

EFFECT OF THE NATURE OF FIBERS ON THE MECHANICAL PROPERTIES OF PLASTER IN PRESENCE OF SUPERPLASTICIZER

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ABSTRACT

Plaster and composites made up of gypsum have been extensively used in building for various purposes. This work aims to study the use of polypropylene (synthetic polymer), Alfa (*Stipa tenacissima*) and plastic waste as fiber in the manufacture of plaster and mortar plaster. In this study, a Superplasticizer was used to improve the fluidity of the plaster grout and mortar plaster. The optimization of the dosage of superplasticizer of plaster grout without fiber was determined based on the mechanical strength tests (compression and flexure), the results show that the strengths development (flexion and compression) increase with increasing superplasticizer percentage (0.5, 1.0 and 1.5%). A reference plaster paste and six mixtures incorporating fibers at various nature and at different contents (0.5 and 1%) in presence of superplasticiser(1%) have been prepared. The obtained results of mechanical tests of these mixtures showed that whatever the nature of fiber the resistance of the specimens increases with the increase of the fiber content. The different mixtures of fibers exhibit a major increase of the strengths compared to the specimen without fibers. The plaster made up of the polypropylene give good strengths (compression and bending) in comparison to others fibers (alfa and waste plastic fibers). However, the obtained strength gain for plasters made of different fibers offers a possibility to use the natural fiber or the fiber waste in replacement of synthetic fiber.

Keywords: Plaster, polypropylene, alfa, waste, compressive strength, bending strength

1 INTRODUCTION

Since ancient times, gypsum has been used as a construction material[1]. As environmental-friendly material, its use is relatively limited in construction. Plaster is a very cheap building material, which has been used since ancient times. It is very widespread material and is well known for its qualities: it contributes to the protection of the environment, fairly malleable, low density, with remarkable functional properties (fire protection, thermal insulation, regulator of the hygrometry of the enclosures), which justifies the interest granted to this material for the constructions. Plaster is