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## Inviting you to review for Journal of Building Engineering

1 message

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To: Guillermo Barrios del Valle <gbv@ier.unam.mx>

Thu, Oct 19, 2023 at 7:38 PM

Manuscript Number: JBE-D-23-09742

Generic Geometrical Parametric Study of Wind-Driven Natural Ventilation to Improve Indoor Air Quality in Offices

Marzieh Fallahpour; Hurie Ghorbani; Parham A. Mirzaei

Dear Dr Barrios del Valle,

I would like to invite you to review the above referenced manuscript submitted by Dr Parham Mirzaei. I believe your expertise is a great fit for this manuscript and I would value your input. You can read the manuscript abstract at the bottom of this email.

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Peer review - and reviewers - are at the heart of the academic publishing process and so I thank you in advance for your contribution and time.

Kind regards,

Runming Yao

Editor-In-Chief

Journal of Building Engineering

#### Abstract:

Indoor air quality is positively impacting on productivity and well-being of employees in office buildings. Despite a long history in the development of models and guidelines to promote air exchanges and thermal comfort via wind-driven natural ventilation in office buildings, the details of airflow pattern are mainly overlooked in these previous efforts. In specific, the airflow pattern provides crucial understanding about how air exchange occurs rather than focusing on the final outcome. Nevertheless, such information is extremely beneficial to design healthy offices, especially against CO<sub>2</sub> and virus-laden droplets released by multiple occupants in offices. This study, thus, aims to investigate the impact of geometrical parameters of offices and their openings on the generic flow patterns against the wind-driven ventilation. For this purpose, a validated CFD model is first developed and is then applied to about 150 cases, representing simultaneous alterations of 9 and 12 parameters related to the single-sided (SV) and double-sided (DV) wind-driven ventilations, respectively. A sensitivity analysis is employed to identify the most contributing parameters in the formation of generic airflow patterns. Eventually, five major categories for the airflow patterns can be identified in the DV cases (i.e., (1) without a weak zone (WZ), (2) with a dominant WZ, (3) with a WZ on bottom side, (4) with a WZ on upper side, and (5) with two WZs on upper and bottom sides). Nevertheless, a generic airflow pattern can be barely seen in the SV cases.

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