DESIGN AND DEVELOPMENT OF MOTORAISE GRINDING VALVE FOF MOTORCYCLE ENGINE

ABDUL HADI BIN SHAMSUL KAMAR

UNIVERSITI MALAYSIA PAHANG

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JUDUL: DESIGN AND DEVELOPMENT OF MOTORAISE GRINDING VALVE FOF MOTORCYCLE ENGINE

SESI PENGAJIAN: 2011/2012

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Alamat Tetap:
F9,
Jalan kekabu 5 Kuartes UPM,
43400 Serdang
Selangor.

Dr. Sugeng Ariyono

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DESIGN AND DEVELOPMENT OF MOTORAISE GRINDING VALVE FOF MOTORCYCLE ENGINE

ABDUL HADI BIN SHAMSUL KAMAR

Report submitted in partial fulfillment of the requirements
for the award of Diploma in Mechanical Engineering

Faculty of Mechanical Engineering
UNIVERSITI MALAYSIA PAHANG

JANUARY 2012

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project report and in my opinion this project is satisfactory in terms of scope and quality for the award of Diploma in Mechanical Engineering.

Signature:
Name of Supervisor: Dr. Sugeng Ariyono
Position: Lecturer
Date: 10 January 2012

STUDENT DECLARATION

I hereby declare that the work in this report is my own except for quotations and summaries which have been duly acknowledged. The report has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature:
Name: Abdul Hadi Bin Shamsul Kamar
ID Number: MB09145
Date: 10 January 2012

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I sincerely grateful to my parents, Shamsul Kamar Bin Abdullah and Kasmah Mohammad for they love and sacrifice that they had for me throughout my life and their support for me in all my activities that I have done. I also wanted to that other people who have directly or indirectly help in the completion of my Final Year Project. I sincerely appreciate all your help.

ABSTRACT

This report shows the design and development of motoraise grinding valve for motorcycle engine. The objective of the report is to design and development a motoraise grinding valve for motorcycle engine. Design generation is showed and solid three dimensional structures modelling of the motoraise grinding valve was developed with computer aided design software. This report also explains the fabrication process that is needed for this project. Material that is being used in this project is galvanize iron sheet metal and mild steel bar, shaft and hollow shaft. The problems encountered during completion of this project are also show in the report. An idea of improvement for the motoraiser grinding valve is also provided to further improve the motoraiser grinding valve. The expected result for this project can solve the entire stated problem statement.

ABSTRACT

Laporan ini menunjukkan reka bentuk dan pembangunan pencanai injap bermotor untuk enjin motosikal. Objektif laporan ini adalah untuk merekabentuk dan membangunkan pencanai injap bermotor untuk enjin motosikal. Konsep lukisan dan reka bentuk telah ditunjukan dalam bentuk tiga dimensi, lukisan struktur model pencanai injap bermotor telah dihasilkan dengan perisian reka bentuk komputer. Laporan ini juga menerangkan proses pembuatan yang diperlukan untuk projek ini. Bahan yang digunakan dalam projek ini adalah galvanise iron dan beberapa logam asli. Masalah-masalah yang dihadapi semasa menyipakan projek ini juga turut di nyatakan dalam laporan itu. Idea penambah baikan bagi pencanai injap bermotor juga disediakan untuk meningkatkan lagi keupayaan pencanai injap bermotor tersebut. Keputusan yang dijangkakan bagi projek ini ialah dapat menyelesaikan segala penyataan masalah yang telah di nyatakan.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

CHAPTER 1 is the introduction chapter of this project. Generally, it discuss about the project background, problem statement, the objective, scope of project, project flow and project Gantt chart.

1.2 BACKGROUND

Engine valves open and close to allow in a mixture of air and fuel for combustion, and it is important that they have a good seal for optimal engine performance. A poor seal will leak fuel into the engine and can cause heat damage to the engine. When replace or repair valves, the edges must be ground to fit. People began grounding metal thousands of years ago, and similar methods are implemented today.

The basic principle of grinding is to rub a metallic edge against an abrasive surface, such as a rock. Modern advancements improve efficiency and quality of grinding. Lapping is the other name for grinding valve it makes the valves seat like new again in the valve slot.

When the valve is closed and there is not a perfect seal it wills loss compression. This is a great thing to do if doing a hybrid since it will have the heads off anyways. On high mileage engines it is recommended to take the valves in to the ground before lapping.

1.3 PROBLEM STATEMENT

Until now days many workshop are still using manually with is using man power to do lapping or grinding valve, this process are usually take long time to done some time it takes several hour. I decide to make a motoraise grinding valve for motorcycle engine to make it easier and save man power for lapping or grinding valve, so man power can be use for doing other work while waiting lapping process done.

1.4 OBJECTIVE

The objective of this project is:

(i) To design motorise grinding valve for motorcycle engine.
(ii) To development of motoraise grinding valve for motorcycle engine.

1.5 SCOPE

In this project, scope performed a range in the completion of a project. The scopes of this project are:

(i) Use motorcycle engine head to lapping and grinding valve hole.
(ii) Development of portable motoraise grinding valve for motorcycle engine.
(iii) Development Motoraise grinding valve is easy to operate.

1.6 FLOW CHART

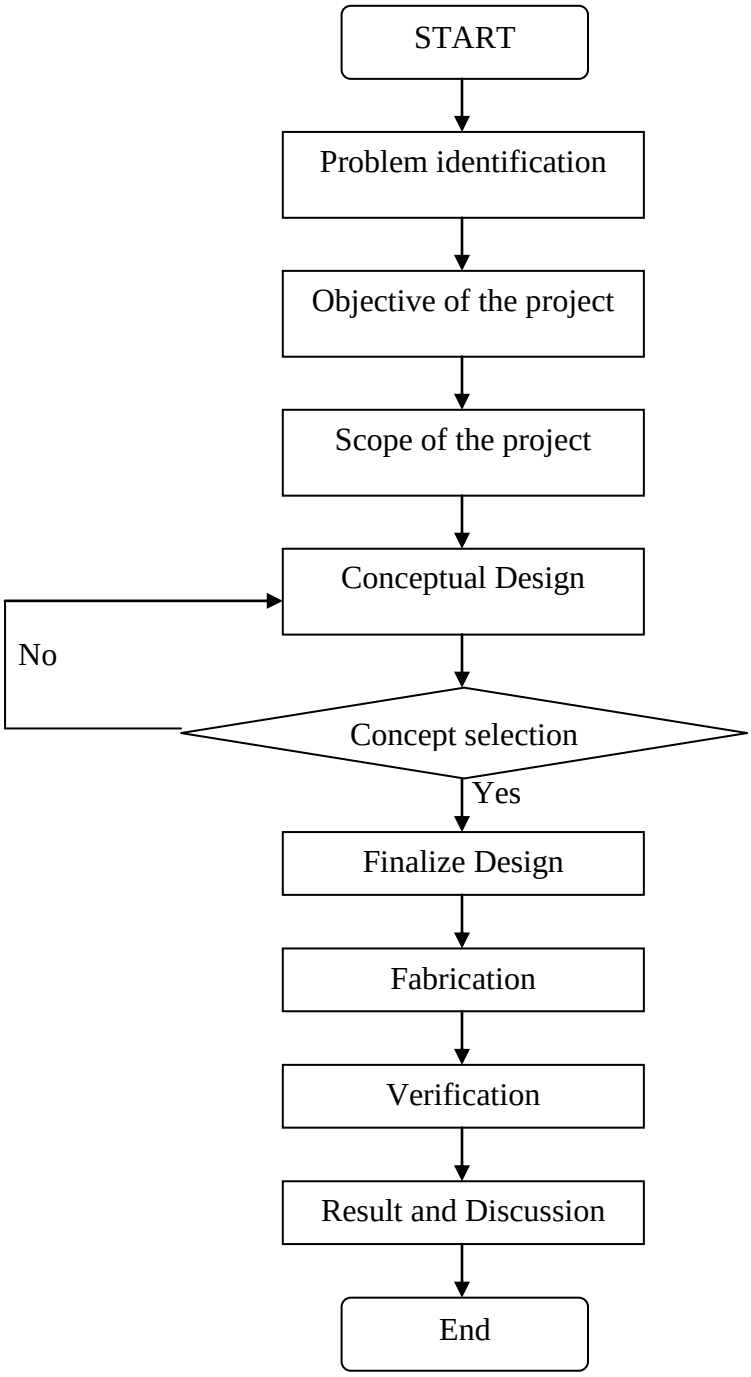

Figure 1.1: Flow Chart

The project starts identify the problem. It is a first step for the project flow in order to find the problem in conventional lapping. This step helps to create a different design to improve the product.

After identify the problem for the project, project continues with identify the objective. The objective is very important in every work because every procedure to make a project will depend on it. It will help to know the main point to make the project success or not.

The project continues with identify the scope of the project because this scope can help the progress to create the new product design for the project and to make sure the method chose will be within the range of achievable objective.

Next continue it with literature review and research about the title. This consist a review of the design and type of safety. These tasks have been done through research on the internet.

From the flow chart, start to design new concept. Use datum as reference. Then improve the design. Try to come with several concepts. Then compare the criteria from each design which the most best. If the design chosen still needed to be improved go back to the previous steps. If no improvement is needed go to next step. Produce the drawing together with dimension of the product and the type of material needed.

After completing the previous task, start the fabrication process. Gather the parts needed for the project to proceeds the fabrication process.

Here come the testing and evaluation process. The motoraise grinding valve for motorcycle engine will be test to see if it full fills the objective of development, safety, ability and strength. During the testing, if problem occur, the process of fabrication motoraise grinding valve will step back to the previous process. The reason to step back is to fix the error.

After all part had been joined together and no error, here comes the phase of result and discussion. In this part, how the motoraise grinding valve function will be informs.

Beside, how to achieve objective and solve problem statement of the project will be discuss in this phase.

1.7 GANTT CHART

Gantt chart is an importance to guide work process during this project. With Gantt chart what need to be done first can be plan accordingly. Other than that, this project will run smoothly and finish on time.

Table 1.1: Gantt chart

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Task														
Data collection														
Interpreting data														
Project sketching														
Project drawing (CAD)														
Material selection														
First presentation														
Project fabrication														
Part assembly														
Design testing														
Finishing														
Final presentation														
Report														
Planning														
Actual														

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

CHAPTER 2 is the literature review of the project. In this chapter, basic principle of grinding is to rub a metallic edge against an abrasive surface.

2.2 GRINDING AND LAPPING

Grinding is the process of removing metal by the application of abrasives which are bonded to form a rotating wheel. When the moving abrasive particles contact the workpiece, they act as tiny cutting tools, each particle cutting a tiny chip from the workpiece. It is a common error to believe that grinding abrasive wheels remove material by a rubbing action actually, the process is as much a cutting action as drilling, milling, and lathe turning. Lapping is the process by which material is precisely removed from a workpiece (or specimen) to produce a desired dimension, surface finish, or shape.

2.3 ABRASIVES

Most grinding wheels are made of silicon carbide or aluminum oxide, both of which are artificial (manufactured) abrasives. Silicon carbide is extremely hard but brittle. Aluminum oxide is slightly softer but is tougher than silicon carbide. It dulls more quickly, but it does not fracture easily therefore it is better suited for grinding materials of relatively high tensile strength

2.4 TYPE OF GRINDING MACHINES

2.4.1 Floor Mounted Utility Grinding Machine

The typical floor-mounted utility grinding machine stands waist-high and is secured to the floor by bolts. The floormounted utility grinding machine mounts two 12inch-diameter by 2-inch-wide grinding abrasive wheels. The two wheel arrangement permits installing a coarse grain wheel for roughing purposes on one end of the shaft and a fine grain wheel for finishing purposes on the other end this saves the time that would be otherwise consumed in changing wheels.Each grinding abrasive wheel is covered by a wheel guard to increase the safety of the machine, Transparent eyes hields, spark arresters and adjustable tool rests are provided for each grinding wheel. A tool tray and a water pan are mounted on the side of the base or pedestal. The water pan is used for quenching carbon steel cutting took as they are being ground. Using the 12-inch wheel, the machine provides a maximum cutting speed of approximately 5.500 SFPM. The 2-HP electric motor driving this machine has a maximum speed of 1.750 RPM.

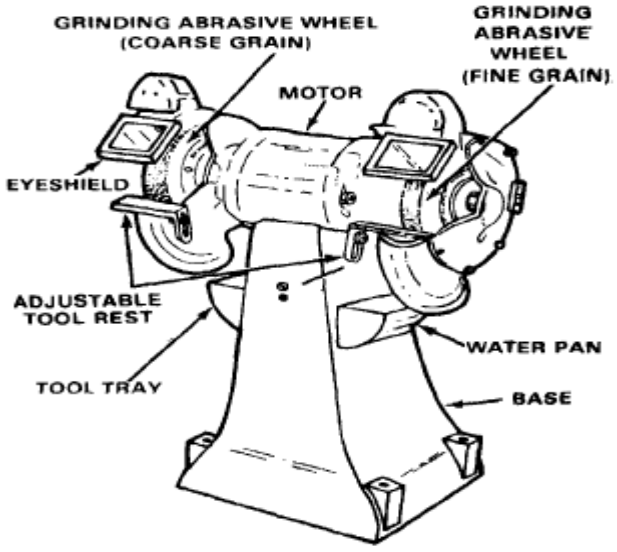

Figure 2.1: Floor Mounted Utility Grinding Machine

2.4.2 Bench Type Utility Grinding Machine

Like the floor mounted utility grinding machine, one coarse grinding wheel and one fine grinding wheel are usually mounted on the machine for convenience of operation. Each wheel is provided with an adjustable table tool rest and an eyeshield for protection. On this machine, the motor is equipped with a thermal over-load switch to stop the motor if excessive wheel pressure is applied thus preventing the burning out of the motor. The motor revolve at 3.450 RPM maximum to provide a maximum cutting speed for the 7 inch grinding wheels of about 6,300 surface feet per minute (SFPM).

