Semester Project Report

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Date

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ME109 ENGINEERING

DRAWING

Diesel Engine Block

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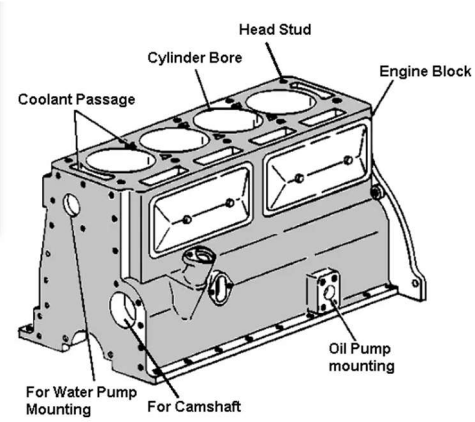
INTRODUCTION:.

Diesel Engine Block:

Cylinder block is the main component of internal combustion engine both 2 stroke and 4 stroke. This component becomes a primary component to place various engine compartments that support the working process of the machine. The shape of the cylinder block of each machine is generally the same but the details will be different. That's because the details of the cylinder block are adjusted with all components that will stick to this block.

3D geometry of Diesel of Engine Block:



It is the largest part of the diesel engine. Its upper section carries the cylinders and pistons normally the lower section forms the crankcase and supports the crankshaft. A core is used to prevent leakage of water or coolant from the engine. A water pump is provided on the side of a cylinder block in housing coupled with a coolant casing. Deck is the top surface of the block where the end of the cylinder remains.

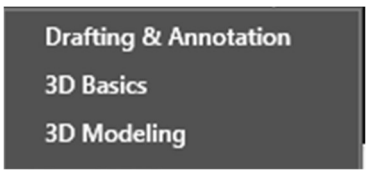
Main Objectives of this Report:

Main objectives of this report include

- Design a 2D diagram for diesel engine block
- Design an isometric view for Diesel engine block
- Design a diesel engine block in 3D

How these objectives can be achieved?

2D and isometric in AutoCAD can be made using drafting and annotation and for 3D we have to use 3D modeling.



Why 3D geometry was chosen for this particular problem?

3D geometry was used in designing this Engine block because of the following reasons

- 3D modeling makes it easier for us to see hidden parts which cannot be seen in Multiview.
- Once a 3D model in designed it is very easy to generate 2D views of the model.

IMPORTANT COMMANDS:

Extrude:

It is use to create a solid object using 2D object. I my project when I created a 2D diagram I used the extrude command to make it solid 3D.

Press-pull:

It is same as Extrude and in this project, it was used to create hole in a 3D model

UCS:

It was used to move X-Y-Z axis in 3D modeling. In this project it was used in dimensioning

Section plane:

This command is use to divide a section and reveal some hidden parts in three-dimensional modeling.

Shell:

This command is use to create shell form a solid object. In this project it was used to create a shell for the outer boundary of the block.

Arc:

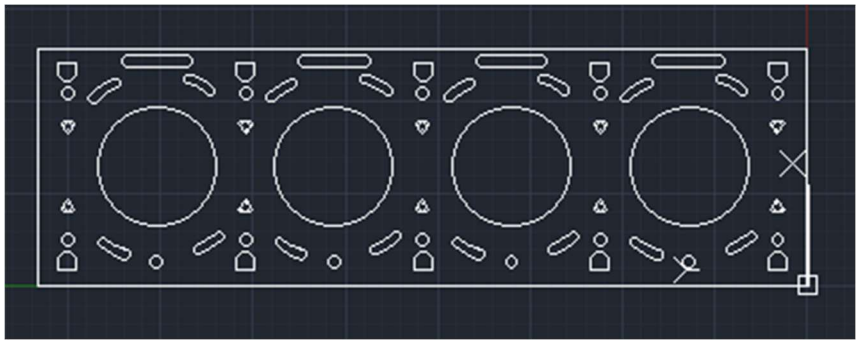
It is use to create a circular arc. In this project it was used in pattern of the top view.

