Experimental Campaign on the Use of the Flat Jack Test in Cob Walls

Alejandro Jiménez Rios*, Michael Grimes† and Dermot O'Dwyer†

* Department of Civil, Structural and Environmental Engineering
Trinity College Dublin
College Green, D02 Dublin, Ireland
E-mail: jimnezra@tcd.ie
Web page: https://www.tcd.ie/civileng/people/doctoral-students/alejandro-jimenez-rios.php

E-mail: michael.grimes@tcd.ie
Web page: https://www.tcd.ie/civileng/people/migrimes/

†E-mail: dwodwyer@tcd.ie
Web page: https://www.tcd.ie/civileng/people/dwodwyer/

ABSTRACT

The flat jack test is one of the most used investigation techniques in the area of cultural heritage conservation. Originally developed to be used in the field of rock mechanics [1], it has been adopted and used during the last four decades to determine in-situ the levels of stress and the mechanical properties of different types of masonry (ashlar masonry, brick masonry, stone masonry) and earthen (adobe and rammed earth) walls [2]. There are no results available in the literature reporting the use of the flat jack technique in cob walls, which is another earthen construction technique present in at least eighteen European countries [3] and many others around the world [4, 5].

This paper presents the experimental campaign performed in the laboratory of Trinity College Dublin to validate the use of this minor-destructive technique to determine the levels of stress in cob walls and their mechanical properties. The characteristics of the soil used to build the wallettes are presented and the construction process described. Furthermore, the consolidation process of the wallettes is explained and the results obtained are reported. One of the aims of this experimental campaign consists on finding the value for the dimensionless geometrical efficiency constant K_e [6]. Such values, to be applied when the technique is used in-situ, would allow to obtain a more realistic estimation of cob's mechanical properties, thus avoiding the implementation of over invasive interventions that may put in danger the authenticity and value of the historical structure under consideration.

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