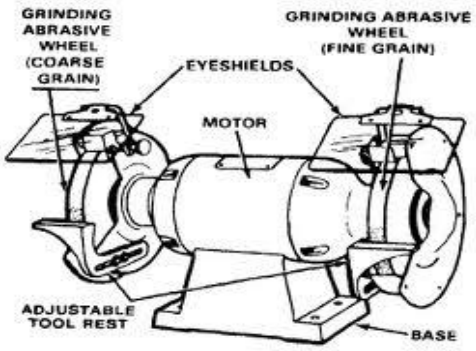

Figure 2.2: Bench Type Utility Grinding Machine

2.4.3 Milling and Grinding Lathe Attachment

Also called a Versa-Mil this attachment is a versatile machine tool attachment that mounts to the carriage of a lathe. It performs internal and external cylindrical grinding among its other functions

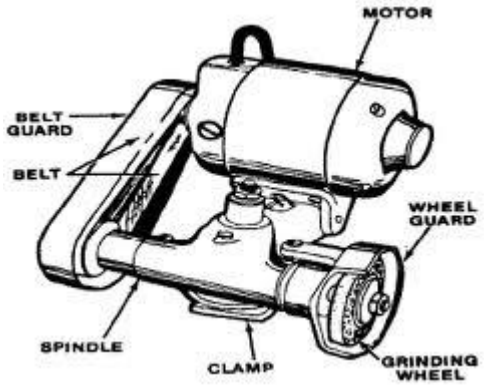

Figure 2.3: Milling and Grinding Lathe Attachment

2.4.4 Surface grinding machine

The surface grinding machine is used for grinding flat surfaces. The workpiece is supported on a rectangular table which moves back and forth and reciprocates beneath the grinding wheel. Reciprocating surface grinding machines generally have horizontal wheel spindles and mount straight or cylinder-type grinding abrasive wheels

Figure 2.4: Surface grinding machine

2.5 FABRICATION PLANNING PROCESS

2.5.1 Lathe

A lathe is a machine tool which turns cylindrical material, touches a cutting tool to it, and cuts the material. A material is firmly fixed to the chuck of a lathe. The lathe is switched on and the chuck is rotated. And since the table which fixed the byte can be moved in the vertical direction and the right-and-left direction by operating some handles. In order to get an efficient process and beautiful surface at the lathe machining, it is important to adjust a rotating speed, a cutting depth and a sending speed as shown in Figure below. I plan to use this process to reduce the diameter of the solidrod.

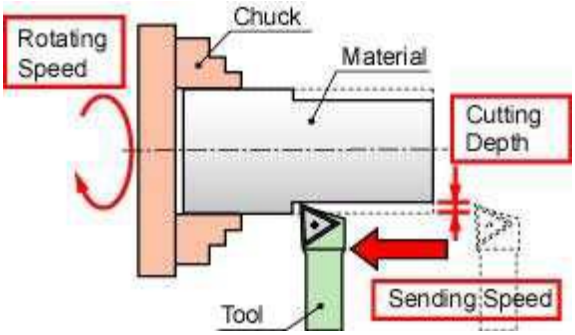

Figure 2.5: Lathe

2.5.2 Milling

Milling is the most common form of machining, a material removal process, which can create a variety of features on a part by cutting away the unwanted material. The milling process requires a milling machine, workpiece, fixture, and cutter. The workpiece is a piece of pre shaped material that is secured to the fixture, which itself is attached to a platform inside the milling machine. The cutter is a cutting tool with sharp teeth that is also secured in the milling machine and rotates at high speeds. By feeding the workpiece into the rotating cutter, material is cut away from this workpiece in the form of small chips to create the desired shape. Milling is typically used to produce parts that are not axially symmetric and have many features, such as holes, slots, pockets, and even three dimensional surface contours. For CNC milling machine, coding is the important thing to run the machine.

There are two ways to make a coding that is using a simulator or master cam. CNC milling machine is more accurate than conventional milling machine. Figure below is an example of milling process. I plan to use conventional milling machine to produce head holder for my project.

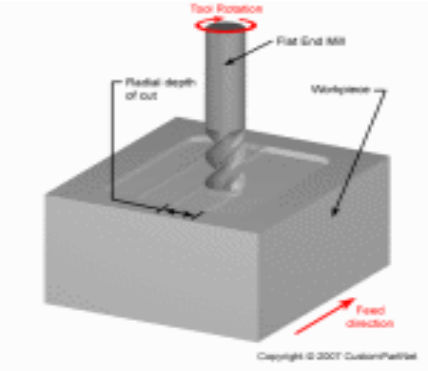

Figure 2.6: Milling

2.5.3 Drilling

There are many machines capable and used to drill, ream or thread holes in a part. Drilling is the manufacturing process where a round hole is created within a workpiece or enlarged by rotating an end cutting tool, a drill. Figure below show the drilling process. I plan to use this process to make a hole for screw and thread.

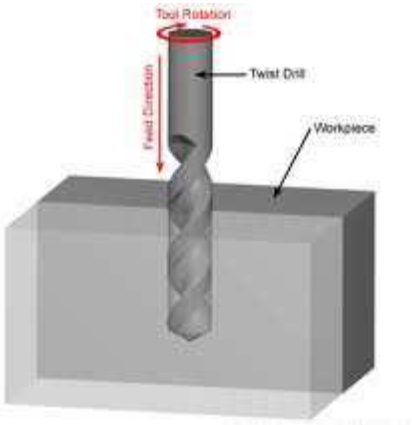

Figure 2.7: Drilling

2.5.4 Welding

Welding is one of joining process that joint part together to be a product. In faculty laboratory there has two type of welding that is metal inert gas welding, MIG and arc welding. Arc welding uses a welding power supply to create an electric arc between an electrode and the base material to melt the metals at the welding point. They can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. While MIG welding uses high deposition rate welding process,

wire is continuously fed from a spool. MIG welding is therefore referred to as a semiautomatic welding process. Figure below show the MIG welding process. I plan to use this process to make a join between workpiece.

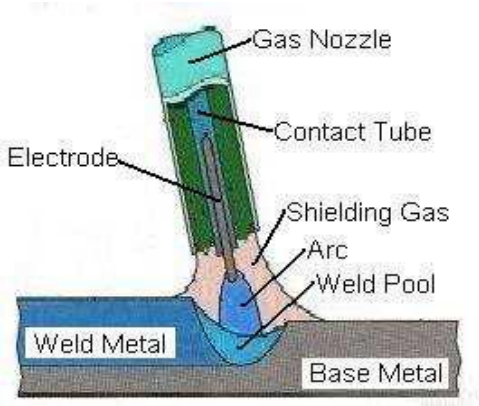

Figure 2.8: Welding

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

CHAPTER 3 is the methodology has been used to make motorize grinding valve for motorcycle engine. In this chapter, a project flow chart is defined. The information that included is establishing target specification, design concept, select final design concept, searching material for the product and fabrication of the product. It also allows others to replicate our study and run new and different studies that are based on our methodology.

3.2 PROCESS FLOW

Table 3.1 shows below the process flow of making motorize grinding valve for motorcycle engine. The manufacturing process consists of 5 phases.

Table 3.1: Process flow

PHASE	TITLE
Phase 1	Establish target specification.
Phase 2	Design concept.
Phase 3	Select final design.
Phase 4	Searching material for the product.
Phase 5	Fabrication of the product.

3.3 PHASE 1 - ESTABLISH TARGET SPECIFICATION

After the investigation of the objective, criteria selection will be developed. Criteria selection here means the criteria that what people will look on the product. Our product is not available yet in the market, we can see that usual motorcycle workshop not use any machine to make a grinding valve, they still use conventional way to grinding valve. Our product target is to sell this product to this kind of motorcycle workshop and for individual user.

This is the criteria that I had to use to the design new product for the motorize grinding valve for motorcycle engine.

a. Easy to use
b. Safety
c. Durable / long life time
d. Lightweight
e. Nice design
f. High resistance to corrosion
g. Low cost
h. Strong

3.4 PHASE 2 - DESIGN CONCEPT

The purpose of this project is to design motorise grinding valve for motorcycle engine and to development of motoraise grinding valve for motorcycle engine. It is also should look more efficient than conventional way to do grinding valve. The motivation for this project is to make grinding process become more perfect without human error and reduce manpower to done this process. So the new product and design should have a mechanism which available to grinding and hold the head block motorcycle. It will look more efficient and if people who use it, they could be interested in product because of the design and function that not available in market yet. Those are the idea concept for new design of motorise grinding valve for motorcycle engine.

3.4.1 Design Concept 1

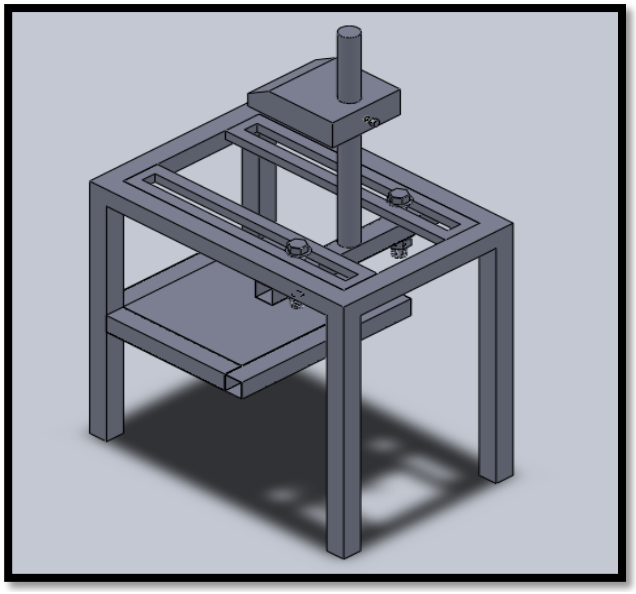

Figure 3.1: Concept 1

3.4.2 Design Concept 2

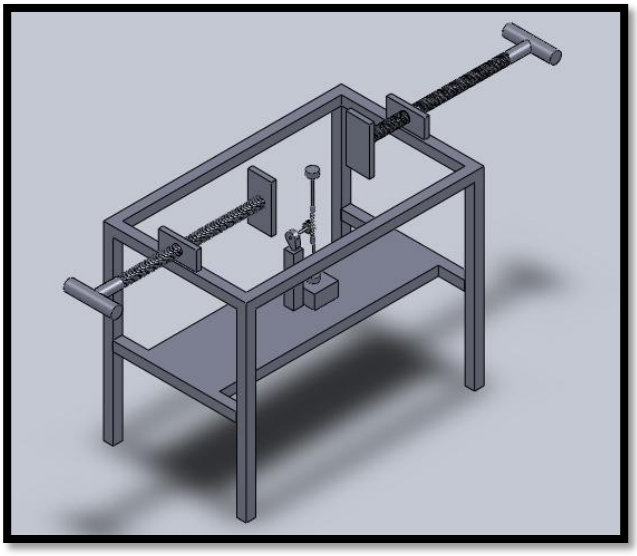

Figure 3.2: Concept 2

3.4.3 Design Concept 3

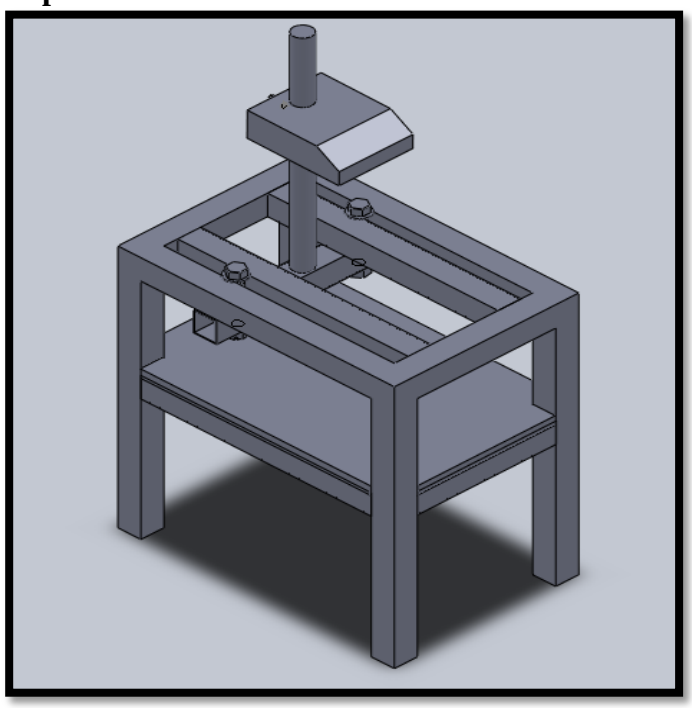

Figure 3.3: Concept 3

3.4.4 Design Concept 4

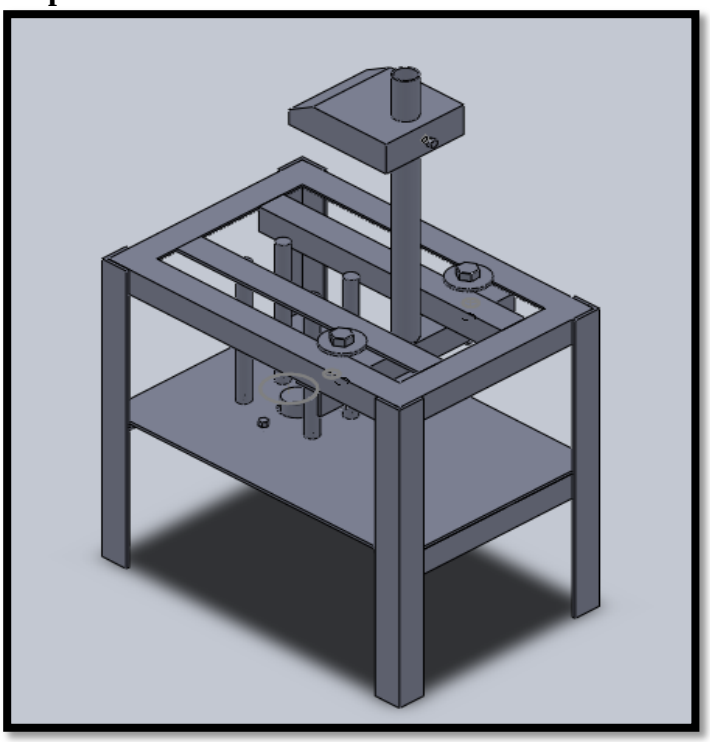

Figure 3.4: Concept 4

3.5 PHASE 3 - SELECT FINAL DESIGN

After the design concept, the best design is studied to relate it with criteria selection. Then make decision which design is the best. For this project, design concept 3 is the best after considering the criteria selection.

Table below is used to select which criteria is the best.

