

Wind Velocity Mitigation for Conceptual Design: A Spatial Decision (Support Framework)

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Abstract : Simulating wind pattern behavior over proposed urban features is critical in the early stage of the conceptual design of both architectural and urban disciplines. However, it is typically not possible for designers to explore the impact of wind flow profiles across new urban developments due to a lack of real data and inaccurate estimation of building parameters. Modeling the details of existing and proposed urban features and testing them against wind flows is the missing part of the conceptual design puzzle where architectural and urban discipline can focus. This research aims to develop a spatial decision-support design method utilizing LiDAR, GIS, and performance-based wind simulation technology to mitigate wind-related hazards on a design by simulating alternative design scenarios at the pedestrian level prior to its implementation in Sydney, Australia. The result of the experiment demonstrates the capability of the proposed framework to improve pedestrian comfort in relation to wind profile.

Keywords : spatial decision-support design, performance-based wind simulation, LiDAR, GIS

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