

The impact of salinity on mudrock permeability and compressibility

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ABSTRACT

The salinity of the water surrounding clay particles during deposition of mudrocks has a control on the development of flocs and consequently the material behavior of the mudrock during burial.

This study primarily on Boston Blue Clay (BBC) shows that the soil is relatively insensitive in terms of hydraulic conductivity and compression characteristics to increases in pore fluid salinities up to 256g/L. Tests were conducted on resedimented natural BBC, leached BBC and BBC which had its fabric dispersed using sodium hexametaphosphate. Leaching of the natural salts and then resedimenting with various pore fluid salinities can lead to a modest increase in sensitivity.

Tests were carried out primarily using the Constant Rate of Strain (CRS) device to stresses of 10MPa with some tests to 40MPa. The next step will be to conduct tests to 100MPa and determine if the current insensitivity remains at higher stresses.

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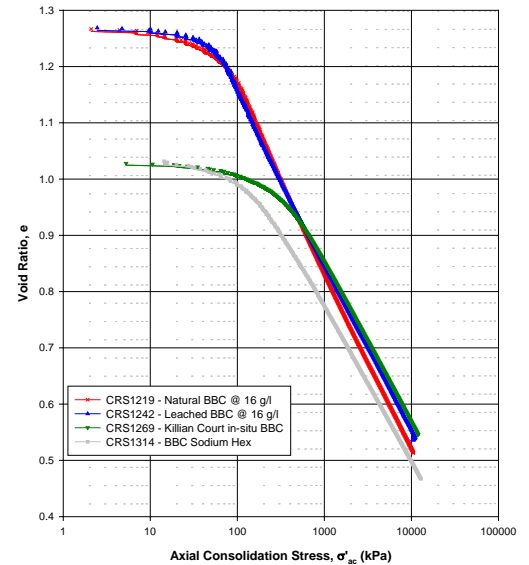


Fig. 1: Compression behavior curves of four derivatives of BBC. The compression behavior for both the natural BBC and the leached BBC at the same resedimented pore fluid salinity indicates that the soil is insensitive to leaching of the natural salt contents.

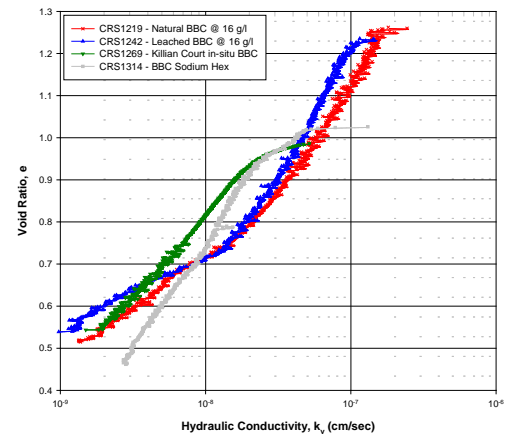


Fig. 2: Hydraulic Conductivity of four derivatives of BBC. Comparison between natural and leached BBC at the same resedimented pore fluid salinity indicates that hydraulic conductivity is relatively insensitive to modification of initial fabric.

