

# PSC 가

## Evaluation of Reinforcement Effect of Deteriorated PSC Beam through Cutting Its External Tendons

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### Abstract

In this study, the PSC girder bridge retrofitted with external tendons is tested to verify the strengthening effects. We measure the variations of the displacement and strain at mid-span of each beam as external tendons are removed in sequence. The structural behavior of the bridge are examined using controlled truck load tests for the systems before and after all external tendons were removed. From the test results, the characteristics of structural behavior of the bridge do not change significantly, but the natural frequency is decreased after the external tendons are removed. The strengthening effects of bridges can be exactly estimated by analytical methods some extent. As a result of this study, when a PSC girder bridge is deteriorated, the bridge can be retrofitted effectively by External Prestressing Strengthening Method, and the strengthening effects can be predicted through accurate structural analysis.

PSC Beam

가 가 가 가

Keywords : External Prestressing Strengthening Method, PSC beam, external tendon, strengthening effect, load test

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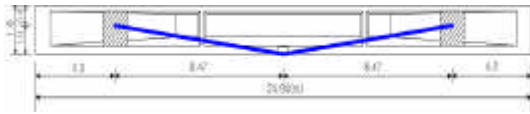


Fig. 2

Table 1

	$V_{D2}(cm^3)$	$D_1(吋)$	$D_2(吋)$	( )	
Unbonded Strand	11.10	128	110	9.80cm	7.92mm

(2)



Fig. 3

Fig. 2

Table 1

	128ton
8mm	(3)
1	PSC Beam

3

14%가

110ton

가

(1), (13)

가

2.2

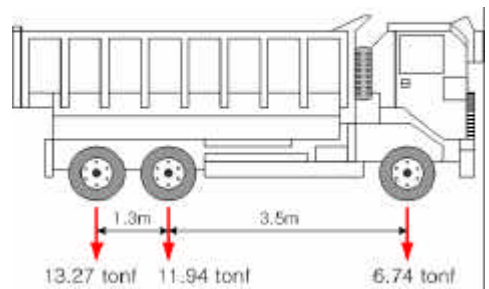


Fig. 4.

( : 1.85m)

2.3

Midas-Civil

Beam

Plate

Fig. 5

Fig. 1

Fig. 1

Fig. 4

Fig. 3

5

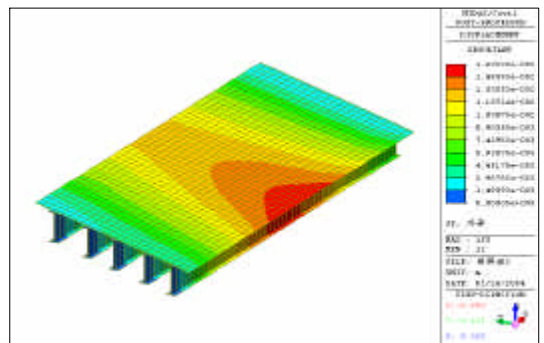


Fig. 5.

Table 1

Table 2

( :mm)

3.

Fig. 6

( )

Fig. 1 B5 B1

, Fig. 6

. Fig. 6 (a)

B5

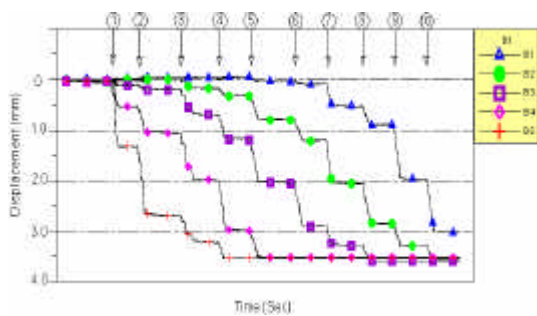
B4,

B3, B2, B1

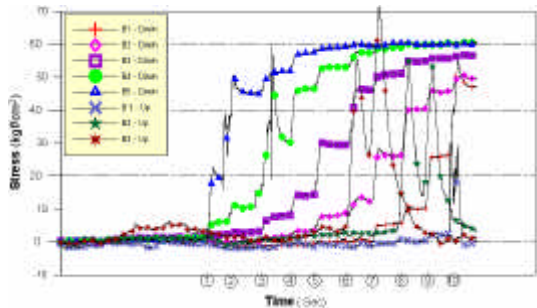
. Fig. 6 (b)

. Fig. 6(a)

가



(a)



(b)

Fig. 6.

