



Review

Basalt Fiber Reinforced Concrete: A Compressive Review on Durability Aspects

Buthainah Nawaf Al-Kharabsheh ¹, Mohamed Moafak Arbili ², Ali Majidi ³, Saleh M. Alogla ⁴, Ahmad Hakamy ⁵, Jawad Ahmad ^{6,*} and Ahmed Farouk Deifalla ⁷

- ¹ Civil Engineering Department, Faculty of Engineering, Al-Abbayt University, Maftaq 25113, Jordan
 - ² Department of Technical Civil Engineering, Erbil Technical Engineering College, Erbil Polytechnic University, Erbil 44001, Iraq
 - ³ Department of Building and Construction Techniques, Al-Mustaqbal University College, Hillah 51001, Iraq
 - ⁴ Department of Civil Engineering, College of Engineering, Qassim University, Burraydah 51452, Saudi Arabia
 - ⁵ Department of Physics, Faculty of Applied Science, Umm Al-Qura University, Makkah 21955, Saudi Arabia
 - ⁶ Department of Civil Engineering, Military College of Engineering, Sub Campus of National University of Sciences and Technology, Islamabad 44000, Pakistan
 - ⁷ Structural Engineering Department, Faculty of Engineering and Technology, Future University in Egypt, New Cairo 11845, Egypt
- * Correspondence: jawadcivil13@soetwub.edu.pk

Abstract: The creation of sustainable composites reinforced with natural fibers has recently drawn the interest of both industrial and academics. Basalt fiber (BF) stands out as the most intriguing among the natural fibers that may be utilized as reinforcement due to their characteristics. Numerous academics have conducted many tests on the strength, durability, temperature, and microstructure characteristics of concrete reinforced with BF and have found promising results. However, because the information is dispersed, readers find it problematic to assess the advantages of BF reinforced concrete, which limits its applications. Therefore, a condensed study that provides the reader with an easy route and summarizes all pertinent information is needed. The purpose of this paper (Part II) is to undertake a compressive assessment of basalt fiber reinforced concrete's durability features. The results show that adding BF significantly increased concrete durability. The review also identifies a research deficiency that must be addressed before BF is used in practice.

Keywords: basalt fibers; shrinkage; thermal properties; scan electronic microscopy



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1. Introduction

In recent years, there have been increased demands for strength and durability features due to the construction of large-scale infrastructure in several challenging service settings [1–4]. Contrarily, concrete has several unfavorable characteristics, including brittleness, low impact resistance, and excessive weight. Consequently, there is a need to improve tensile capacity [5–8]. One of the current hot topics for building materials research is the use of fiber-reinforced technology to boost the durability of concrete [9–11]. Traditional concrete is typically strong in compression, but not in tension [12–14]. Reinforcement bars are frequently utilized in concrete to compensate for the tensile stresses. In fiber-reinforced concrete, a specific type of concrete, fibers are added to increase the necessary tensile capacity of concrete [15,16].

Since ancient times, many parts of the world have been using fibers in construction materials. The motivation for this effort was to boost the tensile strain of the concrete's "perceived" delicate properties. In the 20th century, this technique was employed to produce fiber-reinforced concrete, which has grown in popularity and apply in construction sector due to its improved strength. The components of concrete are reinforced with a variety of fibers, including biological and inorganic fibers. The surface of the fibers,

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