12.11: Creep Behavior of a Marine Illitic Clay

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ABSTRACT

In Gulf of Mexico, older rocks are commonly more compressed than younger rocks, of the same lithology, at the same effective stress. Creep deformations (secondary compression) may explain this observed behavior (Fig.1). We studied secondary compression behavior of a marine illlitic clay (BBC) through incremental oedometer tests performed on both intact and resedimented specimens from 1 to 9 MPa. Results show that secondary compression index is in the range of 0.0057 to 0.0106 for all specimens and decreases with increasing effective stress. Furthermore, it is similar for both intact and resedimented specimens (Fig.2). We also showed that compression curve depends on the strain rate during secondary compression. That is, lower strain rates result in approximately parallel but shifted down compression curves in void ratio vs effective stress space.

CLICK ON IMAGE FOR LARGER VIEW

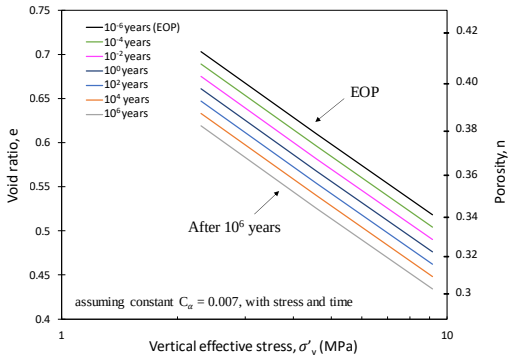

Fig 1: Effects of creep on compression behavior at different times up to 1 million years. End of primary curve (black line) is obtained from a laboratory test. Secondary compression index is assumed to be constant with stress and time.

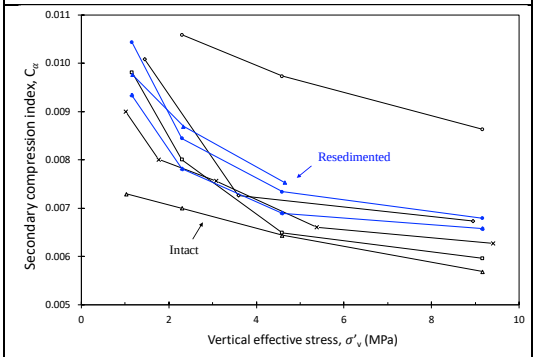

Fig 2: Effects of effective stress on secondary compression index of Boston Blue Clay

