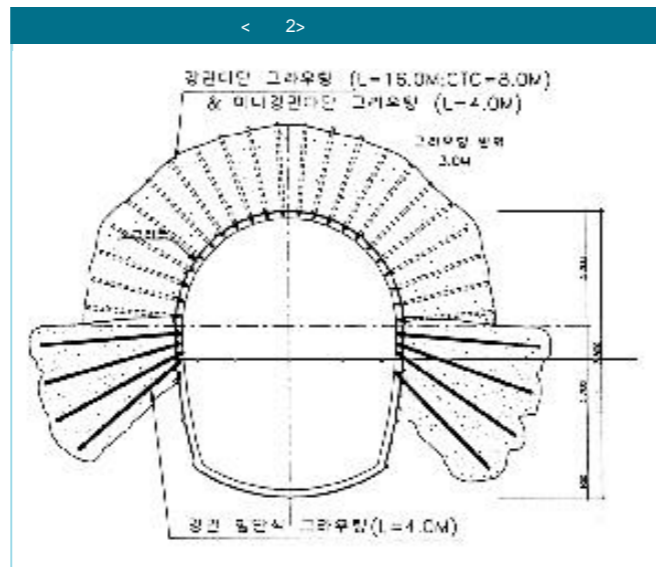
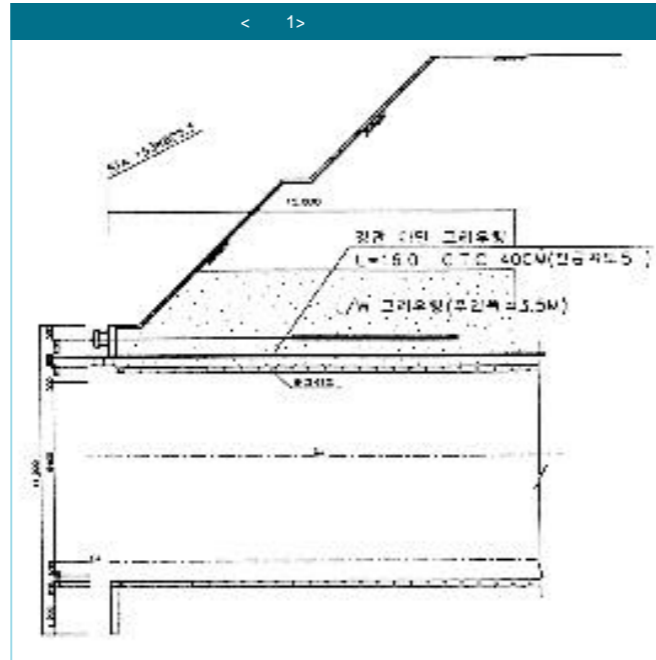


NATM

Troubleshooting

NATM



: 29.0m, : 17.4m
: Ring Cut, Mini Bench
(Bench = 8~12m)

Shotcrete : T=20cm (1 : 5cm, 2 : 10cm, 3 : 5cm)
Wire Mesh : 1, 2 (5x100x100)
Rock Bolt : D25mm, L=3.0m, C.T.C 0.6m

