

عنوان مقاله:

Experimental and numerical study of natural ventilation in four-sided wind tower traps

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خلاصه مقاله:

In the past, wind towers were applied as the main architectural part of building construction in the desert areas of Iran. These almost high structures were used as cooling load suppliers at residential buildings. In the present study, the effect of symmetric four-sided wind tower in flow induction to the bottom space has been analysed by using a wind tunnel and numerical simulations. In the numerical simulation, the flow is assumed to be three-dimensional, unsteady, compressible and turbulent. The experimental studies have been performed by placing a model of these structures at a laboratory wind tunnel. At this state, crossing airflow through every channel is measured for analysing the induction performance of wind tower at different angles of wind blowing. Moreover, the turbulence effect is analysed by adding horizontal and vertical blades and crowns at the top and bottom of the internal gate of traps for attaining better performance. Two different geometries are used for simulations. The results showed that inserting the blade and crown at the bottom and top affect on the flow rate have effect on the flow rate. For instance, inserting horizontal blades and crown at the top of the model leads to 8 and 16% increase in the flow rate, respectively. The results of the numerical simulations have shown acceptable agreement with experimental results.

کلمات کلیدی:

Wind Tower, Wind Tunnel, Natural Ventilation, numerical simulation

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