

Abstract Submitted  
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**Evaluation of Passive Control of Cavitation in Separated Flows**

HAILING AN, MICHAEL PLESNIAK, Purdue University — Vortex generators have been used for many years to successfully control separated flows. The goal of this study is to evaluate the effectiveness of such passive devices for controlling cavitation in separated flows. Cavitation has been associated with the low pressure cores of turbulent coherent structures. The hypothesis is that weakening these structures or disrupting their spanwise coherence will impact cavitation. However, the devices studied generate relatively strong streamwise vortices which could enhance cavitation. The net result will be a balance of competing effects. Three vortex-generating separation control devices (surfaced-mounted fence, spanwise cylinder and vane-type vortex generators) are compared. Their performance in reducing the separation bubble length downstream of a backward facing step is evaluated, as well as their effect on cavitation phenomena. Measurements are made using LDV, PIV and high speed cinematography to facilitate comparisons between the baseline and the controlled cases. These measurements also provide benchmarks for companion CFD studies. The effects of separation control on both the flow physics and cavitation phenomena are discussed.

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