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The Influence of depth and surface waves on marine current turbine performance[1] ETHAN LUST, KAREN FLACK, LUKSA LUZNIK, MAX VAN BENTHEM, U.S. Naval Academy, JESSICA WALKER, University of Tasmania — Performance characteristics are presented for a $1/25^{\text{th}}$ 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 for lift 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 depths of 0.8D and 1.75D measured from the blade tip to the mean free surface. Overall average values for power and thrust coefficient were found to be insensitive to wave form and weakly sensitive to turbine depth. Waves yield a small increase in turbine performance which can be explained by Stokes drift. Variations on performance parameters are on the same order of magnitude as the average value especially near the mean free surface and in the presence of high energy waves.

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