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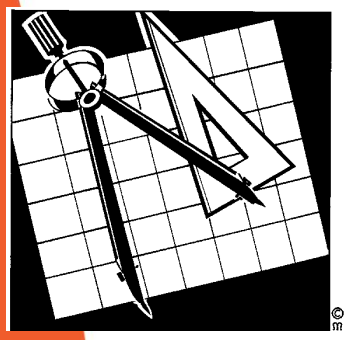
PVC-Silty Clay Interface Friction Angle

Dr. Shobha Bhatia and Gautam Kasturi of Syracuse University conducted interface friction angle testing of 3 different types of PVC geomembranes and 2 types of HDPE membranes with sand, sandy loam, silty clay and non-woven geotextile.

The results of their testing with silty clay are summarized at the right.. The shear stress at 10% strain for the rigid membranes (HDPE & HDT) is less than at the peak. However, for the flexible PVCs , due to their stretching during the tests, the strength at higher strain is greater than at lower strain. This was observed with all PVC interfaces with all the other interface materials, except with fine sand. For this reason the friction angle for the interfaces were calculated at both peak stress and the stress at 10% stain. The yield point of the interface does not represent a failure condition for PVC. This is because further shearing causes an increase in strength and not a decrease, whereas further shearing in HDPE causes reduced strength.



Therefore, under field conditions, if the PVC membranes are stressed beyond the yield stress for the interface, the material stretches under the load without any loss of strength or material damage.

Silty Clay Interface Friction Angle Values:

	10% Strain	Peak Stress
30 mil Smooth PVC	20.8	21.5
30 mil Textured PVC	26.4	22.9
30 mil File Finish PVC	26.0	27.7
60 mil Smooth HDPE	17.0	25.8
60 mil textured HDPE	41.8	41.8

"The stress stain behavior of PVC is much different from that of HDPE. Even after reaching yield stress of the interface, PVC interfaces will not fail but maintain stability by stretching of the membrane material without loss of strength or material damage."

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