

**MAJOR PROJECT REPORT**  
**ON**  
**STATIC AND MODAL ANALYSIS OF**  
**LEAF SPRING USING FEA**

*Submitted in partial fulfilment of the requirement for the*

*Award of the degree*

*Of*

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## **CERTIFICATE**

This is certified that project synopsis entitled “**STATIC AND MODAL ANALYSIS OF LEAF SPRING USING FEA**” Which is submitted by-MAYANK SINGH (216412) and SHASHI KAPOOR VERMA (216412) of B-Tech fourth year, Mechanical Engineering V.B.S.P.U Jaunpur for the award of the degree B-Tech is a bonafide record of work carried out by them under the supervision & guidance of Dr. Hemant Kumar Singh. The content of the project synopsis has not been submitted to any other university or institute for the award of any degree or diploma.

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# SELF ATTESTATION

This is certify that, we have personally worked on the dissertation entitled “**STATIC AND MODAL ANALYSIS OF LEAF SPRING USING FEA**”. A case study and data mentioned in this report was obtained during genuine work done and collected by us.

Any other data and information in this report, which has been collected from outside agency, has been duly acknowledged.

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# ABSTRACT

The objective of this present work is to estimate the deflection, stress and mode frequency induced in the leaf spring of an army jeep design by the ordinance factory. The emphasis in this project is on the application of computer aided analysis using finite element concept. The leaf spring, which we are analysing, is a specially designed leaf spring used in military jeeps. This spring is intended to bare heavy jerks and vibrations reduced during military operations. A model of such jeep has been shown in this project report. In analysis part the finite element of leaf spring is created using solid tetrahedron elements, appropriate boundary conditions are applied, material properties are given and loads are applied as per its design, the resultant deformation obtained. The automobile industry is showing increased interest in the replacement of steel spring with fiberglass composite leaf spring due to high strength to weight ratio. Therefore; this project aims at comparative study of design parameters of a traditional steel leaf spring assembly and mono composite leaf spring with bonded end joints. By performing static analysis using ANSYS software and mathematical calculations, the maximum bending stress and corresponding payload have to be determined by considering the factor of safety. Determining and assessing the behaviour of the different parametric combinations of the leaf spring, their natural frequencies are compared with the excitation frequencies at different speeds of the vehicle with the various widths of the road irregularity. These excitation frequencies are calculated mathematically. on, mode frequencies and stresses obtained are reported and discussed.

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