



**Ahmedabad
University**

School Of Engineering and Applied Science

Computer Aided Design and Manufacturing

Fabrication of Bracket for Bearing Assembly

By: Group 4

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1. Introduction

Bearing assembly consists of a mounting bracket (pillow block) that houses a bearing and is used in low-torque, light load applications. With this configuration, the mounting bracket is bolted to a foundation, securing it, while the shaft and the inner ring of the bearing are free to rotate. Usually made of gray cast iron, pillow blocks come in two types, split or unsplit. With split pillow blocks the housing element or cap can be separated from the base. An unsplit pillow block is made from one solid piece. These pillow blocks differ from plummer blocks in the sense that in plummer blocks, bearings are attached separately. Even though they are made of gray cast iron, they can be made of various other materials such as stainless steel, ductile iron and mild steel. The bearing element is made from chromium steel alloy, plastic or cast bronze (SAE660). This bearing assembly contains a bearing of various rolling elements, e.g. ball, cylindrical roller, spherical roller, tapered roller or metallic or synthetic bushing. The main purpose of bearing assembly is to mount a bearing in such a way that the outer ring of the bearing is stationary while allowing rotation of the inner ring.

2. Objective

Fig. 2.1 shows the isometric view of the final product after all the manufacturing processes and assembly are done. The upper cylindrical part (part no. 3) which is welded with part no. 2 (Fig. 2.2) has a hole of diameter 20 mm. This combined part is welded on the two sides of part no. 1 (Fig. 2.2) such that the holes on both these parts share a common central axis. These holes contains bearings in it through which the shaft passes for further use. If the holes do not share a common central axis, then it will not allow the shaft to pass through both holes at the same time, will thus fail to serve the purpose. This whole assembly requires four different parts to be manufactured separately and then welded as per above assembly drawing (Fig. 2.2 and 2.3). Fig. 2.4, 2.5, 2.6 and 2.7 show the parts that have to be manufactured. Dimensions written in red show the dimensions that we derived after manufacturing of pocket

