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(CRS)

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( ) Lee et al. (ASTM - D4186, 2002)

Almeida et .

(CRS)

( ) Hamilton and Crawford

( ) al.

Lee et al. ( )

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(Dubak, 2003)

(Younes and Chung, 2005)

% / % /

Esmith and Wahls .

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Hamilton and Crawford, )

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(1959

( ) Wissa et al.

Wissa et al.

( ) Esmith and Wahls

( ) Sallfors .

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Gromen et %

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( ) Sheahan and Watters .

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( ) Sheahan and Watters

(Load Cell)

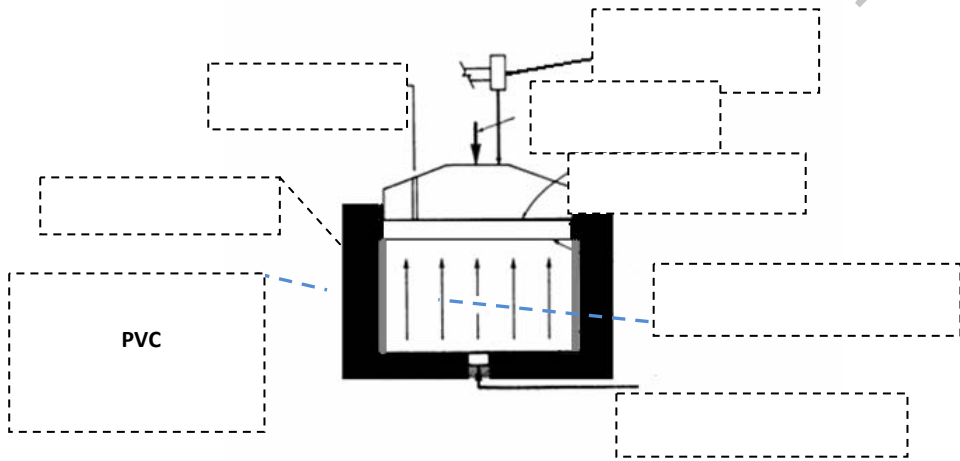
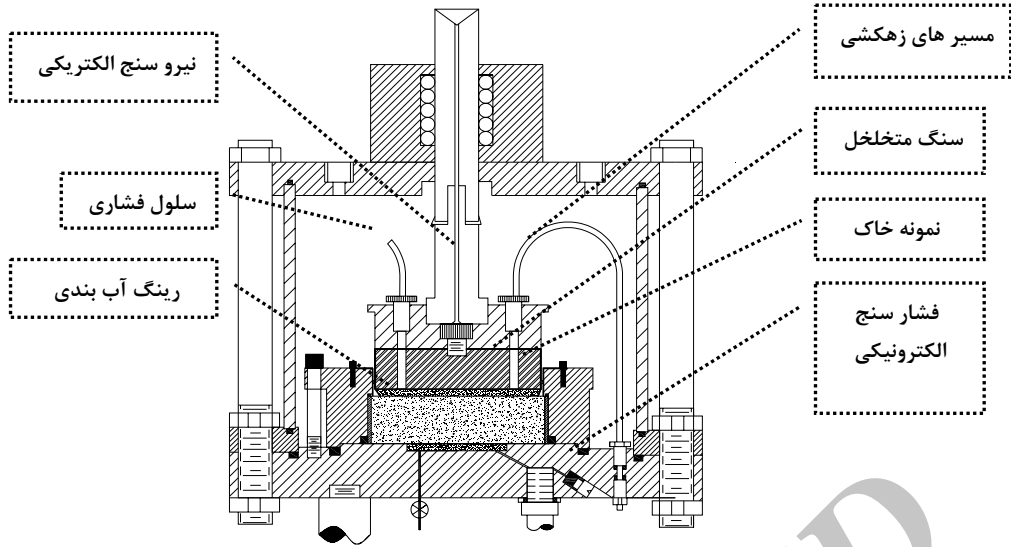
(LVDT)

CRS

( )	PL (%)		LL (%)		Gs	
CL	/	/	/	/	/	A
CL	/	/	/	/	/	B
CH	/	/	( )	( )	/	C
CH	/	/	( )	( )	/	D

CRS

(kPa)		%	%/min	
7/24	1/78	74/2	/	1A
	1/80	70/2	/	2A
	1/76	68/1	/	3A
	1/77	68/1	/	4A
9/4	1/83	67/4	/	1B
132/6	1/81	66/2	/	2B
203	1/87	70/1	/	3B
526	1/80	68/4	/	4B
2	2/4	89	/	1C
14	2/4	88	/	2C
22	2/41	89	/	3C
50/6	2/5	84	/	4C
1/7	0/9	33	/	1D
9/6	0/90	30	/	2D
22	0/93	32/96	/	3D
30/5	0/92	32/96	/	4D