	B1		B2		B3		B4		B5	
B1	1.05	1.04	0.39	0.43	0.06	0.08	-0.01	-0.01	-0.01	-0.02
B2	0.28	0.44	0.80	0.83	0.43	0.45	0.16	0.17	-0.01	0.01
B3	0	0	0	0.35	0.88	0.85	0.49	0.48	0.10	0.10
B4	0	0	0	0	0.01	0.54	0.91	0.94	0.52	0.53
B5	0	0	0	0	0	0	0.34	0.54	1.33	1.32

Table 2

(B1 B5) 1.04 ~ 1.33mm  
(B2, B3 B4) 0.8 ~ 0.94mm

Fig. 7

가  
가

25 ~ 52%

53 ~ 96%

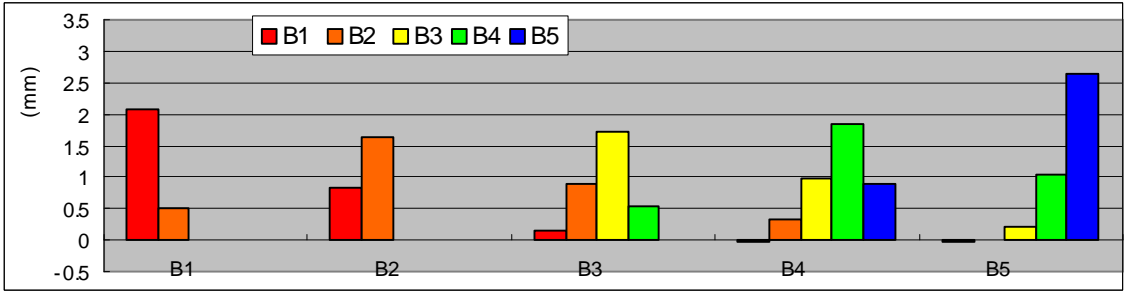
가

30

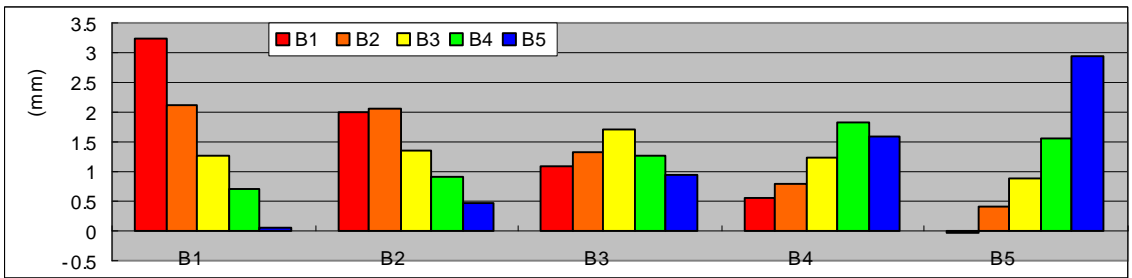
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Fig. 8

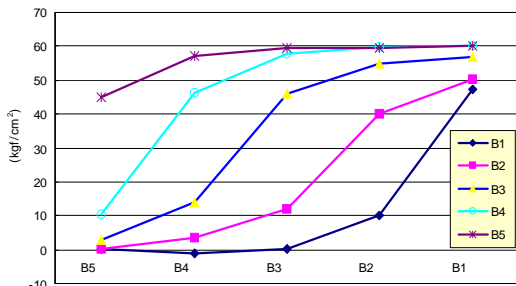


(a) ( )

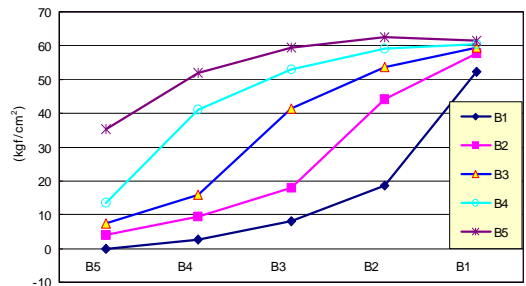


(b) ( )

Fig. 7



(a)



(b)

Figure 8 shows the relationship between the load and the displacement of the specimens.

35.4kgf/cm<sup>2</sup> ,  
27.6kgf/cm<sup>2</sup>

25.4 ~

Fig. 8(a)

60kgf/cm<sup>2</sup> ,  
37.3 ~ 44.9 kgf/cm<sup>2</sup> ,  
28.0 ~ 32.1kgf/cm<sup>2</sup> .  
33.6 ~

14%가

19%,

가

Fig. 8  
60kgf/cm<sup>2</sup>

가 25kgf/cm<sup>2</sup> (Fig. 9 ) ,

32tonf

가  
가

4.

