

Electric bike prototype uses cast frame to develop metal casting industry products

by Heri Wibowo, Fatchul Arifin, Rustam Asnawi, Mujiyono, Tafakur

ABSTRACT

The electric bicycle is the development of a bicycle that functions as a means of transportation and is now turning its function into a sporting tool that is currently in demand by the public. In general, electric bicycles are formed from the main components, namely the frame, handlebar, shaft, saddle, wheels, brakes and installed an electric motor from battery power. Alternative frame production technology is needed to reduce dependence on frame pipe raw materials and the connection process so that bicycle frames can be produced by small and medium industries (IKM). The purpose of this research is to develop designs and make frames with casting techniques in IKM and make prototypes of electric bicycles.

The research method is research and development with the following steps: (1) The process of analyzing the needs of geometry; (2) frame design; (3) simulation of frame design; (4) validation and revision of the frame design; (5) the frame production process by casting; (6) frame testing; (7) revision of the final frame; (8) electrical analysis; (9) electrical installation and testing; (10) production of electric bicycle prototypes.

The results show that the frame design uses a modern frame shape with A356 Aluminum material on the head tube and seat tube and A6061 material on the top tube and button tube. The bicycle frame simulation results show that the stress on the material is still below the allowable stress. The bicycle frame production process is carried out using 2 techniques, namely the casting technique on the head tube, seat tube and stay frame, while the welding technique is carried out on the top tube and button tube with TIG welding. There are 2 types of bicycle prototypes, namely the Inobike UNY manual bicycle with 27 speed levels and the Inobike UNY hybrid electric bicycle prototype with 480 W battery power - 5 speed levels.

Kata Kunci: *electric bicycle, cast frame, metal casting*