

Estimate the Ventilation Effect from Wire Mesh Screen Assisted Solar Chimney

ABSTRACT

In 1750s European houses, chimneys are used to remove smoke and dust particle from the fire place to the ambient. At present the applications of chimneys are extended for house ventilation, which is known as solar chimney assisted ventilation system. In this paper, the effect of wire mesh screen on chimney assisted ventilation system is studied and presented. Natural draft chimney integrated with solar heating system that is known as solar chimney, can be used for building ventilation. Number of research works had been conducted on different types of solar chimney to enhance the building ventilation performance. In this study a solar chimney model is designed and modified with wire mesh screens. An electric heating system is installed in the models to replace the solar absorber in the solar chimney. The airflow rates and the exit air temperatures are also measured and compared for normal chimney and modified chimneys under different heat loads. The performances of the chimneys are evaluated to determine the effects of wire mesh screen on the solar chimney. Experimental results indicated the solar chimney model with 0.64 mm × 0.64 mm pore size wire mesh screen at the exit is able to enhance velocity and the exit air temperature are about 54% and 41%, respectively. It has been concluded that the wire mesh screen has significant effect of model solar chimney and is able to enhance the performance.