

Thesis Title	Study of Effect of Screening on the Performance of Roof Solar Collector
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ABSTRACT

The effect of screening on the performance of Roof Solar Collector (RSC) is the main objective of this research. The RSC is composed of CPAC monier tiles on the outer side, air gap and gypsum board on the inner (room) side. Different types of screening were considered, namely, screen, square net, grill and plastic filter. They were installed, alternatively, at the outlet free opening of a unit of RSC located at the southern side of roof of the school single-room house. Performance were compared to another unit of RSC just located near the screened one without screens. The surface area of the RSC unit is 1.5 m^2 . The air gap was fixed at 14 cm. Experiments were conducted under 3 conditions : Windy and weak windy days. With the third, the air ventilation was produced by an electrical DC fan run by a photovoltaic panel. Experimental observations indicated that for RSC without screens, a air ventilation produced by photovoltaic fan was about $640 \text{ m}^3 \cdot \text{hr}^{-1}$ for RSC with screens and $680 \text{ m}^3 \cdot \text{hr}^{-1}$ without screens. The difference of air ventilation was about 6 % when the free opening outlet area of the screened RSC was about 63.05 % of that without any screens. For windy day, the induced air ventilation for both RSC with and without screens was about $68 \text{ m}^3 \cdot \text{hr}^{-1}$ and $74 \text{ m}^3 \cdot \text{hr}^{-1}$. The air ventilation decreased by about 7.94 % when open outlet area was 28.37 % of the total one (no screens). For weak wind day, the resulting average induced air ventilation for both cases was $41.81 \text{ m}^3 \cdot \text{hr}^{-1}$ and $47.40 \text{ m}^3 \cdot \text{hr}^{-1}$ respectively. The decreased rate of air ventilation due to screening varied between 6-18 % depending on free open outlet area, i.e., the type of screen used, which varied between 28.37-67.51 %.

Finally, it can be concluded that the addition of screening decreased the air ventilation but it is still relatively important to ensure indoor air motion.

Keywords : Screening / Air ventilation / Photovoltaic / Solar chimney.