Fillet:

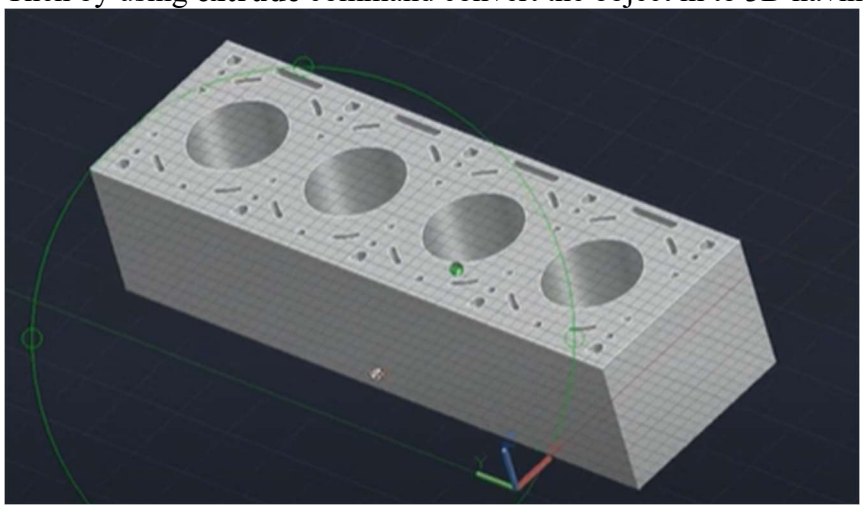
It is used to create a circular arc at the joining ends of two lines. In this project it was also used in pattern of the top view.

3D Modeling of Diesel Block:

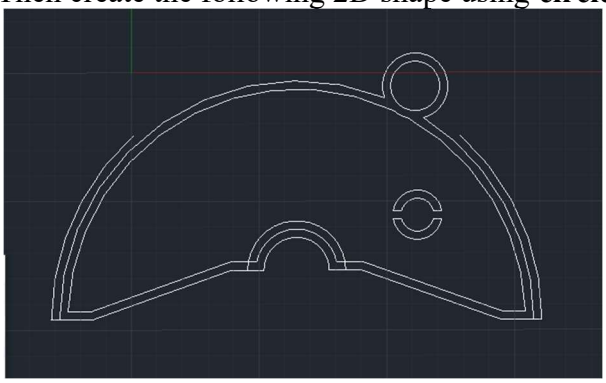
- First, we have to change our mode to 3D modeling in this way we can access different commands of 3D e.g., extrude, press pull, union, intersection, etc.
- Then we have to go in **SE isometric** view and draw the following 2D diagram (Dimensions:130x40).



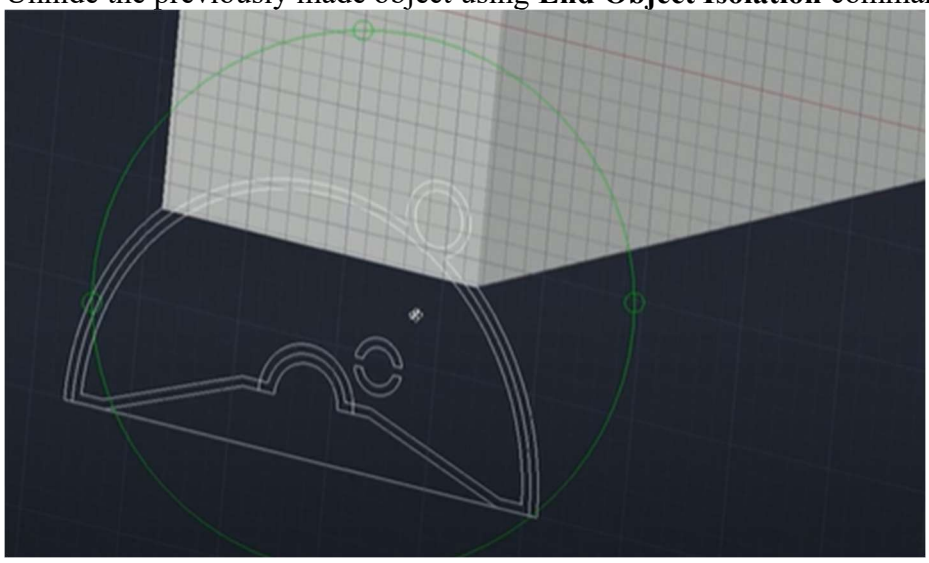
- Then by using **extrude** command convert the object in to 3D having the width of 30 units



