

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Experimental Performance of a Novel Trochoidal Propeller

BERNARD ROESLER, BRENDEN EPPS, Thayer School of Engineering, Dartmouth College — In the quest for energy efficiency in marine transportation, a promising marine propulsor concept is the trochoidal propeller. We have designed and tested a novel trochoidal propeller using a sinusoidal blade pitch function. The main results presented are measurements of thrust and torque, as well as the calculated efficiency, for a range of advance coefficients. The experimental data show narrow 95% confidence bounds, demonstrating high accuracy and repeatability in the experimental methods. We compare our sinusoidal-pitch trochoidal propeller with prior cross-flow propellers, as well as a representative screw propeller. While the efficiency of our propeller exceeds that of the cycloidal-pitch trochoidal propeller, it is slightly lower than the efficiencies of the other propellers considered. We also present a theoretical model that can be used to further explore and optimize such trochoidal propellers, leading to new avenues for improvements in marine propulsion systems.

Brenden Epps
Thayer School of Engineering, Dartmouth College

Date submitted: 03 Aug 2015

Electronic form version 1.4