

Abstract Submitted
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Control of Cavitation in a Separated Flow using Vortex Generators HAILING AN, MICHAEL PLESNIAK, Purdue University — In this study, cavitation inception and evolution in a mildly adverse pressure gradient region downstream of a backward facing step flow was studied. A flow separation control scheme employing streamwise vortex generators to modify the turbulent flow structures and thus potentially to modify cavitation inception and development was evaluated. PIV and LDV measurements were made at selected planes for baseline and controlled cases. Cavitation inception and development was also visualized using a high speed camera (2000 frames/s). The flow field measurements indicate that the controlled case should have earlier cavitation inception because of the changes in the separation and reattachment phenomena and corresponding pressure field, although direct verification is still necessary. In the (vortex generator) controlled case, cavitation is more developed, the noise level is lower, and the cloud shedding structures are less energetic and contain smaller scales and higher frequency. Cavitation does not significantly alter the overall flow field on the selected measurement planes, but it does weaken the introduced streamwise vortices and increases turbulence levels with respect to the non-cavitating case.

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