

DESIGN AND FABRICATE PORTABLE TOWER FOR TV ARIAL

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DESIGN AND FABRICATE PORTABLE TOWER FOR TV ARIAL

MOHD U'KASYAH BIN HASHIM

A thesis submitted in fulfilment of the
requirement for the award of the diploma of
Mechanical Engineering

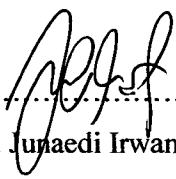
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SUPERVISOR DECLARATION

“I declare that I have read this thesis and in my opinion, this thesis is enough to fulfill the purpose for the award for the Diploma of Mechanical Engineering from the aspects of scope and quality.”


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Supervisor : En. Junaedi Irwan Wan Abdul Halim

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DECLARATION

I declare that this thesis entitled "*design and fabricate portable tower for TV Ariel*" is the result of my own research except as cited in the references. The thesis has not been accepted for any diploma and is not concurrently submitted in candidature of any other diploma.

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Date : *11 NOVEMBER 2008*

Especially for

My beloved family

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ABSTRACT

Nowadays, media is very important because its' role as a medium for us to get information especially to know current issues which we can get it from television, radio, newspaper and other relating component. According to the survey and some simple research we can conclude that the most needed medium to get information for people is television because of the modernisation even though internet have more exposed to hem sapiens. Furthermore television can be get in lower price than other instrument. Although this magic box everybody can get it but not all area of community can get clear signal for certain channel especially people who live far from town. For those who can afford, they can use ASTRO to solve this problem, but try to think for a while to others who cannot afford it? They only use local indoor or outdoor area network to get the better signal. Although outdoor local area perhaps helping, but if there any unexpected problem especially relate to environmental disease it will harm the users. Besides for using this local area we need to place it on top and people who are not know about safety will not alert for any caution and the risk to get injured is higher. It is also hard when to outer the area position to get the signal. This problem has being encountered for a long time, so the processing engineers have study for this case. They do some research and develop new idea about the local area model and also the placement to that area. This idea has help me to decorated new area placement which has safety model and ergonomic characteristics that will increase the safety to the users. So, my project idea has being base on this research to help our community to get better signal to watch television and live in a better conditions.

ABSTRAK

Dalam kehidupan seharian kita, media massa merupakan suatu yang amat penting untuk mengetahui isu-isu semasa. Sumber-sumber yang diperolehi adalah daripada televisyen, radio, akhbar dan sebagainya. Dalam dunia teknologi yang semakin canggih, televisyen merupakan satu keperluan bagi setiap orang di dunia ini. Boleh dikatakan setiap rumah mempunyai sekurang-kurangnya satu televisyen. Namun begitu isyarat untuk mendapatkan liputan yang jelas kadang kala amat sukar diperolehi. Bagi yang berkemampuan astro merupakan salah satu liputan yang mempunyai pelbagai pilihan. Bagi mereka yang tidak berkemampuan pula hanya arial televisyen biasa menjadi pilihan, sama ada yang di dalam rumah atau di luar rumah. Kadang kala isyarat arial televisyen di dalam rumah tidak begitu jelas, berbanding arial televisyen di luar rumah. Namun begitu tempat untuk meletakkan arial televisyen di luar rumah perlu berada di tempat yang tinggi, dan agak bahaya untuk memasangnya. Maka jurutera-jurutera didalam bidang pembuatan telah berusaha untuk menghasilkan tempat letak arial televisyen yang mempunyai reka bentuk dan mempunyai ciri-ciri yang ergonomik. Maka reka bentuk yang saya hasilkan ini dicipta sebagai salah satu usaha untuk memenuhi ciri-ciri tersebut.

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CHAPTER 1

INTRODUCTION

1.1 PROJECT SYNOPSIS

This project contains of designing and fabrication of portable tower for TV Arial. There have many differences between this portable tower with current design in market place. In this project we have to develop and improving it performance as well so that there has no doubt about the design and concept. This design much more portable because it easy to carry together when using and more user friendly. In this project, it needs lot of skills, information and also knowledge such as Computer Aided Design software (AutoCAD), Solidworks 2005 software, using CNC Shearing Machine, cutting process, welding process, rivet process and fastening process. This design obviously would help people and the most important thing is get improving their activities much better. So, this design would through many processes before it get into prototype term in order to achieve the objective and off course customer need.

1.2 PROJECT PROBLEM STATEMENT

Usually we install the Arial TV at a height place. Such as top of the roof and corridor .This method is very dangerous because can produce injure, but nowadays many can tower for Arial TV was produce. But most of the current product was attached at the wall. So the current product is not portable. Then the current products are troublesome and difficult use because it make user feel not suitable as well. Beside that, most of products also not quality for low place Arial and receives signal not clear. Then material

used in current design difficult to get compare this design which is more material availability because it using sheet metal in difference thickness and using aluminums pipe.

1.3 PROJECT OBJECTIVES

1.3.1 General Objective

Diploma final year project objectives is to practices the knowledge and skill of the student that have been gathered before solving problem using academic research, to born an assistant engineer that have enough knowledge and skill.

This project is part of the subject that must be complete on this semester. Student also can explore the advanced machine before involves with industries.

Otherwise, the project will be produce and train student to capable of doing a work with minimal supervisory and more independent in searching, detailing and expanding the knowledge and experiences.

The project also will generate student that have capability to make a good research report in thesis form technical writing.

1.3.2 Specific Project Objective

- i. To design and fabricate the portable tower for Aerial TV based on mechanical design method.
- ii. Can storage the tools easily and practically.
- iii. Know to solve the problem that might be occurred
- iv. To modified the mechanism of current product and try improving its functionality.
- v. Upgrade skill

1.4 PROJECT SCOPE

In order to finish this project require precise scope of work and proper plan need to be followed because this project must through various process before it would be done. Beside that this project title is new idea which is come from literature review about it articles and current design in market and the most important thing is the knowledge isn't entirely covered in classes or lab. So it give an advantages to learn new process to produce this product and absolutely could find a lot of advantages neither in realized or not. These are scope of work in this project,

- i. Literature review about the design from any possible resource
- ii. Design the model of tower for Arial TV
- iii. Fabricate the design using material that been selected
- iv. Test the design in demonstration

1.4.1 Project Planning

This project begin by meet the supervisor to collect some information and then search via internet, books and survey at market. This literature review takes about two week. The finding of information not will be stop on a week but continues along the way of this project done to get more valuable information.

Gantt chart (time management) and flow chart (process management) will be developing on second week. This is done using Microsoft Excel programmer.

The second and third week, have to make some sketching. These sketching based on the advantages and disadvantage product in marketing nowadays.

