

Design and Assembly of a Wiper Mechanism

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1. Objective:-

To design and assemble a CAD model of a wiper mechanism, focusing on demonstrating core engineering principles and the application of gears in mechanical systems. This project serves as a practical example of how gears facilitate motion control, translating rotational motion into the oscillatory motion needed for wiper mechanisms commonly found in vehicles.

2. Problem Statement:-

The project aims to develop a detailed and functional CAD model of a windshield wiper mechanism, illustrating the significance of gears in mechanical systems. This model serves as an educational tool to help understand the assembly, operation, and efficiency of a typical wiper mechanism, as used in cars and other automobiles. By visualizing the model in CAD, the project emphasizes the importance of component interaction and proper alignment within mechanical assemblies to achieve desired motion and durability.

3. Description:-

This project involved the CAD design, modeling, and virtual assembly of a wiper mechanism. The primary goal was to create a model that showcases key components and demonstrates their functionality within a complete system. The main components of this model include:

- **Housing:** The structural casing that holds and protects the wiper system components.
- **Connector:** A link that transmits motor output to the wiper arms, enabling coordinated movement.
- **Wiper Blade Handle:** The arm that holds and moves the wiper blade across the windshield in a controlled arc.

- Helical Worm Gear and Worm Gear: A gear pair used to provide high torque and precise, controlled motion, essential for converting motor rotation into oscillatory wiper movement.
- Motor Housing: A casing that securely holds the motor, which powers the entire wiper mechanism.

Each component was carefully modeled and assembled in CAD software to simulate realistic movement and assembly interactions. The helical worm gear and worm gear serve as the central motion translation system, converting the motor's rotational energy into the back-and-forth sweeping motion characteristic of windshield wipers.

This project illustrates the critical role that precise component design and assembly play in mechanical systems, particularly in ensuring efficient power transmission and durability in automotive applications. The CAD model serves as a visual and functional representation of a wiper mechanism, highlighting the importance of gears in achieving desired motion and load distribution.

4. Reference:-

<https://youtu.be/6D12GICC7cU?si=kCmU9TOBv18mgZ0T>