DEVELOPMENT OF AN ACTUATOR SYSTEM FOR APPLYING LOAD FOR WING BOX STATIC TEST

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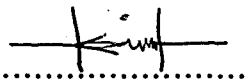
"I declare that this thesis is the result of my own work except the ideas and summaries which I has clarified their sources. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any degree."

Signed : 

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ABSTRACT

Wing box test rig is designed to hold the wing box in place and keep them cantilevered so that the lift on the wing does not bend the rig during the experimental session. In order to conduct a test that involve high load, the wing box test rig structure was constructed. However, the current structure cannot apply load to a wing box. In this project, the wing box load applicator was developed by using hydraulic actuator. Actuator can be defined as energy converters which transform energy from an external source into mechanical energy in a controllable way. The output quantities are the force, the work and the stroke (50cm). The scopes of this project is design and analyze the platform that can withstand at least 1kN of load with factor of safety of 3 and to analyze the system from the aspect of the structural requirement and load requirement of test to be conducted. This platform was joined together with current structure that has been utilized in the UiTM Aerospace Laboratory and the students will be able to conduct experiment or wing box static test by using this new structure. For the design analysis, it consists of the comparison of four cases. The raw material that was selected to fabricate the platform is square hollow beam.mild steel (A36). The theoretical analysis in this design analysis is moment inertia and maximum deflection of each case. All of these results are compared and the case which gives the less deflection or gives a minimum value of deflection was selected for fabrication process.

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