Table 3.2: Screening method

CHARACTERISTIC	DESIGN			
	1(DATUM)	2	3	4
Easy to use	0	-	+	+
Safety	0	-	0	0
Estimate cost	0	0	0	+
Aesthetic value	0	-	0	+
Manufacture	0	+	-	+
Long lasting	0	-	+	+
Strength	0	-	+	+
Sum of (+)	0	1	3	6
Sum of (0)	7	1	3	1
Sum of (-)	0	5	1	0
Net score	0	-4	2	6
Rank	3	4	2	1

Notes: + = better than
0 = same as
- = worse than

Design concept 4 had the higher net score than the other concept. So this concept had been chosen to be the final concept and will be fabricate. Figure 3.15 are the finalized design.

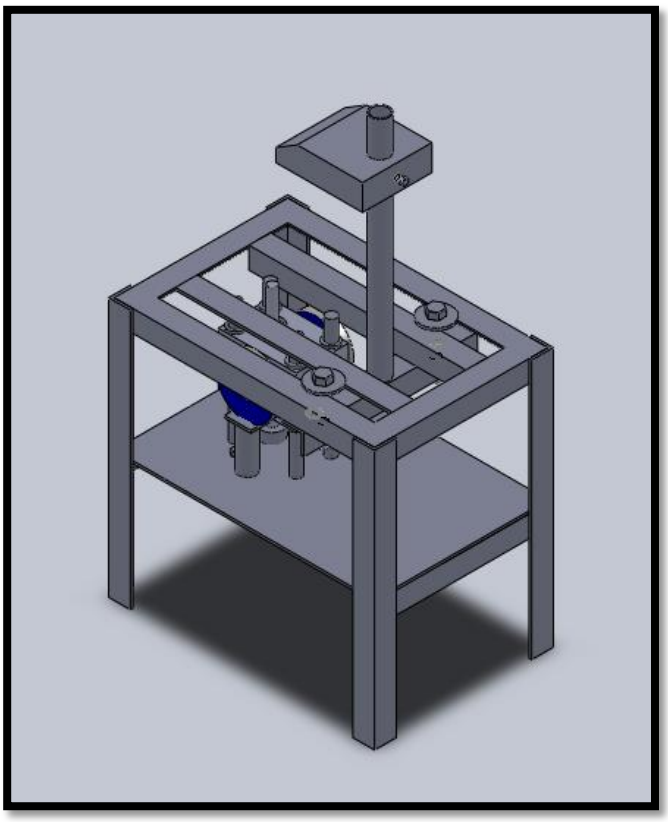

Figure 3.5: Finalized design

3.5.1 Sketching for mechanism

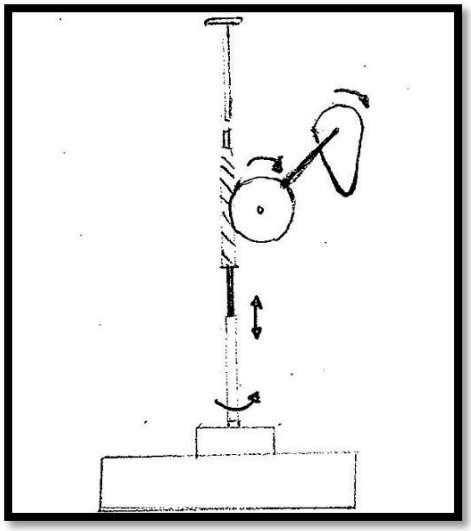

Figure 3.6: Mechanism concept

3.5.2 Drawing for mechanism (gear box)

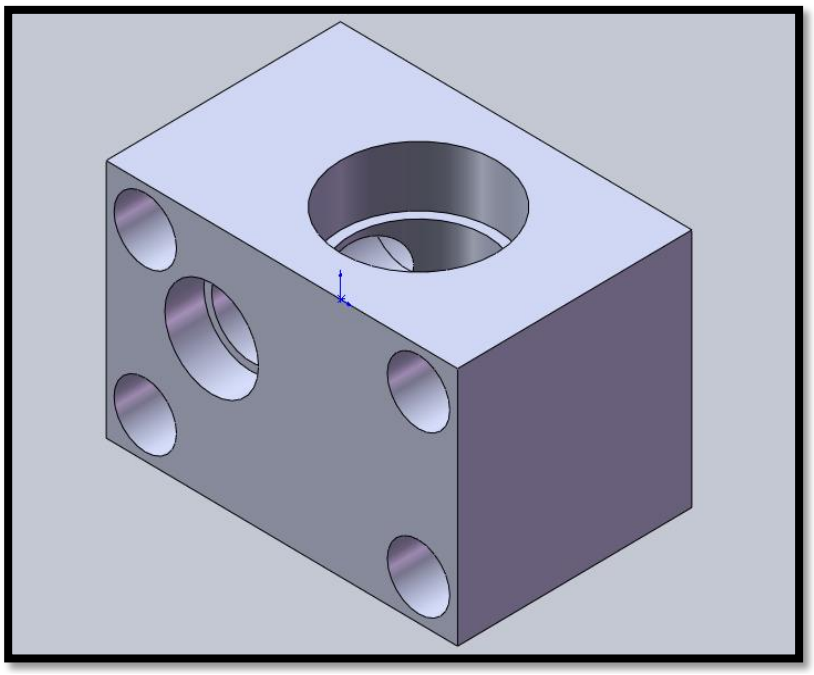

Figure 3.7: Gear box housing

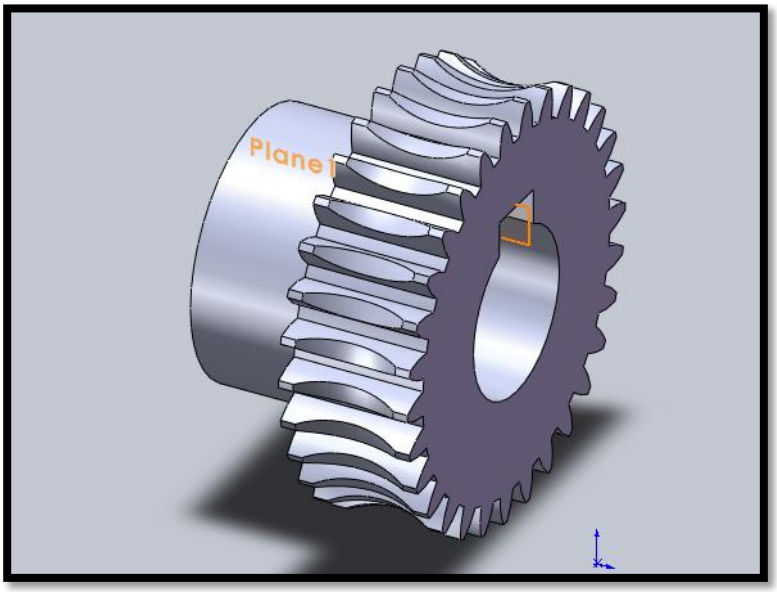

Figure 3.8: Worm gear

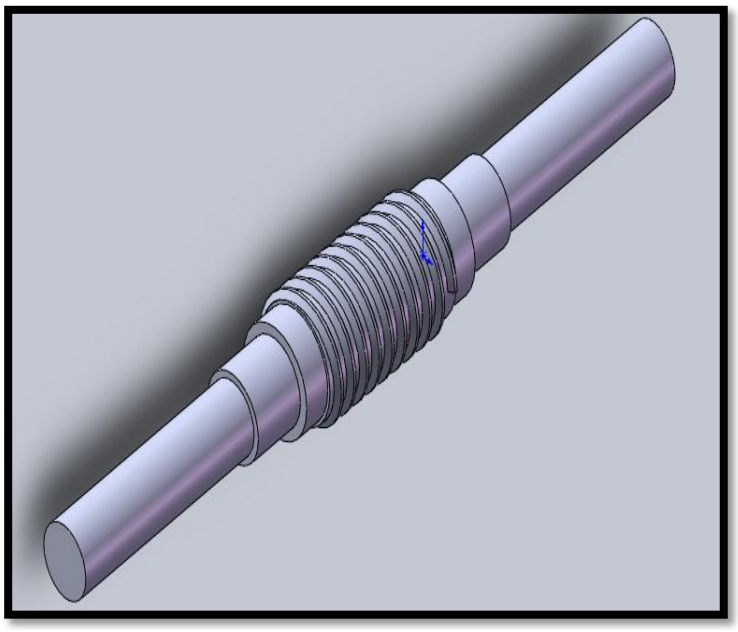

Figure 3.9: Worm shaft

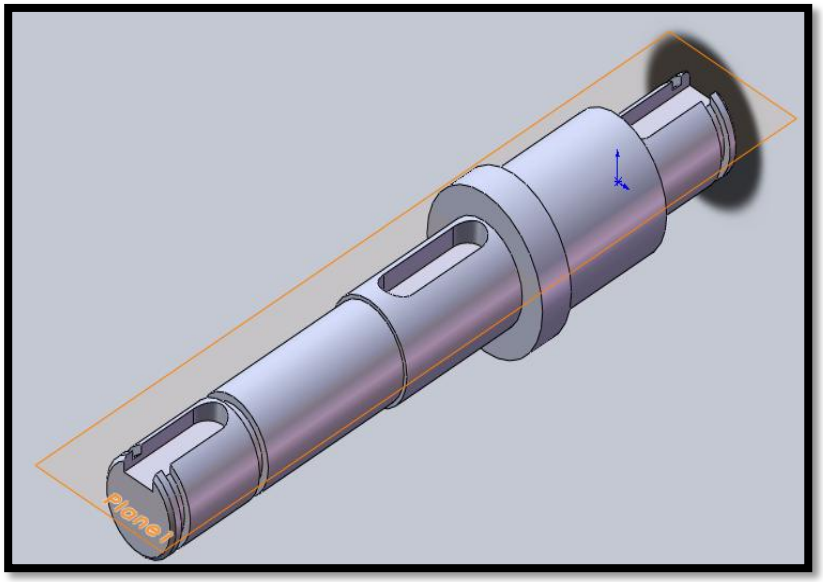

Figure 3.10: Cam shaft

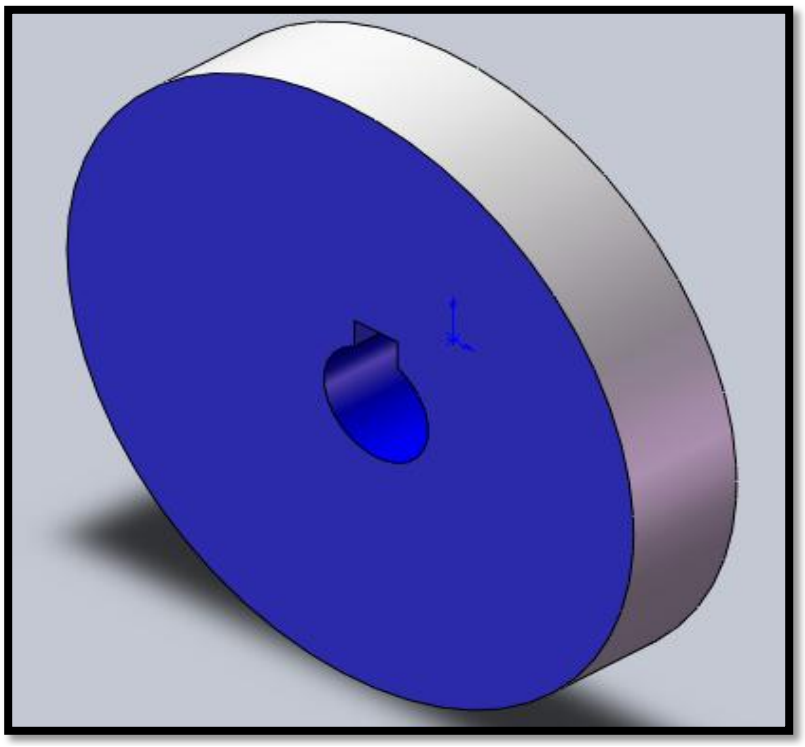

Figure 3.11: Cam

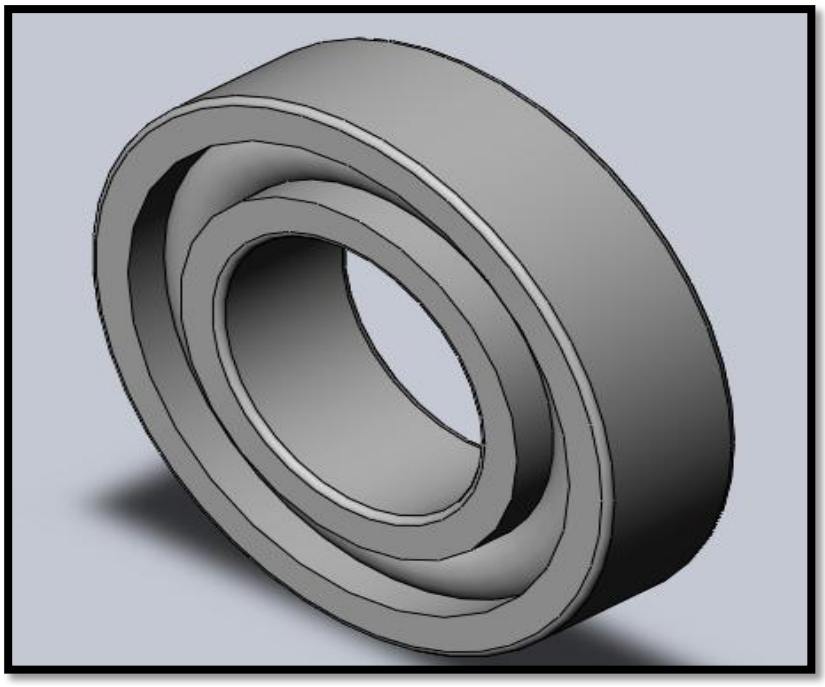

Figure 3.12: Ball bearing

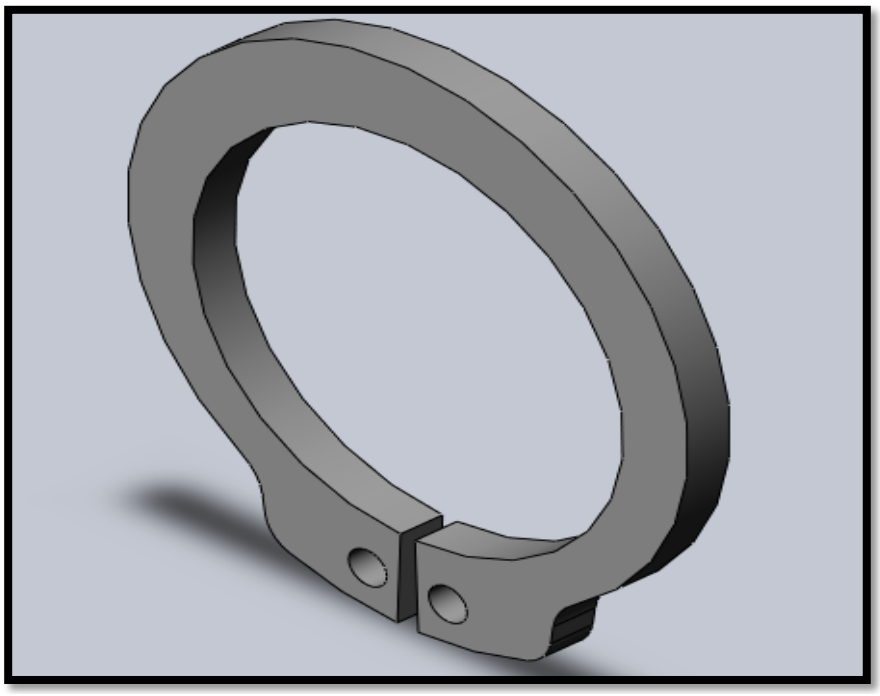

Figure 3.13: Ring

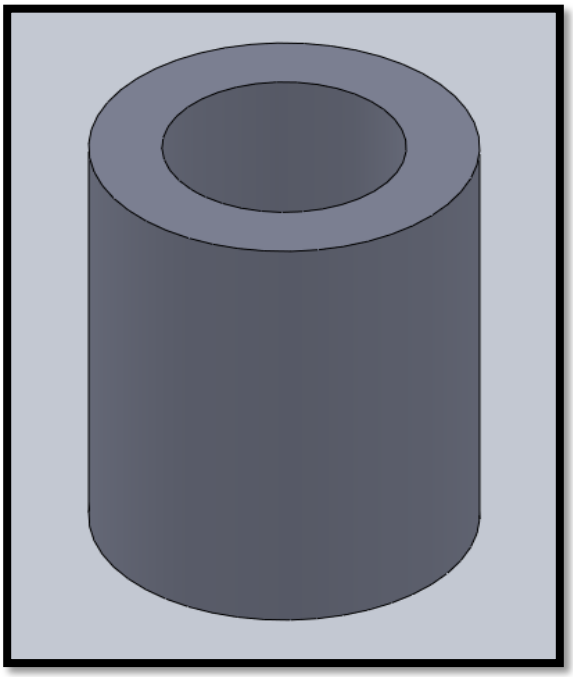

Figure 3.14: Washer

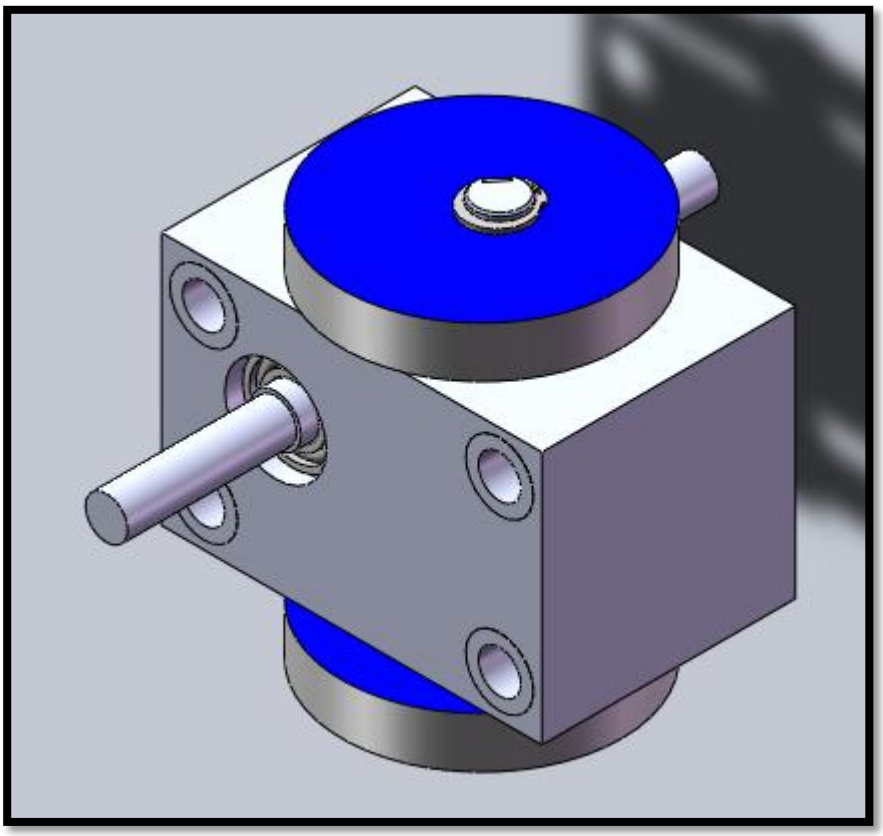

Figure 3.15: Full view for gear box after assemble

3.6 PHASE 4 - SEARCHING MATERIAL AND PART FOR THE PRODUCT

For this project, I plan to use mild steel, aluminium and galvanized iron. Mild steel is used as body for main part in this project to support motorcycle head block. Aluminium is use for make head holder and gear box that located worm gear. Besides that, galvanize iron is use as a bottom of the body to support the motor and other mechanism. Table below is the list of material that needed to fabricate this project. I chose to use all this material because of the safety factor and all this material have in our lab.

Table 3.3: List of material

Part	Material	Dimension (mm)
Body	Mild steel with "L" profile	(t 0.4x 25) total length need 3300
Hollow shaft	Mild steel	160 R 21
Shaft	Mild steel	560 R 12
Gear box	Aluminium	90x60x60
Head holder	Aluminium	92x82x31
Bottom body	Galvanize iron	300x200

3.6.1 Other part required in this project.

Table 3.4: Other part

Part	Dimension (mm)	Quantity
Power window motor	-	1
Motorcycle head block	-	1
Valve	-	1
Ball bearing	Outside 40 Internal 30	1
Ball bearing	Outside 24 internal 12	3
Screw	M6	7
Screw	M8	2
Nut	M8	2
Dc adapter 12V	-	1
Timer	-	1

Part such as Screw, Nut, washer, DC adapter, Timer, Power window motor, Motorcycle head block and Valve are available in the market. Figure 3.16 until figure3.21 shows the all part.

Figure 3.16: Screw, nut and washer

Figure 3.17: DC adapter

Figure 3.18: Timer

Figure 3.19: Power window motor

Figure 3.20: Motorcycle head block

Figure 3.21: Valve

3.7 PHASE 5 - FABRICATION OF THE PRODUCT

First and foremost gather all the material needed such as mild steel shaft, hollow shaft and Mild steel with “L” profile based on figure 3.22 and figure 3.23. Bandsaw and shearing machine are used to get the actual dimension.

Figure 3.22: Mild steel shaft and hollow shaft

Figure 3.23: Mild steel with “L” profile

After that I use bandsaw to cut mild steel with “L” profile for make each side with angle 45degree as shown figure 3.24.

Figure 3.24: Mild steel “L” profile with 45 degree

Next I use arc welding to assemble Mild steel with “L” profile to make a body for motorise grinding valve. The final part for body motorise grinding valve is shown in figure 3.25.

Figure 3.25: Body for motorise grinding valve

