

عنوان مقاله:

Application of Phase Change Material (PCM) for Cooling Load Reduction in Lightweight and Heavyweight Buildings:-
Case Study of a High Cooling Load Region of Iran

محل انتشار:

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خلاصه مقاله:

The application of phase change material (PCM) for energy conservation purposes in the residential buildings was investigated in the present study. Two types of building in terms of materials as the lightweight building (LWB) and heavyweight building (HWB) located in a high cooling load demanding region of Iran were considered for the study. Different types of PCM from organic and inorganic categories were examined to determine the most appropriate type of the buildings in terms of indoor air conditions and yearly required cooling load. The buildings in the existing form and with an added layer of PCM were simulated hourly, and indoor air conditions and yearly cooling loads were determined. EnergyPlus software was used for this purpose. The study revealed that the LWB with the added layer of calcium chloride hex hydrate (CCH) had the minimum yearly required cooling load with about 39.8 GJ, and 25.7% reduction in the yearly cooling load was observed and the HWB had the best performance in terms of yearly required cooling load with the added n-eicosane (N.EIC) layer with about 28.8 GJ, which is a 47.1% reduction in the yearly cooling load. After determining the proper PCM for the buildings, the recommended PCM was planned to be positioned in the external layer, mid-layer, and internal layer to examine the position effect on the yearly required cooling load

کلمات کلیدی:

(Building, energy conservation, EnergyPlus software, Phase change material (PCM)

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