

PERBANDINGAN KEBISINGAN ANTARA *AIRFOIL* CLARK Y DAN *AIRFOIL* NACA 4412 DENGAN METODE NUMERIK

Isyatur Rodiyah
16050124
Program Studi Teknik Dirgantara
Institut Teknologi Dirgantara
Email: isyatur.rodiah26@gmail.com

ABSTRAK

Aeroakustik berperan sebagai salah satu solusi dari sisi *ergonomy*. Kajian dilakukan dengan tujuan membandingkan nilai *airfoil* clark y (PUNA AD-01) dan *airfoil* NACA 4412 (pembanding). Penelitian dilakukan dengan tujuan untuk mendapatkan nilai maksimal serta plot dari L_p (*sound pressure level*) dan L_w (*sound power level*). Penelitian ini juga mempertimbangkan nilai kebisingan berdasarkan baku mutu yang berlaku di Indonesia.

Proses kajian dilakukan menggunakan metode komputasional pada *CFD*. Dalam *CFD* metode turbulensi menggunakan *LES* (*Large Eddy Simulation*) sedangkan akustiknya menggunakan metode *FWH* (*Ffowcs William and Hawking*). Proses komputasi menghasilkan nilai L_p (*sound pressure level*) yang selanjutnya diolah untuk mendapatkan nilai L_w (*sound power level*).

Hasil kajian ditemukan bahwa nilai L_p (*sound pressure level*) tertinggi sebesar 92.3 dB dan L_w (*sound power level*) 123.075 pada frekuensi 31.5 Hz yang terjadi pada parameter sudut serang 20^0 dan kecepatan 19 m/s yang berada pada *receiver* 1 *airfoil* Clark Y. Berdasarkan nilai maksimal L_p (*sound power level*) *noise* atau kebisingan yang terjadi dalam tahap tidak aman karena melebihi batas nilai L_{max} pada acuan nilai baku mutu kebisingan.

Kata kunci: *sound pressure level*, *sound power level*, *airfoil*, *LES*, *FWH*

NOISE COMPARISON BETWEEN CLARK Y AIRFOIL AND NACA 4412 AIRFOIL WITH NUMERICAL METHOD

Isyatur Rodiyah
16050124
Program Studi Teknik Dirgantara
Institut Teknologi Dirgantara
Email: isyatur.rodiah26@gmail.com

ABSTRACT

Aeroacoustics acts as one of the solutions in ergonomics. The study was conducted with the aim of comparing the values of the airfoil (PUNA AD-01) and the airfoil NACA 4412. The research was conducted with the aim of obtaining the maximum value and plot of L_p (sound pressure level) and L_w (sound power level). This study also considers the noise value based on the applicable quality standards in Indonesia.

The study process was carried out using computational methods on CFD. In CFD the turbulence method uses LES (Large Eddy Simulation) while the acoustics uses the FWH (Fowcs William and Hawking). The computational process produces a value of L_p (sound pressure level) which is then processed to obtain a value of L_w (sound power level).

The results of the study found that the highest L_p (sound pressure level) was 92.3 dB and L_w (sound power level) was 123.075 at a frequency of 31.5 Hz in the parameters of the angle of attack of 200 and the speed of 19 m/s which is located occurs noise on receiver 1 airfoil Clark Y. Based on the maximum value of L_p (sound power level) noise occurs in the unsafe stage because it exceeds the L_{max} value limit on the reference value of the noise quality standard.

Keywords: sound pressure level, sound power level, airfoil, LES, FWH