East West University

Project Report
Project : Draw Piston in AutoCAD

Course Title : Computer Aided Engineering Drawing

Course Code : CSE 200

Section : 11

Submitted To :

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Introduction :

This project involves 3D modeling a piston using AutoCAD 2025. The piston is one of the most important parts of an internal combustion to the crankshaft through the connecting rod. This process converts chemical energy into mechanical energy. The goal of this project is to learn and use CAD design techniques to create a detailed 3D model of a piston and it's connecting rod assembly.

Objectives:

- To design a 3D Piston model using AutoCAD.
- To learn and apply solid modeling tools such as extrude, revolve, fillet, chamfer, union, subtract, etc.
- To visualize the piston with realistic rendering in AutoCAD.
- To understand the geometrical features of a piston and it's function importance.

Software use:

- AutoCAD 2025 (Student Version)
- Features Applied:
  - 2D sketching for base profiles.
  - Extrusion and revolution for 3d features.
  - Boolean operators for hollow sections.
  - Fillet and chamfer for smooth edges.
  - Rendering mode (realistic view) for final visualization.

Piston Design Description:

The piston design consists of the following parts:

Piston Head

- The flat top surface designed to withstand high pressure during combustion.
- Equipped with piston rings grooves for sealing and lubrication.
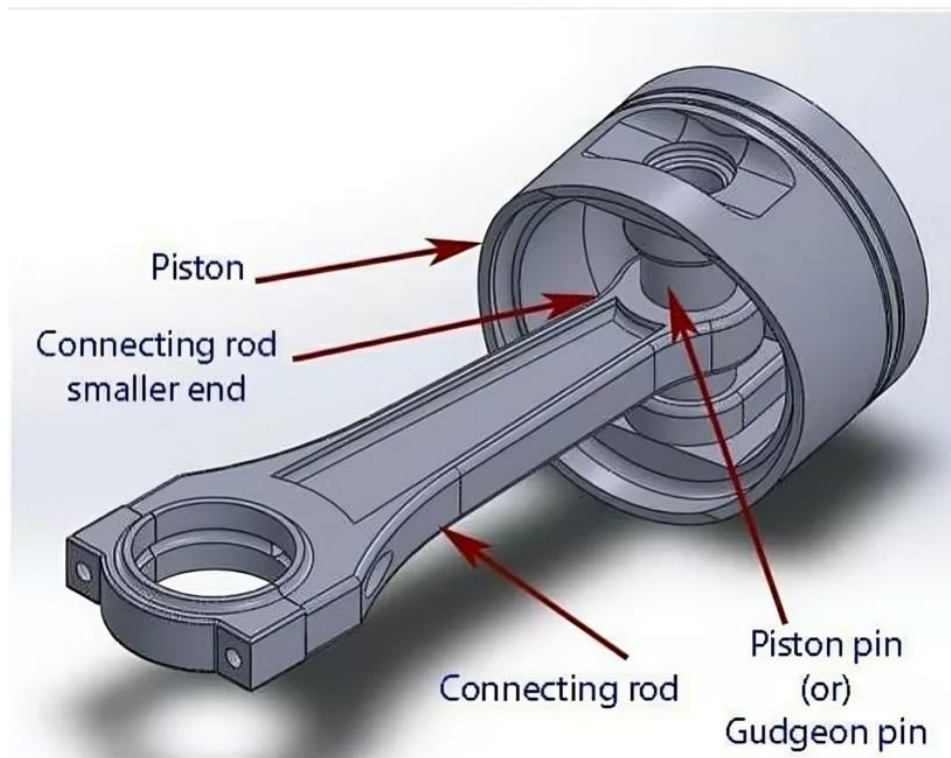
Piston Body

- Cylindrical shape with hollow inside.
- Includes a piston pin hole for connecting the connecting rod.

Connecting Rod

- Modeled with both small rod (connected to piston pin) and big end (connected to crankshaft).
- The geometry is tapered for strength and weight reduction.

Grooves & Chamfers

- Added to reduce stress concentration and enhance assembly fit.

Step In AutoCAD Modeling

1.Sketching the Base Profile:

- 2D profile of piston head and body drawn using line, circle, and arc commands.

2.Revolve Command:

- Used to create the cylindrical piston body.

