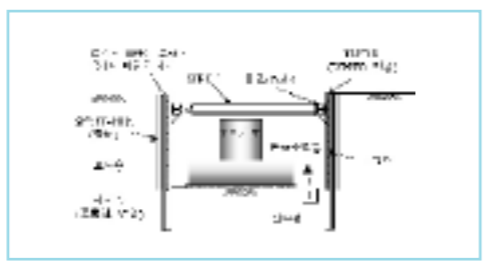


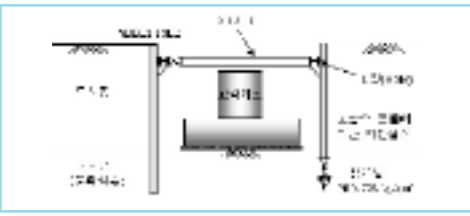
가
가
가
가
2.4 SHEET-PILE + WATER JET

, SHEET-PILE H-PILE



SHEET-PILE WATER JET

SHEET-PILE



- (T-4) , H-PILE
- H-PILE SHEET-PILE
- (STRUT)
SHEET-PILE

- SHEET-PILE WATER JET
(200 ~ 700kg/cm²
300m/sec) SHEET-PILE

가
가
가

- (STRUT)
가
가

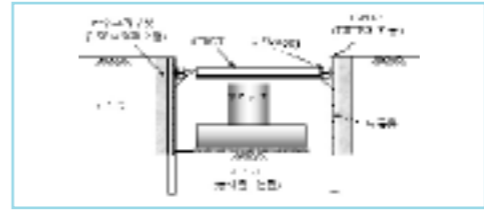
- 가 , WATER JET

2.6 H-PILE + GROUTING
H-PILE + , H-PILE
L.W S.G.R GROUTING (2)

2.5 H-PILE + SHEET-PILE
H-PILE +

- (T-4) , H-PILE
- H-PILE L.W S.G.R
GROUTING (2)

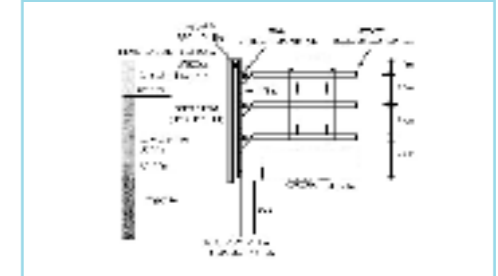
- (STRUT) , (GL-8.2m) 가
가
가 PIER #2 SHEET-PILE + STRUT 가



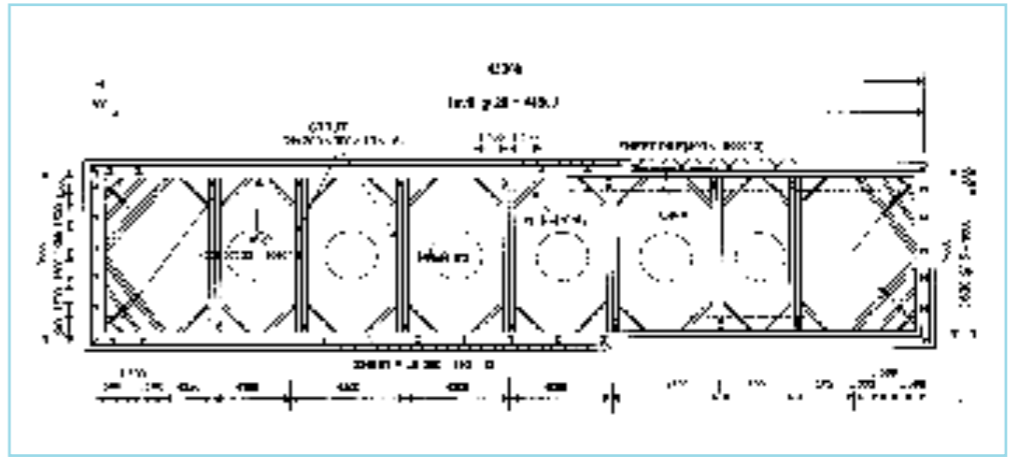
SHEET-PILE
가 WATERJET
가
가

가
가 SHEET-PILE
()
H-PILE + SHEET-PILE

가 가 가 가 [1], [2]



3.
3.1 (PIER #2) 가
(PIER #2)



[2] PIER #2 가

Troubleshooting

3.2

(PIER #1,2,3) 가

(PIER #1,2,3) GL-

6.5m

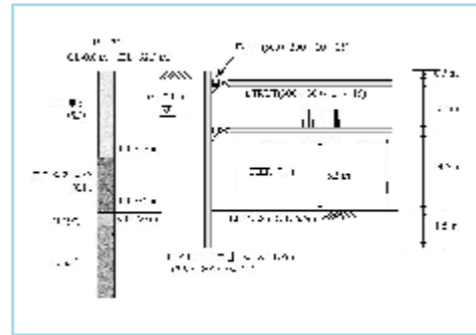
(SP),

(GP),

가

PIER #1,2,3

OPEN CUT



[3] PIER #1,2,3 가

4.

OPEN CUT

가

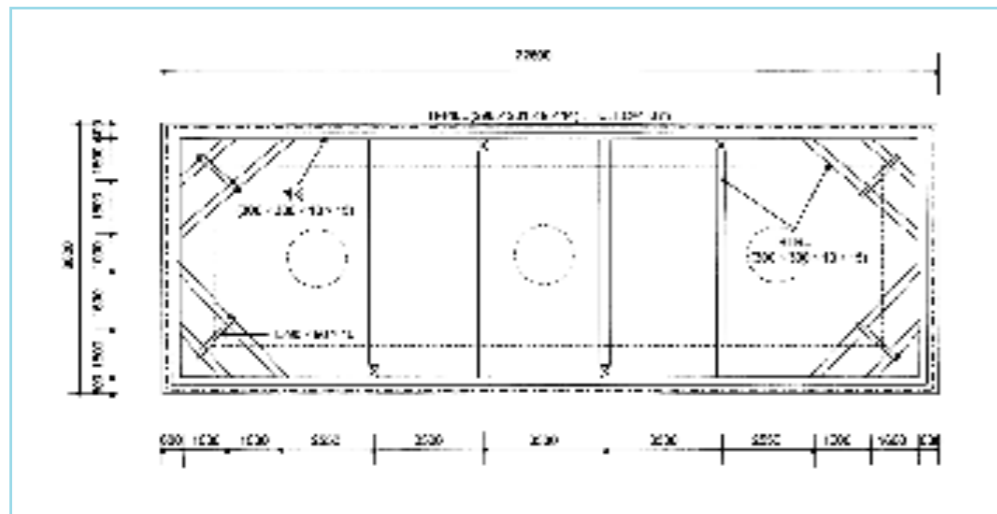
가

가

H-PILE+STRUT

가

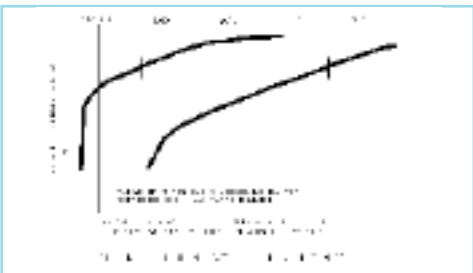
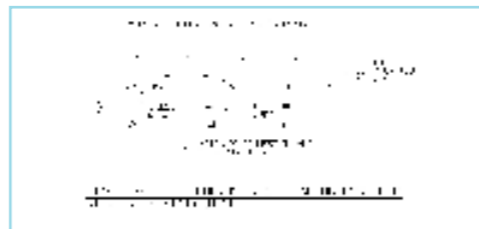
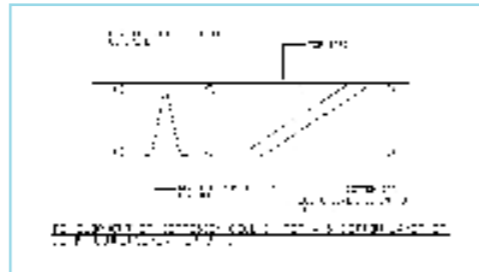
[3],[4]



[4] PIER #1,2,3,8,9,10 가

Troubleshooting

Traffic action Spall 가
 Chloride 15 ~ 1,000 가
 Chloride 2
 0.2% Acid-soluble chloride



Element	Atomic No.	Atomic Radius	Ionic Radius
Cl	17	0.99	1.81
Ca ⁺	20	1.97	0.99
Na ⁺	11	1.86	0.95
) Cl	1.81		

가
 pH , pH
 12 ~ 13
 2.5
 5% 가

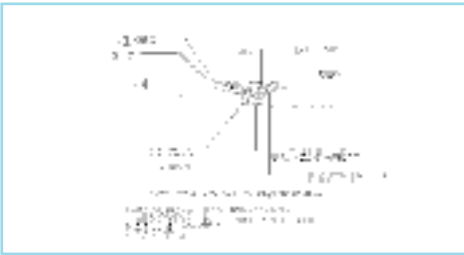
가 , Support
 settlement,
 ACI 224R , 0.18 mm
 0.25 mm
 ACI code .(
)
 , Pre-cast pre-tensioned
 Floor slab joint ,

