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Wingtip Devices for Marine Applications¹ IVAYLO NEDYALKOV, TIMOTHY BARRETT, ALEKSANDRA WOJTOWICZ, MARTIN WOSNIK, University of New Hampshire — Wingtip devices are widely used in aeronautics, and have been gaining popularity in wind and marine turbine applications. Although the principles of operation of the devices in air and water are similar, one major difference in the marine environment is the presence of cavitation. In an integrated numerical and experimental study, three wingtip devices were attached to an elliptical foil and compared to a reference case (no wingtip). Lift, drag, and cavitation characteristics were obtained both numerically (in OpenFOAM) and experimentally (in the University of New Hampshire High-Speed Cavitation Tunnel). As expected, with the addition of wingtip devices, the maximum lift/drag ratio increases and tip vortex cavitation is suppressed. The next step in the study is to develop a theoretical relationship between tip-vortex cavitation inception and flow parameters for foils with non-elliptical load distribution, such as foils with wingtips.

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