

Correlation of directional wind loads on high-rise buildings with square-shaped plan

*Seung Yong Jeong¹⁾ and Thomas Kang²⁾

^{1), 2)} *Department of Architecture & Architectural Engineering, Seoul National University, Seoul, Korea*

²⁾ tkang@snu.ac.kr

ABSTRACT

Wind load on a building is composed of along-, across-, and torsional-wind loads. Because an occurrence probability of the maximum of each directional wind load at the same time is low, design codes and standards such as KBC 2016, ISO 4354 (2009) and AIJ-RLB 2015 present the wind load combination factor. The wind load combination factor for across- and torsional-wind loads on a high-rise building was determined considering their correlation only. However, because resonant components are dominants in equivalent static loads of across- and torsional-wind, dynamic properties of buildings should also be considered in the wind load combination factor (Somekawa et al., 2014).

Thus, the correlations of directional wind loads on high-rise buildings with square-shaped plan were studied in this research. The correlations of fluctuating wind loads depending on the angle of attack were compared based on wind tunnel tests. Finally, time history analysis was carried out to determine the effect of dynamic properties.

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¹⁾ Graduate Student

²⁾ Professor