

Indoor thermal comfort in temporary building units

Case study in Egypt

Habiba Khaled Mohamed Mabrouk¹, **Norhan Ahmed Elakkad**², **Walaa S.E. Ismaeel**^{3*}

Graduate student, The Department of Architecture, Faculty of Engineering, The British university in Egypt, El-sherouk city, Egypt¹

Teaching Assistant, The Department of Architecture, Faculty of Engineering, The British university in Egypt, El-sherouk city, Egypt²

Associate professor, The Department of Architecture, Faculty of Engineering, The British university in Egypt, El-sherouk city, Egypt³

*E-mail: Walaa.Salah@bue.edu.eg

Abstract. Temporary building units (TBUs) have become increasingly prevalent for diverse applications, however, their lightweight construction often leads to thermal discomfort for occupants, especially in extreme climates. Thus, this research investigates the selection of different materials for building elements (wall, floor and roof types) to achieve thermal comfort in TBU. Another research aim is to optimize designs through simulation models using Design Builder, which included eight simulations to assess the building's total site energy consumption and the number of unmet hours. The initial phase focused on wall materials—comparing PVC, fiberglass, and plywood—where plywood was identified as the most suitable option. The subsequent simulations assessed three types of flooring: plywood, vinyl, and fiberglass, with plywood again emerging as the preferred choice. Finally, the roof options were evaluated for the metal and green roofs, with the green roof demonstrating greater effectiveness. This is beneficial for designers and developers of TBUs to achieve indoor thermal comfort.

Keywords: Building simulation; Floor design; Indoor thermal comfort; Roof design; Temporary building units; Wall design

