

V12 Engine Design and Assembly

Designer: Lee Roy Musaringo

Software Used: SolidWorks

Project Type: CAD Modeling, Assembly, and Functional Documentation

Objective: To create a detailed mechanical model and subassemblies of a V12 internal combustion engine in SolidWorks, showcasing engineering design skills and verifying mechanical motion using basic simulation.

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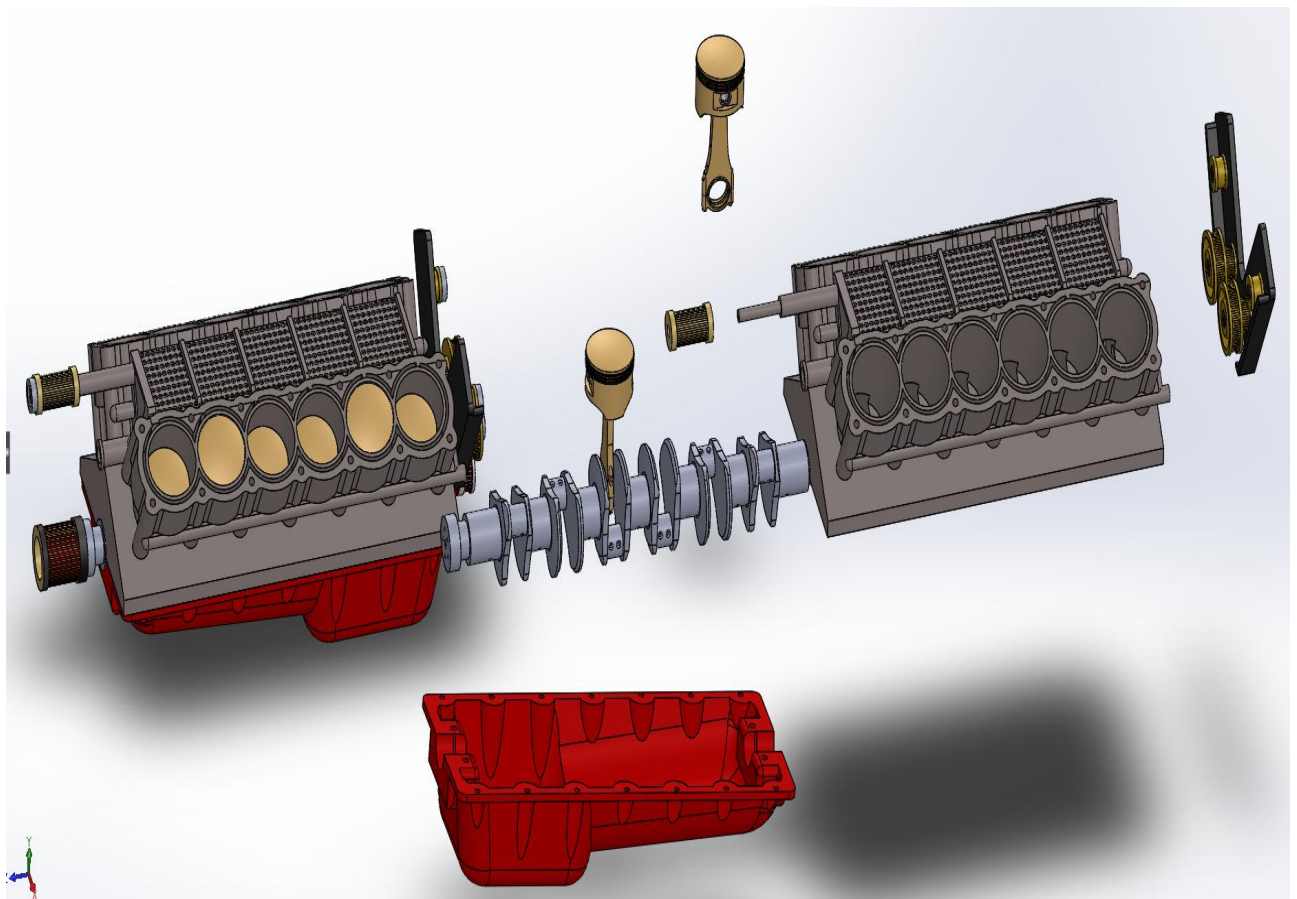
Cylinder Block Assembly

Components:

- Cylinder Block: Houses all combustion chambers; forms the backbone of the engine.
- Crankshaft: Converts piston reciprocation into rotary motion.
- Crankshaft Pulley: Drives belts for auxiliary systems.
- Connecting Rod & Cap: Transfers motion from piston to crankshaft.
- Piston: Facilitates compression and expansion in each cycle.
- Piston Circlip: Retains the gudgeon pin, prevents axial movement.
- Piston Rings: Seal combustion gases and control oil film.
- Oil Ring: Manages lubrication, scrapes excess oil.
- Gudgeon Pin: Connects piston to connecting rod.
- Belt Guide / Pulley / Locker: Ensures aligned belt motion and tension.
- Oil Pan: Reservoir for engine oil.

