

Abstract Submitted  
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**The Propulsive Performance of Side-By-Side Foils at a Range of  $Re$  and  $St$**  AHMET GUNGOR, ARMAN HEMMATI, University of Alberta — The hydrodynamic interactions between two foils placed in side-by-side arrangement are investigated using Direct Numerical Simulation at Reynolds numbers of 1000, 2000 and 4000, and Strouhal numbers ( $St$ ) ranging from 0.25 to 0.5. The transverse spacing and phase difference between the foils are kept constant. Dynamic motions of the foils are simulated using dynamic mesh morphing technique in OpenFOAM. Coefficients of thrust and power, as well as efficiency, are used to compare the performance of foils. The interactions between foils are also studied through varying the  $St$  of individual foils. The performance parameters of the system are observed to depend on both  $St$  and  $Re$ . In the range of  $St$ , the combined efficiency of the system reaches the maximum at  $St=0.4$ . The system experiences a thrust enhancement with increasing  $Re$  although the coefficient of power remains stable in the  $Re$  range. The results are used to evaluate the applicability of the scaling law developed by Floryan et al. (2017) on an isolated foil. The scaling laws for tandem foils in side-by-side arrangements are also developed.

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