1D 1C 1B 1A

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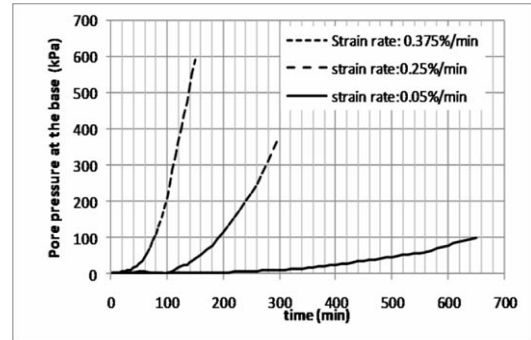
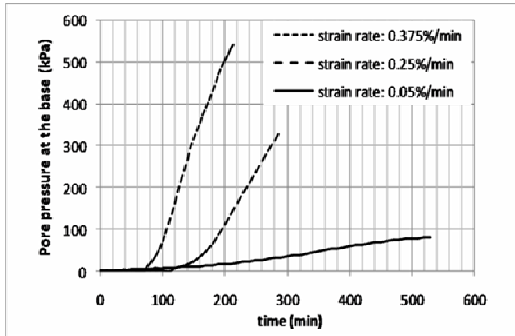
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0.025%/mm

0.025%/min

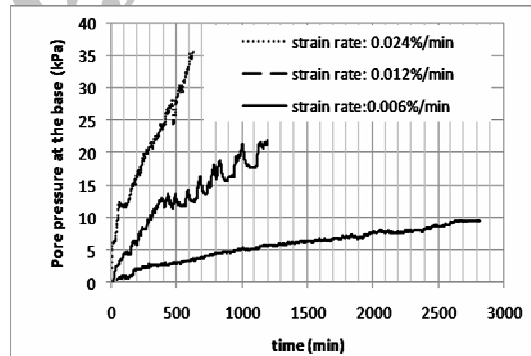
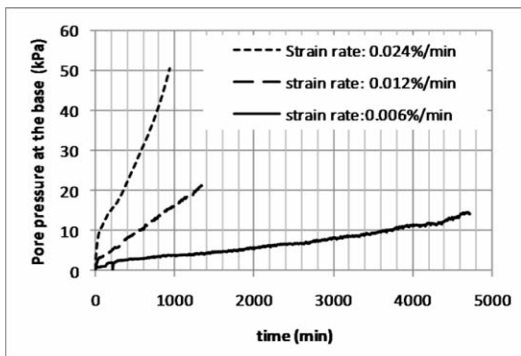
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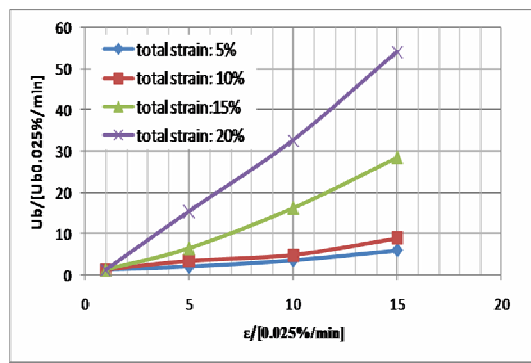
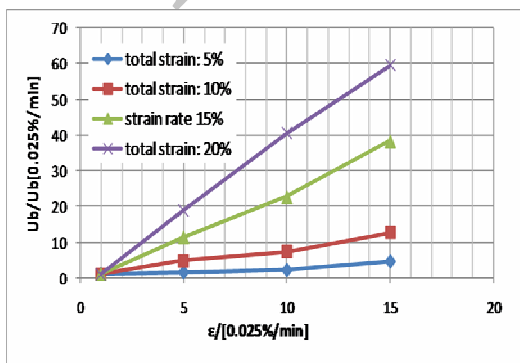
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C



