ABSTRAK

Ground effect merupakan suatu fenomena dimana ketika perangkat penghasil gaya angkat (*lift*), seperti sayap, bergerak dengan sangat dekat terhadap permukaan (*ground*). Semakin dekat dengan *ground*, maka *wingtip vortices* yang terbentuk semakin meningkat, namun besarnya *induced drag* akan menurun. Pada penelitian ini dilakukan simulasi untuk mengetahui pengaruh *ground effect* terhadap *airfoil* NACA 4415 dengan memvariasikan sudut serang (*AoA*) dan ketinggian terhadap *ground*. Penelitian ini menggunakan metode simulasi berbasis *Computational Fluid Dynamic* 2D dengan menggunakan *software Ansys Fluent* dan juga didukung oleh *software* AutoCAD 2016. Hasil yang diperoleh dari simulasi ini ialah berupa *coefficient lift* (C_L), *coefficient drag* (C_D), kontur *pressure*, kontur *velocity*, dan *streamline*. Berdasarkan dari hasil penelitian menunjukkan bahwa airfoil NACA 4415 memiliki *maximum angle of attack* 15^o pada ketinggian 0,05*c* dimana sudut serang tersebut nilai *coefficient lift* (C_L) tertinggi dihasilkan. Sedangkan besarnya nilai *coefficient drag* (C_D) tertinggi dihasilkan oleh sudut serang 18^o pada ketinggian 0,8*c* yang mana pada sudut serang inilah terjadi fenomena *stall*, sehingga semakin dekat *airfoil* dengan *ground* maka semakin tinggi nilai *coefficient lift* (C_L) serta semakin rendah nilai *coefficient drag* (C_D), dan berlaku sebaliknya. Penelitian ini diharapkan bisa bermanfaat untuk pertimbangan dalam perancangan pesawat *Wing In Ground Effect* (WIG), sehingga performa terbang suatu pesawat dapat dimaksimalkan.

Kata Kunci : *Ground effect, Computational Fluid Dynamic,* NACA 4415, *Angle of Attack*

ABSTRACT

The ground effect is a phenomenon in which a lift-producing device, such as a wing, moves very close to the ground. The closer to the ground, the more wingtip vortices formed, but the magnitude of the induced drag will decrease. In this study, a simulation was conducted to determine the effect of the ground effect on the NACA 4415 airfoil by varying the angle of attack (AoA) and height to the ground. This research uses a simulation method based on Computational Fluid Dynamic 2D using Ansys Fluent software and is also supported by AutoCAD 2016 software. The results obtained from this simulation are lift coefficient (C_L), drag coefficient (C_D), pressure contour, velocity contour, and streamline. Based on the results of the study, it shows that the NACA 4415 airfoil has a maximum angle of attack of 15^o at a height of 0.05c where the angle of attack has the highest lift coefficient (C_L) value. While the value of the highest drag coefficient (C_D) is generated by an angle of attack of 18^o at a height of 0.8c, which is at this angle of attack the stall phenomenon occurs, so the closer the airfoil to the ground, the higher the lift coefficient value (C_L) and the lower the drag coefficient value (C_D), and vice versa. This research is expected to be useful for consideration in the design of Wing In Ground Effect (WIG) aircraft, so that the flying performance of an aircraft can be maximized.

Key Words: Ground effect, Computational Fluid Dynamic, NACA 4415, Angle of Attack