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The Influence of surface waves on marine current turbine performance[1] ETHAN LUST, KAREN FLACK, LUKSA LUZNIK, United States Naval Academy — Performance characteristics are presented for a $1/25^{th}$ scale marine current turbine operating in calm conditions and in the presence of intermediate and deep water waves. The two-bladed turbine has radius of 0.4 m and a maximum blade pitch of 17°. The hydrofoil is a NACA63-618 which was selected to be Reynolds number independent in the operational range (Re_C = 2 - 4 x 10^5). The experiments were performed in the 116 m tow-tank at the United States Naval Academy at a depth of 0.8D measured from the blade tip to the mean free surface. The performance characteristics without waves match expected results from blade-element-momentum theory. Results show that the average power coefficient is unaffected by the presence of waves, however, the phase averaged results indicate significant variation with wave phase.

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