

# **MINI PROJECT REPORT**

## **Mini Project: Design and Analysis of V-Shaped Engine Assembly**

### **1. Introduction**

A V-shaped engine is an internal combustion engine where the cylinders are arranged in a V configuration. This design allows a compact structure and better power-to-weight ratio. It is widely used in automotive applications.

### **2. Objective**

The objective of this project is to:

- Design a V-shaped engine assembly using SolidWorks
- Assemble all components properly
- Perform basic motion or structural analysis
- Study mechanical behaviour of the system

### **3. Components Modeled**

The following parts were created:

- Engine block
- Pistons
- Connecting rods
- Crankshaft
- Cylinder heads
- Frame/support structure

(All components were modeled individually and assembled using proper mates.)

### **4. Modeling Approach**

- 3D parts were created using extrusion, cut, fillet and pattern features.
- Dimensions were assigned based on realistic engine proportions.
- Materials such as steel and aluminium were considered.
- Assembly mates were applied to ensure proper alignment and movement.

### **5. Simulation / Motion Study**

(Choose what you did)

If Motion Study:

- A motor was applied to the crankshaft.
- The piston movement was analysed.
- Velocity and displacement plots were generated.

If Structural Analysis:

- Loads were applied on connecting rod / crankshaft.
- Stress and deformation were analysed.
- Factor of Safety was evaluated.

## 6. Results and Observations

- The assembly functions smoothly with synchronized piston movement.
- The V configuration provides compact arrangement.
- Motion/Stress results validated the design concept.

## 7. Conclusion

The V-shaped engine assembly was successfully designed and analysed in SolidWorks. The project improved understanding of mechanical assembly, motion transmission, and engine mechanism behaviour.

## 8. Software Used

SolidWorks (CAD Modeling & Simulation)

## 9. Photos



