

Design and Analysis of Composite Polyacetylene Epicyclic Gear

Thorat Maheshwari Ramesh
Research Scholar, Department of Mechanical Engineering
Dr.V.V.P. College of Engineering,
Ahmednagar, M.S. India
mahithorat212@gmail.com

Prof. Narwade P.A
Assistant Professor, Department of Mechanical Engineering
Dr.V.V.P. College of Engineering,
Ahmednagar, M.S. India
narawadeprashant@gmail.com

Abstract-

Gear is an important element which is transmitted power, therefore material selection base on density, strength, coefficient of friction etc. In metal gear for low torque reduce efficiency of gear box. Plastic gear has better efficiency at low torque but torque increase gear will fail. By using plastic gear having low weight having high efficiency, it works without lubrication, high surface quality reduce friction losses. But as compare to strength gear having low strength. Generally Acetal material is used in gear. Material selection is an important asset during the design of machines and industrial product. Material affects material efficiency and reliability. In this paper the composite Polyacetylene gear has been design and tested for efficiency and other two types of failure.

Keywords- Acetal, Glass fiber reinforced, Calcium Carbonate, Epicyclic Gear.

I. INTRODUCTION

Gear is most important element of power transmission choose for small distance. It is very efficient and very effective mode of power transmission. It is used nearly all industrial drive for power transmission. A gear is a machine part designed to transfer force and motion from one mechanical part to another.

In this paper we have study of the dynamic behavior, in terms of sound production of plastic gears. Polymeric gears are repeatedly estimated as actuality 'low-noise' constituents for the reason that their low modulus generates them robust when the teeth come into contact. However, this does not explanation for tribological sound, created as a result of the interacting tooth flanks. These are significant considerations particularly where high accuracy motion control and short noise are required. At the present time, Plastic materials are used in large number in various engineering structures including spacecraft's, airplane, automobiles, boats, sports' equipment's, bridges and buildings. Widespread use of composite materials in industry is due to the good characteristics of its strength to density and hardness to density.

Composite materials are engineered materials made from two or more constituent materials with significantly different physical or chemical properties which remain separate and distinct on a macroscopic level within the finished structure. The future necessity of power saving and efficiency of mechanical parts during the past few years increased the exercise of composite materials. Composite materials are

preferred in place where lighter materials are desired or required without sacrificing strength. Widespread use of plastic materials in industry is due to the good characteristics of its strength to density and hardness to density.

II. OBJECTIVES

- The purpose of this project to study the current Epicyclic gear for washing machine. Design the new Composite Epicyclic Gear installing it in existing machine.
- Comparing and verifying the results with the existing and new values individually.
- To design the model using modeling software CATIA.
- Designs are create in comparison to the existing gear of washing machine and simulate in software.
- Experimental analysis of Gear.

III. LITERATURE SURVEY

V. Siva Prasad et al. (Aug 2012) They are described design and analysis of spur gear and it is probable to exchange the metallic gears of sugarcane juice machine with polymer gears to reduce the weight and noise. A basic structure of spur gear was produced in PRO-E, Model is import in ANSYS 10.0 for analysis by applying standard load condition. The major reason of this article to research the dissimilar polymer gears namely nylon, polycarbonate and their feasibility checked with complement metallic gear like as cast iron. final the study by the FEA methodology, it can be prove that the composite gears, if well calculated and analyzed, will give the valuable properties like as a low cost, noise, Weight, vibration as well as perform its process like to the metallic gears.

Utkarsh.M.Desai et al.(March 2015) Composite materials provide adequate strength with weight reduction and they are emerging as a better alternative for replacing metallic gears. In this work, A metallic gear of Alloy Steel is replaced by the composite gear of 30% Glass filled Poly-ether-ether- Ketone (PEEK). Such Composites material provides much improved mechanical properties such as better strength to weight ratio, more hardness, and hence less chances of failure. In this work, an analysis is made with replacing metallic gear with composite material such as PEEK so as to increase the working life of the gears to improve overall performance of machine. Finally the Modeling of spur gear is carried out using SOLID WORK and bending stress analysis of spur gear is carried out using ANSYS V14.



[Signature]
PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar