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Research on the Impact on Building Temperature and Ventilation by Outdoor Shading Devices in Hot-Humid Area: Through Measurement and Simulation on an Office Building in Guangzhou

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Abstract : Shading devices (SDs) are widely used in buildings in the hot-humid climate areas for reducing cooling energy consumption for interior temperature, as the result of reducing the solar radiation directly. Contrasting the surface temperature of materials of SDs to the glass on the building façade could give more analysis for the shading effect. On the other side, SDs are much more used as the independence system on building façade in hot-humid area. This typical construction could have some impacts on building ventilation as well. This paper discusses the outdoor SDs’ effects on the building thermal environment and ventilation, through a set of measurements on a 2-floors office building in Guangzhou, China, which install a dynamic aluminum SD-system around the façade on 2nd-floor. The measurements recorded the in/outdoor temperature, relative humidity, velocity, and the surface temperature of the aluminum panel and the glaze. After that, a CFD simulation was conducted for deeper discussion of ventilation. In conclusion, this paper reveals the temperature differences on the different material of the façade, and finds that the velocity of indoor environment could be reduced by the outdoor SDs.

Keywords : outdoor shading devices, hot-humid area, temperature, ventilation, measurement, CFD
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