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SINGLE-SIDED NATURAL VENTILATION DRIVEN BY A COMBINATION OF WIND PRESSURE AND TEMPERATURE DIFFERENCE

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ABSTRACT

Natural ventilation is a commonly used principle when ventilation systems for buildings are designed. The ventilation can either be obtained by automatically controlled openings in the building envelope, or it can just be the simple action of opening a door or a window to let the fresh air in. In both situations the aim is to obtain a good indoor environment but to control the amount of air, some basic knowledge of the flow through an opening is necessary.

The amount of air going through the window opening in single-sided ventilation will depend on the wind speed near the building, the temperatures inside and outside the room, the wind direction, the turbulence characteristics in the wind and the pressure variations caused by e.g. wind gusts. Finally it also depends on the size, type and location of the opening. Therefore, expressions for this prediction mainly depend on unsteady parameters, which make the prediction difficult.

From earlier work, a few design expressions for single-sided ventilation already exist, but none of these include the wind direction, which here is an important parameter. Therefore several wind tunnel experiments are made in this work to find a new design expression which includes all of the above parameters.

KEYWORDS

Single-sided natural ventilation, wind tunnel, measurements, air change rates

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