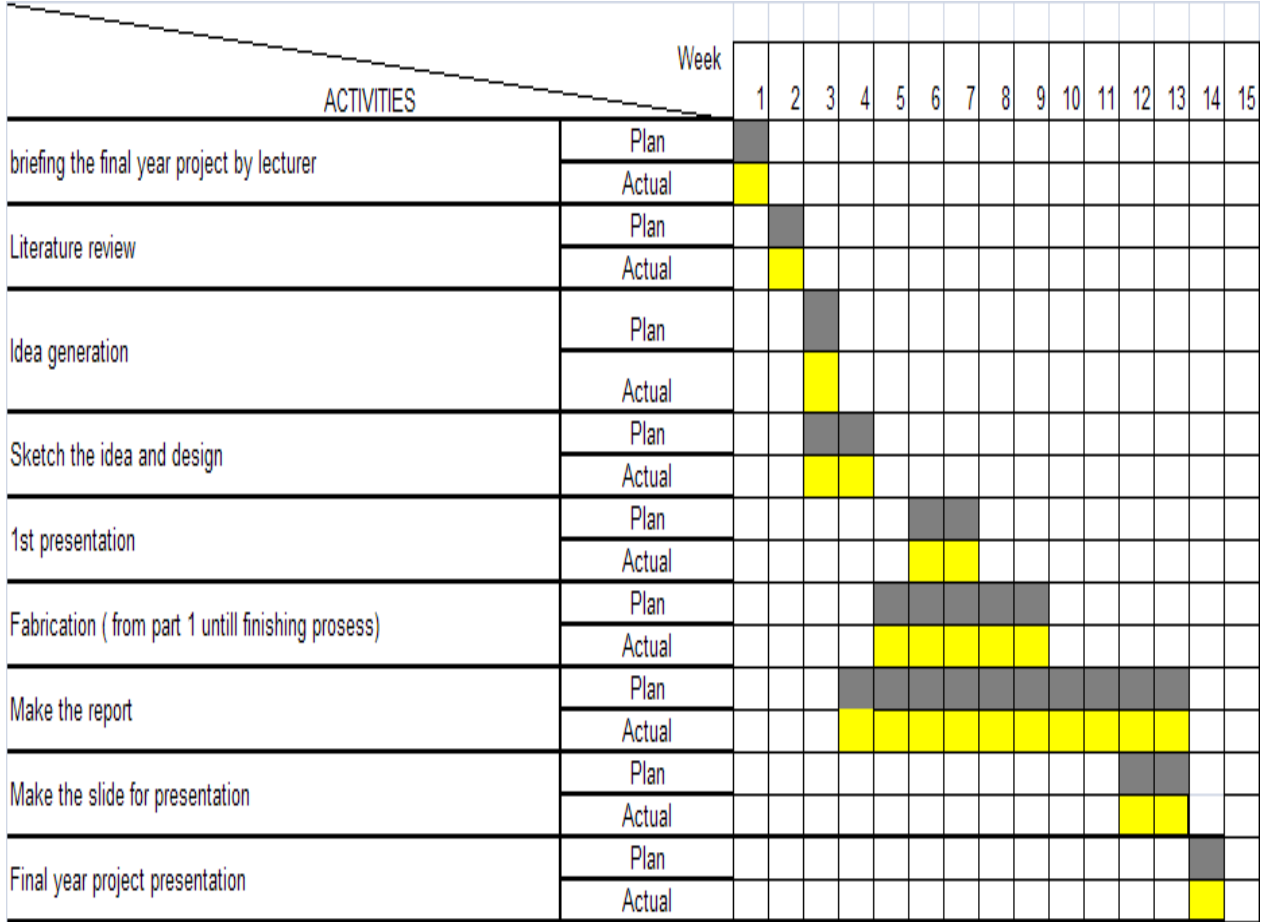
In Fourth week, the Pugh analysis and matrix analysis will be develop. The function of this analysis is to get a final design. After getting a final design solid work will be starting.

On fifth and sixth weeks the progress report will be start. Meeting with supervisor on weeks seventh and eight gather data to complete progress report. At week the mid presentations also start.

The getting material will be start after mid presentation. The process cutting raw materials start on week nine. At same time the process fabrication also starts. The planning process of fabrication around week's nine until twelve. After finish the process fabrication, the final report will be start. To complete the report I will use format thesis 2008. The last presentation will be started on week fourteen

1.5 PROJECT SCHEDULE

Gantt chart



█ Plan
█ Actual

Table: 1.1

1.6 PROJECT FLOW CHART

From the flow diagram on figure 3.1, this project started by discussion with supervisor about the title. The discussion covering from project overview, throw out opinion that related about title and get a certain design and concept before go to the next step.

On literature review, the most important is to determine the project scope, objective and project planning so that we could easy get a clear overview. Then all information related to the design and these entire tasks has been gathering through study from internet, journal and other source.

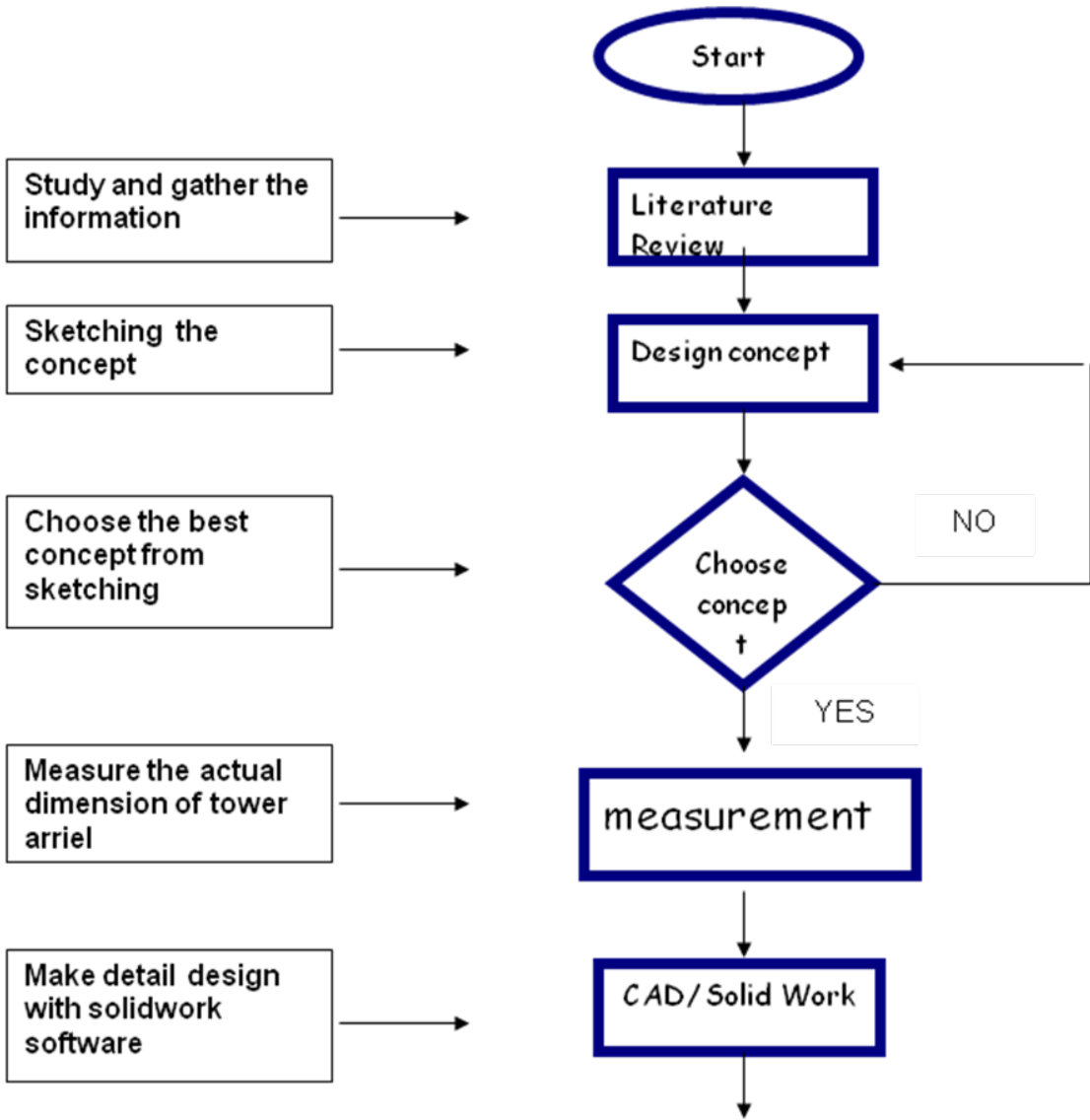
After collect all related information and obtain new idea, the projects continue with the design process. In this stage, the knowledge and idea should throw out in sketching process. After several design sketched, the best design would be choose so that we could carry on designing process. Then the selected design would be transfer to engineering drawing using SolidWork software in order to improve it capability and for analysis process.