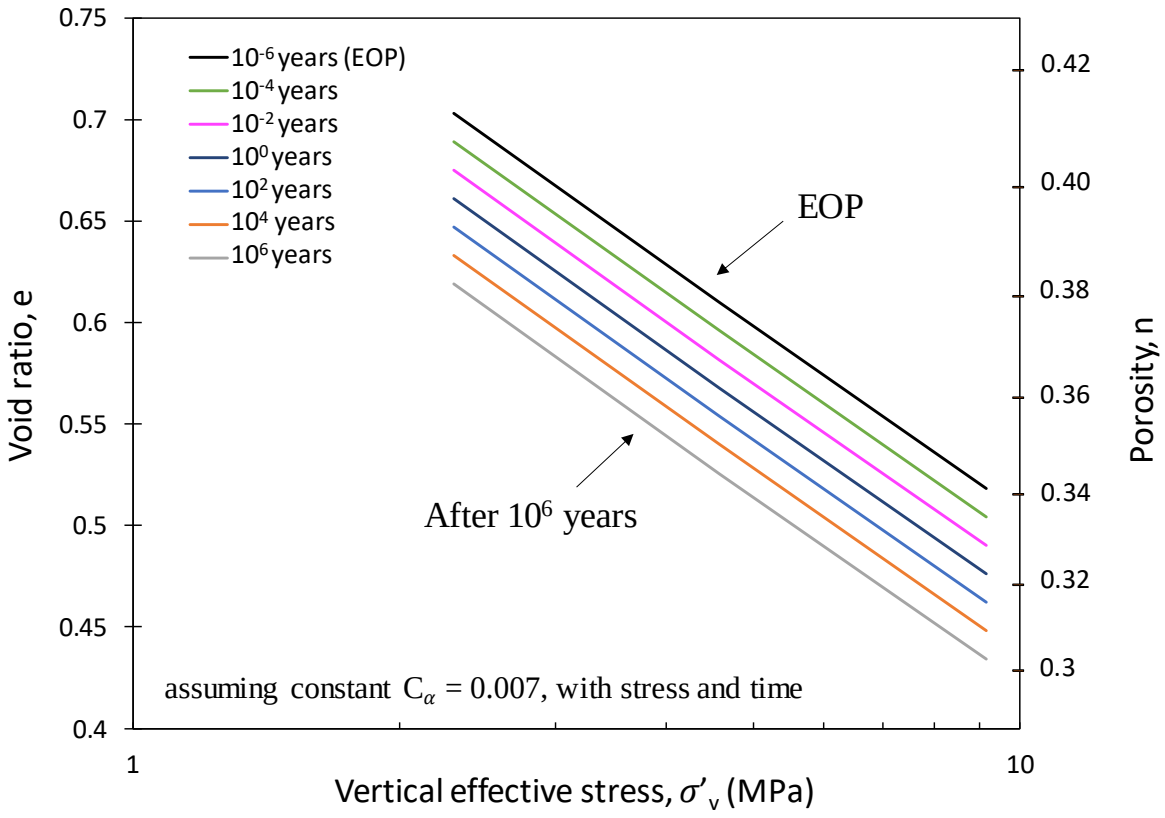

Fig. 1: Effects of creep on compression behavior at different times up to 1 million years. End of primary curve (black line) is obtained from laboratory test. Secondary compression index is assumed to be constant with stress and time.

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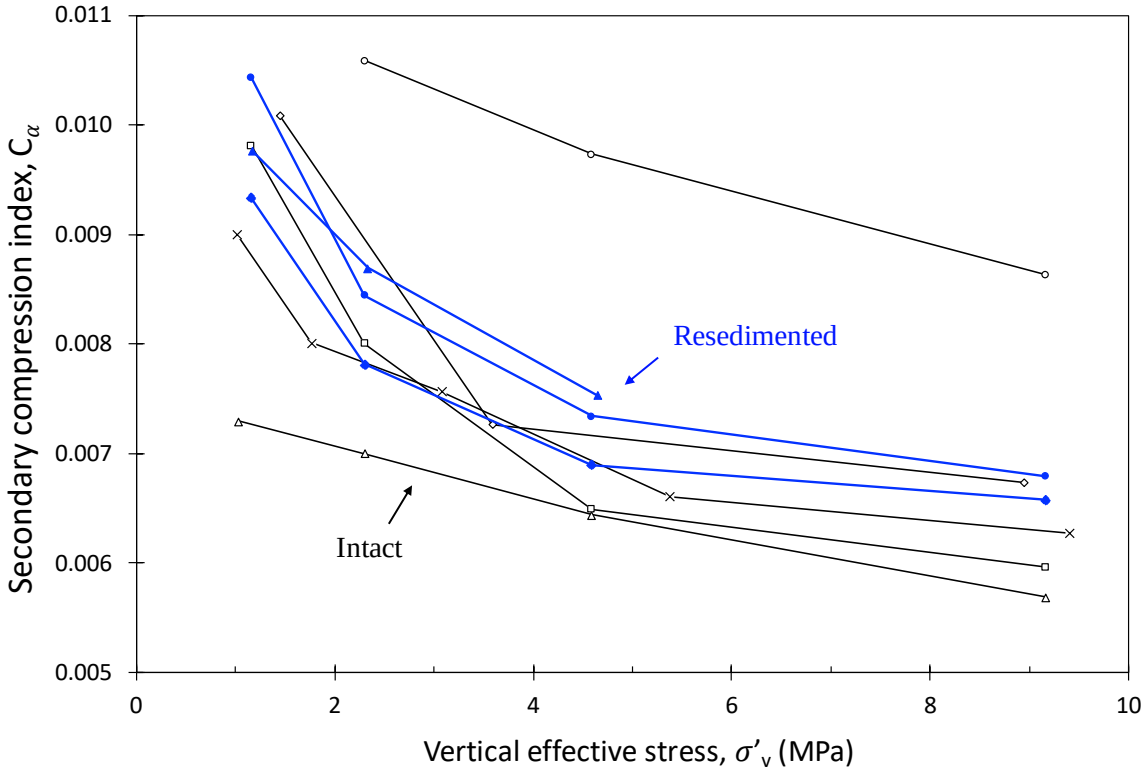

Fig. 2: Effects of effective stress on secondary compression index of Boston Blue Clay

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