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Effects of flow parameters on bluff body near wake structures associated with base drag VIBHAV DURGESH, JONATHAN NAUGHTON, University of Wyoming, STEPHEN WHITMORE, Utah State University — Recent studies have confirmed that the base drag on a bluff body can be reduced by modifying the boundary layer thickness and that changes in the near wake structures are responsible. However, these previous investigations did not identify the exact nature of the structure changes and their dependence on Reynolds number and boundary layer parameters. To address these issues, measurements have been performed on wedge and flat plate models including hot-wire measurements upstream of separation, pressure measurements in the base area, and Particle Image Velocimetry (PIV) measurements in the near wake. These measurements are used to determine boundary layer parameters, base drag reduction coefficients, and near wake large scale coherent structures using Proper Orthogonal Decomposition (POD). Previous publications have discussed that, in some cases, the vortical structures in the wake become weaker and become more organized as the boundary layer thickens. Here, the focus is on characterizing the wake parameters and their dependence on Reynolds numbers and boundary layer parameters as well as the corresponding base drag coefficients. The results show that the wake parameters are related to the boundary layer parameters, but they have an additional dependence on the Reynolds number.

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