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Investigation of Effects and Hazards of Wind Flow on Buildings in Multiple Arrangements Using CFD

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Abstract : The wind flow over several buildings lying in close vicinity in urban areas generates flow interference effects causing problems related to pedestrian comfort and ventilation within the buildings. This promoted a lot of research interest in the recent years. Airflow over a building creates a positive pressure zone on the upstream side and negative pressure zones (cavities or eddy zones) on the roof and all other sides. Large eddy simulation model is used along with sub-grid-scale model to numerically simulate turbulence for this purpose. The basis of flow outside the building is the pressure difference (between the wind and building interior). Wind Tunnel models are fabricated and tested in the subsonic wind tunnel. Theoretical results are compared with the experimental data. Newer configuration is tried for favorable effects in recovering static pressure values. Results obtained are seen very encouraging. The proposed exhaustive research investigation through numerical simulations and the experimental work are described and some interesting findings are brought out.

Keywords : wind flow, buildings, static pressure wind tunnel testing, CFD
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