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Visualized Flow Patterns around and inside a Two-Sided Wind-Catcher in the Presence of Upstream Structures

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Abstract : In this paper, the influence of an upstream structure on the flow pattern within and around the wind-catcher is experimentally investigated by smoke flow visualization techniques. Wind-catchers are an important part of natural ventilation in residential buildings or public places such as shopping centers, libraries, etc. Wind-catchers might be also used in places of high urban densities; hence their potential to provide natural ventilation in this case is dependent on the presence of upstream objects. In this study, the two-sided wind-catcher model was based on a real wind-catcher observed in the city of Yazd, Iran. The present study focuses on the flow patterns inside and outside the isolated two-sided wind-catcher, and on a two-sided wind-catcher in the presence of an upstream structure. The results show that the presence of an upstream structure influences the airflow pattern force and direction. Placing a high upstream object reverses the airflow direction inside the wind-catcher.

Keywords : natural ventilation, smoke flow visualization, two-sided wind-catcher, flow patterns
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