

## **Civil Engineering Journal**

Vol. 6, No. 3, March, 2020



## The Porosity of Stabilized Earth Blocks with the Addition Plant Fibers of the Date Palm

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Received 14 November 2019; Accepted 02 February 2020

## Abstract

This work is an experimental study to analyze the physical behavior of Stabilized Earth Block (SEB) and reinforced with Plant Fibers of the Date Palm (PFDP). This is part of the valorization of local building materials (earth, fiber) and contributes to reduce the price of housing. Initially, physical tests (Density, Total Water Absorption, and Capillary Absorption) were carried out in preparation for the porosity study. However, the main objective of this study is the investigation of porosity phenomenon using several methods as well as the total porosity estimation, the total volume porosity in water and Open porosity analyses, various dosages are proposed for cement, lime and fiber. Thus (0%, 5%, 10%) of cement, (0%, 5%, 10%) of lime and the combination (5% cement + 5% lime) with (0%, 0.25%, and 0.5%) of fibers for each composition. The experimental results showed that the addition of fibers increases the porosity of the stabilized earth block proportionally and an increasing quantity of the stabilizer reduces the porosity of the SEB, cement is also more effective at closing pores than lime. Moreover, the compositions 10% cement and the mixture of 5% cement + 5% lime with 0% fiber showed a good results of porosity, for this reason they can be used as a durable building material and good resistance to natural and chemical aggression.

Keywords: SEB; Plant Fibers of the Date Palm; Stabilizer; Porosity; Mechanical Strength.

## 1. Introduction

Over the past century there has been an important increase in the use of earth as a building material due to its local availability, low cost and ease of its workforce, which makes the earth over time one of the most important building materials in the world. However, the statistics indicate that about 30% of the world population or more lives in earth constructions essentially in desert and arid areas [1]. Today, there is a strong demand for housing where several construction projects of equipment and habitation are launched. Therefore, the use of concrete material becomes more and more expensive and results harmful consequences to the environment by about 25% of their production as global warming and air pollution [2, 3]. Many scientists suggested that the use of local materials, especially earth is the solution to these problems. Nonetheless, it's our duty to proceed with the valorization of earth, taking in consideration that the use of earth as a construction material requires adequate treatment.

doi) http://dx.doi.org/10.28991/cej-2020-03091485



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