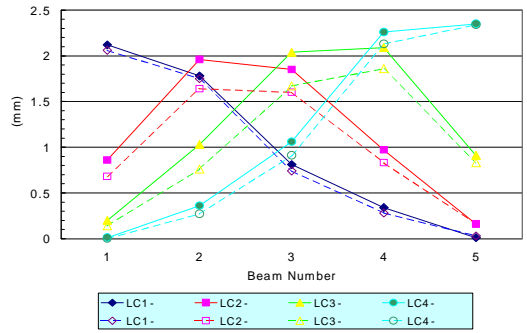
4.1

Fig. 1

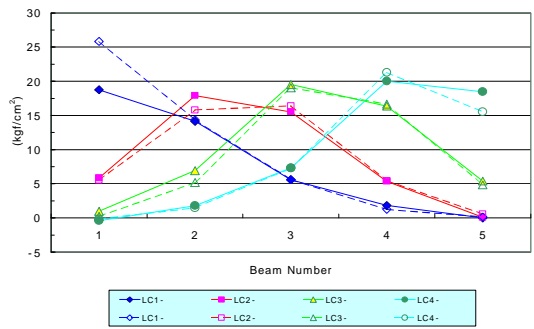
Fig. 9

Fig. 9

Fig. 9(a)



(a)



(b)

Fig. 9

가

가

가 가

30

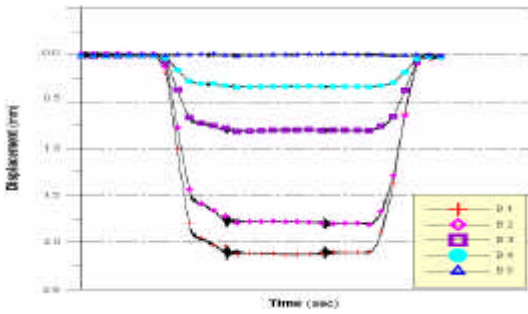
가  
가

가

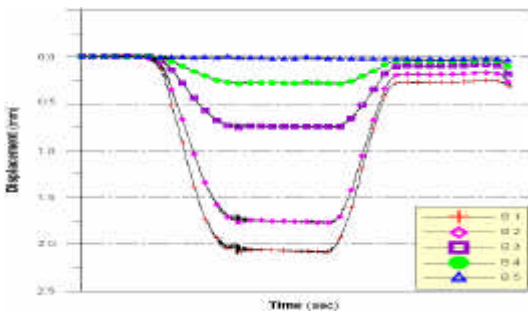
가

가

가

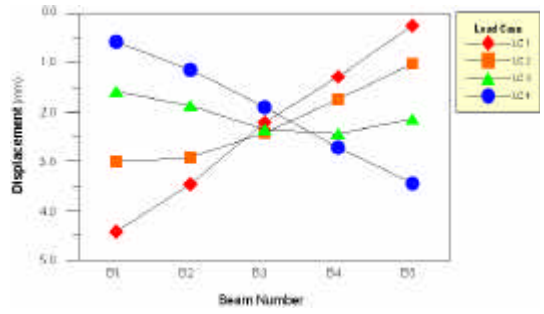


(a)

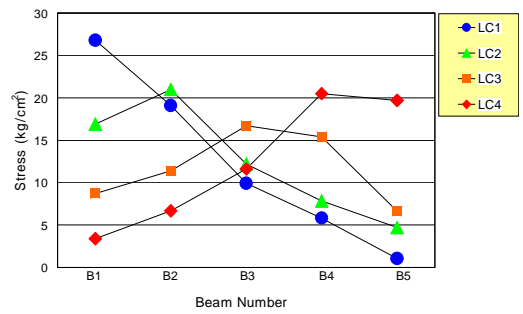


(b)

Fig. 10 LC1



(a)



(b)

Fig. 11

( )

Fig. 10

Fig. 10

Fig. 10(b)

Fig. 11

Fig. 11

Fig. 9

(7),(8)

가 40%

(25%)

(1),(9),(11)

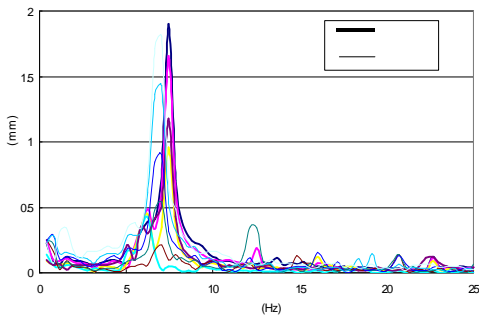


Fig. 12

B1 10% 가 .  
4.2

Fig. 12  
7.42Hz , 7.03Hz  
가 5.5% 가

5.

PSC Beam

1) 110tonf 1  
0.8mm  
~ 0.94mm, 1.04mm ~ 1.33mm  
60kgf/cm<sup>2</sup> 가 32tonf  
2.4

가 가  
2)  
60.1kgf/cm<sup>2</sup>  
62.2kgf/cm<sup>2</sup>

3)  
가

4)  
가 가

5) 가 5% 가  
가

가 가

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