

Investigation of Dynamic Heat Transfer in Masonry Walls

Authors : Joelle Al Fakhoury, Emilio Sassine, Yassine Cherif, Joseph Dgheim, Emmanuel Antczak

Abstract : Hollow block masonry is the most used building technology in the Lebanese context. These blocks are manufactured in an artisanal way and have unknown thermal properties; their overall thermos-physical performance is thus unknown and also poorly investigated scientifically in both single wall and also double wall configurations. In this work, experimental measurements and numerical simulations are performed for a better understanding of the heat transfer in masonry walls. This study was realized using an experimental setup consisting of a masonry hollow block wall (0.1m x 1m x 1m) and two heat boxes, such that each covers one side of the wall. The first is a reference box having a constant interior temperature, and the other is a control box having an adjustable interior temperature. At first, the numerical model is validated using an experimental setup; then 3D numerical analyzes are held in order to investigate the effect of the air gap, the mortar joints, and the plastering on the thermal performance of masonry walls for a better understanding of the heat transfer process and the recommendation of suitable thermal improvements.

Keywords : masonry wall, hollow blocks, heat transfer, wall instrumentation, thermal improvement

Conference Title : ICEECBDC 2022 : International Conference on Energy Efficient Commercial Building Design and Construction

Conference Location : Bali, Indonesia

Conference Dates : July 12-13, 2022