard ground slanted bit	- Combined - Compacting reamers
5	Coarse to very coarse inchoerent formations Rock formation RQD < 25% (<u>unstable</u> borehole)	- Casing pipe - Soft rock/hard ground slanted bit - DTH hammer: TCI hammer bits (slanted, eccentric)	Combined

PILOT BORE METHOD

- Required final product does include?
 - Cementing before / after
- Which methods are the most suitable?
 - High percentage to success
 - Low percentage to success
- What are the limitations?
- Energy needed to run these tools can be an issue?
- Bent subs

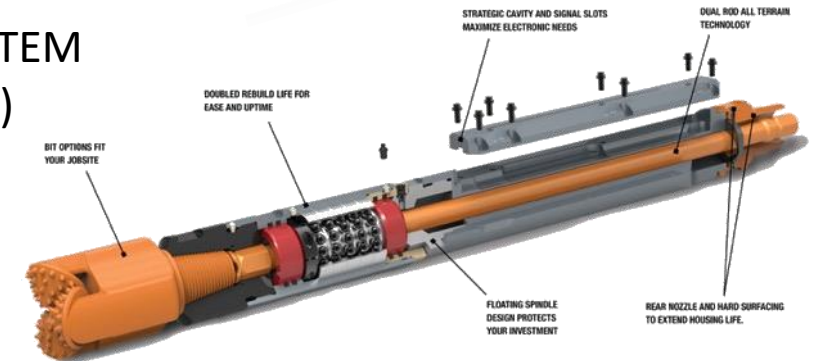
Standard Jetting



AIR HAMMER



ALL TERRAIN SYSTEM (Twin rod system)

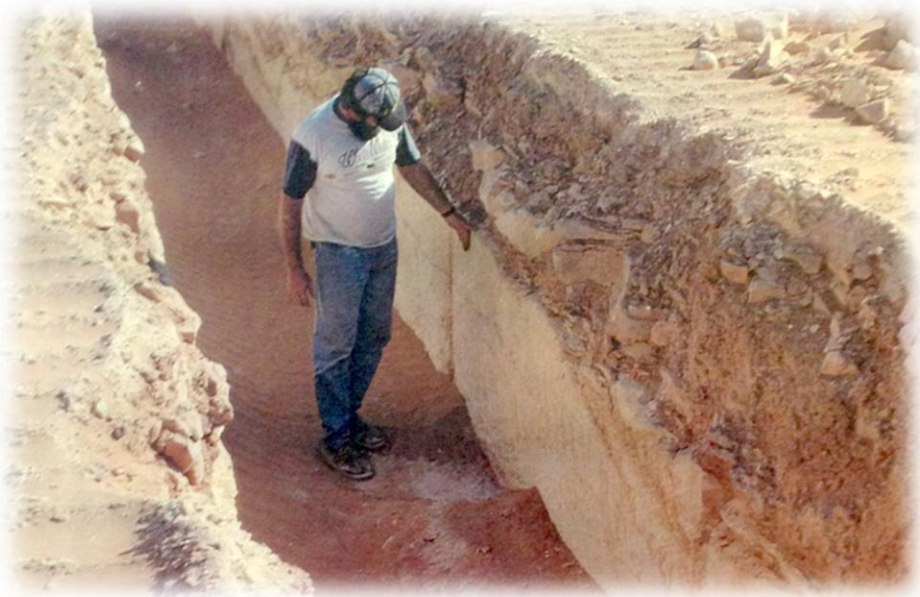


MUD MOTOR



PILOT BITS FOR ROCK

- Choosing the correct Tricone, PDC or Rock bit
Which one will suit where ?



Bit Selection

Soft Rock
Shale, Siltstone
0 to 6,000 PSI (413 bars)
Piranha Bit



Soft Rock
Sandstone, Marble, Soft Limestone
0 to 12,000 PSI (827 bars)
PDC Bit or Mill Tooth Bit



Bit Selection

TCI Bit (Tungsten Carbide Insert)

500 Series (Soft to Medium Rock)
Sandstone, Limestone, Soft Granite
6,000 to 12,000 PSI (413 to 1,103 bars)

600 Series (Medium to Hard Rock)
Dolomite, Granite
16,000 to 25,000 PSI (1,103 to 1,723 bars)

700 Series (Hard Rock)
Quartz, Basalt, Very Hard Granite
25,000 to 38,000 PSI (1,723 to 2,620 bars)

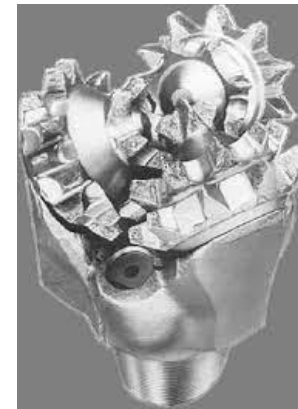


IADC CODE REFERENCE

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First Digit:

1, 2, and 3 designate Steel Tooth Bits with 1 for soft, 2 for medium and 3 for hard formations.
4, 5, 6, 7, and 8 designate Tungsten Carbide Insert Bits for varying formation hardness with 4 being the softest and 8 the hardest.



Back reaming in soft soil / stable mixed ground

1



- Reaming

- Tools

What to select for the correct rock?

2



- Hole

What to do before and after the main reamer (large diameters)?

Using barrels reamer, centerizers?

3



- Pro Contra

What are the risks or advantages of these tools?

- High percentage to have a successful hole opening
- Low percentage to have a successful hole opening

4



5



6



Back reaming in rock / stable mixed ground

1



- Rock drilling reaming

- Tools

What to select for the correct rock?

- What type of cutters?
- How many cutters?
- Fixed arm or bolt?

- Centralizers

Why and when to use them?

- Barrel reamers

Why and when to use them?

- Pro Contra

What are the risks or advantages of these tools?

- High percentage to have a successful hole opening
- Low percentage to have a successful hole opening

2



3



4



5



6



Methods in unstable ground

- - Choosing the correct method: Which one will suit where ?
 - Force pull
 - Cementing
 - Casing pipes
 - Other method in general



Casing



High pressure cementing

