

Design of Agitator Gear

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Abstract— A worm wheel or worm gear is a cylindrical gear with flanks cut in such a way as to ensure contact with the flanks of the worm gear. The worm wheel is analogous to a nut that fits on the screw thread of the worm. If the worm is restrained axially within its housing and if the worm is rotated, the worm gear will also rotate. In a worm and wheel gear set rotary power can be transmitted between nonparallel and nonintersecting shafts. Worm and wheel gears are widely used for nonparallel, nonintersecting, right angle gear drive system applications where a high transmission gearing ratio is required. In comparison to other gear, belt, and chain transmission elements, worm and wheel gear sets tend to offer a more compact solution. In certain configurations, a worm and wheel gear set can provide sufficiently high friction to be self-locking. This can be a desirable feature if a defined position is required for a gear train, if it is not braked or unpowered. Introduction A worm gear is a cylindrical helical gear with one or more threads and resembles a screw thread.

Keywords: Worm Wheel or Worm Gear, Bearing, Deceleration

I. INTRODUCTION

In This Process, mixing is one of the most fundamental operations in industries like paper, food, cosmetic, chemical, biochemical and pharmaceutical applications. Agitator is one of the important parts in the mixing process. Proper and uniform mixing gives improved quality of the product. The aim of our project is to design small size agitator worm and worm wheel gear, then the Worm gears are one of the most important technical devices for transmitting torque between spatial crossed axes. Worm gears are somewhat special because of the degree of conformity which is greater than in any other type of gear. It can be classified as a screw pair within the family of lower pairs. However, it represents a fairly critical situation in view of the very high degree of relative sliding. From the wear point of view, the only suitable combination of materials is phosphor-bronze with hardened steel. Due to their high transmission ratio and compact structure, they are widely used in power transmission applications in which high reduction is required. Comparable parallel axis gearing would normally require two or three stages to achieve the same ratio with a consequent increase in complexity and number of parts. Worm drives applications are mainly used in industry for automotive transmissions, steam turbines, process machinery, conveyors, and elevators... The main disadvantage of worm gear is the wear problem due to the high degree of sliding present between the teeth. In order to reduce friction and to prevent scuffing of the tooth surfaces, it has been necessary to use hard/soft combination of materials, usually a hard steel worm

and a softer wheel made of bronze or nylon. This disparity in materials have for consequence that the contact pressures are much lower in this type of gears, the limit being imposed by the material of the wheel.



Fig. 1: Project Setup Drawing

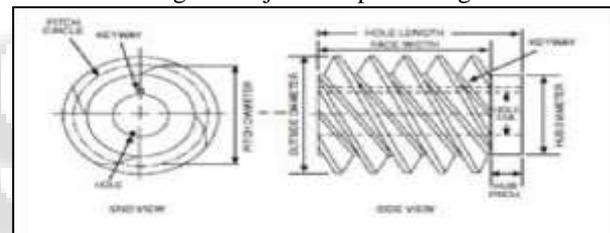


Fig. 2: Working Principle Mechanism

II. OBJECTIVES

- 1) To design small size agitator gear.
- 2) To design of worm and worm gear with ratio 10:1.
- 3) The worm gear is use in agitator because reduction ratio is high.
- 4) To enhance the performance of agitator.

III. METHODOLOGY

The method is to carried out for entire project as follows

- 1) Literature survey on Agitator gear in India.
- 2) Design development and fabrication of Agitator Gear.
- 3) The analysis of these processes from both a theoretical and industrial perspective is the knowledge of the flow structure in such vessels.

IV. CONCLUSION

In our project we have designed a Worm gear box. Loads are calculated when the gears are transmitting different speeds 2400rpm and 5000rpm and different materials Aluminum Alloy and Cast Iron. By observing the structural analysis results using Aluminum alloy the stress values are within the permissible stress value. So using Aluminum Alloy is safe for differential gear. When comparing the stress values of the

three materials for all speeds 2400rpm and 5000rpm, the values are less for Aluminum alloy than Cast Iron. And also weight of the Aluminum alloy reduces almost 3 times when compared with d Cast Iron since its density is very less. Thereby mechanical efficiency will be increased. By observing analysis results, Aluminum Alloy is best material for Differential.

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