Topic: Daylight Transmission through a Double-Section Slat Window

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ABSTRACT

Double-glazing units have become popular in commercial buildings because of their saving potential and sun shading product as slat were designed to insert into double-glazing window. Ordinarily, one-section slat or a set of parallel slats (all tilt the same angle) is used in double-glazed window, but in this study, double-section slat window which consists of two sets of slat (upper and lower sets) and each set of the slat can be tilted to different angles blind is investigated. The aims of this research are to determine the daylight transmission and heat transmission for both cases of the outer edge of the blind slats tilted downward to ground and upward to sky by using computer program in an attempt to maximize energy saving from lighting and air-conditioning system. In this work, the developed model was validated with experimental data collected in a full-scale physical laboratory. Temperature of the two glass planes and blind of double section slat window were measured to determine the heat gain. Results of calculation from the program agreed well with those results from experiments. The validated numerical model were used to evaluate an annual interior daylight from the window and a whole year electrical energy consumption of a continuous dimmable lighting system and air-conditioning system. The results show that two-section slat window can enhance the daylight use in the building by increasing more useful daylight illuminance, and providing better uniformity of the interior daylight distribution than the single-section slat window. In term of energy saving potential, found that the use of two section slat window saves electrical energy consumption as well as one section slat window. Overall, window with slat provides better interior daylight performance and electrical energy savings than single window with heat reflective glasses.

Keywords: double - section slat window, daylighting, heat transfer, energy saving potential