B

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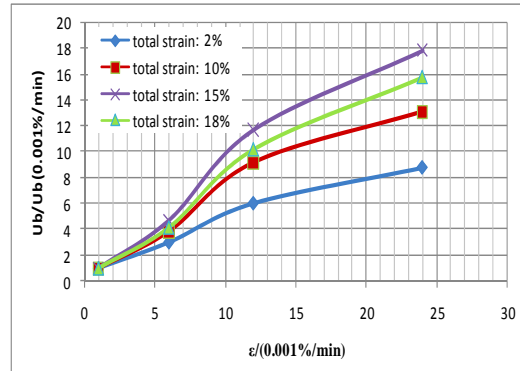
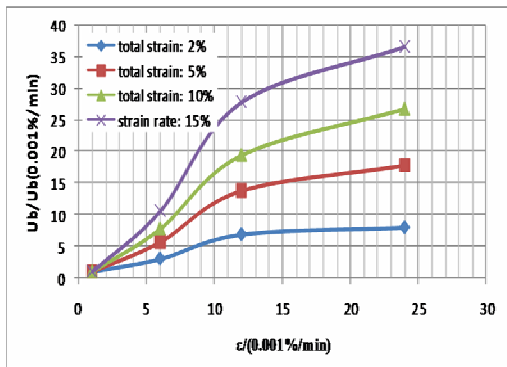
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B A



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D

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B A

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D C

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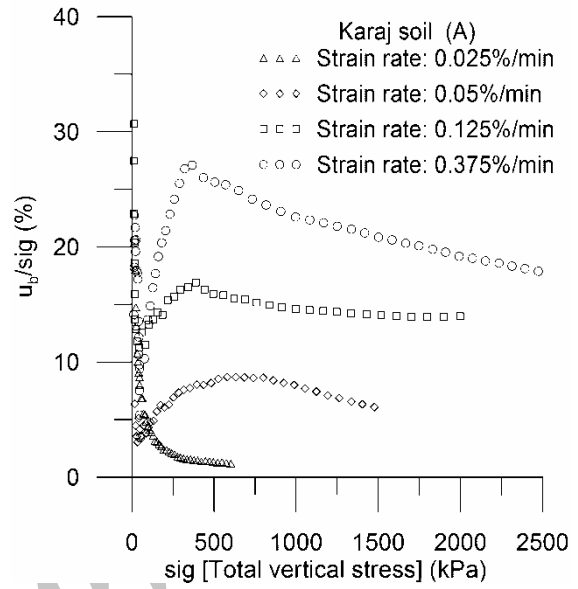
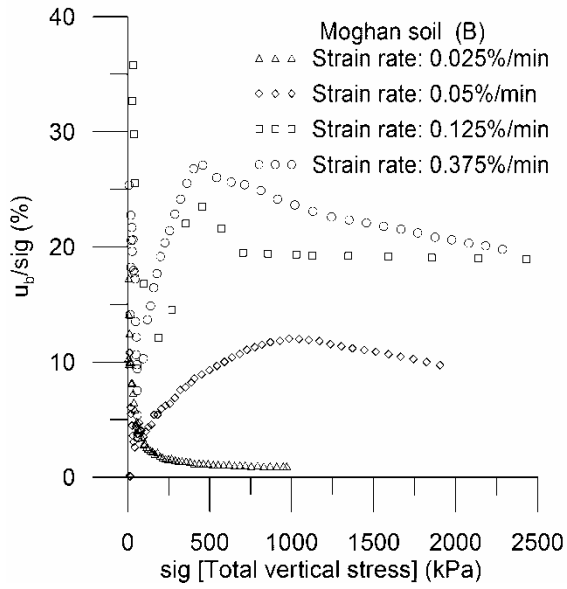
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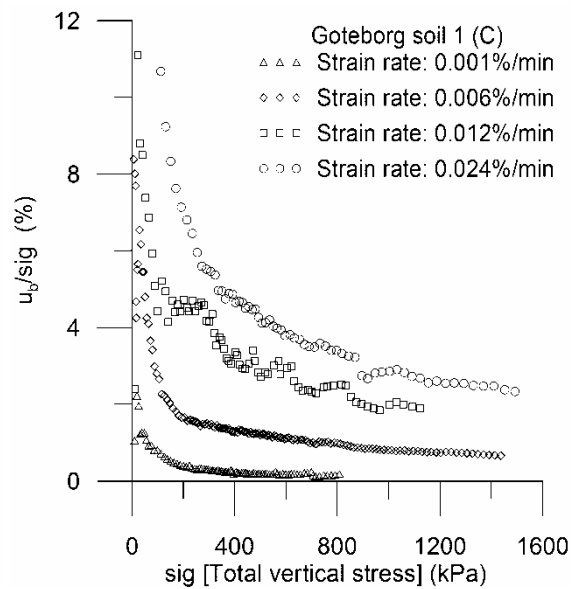
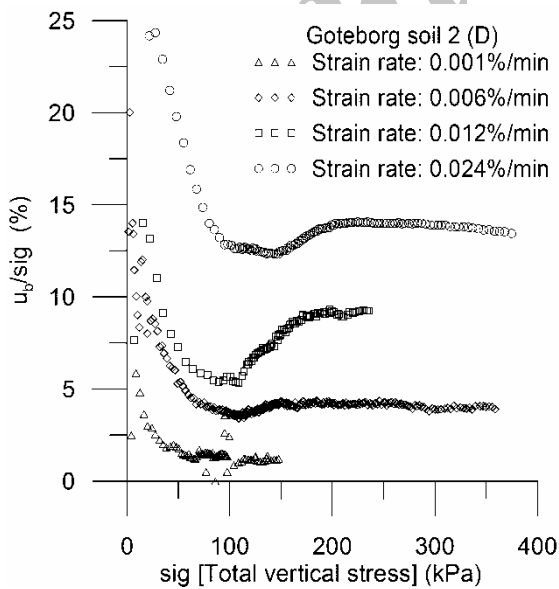
C