Function:

This assembly generates mechanical torque from combustion energy.



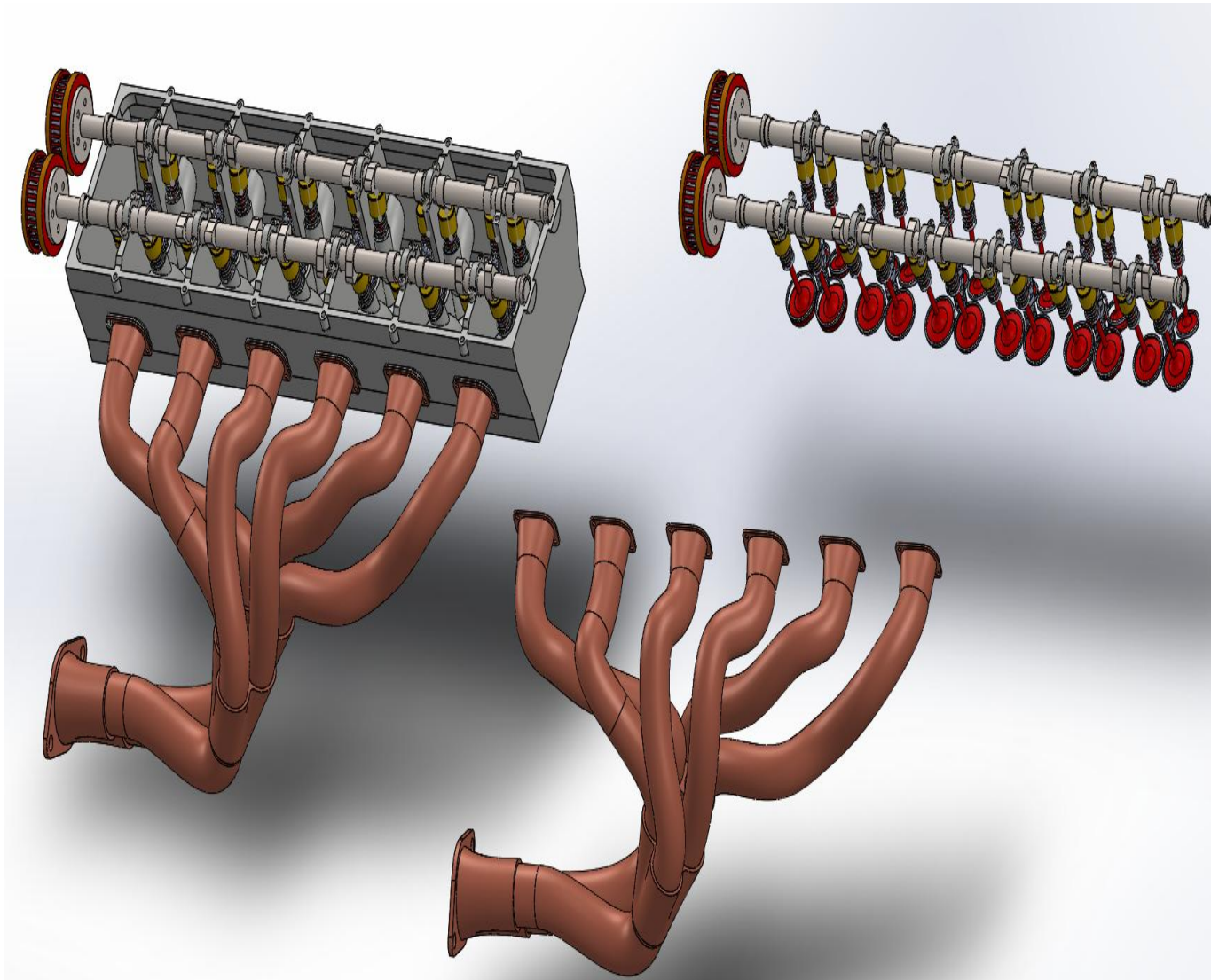
Cylinder Head Assembly

Components:

- Cylinder Head, Intake/Exhaust Valves with Springs
- Camshafts, Bearings, Valve Lockers, Retainers, Sparkplug
- Exhaust Manifold, Bolts and Screws

Function:

Controls airflow, combustion, and exhaust timing with precision.



