

Anisotropic Shear Strength of Sand Containing Plastic Fine Materials

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Abstract : Anisotropy is one of the major aspects that affect soil behavior, and extensive efforts have investigated its effect on the mechanical properties of soil. However, very little attention has been given to the combined effect of anisotropy and fine contents. Therefore, in this paper, the anisotropic strength of sand containing different fine content (F) of 5%, 10%, 15%, and 20%, was investigated using hollow cylinder tests under different principal stress directions of $\alpha = 0^\circ$ and $\alpha = 90^\circ$. For a given principal stress direction (α), it was found that increasing fine content resulted in decreasing deviator stress (q). Moreover, results revealed that all fine contents showed anisotropic strength where there is a clear difference between the strength under 0° and the strength under 90° . This anisotropy was greatest under $F = 5\%$ while it decreased with increasing fine contents, particularly at $F = 10\%$. Mixtures with low fine content show low contractive behavior and tended to show more dilation. Moreover, all sand-clay mixtures exhibited less dilation and more compression at $\alpha = 90^\circ$ compared with that at $\alpha = 0^\circ$.

Keywords : anisotropy, principal stress direction, fine content, hollow cylinder sample

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