



“Gheorghe Asachi” Technical University of Iasi, Romania



REAL TIME MONITORING OF INDOOR ENVIRONMENT QUALITY AND ENERGY CONSUMPTION IN A RESIDENTIAL BUILDING

Mihai Toderascu^{1,2}, Vlad Iordache^{2*}, Cristian Petcu¹, Horia Petran¹

*¹National Institute for Research and development in Construction, Urban Planning
and Sustainable Spatial Development „URBAN-INCERC”, Pantelimon 266, Bucharest*

²Technical University of Civil Engineering of Bucharest, Pache Protopopescu 66, Bucharest

Abstract

Several theoretical studies were oriented towards the relationship between the main two building design estimators (building energy consumption and indoor environmental quality) but very little experimental research has been carried out in order to underline the correlation between these two parameters. This paper is focused towards the experimental study of the correlation between these two design estimators. Several indoor comfort parameters (air temperature, radiant mean temperature, sound pressure level, outdoor ventilation rate and lighting level) as well as energy consumption were monitored in different rooms inside a laboratory experimental house at real scale located in Bucharest, Romania. Time variations of these parameters and space distribution maps inside the house were analysed in order to understand the indoor comfort variations. Four comfort indexes (thermal comfort index, acoustic comfort index, indoor air quality index and visual comfort index) were determined and their time variations were used to emphasize the correlation between the indoor environment quality and the energy consumption. The overall indoor environment quality was found to be inversely correlated with the energy consumption and that this general trend can be easily influenced by the weight of the four comfort types.

Key words: building operating, energy efficiency, IEQ

Received: September, 2018; Revised final: January, 2019; Accepted: April, 2019; Published in final edited form: July, 2019

* Author to whom all correspondence should be addressed: e-mail: viordach@yahoo.com; Phone: +40749218162