After that material preparation which is has been confirm initially. Purpose of this process is to determine the suitable and strength materials follow the product and design requirement. This process covering from purchased material, measuring material and cutting off based on requirement. This process is important because the material would determine whether our product in way to successful.

After all drawing and material preparation done the next process is a fabrication work. This process based on dimension that has been determined from drawing. During this process, all the suitable manufacturing process is used such as drilling process using CNC Machine, welding process, fasting process and cutting material using CNC shearing machine.

After all above process done on schedule without any problem such as product malfunction or product brittleness, all material for report writing is gathered. The report writing process covering and including all manners from week 2 until finished. This process also included the presentation for final presentation of the project.

Flow Chart



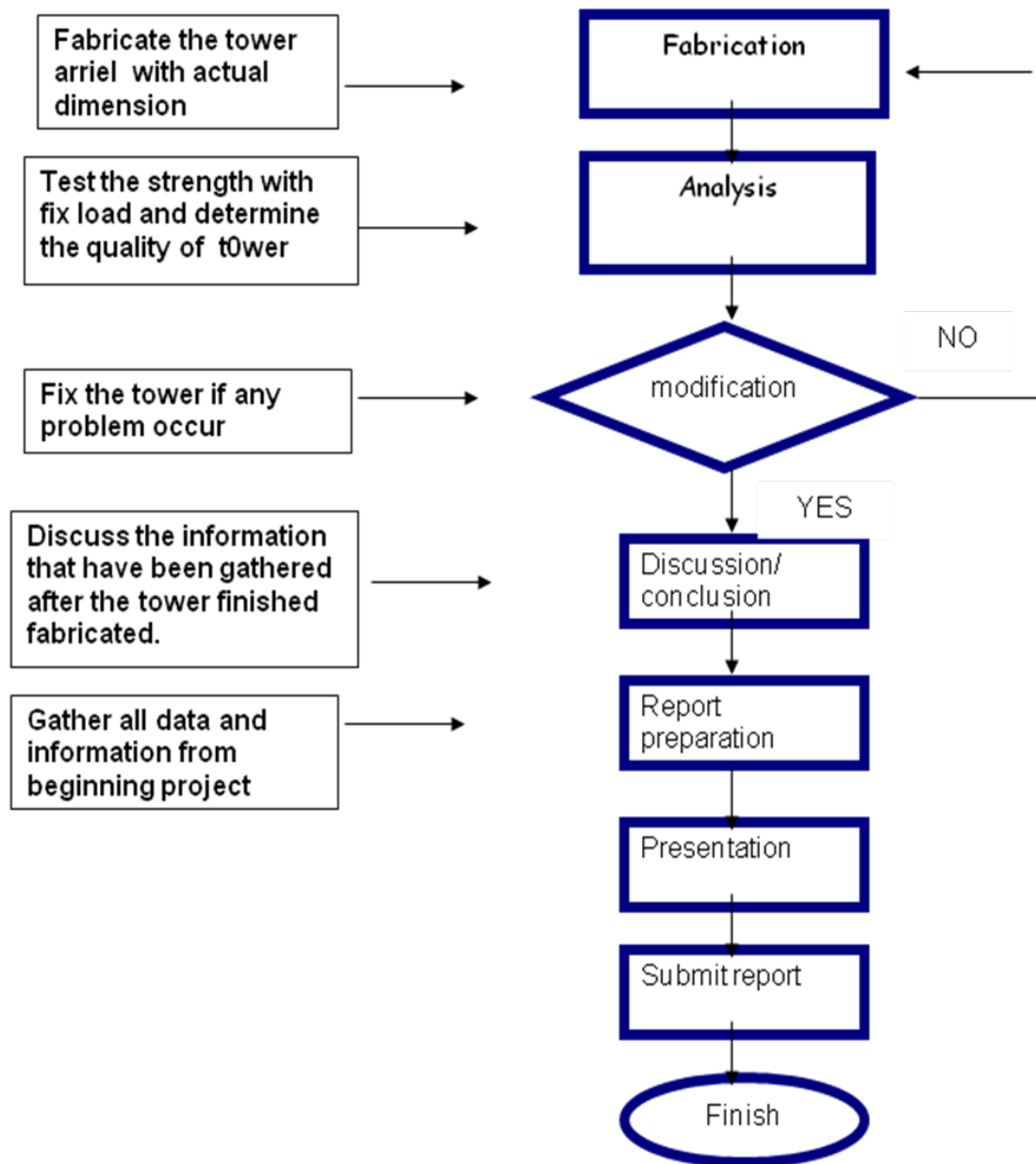


Figure 1.1 Flow chart

1.7 PROJECT EXPECTATION

- At the end of this project student must learn and know a manufacturing process and how to fabricate it
- This project would perform well and achieve its objective
- This design and idea of function will enter a current market in order to improve its functionality.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Portable tower making involves techniques such as creating appropriate joints, shelving systems and the use of finishing tools.

This chapter is present about literature review of fabrication process such as shearing, welding, drilling, fastening and other else. Before fabrication process, the material selection is crucial. The selection of joining process is also important to get a product with better strength and durability. Literature review about machine is also important. It is include guide to setup the machine, type of machine suitable for fabrication process and advantages using this machine.

2.2 FABRICATION PROCESS

The fabrication process due to complete this project is welding, cnc shearing process, drilling process, rivet, fastening and others.

2.3 WELDING

Welding is a fabrication process that joins materials, usually metals or thermoplastics, by causing coalescence. This is often done by melting the workpieces and adding a filler material to form a pool of molten material (the weld puddle) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower-melting-point material between the workpieces to form a bond between them, without melting the workpieces

Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, an electron beam, friction, and ultrasound. While often an industrial process, welding can be done in many different environments, including open air, underwater and in outer space. Regardless of location, however, welding remains dangerous, and precautions must be taken to avoid burns, electric shock, eye damage, poisonous fumes, and overexposure to ultraviolet light.

2.3.1 Arc Welding



Figure 2.1 Arc Welding

Arc welding uses a welding power supply can use either direct (DC) or alternating (AC) current, and consumable or non-consumable electrodes. The welding region is sometimes protected by some type of inert or semi-inert gas, known as a shielding gas, and/or an evaporating filler material. The process of arc welding is widely used because of its low capital and running costs. Create an electric arc between an electrode and the base material to melt the metals at the welding point.

2.4 METAL INERT GAS

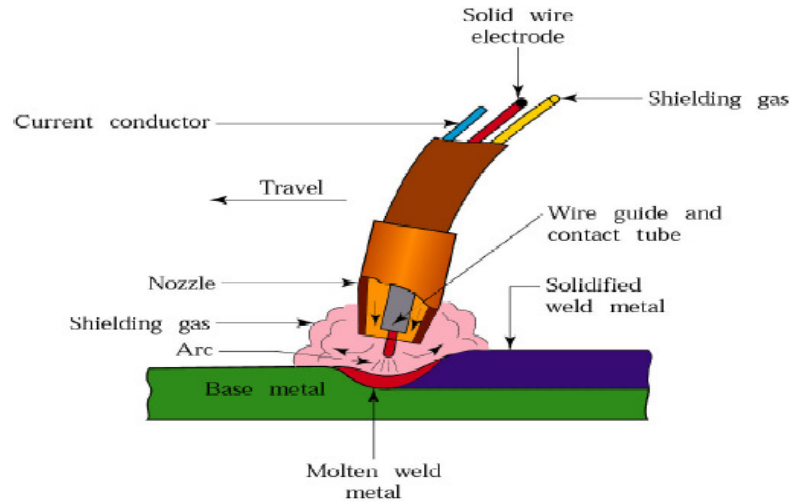


Figure 2.2

Gas metal arc welding (GMAW), sometimes referred to by its subtypes metal inert gas (MIG) welding or metal active gas (MAG) welding, is a semi-automatic or automatic arc welding process in which a continuous and consumable wire electrode and a shielding gas are fed through a welding gun. A constant voltage, direct current power source is most commonly used with GMAW, but constant current systems, as well as alternating current, can be used. There are four primary methods of metal transfer in GMAW, called globular, short-circuiting, spray, and pulsed-spray, each of which has distinct properties and corresponding advantages and limitations.

