Optimization Of Vehicle Mono Leaf Spring By Using Composite Carbon Fibre Material

Mr.Khwaja Javeed Ahmed
PG Student, Department of Mechanical Engineering
DVVPCOE Ahmednagar, Maharashtra, India

Prof. P.A.Narwade
Assistant Professor ,Department of Mechanical Engineering
DVVPCOE Ahmednagar, Maharashtra, India

Abstract— **Expanding rivalry and development in vehicle part will in general alter the current items or replace old items by new and propelled material items. A suspension arrangement of vehicle is additionally a territory where these advancements are completed consistently. More endeavors are taken so as to build the comfort of user. Proper parity of comfort riding characteristics and economy in assembling of leaf spring turns into a conspicuous need. Leaf springs are generally utilized as suspension framework in car vehicles. In this task, examination and exploratory approval of leaf spring was performed by changing from customary steel to composite material. Composite materials are exceptionally utilized in a few unique fields like aviation structure, marine, car, and so forth. Because of high quality they are generally utilized in the low weight applications and furthermore as an other for metals to diminish the material expense. FEA examination in Ansys was done by utilizing ACP apparatus (ACP Tool) where genuine composites layer demonstrating will be utilized to make fiber handle. Ordinary steel, carbon fiber, glass fiber and kevlar fiber material was contemplated. Carbon fiber mono leaf spring was prepared and compared with ordinary steel. we observed 80 percent weight reduction also cost benefit therefore we have recommended carbon fiber for for future items.**

I. INTRODUCTION

So as to save common assets and streamline vitality, weight decrease has been the primary focal point of vehicle makers in the present situation. Weight decrease can be accomplished principally by the presentation of better material, structure advancement and better assembling procedures. The suspension leaf spring is one of the potential things for weight decrease in autos as it represents 10% - 20% of the unsprung weight. This accomplishes the vehicle with more eco-friendliness and improved riding characteristics. The presentation of composite materials was made it conceivable to lessen the heaviness of leaf spring with no decrease on burden conveying limit and firmness. Since, the composite materials have increasingly versatile strain vitality stockpiling limit and high solidarity to weight proportion as contrasted and those of steel, multi-leaf steel springs are being supplanted by mono-leaf composite springs. The composite material offer open doors for considerable weight sparing however not generally are practical over their steel partners. The leaf spring ought to assimilate the vertical vibrations and effects because of street anomalies by methods for varieties in the spring avoidance with the goal that the potential Energy is put away in spring as strain vitality and after that discharged gradually. Thus, expanding the vitality stockpiling ability of a leaf spring guarantees a progressively consistent suspension framework. As indicated by the investigations made a material with greatest quality and least modulus of flexibility the longitudinal way is the most appropriate material for a leaf spring. Luckily, composites have these attributes. Weakness disappointment is the transcendent method of in-administration disappointment of many car segments. In the present work, a steel spring utilized in traveler autos is supplanted with a composite leaf spring made of glass/epoxy composites. The measurements for both steel leaf spring and composite leaf springs are viewed as the equivalent. The essential goal is to think about their heap conveying limit, solidness and weight reserve funds of composite leaf spring. At last, weakness life of steel and composite leaf spring is additionally anticipated utilizing life information

II. LITERATURE REVIEW

Senthilkumar and Vijayarangan [1] in there paper describes static and fatigue analysis of steel leaf spring and composite multi leaf spring made up of glass fibre reinforced polymer using life data analysis. Roselita Fragoudakis , Georgios Savaidis , Nikolaos Michailidis [2] study & investigates the microstructure, surface mechanical properties, and fatigue life of 56SiCr7 leaf specimens produced under serial conditions. The investigation occurs at different stages of the manufacturing process of the leaf springs; mainly heat treatment and surface treatment by shot peening. Hiroyuki Sugiyama , Ahmed A. Shabana , Mohamed A. Omar , Wei-Yi Loh [3] develop nonlinear elastic leaf spring model for multibody vehicle systems. In this investigation, a nonlinear elastic model of leaf springs is developed for use in the computer simulation of multibody vehicle systems. In the leaf spring model developed in this investigation, the distributed inertia and stiffness of the leaves of the spring are modeled using the finite element floating frame of reference formulation that accounts for the effect of the nonlinear dynamic coupling between the finite rotations and the leaf deformation.

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar