

The effect of group pile installation

¹⁾, Myung-Whan Lee, ²⁾, Hun-Sung Hong, ³⁾, Sung-Hoi Kim, ³⁾, Young-Suk Jun

¹⁾ () , Research Fellow, Piletech Consulting Engineers

²⁾ () , President, Piletech Consulting Engineers

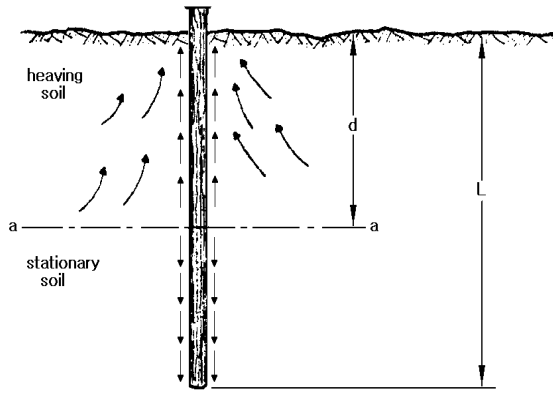
³⁾ () , Manager, Piletech Consulting Engineers

SYNOPSIS : Most of the piles are designed as group piles. In certain geotechnical environments, the installation of group piles causes heaving of the already installed piles. The unfavorable effects of pile heaving on pile bearing capacity have been well known to field engineers. However not many engineers pay enough attention to this subject. According to our recent researches, not only the bearing capacity but also the pile material could be seriously damaged due to the installation of nearby piles, especially with the cases of precast concrete piles. When the pull-out force due to installation of neighboring piles acting on the already installed precast concrete pile exceeds the shaft friction, pile heaving occurs. At the same time, if the pull-out force exceeds the allowable tensile strength of the precast concrete pile, tensile failure is inevitable, which is critical for the pile integrity. In other cases the pile material was not damaged but serious relaxation occurred as the results of pile heaving. In this paper, the pull-out mechanism due to the installation of group piles is explained.

Key words : group pile, pile heaving, pull-out force, relaxation, pile bearing capacity, PDA, set up

1.

가
(傾斜), (heaving)
[1]



[1]

가

가

PC PHC

가 (劣化)

()

relaxation

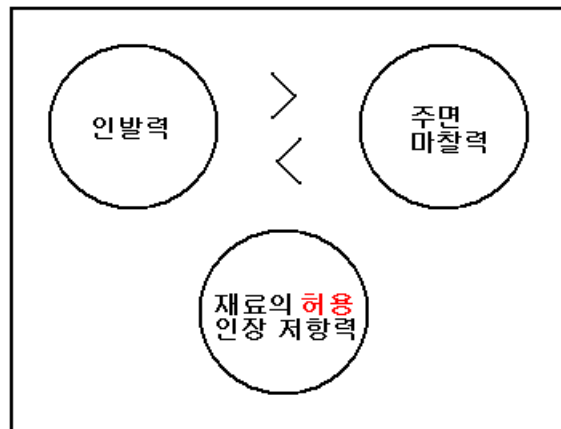
2.

가

가

가

([2]).



[2]

3가

> >

가

()

A ø400mm

A (

PC
40kg/cm² PHC
27.4ton, ø500mm

42.2ton

> >

가

(void)
(restrike)

가
가

relaxation

> >

> >

가
가

(fatigue)

가

가

가

가

가

(工期)

가

가

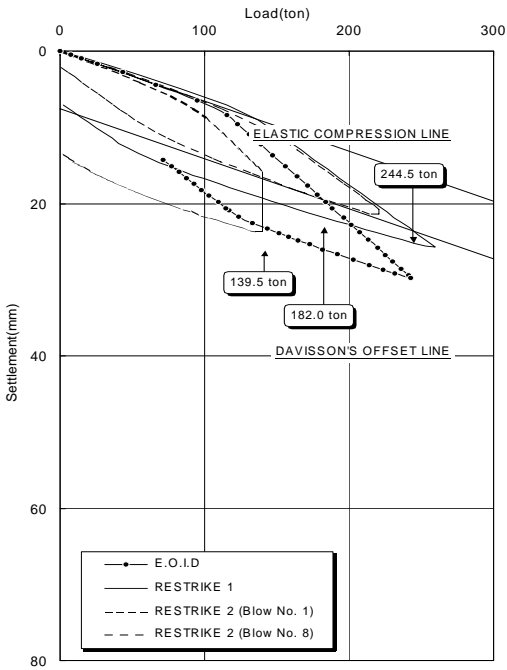
(安全率)

