Study of the Aerodynamic Effect of Tall Building over a Small Building using OpenFOAM

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Abstract

This paper aims to study the aerodynamic influence of tall building over a small building where the two buildings are situated at a distance of 40 feet apart. The height of the tall building is 120 feet (10 floors) and that of small building is 72 feet (6 floors). The cross section shape of the two buildings are square with side 25 feet. Structured 2D mesh is generated on the buildings in the front view and top view and two cases are simulated separately in OpenFOAM software at a velocity of 10 m/s. Since the flow direction is from tall building to small building, the face of tall building exposed to direct flow, experiences a highest positive pressure except near to the top portion. A recirculation zone is found to be created between the gap of the two buildings, creating a suction pressure. The simulation shows the continuous shedding of vortices from the top floor of the tall building in front view. Most of the area of the front face and rear face of the small building found to have negative pressure.

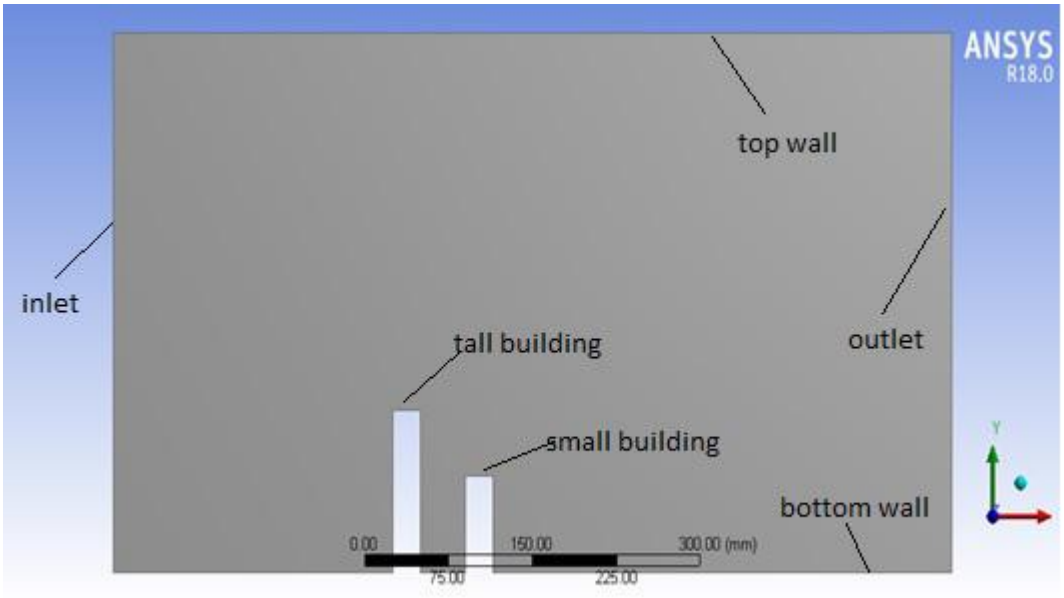

Fig. 1 Buildings with Domain