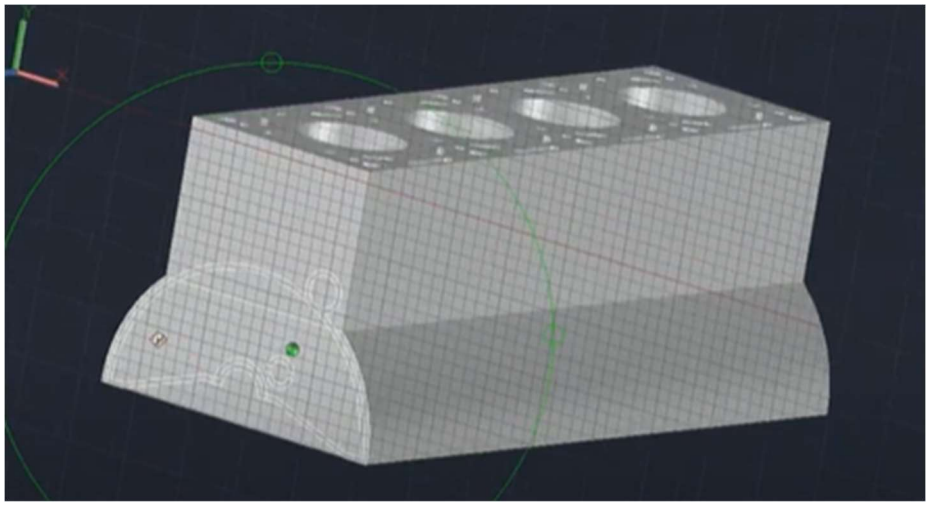
- Then using **Hide Object** command hide object that is just made but before hiding keep the side view in front of screen
- Then create the following 2D shape using **circle** command and **line** command



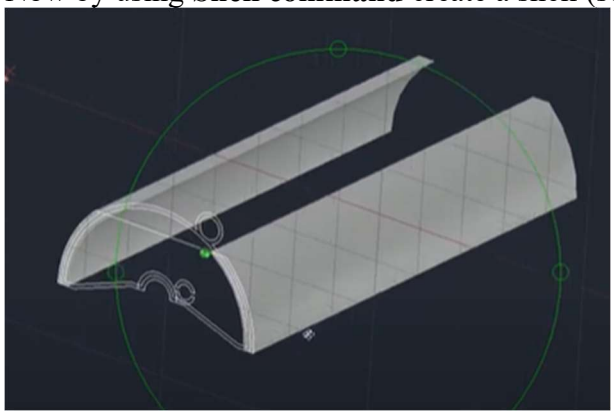
- Unhide the previously made object using **End Object Isolation** command



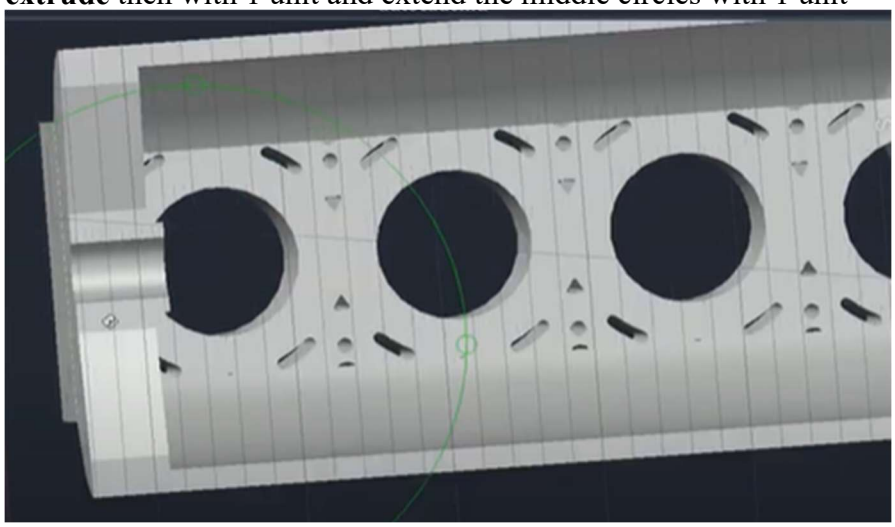
- Now, select the outer most circle and use the extrude command to make it solid 3D



