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The Effect of Geometry on the Wake Structure of a Surface Mounted Obstacle BHAGIRATH ADDEPALLI, Los Alamos National Laboratory / University of Utah, ERIC PARDYJAK, University of Utah, MICHAEL BROWN, Los Alamos National Laboratory - Experiments were conducted to better understand the flow structure in the wake of a square cylinder as a function of its height and develop a parameterization for tall buildings for the QUIC-URB wind model. The experiments were conducted in an open-circuit wind tunnel in a fully turbulent boundary layer. 2D PIV was used to measure the flow field along the vertical symmetry plane of the model buildings. Numerous experimental cases were run in which the geometry was varied by increasing the wall-normal height H of a square cylinder (where W=L; L is streamwise length and W is spanwise width) from H/L=1 to H/L=3 in increments of 0.3L. Preliminary results indicate that a saddle point appears for heights greater than H/L=1.6. The saddle is accompanied by a significant modification of the wake structure. This change can be attributed to the enhanced flux of momentum around the sidewall into the near-wake as the height of the model building is increased. Future work will include horizontal plane measurements in the wake of the model building to further explore the mechanisms that lead to the change in the flow structure.

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