ABSTRACT

Considerable research has been done in the West and America recently to substantiate the desirable effects of rubber pieces as aggregates in concrete, such as improvements in energy absorbance and ductility of rubberized concrete. Because of such emphasis, the fundamental and important properties such as the compressive and tensile strengths had been compromised.

Efforts have been made in this research to study the strengths of rubberized concrete and to investigate how the strengths can be compensated with silica fume additions in the mixes. Other properties of rubberized concrete, which have not been equally emphasized so far, are also studied. Tests were carried out to determine compressive and flexural strengths, flexural load deflections, water absorption and initial surface water absorption.

The results in this research have shown that concrete with rubber as partial aggregate replacements generally cause reductions in the compressive and flexural strengths. With silica fume addition, specimens containing 5% rubber pieces in the replacement of aggregates can be compensated with compressive strengths comparable to the control concrete. Flexural strengths can also be successfully restored in concrete mixes containing aggregates with 5% and 10% rubber replacements.

The mid-span deflections of concrete beams increased with the increasing of rubber replacements for specimens with and without silica fume. The rubber replacements in the concrete specimens also helped to lower water absorption and initial surface water absorption values. Silica fume augmented the reduction in permeability besides contributing to strength compensations. There are thus potential for the application of rubberized concrete in Singapore.