

A Study on Energy-Saving Modular Housing Units Considering Environmental and Aesthetic Aspects

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Abstract : This study aims to propose design technologies for the energy-saving modular housing units considering environmental and aesthetic aspects. Modular houses are environmentally friendly based on 3R (Reduce, Reuse, Recycle) because they can dramatically reduce carbon dioxide and construction wastes generated during the construction, use, and disposal process by the pre-fabrication at the factory and the recyclability of the unit, compared to the existing construction methods. The existing modular housing, however, tends to focus on quantitative aspects of energy reduction, such as windows, insulation, and introduction of renewable energy, and there is not much research on energy-saving type units considering the environmental aspects such as daylighting and ventilation, and the design that goes beyond the standardized appearance. Therefore, this study conducts theoretical investigation and analytical case studies on the energy-saving methods through various architectural planning elements as well as materials like insulation considering the environmental and aesthetic aspects in the modular housing. Then, comparative analysis on the energy efficiency through the energy simulation is conducted. As a conclusion, the energy-saving modular housing units considering environmental and aesthetics aspects are proposed. It is expected that this study will contribute to the supply and activation of modular housing through deriving design technologies for the energy-saving modular housing units that consider not only quantitative aspects but also qualitative aspects.

Keywords : aesthetic aspects, energy-saving, environmental, modular housing

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