Abstract Submitted
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The effect of freestream turbulence on the wake of a 2D square prism[1] DANIEL LANDER, CHRIS LETCHFORD, Department of Civil and Environmental Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA, MICHAEL AMITAY, Center for Flow Physics and Control, Department of Mechanical, Nuclear and Aerospace Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA, GREGORY KOPP, Boundary Layer Wind Tunnel Laboratory, University of Western Ontario, London, CA. — The effect of freestream turbulence (FST) on a $2D$ square prism is investigated at $Re_D = 5.0 \times 10^4$ using long duration Time Resolved Particle Image Velocimetry (TR-PIV). Increasing the FST results in alterations to the flow field in the shear-layer and base regions and the origins of the apparent differences are discussed. The triple decomposition technique is employed to disintegrate changes attributable to the coherent and random components of the global wake stresses. In the presence of FST the vortex formation process is altered due to an increase reattachment time of the separating shear-layers on the trailing edge of the prism. This is accompanied by a transposition of the von-Kármán vorticies observed in the phase averaged flow field; a feature complementary to the narrowing and lengthening of the steady wake commonly observed in the literature.

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