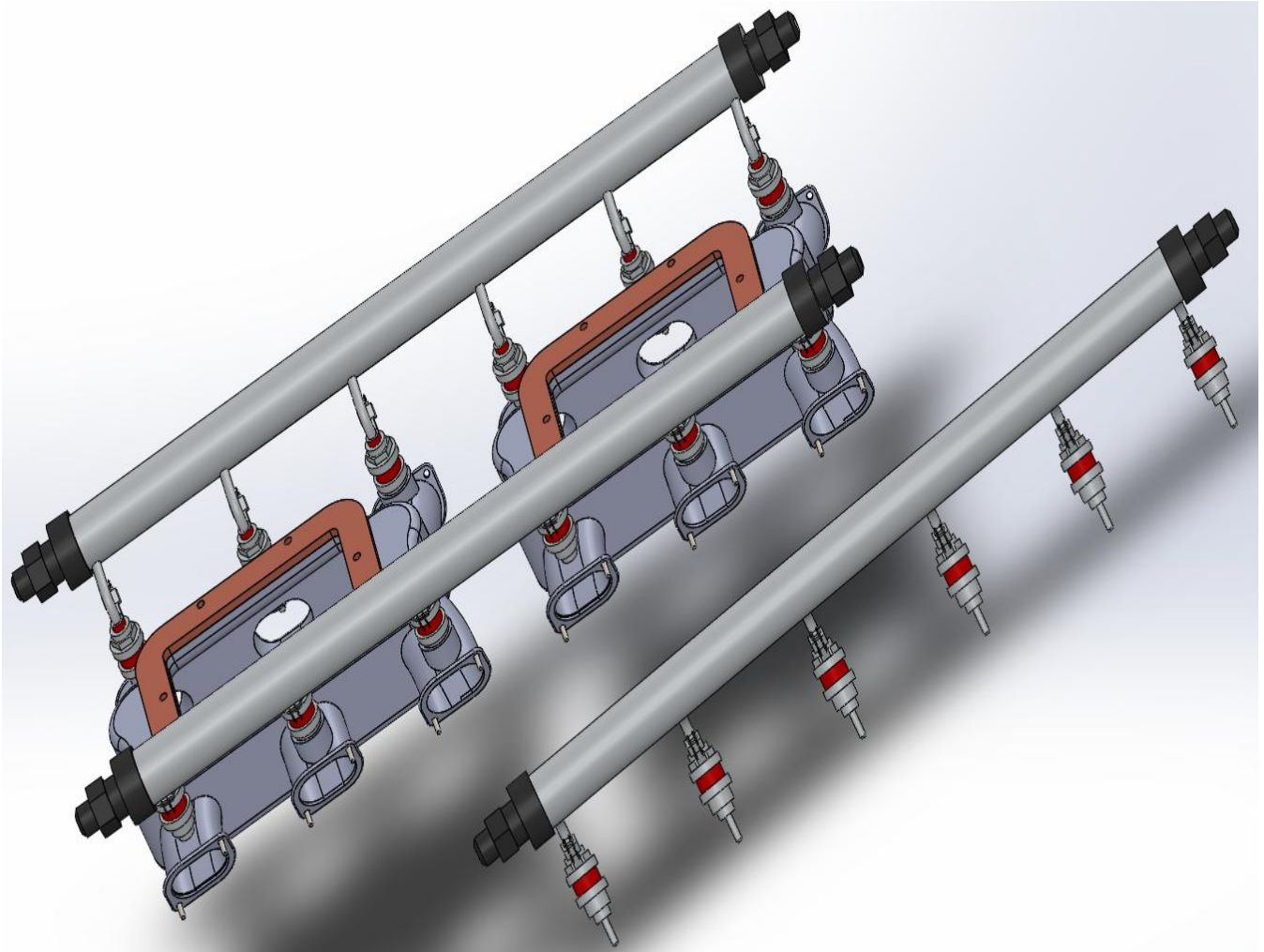
Intake Manifold & Injectors

Components:

- Intake Manifold: Distributes air to cylinders.
- Fuel Injectors: Deliver fuel into the intake stream.

Function:

Ensures efficient air-fuel mixing for combustion.



