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# Effect of Porous Multi-Layer Envelope System on Effective Wind Pressure of Building Ventilation

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**Abstract :** Building ventilation performance is an important indicator of indoor comfort. However, in addition to the geometry of the building or the proportion of the opening, the ventilation performance is also very much related to the actual wind pressure of the building. There are more and more contemporary building designs built with multi-layer exterior envelope. Due to ventilation and view observatory requirement, the porous outer layer of the building is commonly adopted and has a significant wind damping effect, causing the phenomenon of actual wind pressure loss. However, the relationship between the wind damping effect and the actual wind pressure is not linear. This effect can make the indoor ventilation of the building rationalized to reasonable range under the condition of high wind pressure, and also maintain a good amount of ventilation performance under the condition of low wind pressure. In this study, wind tunnel experiments were carried out to simulate the different wind pressures flow through the porous outer layer, and observe the actual wind pressure strength engage with the window layer to find the decreasing relationship between the damping effect of the porous shell and the wind pressure. Experiment specimen scale was designed to be 1:50 for testing real-world building conditions; the study found that the porous enclosure has protective shielding without affecting low-pressure ventilation. Current study observed the porous skin may damp more wind energy to ease the wind pressure under high-speed wind. Differential wind speed may drop the pressure into similar pressure level by using porous skin. The actual mechanism and value of this phenomenon will need further study in the future.

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