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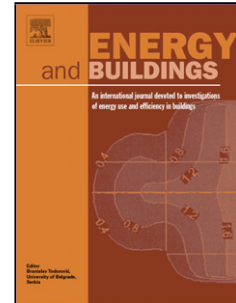
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Development of a detachable window aircap module for energy saving

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Highlights

- Developing a detachable window aircap module using magnet attachment
- Evaluating the performance considering air-conditioning and lighting consumption
- Confirming that the energy reduction of 2.4% to 19.1% occurred using existing methods

Abstract

Aircap insulation has been extensively researched owing to its effectiveness in building energy saving. However, most aircap studies have investigated the improvements achieved in window insulation performance based on the size and attachment position of the aircaps. No research has considered the aircap installation convenience and light environment. Therefore, we aimed at 1) developing a detachable window aircap module considering its energy-saving potential and application convenience and 2) verifying its effectiveness through a performance evaluation using a testbed. The results stated the following. 1) An easily detachable window aircap module (Case 4) employing magnetic principles was proposed. 2) The cooling and heating energy consumption in Case 4 was 27.4%, 13.3%, and 3.4% smaller than that for the scenario with no aircap attachment (Case 1), the scenario with an aircap attached to the window glass (Case 2), and the scenario with an aircap attached to the window frame (Case 3), respectively. 3) Rooms with

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