Joint
 가 . 가 가
 Expansion joint Joint
 Joint distress & leakage
 Construction joint 1-2. 가
 Visual examination & documentation
 Fine(F) : 0.25mm
 Medium(M) : 0.25~0.75mm
 Wide(W) : 0.75mm
 Plastic concrete , / / / /
 sealant , /
 Joint , 가
 Debris
 8 ~ 10
 , Deck
 Joint 가
 Joint-system ,
 Chloride ion content of concrete
 FHWA(Federal Highway Admin) 280 ~ 410ppm
 Acid soluble chloride 가
 Half-cell corrosion-potential testing
 Expansion joint 가
 Creep,
 30cm
 가
 Joint ,
 system , Debris - Potential : -0.02V CSE :
 Expansion 가 90%
 joint Parking structure - Potential : -0.02 ~ 0.35 V CSE :
 Joint , 가
 가 - Potential : -0.35 V CSE :
 가 가 90%

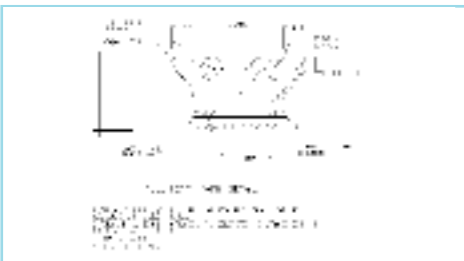
Troubleshooting

1-3.

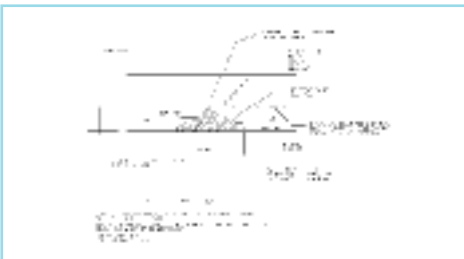
- Patching
- Protective coating
- Replacement
- Cathodic protection
- Sealing



Patching 1-1



Patching 1-2



Patching 1-3



Patching 1-4

Patching

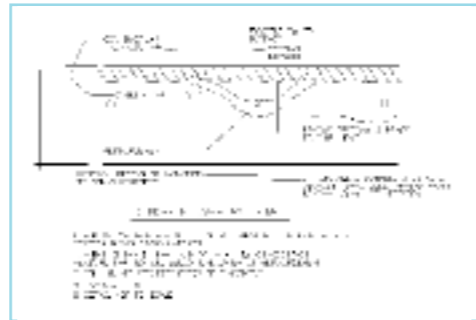
Patching 가 ,
(Full-Depth) 12.7cm 가

Patching 가
Patch
1.9cm Feather-edge

Coating

Sealer 가
Sealer 3-5 가

Sealer 가
Sealer 가
Sealer 가



Bonded-concrete overlay

Overlay ,가
, Overlay + , + ,

Replacement

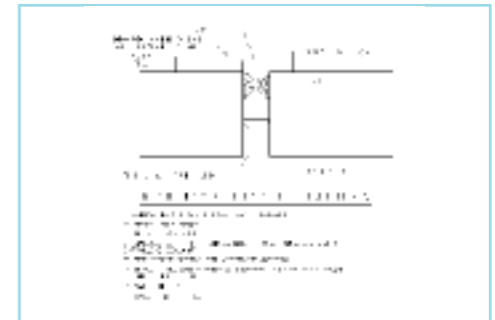
가 , 0.16cm , 0.32cm
12.7cm 가 Pan-
joist, Patch

4-5 Patch
Patch 가
depth 가 Full-
depth Patch

Cathodic protection

Floor system , Bridge
deck 가 가

, 10
steel , Prestressing
Sealing



Patch 1-2
Patch
Patch
Seal
3-5
가 . Strip
patch()

1-4. Basic requirement

Bonding medium 가 , Overlay()
+ , , , ,)

10-20

5-10

Troubleshooting

10~20 Cathodic < 1> 가 \$30,000,000
 protection 20 , Full- 20
 depth(, A , B
)
 20~40 가 . 8 ,
 , A 13
 Sealer
 \$200,000

2. System

2-1. 가
 . 17
 \$1,000,000
 Rebar가 , 3 B
 Sealer 가 \$300,000, \$2,000자

Year	Non Monitoring Building		Monitoring Building		
	1 st Cost.	Repairs	1 st Cost.	Monitor	Repairs
1	30,000,000		30,000,000	300,000	
2				2,000	
3				2,000	
4				2,000	
5				2,000	
6				2,000	
7				2,000	
8				2,000	
9				2,000	
10				2,000	80,000
11				2,000	
12				2,000	
13		200,000		2,000	80,000
14				2,000	
15				2,000	
16				2,000	80,000
17		1,000,000		2,000	
18				2,000	
19				2,000	80,000
20				2,000	
Total		1,200,000		338,000	320,000

10 Corrosion sensor ,
 가 , \$80,000
 Sealer . 2-4.
 Sealer 3 , Ctholic Univ.
 4 100
 가 , 가
 가 , 가

2-2. Building monitoring sensors

3.
 Visual survey ,
 가
 Semi-smart 가 가 ,
 가 가

2-3. Distributed sensor & fiber optics

가 , 가 가 ,
 (Moisture sensor) Bay
 가 (Strain gage) . S
 가
 Optic fiber 1.
 2.