

# Comparisons of Compressive Strength and Crack Pattern for Polymer and Macrosynthetic Fibers Concrete

Hamid Eskandari-Naddaf<sup>1</sup>, Milad Aram-Partan<sup>2</sup>

1. Associate Professor of Civil Engineering, Hakim Sabzevari University  
Email: Hamidiisc@yahoo.com
2. M. Sc. Student of Structure, Hakim Sabzevari University  
Email: milad.aram@gmail.com

## Abstract

Concrete is widely used in construction. Plasticity and energy absorption capacity are two main specifications of structures resistant against earthquake. On the other hand, plain concrete has low tensile strength, low energy absorption and trivial resistance to cracks. In this research, samples reinforced with polymer and macrosynthetic fibers in 150\*150 and 500\*100\*100 mm sizes were prepared and tested after being processed. The results show decrease in compressive strength of fiber-reinforced samples. On the other hand, the use of fibers reduces the distance, width and depth of cracks in samples under loading and bending, which is indicative of increase in concrete flexibility.

**Key words:** polymer fiber; macrosynthetic fiber; compressive strength; crack; bending

## 1. Introduction

This Concrete is basically made up of cement, aggregate and water, thus is widely used in construction industry since all its constituents are commonly available and cheap. Concrete under loading has much high strength, whereas its tensile strength is low. In order to improve the tensile strength, steel is often used in concretes. In addition to traditional steel, different fibers are mainly used to increase the tensile strength of concretes. Generally, four types of fiber are used to reinforce concretes: steel fiber, glass fiber, natural fiber and artificial fiber [1].

Cracking is an important factor in the final life of a concrete. Cracks allow harmful substances to enter the concrete, which in turn causes structural failure. In recent years, fiber-reinforced