Modification and Analysis of the Functionality of the Jupiter MX 135 Swing Arm Performance on Hybrid Conversion Vehicles

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ABSTRACT

The development of electric vehicles as an environmentally friendly transportation solution demands adjustments to various mechanical components, including the swing arm, to be compatible with the new electric drive system. This study aims to modify and analyze the functional performance of the swing arm on a converted Yamaha Jupiter MX 135 motorcycle into a hybrid vehicle. The modification focuses on structural strength, load distribution, and vehicle stability. The research methods include literature review, redesign using CAD software, material selection (ASTM A36 steel and 6061-T6 aluminum), fabrication using Gas Metal Arc Welding (GMAW), and functional testing such as road tests and laser leveling. Test results show that the modified swing arm can withstand a load of 199.2 kg without deformation over a distance of 7 km at a speed of 20 km/h. Additionally, no misalignment or damage was found on the rear axle components. These findings indicate that the modified swing arm has good structural strength, high stability, and is functionally feasible for use in energy-converted vehicles. This research contributes to the development of hybrid vehicles and serves as a reference for converting fossil-fueled motorcycles into electric-powered ones.

Keywords*: Swing arm, energy conversion vehicle, Jupiter MX 135, GMAW welding, functional testing, laser leveling.*