Postprint: Study on Wind Pressure Characteristics of Long-Span Retractable Roofs

Authors: Sun Fangjin1,2 ,Zhu Donghan1 ,Zhang Shangxiang1 ,Feng Xu3 ,Zhang Daming4,5

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Abstract

Large-span roof structures have become one of the primary forms of building structures, while retractable roof structures represent a structural configuration that has recently emerged. Research on large-span retractable roofs through numerical simulation in China remains in its infancy. This study established roof models under four different opening/closing configurations and analyzed the wind pressure characteristics on roof surfaces under varying opening/closing states, wind direction angles, and wind speeds. For the fully opened roof condition, zoning was performed and zonal shape coefficients were calculated, providing reasonable recommended values for the zones to serve as an effective reference for future practical engineering applications. The research demonstrates that wind direction angle significantly influences the distribution of wind pressure on the roof surface, with the 30° and 60° wind direction angles exhibiting particularly pronounced effects on the distribution of wind pressure coefficients. The opening/closing state of the roof also notably affects the wind pressure distribution, though it has minimal impact on the magnitude of wind pressure coefficient values.

Full Text

Preamble

[The provided text consists primarily of corrupted characters, encoding artifacts, and watermarks that cannot be meaningfully translated. No coherent academic content could be extracted from this section.]

Note: Figure translations are in progress. See original paper for figures.