Evaluation of the Effect of Waste Mine Additions to Concrete on its Ventilation Energy Storage Capacity in a FRP Tubes Filled with Concrete

Record number : OPR-465

Overview

RESEARCH DIRECTION

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie civil et de génie du bâtiment
Département de génie mécanique

LEVEL(S)

2e cycle
3e cycle

LOCATION(S)

Campus principal

Project Description

Rectangular beams made of fibre-reinforced polymer tube (FRP) filled with concrete (CFFT) have been proven to have exceptional performance in terms of strength and energy absorption. The bending strength and energy values achieved by CFFT beams are more than three times and five times higher, respectively, than those of reinforced concrete beams (RC).

In addition, the beams are also an important building structure for storing thermal energy. The particular and innovative design of CFFT beams/columns hollowed out from the inside, and using concrete with and without the addition of mine tailings, would provide several benefits, including reduced dead weight, innovative use of mine tailings in a sealed, closed hybrid structure, and use of this void as an energy storage element through ventilation. As a result, CFFT structures can be used to reduce building energy consumption and peak electricity demand, thereby reducing greenhouse gas emissions. The thermal storage capacity of CFFT structures depends on the thermal property and structure of the CFFT beams/columns. To build reinforced concrete structures and improve the energy efficiency of buildings, this project will carry out fundamental studies on the thermal property and energy storage capacity of CFFT beams/columns of conventional concrete and tailings additions, and develop an accurate numerical model of energy storage in CFFT structures for optimal design.

Discipline(s) by sector

Sciences naturelles et génie

Génie civil, Génie mécanique

Funding offered

Yes

The last update was on 12 March 2024. The University reserves the right to modify its projects without notice.