

## Design, Modification and Structural Analysis of Bicycle Sprocket Using ANSYS

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**Abstract :** Bicycles are important parts of the transportation industry. In the current world, use of sprocket is very high on bicycles these days. Sprocket and chains are important parts of the transmission of power in the bicycle. However, transmission of power is highly dependent on sprocket design. In conventional bicycles, sprockets are made up of mild steel which undergoes wear and tears with the passage of time due to high pressures applied on it. In the current research, a new sprocket is designed by changing its structure and material to carbon fiber from mild steel. The existing sprocket of a bicycle is compared with the new and modified sprocket design. However, new design has structural and material changes as well. According to the results, in carbon fiber, sprocket deformation is 0.091 mm while sprocket stress value is 371.13N/mm<sup>2</sup>. Also, comparison based analysis is done by physical testing and software analysis. There is 8.1% variation in software and experimental results of steel. Additionally, the difference between both methods comes 8 to 9%. This improved design can be used in future for more durability and long run timings for bicycles.

**Keywords :** sprocket, mild steel, drafting, stress, deformation

**Conference Title :** ICMASM 2018 : International Conference on Mechanical Advantage and Simple Machines

**Conference Location :** New York, United States

**Conference Dates :** August 27-28, 2018