

1. \_\_\_\_\_

38  
 ( )  
 ( , 1991.12  
 ~1996.12, L=1,960m) ( )  
 , 1996.12~2000.12, L=1,765m) 2  
 35%, 65%



(Q ~ 2Q)

: NATM +  
 :  
 :  
 : 2

2. \_\_\_\_\_

(Pre-Cambrian)  
 (Gyeonggi Gneiss Complex)  
 (Metamorphic Rocks)  
 (Granitic Gneiss)  
 가 가  
 , RMR

53 ( )

3. \_\_\_\_\_

(NATM)

4. \_\_\_\_\_

Large hole burn cut  
 (L = 23m),  
 (H = 104m)

가 (7Q ~ 9Q)가 , (L = 150m),

가 , V-cut +  
 Large hole burn cut

	1 cycle (kg)		TYPE - 4
		18.87	
	121.68	75.44	1.65m

5. \_\_\_\_\_

1) -7mm ~ -2mm  
 -5mm  
 15 가 0.1mm/day

1) : V = 2.5cm/sec

2) Rock - bolt 2~3ton  
 (7.5ton)40%

2) : 가  
 ,가  
 가 V = 0.01 ~ 0.06/sec

CON'C  
 shotcrete 1.5 ~ 39kg/m<sup>3</sup>  
 (80kg/m<sup>3</sup>) 가

3) :  
 0.25 ~ 1.25mm  
 1/6,200 ~ 1/27,000  
 0.2cm/sec ( : V = 0.3cm/sec) CON'C

3) 2  
 (crack zone) Rock - bolt

6. \_\_\_\_\_

1)

L = 615m 3  
(L=2m, H=4.5m)

(MW) 가 10~30m  
, 3mm ( )  
1.5m 가  
50,( )  
가

Forepoling  
wire-mesh shotcrete  
wire - mesh shotcrete  
steel rib  
(1.5m 0.75m)

2)

(L=31m, B= 13.33m)  
setting

1m 가  
가  
가  
가  
3)  
(L=402m / 1765m, W=0.3~1.8mm) 22%  
가  
(f<sub>ck</sub>=50kg/cm<sup>2</sup>)가  
24~40  
( wire - mesh )

OMC( )

4)

2 가 Arch  
가

5)

abutment CON'C  
con'가 abutment 가 CON'C  
CON'C CON'C

abutment

CON'C

가

7. \_\_\_\_\_

NATM 가

가

					( )	/ (%)
	TON	4,128.69	4,511.41	382.72	19,340	109.3%
	m <sup>3</sup>	4,974	5,485	511	18,343	110.3%
	m <sup>3</sup>	2,544	4,730	2,186	19,674	185.9%
	EA	9,686	9,686	-	-	100%
	m <sup>2</sup>	18,390	32,740	14,350	17,220	178.0%
	kg	113,363	177,000	63,637	30,545	156.1%
	EA	9,686	28,692	19,006	28,318	296.2%
( )	kg	73,503.7	45,525	27,978.7	72,742	61.9%
( )	kg	4,653.3	4,225	428.3	2,312	90.8%
	EA	99,901	57,016	42,885	68,616	57.1%
( )		475	475	-	-	100%
( )		654	654	-	-	100%
( )		31	31	-	-	100%
( )		29	29	-	-	100%
	Con'c m <sup>3</sup>	13,185	11,875	1,310	56,382	90.1%
					66,612	

