

DESIGN OF PICOHYDRO TURBINE CROSSFLOW POWER PLANT WITH NACA 6409 BLADE VARIATION

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ABSTRACT

The crossflow water turbine is one action turbine. The magnitude of the crossflow water turbine rotation is due to the utilization of water energy in the turbine which is carried out twice, the first is the water collision energy on the blades when the water enters, and the second is the thrust of the water on the blades when the water leaves the runner. This study aims to determine the design and manufacture and test results of crossflow turbines for PLTPH, to determine the performance of crossflow turbines using NACA 6409 blades, and to determine the effect of increasing load power on the performance of crossflow turbines. The research was conducted in Cempaka Hamlet, Pakis Village, Panti District, Jember Regency by utilizing irrigation flow. The research method used is an experimental method by making turbines based on potency. The results of the turbine manufacture are then tested to determine the performance of the crossflow turbine. The design of the crossflow turbine is based on the potential obtained from the energy potential survey of 362.2 watts. The results of testing the power generated by the Crossflow turbine using NACA 6409 blades of 167.47 watts. The test results at a water drop height of 1.2 m showed that the no-load voltage was 222.83 volts, a frequency of 49.7 Hz, a turbine rotation of 217.47 rpm, a torque of 7.35 Nm and a turbine efficiency of 46%. Along with the addition of load power on the generator, the turbine rotation, voltage, frequency, torque, and turbine power decrease.

Keywords: *crossflow turbine, NACA 6409, performance*