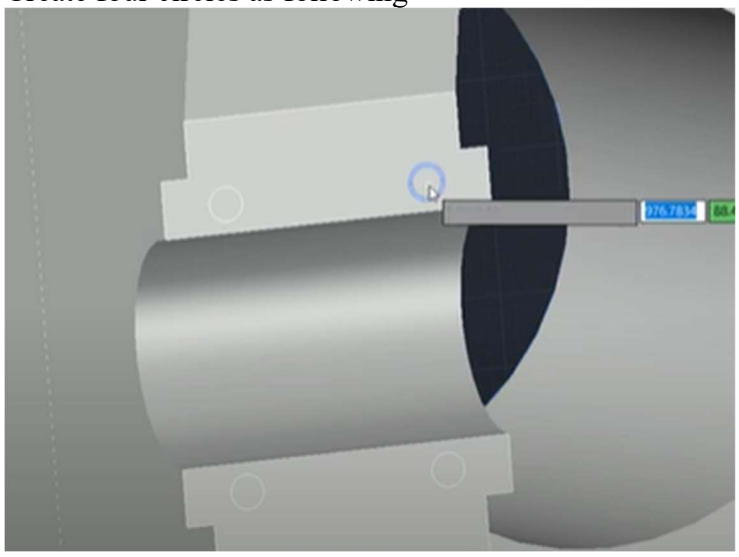
- Then hide the top block object again
- Now by using **Shell command** create a shell (setting the offset distance of 1 unit)



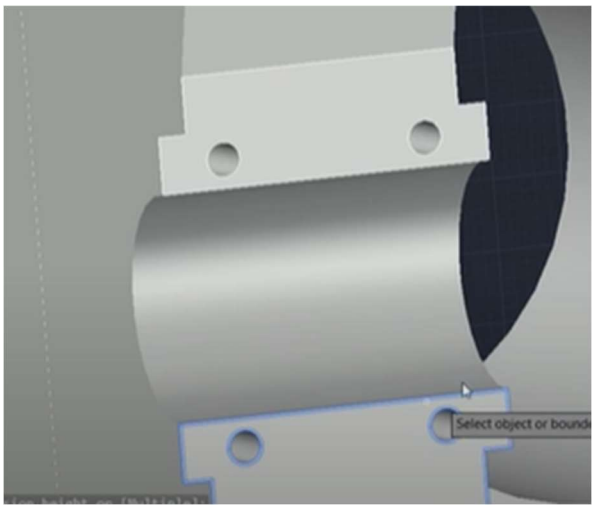
- Then by using the select the outer most circles (without the upper small circles) and **extrude** then with 1 unit and extend the middle circles with 1 unit