가

가

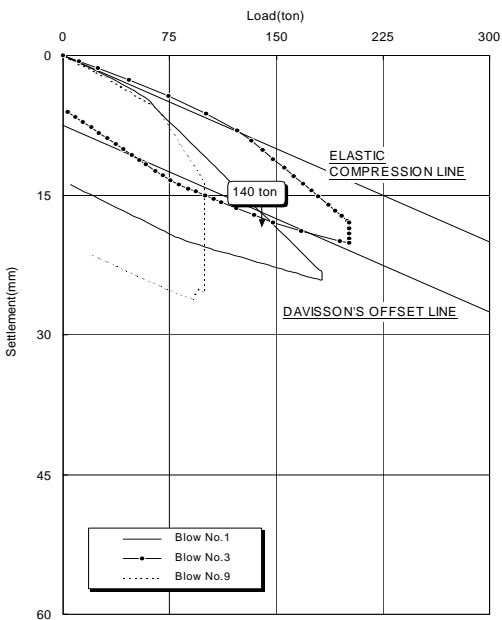
가

3.



[3]

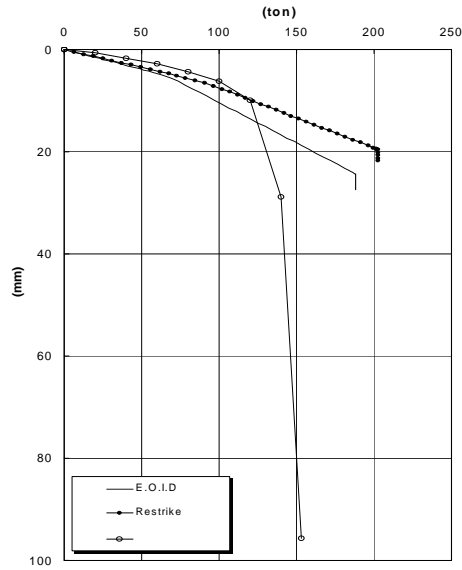
[3] \varnothing 450mm PHC 14m
 30m
 (, 1998).
 Davisson
 182.0ton , 1
 244.5ton 34% 가
 15mm
 2.5
 4
 (Blow No. 1) Davisson
 139.5ton 가 , 8 가
 (1)



[4]

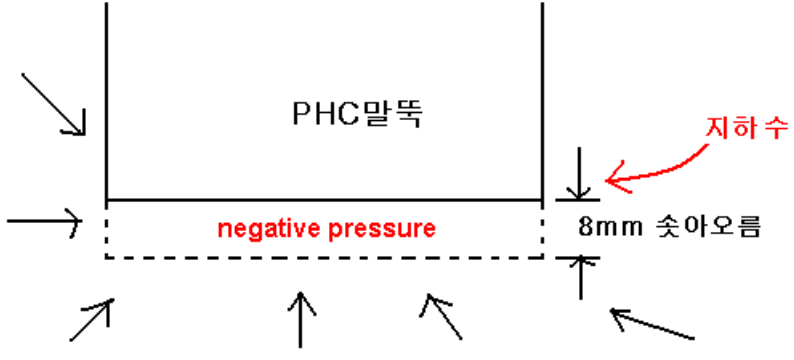
()가 ,
 8 가 가 가
 .[4]

Davisson
 (BTA)가 10
 3 140ton
 9 201ton
 106, 30
 가 가 가
 TV



[6]

가
 가 [6]
 relaxation
 ([7]).

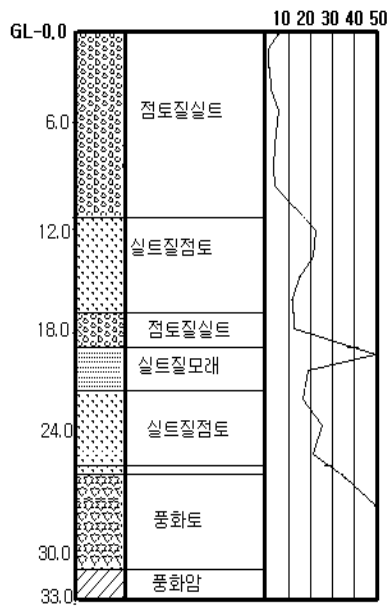


[7] relaxation

《
 8.0mm
 (負壓, negative pressure)
 (地下水界)
 (劣化) , 가 .》
 가 .

