

Utilization of Polymer-Modified Mortars and Concrete in Building and Construction Industry

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Abstract

Polymer modified concrete or mortar is an alternative to the advancement of long serving civil engineering material - mortar and concrete. The excellence and promising benefits of modified composites have led to numerous progressive studies of its application. This paper presented a critical review from previous researches on the polymer modified concrete and mortar. Both fresh and hardened state properties were reviewed as they are important for the development of excellent engineering material. Most of the applications of polymer modified concrete and mortar can be seen in diverse types of polymer such as latex, epoxy and emulsion. The utilization of each type of polymers resulted in different characteristics of composite concrete or mortar. Such applications have contributed to the improvement in terms of workability and mechanical strength, especially at higher grade of composite strength of concrete material. Because the use of a polymer in concrete represents a substantial increase in cost, polymers should be used only in applications in which the higher cost can be justified by superior properties, low labor cost or low energy requirements during processing and handling. It is therefore important that architects and engineers have some knowledge of the capabilities and limitations of polymer-concrete/mortar composite materials in order to select the most appropriate and economic product for a specific application.

Key words: Polymer, Concrete, Mortar, Workability, Mechanical properties.

1. Introduction

The application of polymer-modified concrete has been started since a few centuries back. There are three types of polymer-concrete composites (PCC), which are polymer concrete (PC), polymer-modified concrete (PMC) and polymer-impregnated concrete (PIC) [1-4]. PC can be defined as a composite material with its binder made of synthetic organic polymer, while the PMC consists of the combination of cement and polymer in certain proportion as binder [1]. The preparation for polymer type concrete, especially for PC and PMC, is by mixing the polymer or monomer (in the form of powder or liquid) with aggregates for PC, and with the addition of cement for PMC [2]. On the