

COMPARATIVE STUDY OF COMPOSITION AND STRENGTH RELATED PROPERTIES OF CEMENTS

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Abstract

This report presents a comparative analysis of chemical properties of cement and mechanical properties of cement-sand mortar and concrete. Seven brands of cements manufactured locally were employed in this study. Chemical composition of these cements were determined and compared with those recommended by the relevant standards. Cement-sand mortar cubes and concrete cylinders were tested to study their mechanical properties. Normal, high and very high strength concrete was used. Fineness test of cements was also performed. Cements with higher silicates were found to give higher 28-day strength whereas cements with higher fineness were found to give higher 7-day strength. The change in 7-day strength of concrete was proportional to the change in fineness of cement. Tensile strength of concrete was found to be 10% of its compressive strength for all the three types of concrete. Rate of slump loss was measured and was found to increase with richness of the mix and to decrease with water content of the mix. An analytical model is suggested to predict 28-day strength of concrete using its 7-day strength. The model was found to predict the strength of concrete with sufficient accuracy. A modification in the existing ACI code equation is suggested to predict 28 day strength of concrete. The modified equation was found to give satisfactory results for most of the data obtained in this study.