I used conventional milling machine to make a hole for hollow shaft holder and thread, the angle 30 degree for head holder are also from milling process. Final part is shown figure 3.26.

Figure 3.26: Head holder

I need a mild steel shaft with diameter 10mm for gear box holder. Since at lab mild steel shaft with the diameter 10mm is not available I use conventional lathe machine to remove the diameter of mild steel shaft from 20mm to 10mm. I also use lathe machine to make a hole for making a thread. Figure 3.27 is shown the final part after lathe process.

Figure 3.27: Mild steel shaft with diameter 12mm

To make the bottom body for supporting the motor and other mechanism, I use galvanize iron. For cut the dimension need I use vertical bandsaw and to make a hold I use hand drilling. Figure 3.28 is the final part.

Figure 3.28: Bottom body

Next is I use hollow mild steel and Mild steel “L” profile which has been cut into dimension need for making a support for head holder, than I use arc welding to assemble between this two component. Figure 3.29 is the final product for this part.

Figure 3.29: Support for head holder

Gear box is the critical part for making of motorise grinding valve product so I send my drawing to outside company for fabricate this part. In gear box part it included cam, heavy duty external retaining ring, ball bearing, cam shaft, worm shaft, worm gear and washer. Figure 3.30 is ull view for gear box after assemble.

Figure 3.30: Full view for gear box after assemble

Next is finishing. For finishing I spray parts that can be easily rust this is to ensure that the product is extending the life span. After that I assemble all the part to make a product as show in figure 3.31 and figure 3.32.

Figure 3.31: Body for motorise grinding valve

Figure 3.32: Support for head holder

After that I assemble all the parts become a new product as show in figure 3.33.

Figure 3.33: Final product

CHAPTER 4

RESULTS & DISCUSSION

4.1 INTRODUCTION

CHAPTER 4 is the discussion on the results for modification of this project and several problems occur to the project. This chapter also will discuss mainly about the problems encountered during the whole project was been carried out.

4.2 FINAL PRODUCTS

The final design and final product in several views are shown in figure 4.1 and 4.2 below.

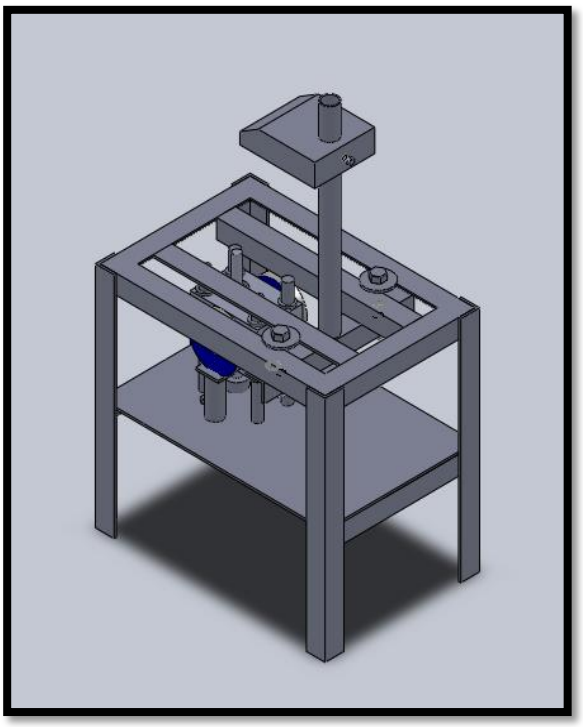

Figure 4.1: Drawing final design

Figure 4.2: Final product side view

4.2.1 Component of Final Products

There are three main component in motorise grinding valve with is body, mechanism and gear box. For body component the part is body for motorise grinding valve, gear box holder, head holder, Support for head holder and bottom body as shown in the Figure 4.3 until figure 4.8.

Figure 4.3: Motorise grinding valve

Figure 4.4: body for motorise grinding valve

Figure 4.5: bottom body

Figure 4.6: Support for head holder

Figure 4.7: Head holder

Figure 4.8: Gear box holder

Then for mechanism part it includes DC adapter, Timer and Power window motor as shown in figure 4.9 until 4.12.

Figure 4.9: Full part of mechanism

Figure 4.10: DC adapter

Figure 4.11: Timer

Figure 4.12: Power window motor

Next for gear box part it include gear box housing, cam, heavy duty external retaining ring, ball bearing, cam shaft, worm shaft, worm gear , gear box washer and cam based as shown in figure 4.13 until figure 4.21.

Figure 4.13: Full view for gear box after assemble

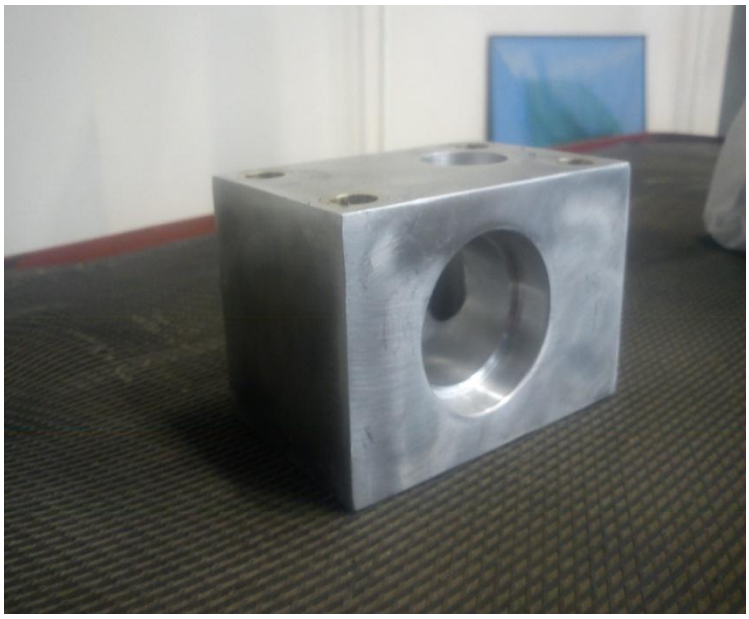

Figure 4.14: Gear box housing

Figure 4.15: worm gear, Cam shaft and Ball bearing

Figure 4.16: Worm Shaft

Figure 4.17: Cam

Figure 4.18: Ball bearing

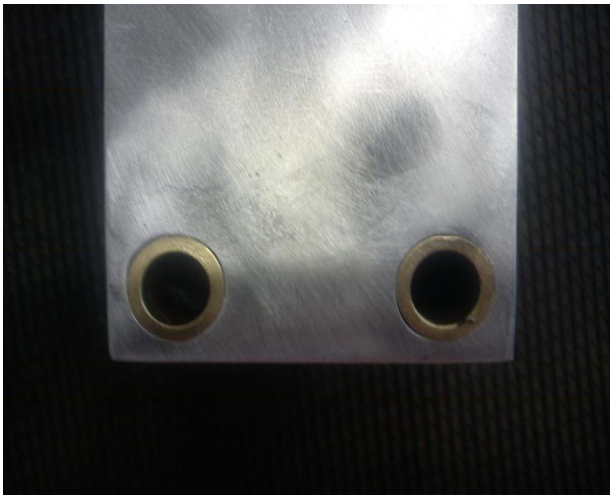

Figure 4.19: Washer

4.2.2 Function of Final Product Component

Table 4.1 shows the function of every part on the product.