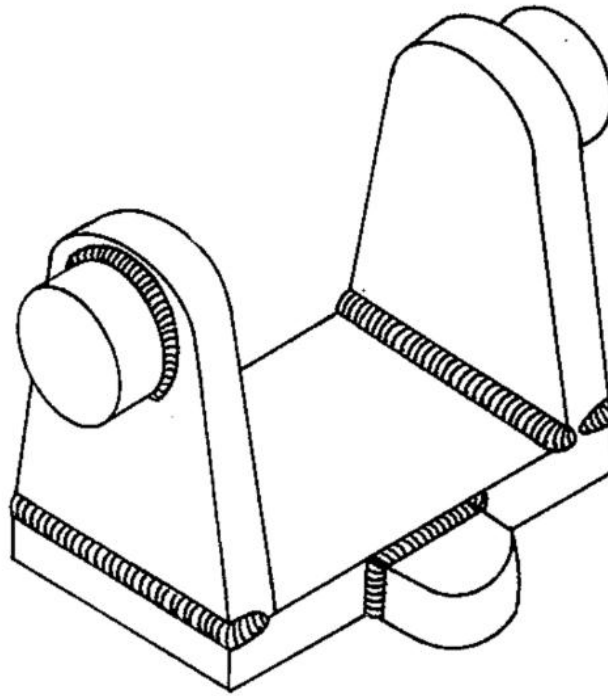


Fig 2.1: Isometric view of the expected product

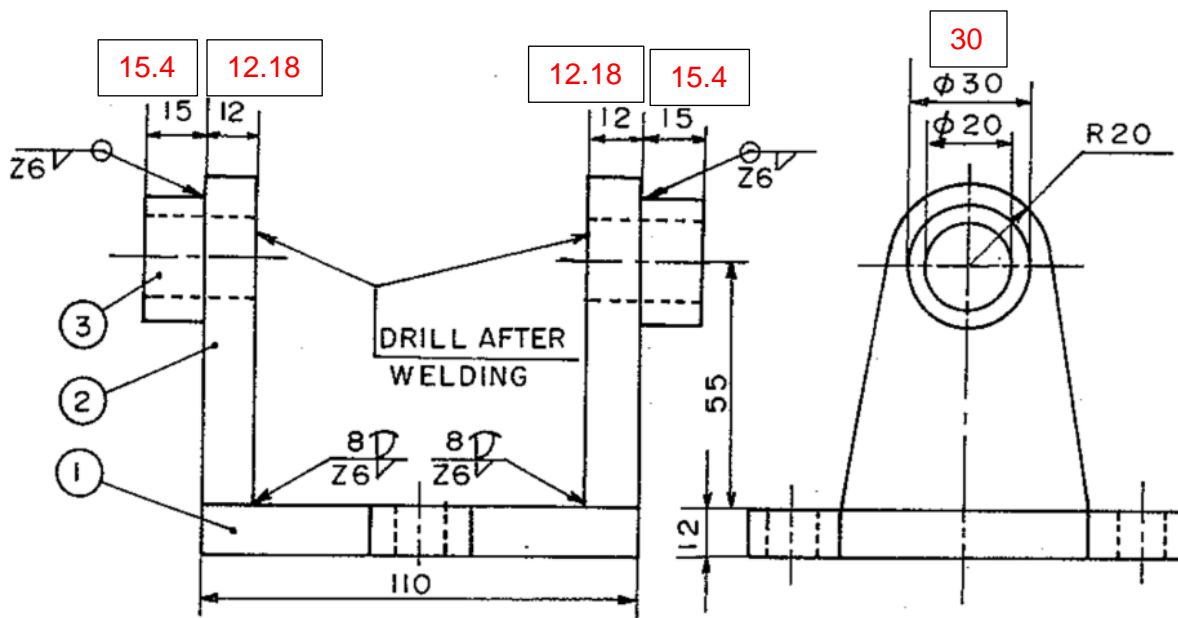


Fig 2.2: Front view of the expected product

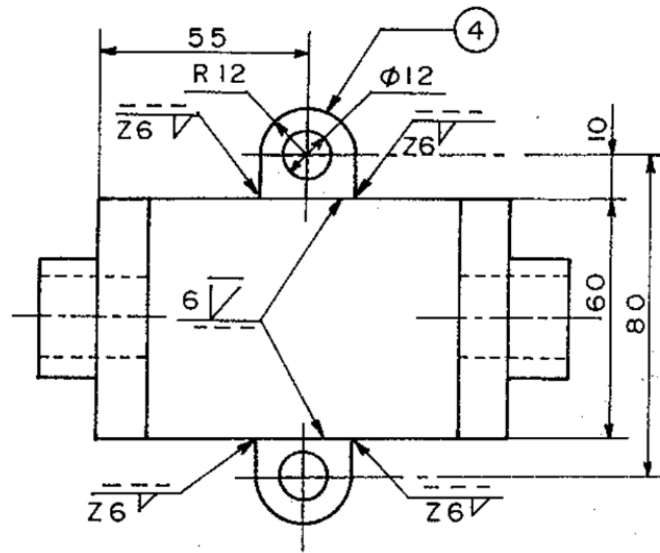


Fig 2.3: Top view of the expected product

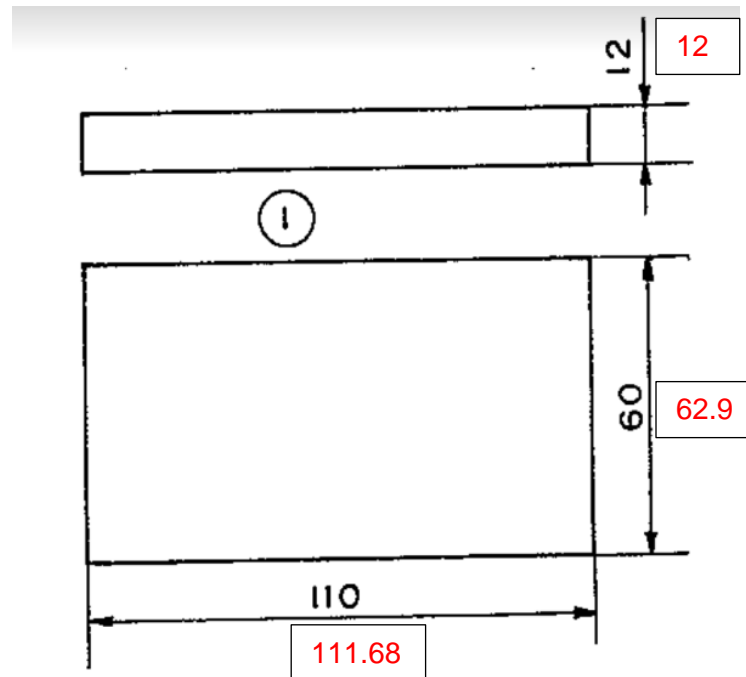


Fig 2.4: Part 1

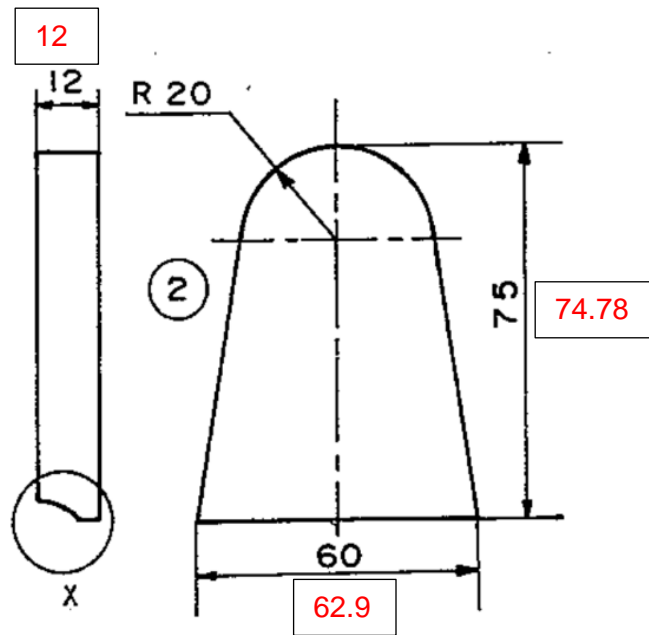


