



Project Title: Bearingcapacity of Foundation Resting on Two-Layered Sand  
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## Abstract

The purpose of this project is to study bearing capacity of foundation resting on two-layered sand. The sand has been prepared as the top layer sand has more strength than bottom layer. In the test pit, the top layer sand has the average relative density at 72.33% with internal friction angle of 29.53 degrees, while the bottom layer sand has the average relative density at 60.58% with internal friction angle of 28.35 degrees. The plate bearing test following ASTM D 4253-93 and ASTM D 4254-91 has been performed in the test pit using 25-cm plate diameter. Series of tests were conducted by varying the dimensionless thickness of top layer sand  $t/B$  (the ratio of thickness of top layer to plate diameter) as 0, 0.6, 1, 1.5 and 2. Test results show that the bearing capacity of foundation resting on two-layered sand are bounded between the lower bound and upper bound value. The lower bound value is the bearing capacity of foundation resting on sand with the same properties as bottom layer sand, while the upper bound value is the bearing capacity of foundation resting on sand with the same properties as top layer sand. The bearing capacity of foundation resting on two-layered sand can be plotted as parabola function of  $t/B$  and increases as increasing  $t/B$ . The bearing capacity of two-layered sand reaches upper bound limit when  $t/B$  approaches  $t/B_{critical}$ . This observation is regarding the failure mechanism. When  $t/B$  of top layer sand is less than  $t/B_{critical}$ , the failure occur in both top and bottom layer (punching shear in top layer and general shear failure in the bottom layer). Beyond  $t/B_{critical}$ , the failure mechanism occurs in the top layer sand solely, hence the constant bearing capacity.  $t/B_{critical}$  of 1.54 has been found from this research.