

This research is to study principal properties of concrete repair material as commercially available so as to develop new repair materials from cement base using superplasticizer to adjust its physical and mechanical properties. Basic properties of concrete repair materials are compressive strength, tensile strength, modulus of elasticity, shrinkage, thermal expansion and bond strength. The developed material from cement base, only sand to cement ratio was considered as the major variables and dosage of superplasticizer was adjusted to obtain appropriate applications.

The repair materials as available in the industry may be classified as patching materials such as epoxy mortar and non-shrunked mortars, and grouting materials such as epoxy injection and cement grout. The cement mortar with superplasticizer as developed in this research may be classified into two groups; first group for patching using cement mortar with sand to cement ratio of 1:1, 1.5:1, 2:1 and 2.5:1, and second group for grouting using cement paste and cement mortar as sand to cement ratio 0.5:1, 1:1 and 1.5:1. The compressive strength of control concrete as used in this research was averaged to 400 ksc. with modulus of rupture at 50 ksc.

The results of commercial repair materials for patching and injection with epoxy base showed its better strength than the control concrete specimens but its thermal expansion was rather high. For non-shrinkage mortar, most properties of the test specimens were about the same as those of normal used concrete but their shrinkage were found to be less than the normal concrete. Bond strength tested by shear compression was 358 ksc. and by bending was 30 ksc. The cement mortar with superplasticizer developed in this research for patching indicated its reduction in strength and shrinkage with higher sand to cement ratio. Bond strength in terms of shear-compression tests and bending tests have shown the maximum values of 396 and 35.6 ksc., respectively. The same behavior in grouting materials were obtained but the bond strength was reduced to 219 and 29.7 ksc. as for shear-compression and bending tests, respectively. Several basic structural properties were presented so that each mixed proportions would be considered for their appropriate uses.