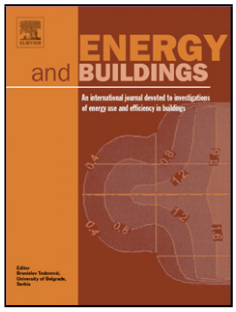

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Infrared thermography for the investigation of dynamic thermal behaviour of opaque building elements: comparison between empty and filled with hemp fibres prototype walls

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Abstract

The analysis of the thermal dynamic behaviour of buildings is an important tool for reducing inefficiencies and then wasted energy. In this field, European Standards specify the procedures to obtain information about the thermal behaviour of building in terms of decrement factor and time lag. However, these procedures are based on a theoretical approach that does not take into account the real factors involved in the heat exchange phenomena such as the correct knowledge of thermo-physical parameters and the presence of non-homogeneous materials or defects in the investigated walls.

In this work, we propose an innovative experimental procedure based on the application of stimulated thermography with the aim of investigate the thermal dynamic behaviour of walls. In particular, two prototype walls were compared: an empty wall and one made with an insulating filler of vegetable nature (hemp fibre).

The results were then compared with those obtained with a numerical simulation and with the Standard procedure EN ISO 13786:2007, highlighting the differences between the three approaches.