3. Extrude & Subtract:

- Applied to form the hollow inside and piston grooves.
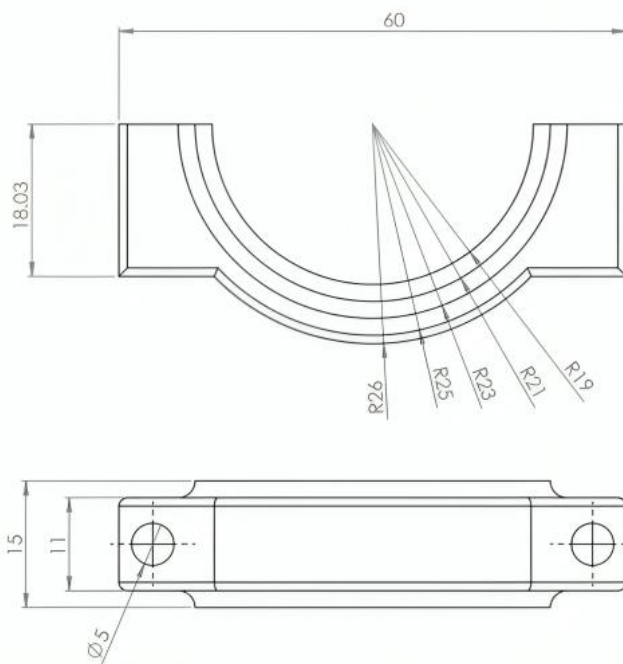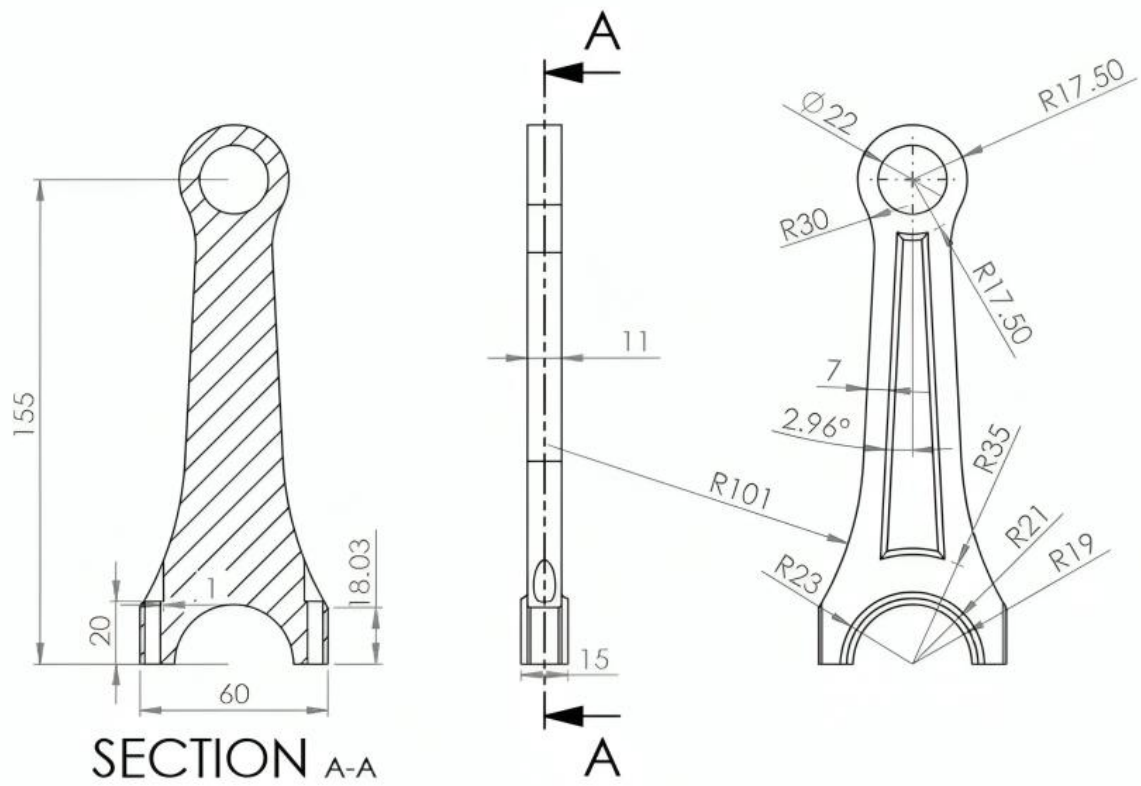
4. Connecting Rode Modeling:

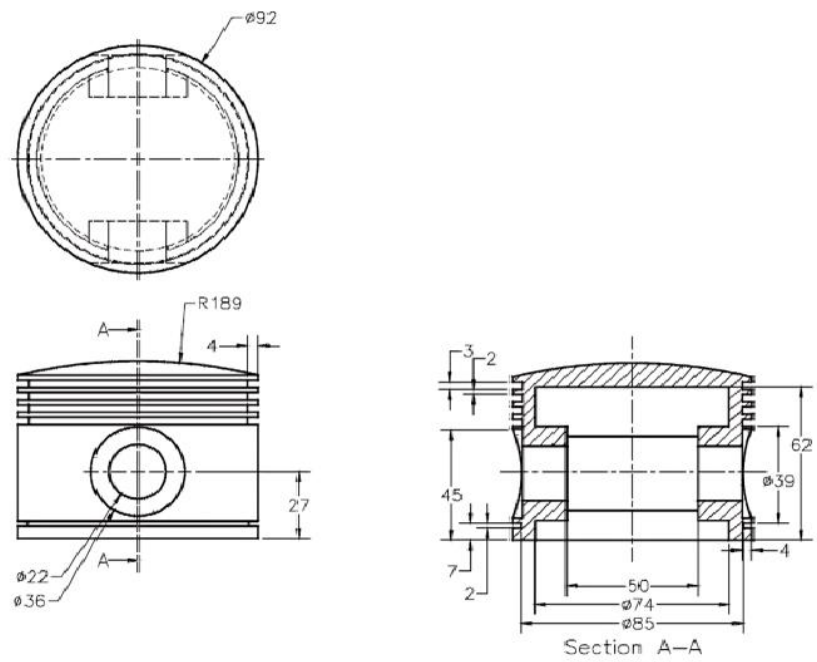- The rod and holes were created using extrude and subtract.

5. Assembly:

- The piston and connecting rod where combined using union command.

6. Final Rendering:

- Applied Realistic View to visualize the piston in 3D with proper shading.

SECTION A-A

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Final Look :

Applications:

Piston are widely used in:

- Automobiles (Cars , Motorcycles, Trucks)
- Marine engines
- Aircraft engines
- Industrial compressors

Advantages of Using AutoCAD for piston Design:

- Accurate 2D to 3D modeling transition.
- Realistic rendering and visualization.
- Easy modification of design parameters.
- Faster prototyping before manufacturing.

Conclusion:

The piston model designed in AutoCAD demonstrates the ability of CAD software in creating complex mechanical components. Through this project, the fundamentals of 3D solid modeling, and design visualization were successfully applied. This model can be further enhanced by performing Finite Element Analysis (FEA) for stress testing, or by exporting the design to CAD software for actual machining.