



Study on Bond Strength of Alccofine Based Normal and High Strength Concrete

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Abstract

Plenty of research works in India and abroad focusing on the reuse or recycling of waste materials from many industries. Among that finding out suitable cementitious material for the replacement of cement is significant. Many waste materials such as fly ash, silica fume, GGBS, metakaoline, micro materials, quartz power, etc. are tried out for replacing partially or full of cement in concrete. A new ultrafine material called Alccofine is tried out for replacing partially in this research. M20 and M60 grade of concrete is intended to study the performance of normal and high strength concrete by replacing the cement with alccofine of different dosages. Previous researches showed that the replacement of alccofine increases the strength. Design mix made for M20 and M60 grade and cubes casted with various percentage of alccofine with cement. Hence the study is aimed to assess the bond behavior of M20 and M60 grade of concrete structures as an alternate to the conventional materials. The cubes are prepared initially for the design mix and determined the strength of concrete. Then specimens are prepared for the bond test and tested using pullout test methods. The results are analyzed and observed that the bond strength is increased with increase of alccofine replacement to certain dosage.

Keywords: Alccofine-1203; Conventional Concrete; Conventional Steel Rebar; Bond Behavior.

1. Introduction

Mechanical properties of concrete which includes compressive strength and pull out strength. Compression test is the most common test conducted on hardened concrete partly because it is an easy test to perform and partly because most of the desirable characteristics properties of concrete are qualitatively related to its compressive strength. The compression strength is carried out on the specimen cubical or cylindrical in shape prism is all so used but it is not common in our country. Sometimes the compressive strength of the concrete is determined using parts of a beam tested in flexure. Bond in reinforced concrete refers to the adhesion between the reinforcing steel and the surrounding concrete. It is this bond which is responsible for the transfer of axial force from a reinforcing bar to the surrounding concrete, there by proving strain compatibility and composite action of concrete and steel. If this bond is inadequate, slipping of the reinforcing bar will occur, destroying full composite action. Hence the fundamental assumption of the theory of flexure, viz. plane section plane even after bending, becomes valid in reinforced concrete only if the mechanism of bond is fully effective. It is through the action of bond resistance that the axial stress (tensile or compressive) in a reinforcing bar can undergo variation from point to point along its length.

The Effect of surface texture on bond strength of GRRP bar both sand coated GFRP and plain GFRP in concrete

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