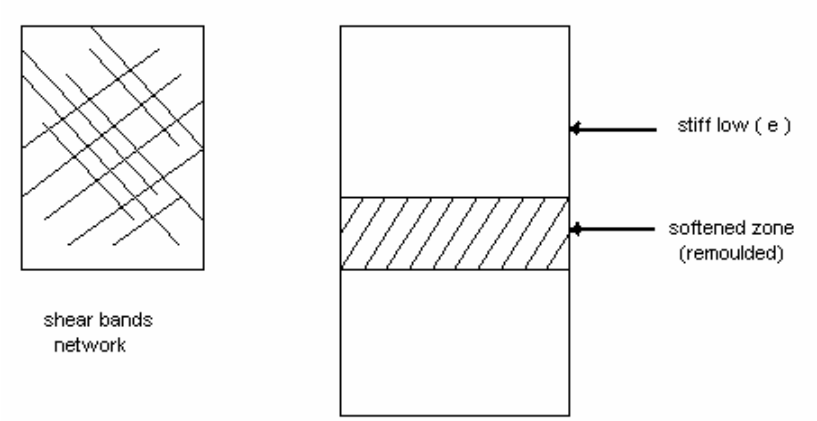
Appendix 5.1A

Despite the high OCR values of the dry pressed specimens, the specimens failed in attaining the critical state stress ratio of M=1.14. This was related to the method of specimen preparation. The theoretical justification of the mechanism based on the assumption that a unique shear bands is created as soon as the axial stress was reduced after forming the specimen. The mathematical explanation is as follow:



The explanation is also based on the subsequent removal of the axial load that created two different zones within the internal structure of the specimen, one is a stiffed zone, and the other is softened zone that resembles a remoulded specimen form

The average void ratio is 0.26 for the normal slurry shale, while an approximate value of ~0.18 is measured for the stiffened material

By assuming void ratio at critical state e_{cs} at 100 *kPa* is ~0.35, then

$$V_V = 0.26\left(V_{s\exp} + V_{scmp}\right) = 0.18V_{scmp} + 0.45V_{s\exp}$$

$$0.08V_{scmp} = 0.19V_{s\exp}$$

$$V_{sswl} \cong 2.38V_{s\exp}$$

$$= 0.879V_{s\exp}$$

$$V = V_V + V_{s\exp} + V_{scmp}$$

$$= \left(0.879 + 1 + 2.38\right)V_{s\exp}$$

$$V_{s\exp} = 0.235V$$

$$V_{scmp} = 0.559V$$

$$V_V = 0.207V$$

Hence

$e = e_o - c_c \log \sigma'$

and

$$d\varepsilon_v = \frac{-de}{1+e} = \frac{\lambda \ln \sigma'}{1+e_o} = -\frac{dV}{V}$$

$$dV = -\lambda \ln \sigma'$$

From the reloading curve, the expanded volume is 0.34, and the compressed volume can be determined as V- $0.34V$.

The change in volume during the pressing can then be expressed by

$$\frac{dV}{V} = \left(\frac{dV}{V}\right)_{\text{exp}} + \left(\frac{dV}{V}\right)_{cmp}$$

Where expanded volume = $0.34V$

Compressed volume = $0.659\ V$

$$dV = \lambda \ln\left(\frac{\sigma'_1}{\sigma'_2}\right) V_{\text{exp}} + \kappa \ln\left(\frac{\sigma'_1}{\sigma'_2}\right) V_{cmp}$$

where

exp = expanded condition

cmp=compressed condition

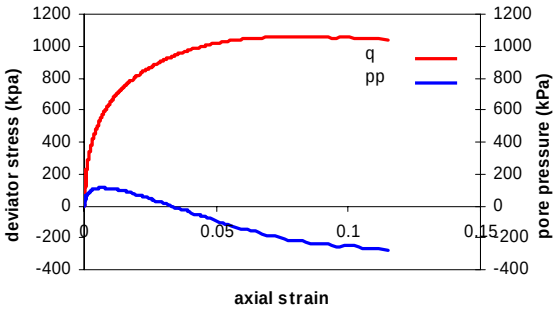
$$\frac{dV}{V} = \left[0.34\lambda + 0.659\kappa\right] \ln \frac{\sigma'_1}{\sigma'_2}$$

