



WATER SENSITIVITY OF HEMP-FOAM CONCRETE

A. Mohamad^{1*}, F. Khadraoui¹, N. Sebaibi¹, M. Boutouil¹, D. Chateigner²

¹COMUE Normandie Université – Laboratoire ESITC - ESITC Caen, 1 Rue Pierre et Marie Curie, 14610 Epron, France

²CRISMAT, CNRS UMR 6508, ENSICAEN, IUT Caen, Université de Caen Normandie, Normandie Université, 14050 Caen Cedex 4, France

*Corresponding author; e-mail: abdelrahman.mohamad@esitc-caen.fr

Abstract

The necessity to build energy-efficient and low environmental impact buildings favors the development of light-weight concretes like foam concretes known for their high porosity. In this context, experimental protocols were developed in this work to study water sensitivity of foam concretes and the effects of water immersion on their physical properties. Foam concrete incorporate several materials and compounds: cement, protein-based foaming agent, ground granulated blast-furnace slag, metakaolin as binder and hemp shives as bio-based aggregates. The study investigated first the effect of the elaboration method, comparing direct mixing of the constituents versus preformed samples. Then the incorporation of hemp shives (from 5 to 15 vol%) on the resulting density and the mechanical behavior at 7 and 28 days are examined. Obtained results show variations in densities from 8.8 to 22.7%, in compressive and flexural strengths from -14.6% to 12.9% and from -31.5% to 5.3% respectively. Moreover, the preformed method renders results in more sensitive concrete to water than the direct one.

Keywords:

Foam concrete, vegetable aggregates, production methods, water sensitivity, mechanical strength.