Experimental Analysis of Building Air Tightness in Traditional Residential Portuguese Construction

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Abstract

It is currently recognized that the residential building sector is one of the largest energy consumers in the world. The energy crisis of the 1970s was important for drawing attention to the subject of energy consumption and the necessity to save energy. The airtightness of buildings is an important factor affecting a building's energy consumption and also energy-saving potential. On the other hand, the ventilation rate has also a significant effect on indoor air quality and is assumed to be an essential criterion of a building's performance. However, most of the existing research in this area has been developed in cold climates and there is a research gap with regard to countries in warmer climates such as those close to the Mediterranean Sea. Therefore, this research aimed to study the airtightness and ventilation rate of existing buildings by employing in-situ measurements.
In-situ measurements were achieved using the fan pressurization test (Blower Door Test) method. According to the selected case studies, the results of the measurements indicate a correlation between building typology, airtightness, and ventilation rate.

Keywords: natural ventilation, indoor air quality, air circulation, architectural solutions, infiltration rate, air permeability.

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