# The analysis of wind blade on the performance of Vertical Axis Wind Turbine

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**Abstract:**
The long-term energy crisis is one of the biggest issues of this century that needs to be tackled to ensure a prosperous future for coming generations and wind energy is one of the energy sources that grows rapidly and most promising renewable energy. Vertical Axis Wind Turbine (VAWT) is the best option for small wind turbine project and suitable for low average wind speed environment. In this project, experiment had been carried out to study the effect of wind blade number on the Savonius wind turbine performance at different wind speeds and a comparison had been made to choose the best performance between 2, 3, 4, 5 and 6 blades wind turbine. A small Savonius wind turbine prototype, PicoScope, Digital Anemometer, Digital Tachometer and other equipment were used for this purpose. A PicoScope software with a hardware device had been used to create an oscilloscope and spectrum analyser on the PC. The experiment was carried out in an open room space to acquire a close condition to the real environment. The performance results were analysed and Malaysia's average wind speed had been used as the guideline for the comparison. It can be deduced that 5 blades rotor gives the best performance compared to the 2, 3, 4 and 6 blades rotor. At wind speed 6.1 m/s, 5 blades rotor produced optimum mechanical power output at 260 mW, power coefficient of 0.109 (10.9 %), torque at 0.12 mN.m and tip speed ratio at 8.28.

***Keywords***: Vertical Axis Wind Turbine; VAWT, Savonius Turbine; Wind Speed; Number Of Blades; Performance

**REFERENCES**

[1] M. Rahman, K. N. Morshed, J. Lewis, and M. Fuller, "Experimental and Numerical Investigations on Drag and Torque Characteristics of Three-Bladed Savonius Wind Turbine," no. 43796, pp. 85-94, 2009.

[2] Y. K. Yadav, "A Savonius Wind Turbine with Electric Generator: Model and Test," Master of Science in Mechanical Engineering, Clemson University, 2016.

[3] J. Antonelli, "Reduced order modeling of wind turbines in MatLab for grid integration and control studies," ed, 2012.

[4] G. N. Tiwari and M. K. Ghosal, Fundamentals of Renewable Energy Sources. Alpha Science International Limited, 2007.

[5] B. Khan, Non-conventional energy resources. Tata McGraw-Hill Education, 2006.