

Thesis Title	Effect of Silt and Clay Contents on the Properties of Concrete and Mortar
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Abstract

In this thesis, effects of silt and clay contents on the properties of concrete and mortar were studied. Relationships between percentage of silt or clay and ratio of volumetric of fine material to fine aggregate at the percentage replacement of 0.5, 1, 2, 3, 5, 7 and 10 by weight of fine aggregate were presented. Compressive strengths of 5 cm-cube mortar were determined at the ages of 3, 7, 14, 28, 60 and 90 days. Concrete cubes of 15 cm were used to study the compressive and bond strengths at the age of 28 days. For bond strength test, a 12 mm diameter round bar was embedded vertically in a concrete cube specimen and was tested at the age of 28 days.

The use of silt to replace fine aggregate resulted in increasing the flow of mortar, slump and setting time of concrete, however, it decreased those properties in case of clay. The compressive strengths of mortar and concrete at 28 days increased 12 and 11 percent, respectively, with the presence of 10 percent of silt by weight of fine aggregate. In contrary, they reduced 3 and 5 percent, respectively, with the presence of 3 percent of clay by weight of fine aggregate. The bond strength of concrete, which designing of concrete cube strength at 28 days of 300, 375 and 450 ksc, increased 6, 15 and 3 percent, respectively, with the presence of 5 percent of silt by weight of fine aggregate, however, they reduced 10, 6 and 24 percent, respectively when 3 percent of clay by weight of fine aggregate was introduced in concrete.

In summary, the test results indicated that the amount of fine material in fine aggregate may be allowed to be higher than the limit specified by ASTM C 33 [1], depending on types of fine material and mix proportion of concrete. However, the amount of clay which is higher than the allowance of the standard in the sand should be avoid in mixing concrete.

Keywords : Silt / Clay / Setting Time / Flow / Slump / Compressive Strength / Bond
Strength