2.5 CNC SHEARING MACHINE



Figure 2.3: CNC shearing machine

Shearing is a process for cutting sheet metal to size out of a larger stock such as roll stock. Shears are used as the preliminary step in preparing stock for stamping processes, or smaller blanks for CNC presses. During the shearing process, an upper blade and a lower blade are forced past each other with the space between them determined by a required offset.

Material thickness ranges from 0.125 mm to 6.35 mm (0.005 to 0.250 in). The dimensional tolerance ranges from ± 0.125 mm to ± 1.5 mm (± 0.005 to ± 0.060 in). The shearing process produces a shear edge burr, which can be minimized to less than 10% of the material thickness. The burr is a function of clearance between the punch and the die (which is nominally designed to be the material thickness), and the sharpness of the punch and the die.

The illustration at next page had shown a two-dimensional look at a typical metal shearing process. Note how the upper shear blade fractures the metal workpiece held in place by the work holding devices. The sheared piece drops away.

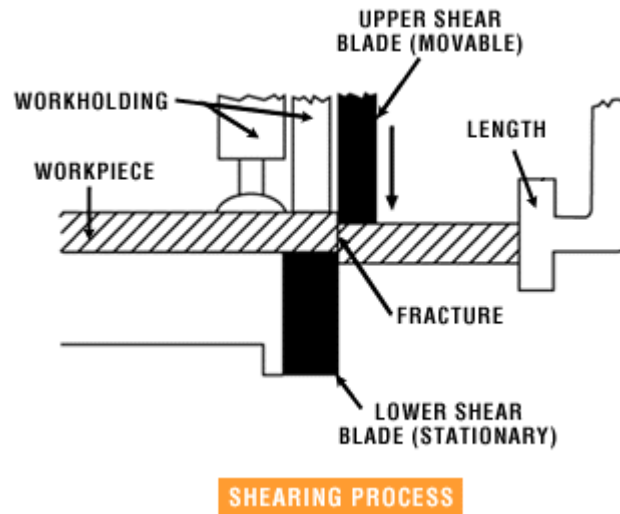


Figure 2.4: Shearing Process Features

Typically, the upper shear blade is mounted at an angle to the lower blade that is normally mounted horizontally. The shearing process performs only fundamental straight-line cutting but any geometrical shape with a straight line cut can usually be produced on a shear. Metal shearing can be performed on sheet, strip, bar, plate, and even angle stock. Bar and angle materials can only be cut to length. However, many shapes can be produced by shearing sheet and plate.

Materials that are commonly sheared include:

- i. Aluminum
- ii. Brass
- iii. Bronze
- iv. Mild steel
- v. Stainless steel

2.6 DRILLING MACHINE



Figure: 2.5 Drilling Machine

A **drill** (from Dutch *Drillen*) is a tool with a rotating drill bit used for drilling holes in various materials. Drills are commonly used in woodworking, metalworking, construction and DIY.

The drill bit is gripped by a chuck at one end of the drill, and is pressed against the target material and rotated. The tip of the drill bit does the work of cutting into the target material, either slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), or crushing and removing pieces of the workpiece (SDS masonry drill).

2.6.1 Types Drill

There are many types of drills: some powered manually, others using electricity or compressed air as the motive power, and a minority driven by an internal combustion engine (for example, earth drilling augers). Drills with a percussive action (such as hammer drills, jackhammers or pneumatic drills) are usually used in hard materials such as masonry (brick, concrete and stone) or rock. Drilling rigs are used to bore holes in the earth to obtain water or oil. An oil well, water well, or holes for geothermal heating are created with large drill rigs up to a hundred feet high. Some types of hand-held drills are also used to drive screws. Some small appliances may be drill-powered, such as small pumps, grinders, etc.

2.7 RIVET



Figure 2.6 Rivet Tool

A rivet is a mechanical fastener. Before it is installed it consists of a smooth cylindrical shaft with a head on one end. The end opposite the head is called the buck-tail. On installation the rivet is placed in a pre-drilled hole. Then the tail is "upset" (i.e. deformed) so that it expands to about 1.5 times the original shaft diameter and holds the rivet in place. To distinguish between the two ends of the rivet, the original head is called the factory head and the deformed end is called the shop head or buck-tail.

Because there is effectively a head on each end of an installed rivet it can support tension loads (loads parallel to the axis of the shaft); however, it is much more capable of supporting shear loads (loads perpendicular to the axis of the shaft). Bolts and screws are better suited for tension applications.

Fastenings used in traditional wooden boat building like copper nails and clinch bolts work on the principle of the rivet but they were in use long before the term rivet was invented. So, where they are remembered, they are usually classified among the nails and bolts respectively.

2.8 FASTENING

The screw-fastening assembly process is one of the most widely used fastening methods in industrial assembly. However, little research has been conducted in this area in terms of the effect of the screw-fastening process on the assembly accuracy.

In our study, we observe that an order of magnitude difference (ranging from about 1 μm to over 10 μm) in the assembly accuracy may result using different screw-fastening conditions, and our analysis shows that, number of screws, datum pins, washer and holding force are the important factors affecting assembly accuracy during the screw-fastening process.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

After done a literature review about the design, the fabrication processes should be carry out using machine and tool or equipment in lab. Basically, for this design it use a familiar manufacturing processes such as drilling, welding and shearing. The process done step by step following the idea and step that been planed already. In this chapter it would covering all processes that been done and design drawing including dimension so that the explanation would be more clear and easy.

After the information gathered and the project is continued with the design process. It is important to make a best design for the project. After several design sketched, the best concept have been chosen through it advantages. The selected design is then transferred to detail drawing by using Solidwork software.

After all the engineering drawing finished, the drawing has been used as a reference for next process, which is fabrication process. The manufacturing processes include in this process are welding, cutting, drilling, rivet and others. During the fabrication process, if any wrong occur the modification step will be take the action. Analysis stage has been implemented after fabrication stage. The evaluation is by considering the strength, durability, safety and others.

Then after all processes that mentioned above is done, all materials for report writing are gathered. The report writing will be guided by the UMP final year report writing. The project ended after the presentation and submission of the report.

3.2 DESIGN

3.2.1 Introduction

The design of portable tower for aerial TV must be compliance to several criteria. The design consideration must be done carefully so the design can be fabricated and the tower is functioning. The criteria that must be considered in designing the tower are:

- i. Durability : The tower must be durable when fill with aerial. TV
- ii. Material : The material that will be used must be suitable to fabricate the tower and easy to get. Have strength to stand a weight from aerial
and wind below
- iii. Cost : It depends on material and manufacturing processes. It should reduce the cost to the minimum.