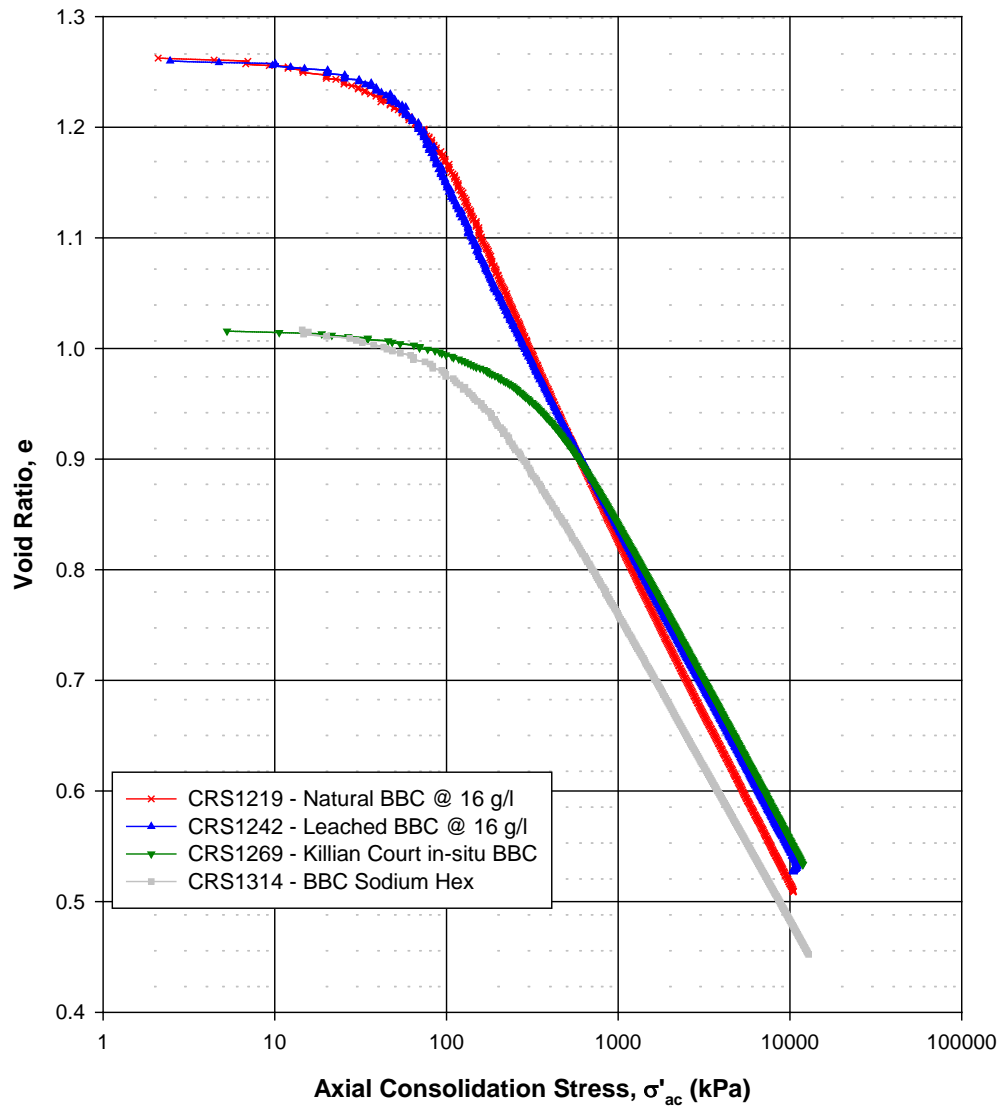


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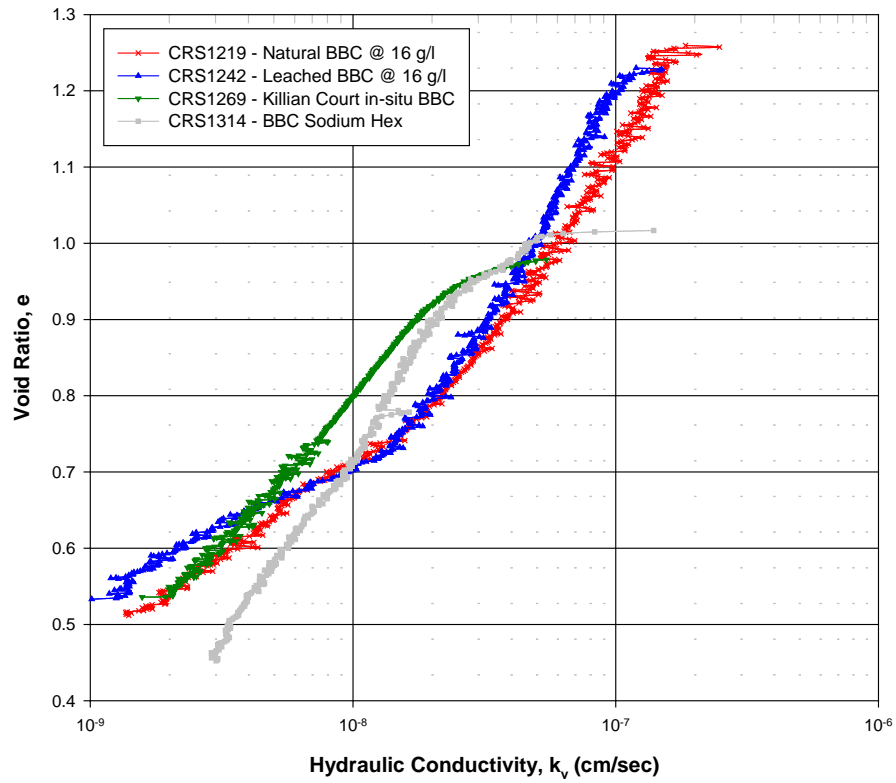


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