Table 4.1: Function of every part

Part	Function
Body for motorise grinding valve	As the base to hold the head block and chassis
Bottom body	As the base to hold mechanism.
Gear box holder	To hold the gear box.
Support for head holder	To support the head holder.
Head holder	To hold motorcycle head block.
DC adapter	To convert AC current too DC current and as a power supply for motor.
Timer	To set the duration for grinding time.
Power window motor	To run the mechanism.
Gear box housing	As a housing for gear.
Worm gear	To make a movement.
Worm Shaft	To make a movement.
Cam shaft	As a holder for cam.
Cam	To make a movement up and down.
Ball bearing	To make a movement smooth.
Heavy duty external retaining ring	As a clip between cam and cam shaft
Washer	To avoid the gear housing from wear.
Cam based	As a base for cam to move.

4.3 HOW TO USE THIS MOTORISE GRINDING VALVE FOR MOTORCYCLE ENGINE?

Firstly put the motorcycle head block on the motorise body then adjust the position of the head holder and support for head holder. After that setting the position of the valve, and connect between the valve and the mechanism, when satisfied tighten all screw at head holder and support for head holder. Then put the grinding paste at valve and set the duration need to make this grinding and lapping process. After this process done, check either satisfied or not, if not repeat the steps from beginning.

4.4 PROJECT PROBLEMS.

4.4.1 Literature Review

In the market, that is no available product, so student must do and thing everything, so it hard for student to get the idea and make it as a referent.

4.4.2 Designing and Sketching

In the market, there is currently no motorise grinding valve for motorcycle engine for common motorcycle. So, there are no references that can be referred. All the drawing and dimension need to generate by student itself.

4.4.3 Material Preparation

In faculty central store there are limited resources on type of material. Therefore, I have to change my first plan which is using mild still hollow bar to mild still with “L” profile. So the grade of the final product is lower than the first plan.

4.4.4 Fabrication

Mild still shaft with 12mm diameter is not available. So I have to make a work around by using conventional lathe machine to remove the diameter from 20mm to 12mm to get the actual size which take more time. Other than that, my product consists of small part thus making the fabrication harder. Small part is hard to hold because of lack suitable holder for small components such as for drilling, welding and bending.

Besides that, there are so many things happen in fabrication the product during welding process such as defect. This defect happens because lacks of skill to operate a machine such as MIG welding machine and ARC welding machine. Furthermore, the heat must suitable to the type of material that I use. I had a problem to fabricate gear and gear box because I have no knowledge in making the gear furthermore to fabricate the gear it must be prizes and prefect. So my supervisor's advice me to send the drawing to the outside company for fabricate process.

4.5 HOW THIS PROJECT ACHIEVES THE OBJECTIVE AND SOLVES THE PROBLEM STATEMENT?

The problem statement for this project is until now days many common workshop are still using manually with is using man power to do lapping or grinding valve, this process are usually take long time to done some time it takes several hour. To solve the problem, idea to produce motoraiser grinding valve for motorcycle engine had come. I decide to make a motoraise grinding valve for motorcycle engine to make it easier and save man power for lapping and grinding valve process, so man power can be use for doing other work while waiting lapping process done. This motoraiser use same concept from the conventional way but it operate by motor.

A several new concept designs were come out to solve the problem. Those new concept designs are create by depending on the objective. Then, they were comparing to look, which of them could be the final design and will be fabricate.

The user can use it easily will feel this product is very friendly to them. Besides that, this motorise grinding valve give more perfect finishing. That means the objective of the product had been achieved.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

CHAPTER 5 is the conclusion and recommendation of this project. In this chapter, it will include the objective of this project is fulfilled and some weakness that need to be improve.

5.2 CONCLUSION

The project is finish and the motoraise grinding valve for motorcycle engine is able to do lapping and grinding the valve and valve hole. The objective of the project is achieved at the end of design and fabrication.

5.3 RECOMMENDATION

The motoraise grinding valve for motorcycle engine has its weaknesses which will need to be improved to get a better result such as the speed of the motor can be adjust.

5.3.1 Material selection

The motoraise grinding valve for motorcycle engine is made out of mild still. However, it is better to use stainless steel. It is because stainless steel is lighter and will not rust than mild still.

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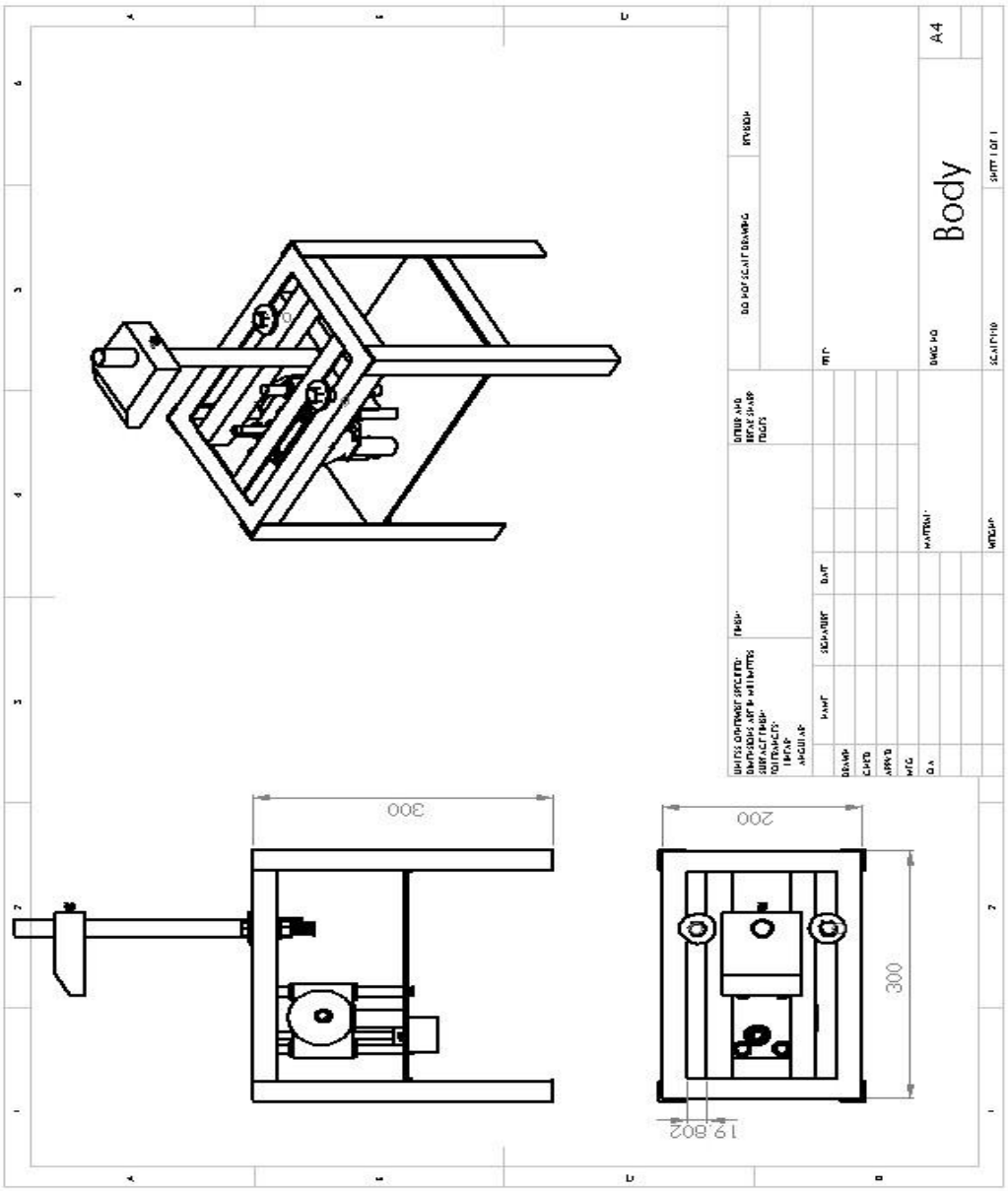
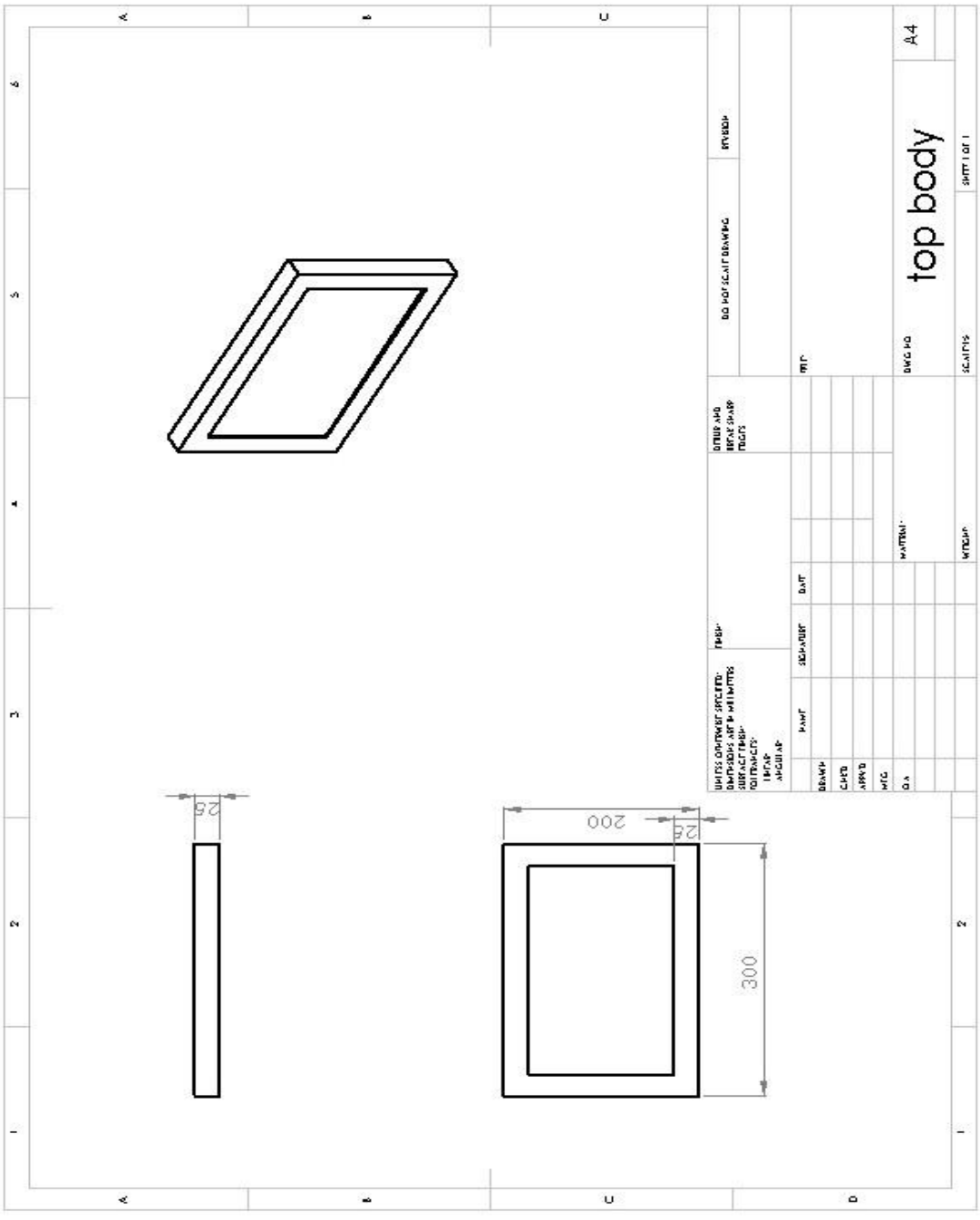
APPENDIX A

