



**DETERMINATION DYNAMIC CHARACTERISTIC OF SIMPLE
BEAM USING EXPERIMENTAL MODAL ANALYSIS AND
FINITE ELEMENT ANALYSIS**

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

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ABSTRACT

This project is a study on the effect of crack on dynamic properties of mild steel beam and aluminium beam using experimental modal analysis (EMA). The development of experimental modal analysis as a new technology is propelled by its ability to offer quick and effective solutions to real life engineering problems. The main objective of this project is to analyze dynamic properties and dynamic characteristic for uncracked mild steel beam, cracked mild steel beam, uncracked aluminium beam and cracked aluminium beam such as the natural frequencies and mode shape. Then the dynamic characteristic for cracked beam and uncracked beam will be compared. The scope of the experiment of the modal testing is carried out on the simple beam of Aluminium and Mild Steel (uncracked and cracked). Two different cases are selected to carry out the testing (Free hanging and simply support). For the purpose of the practical concept about the dynamic characteristic of beam, experiment has been done using 4-channel analyser system Acquired data ME' Scope and dBRTA software is used to analyse the cracked beam problem. After preparation of samples (uncracked mild steel beam, cracked mild steel beam, uncracked aluminium beam and cracked aluminium beam), then the modal analysis using impact testing are to be performed to find the natural frequency and mode shapes of beam. The simulation using ANSYS software is performed to accomplish the finite element analysis (normal mode analysis) of normal beam as well as the crack beam. The result from experimental testing then will be verified using finite element method (FEM) using ANSYS.

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