

Numerical investigation on the performance of Wells turbine with non-uniform tip clearance for wave energy conversion

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ABSTRACT

The performance of a Wells turbine with various non-uniform tip clearances was investigated using computational fluid dynamics (CFD). The investigation was performed on numerical models of a NACA0020 blade profile under steady flow conditions. The performance of turbines with uniform and non-uniform tip clearances was compared. The results were also compared with experimental results in literature. It was shown that the performance of turbine with non-uniform tip clearance is similar with that of turbine with uniform one in terms of torque coefficient, input power coefficient, and efficiency. However, the turbine with non-uniform tip clearance seems to have a preferable overall performance. An investigation on the flow-field around the turbine blade was performed in order to explain the phenomena.

KEYWORDS:

Wells turbine; NACA0020 blade profile; Tip clearance; CFD

ACKNOWLEDGEMENTS

The authors would like to thank AUN/SEED-Net (JICA) for the providing financial support. The authors would also like to thank the Department of Engineering Design and Manufacture at University of Malaya, the Department of Mechanical and Industrial Engineering at Gadjah Mada University, and the Department of Mechanical Engineering at Keio University.

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