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25
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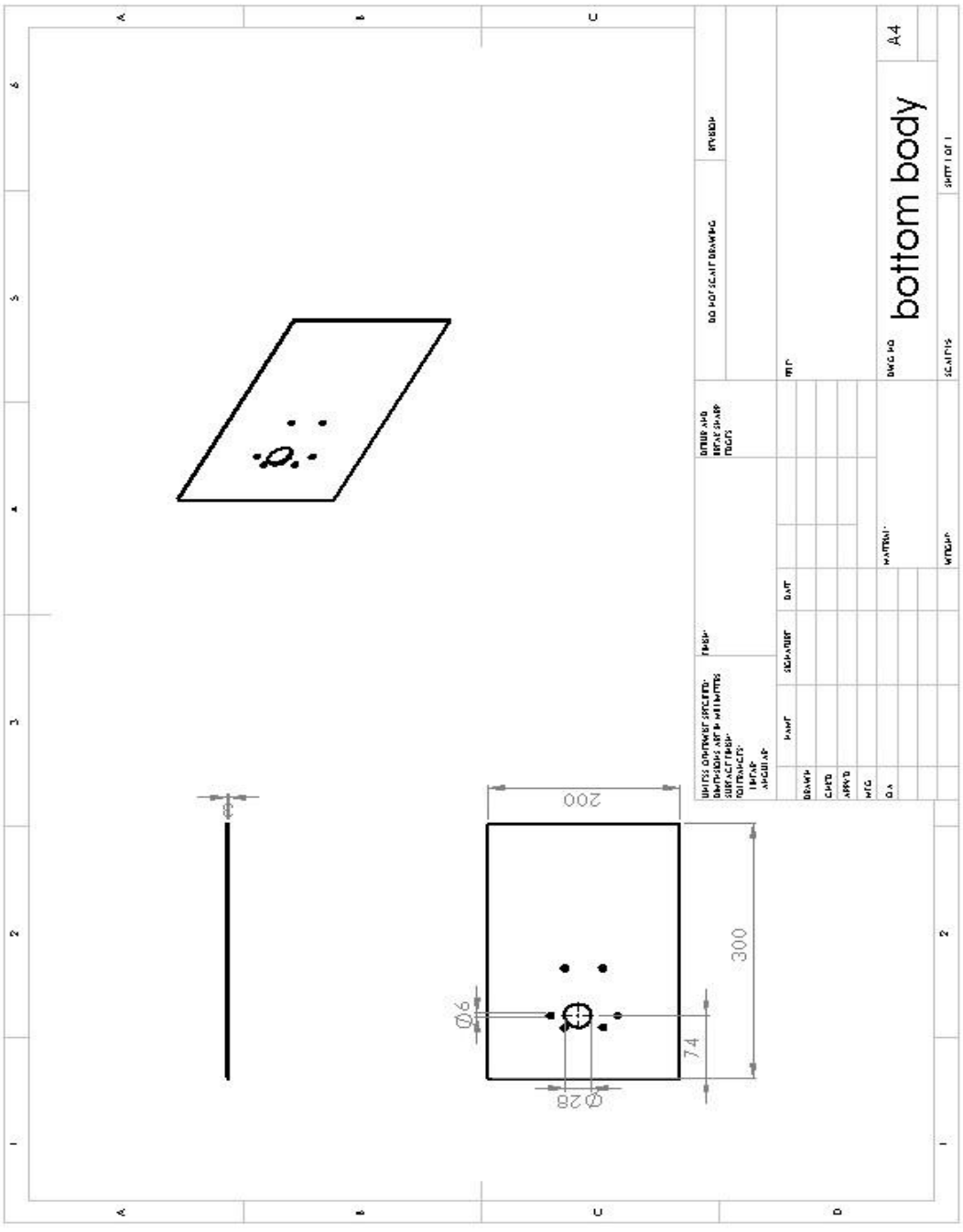
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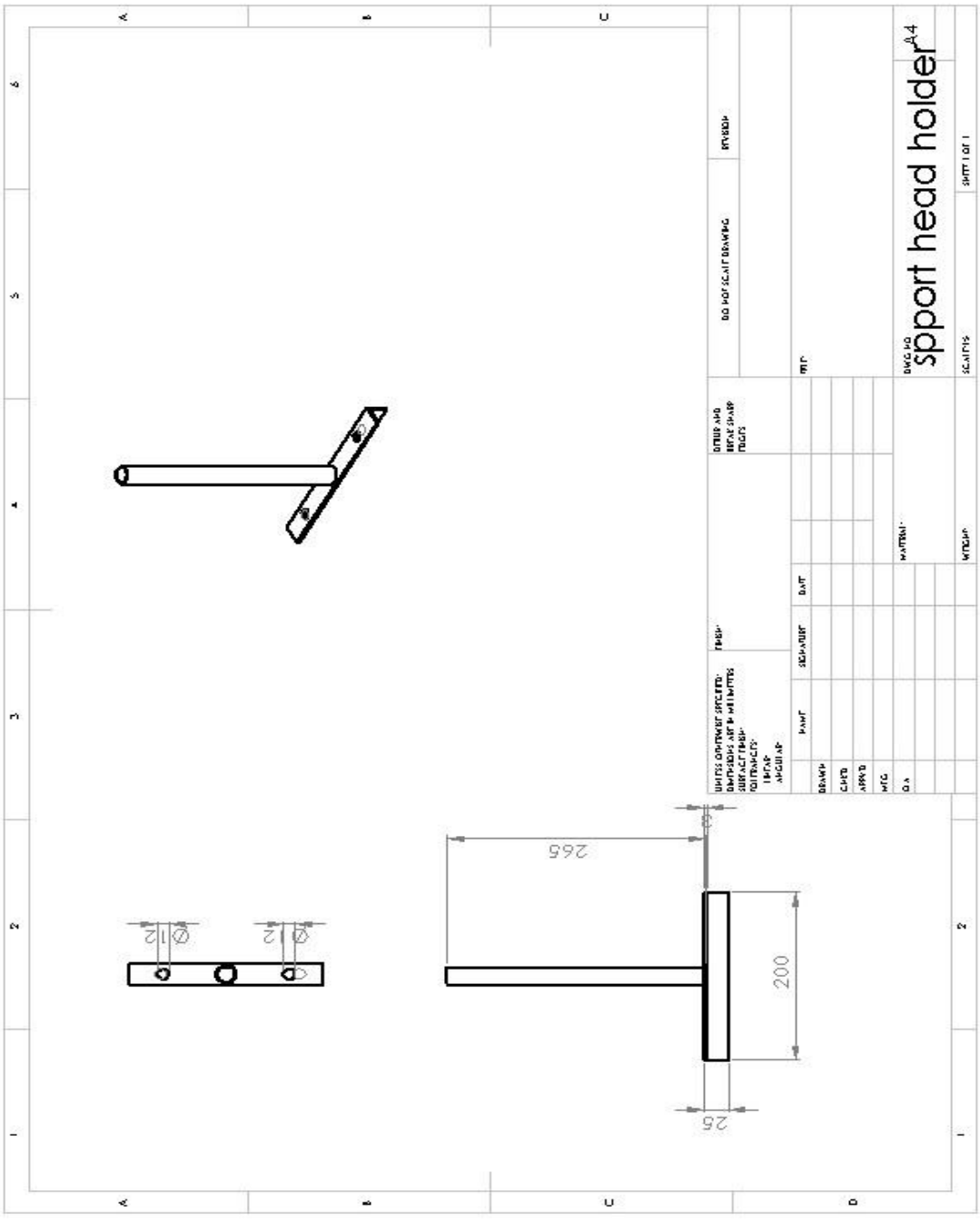
200
300
74
Ø6
Ø28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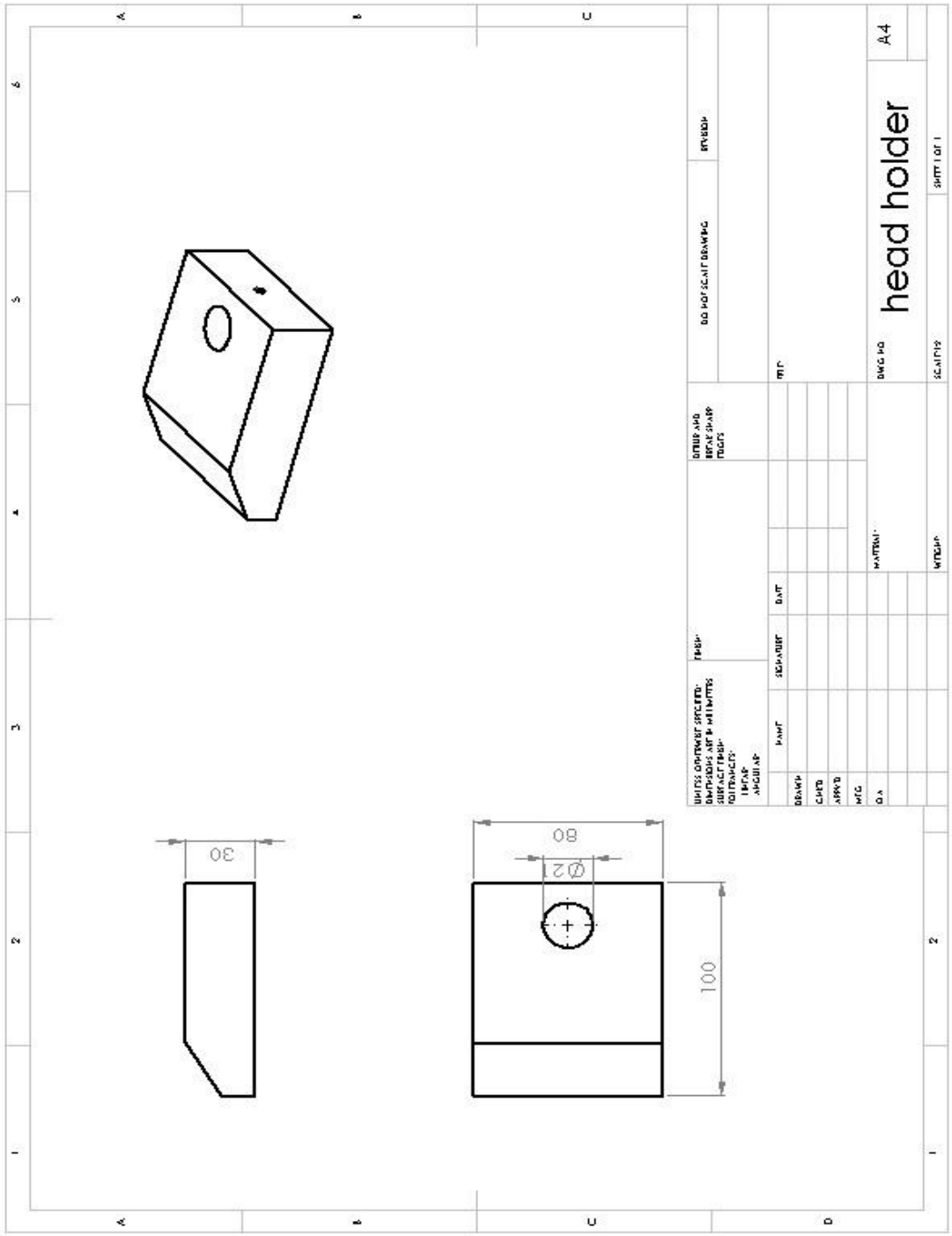
265
200
25
Ø12
Ø12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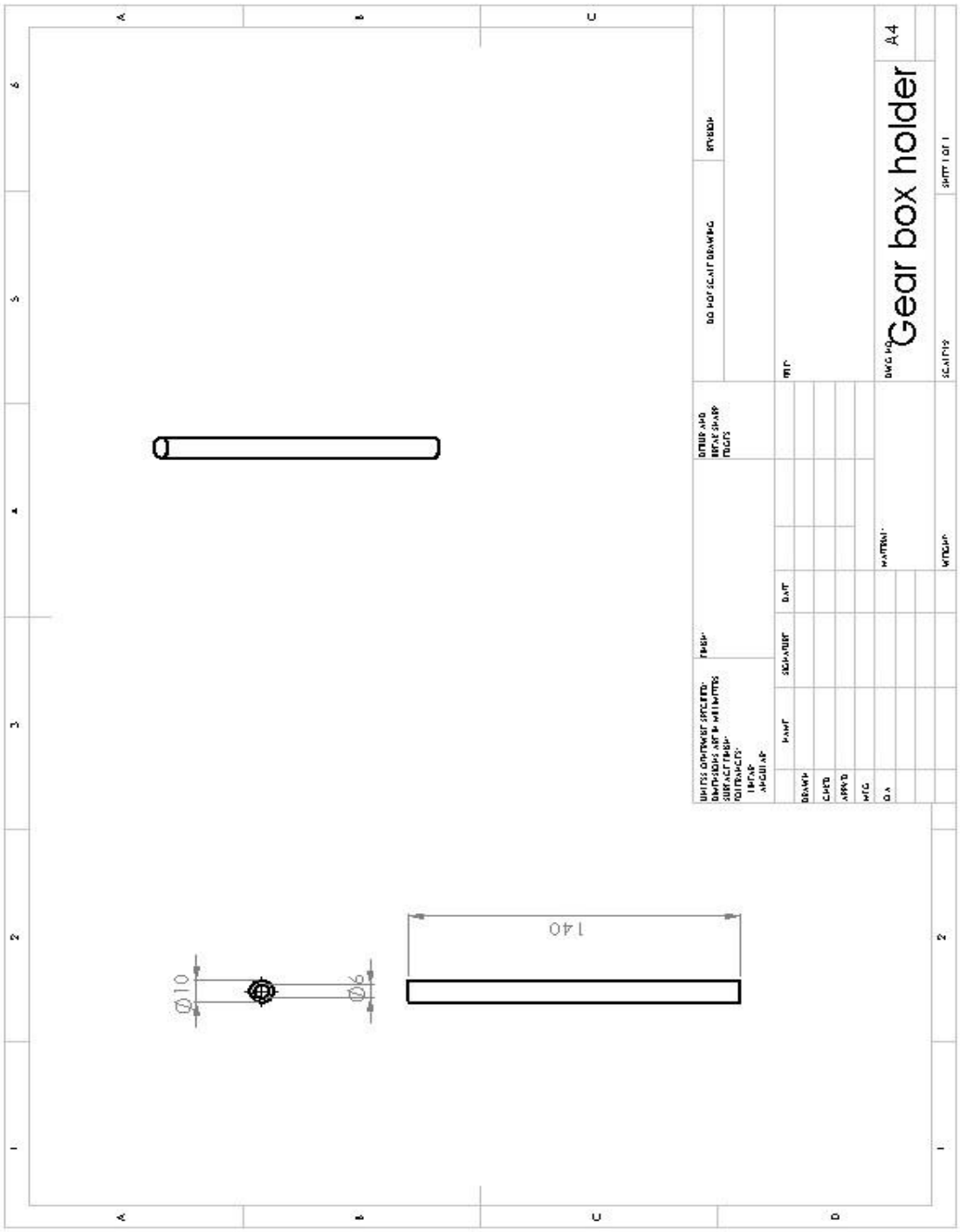
Ø21
100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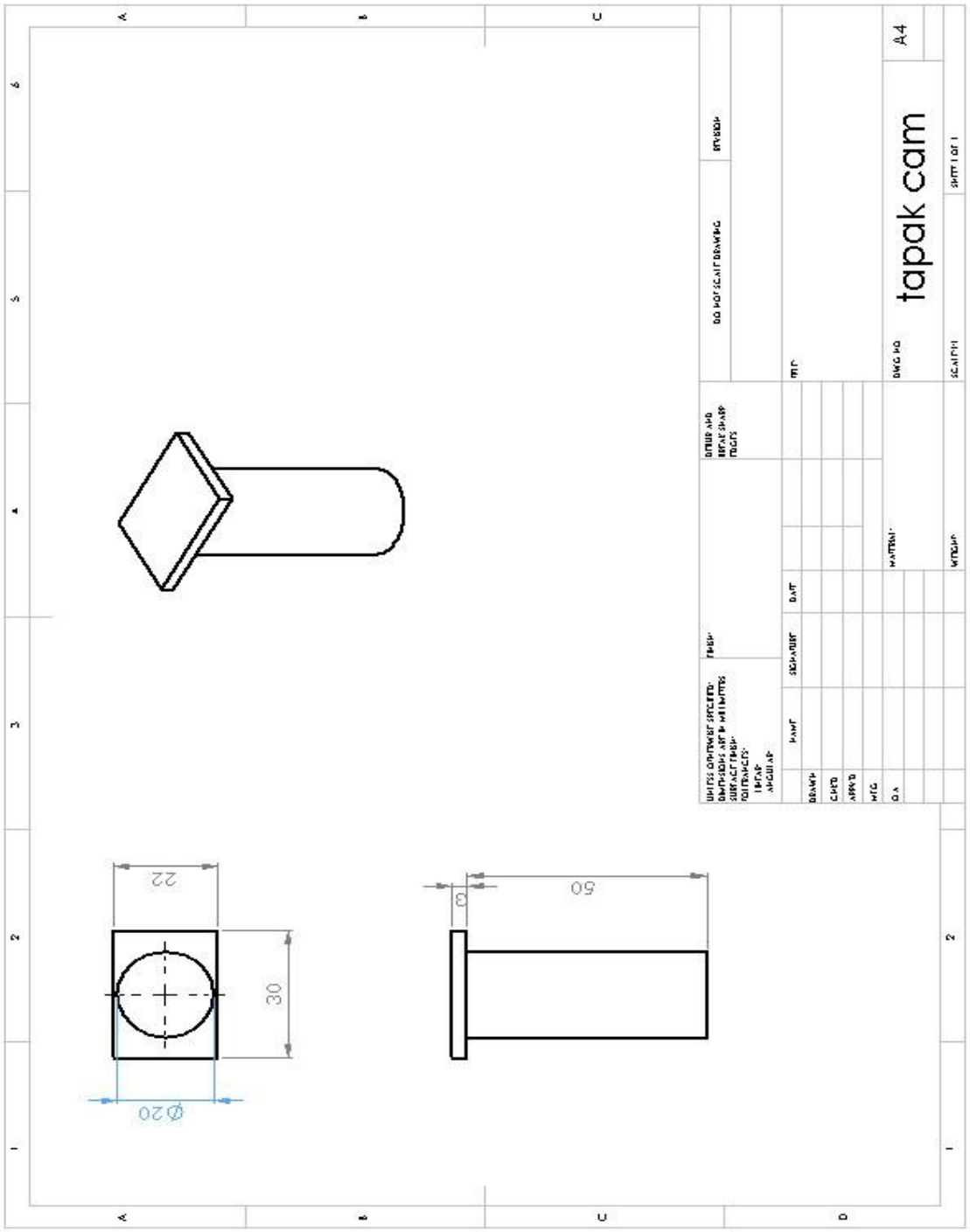
Ø10
Ø6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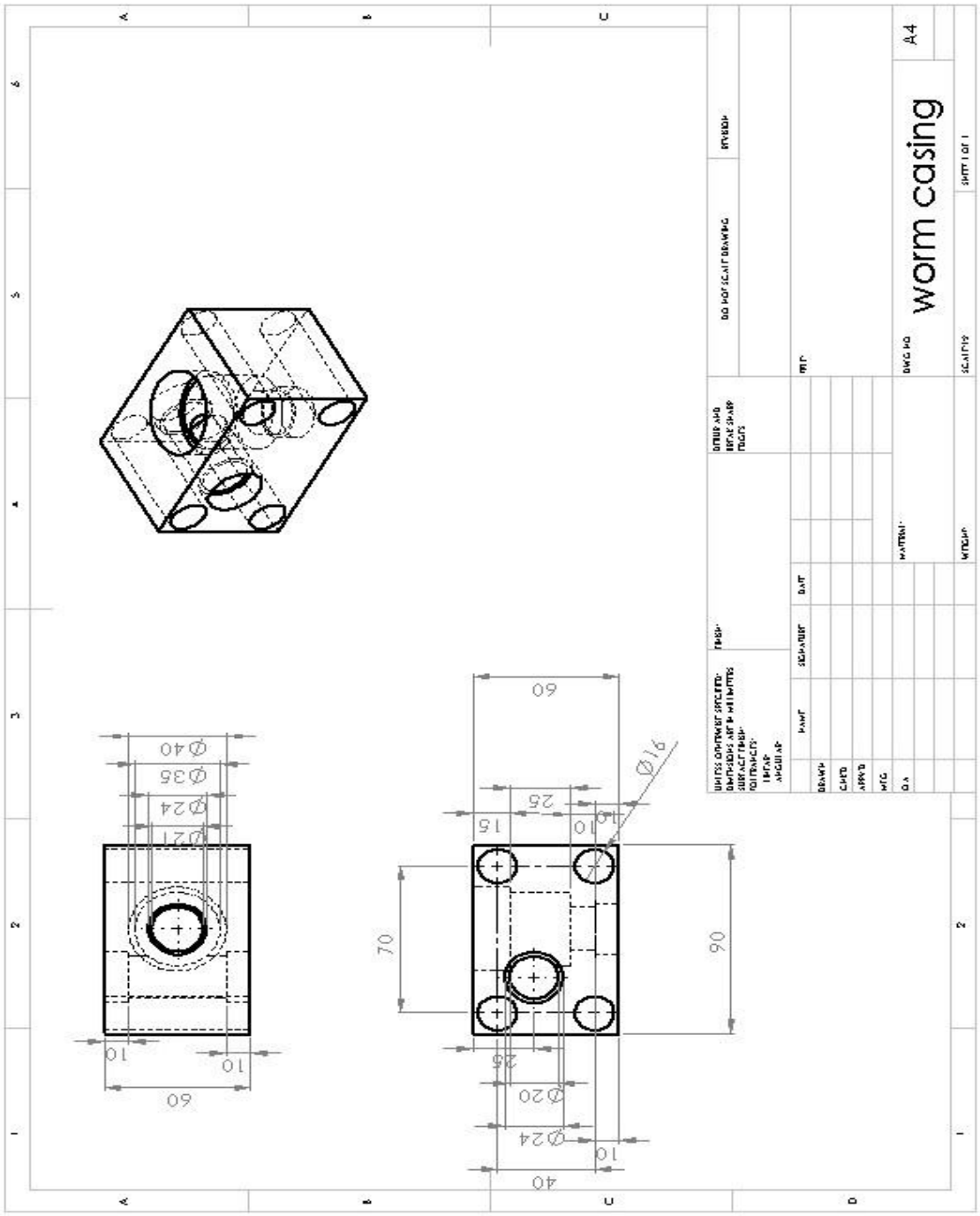
22
30
Ø20
60
3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Ø40
Ø35
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Ø16
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25
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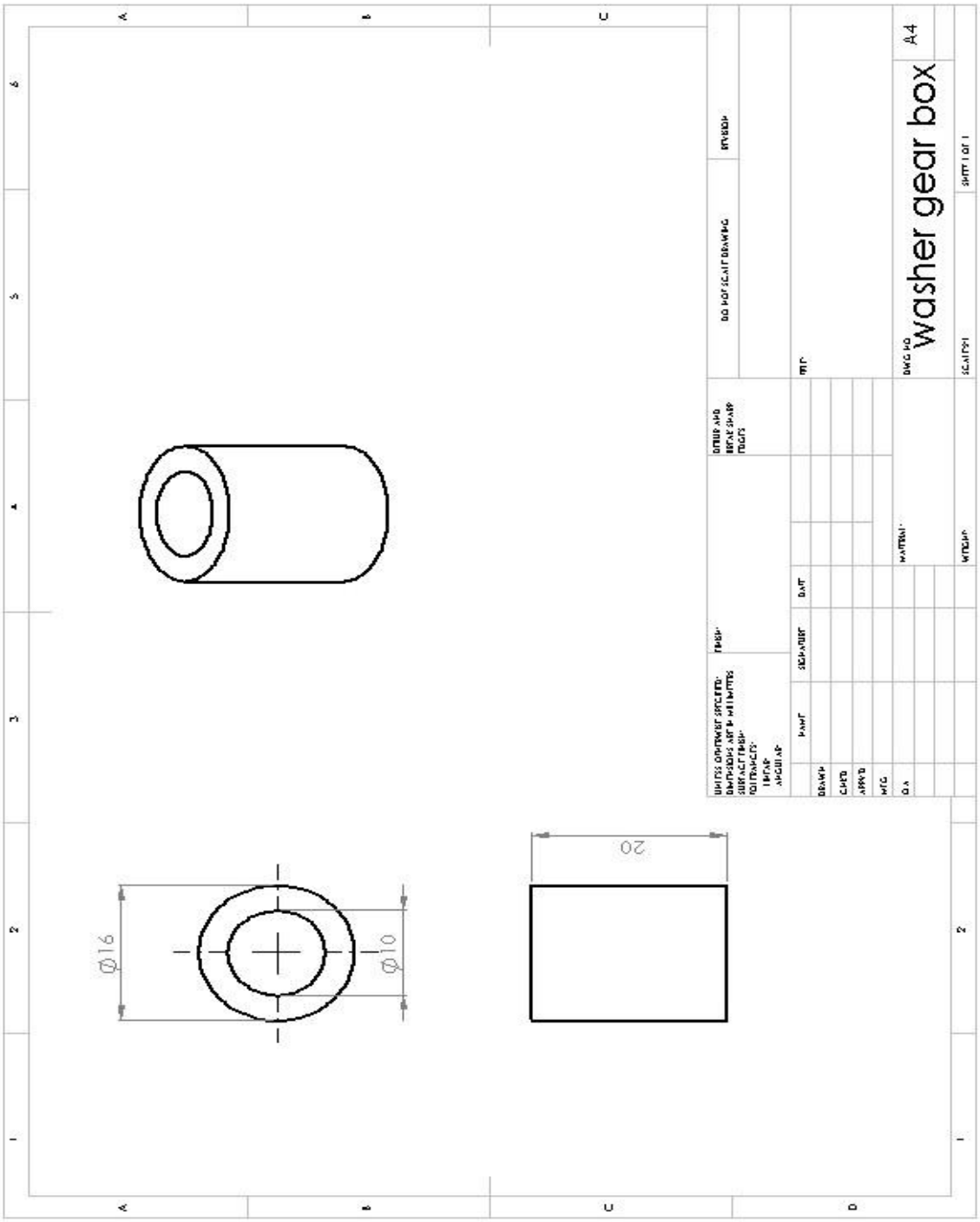
10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Ø10
20
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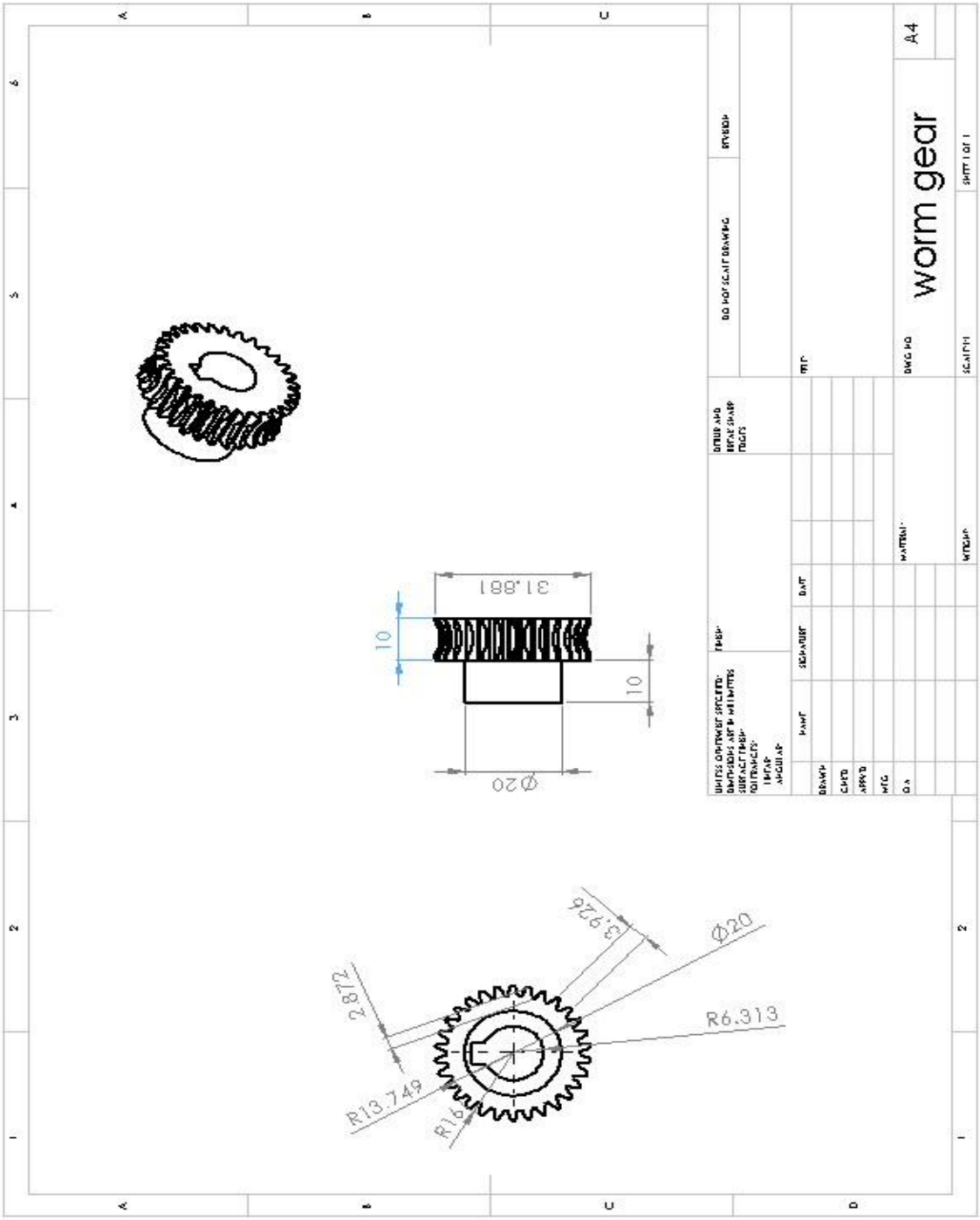
A4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3.926
Ø20
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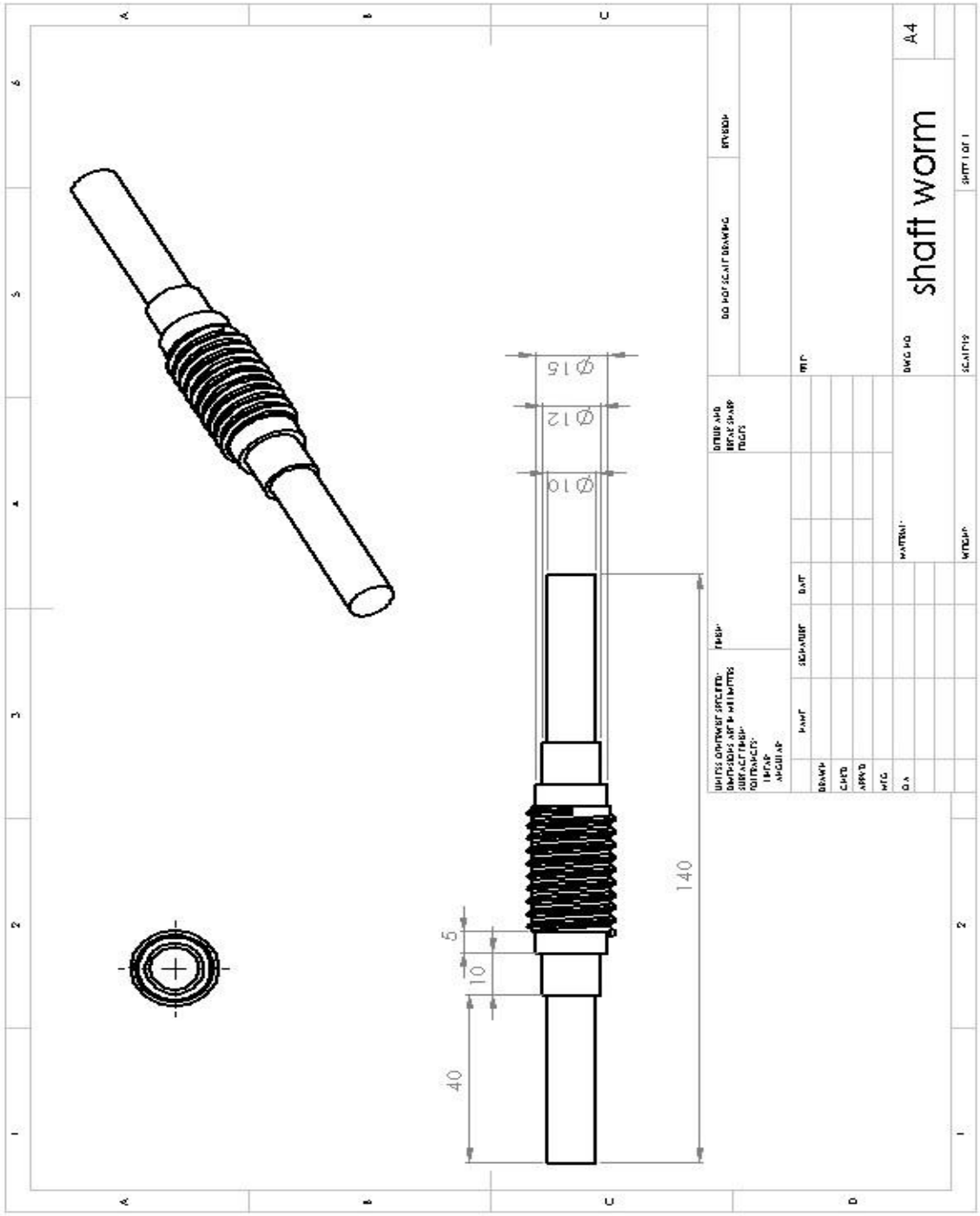
R6.313
R13.749
R16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Ø10
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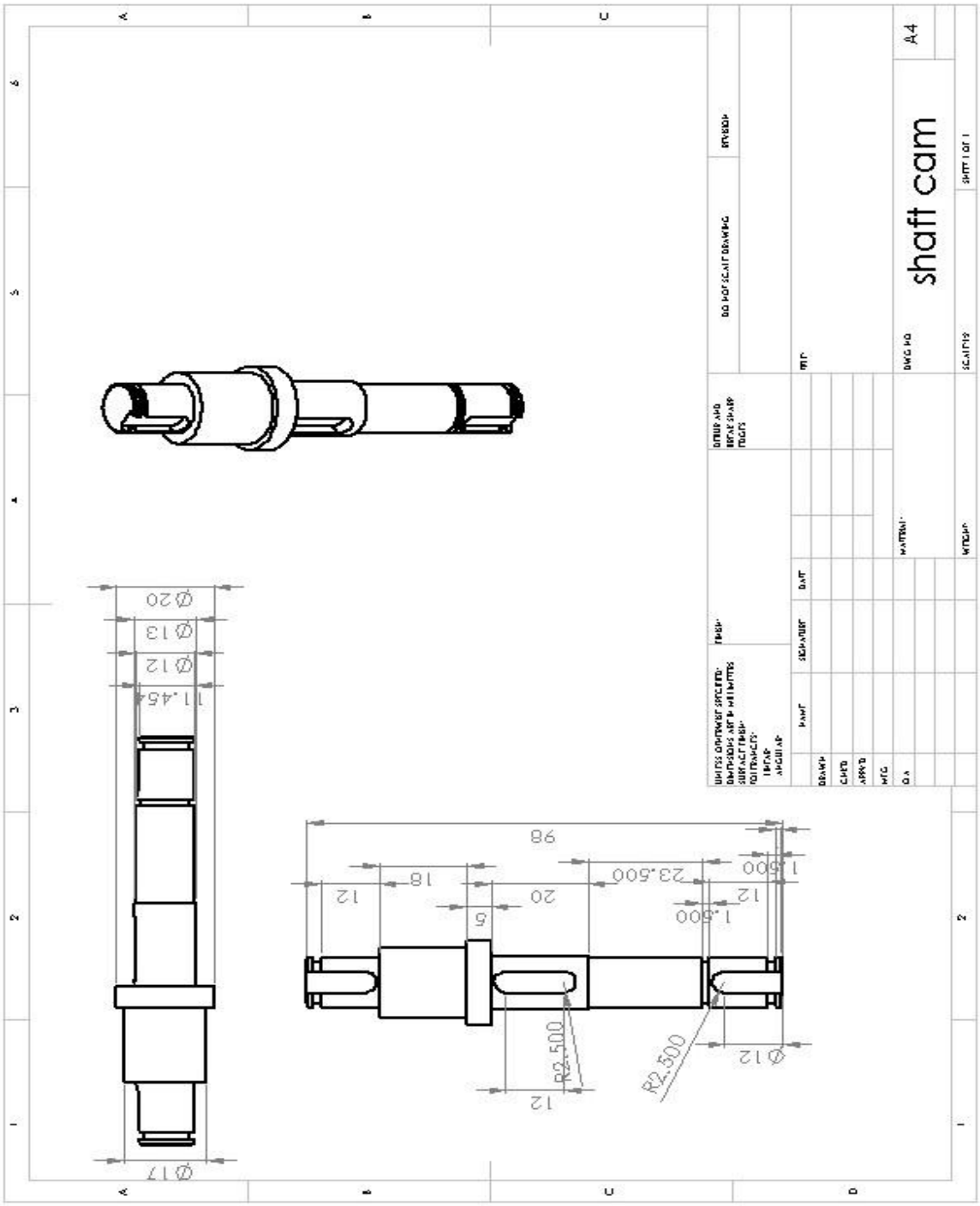
5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Ø13
Ø12
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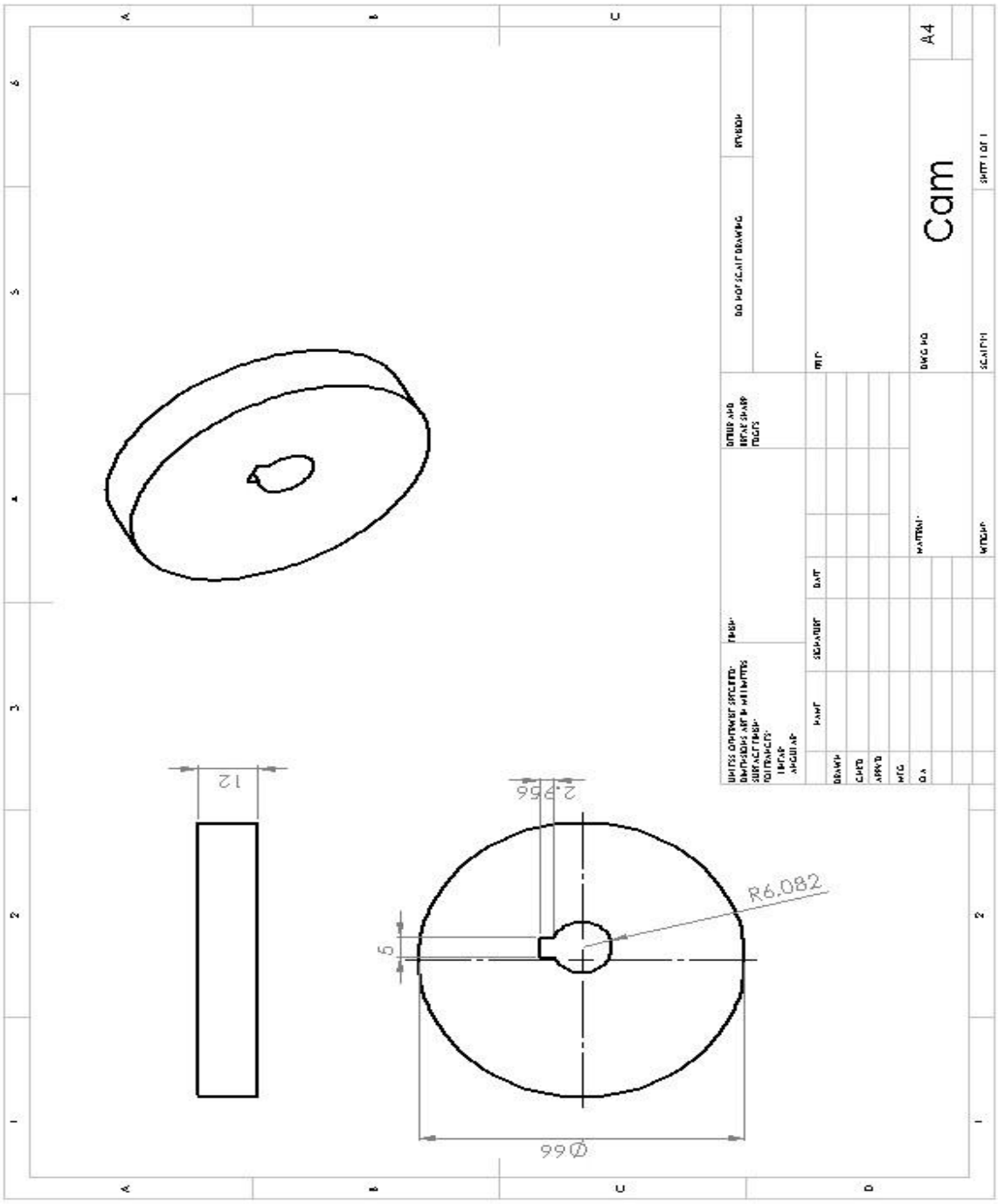
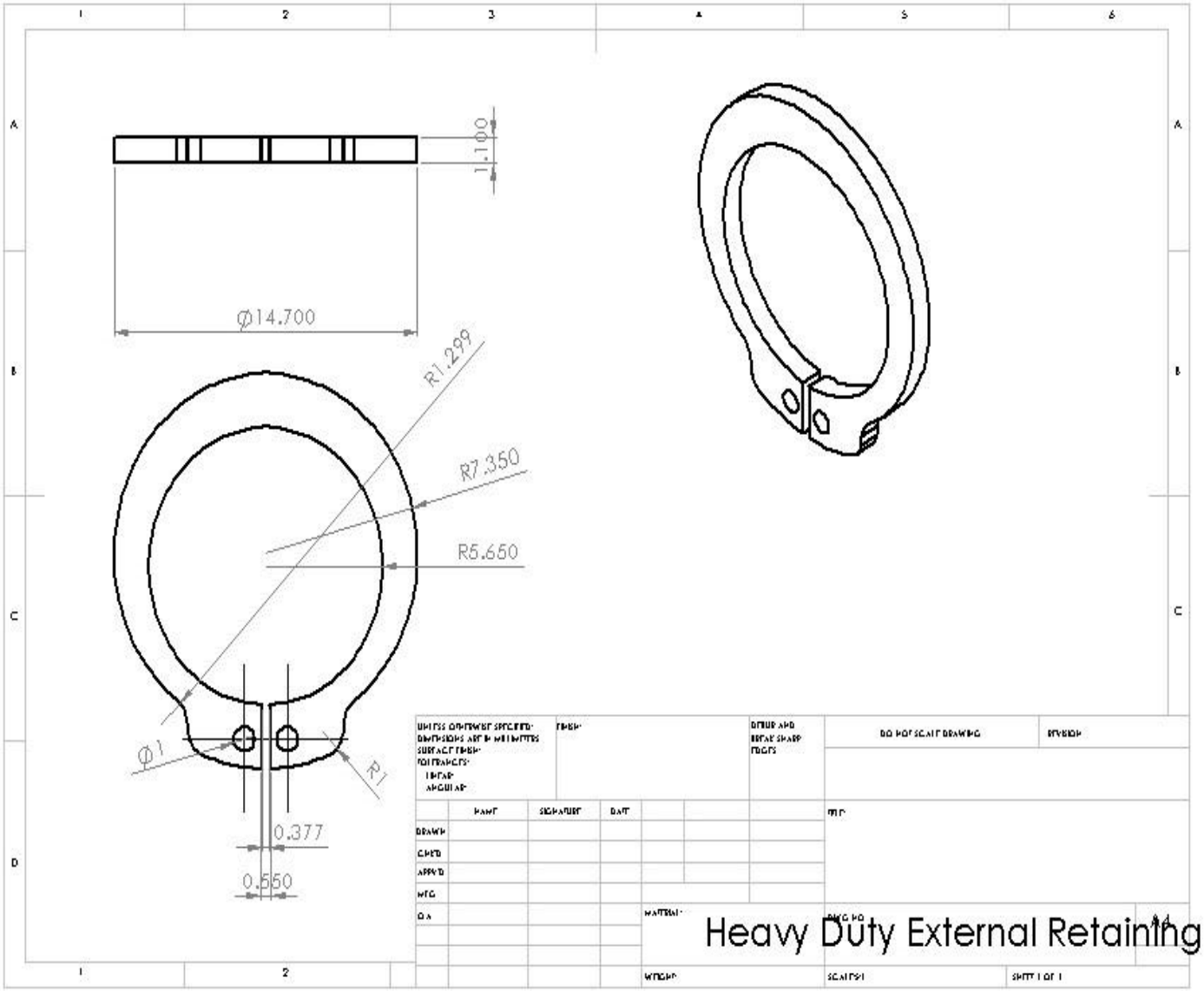
1.500
12
1.500
R2.500
R2.500
12
Ø12


Cam
A4
12
2.756
R6.082
5
Ø66



Heavy Duty External Retaining Ring

APPENDIX B

Machines that being use to finish the project.