

## Applicability of Overhangs for Energy Saving in Existing High-Rise Housing in Different Climates

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**Abstract :** Upgrading the thermal performance of building envelope of existing residential buildings is an effective way to reduce heat gain or heat loss. Overhang device is a common solution for building envelope improvement as it can cut down solar heat gain and thereby can reduce the energy used for space cooling in summer time. Despite that, overhang can increase the demand for indoor heating in winter due to its function of lowering the solar heat gain. Obviously, overhang has different impacts on energy use in different climatic zones which have different energy demand. To evaluate the impact of overhang device on building energy performance under different climates of China, an energy analysis model is built up in a computer-based simulation program known as DesignBuilder based on the data of a typical high-rise residential building. The energy simulation results show that single overhang is able to cut down around 5% of the energy consumption of the case building in the stand-alone situation or about 2% when the building is surrounded by other buildings in regions which predominantly rely on space cooling though it has no contribution to energy reduction in cold region. In regions with cold summer and cold winter, adding overhang over windows can cut down around 4% and 1.8% energy use with and without adjoining buildings, respectively. The results indicate that overhang might not an effective shading device to reduce the energy consumption in the mixed climate or cold regions.

**Keywords :** overhang, energy analysis, computer-based simulation, design builder, high-rise residential building, climate, BIM model

**Conference Title :** ICGBMCE 2017 : International Conference on Green Building, Materials and Civil Engineering

**Conference Location :** London, United Kingdom

**Conference Dates :** February 16-17, 2017