

**STATIC ANALYSIS**  
**OF**  
**AN ISOTROPIC SQUARE PLATE SUBJECTED TO**  
**OUT OF PLANE LOADING**

A dissertation  
presented to  
the faculty of  
Department of Civil and Environmental Engineering  
Delhi Technological University-Delhi



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In Partial Fulfilment  
of the Requirements for the Degree  
Master of Technology

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By  
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JULY-2013

# **CERTIFICATE**

The undersigned have examined the dissertation entitled

## **STATIC ANALYSIS OF AN ISOTROPIC SQUARE PLATE SUBJECTED TO OUT OF PLANE LOADING**

presented by Abhishek Gupta  
a candidate for Master of Technology  
and hereby certify that in their opinion it is worthy of acceptance

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Dr. A.K. Gupta

## DECLARATION

I Certify that

- a. The work contained in this thesis is original and has been done by me under the guidance of my supervisor.
- b. The work has not been submitted to any other Institute for any degree or diploma.
- c. I have followed the guidelines provided by the University in preparing the thesis.
- d. I have conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute.
- e. Whenever I have used materials (data, theoretical analysis, figures, and text) from other sources, I have given due credit to them by citing them in the text of the thesis and giving their details in the references.

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## **ABSTRACT**

This project report aims to the static analysis of an isotropic square plate with different boundary conditions and various types of load applications. For the analysis a four noded isoparametric element has been considered. Numerical analysis (finite element analysis, FEA) has been carried out by developing programming in mathematical software MATLAB. Later, for the same structure, analysis has been carried out using finite element analysis software ANSYS. Finally, comparison has been done between the results obtained from FEA numerical analysis, and ANSYS results with classical method - exact solutions. Numerical results showed that, the results obtained by finite element analysis using MATLAB and ANSYS are in close agreement with the results obtained from exact solutions using Galerkin method from Kirchhoff classical plate theory. During this analysis, the optimal thickness of the plate has been obtained when the plate is subjected to different loading and boundary conditions.