INVESTIGATION of MECHANICAL PROPERTIES of COMPOSITE SANDWICH STRUCTURES

AHMAD FITRI FAIZEE BIN SULAIMAN

(2000127633)

BACHELOR ENGINEERING (HONS) (MECHANICAL)

UNIVERSITI TEKNOLOGI MARA

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

Signed : .....

Date : 27/04/05

Ahmad Fitri Faizee bin Sulaiman

UiTM No: 2000127633

ABSTRACT

This project is purposed to investigate the mechanical properties of composite sandwich structure with aluminum and Nomex honeycomb in term of skin and core. The methodology of this project is by the compressive and tensile test by using Instron Model 4206-006 machine. These tests were used to determine the important characteristics of the materials under study, including the Young's modulus, yield strength, ultimate tensile strength, and fracture strength and then compared with the result of the research focuses on development of Thermal Energy Storage (TES) sandwich structures that combine the heat storage function with structural functionality.

Five specimens were tested for both compress and tensile in order to find its load and displacement. From the obtained result Young's modulus, yield strength, ultimate tensile strength, and fracture strength will be calculated. Engineering and true stress-strain relationships are plotted. Since the specimens have failed, each mechanical property is briefly discussed.

From the tensile test after the maximum load were applied, the result achieved is 4130 MPa, 26.9 MPa, 5.60 MPa,12.2 MPa for Modulus of elasticity, tensile strength, yield strength, and fracture strength respectively and the result for compressive strength, modulus of elasticity and yield strength are 1210 MPa, 11.1 MPa and 17.2 MPa respectively.

The comparison between Aluminum- Nome honeycomb sandwich structure and Thermal Energy Storage (TES) sandwich-structures rises with certain value. For the tension yield stress of the copper screen is 6.75 MPa while the yield stress for compression is 3.0 MPa and aluminum –Nomexs honeycomb sandwich structures gives a 5.60 MPa for tension while for compression is1.72 MPa

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