PENGUJIAN DAN ANALISIS PEMBEBANAN PADA *SWING ARM* ALUMUNIUM *HOLLOW* PADA KENDARAAN HEMAT ENERGI MENGGUNAKAN *SOFTWARE ANSYS* 2024

Cahyaning Nur Karimah S.Pd., M.T. *As Chief Counselor*

Angga Daffa Firmansyah
Study Program of Automotive Engineering
Departement of Engineering

ABSTRACT

design and structural strength analysis of a swing arm is an essential aspect in the development of energy-efficient vehicles that are both lightweight and safe to use. In this study, numerical simulations were carried out using ANSYS software to evaluate the structural performance of a swing arm made of aluminum hollow 6061, focusing on stress, deformation, and safety factor parameters. Simulations were performed under two loading conditions: an engine weight of 11 kg (107.91 N) and 15 kg (147.15 N), both applied at the center of the swing arm with supports on both ends.The results showed that under a load of 11 kg, the maximum stress was 169.46 MPa, with a deformation of 0.496 mm and a safety factor of 1,63. Under the 15 kg load, the maximum stress decreased to 144.9 MPa, deformation increased to 0.677 mm, and the safety factor dropped to 1.9047. All values remained within safe limits according to the mechanical properties of aluminum 6061, which has a yield strength of 276 MPa and a maximum deformation tolerance of 15 mm. From these findings, it can be concluded that the swing arm design using aluminum hollow 6061 is structurally safe and feasible for engine loads up to 15 kg. This study is expected to serve as a reference for the development of lightweight, strong, and efficient swing arm components in energy-efficient vehicle applications.

Keywords: *Swing arm, aluminum hollow 6061, ANSYS, stress, deformation, safety factor, FEM simulation.*