

عنوان مقاله:

Simulation-based assessment of building's energy efficiency considering PCM utilization in Iran

محل انتشار:

چهارمین کنفرانس ملی تحقیقات کاربردی در مهندسی برق، مکانیک، کامپیوتر و فناوری اطلاعات (سال: 1397)

تعداد صفحات اصل مقاله: 15

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خلاصه مقاله:

In last decades, the rapid depletion of natural resources and fossil fuels is one of the main experts' concerns. So, this problem has led to an increased demand for efficient and versatile usage of energy. In this study, the influence of phase change material (PCM) on reduction of the energy usage and related carbon emission of a multi-storey residential building placed in three different climate regions (Bandar Abbas, Tehran, Tabriz) in Iran, was investigated and simulated in a year by EnergyPlusTM. In this survey, the micro-encapsulated bio-PCMTM mats with melting temperatures of 21 °C, 23 °C and 25 °C were located in external walls of the building, which helped to decrease fluctuations of indoor temperatures through a year. On the test results basis, energy savings from PCMs were calculated. It showed that residential buildings located in cold areas (Tabriz) are more prone to get prominent results from utilization of PCMs. According to CO₂ emissions analysis, Tabriz also, had the highest reduction in CO₂ emissions (4.2%) especially by using PCM 25 (melting temperature of 25 °C) in a year. Generally, simulated results indicate that using PCM material reduce total energy consumption of building and in terms of annual energy utilization of the residential building, PCM 25 had the best results in comparison with PCM 21 and PCM 23

کلمات کلیدی:

Phase change material, Energy saving, Residential building, EnergyPlus, Energy consumption

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/870422>

