

ROCK TESTS REQUIRED FOR PREDICTION OF EXCAVATABILITY & MACHINE  
PERFORMANCE,  
UTILIZING THE BEST AVAILABLE PREDICTOR MODELS.

**DIAMOND DRILLING**

CERCHAR Abrasivity Index	Weight on Bit
Sklerograf Hardness	Rotation Speed (r.p.m.)

**ROTARY DRILLING**

Sievers J-number Drillability test	Weight on Bit
Specific Energy (in Uniaxial Compression test)	Rotation Speed (r.p.m.)
Swedish Brittleness Number	Hole Diameter
Uniaxial Compressive Strength	Drill Power
	Drill Torque
	Air Volume (c.f.m.)

**PERCUSSIVE DRILLING ( DTH)**

CERCHAR Abrasivity Index	Hole Diameter
Sievers J-number Drillability test	Drill Power
Norwegian Abrasion Value (with Tungsten Carbide work-piece)	Air Pressure
Rock Impact Hardness Number (RIHN)	Flow Rate
Sklerograf Hardness	
Swedish Brittleness Number	

**PERCUSSIVE DRILLING ( TOP HAMMER)**

CERCHAR Abrasivity Index	Hole Diameter
Coefficient of Rock Strength (CRS)	Drill Energy (J)
Sievers J-number Drillability test	Blow Rate (Hz)
Norwegian Abrasion Value (with Tungsten Carbide work-piece)	Bit Diameter
Specific Energy (in Uniaxial Compression test)	Piston Mass
Stamp Test	Piston Blow Frequency
Swedish Brittleness Number	Drill Rod Cross-sectional Area
	Number of Buttons
	Button/rock Contact Area Radius

**BLASTABILITY**

Rock Density  
 Ultrasonic P-wave and S-wave Pulse Velocities  
 Tensile Strength  
 Point-Load Strength Index  
 Uniaxial Compressive Strength  
 Elastic Modulus & Poisson's Ratio  
 Discontinuities Spacings & Orientations  
 Rock Mass Description : Block Size

### **TRENCHING**

Sklerograf Hardness  
Schmidt Hammer Hardness  
Point Load Strength Index  
Tensile Strength  
Ultrasonic Wave Velocities  
Uniaxial Compressive Strength.  
Specific Energy (in Uniaxial Compression test)  
Goodrich Drillability  
N.C.B. Cone Indenter Index  
Plasticity Index  
CERCHAR Abrasivity Index

*Plus Geological Factors :*

*Defect Spacing  
Fracture Index  
Petrographic Description - Quartz content  
Field Seismic Velocities*

### **ROADHEADERS**

CERCHAR Abrasivity Index  
N.C.B. Cone Indenter Index  
Goodrich Drillability  
Plasticity Index  
Specific Energy (in Uniaxial Compression test)  
Tensile Strength  
Uniaxial Compressive Strength

Cutterhead Power  
Machine Weight

*Plus Geological Factors :*

*Average Joint Spacing  
Petrographic Description - Quartz content  
RQD*

### **RAISE & SHAFT BORERS**

CERCHAR Abrasivity Index  
Morris / Dresser Drillability / RBi  
Uniaxial Compressive Strength  
Specific Energy (in Uniaxial Compression test)  
Tensile Strength  
Sievers J-number Drillability test  
Swedish Brittleness Number  
Norwegian Abrasion Value (with Disc Cutter steel work-piece)

## **TUNNEL BORING MACHINES**

Sklerograf Hardness  
Tensile Strength  
Punch Shear Test  
Fracture Toughness  
CERCHAR Abrasivity Index  
Uniaxial Compressive Strength.  
Specific Energy (in Uniaxial Compression test).  
Sievers J-number Drillability test  
Swedish Brittleness Number  
Norwegian Abrasion Value (with Disc Cutter steel work-piece)  
Morris Test  
Stamp Test  
Porosity

### **Plus Machine Factors**

TBM Diameter  
Cutterhead Power  
Cutterhead Speed (r.p.m.)  
Cutterhead Thrust (kN)  
Cutterhead Torque (kNm)  
Number of Disc Cutters  
Disc Cutter Diameter  
Face Cutter Spacing  
Propel Ram Stroke Length  
Time per Regrip  
Time per Cutter Changed

### **Plus Geological Factors :**

Amphibole content. Mica content. Quartz content.  
Average grain size.  
Average Spacing of the 3 most significant joint sets.  
Strikes and dips of the 3 most significant joint sets.  
Direction of tunnel axis.  
Rock Type.  
Q-system rock mass classification.  
Expected in-situ stress field magnitude and orientation of principal stress axes, relative to tunnel axis.

## **STRAIN BURST INDEX**

Tensile Strength  
Fracture Toughness  
Ultrasonic Wave Velocities  
Uniaxial Compressive Strength.  
Specific Energy (in Uniaxial Compression test).