

Effect of Blade Shape on the Performance of Wells Turbine for Wave Energy Conversion

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Abstract : Effect of 3-dimensional (3D) blade on the turbine characteristics of Wells turbine for wave energy conversion has been investigated experimentally by model testing under steady flow conditions in the study, in order to improve the peak efficiency and the stall characteristics. The aim of the use of 3D blade is to prevent flow separation on the suction surface near the tip. The chord length is constant with radius and the blade profile changes gradually from mean radius to tip. The proposed blade profiles in the study are NACA0015 from hub to mean radius and NACA0025 at the tip. The performances of Wells turbine with 3D blades has been compared with those of the original Wells turbine, i.e. the turbine with 2-dimensional (2D) blades. As a result, it was concluded that although the peak efficiency of Wells turbine can be improved by the use of the proposed 3D blade, its blade does not overcome the weakness of stalling.

Keywords : fluid machinery, ocean engineering, stall, wave energy conversion, wells turbine

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