Fig 2.5: Part 2 (2 nos. of this part are required in final assembly)

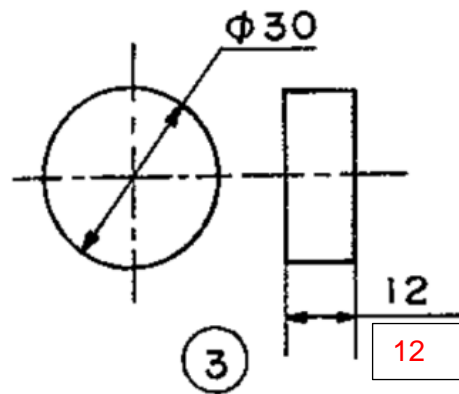


Fig 2.6: Part 3 (2 nos. of this part are required in final assembly)

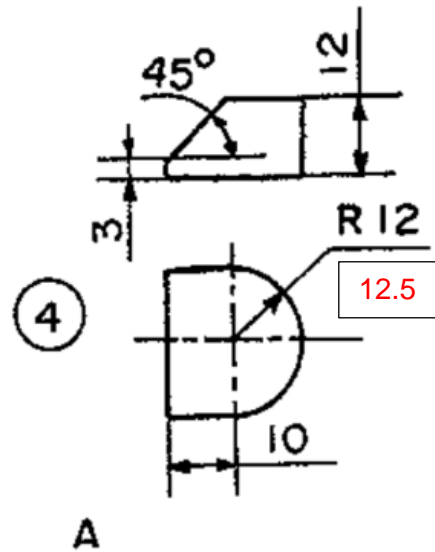


Fig 2.6: Part 4

3. Block Bearings

In this assembly, block bearings will be used through which the shaft will pass. Some of the advantages and disadvantages of block bearings are discussed in this section.

