

VIBRATIONAL ANALYSIS OF DELAMINATED PLATES

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF

**BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING**

BY

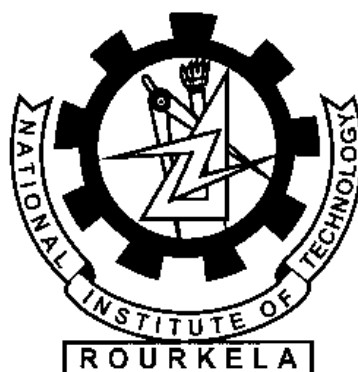
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CERTIFICATE

This is to certify that the thesis entitled, “**Vibration Analysis of Delaminated Plates**” submitted by **MR. KUMAR AMAN** and **MR. KULWANT SINGH PARIHAR** in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Mechanical Engineering at National Institute of Technology, Rourkela is an authentic work carried out by him under my supervision and guidance. To the best of my knowledge, the matter embodied in the thesis has not been submitted to any other University/Institute for the award of any Degree or Diploma.

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ABSTRACT

The delamination phenomenon is common in composite beams as the composite beams are having laminate structures. Delamination leads to development of cracks which reduces the strength of the material and ultimately the material fails to bear the desirable load. In this project, the effect of delamination on free vibration of a rectangular plate with through width delamination was investigated using a finite strip method. The basic understanding of the influence of delamination on natural frequencies of delaminated plate is presented using Ansys13.0. Hamilton's principle is used to derive the equations of motion. In addition other factors affecting the vibration of delaminated plates are discussed. The variables of delamination are:

1. Location of delamination
2. Size of delamination
3. Mode of frequency

The numerical results for free vibration of delaminated plates are presented. As expected, the natural frequency decreases with increase in delamination length. These results obtained from ANSYS 13.0 are compared with the results of other case studies. The simulation and graphs are plotted to correlate the natural frequency and delamination variables.