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B

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D

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B A

D

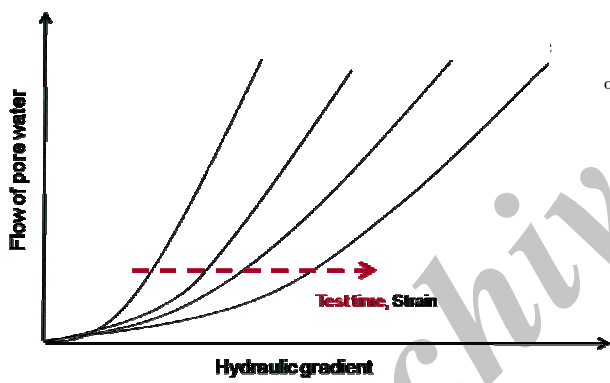
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CD

(Dubak, 2003)



Mitchell and Younger, )

(1967

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( ) Hansbo

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Seah and )

(Juirnarongrit, 2003

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v-i

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(v)

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v-i

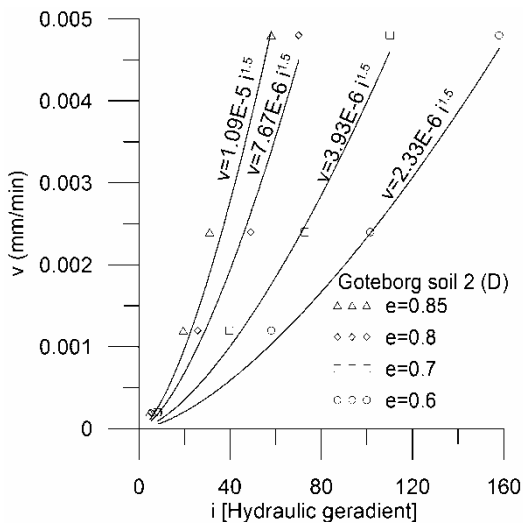
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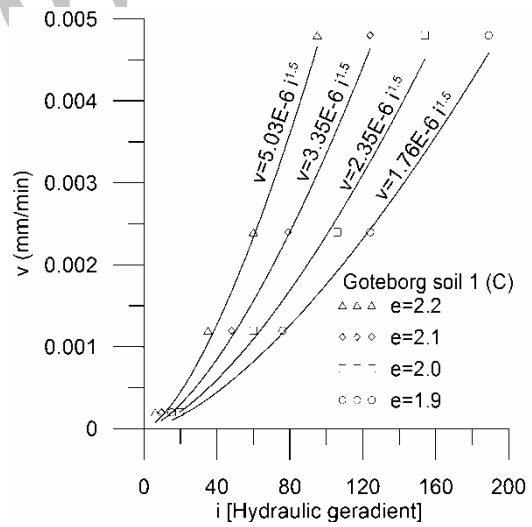
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(Mitchell and Soga, 2005)



(PI=66) D



(PI=60) C

v-i

v-i

(Hansbo, 1960; 2001; 2003)

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$$(u_b/\sigma)$$

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(CL)

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(CL)

(CH)

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