3.1 Advantages

1. Pillow block bearings have accuracy in shaft alignment.
2. Pillow block bearings can be installed with either continuous or end supports.
3. They handle moment loads well.
4. They offer low drag and excellent smoothness.
5. Pillow block bearings are without doubt easier and less expensive to install.
6. Overall dimensions are small of pillow block bearings.
7. They can work in any weather.

3.2 Disadvantages

1. Non operable at very high speed.
2. Low resistance to shock loading.
3. Initial cost is a little high.
4. Design of bearing housing is complicated.

4. Machines Used and Manufacturing

4.1 Pillar Drill Machine

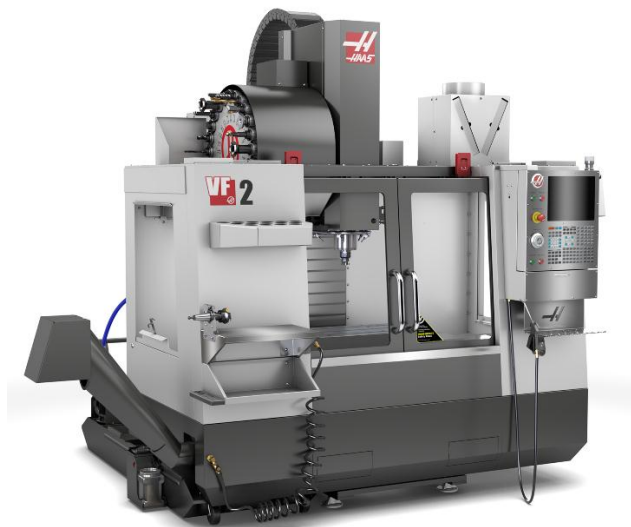


Specifications:

1. Make: Nilmani
2. Motor Power: 1 HP
3. Chuck: 0.5" drill chuck

We used drill bits of 6mm, 12.5mm and finally 20 mm for drilling the holes

4.2 HAAS VMC



The tool that was used in this VMC machine for machining of the part that we required was End Mill Cutter of 16 mm diameter.



