DEVELOPMENT OF A PROTOTYPE OF CAST ALUMINUM BIKE CRANK GEAR WITH T6 HEAT TREATMENT TO INCREASE THE MECHANICAL STRENGTH OF THE PRODUCT

by Heri Wibowo, Ardani Ahsanul Fakhri, Arif Marwanto

ABSTRACT

Bicycles are a choice of sports equipment that people like, apart from being a manual means of transportation. Technological innovation by industry and academia is needed so that bicycle products can compete with imported products. The making of an aluminum bicycle prototype has been carried out between UNY and IKM to produce a manual bicycle with the brand "Inobike UNY" with innovations in the bicycle frame.

The research method applied is pure experimentation with variable time and temperature of the T6 heat treatment process on A356 cast aluminum. Tensile strength, bending resistance, hardness and impact toughness tests were carried out to determine the effect of T6 treatment on A356 Aluminum material. The best T6 heat treatment was applied to the bicycle crank gear prototype made from A356 cast aluminum.

The research results showed that mechanical property tests such as tensile, hardness and impact tests showed that optimal T6 heat treatment results were obtained by solution treatment for 4 hours followed by aging for 3 hours. This heat treatment is most suitable to meet the material requirements of the crank gear. Simulation analysis suggests that the upgraded A356 is capable of withstanding both static and dynamic loads on standard crank gear designs. Although the castings showed the necessary quality improvements according to the crank gear manufacturing process, problems arose during the T6 heat treatment of excessive deformation.

Kata Kunci: *A356 aluminum, bicycle components, crank gear, T6 heat treatment*