THESIS

CALCULATION OF PROPELLER DIMENSION FOR 25 KILOGRAMS MAXIMUM TAKE-OFF WEIGHT UNMANNED AERIAL VEHICLE (UAV)

Submitted in Partial Fulfillment of the Requirements for Bachelor of Engineering in Mechanical Engineering Department of Andalas University

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ABSTRACT

UAV (Unmanned Aerial Vehicle) is needed to carry the payload required to the disaster-affected area or doing the facility mapping nowadays. Moreover, it also is required for mapping the construction area, fertilizer spreader for plantation and agricultural requirements, and feasibility surveying. For those necessities, the total weight is estimated at around 25 kg. These UAVs have been sold in the market. However, the price of either that plane UAV or UAV components such as the propeller is expensive.

To overcome this case, creating local design and fabrication UAV components such as propeller is beneficial according to the necessity. To obtain the compatible propeller dimension, it is necessary to calculate the geometry. For a given operative condition and profile distribution along the blade, several parameters such as the blade angle, and velocity angle, of each blade profile and the thrust can be obtained. Numerical calculation using Ansys Fluent is carried out to examine the design calculation.

The result shows that the analytical calculation and numerical calculation of obtained propeller geometry is approaching. It proves that the geometry design process has done it right and the propeller geometry is compatible with 25 kg Maximum Take-Off Weight (MTOW) UAV.

Keywords: Propeller, UAV, Thrust