4.3 MIG Welding

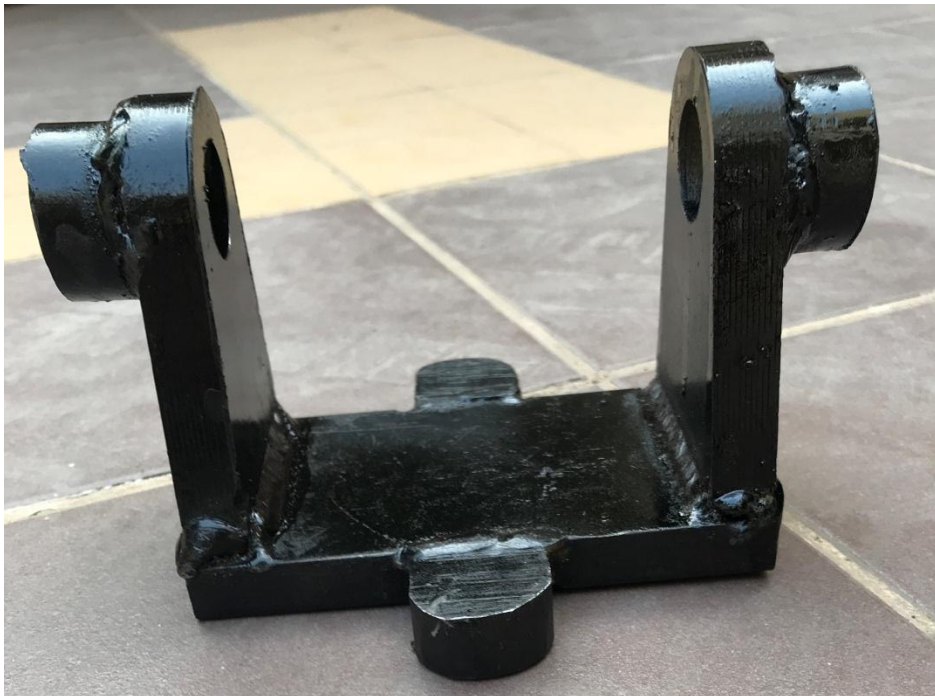
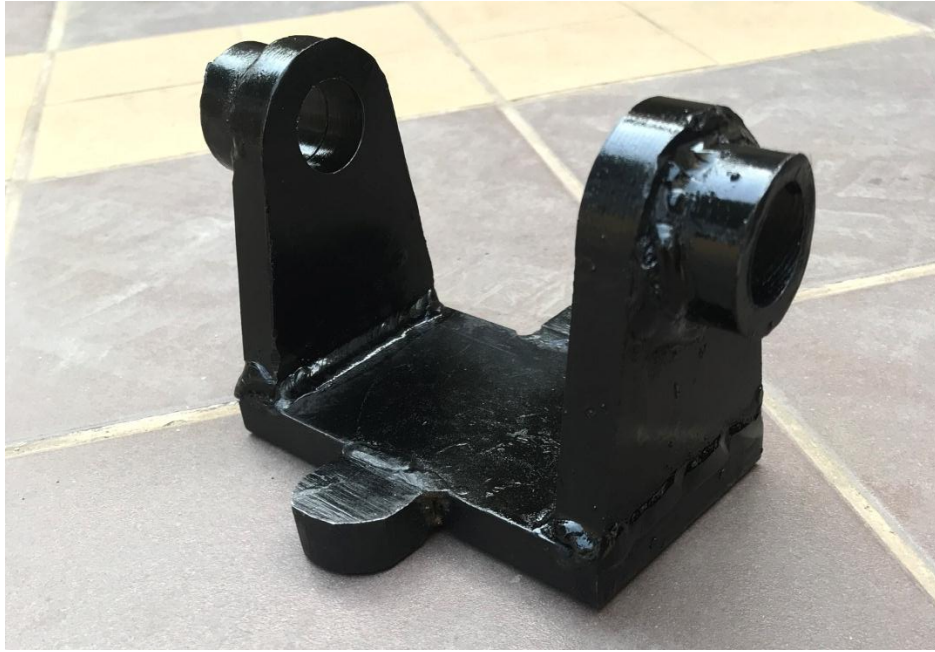


Specifications:

1. Make : Met-Weld
2. Model : MIG400I, MIG and ARC both options inbuilt
3. 36 KD MIG Torch
4. CO2 Regulator
5. 70-400 amps o/p
6. Inverter based
7. 17 KVA at 60% duty cycle

0.75 mm welding wire was used for the purpose of welding the parts in this project.

4.4 Final Product





4.5 Code used in VMC

O00022 (UNIVERSAL JOINT);

G40 G00 GBO G90 G94 ;

G00 G53 70;

M06 T2 ;

M03 S3000 ;

G00 G90 G54 X-55 Y50 ;

G43 H02 750 ;

GO1 750,2 F1000 MOB ;

M97 P1005 L50 ;

G90 GOO 780; M05 ;

M09;

GOO G53 70 ;

GOO G53 Y0 ;

M30;

N1005 G91 GO1 Z-0.5 F50 ;

G41 D02 ;

GOO GO1 X-55 Y50 ;

G90 GO1 X-55 Y30 F500 ;

GO1 XO Y20;

G02 X0 Y-20 R20 ;
GO1 X-55 Y-30 ;
GO1 X-55 Y-50 ;
G42 D02 ;

GO2 X0 Y-20 R20 ;
GO1 X-55 Y-30 ;
GO1 X-55 Y-50 ;
G42 DO2 ;
GO1 X-55 Y-50 ;
G91 GO1 Z-0.5 F500 ;
G90 Gel Y-30 ;
GO1 X0 Y-20 ;
G03 X0 Y20 R20;
GO1 X-55 Y30 ;
GO1 Y50 ;
G40 ;
M99 ;