Cavitation CFD using STAR-CCM+ of an Axial Flow Pump with Comparison to Experimental

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Cavitation is a critical phenomenon in liquid turbomachinery. It can deteriorate performance and damage the internal components. It can also deteriorate flow range. STAR-CCM+ has proven to be a useful tool in the design and analysis of cavitating turbomachinery. The unsteady cavitation model can be used to predict net positive suction head (NPSH) breakdown, and as well as predict the internal pressures and forces on the various internal components.

Axial flow pumps are devices that produce low head at high mass flow rates. They are subject to cavitation at low inlet pressures, and so they must be carefully designed. A pristine axial pump geometry and fluid dynamic dataset have been obtained to evaluate the capabilities of the cavitation model utilized by STAR-CCM+. Mesh density and turbulence models will be evaluated in concert with the cavitation model to determine best practices for a proper cavitation analysis.

Author Company:
Mechanical Solutions, Incorporated
Author Name:
Edward Bennett
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