3.2.2 Concept Selection Method

The design portable tower for Arial TV must trough process of concept selection method. It includes sketching four types of tower for Arial TV that have certain characteristic and advantages. The sketches designs of the tower are:

i. Concept A

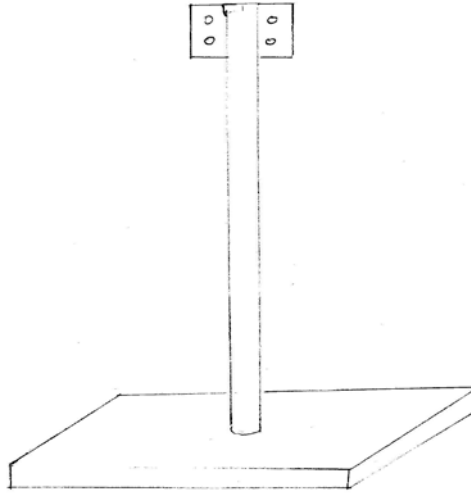


Figure 3.1: Concept design A

It is a simple design and easy to put on the aerial TV. But the problem of this design is it not a portable product. Beside that it cannot put on the aerial TV specifically. The process that will use is welding, rivet, and others.

ii. Concept B

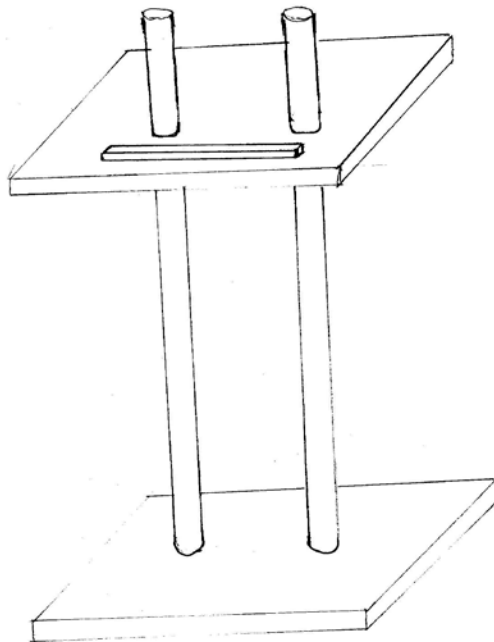


Figure 3.2: Concept design B

It also a simple design. Beside that it is a simple product. But the problem of this product is it not really suitable to put on the aerial TV, because it don't have specific holder aerial TV. This tower will use manufacturing a lot of processes such as cutting shearing, , welding, rivet and others.

iii. Concept C



Figure 3.4: Concept design C

The advantages of this product are it is a portable design. This design also have enough capacity and easy to put on the aerial TV. The disadvantage of this design is it difficult to move because it is a heavy product. This tower will use manufacturing a lot of processes sheering, privet, welding, drilling and others.

iv. **Concept D**

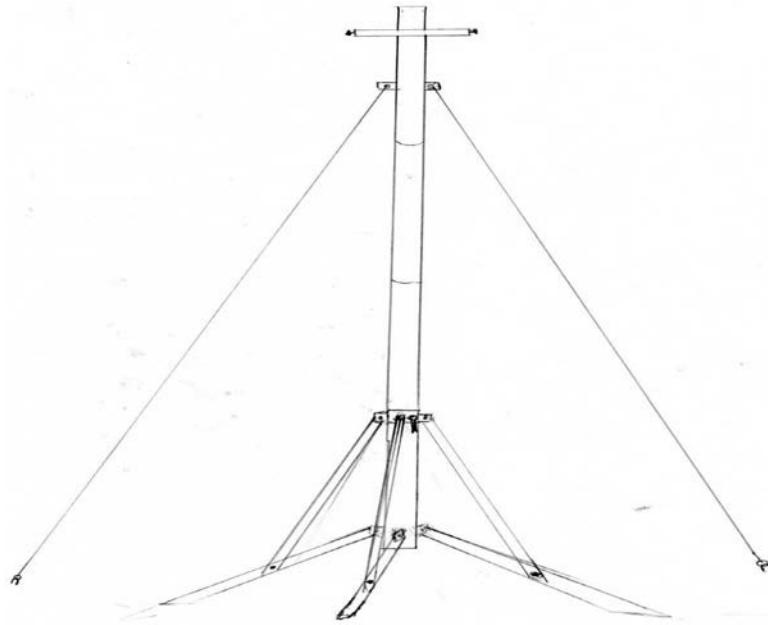


Figure 3.4: Concept Design D

This design is modification of design C. These designs have more advantages compared to the design before. This is a portable design and easy to put on the aerial TV. Beside that, it also has a holder stand (ring) to make it easy to move. To fabricate this design it will use a lot of manufacturing processes such as welding, cutting, rivet, sheering and others.

3.2.3 Result

From all the design sketch, one of the best designs will be selected. It can be evaluated through several section criteria for its function.

The first criteria are customer needs. It is important to know what customers want about this product. It is easier when a product enters the market. Next selection criteria are easy to use.

Besides that, easy to manufacture also be an important criteria to select the design. It includes the process to fabricate the concept, the material that will use, the capability of the machine at FKM lab to fabricate the design and others

After that, cost of manufacture also has been considered as selection material. When the concept enters a market, cost is very important to attract customer to buy it. Lastly the selection criteria are the strength of the product. The strength of the product can be known through the analysis.

According to the criteria above, the concept D has been selected as the best design. It is because the concept D can fulfill the criteria and have some advantages compared to design A, design B, and design C.

3.2.4 Concept Generation and Evaluation

Selection Criteria	Concept A	Concept B	Concept C	Concept D
Easy to handling	(-)	(-)	(-)	(+)
Capability	(+)	(+)	(+)	(+)
Strength	(-)	(-)	(+)	(+)
Shapes	0	(-)	(+)	0
Weight	(+)	(+)	(-)	(-)
Function	0	0	(+)	(+)
Plusses	2	2	3	4
Same	2	1	0	1
Minuses	2	3	2	1
Net	0	-1	1	3
Rank	4	3	2	1
Continues	NO	NO	NO	YES

Table 3.1: Pugh concept

3.3 PRODUCT DESIGN SPECIFICATION

Concept D is the best concept and must be fabricated. The product design specification is like below.

3.3.1 Part 1

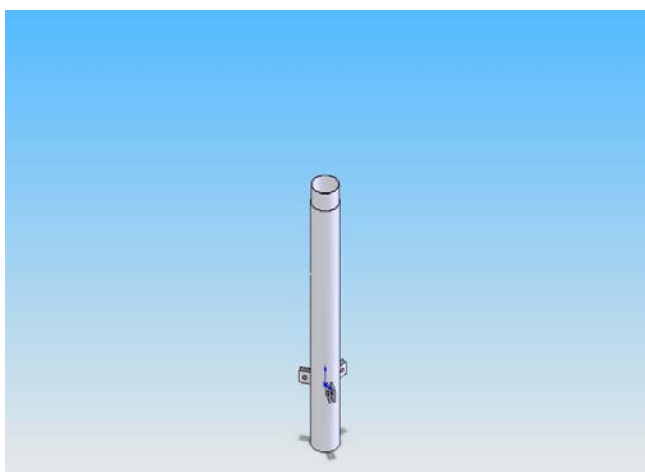


Figure 3.5: Part 1

- i. The material is 2 x 2 inches the hollow aluminum pipe
- ii. Sheet metal cutting of by shearing for 6 units with size 30.50mmX30mm each one
- iii. The hollow aluminum pipe also been cut off using cutter to get desire dimension.
- iv. Use drilling to get hollow and rivet to assembly between sheet metal and hollow aluminum pipe.