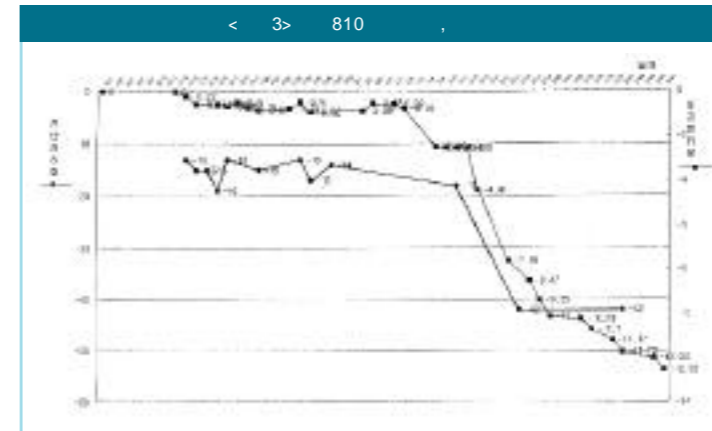
: 0.6m : : = 3.5m
: - 2.5m

Feed Back

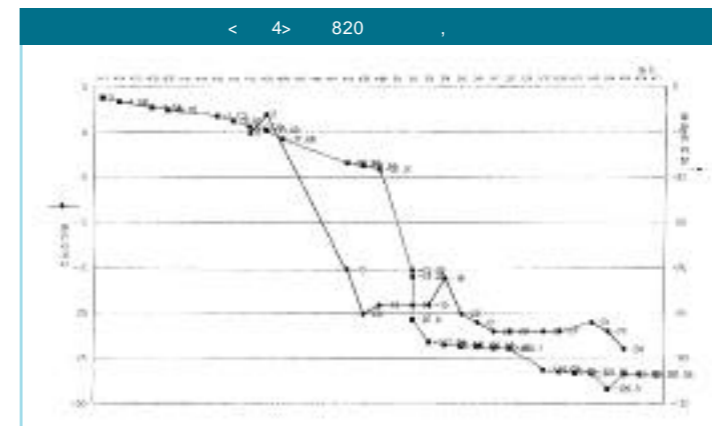
1) 1 (153k 810)
: 3 11 ~ 3 17 , 6
: : C = 24mm, Cmax = 42mm
: W = 7.6mm, Wmax = -10.1mm

Invert 2 (153k 820)
: 4 23 ~ 4 30 , 7

: : C=20mm,
Cmax=20mm
: W = 17.32mm,
Wmax=-31.01mm

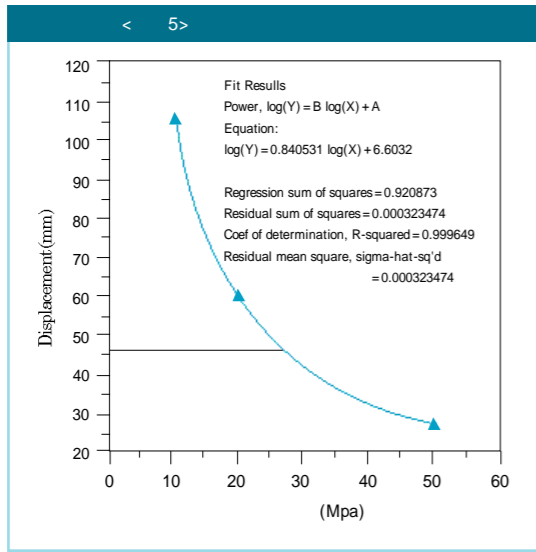
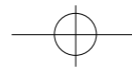


1 가
3 (153k 820)
: 4 30 ~ 5 3 , 7
: : C =
: W = 76mm,
Wmax = -107mm

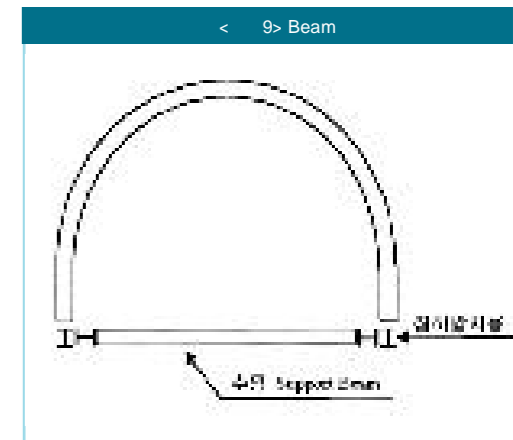
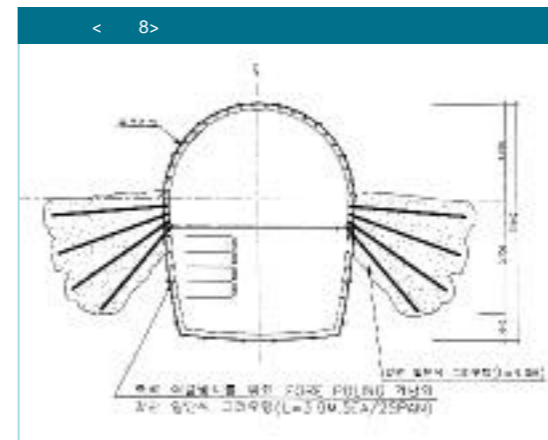
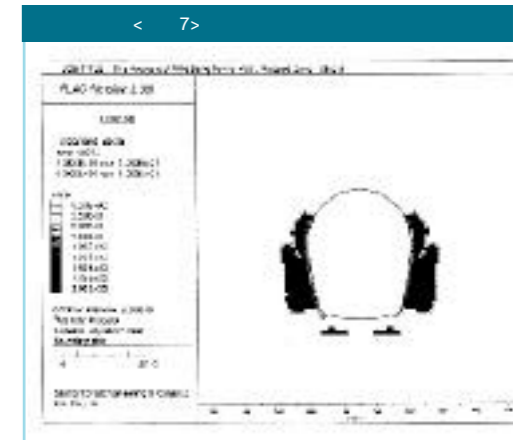
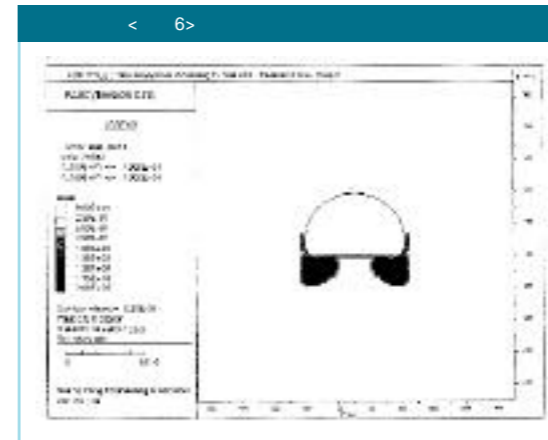