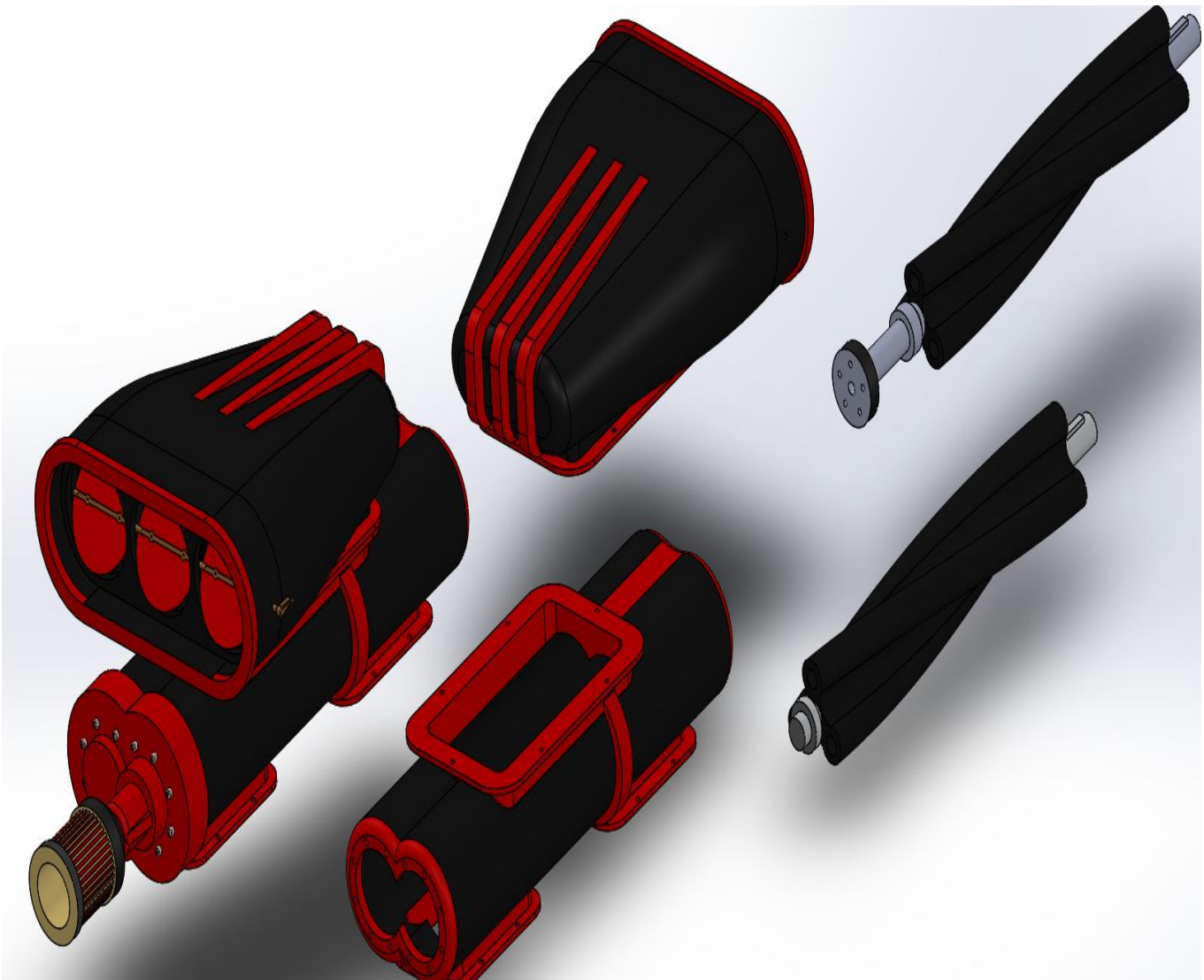
Blower & Supercharger Subassembly

Components:

- Blower, Supercharger Rotors, Gears, Air Inlet

Function:

Increases air pressure for more power and efficiency.



Coolant Inlet System

Component:

- Coolant Inlet

Function:

Maintains engine temperature within optimal range.

Engineering Skills Applied

CAD & Design:

- Advanced SolidWorks Modeling
- Assemblies, Exploded Views

Engineering Knowledge:

- IC Engine Mechanics
- Motion & Thermodynamics

Simulation:

- Motion Analysis to validate connections

Practical Skills:

- Design Thinking, Mechanical Integration

Conclusion

This project successfully showcases advanced V12 engine design with a full mechanical layout. Each component was integrated in SolidWorks, and motion analysis confirmed working kinematics. The effort demonstrates deep mechanical design and CAD expertise.

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Visual Gallery

