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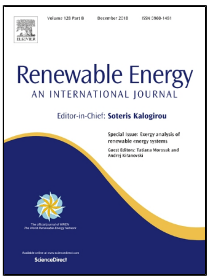

Numerical Simulation of Heat Transfer Process of the Raised Floor Heating System Integrated with a Burning Cave

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Numerical Simulation of Heat Transfer Process of the Raised Floor Heating System Integrated with a Burning Cave

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Abstract: In order to optimize structural design and balance heat distribution of the raised floor heating system heated by a burning cave, an unsteady heat transfer process of the raised floor was analyzed and discussed. An unsteady heat transfer model of the raised floor heating system was established to solve the problem of inner natural convection by air coupled with radiation and conduction heat transfer between two floor surfaces by computational fluid dynamics (CFD). Moreover, heating intensity, structural size and position of the heat source (burning cave) impact on the heat transfer performance and heating effect were discussed, which can provide a theoretical basis for parameter matching and structure optimizing. The results indicate that the best position of burning cave is under the center ground of a rural house, where the reasonable heat intensity of the burning cave is about 200 W/m^2. The calculated temperatures and velocities are in reasonable agreement with measurements on the model house, which can provide a basic data support for the engineering practice of raised floor heating system.

Key words: Raised floor heating system; heat transfer; CFD; burning cave

1. Introduction