A STUDY AND INVESTIGATION ON STRENGTH PARAMETERS OF POLYPROPYLENE FIBER REINFORCED CONCRETE

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ABSTRACT

Fiber reinforced concrete (FRC) is concrete containing fibrous material which increases its structural integrity. It contains short discrete fiber that are uniformly distributed and randomly oriented. High performance fiber reinforced cementations composites have been engineered to satisfy various field performance requirements such as high durability or impact load resistance. Fibers are usually used in concrete to control cracking due to both plastic shrinkage and drying shrinkage.

They also reduce the permeability of concrete and thus reduce bleeding of water. Taking these advantages into account a study was done on FRC. The interest in the use of fibers for the reinforcement of composites has increased during the last several years. A combination of high strength, stiffness and thermal resistance favorably characterizes the fiber. In this study, the results of the Strength properties of Polypropylene fiber reinforced concrete have been presented.

The compressive strength, flexural strength of concrete samples made with different fibers amounts varies from 0%, 0.1 %, 0.2% 0.3% and 0.4% were studied. The samples with added Polypropylene fibers of 0.3% showed better results in comparison with the others.

I. INTRODUCTION

1.1 GENERAL

The term fiber reinforced concrete (FRC) is defined as a concrete made of hydraulic cements containing fine or fine and coarse aggregates and discontinuous discrete fibers. Inherently concrete is brittle under tensile loading. Mechanical properties of concrete can be improved by reinforcement with randomly oriented short discrete fibers, which prevent and control initiation, propagation, or coalescence of cracks.

FRC can continue to sustain considerable loads even at deflection exceeding fracture deflections of plain concrete. The character and performance of FRC changes depending on matrix properties as well as the fiber material, fiber concentration and fiber distributions.

FRC can be regarded as composite materials with two phases in which concrete represents the matrix phase and the fiber constitutes the inclusion phase. Volume fraction of fiber inclusion is the most commonly used parameter attributed to the properties of FRC.

Fiber count, fiber specific surface area, and fiber spacing are other parameters, which may also be used for this purpose. Another convenient numerical parameter describing a fiber is its aspect ratio, defined as the fiber length divided by its equivalent diameter.

It is possible to make several classifications among fiber types. Fibers can be divided into two groups; those with elastic moduli lower than the cement matrix, such as cellulose, nylon, and polypropylene and those with higher elastic moduli such as asbestos, glass, steel, and carbon.

There are various applications of FRC. Asbestos fibers have been used in pipes or thin sheet elements for a long time. Glass fibers are also used in thin sheet element production as well as shotcrete applications.

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