



6th International Building Physics Conference, IBPC 2015

Computing the Thermal Energy Performance of Building by Virtue of Building Dimensional Typology

Atefeh Salehi ^{a*}, Isabel Torres ^{a*}, Ana Ramos ^b

a Civil Engineering Department, Faculty of Science and Technology, University of Coimbra, Portugal. Rua Sílvio Lima, Universidade de Coimbra – Pólo II, 3030-790, Coimbra, Portugal.

b Civil Engineering Department, Superior School of Technology, Polytechnic Institute of Castelo Branco, Portugal. Av. Do Empresário, 6000-767, Castelo Branco, Portugal.

Abstract

The constructive particularities of Portuguese old buildings, with specific and ancient constructive solutions and buildings' aesthetics, determine the type of interventions and turn some of the most efficient interventions impossible to apply. Since the external appearance of buildings in old city centers must be preserved, nor is the use of external isolation not an alternative, neither the use of materials with low hygro-scopicity, due to the nature of the material used in exterior walls, usually stone. Presented research was expanded to figure out the reaction of different intervention solutions which are used in old buildings' envelope to accomplish their energy performance. The old city center of Coimbra has a building typology very characteristic and similar to other Old Portuguese city centers, so the idea was to create a representative building of their dimensional characteristics. The modeled building unit was designed after studying around thirty buildings. With all the collected data, it was possible to design a building which we consider that as representative of Coimbra City Centre buildings. This modelled building was used to simulate, with Design Builder software, in real condition and with different solutions for interventions in facades, to predicting the thermal performance achieved for each one. Their final performance was analyzed and compared. The achieved results will be used to define the most suitable interventions in old buildings to improve its energy performance beside of good indoor air quality.

© 2015 The Authors. Published by Elsevier Ltd.

Peer-review under responsibility of the CENTRO CONGRESSI INTERNAZIONALE SRL.

Keywords: Energy Performance, Thermal Insulation, Retrofit, BuildingTypology, Construction Physics;

□ Corresponding author. Tel.: +35-123-979-7205; fax: +35-123-940-6669.
E-mail address: salehi.atefeh@student.dem.uc.pt, itorres@dec.uc.pt,