$\lambda = 0.025$ and agrees with the slope of the reloading curve

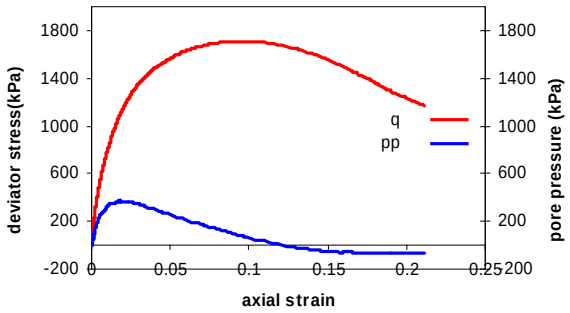
Appendix 5.2A

1. Reconstituted, dry pressed specimens

A. Responses of specimens in undrained condition



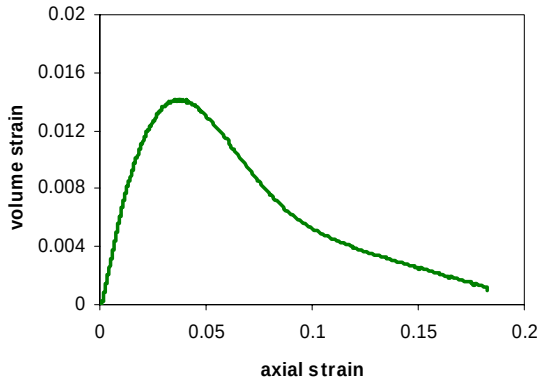
(1)



(2)

Typical pore pressure response at 400 and 1000 *kPa*

B. Responses of specimens in undrained condition

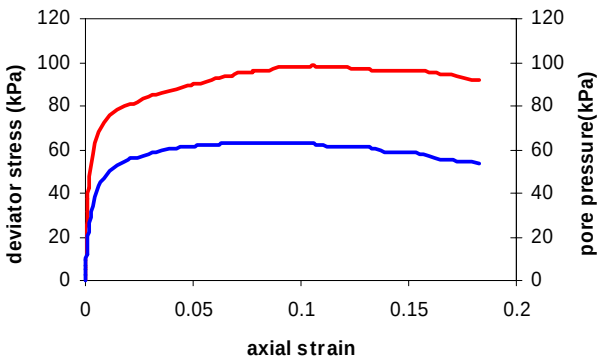


Typical volume strain of reloaded specimen at 400 *kPa*

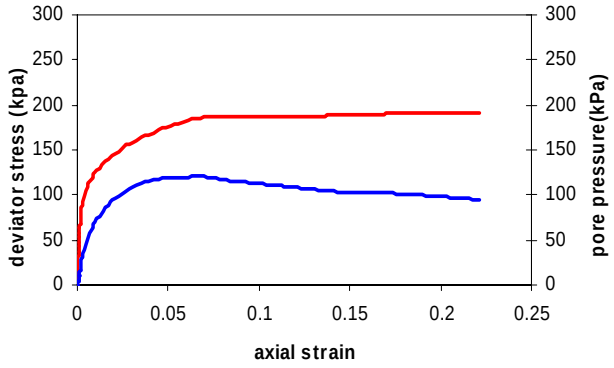
2. Reconstituted slurry specimens

(i) Low pressure series

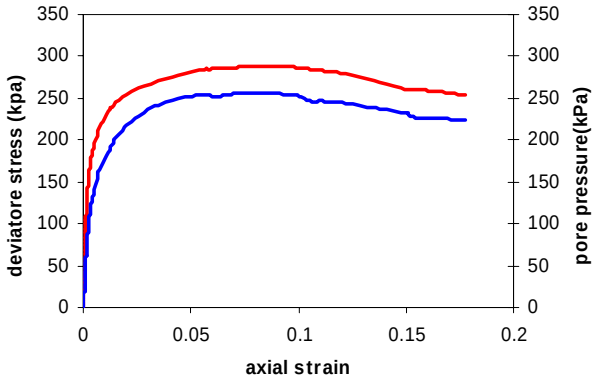
A. Normally consolidated undrained responses



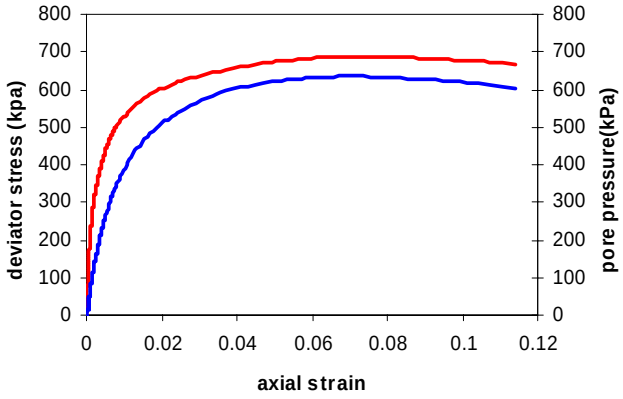
(1)



(2)



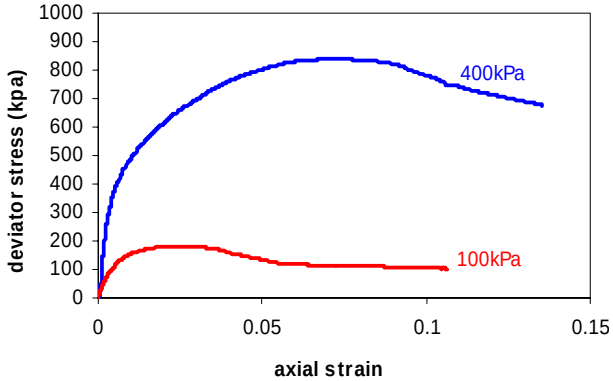
(3)