3.3.2 Part 2

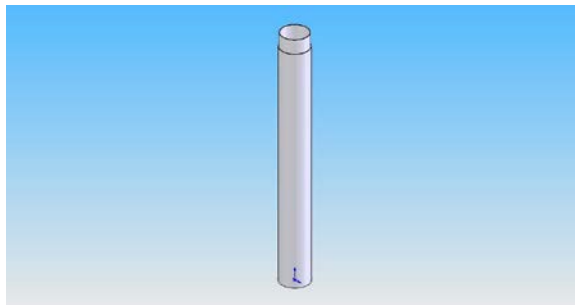


Figure 3.6: Part 1

- i. The material for this part is hollow aluminum pipe
- ii. The dimension is 2 x 2 inches.
- iii. Using cutter and rivet to fabricate this part

3.3.3 Part 3

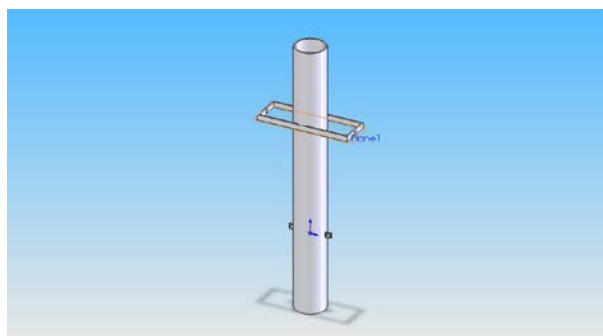


Figure 3.7: Holder Arial TV

- i. steel sheet metal 3mm
- ii. Need 0.5m the hollow rod
- iii. The material is 2 x 2 inches hollow rod
- iv. Top and bottom side holder Arial TV =3mm x 150mm (2 pieces)
- v. Left and right side holder Arial =50mm x 3mm (2 pieces)

3.3.4 Holder stand (ring)

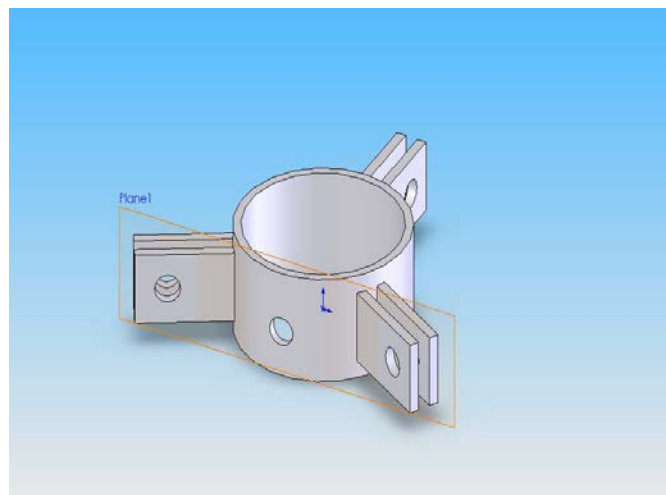


Figure 3.8: Holder Stand

- i. The material for this part is stainless steel sheet metal 1mm
- ii. Dimension for :
 - a. 6 units with size 30.50mm X 30mm
 - b. 1 unit with size 30.50mm X 190mm
- iii. Using welding process to make joining this part

3.3.5 Part 5 stand (1)

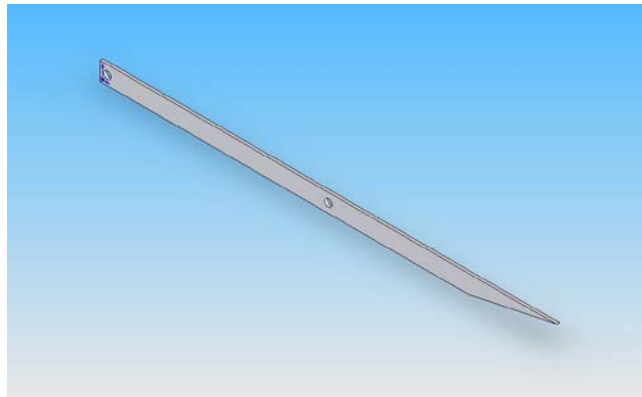


Figure 3.9: Stand 1

- i. The material for this part is mild steel sheet metal 3mm
- ii. Left and right side =20mm x 3mm (2 pieces)
- iii. Top and bottom side =20mm x 500mm (2 pieces)
- iv. Using drilling to get hollow and cutting process

3.3.6 Part 6 stand (2)

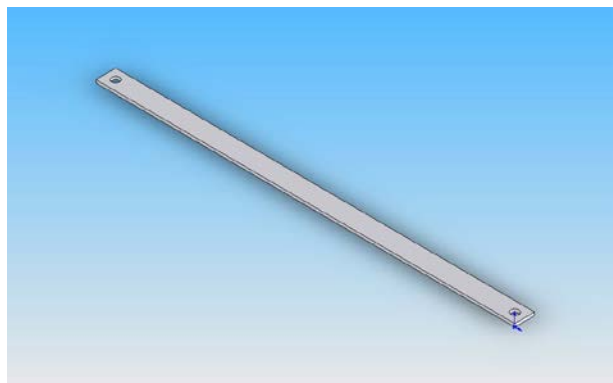


Figure 3.10: Stand 2

- i. The material for this part is mild steel sheet metal 3mm
- ii. Using drilling to get hollow and cutting process.

3.4 Assembly Drawing

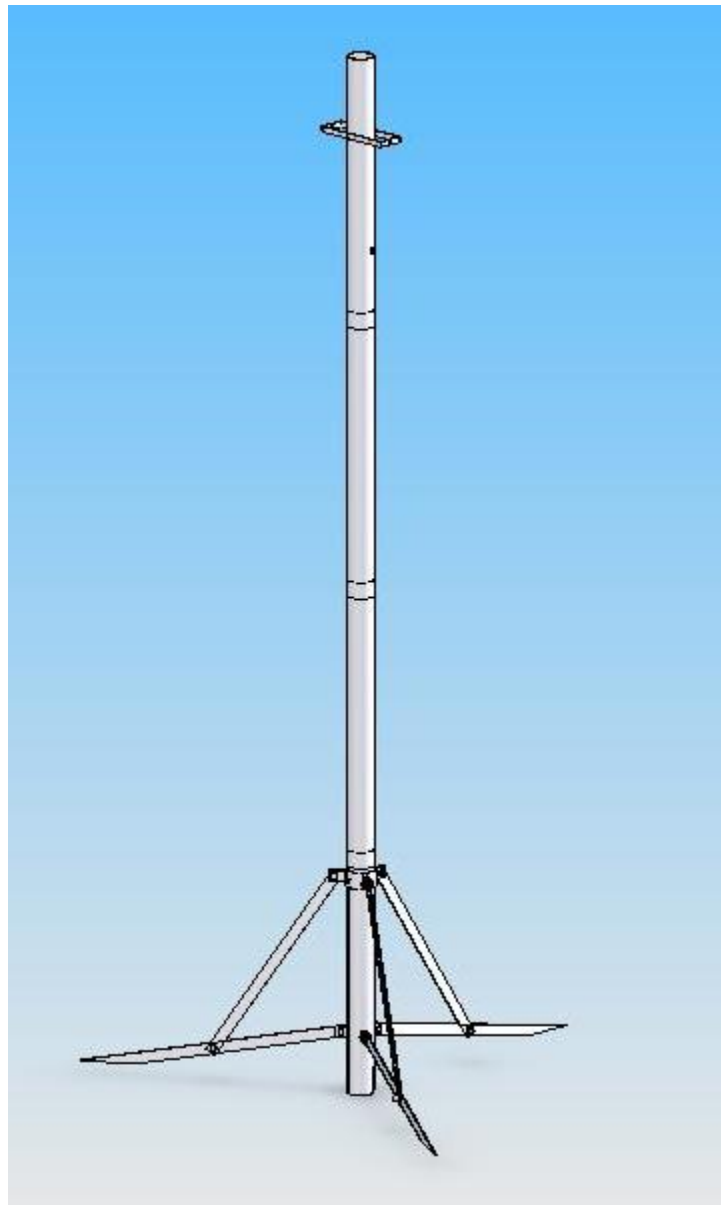


Figure 3.11: Assembly Part

- i. Full assembly Portable Tower For Arial TV (before modification).

3.5 PROCESSES INVOLVES

In order to make the design come reality, fabrication process needs to be done first .The fabrication process start from dimensioning the raw material until it is finish as a desire product .The processes that involve are:

i. Getting material

Figure 3.16 introduces the material have in UMP mechanical laboratory .This rack have a lot more type of steel like rectangular hollow, hollow cylinder and etc.



Figure 3.12: Raw material

ii. Measuring and Marking

After getting the material, the next step is measuring and making material like Figure 3.17. The equipment used in this process is measuring tape and marker pen.



Figure 3.13: Marking and measuring process

iii. Cutting process

Figure 3.13 introduce the material cutting process using floor cutter disc after measurement.



Figure 3.14: Cutting process

iv. Joining Process

Figure 3.14 introduce about joining method using MIG welding .This process is used to joint the holder stand and holder Arial TV part.



Figure 3.15: Joining process by using MIG weld

v. Shearing process

The purpose of shearing process is to cut the stainless steel sheet metal according to its dimension.



Figure 3.16: Set up the shearing machine

vi. Grinding process

After cutting and welding process the chip from work piece must remove using hand grinding show in figure 3.21 to remove chip after process cutting and remove bead after welding process on the work piece and get smooth surface before joining and after joining process. This step must take to protect from dangerous because the chip is very sharp.



Figure 3.17: Grinding process

vii. Drilling process

The purpose of drilling process is to get hollow stainless steel sheet metal according its dimension.



Figure 3.18: Drilling process

Vii Finishing process (painting)

After grinding process, the finishing process is taken place. The purpose of painting is to make the product be more pleasing in appearance.



Figure 3.19: Painting process.

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

This chapter will discuss about the completed fabrication, types of defects, product specification and cause of problem in this project. The analysis also was helped to give improvement of the portable tower.

4.2 RESULTS

After finish fabrication process, the product has been analyzed. At this stage, all information about this product is collected and gathered. It is important to classify the product before it can use. The complete fabrication of the product is like below.



Figure 4.1: Before assembly view



Figure 4.2: Isometric view



Figure 4.3: Front view



Figure 4.4: Back view



Figure 4.5: Side view

4.2.1 Product Specification

Product specification is one of example for analysis process. The product specification is like below.

Table 4.5: Table of product specification

Category	Result
Type	Portable tower Arial
Area of Arial holder	72.5mm X 50mm
Color	Silver and red
Height	3m
Maximum force can be load	5 kg

4.3 DISCUSSION

Discussion is diving by two parts. Firstly is discussion about type of defect on the final product .Second, is about the problem starting from literature review until fabricate and finish this product.

4.3.1 Type of Defect

After fabrication process finish, many type of defect was existed. It happened from fabrication process and weakness during using several machine and tools. Type of defects is like below.

i. Bead

Figure 4.6 is example a defect on holder stand and holder Arial TV. The bead is not trim from welding process. The voltage when welding process is not suitable for this material. Insufficient experience to handle also caused of the defected.

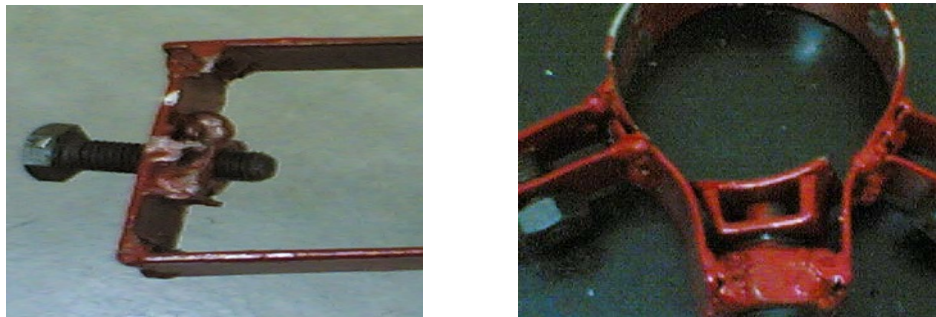


Figure 4.6: Bead at the holder.

ii. Gap

Figure 4.7 is shown a defect in part .It is occurring after using cutter.



Figure 4.7: Gap between two materials after assembly.

iii. Not parallel

This defect happen cause by less skill when process weld holder Arial TV .When the holder is not place at the flat surface during weld the holder.



Figure 4.8: Leg not parallel

iv. Deformation Part

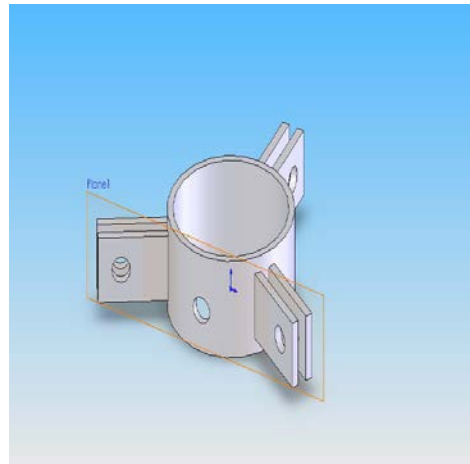


Figure 4.9: Holder stand before



Figure 4.10: New design holder stand

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

For the final chapter it present about conclusion and recommendation for the project. The important things for this chapter are about the problems encountered during the whole project carried out. The problem are included the process planning that have been done. These project problems also make the student to think more creative to solve the problem. This chapter also discuss about the conclusion of the project that is concluding all the process involved. Beside that, this chapter also contains recommendation about project. This is very important to make some improvement about the project for future work.

5.2 CONCLUSION

All design and product that intend to be manufactured basically would through various manufacturing process. In this design the process that been through wasn't strange process because this manufacturing or fabrication process was a common process such as milling, drilling, rivet and welding.

In this design the part was being manufactured part by part and then finally the assembly process would hold in order to get desire design. Beside that this method would easier us because the damage part can be replace anytime and isn't hard to replace it and it directly give benefit such as reduce cost and save time.

As the conclusion, the objective of the project was achieved. The portable tower for Arial TV has better space for better arrangement of Arial TV. This because the dimension of the holder Arial is 50 x 147.5 mm. So it has very suitable space to put the Arial TV. Besides that this tower is light weight that has been designed to put the Arial TV outdoor specifically. Fabrication of portable Arial TV is very useful especially for customer satisfied .furthermore I can improve all skills and knowledge that have been learned before and can generate creative idea to solve the problem that might be occurred.

5.2 RECOMMENDATION

After finish the project, the portable tower look very stable and interesting. But several recommendations to improve for future final year project. The material used to make the poles should be changed to a heavy weight material such as steel hollow rod. This is because the heavy weight material can make the portable tower for Arial TV be more stable. Beside that the width of the tower should be increase. to make the product more stable.

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3. Ulrich K. T., and Eppinger S. D, (2004). Product Design and Development.
4. <http://www.asseenontvguys.com>, dated on October 23, 2008
5. <http://en.wikipedia.org/wiki/Welding>, dated on October 23, 2008
6. <http://en.wikipedia.org/wiki/Rivet>, dated on October 23, 2008
7. <http://en.wikipedia.org/wiki/Drill>, dated on October 23, 2008
8. http://en.wikipedia.org/wiki/Gas_metal_arc_welding, dated on October 24, 2008

