AIR DISTRIBUTION STUDY OF NATURAL VENTILATED BUILDINGS TO DECREASE CONCENTRATION OF VOLATILE ORGANIC COMPOUNDS FROM PAINT PRODUCT BY USING COMPUTATIONAL FLUID DYNAMIC SOFTWARE

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ABSTRACT

Volatile Organic Compounds (VOCs) are commonly found in indoor environment. Building materials, especially paint products are major sources of VOCs which can affect indoor air quality. Major VOCs (Benzene, Toluene, Ethlybenzene, Xylene, and Formaldehyde) from selected paint products were monitored in stainless steel small-test chamber by using Fourier Transfer Infrared technique. The amount and emission rate of each compounds were use in simulation process. Seventeen opening configurations were simulated under Computational Fluid Dynamic software (FloVent 5.1) to investigated wind pattern and time required to lower VOCs concentration into safety standard in each strategy. The results show that building under single-sided natural ventilation with casement window can decrease concentration of VOCs in shorter time than sliding window type even with same opening area. As a result of casement windows can act as wing-wall to create pressure different and control wind direction to flow pass through windows opening. Using exhaust fan in both window types can lower concentration in shorter time than existing condition. However, cross-ventilation with casement and sliding window give better performance to reduce in pretty short time.

Keywords: Volatile Organic Compounds, Paint product, Indoor air quality, Single-sided natural ventilation

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