

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

An experimental study on suppressing Tip Vortex Cavitation by means of a Flexible Thread JEONGHWA SEO, Seoul National University, ALI AMINI, Ecole Polytechnique Federale de Lausanne, SEUNG JAE LEE, JONGYEOL PARK, HONGGU YEO, Seoul National University, MOHAMED FARHAT, Ecole Polytechnique Federale de Lausanne, SHIN HYUNG RHEE, Seoul National University — Tip vortex cavitation (TVC) is an important issue in hydraulic machines and efforts to reduce it are required. The present study aims to mitigate the intensity of a TVC by attaching a flexible thread at the hydrofoil tip. As the test model, a hydrofoil with elliptical planform with NACA 16-020 cross section was used. Reynolds number, incidence angle, and cavitation number were varied to examine the cavitation suppression effects under different flow conditions. It is observed that the size of the cavitating core of the tip vortex is drastically reduced in comparison to the same flow conditions without the thread. The vortex roll-up and formation was disturbed by the fluctuations of the flexible string around the TVC, resulting in cavitation intensity reduction. In addition, the thread diameter and length were varied, to show that the technique was proved effective even for strings as short as half of the root chord length, which acted like a stiff thread. Our results demonstrate that there exists a critical thread length of , where the decrease in the cavitating core diameter converges. It is also found that this recipe ameliorates the desinent cavitation index of the TVC.

Jeonghwa Seo
Seoul National University

Date submitted: 09 Aug 2017

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