

Experimental Study on the Variation of Young's Modulus of Hollow Clay Brick Obtained from Static and Dynamic Tests

Authors : M. Aboudalle, Le Bth, M. Sari, F. Meftah

Abstract : In parallel with the appearance of new materials, brick masonry had and still has an essential part of the construction market today, with new technical challenges in designing bricks to meet additional requirements. Being used in structural applications, predicting the performance of clay brick masonry allows a significant cost reduction, in terms of practical experimentation. The behavior of masonry walls depends on the behavior of their elementary components, such as bricks, joints, and coatings. Therefore, it is necessary to consider it at different scales (from the scale of the intrinsic material to the real scale of the wall) and then to develop appropriate models, using numerical simulations. The work presented in this paper focuses on the mechanical characterization of the terracotta material at ambient temperature. As a result, the static Young's modulus obtained from the flexural test shows different values in comparison with the compression test, as well as with the dynamic Young's modulus obtained from the Impulse excitation of vibration test. Moreover, the Young's modulus varies according to the direction in which samples are extracted, where the values in the extrusion direction diverge from the ones in the orthogonal directions. Based on these results, hollow bricks can be considered as transversely isotropic bimodulus material.

Keywords : bimodulus material, hollow clay brick, impulse excitation of vibration, transversely isotropic material, young's modulus

Conference Title : ICMCBCM 2021 : International Conference on Masonry Construction, Brick and Concrete Masonry

Conference Location : Montreal, Canada

Conference Dates : May 24-25, 2021