8.4m
112

Back pr



가 4 () , 2
 가 6
 가 4 ()
 11mm, 35mm
 가
 가 () 10Mpa,
 20Mpa, 50MPa 4



3 가 가
 가 가

2) Feed Back

(1)

가 가

1.13%

(2)

83.24kg/cm³, 3.00kg/

(Plastic Flow)

cm³,

3.08ton

	()	()		Grouting
(m)	0.0 ~ GL-7.0	GL-7.0 ~ -22.0	GL-22	
(kg/m ³)	1,700	1,800	2,100	1,900
(Pa)	13.57x10 ⁶	27.14x10 ⁶	135.7x10 ⁶	54.28x10 ⁶
	0.35	0.35	0.30	0.35
(degree)	20	30	35	32
(Pa)	10x10 ³	20x10 ³	100x10 ³	80x10 ³
(Pa)	5x10 ³	10x10 ³	50x10 ³	40x10 ³

가

(84kg/cm³) 99.1% 83.24 kg/

cm³

가

(3)

2.0m

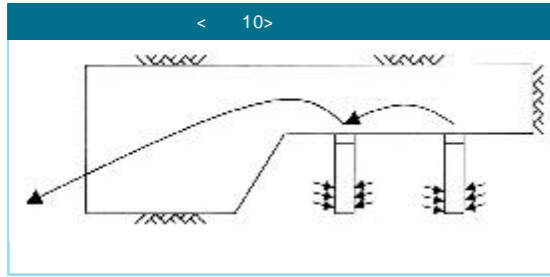
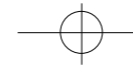
(Step 4)

가

Fore Poling

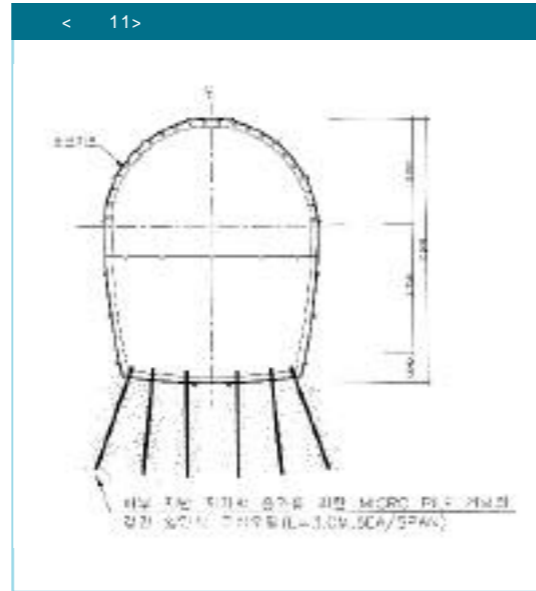
< 8 >

Mini Bench



Bench(L = 8 ~ 12m)

Shotcrete Face
Bench 20m
8m



Mini Bench

Beam Support
Beam
Grouting
10m

(Lining Con c)
Invert
Micro Pile
30.0m

NATM

() 가 가

가 가

1 가

1 가

가 , 1

가

가

2) 가

Con c System

1

NATM

(0.5H)

가

50m 가

가

가

System 가

1) 가

가