

Simulation study of natural ventilation on energy efficiency and reduction of Co² emission in a humid climate

Mostafa Kazemi¹, Hossein Pur Asghariparast², Roya Aeinehvand³, Ronak Geravandi⁴, Abdollah Baghaei Daemei^{5*}

1. Department of Architecture, Tabriz Branch, Islamic Azad University, Tabriz, Iran

2. Department of Architecture, Ahrar Institute of Technology and Higher Education, Rasht, Iran

3. Faculty of Architecture and Urban Planning, Islamic Azad University, Central Tehran Branch, Tehran, Iran

4. Faculty of Architecture, University of Tehran, Tehran, Iran

*⁵. Editorial Board of International Journal of Sustainable and Green Energy, USA

Corresponding Author: baghaei.public@gmail.com

ABSTRACT

Nowadays, researchers have conducted many studies about the role of natural ventilation as a passive cooling system. This would also help in reducing costs, excessive use of energy and the consequential environmental effects of year-round air conditioning. In this regard, energy consumption and Co² emissions associated with buildings has a significant impact on the environment. The current research was carried out in Rasht with humid climate. The major aim of this study was to assess the role of natural ventilation on energy consumption optimization and reduce co² emission over a year on a residential building. The exiting building have a two-story which the first floor was evaluated. The BEopt software was used for evaluation. The results showed that natural ventilation could reduce energy consumption by up to 3% and also reduce the co² emissions more than up to 2.5%.

Keywords: Natural ventilation, Energy Efficiency, Co² emission, Humid climate.

1. Introduction

Sustainable development in the building industry requires designers to satisfy the needs of today's users without compromising the ability of future generations to meet their own needs. Mechanical ventilation and air conditioning of buildings consume large amounts of energy in the world, especially in developed countries, where buildings are responsible for one third of all energy consumption [1,2]. Natural ventilation is set adjoining to the term "passive design" and points to designing a way to facilitate the use of renewable energy. Therefore, natural ventilation is one of the basic solutions to reduce energy consumption in building and improve the environment. Wind energy, amongst renewable energies in the environment, leads human body to a high degree of comfort [3,4]. On the other hand, when an architect is devoid of clear understanding of the importance of passive design, he could not implement proper design of building in the early stages using strategy appropriate to climatic features. Simulation wind tunnel using CFD technology enables designers to directly simulate wind for further

⁵  <https://orcid.org/0000-0003-2660-9714>