5. (劣化)

ø600mm PHC 2.5 [8] 10ton
 110ton 가 90
 7 (relaxation)

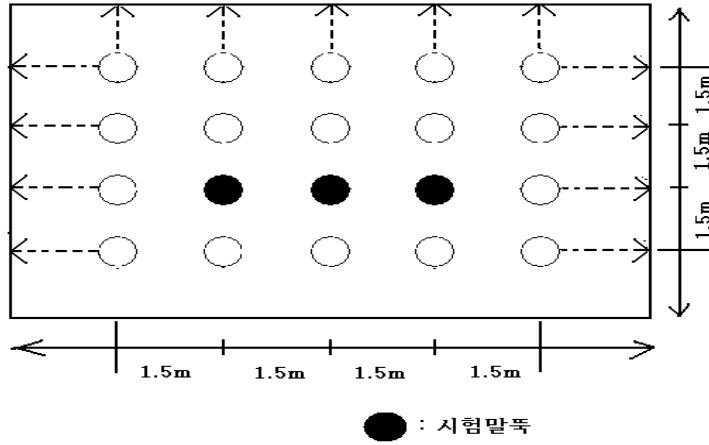


[8]

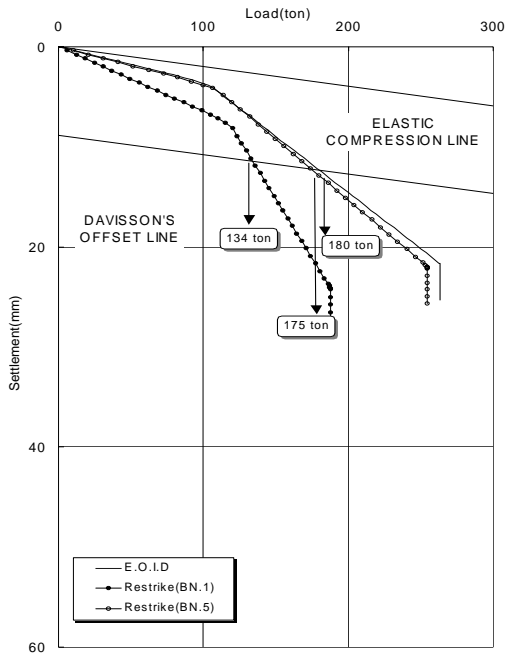
[8]

9]). ([10mm

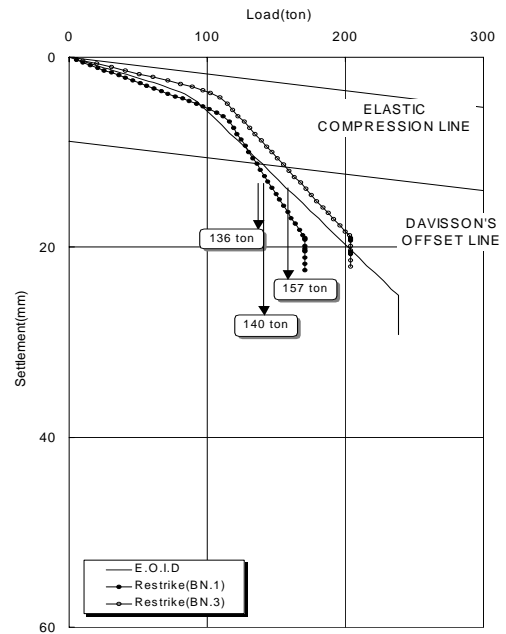
7 (EOID)
 (Restrike) 7
 (relaxation)가



[9]



[10]



[11]

[10] , Davisson 180ton , 7
 (BN.1) 134ton
 , 가 5 (BN.5) 175ton
 . [11] Davisson 140ton
 , 7 (BN.1) 136ton , (BN.3)
 157ton 가
 가 , set up
 , relaxation
 7
 가 PHC KS , 가
 800kg/cm² . E 400,000kg/cm²
 , (wave speed) 4,000m/sec

가

CAPWAP

PHC
1]

가

PHC

가

가

[1]

	(m/sec)		
	EOID	Restrike	
1	3,900	3,800	A
2	4,000	3,800	A
3	4,000	3,800	A
4	3,550	3,400	
5	3,800	3,650	
6	3,600	3,450	

가 4,000m/sec

가

[6]

가

6.

《 5mm

》 ,

가

가

가

(寡聞)

가

가

1. (2003), “ ”, pp278 pp281

2. , , , , .,(1998) “ ”, , pp173 pp178