

ABSTRAK

Kenaikan yang signifikan terhadap konsumsi energi listrik dari bahan bakar fosil telah mendorong pencarian sumber energi yang terbarukan. Angin sebagai sumber energi terbarukan, *green energy* yang ramah lingkungan. Dalam penelitian ini, model poros kerucut Turbin Angin Sumbu Horizontal (TASH) tiga bilah tipe spiral dirancang dan dibuat yang kemudian dilakukan studi baik secara ekperimental terhadap kinerja model poros kerucut TASH tiga bilah tipe spiral tersebut yang terbuat dari *Polylactic Acid* (PLA) dan berdimensi ; panjang rotor 125 mm, diameter 250 mm, *aspect ratio* (panjang rotor / diameter) 125 : 250 mm, dan sudut putar spiral 220° . Studi eksperimental dilakukan di *Wind Tunnel*, Prodi Teknik Mesin ,Universitas Mercu Buana. Pengukuran kecepatan angin dalam satuan m/s dicatat bersamaan dengan putaran turbin dalam RPM, *Voltage* dalam Volt dan arus listrik dalam Ampere ,dan dari hasil *experiment* tersebut dapat dilakukan perhitungan selanjutnya terhadap *Coefficient Power* dan *Coefficient torque* terhadap *Tip Speed Ratio* (TSR). Dari hasil uji eksperimen ini di dapatkan nilai TSR dan koefisien daya yang optimal pada saat pengujian di kecepatan angin 7 m/s dengan kecepatan putar 357 rpm dengan *Coeffisien Torque* 0,038 yaitu 0,79 dan 0,55.

Kata kunci : Tiga Bilah Tipe *Spiral*, Turbin Angin Sumbu *Horizontal* (TASH), *Tip Speed Ratio* (TSR), Koefisien Peforma, Koefisien torsi.



EXPERIMENT STUDY THROUGH WIND TUNNEL ON THE PERFORMANCE OF HORIZONTAL AXIS WIND TURBINE THREE SPIRAL SHIFT WITHOUT AIRGAP

ABSTRACT

A significant increase in the consumption of electrical energy from fossil fuels has prompted the search for renewable energy sources. Wind as a source of renewable energy, green energy that is environmentally friendly. In this study, a three-bladed spiral-type Horizontal Axis Wind Turbine (TASH) conical axis model was designed and manufactured which was then carried out both experimental studies on the performance of the spiral type three bladed TASH conical axis model made of Polylactic Acid (PLA) and dimensionless ; rotor length 125 mm, diameter 250 mm, Aspect Ratio (rotor length / diameter) = 125 : 250 mm, and the spiral turning angle is 220°. The experimental study was conducted at the Wind Tunnel, Mechanical Engineering Study Program, Mercu Buana University. Measurement of wind speed in m/s is recorded along with turbine rotation in RPM, Voltage in Volts and electric current in Ampere, and from the experimental results, further calculations can be made on Coefficient Power and Coefficient Torque against Tip Speed Ratio (TSR). From the results of this experimental test, it was found that the TSR value and the highest power coefficient at the time of testing were at a wind speed of 7 m/s with a rotating speed of 357 rpm with a Coefficient torque of 0.038, namely 0.79 and 0.55.

Keywords : *Three Blade Spiral Type, Horizontal Axis Wind Turbine (TASH), Tip Speed Ratio (TSR), Coefficient of Performance, Coefficient Torque*

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