

Design and Assembly of a Four-Cylinder Engine

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Objective

To design and assemble a four-cylinder engine model to demonstrate the structural and mechanical aspects of engine functionality.

Problem Statement

The project aims to create a detailed model of a four-cylinder engine, which serves as a practical representation of an internal combustion engine. This model aids in understanding the assembly and operational principles of multi-cylinder engines commonly used in automobiles.

Description

This project involved the CAD modeling and assembly of a four-cylinder engine, designed to showcase the core components, including the cylinder block, pistons, crankshaft, connecting rod pin and connecting rods. The engine model serves as a visual and functional reference for analyzing engine mechanics. This report includes the assembly's core elements and references to support the design and assembly methodologies.

Design and Assembly Process

The project's design and assembly phases involved several steps, each crucial for achieving a realistic engine model. Using CAD software, the design was approached in modular phases to simplify complex assemblies. The following steps were followed:

- 1. Component Modeling:** Each part was individually designed in CAD to scale, using measurements based on actual engine specifications. Accurate modeling of each component ensured that they could fit together seamlessly during assembly.
- 2. Assembly Phase:** Once the components were designed, they were assembled in the CAD software. Constraints were applied to ensure correct alignment and

movement simulation. Testing was performed to verify that each part functioned as intended.

3. **Troubleshooting:** Throughout the assembly, minor adjustments were required to achieve the best fit. This is to create a smooth-working engine model.

Conclusion

This project successfully achieved the design and assembly of a detailed four-cylinder engine model. The CAD model represents the core functionalities and structural components of a typical internal combustion engine. Future improvements could include adding a timing mechanism to simulate real engine operation more accurately or incorporating motion simulations to illustrate piston and crankshaft dynamics. This project enhances the understanding of engine components, assembly techniques, and the practical applications of CAD software in mechanical engineering.

REFERENCE:

<https://youtu.be/NZCMTK9VTSQ?si=Ud4RRDhLRE4nVTHz>