

ABSTRAK

Energi angin menjadi salah satu sumber energi terbarukan atau energi alternatif. Energi angin tersebut dapat dimanfaatkan untuk dikonversikan menjadi energi listrik dengan menggunakan Turbin Angin. Turbin angin dibagi menjadi 2 jenis sumbu (*axis*), *Horizontal Axis Wind Turbine (HAWT)* dan *Vertical Axis Wind Turbine (VAWT)*. Berdasarkan penelitian sebelumnya, seri NACA 4 digit biasa digunakan pada turbin angin H-rotor (*Horizontal Axis Wind Turbine*) Darrius. Sehingga, penelitian kali ini menggunakan airfoil ber-geometri NACA 4412. Penelitian ini bertujuan untuk mencari nilai C_l (*Coefficient lift*), C_d (*Coefficient drag*) dan C_p (*Coefficient power*) pada airfoil NACA 4412 dengan kecepatan 12 m/s. Pada kecepatan 12 m/s didapatkan nilai C_l maksimum (dari sudut serang 2° sampai 10°) pada sudut serang 10° dari metode BEM dan CFD dengan nilai masing-masing 1,213 dan 1,39. Pada kecepatan 12 m/s didapatkan nilai C_d (dari sudut serang 2° sampai 10°) maksimum pada sudut serang 10° dari metode BEM dan CFD dengan nilai masing-masing 0,016 dan 0,024. Nilai C_l/C_d maksimum (dari sudut serang 2° sampai 10°) didapatkan pada sudut serang 2° dengan metode BEM sebesar 107,04 dan pada sudut serang 8° dengan metode CFD sebesar 61,00.

Kata kunci : HAWT, NACA 4412, *Blade Element Momentum*, *Computational Fluid Dynamics*, BEM, CFD, Q-blade, Ansys Fluent.

ABSTRAC

Wind energy is one of the renewable energy sources or alternative energy. Wind energy can be used to be converted into electrical energy using Wind Turbines. Wind turbines are divided into 2 types of axes, Horizontal Axis Wind Turbine (HAWT) and Vertical Axis Wind Turbine (VAWT). Based on previous research, the 4-digit NACA series is commonly used in the Darrius H-rotor (Horizontal Axis Wind Turbine). Therefore, this study uses an airfoil with NACA 4412 geometry. This study aims to find the values of C_l (Coefficient lift), C_d (Coefficient drag) and C_p (Coefficient power) on the NACA 4412 airfoil at a speed of 12 m / s. At a speed of 12 m / s, the maximum C_l value is obtained (from an angle of attack of 2° to 10°) at an angle of attack of 10° from the BEM and CFD methods with values of 1.213 and 1.39 respectively. At a speed of 12 m/s, the maximum C_d value (from an angle of attack of 2° to 10°) is obtained at an angle of attack of 10° from the BEM and CFD methods with values of 0.016 and 0.024, respectively. The maximum C_l/C_d value (from an angle of attack of 2° to 10°) is obtained at an angle of attack of 2° with the BEM method, the result was 107.04 and at an angle of attack of 8° with the CFD method, the result was 61.00.

Keywords : *HAWT, NACA 4412, Blade Element Momentum, Computational Fluid Dynamics, BEM, CFD, Q-blade, Ansys Fluent.*