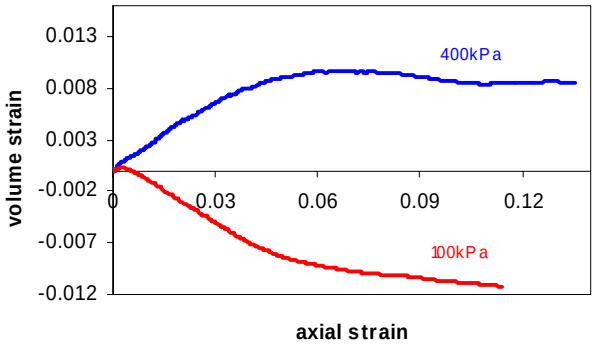


(4)

Responses of stress/strain/pore pressure at (1) 100 *kPa*, (2) 200 *kPa*, (3) 400 *kPa*, and (4) 1000 *kPa*

B. Overconsolidated drained responses

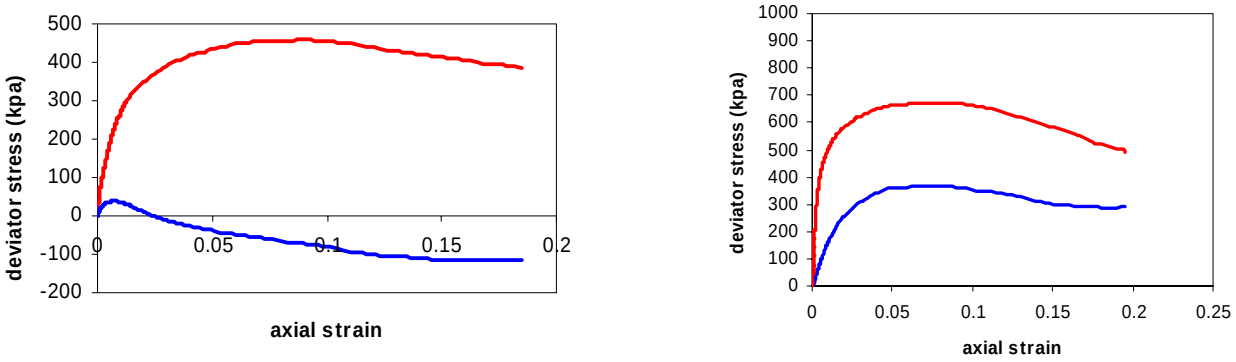




Responses at different effective stresses

Appendix – 5A

C. Overconsolidated undrained responses

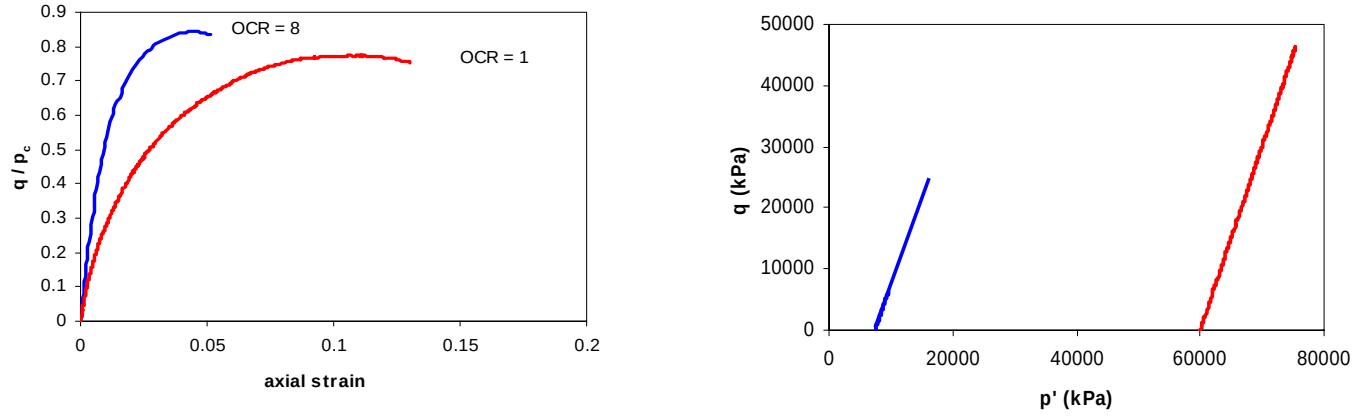


(1) (2)

OCD responses of reconstituted specimens with (1) OCR =10 and (2) OCR = 1.4

(ii) high pressure series

Normally and overconsolidated responses



(1) (2)

OCD tests on reconstituted specimens, normalized stress strain (1) and their stress paths (2)

Appendix – 5A

Appendix 5A

Appendix – 5A