Non K_0 Consolidation on Compression Behavior

Nicholas Picardo, Tufts University

ABSTRACT

In this presentation, we examine several consolidation methods; K_0, isostatic and $1/K_0$; and compare both the compression paths and undrained shear stress paths with those predicted by the Modified Cam-Clay (MCC) Model. The following observations are made:

The $1/K_0$ compression path significantly reduces porosity at a given stress as shown in Figure 1. Theoretically, the $1/K_0$ compression path should fall between the isostatic and K_0 compression paths.

Yield surfaces depend strongly on the lateral stress ratio, K. Figure 2 shows good agreement between the experimental stress path and predicted MCC yield surface for isostatic compression. However, the $1/K_0$ stress path is very different than the predicted MCC yield surface, most likely due to the anisotropy of the soil.

In GeoFluids research, these observations are related to the material behavior at the accretionary prism and understanding this behavior will provide an important foundation for numerical models as well as provide insight into the state of stress in the subsurface at the prism location.

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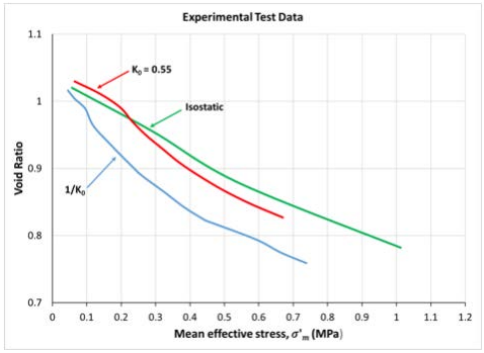

Fig 1: Experimental Compression Test Data

1. Plotted in Mean Effective Stress vs. Void Ratio
2. $1/K_0$ path demonstrates significant reduction in porosity at this stress level
3. $1/K_0$ path theoretically should fall between the Isostatic and K_0 paths

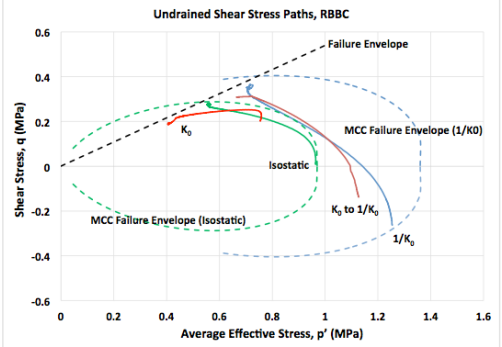

Fig 2: Undrained Shear Stress Paths

1. Good agreement between the experimental yield surface and predicted MCC yield surface for isostatic compression (Green Paths)
2. $1/K_0$ yield surface is very different than the predicted MCC yield surface, most likely due to the anisotropy of the soil.

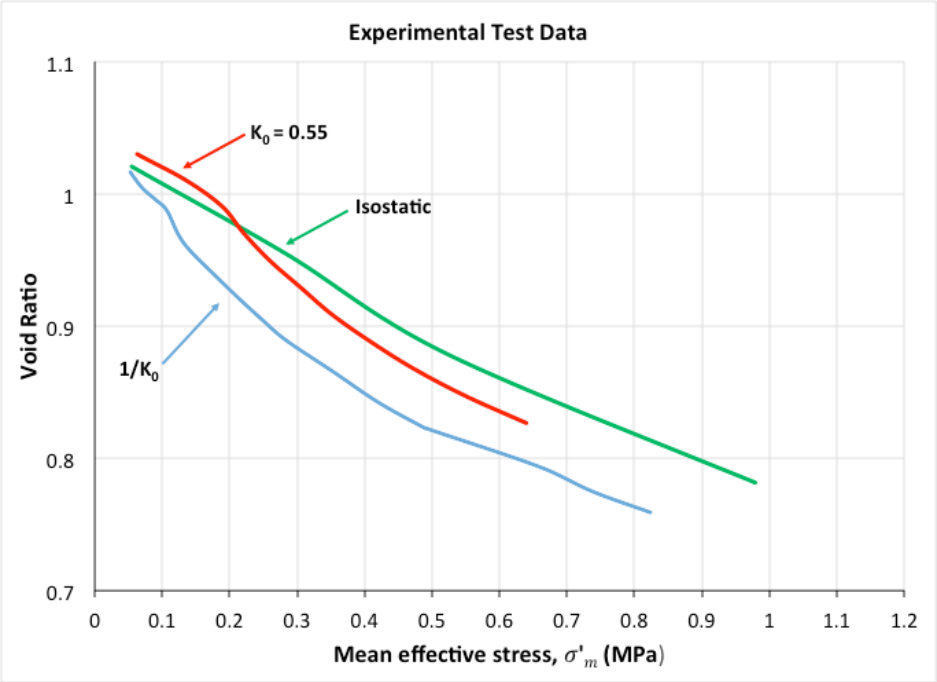

Fig 1: Experimental Compression Test Data - (1.) Plotted in Mean Effective Stress vs. Void Ratio (2.) $1/K_0$ path demonstrates significant reduction in porosity at this stress level (3.) $1/K_0$ path theoretically should fall between the Isostatic and K_0 paths

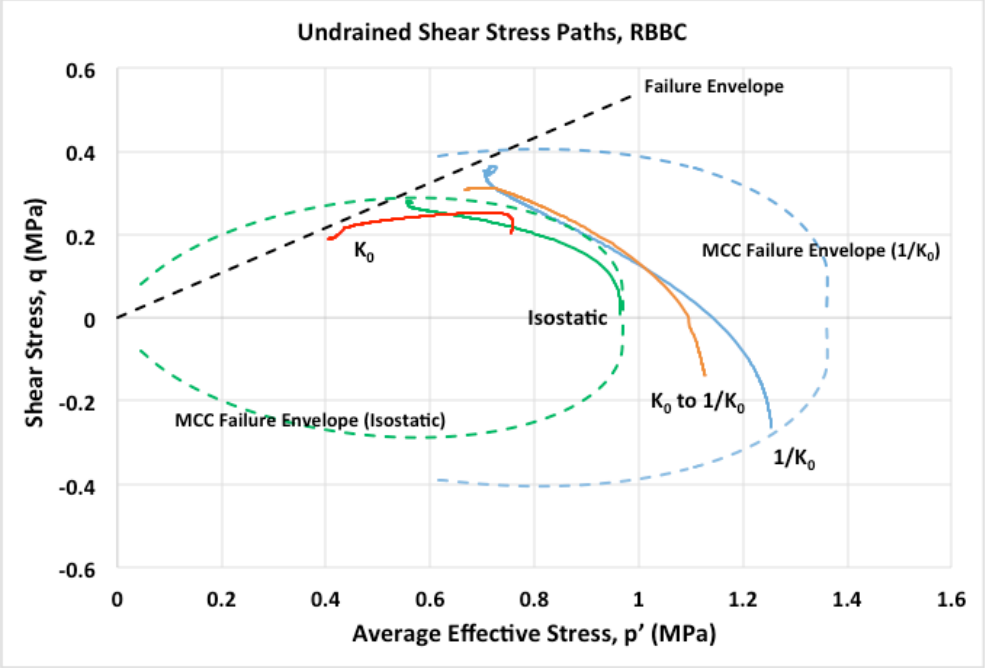

Fig 2: Undrained Shear Stress Paths – (1.) Good agreement between the experimental yield surface and predicted MCC yield surface for isostatic compression (Green Paths) (2.) $1/K_0$ yield surface is very different than the predicted MCC yield surface, most likely due to the anisotropy of the soil.