

Abstract Submitted  
for the DFD09 Meeting of  
The American Physical Society

**Organization of Cylinder Wake Using a Splitter-Plate Active Flow Control** PAVLOS VLACHOS, CHRIS WEILAND, Virginia Tech — It is well-known that a splitter plate in the wake of a circular cylinder prohibits the formation of the classic von Karman vortex street. Here we present an experimental study which shows the near wake can be manipulated using flow control to restore the vortex shedding in the presence of a splitter plate. Three splitter plate locations along with three cylinder diameters were analyzed using spectral analysis and proper orthogonal decomposition of time resolved digital particle image velocimetry (TRD-PIV) data. As an example, in one case the splitter plate was placed 1.9 diameters downstream of the cylinder and spectral measurements of the TRDPIV results indicated its presence decreased the Strouhal number from 0.19 to 0.12 as anticipated. When activated the flow control restored the wake to a Strouhal number of 0.19 and a 2P vortex shedding mode was clearly visible. The data suggests that the jet excited the circular cylinder shear layers causing instability, roll up, and subsequent vortex shedding.

Chris Weiland  
Virginia Tech

Date submitted: 07 Aug 2009

Electronic form version 1.4