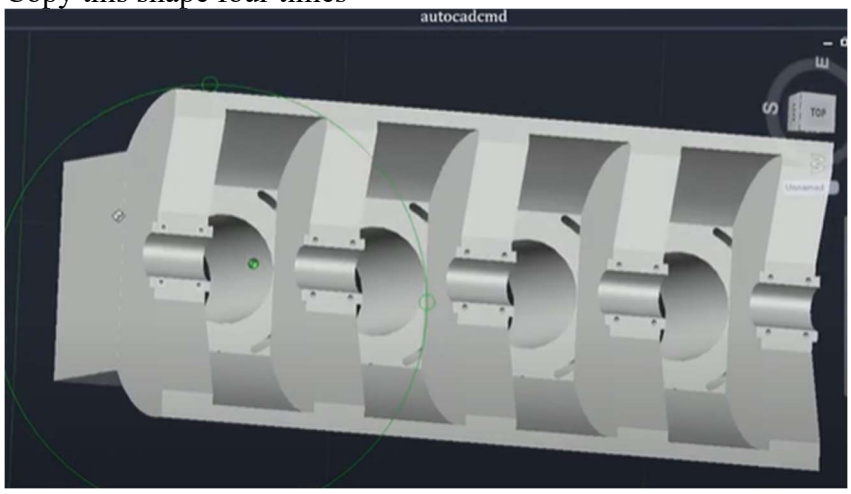
- Create four circles as following



- Now extrude these four circles at five units

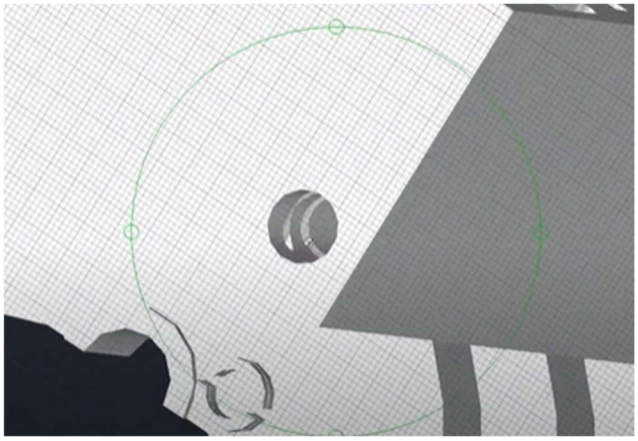


- Copy this shape four times

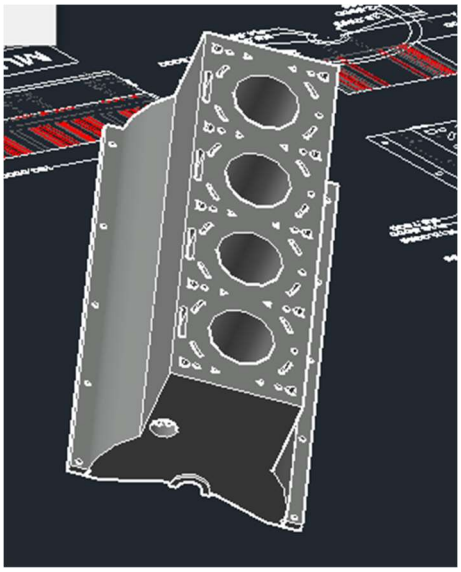


- Hide above object using **Hide object** Command
- Then by using the extrude command and front circles create the following object

- The above diagram has a hole on upper side using that hole we have to create a hole in the top block

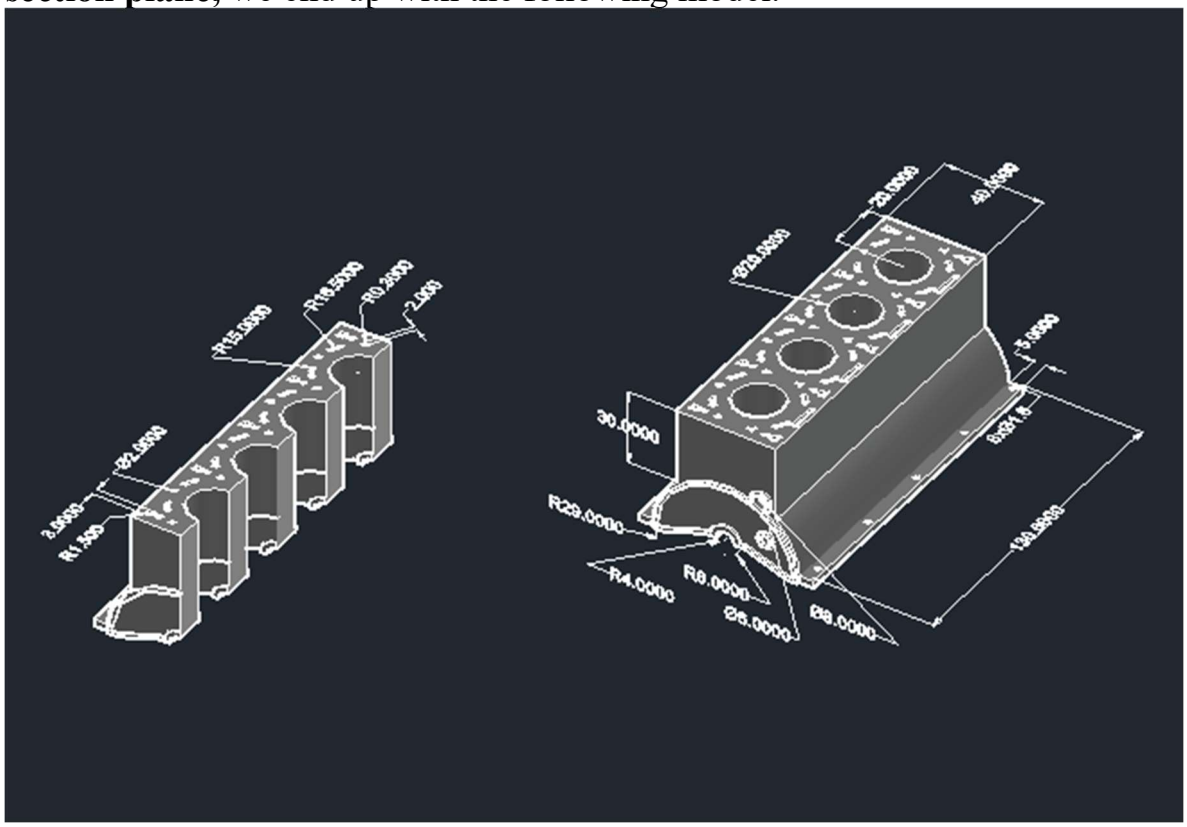


- On the sides we have to create a strip and make four holes in it of radius 0.9 unit



