Recent wind disasters and control measures

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Wind pressures act on the surfaces of buildings, and the majority of wind-induced damage to buildings has been initiated by damage to claddings and components, rather than to main frames. Small damage to eaves or breakage of windows can develop into larger damage to roofs and entire buildings. Therefore, “cladding and component design” is critical in the wind resistant design of buildings. Broken metal roof sheets, clay tiles, and other parts of buildings can be blown off, creating “wind-borne debris” that attacks downstream buildings and other structures, causing a chain of damage. “Damage chain” is a special feature of wind-induced damage. The impact of wind-borne debris is much higher than that of wind pressure, and claddings and components should also have resistance to debris impacts, not only to strong wind pressures.

This presentation describes recent examples of building damage due to typhoons and severe local storms including tornados, reinforcement of building wind resistance, needs for improved wind resistance of infrastructures such as transmission lines, and needs for a full-scale storm simulator (FSSS) to cope with hypothesized future increase in wind-related disaster risks.

Keywords: Typhoon, Tornado, Cladding and Components, Wind Resistance, Full-Scale Storm Simulator

Damage to steel roof sheets due to Typhoon (2004, RIKEN)

Wind-borne debris impacts (2006)

Overturning of two-story wooden house (2012, Kyodo News)