

## **ABSTRACT**

This research discusses the design of a grass chopping machine with varying blade inclination angles using a Computer-Aided Design (CAD) approach and Finite Element Analysis (FEA) thru SolidWorks 2023 software. The purpose of this research is to produce an efficient, robust, and safe grass chopper machine design for medium-scale farmers, considering the influence of blade angle on cutting performance. The machine is designed using a 5.5 HP Honda GX160 gasoline engine with a total pulley transmission system ratio of 8:1, an angle iron frame, and HSS steel blades. Simulation results show that all major machine components are within safe limits, with a minimum Factor of Safety (FOS) of 32 for the blades, 27.04 for the shaft, and 24.10 for the frame. The highest maximum stress occurs on the blades at 94.13 MPa, which is still far below the material's yield strength, while the maximum deformation of each component is below 0.05 mm, so it does not affect machine performance. The results of this study indicate that the design of a grass chopper with varying blade angles is able to improve work efficiency, structural strength, and chopping productivity. Thus, this design can serve as a reference in the development of a more adaptive, economical, and sustainable agricultural system-supporting livestock feed chopper.

**Keyword:** Grass chopper, blade angle, Finite Element Analysis (FEA), cutting efficiency.