Final Model:

After going through all of above-mentioned steps and applying dimensions **section plane,** we end up with the following model.



2D Drawing of Diesel Block using Drafting and Annotation:

Once 3D model is made it is very easy to use draw 2D drawing using **section plane** command.

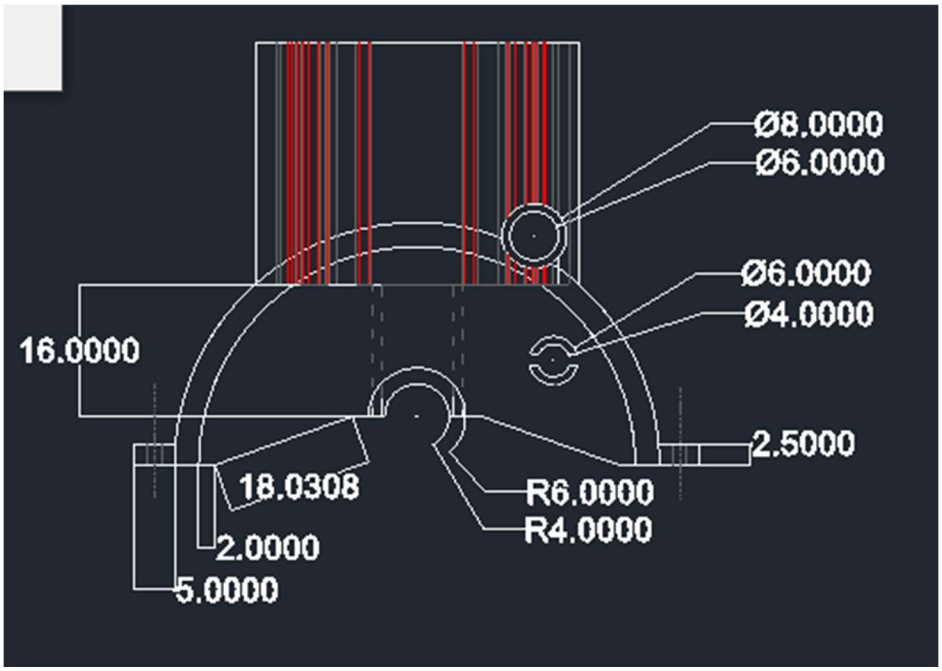
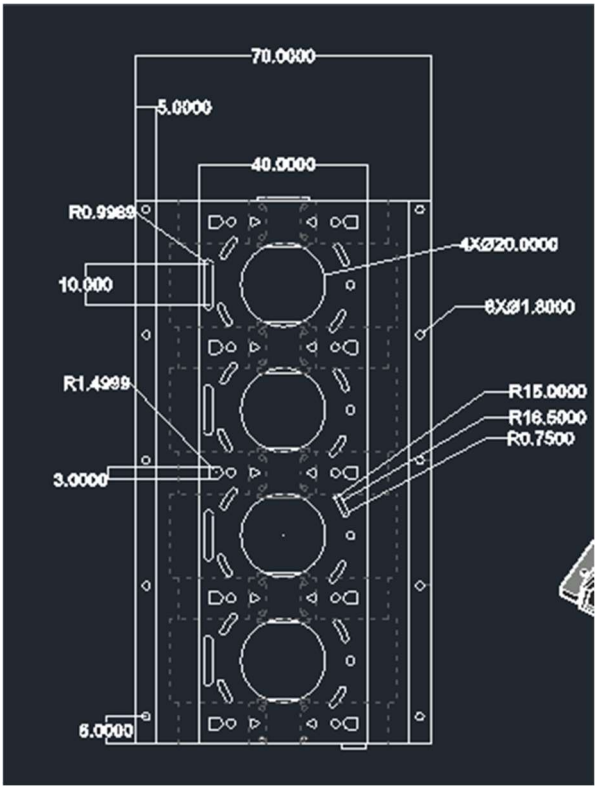
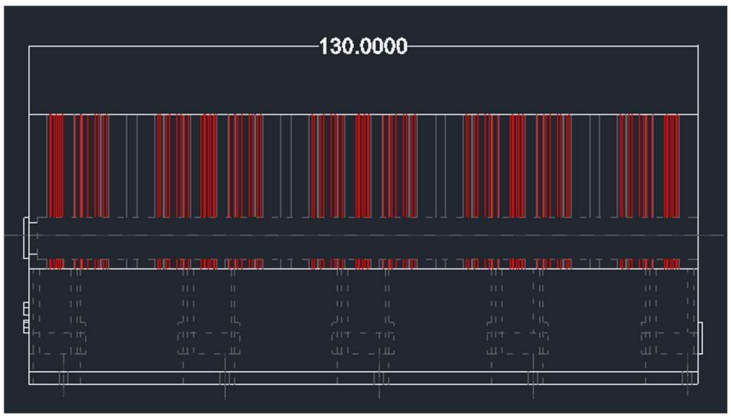
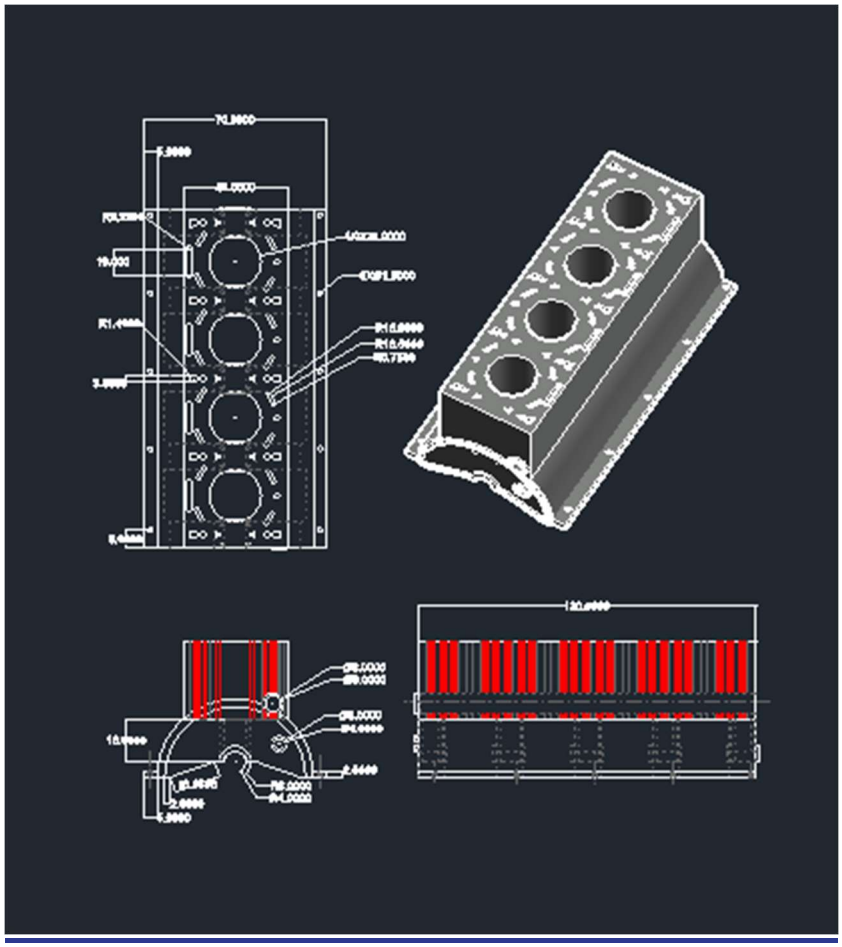


Figure 1(front View)







Discussion:

The Diesel Engine block is one of your engine's central components. It plays a key role in the lubrication; temperature control and stability of the engine and it has to be of precise measurements so there is no room for mistake.

Why I chose this project?

I have chosen this project because of the following reasons.

- To gain hands on experience of different tools in AutoCAD.
- To learn about the 3D modeling
- To learn different technique of in 3D modeling

Improvements:

This model can be improved if the size is decreased so that is occupies less space in car.