Thermal requirements and temperatures evolution in an ecological house

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Abstract :

The treatment of air in the buildings often poses the problem of the homogeneity of the temperature in any point of the room. The treatment of the room in heating mode is constraining. The difference in temperature between the puffed up air and the ambient air can generate stratification. The hot air being lighter than the cold air, one tends to find layers of hot air in height and layers of cold air partly low of the room. The ecological houses are designed in order to avoid any stratification of temperature. In this article it was put forward a method making it possible to calculate the variation in the temperature in an ecological house lasting one period determined with an aim of studying if there exists stratification. In order to envisage the thermal behavior, a mathematical model based on the fundamental laws of transfer of heat and mass was developed. The model makes it possible to determine the variation of the internal room temperature of each part of the house. The principal conclusions derivatives of parametric study are the following ones: - The effectiveness of the model increases with the availability of the solar radiation, of the geographical context in which the system is to be realized. - The performance of the insulation is enough sufficient to restore the conditions of comfort for any climate. The elaborate mathematical model as well as a proposal for a design is presented. Moreover the results of a parametric study were developed in curves allowing decision making for the preliminary evaluation ofthe performance of the insulation.

Keywords :

Ecology; stratification; thermal behavior; insulation; thermal comfort.

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