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EXPERIMENTAL AND ANALYTICAL STUDY FOR UNCERTAINTY IN STRAIN MEASUREMENT

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There are various methods available for measurement of physical strain on material using strain gauges incurred uncertainty in measurement due to several factors. The aim of this study is to determine uncertainty in strain measurement due to bridge configuration. For determining uncertainty in measurement the setup of cantilever beam with quarter bridge, half bridge and full bridge is developed. Using classical and finite element analysis strains are calculated for different loads. The actual strain measurement is carried out using NI LabVIEW for different loads with quarter bridge, half bridge and full bridge configurations. The uncertainty analysis is carried out and found that quarter bridge has more uncertainty than half bridge and full bridge configuration.

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NONLINEAR STATIC FINITE ELEMENT ANALYSIS AND MATERIAL OPTIMIZATION OF CONNECTING ROD

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This paper describes about nonlinear static analysis and optimization of forged steel connecting rod. With the implementation of optimization approach connecting rod of stronger but equally lighter can be obtained with minimum cost. This paper focus on finite element analysis and material optimization of Titanium alloys as an alternative material for connecting rod. For comparison Finite element analysis of connecting rod is completed by considering two materials viz. structural steel & Titanium alloys. A proper CAD model is developed using software CATIA V5 then FEA of connecting rod is carried out to determine the maximum von misses stresses for the given loading conditions using software ANSYS WORKBENCH. The design and weight of the connecting rod affect the engine performance. Specifications of connecting rod have been estimated to calculate the loads acting on it. Structural analysis is carried out on piston end and crank end of connecting rod. The component is to be optimized for material subject to constraint of allowable stress and factor of safety. The percentage weight reduction obtained was 1.5 % by optimization.