

SUPPLEMENTARY MATERIALS

Article

Application geomechanical classification systems in a tourist mine for establishing strategies within 3G's model.

Supplementary Materials:

Table S1. RMR geomechanical classification [53].

1	Rock Matrix	Point load test	>10	10 - 4	4 - 2	2-1	Simple Compression		
	Resistance (MPa)	Simple Compression	>250	250 -100	100 -50	50 - 25	25-5	5-1	<1
	Score		15	12	7	4	2	1	0
2	RQD		90%-100%	75%-90%	50%-75%	25%-50%	<25%		
	Score		20	17	13	6	3		
3	Separation between diaclasses		>2m	0.6-2m	0.2-0.6m	0.06-0.2m	<0.06m		
	Score		20	15	10	8	5		
4	State of the discontinuities	Length of the discontinuity	<1m	1-3m	3-10m	10-20m	>20m		
		Score	6	4	2	1	0		
		Gap	None	<0.1mm	0.1-1.0mm	1-5mm	>5mm		
		Score	6	5	3	1	0		
		Roughness	Very Rough	Rough	Slightly rough	Undulate	Soft		
		Score	6	5	3	1	0		
		Filler	None	Hard-filled <5mm	Hard-filled >5mm	Soft-filled <5mm	Soft-filled >5mm		
		Score	6	5	3	1	0		
		Disturbance	Unaltered	Slightly altered	Moderately altered	Very altered	Decomposed		
		Score	6	5	3	1	0		
5	Groundwater	Overall status	Dry	Slightly humid	Humid	Dripping	Flowing water		
	Score		15	10	7	4	0		
Rock Mass Quality									
	Grade		I	II	III	IV	V		
	RMR		100 – 81	80 – 61	60 – 41	40 – 21	<20		
	Quality		Very Good	Good	Normal	Poor	Very Poor		

Table S2. Rock quality according to the Q Index [82].

Q-Barton	Rock Massif Quality
0.001–0.01	Exceptionally poor
0.01–0.1	Extremely poor
0.1–1	Very poor
1–4	Poor
4–10	Fair
10–40	Good
40–100	Very good
100–400	Extremely good
400–1000	Exceptionally good

Table S3. Descriptions and ratings for the Jr, Jn, Ja y Jw parameters [82].

Joint roughness number (Jr)		Value
(a) Rock wall contact and (b) Rock wall contact before 10 cm shear.	A. Discontinuos joints	4
	B. Rough or irregular, undulating	3
	C. Smooth, undulating	2
	D. Slickensided, undulating	1.5
	E. Rough or irregular, planar	1.5
	F. Smooth, planar	1.0
	G. Slickensided, planar	0.5
(c) No rock wall contacts when sheared	H. Zone containing clay minerals thick enough to prevent rock wall contact	1.0
	J. Sandy, enough to prevent rock wall contact	1.0
Joint set number (Jn)		
	A. Massive rock	0.5 – 1.0
	B. One family of joints	2
	C. One family of joints with other occasional joints	3
	D. Two families of joints	4
	E. Two families of joints with other occasional joints	5
	F. Three families of joints	9
	G. Three families of joints with other occasional joints	12
	H. Four or more families, highly fractured rock	15
	J. Crushed rock	20
Joint alteration number (Ja)		
	Sound-walled joints	0.75 – 1.0
	Slight alteration	2
	Clay alterations	4
	With gritty detritus	4
	With pre consolidated clay detritus	6
	With unconsolidated clayey detritus	8
	With Expansive clay detritus	8 – 12
	Rock and clay mylonites	5 – 12
	Smooth clay mylonites	5
	Coarse clayey mylonites	10 – 20
Joint water reduction factor (Jw)		
	A. Dry excavations or minor inflow, i.e. <5l/min. locally	1.0
	B. Medium inflow or pressure occasional outwash of joint fillings	0.66
	C. Large inflow or high pressure in competent rock with unfilled joints	0.5
	D. Large inflow or high pressure, considerable outwash of joint fillings	0.33
	E. Exceptionally high inflow or water pressure at blasting, decaying with time	0.2 – 0.1
	F. Exceptionally high inflow or water pressure continuing without noticeable decay	0.1 – 0.05