

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELGAUM – 590 010



PROJECT REPORT ON (06ME 85)

“DEVELOPMENT OF DYNAMIC SIMULATOR TEST RIG FOR TESTING COMPOSITE LEAF SPRING”

(Sponsored by Karnataka State Council for Science & Technology Bangalore)

Submitted in partial fulfillment of the requirements for the award of the degree

BACHELOR OF ENGINEERING IN MECHANICAL ENGINEERING

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ABSTRACT

The advantages of fibre composites relative to more conventional materials such as metals are often related to the high stiffness and strength to weight ratios. Also these composites often have superior resistance to environmental attack. Among fibre composites, Glass fibre and Carbon fibre composites are extensively used in aerospace, automotive, marine and infrastructure applications.

In order to conserve natural resources and economic energy, weight reduction has been the main focus of automobile manufacturers in the present scenario. In recent years researches in the area of automobile component have been receiving considerable attention. Particularly the automobile manufacturers and parts makers have been attempting to reduce the weight of the vehicles in current years.

The suspension leaf spring is one of the potential items for the reduction in weight of automobiles as it accounts for 10-20 % of the unsprung weight. This helps in achieving the vehicle more fuel efficiency and improved riding quality. Since the composite materials have more elastic strain energy storage capacity and high strength to weight ratio as compared with those of steel, multi leaf steel springs can be replaced by mono-leaf composite spring.

In the present work it is proposed to design and develop a mechanical simulator test-rig required to perform fatigue tests on multi leaf steel spring and on already fabricated E-glass/epoxy composite mono-leaf spring by hand lay-up process. A finite element model of E-glass/epoxy composite mono-leaf spring was generated and fatigue analysis was carried out. An attempt was made to compare the analysis results with the experimental values for the purpose of validation.