

**AN INVESTIGATION OF THE DYNAMIC CHARACTERISTICS
OF CRACKED BEAM**



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**LAPURAN PENYELIDIKAN "AN INVESTIGATION OF DYNAMIC
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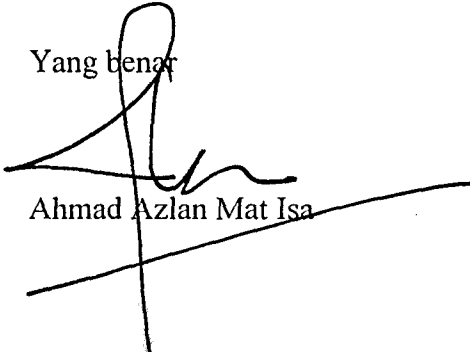
Disertakan bersama ini tiga (2) salinan laporan projek ini untuk tindakan tuan
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Kerjasama pehak puan amat dihargai.

Sekian terima kasih

Yang benar

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Abstract

Structural defects have an adversely effect on its service life. It alters the dynamic characteristics. The change is characterized by changes in the eigenparameters, i.e. natural frequency, damping values and mode shapes associated with each natural frequency. Thus, defect detection even at the initiation stage is an important consideration to guarantee the component safety and prolong the life service of the structure and hence safe costs from catastrophic failure. The main objective of the project is to obtain information about the variation of the dynamic properties with the location and depth of cracks in beam

Analytical, numerical and experimental analysis was carried out to compared the cracked beam and uncracked beam dynamic characteristics by using different boundaries conditions. it is shown that the changes in the dynamic characteristics was significant. This information can be used to obtain the amount of damage in structure.

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CHAPTER

1

INTRODUCTION

To ensure a continuous safety operations of a machine or structure it is necessary to monitor constantly the health of its critical components. This requires the need for a continuous assessment of changes in their static and/or dynamic behaviour. The changes very often originate from the local reduction of the structural stiffness caused by cracks or crack-like defects. The development of a crack does not necessarily make a component instantly useless, but it signal a message that its behaviour needs constant monitoring. This has made the vibration based monitoring of components with cracks or crack-like defects in service very important and therefore the study of vibration of components with crack becomes important.

Cracks identification and detection using vibration signal was investigated as an alternative conventional non-destructive evaluation (NDE) methods since hidden cracks inside the structure is difficult to detect using conventional methods. Relatively larger cracks located away from sensor can be detected by changes in the vibration response of the structure. However, interpretation of the vibration response is often difficult, and detection of cracks at its initial stage also difficult since it has a small effect on the vibration response. Some approaches store pre-damage or