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Local Peak Pressure on Super High-rise Building in Actual Urban Area

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In previous researches, the mechanism of the occurrence of local peak suction on single cylinder building model in turbulent flow has been investigated [1,2]. In this study, characteristics and cause of local peak pressure observed on the surface of a super high-rise building in an actual urban area are discussed through a relationship with the flow characteristics.

Large Eddy Simulation (LES) of high dense area in central Tokyo including several super high-rise buildings is carried out with the turbulent inflow boundary condition [3]. A distinctive wind pressure distribution with large negative pressure is observed at the windward corner on the sidewall of the target building. In the trace of pressure fluctuation at this point, very large suction peaks appear occasionally.

Based on computational results, the relationships between the flow characteristics and the pressure characteristics are analyzed. The wind speed at a point close to the windward corner increases before the peak suction occurs. It is found that strong flow separation generated from the windward building accelerates the conical vortex formed at the windward corner, which induces the peak suction.

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