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Investigation of Passive Solutions of Thermal Comfort in Housing Aiming to Reduce Energy Consumption

Authors : Josiane R. Pires, Marco A. S. González, Bruna L. Brenner, Luciana S. Roos

Abstract : The concern with sustainability brought the need for optimization of the buildings to reduce consumption of natural resources. Almost 1/3 of energy demanded by Brazilian housings is used to provide thermal solutions. AEC sector may contribute applying bioclimatic strategies on building design. The aim of this research is to investigate the viability of applying some alternative solutions in residential buildings. The research was developed with computational simulation on single family social housing, examining envelope type, absorptance, and insolation. The analysis of the thermal performance applied both Brazilian standard NBR 15575 and degree-hour method, in the scenery of Porto Alegre, a southern Brazilian city. We used BIM modeling through Revit/Autodesk and used Energy Plus to thermal simulation. The payback of the investment was calculated comparing energy savings and building costs, in a period of 50 years. The results shown that with the increment of envelope's insulation there is thermal comfort improvement and energy economy, with a pay-back period of 24 to 36 years, in some cases.

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