

# Down Hole Tooling

session 2

- Soft fine soil (sand, silt, clay, peat and combinations)
  - Firm or stiff soil but jettable and steerable Soft rock
- 
- Jetting jobs in soft or stiff soils : Which down hole tools are suitable?



# Soil Rock types

- Fine granular soils, such as silt and sand
- Cohesive fine soils, such as clay
- Very soft soils such as peat, gytja and organic clay
- Very weak rock, such as wheatered sand and siltstone and shale
- Weak rock, such as shale, sandstone, siltstone
  
- Other soil and rock types in other sessions



## Jetting jobs in soft soils

- Pilot

- Tools Which tools can we use and why?
- Borehole What will happen with the borehole?
- Pro-Contra What are the advantages and disadvantages of these tools

- Reaming

- Tools How to select the correct back reamer?
- Borehole When do you use a type of reamer and why?
- Pro Contra What are the advantages and disadvantages of these tools

- Pull Back

- Tools Which tools can we use and why?
- Hole – Pipe Pulling techniques?
- Pro-Contra



# Pilot with jetting assembly

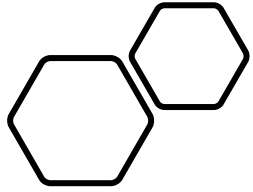
## DIRT HOUSING



Single, double or 3 jets.

- Jet bits





• **Jetting through loose rock, cobbles, soft rock**

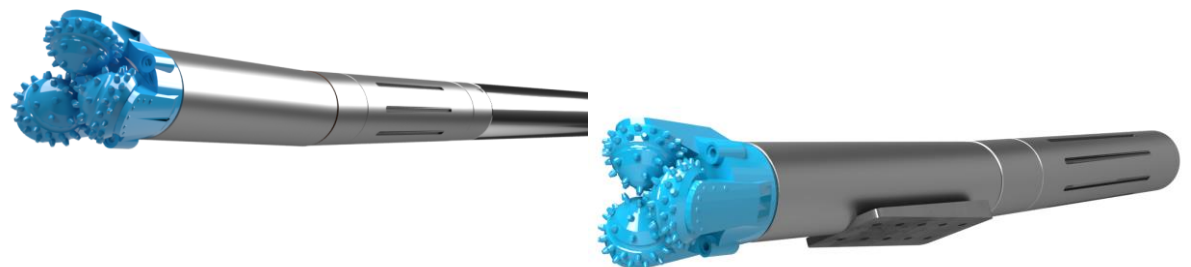
- SINGLE ROLLER CONE BIT
- COBBLE BIT
- ROCK BIT (3 TEETH STYLE)

Wish Tool is prefer in this type of ground?

**Rock Housing**



Universal bit



# Please fill in what you use and why.

	Advantage	Disadvantage	Borehole Quality	Soil Types
TCI triconebit	Plate attachment in soft soils possible. Fast drilling method	Only available for larger drillings Larger rigs need for sufficient power	Very regular well shaped holes. Usually a gradual bending radius	All soil types. Sticky clay and harder rock might cause difficulties
Mill tooth tricone	Plate attachment in soft soils possible. Fast drilling method	Only available for larger drillings Larger rigs need for sufficient power	Very regular well shaped holes. Usually a gradual bending radius	Better in clayey soils than TCI
Tryhawk	Quick connection is possible, steering can be done well	More specific for smaller rigs Pull back is often difficult	Removal of cuttings is not always good due to larger parts	Not in soft soil, but in harder soils and soft rock
Steering plates	Good soil reaction in soft soil	Pull back is often difficult	Usually not very smooth, additional rotation is often required	Soft soils such as peat, soft clay and not very stiff sandy soils
Single bit	Second life is possible	Time consuming	Not much experience available	Soft rock
Single roller cone bit		Steering plate necessary Not used very often	Not much experience available	Softer formations



