Abstract

Have performed experiments on vertical axis turbine Darrieus-type using passive-pitch mechanism with flapping wings. This experiment was conducted at the site Umbulan area, Pasuruan, East Java. The turbine was tested at a flow rate of variations are 0.67 m/s; 0.72 m/s; 0.806 m/s; 0.98 m/s; and 1.15 m/s and using a variation of the pitch angle of 10° and 20°. Then the data obtained from these experiments is RPM and torque. From the data obtained the average value of the highest RPM and torque at a flow rate of 1.15 m/s and using pitch angle of 20°, the RPM value is 77.34 and 17.41 N.m is torque value. As for the average value of the lowest RPM and torque is at a flow rate 0.67 m/s and using the value of the pitch angle 10°, the RPM and torque value is 38.18 and 11.13 N.m. From these data it can be seen that the higher the speed of the flow, the greater the value of RPM and torque produced, this can be evidenced by the angular velocity equation is the flow velocity (v) is proportional to the rotational speed or RPM The turbine (ω). For the efficiency of the turbine the highest is the flow velocity of 0.67 m/s with pitch angle of 20° is 20.01%. And the highest Reynolds number flow generated at 1.15 m/s with a value of 513.39 × 10³.

Keywords: Vertical Axis Turbine, Darrieus Type, Passive-Pitch, RPM, Torque, Flapping wing, Reynold number
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