



A Comparison of the Energy Saving and Carbon Reduction Performance between Reinforced Concrete and Cross-Laminated Timber Structures in Residential Buildings in the Severe Cold Region of China

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Summary:

This paper aims to investigate the energy saving and carbon reduction performance of cross-laminated timber residential buildings in the severe cold region of China through a computational simulation approach. The authors selected Harbin as the simulation environment, designed reference residential buildings with different storeys which were constructed using reinforced concrete (RC) and cross-laminated timber (CLT) systems, then simulated the energy performance using the commercial software IESTM and finally made comparisons between the RC and CLT buildings. The results show that the estimated energy consumption and carbon emissions for CLT buildings are 9.9% and 13.2% lower than those of RC buildings in view of life-cycle assessment. This indicates that the CLT construction system has good potential for energy saving when compared to RC in the severe cold region of China. The energy efficiency of residential buildings is closely related to the height for both RC and CLT buildings. In spite of the higher cost of materials for high-rise buildings, both RC and CLT tall residential buildings have better energy efficiency than low-rise and mid-rise buildings in the severe cold region of China.

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