# Reaming in jettable soils.

BEAVETAIL STYLE



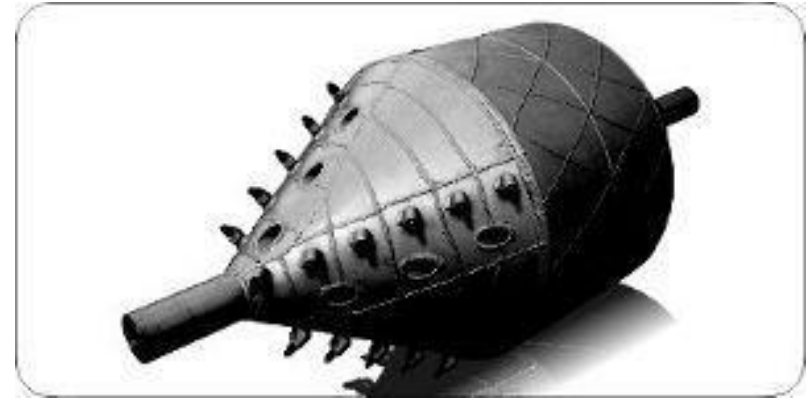
FLY CUTTER STYLE



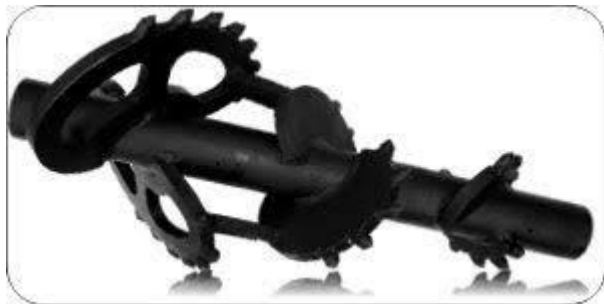
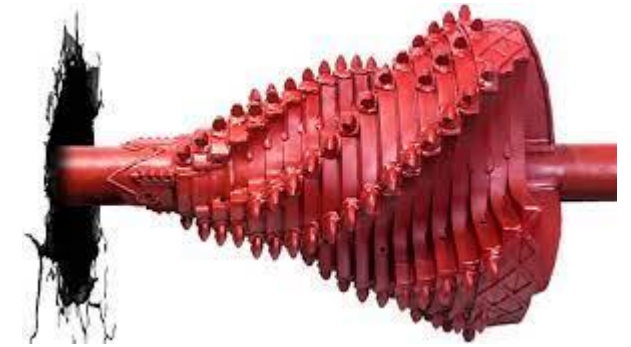
FLUTED REAMER



BARREL REAMER



# Reaming in jettable soils.





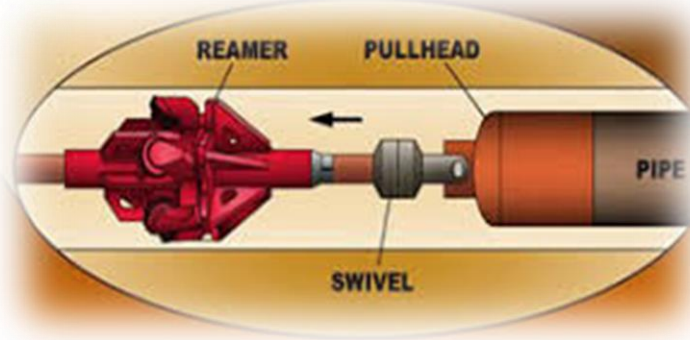
# Which reamer to use?



	Advantage	Disadvantage	Borehole Quality	Soil Types
Flycutter	Sufficient space for the cuttings to be removed Not heavy Large reaming steps possible	A centralizer is required The nozzle locations determine the quality of the borehole	In case of the use of a centralizer and well designed nozzles, a well shaped hole can be derived	All types
Barrel reamer	No wiper trip needed Stable borehole	Sometimes high torque values No always sufficient space for flow	Very good quality ( weight	Only in sedimentary soils without certain cementation
Hole opener				Rock formations ( see next session)
Beaver tail reamer		Suitable for smaller drillings	Not always a well shaped bore hole	Mixed soils with a certain granular content
Fluted Reamer	Stable borehole Displacement is softer soils possible	No always sufficient space for flow Sometimes high torque values		Sandy soils and very soft soils
Many others				



# Pull Back



- Pullback Swivel. Internal to the reamer or External?
- Pullheads, ...??
- Any new process to stop the cuttings to fall between the tool and the pulling head?



MESH PULLIN GRIP



SLEEVED DUCT PULLER



MUD TIGHT PULLER



Fuse-on Towing Head



# WHAT TO DO FOR A NICE PULL

- Points of attention
  - Oversize hole?
  - Cleaning run with 'wiper' configuration?
  - Reamer sequence in front of pulling head?

