"DESIGN AND ANALYSIS OF HELICAL SPRING IN TWO-WHEELER SUSPENSION SYSTEM"

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ABSTRACT

A helical spring is a mechanical device which is typically used to store energy and subsequently release it, to absorb shock, or to maintain a force between contracting surface. They are made of an elastic material formed into the shape of a helix which returns to its natural length when unloaded. The purpose of this project is to modeling and analysis of helical spring and to increase the stiffness of it by using the new materials to reduce the vehicle problem that happens while driving on bumping road condition. The comparative study is carried out between existed spring and new material spring. Static analysis determines the stress and deflection of the helical compression spring in finite element analysis (FEA). The model is used to analyze the spring on the **ANSYS 16.2** under different materials conditions. Finite element analysis methods (FEA) are the methods of finding approximate solution to a physical problem defined in a finite region or domain. **FEA (WORKBENCH**) is a mathematical tool for solving engineering problems. In this the finite element analysis values are compared to the experimental values. A typical two-wheeler suspension spring is chosen for study. The modeling of spring is developed on **SOLIDWORKS** and analysis is carried out on **ANSYS 16.2**.

The suspension system allows the wheels to bounce up and down on rough roads while the rest remains fairly steady. It also allows the vehicle to corner with minimum roll or tendency to lose traction between the tyres and the road surface. The basic elements of a suspension system are springs and shock absorbers. This project is mainly based on spring. A spring is an elastic element which deflects under the action of the load and returns to its original shape when the load is removed.

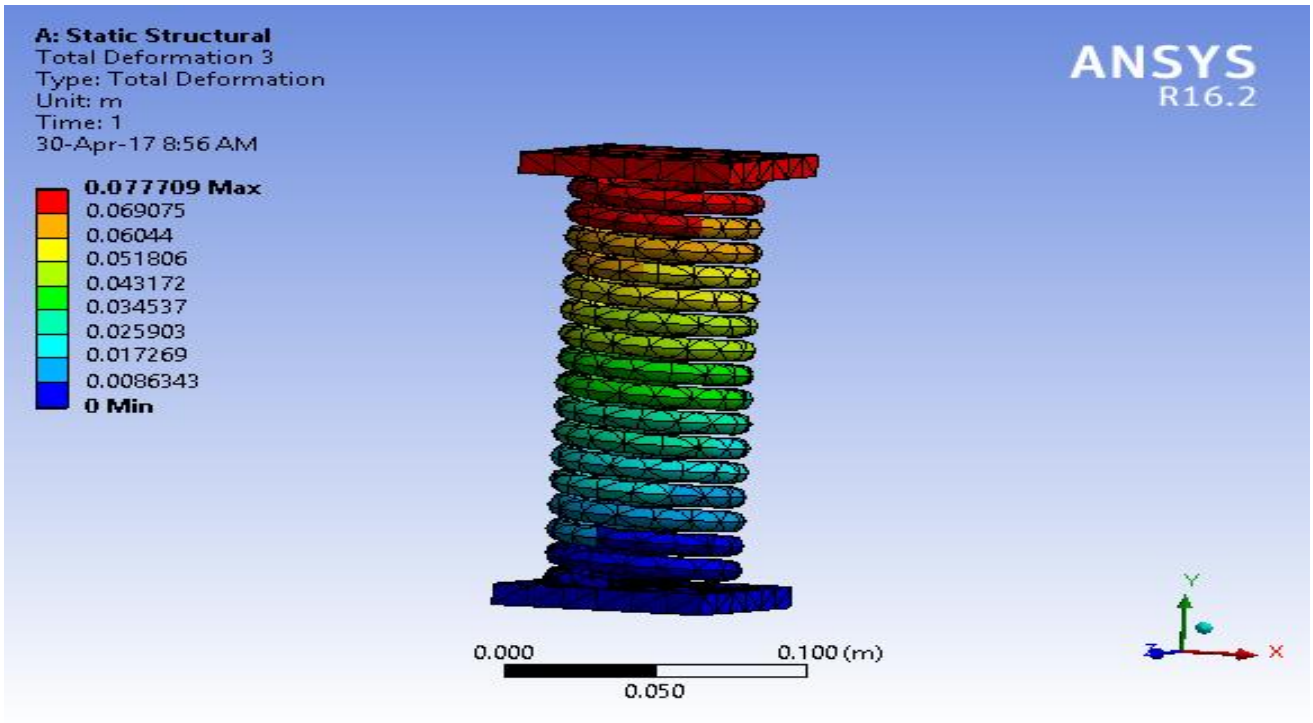
In this project, we have used four different materials like high carbon steel, Elgiloy, Hastelloy C276,Inconel X750 for analyzing the stiffness and maximum shear stress of helical spring with a constant load of 2750N. Among the above materials Inconel X750 material give the better maximum shear stress and stiffness values comparing to other materials. Mostly prefer high carbon steel material

for bike suspension spring due to its material stability and ductility by observing those analysis stress and deformation values. By comparing stiffness and maximum shear stress value of all four materials**.**

InconelX750 is the best material for spring design. Inconel alloy X750 is a precipitation hardenable Ni-Cr alloy used for its corrosion and oxidation resistance and high strength at temperature up to 1300°FInconel X750 offers excellent resistance to relaxation and as a result it is widely used for springs operation at elevated temperature.

Analysis of different spring either for heavy duty vehicle or light duty vehicle can also be analyzed. Vibrational analysis can be done at ansys for minimize the fatigue failure. This material can work on even high industrial temperature that is up to 1100°F. Dynamic analysis of spring can also be performed on ansys to get better analysis. Torsional analysis can be done due to presence of small amount of torsional moment in spring wire. Design modification can be done to minimize the weight of helical spring and the inertia force.

IMAGE OF PROJECT



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