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Improving Efficiencies of Planting Configurations on Draft Environment of Town Square: The Case Study of Taichung City Hall in Taichung, Taiwan

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Abstract : With urban development, lots of buildings are built around the city. The buildings always affect the urban wind environment. The accelerative situation of wind caused of buildings often makes pedestrians uncomfortable, even causes the accidents and dangers. Factors influencing pedestrian level wind including atmospheric boundary layer, wind direction, wind velocity, planting, building volume, geometric shape of the buildings and adjacent interference effects, etc. Planting has many functions including scraping and slowing urban heat island effect, creating a good visual landscape, increasing urban green area and improve pedestrian level wind. On the other hand, urban square is an important space element supporting the entrance to buildings, city landmarks, and activity collections, etc. The appropriateness of urban square environment usually dominates its success. This research focuses on the effect of tree-planting on the wind environment of urban square. This research studied the square belt of Taichung City Hall. Taichung City Hall is a cuboid building with a large mass opening. The square belt connects the front square, the central opening and the back square. There is often wind draft on the square belt. This phenomenon decreases the activities on the squares. This research applies tree-planting to improve the wind environment and evaluate the effects of two types of planting configuration. The Computational Fluid Dynamics (CFD) simulation analysis and extensive field measurements are applied to explore the improve efficiency of planting configuration on wind environment. This research compares efficiencies of different kinds of planting configuration, including the clustering array configuration and the dispersion, and evaluates the efficiencies by the SET*.

Keywords : micro-climate, wind environment, planting configuration, comfortableness, computational fluid dynamics (CFD)
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