A study on some properties of Polymer Concrete (PC) based on Iraqi grade unsaturated polyester resin.

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Abstract

Samples of an Iraqi grade unsaturated polyester resin - concrete (PC) were prepared, moulded and tested in compression, direct tensile and compression stress-strain. Factors affecting mechanical strengths including polymer content (5 , 7.5 ,10 and 15 %), age (3 - 90 days), and curing temperature (ambient, 50 and 70 °C) were investigated. Chemical resistance properties of the (PCs) to typical reagents (20 % HCl, 20% H_2SO_4, saturated Na_2SO_4, 50 % NaOH, toluene, crude oil and tap water) were also investigated. The results indicated that compressive and tensile strengths increase with increasing polymer content and they developed an optimum strength in a curing period of about 3 days at the testing temperatures. Stress - strain curves reveal the increment of strain with increasing polymer content. Chemical resistance tests confirm the fact that the (PCs) possess outstanding chemical resistance against the selected chemicals.

Introduction

About fifty years ago, considerable systematic studies were started to modify the characteristics of normal concrete by filling the pores of the body with polymers (1 - 4). The following three types of concrete materials utilize polymers to form composites : (1) Polymer Impregnated Concrete (PIC), which is a hardened cement concrete that has been impregnated with a monomer and subsequently polymerized in situ, (2) Polymer Cement Concrete (PCC), which is produced by adding either a monomer or polymer to a fresh concrete mixture and subsequently curing and polymerizing the material in place, and (3) Polymer Concrete (PC), which is a composite material formed by polymerizing a monomer and aggregate mixture.

Liquid vinyl monomer systems have generally been used in PIC. PCC has been prepared with both pre-mix and post-mix polymerized material include latexes and

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