APPENDIX A

MACHINE TOOL AND EQUIPMENT



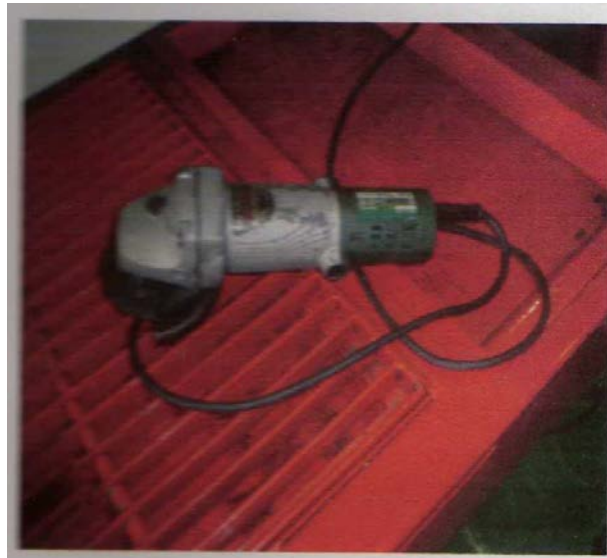
MIG Welding Machine



Abrasive Cutter



Measuring Tape



Hand Grinding



Personal Protection Equipment (PPE): Visor, Goggle, Glove & Apron



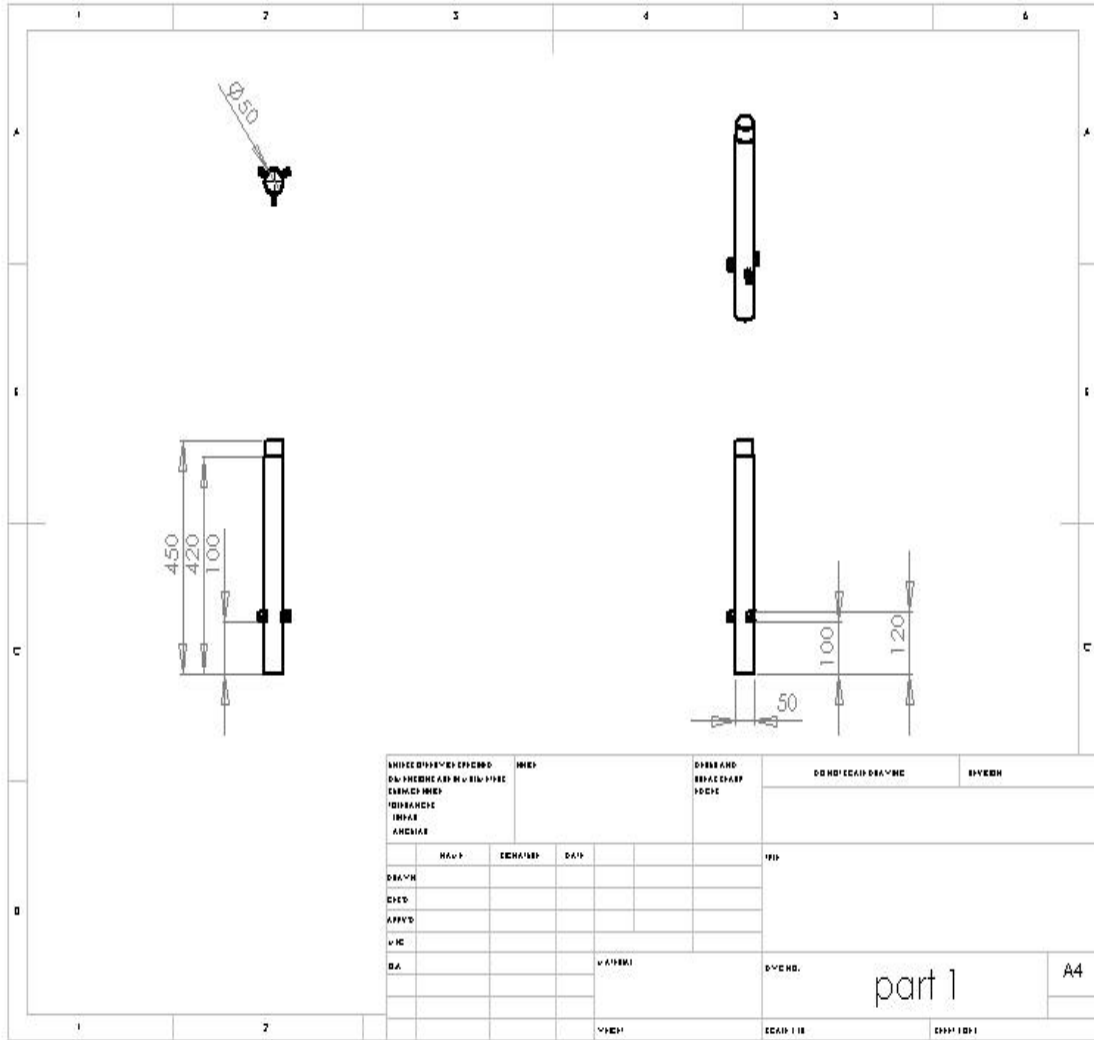
Hand Drill



Rivet Pop

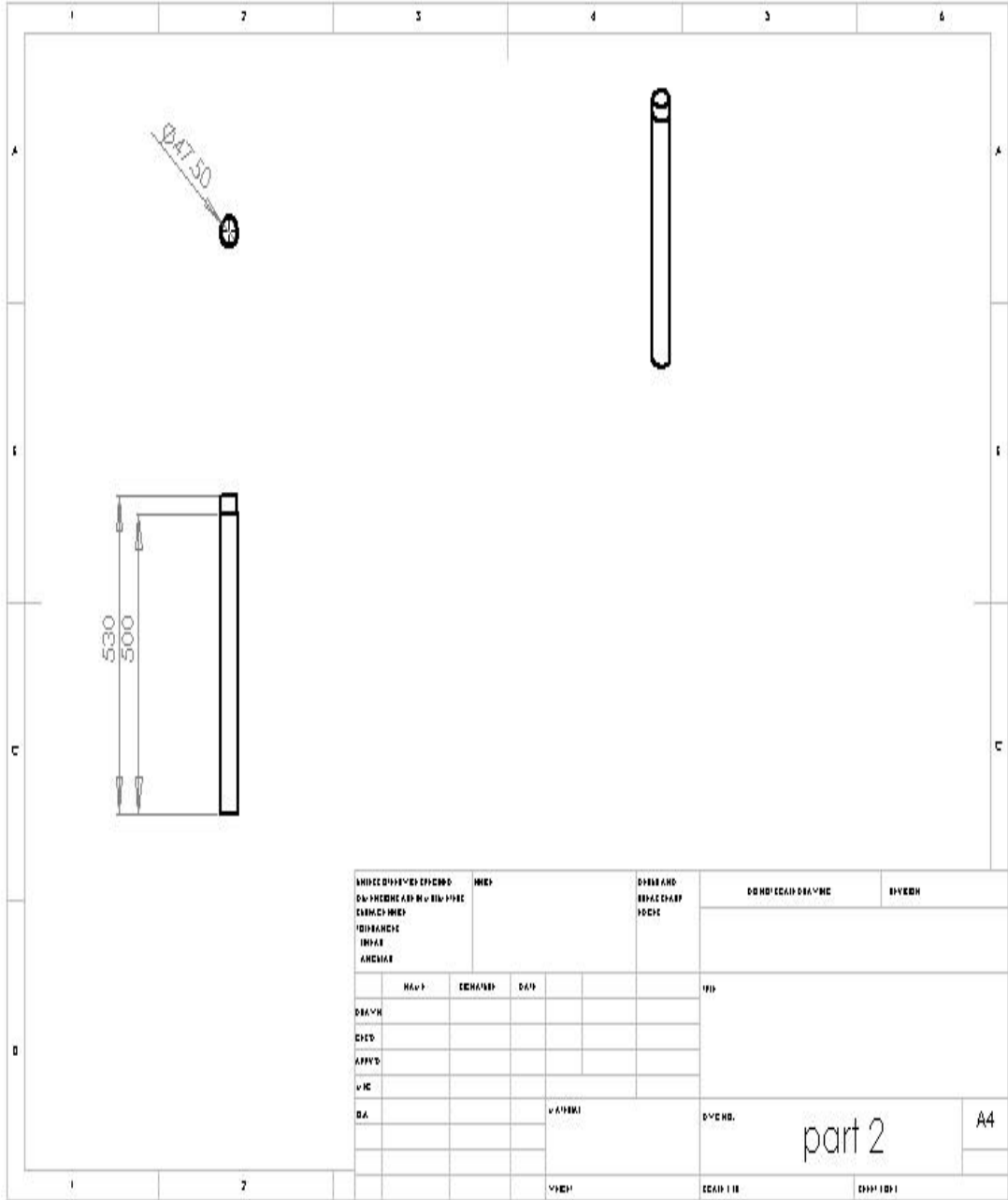
APPENDIX B

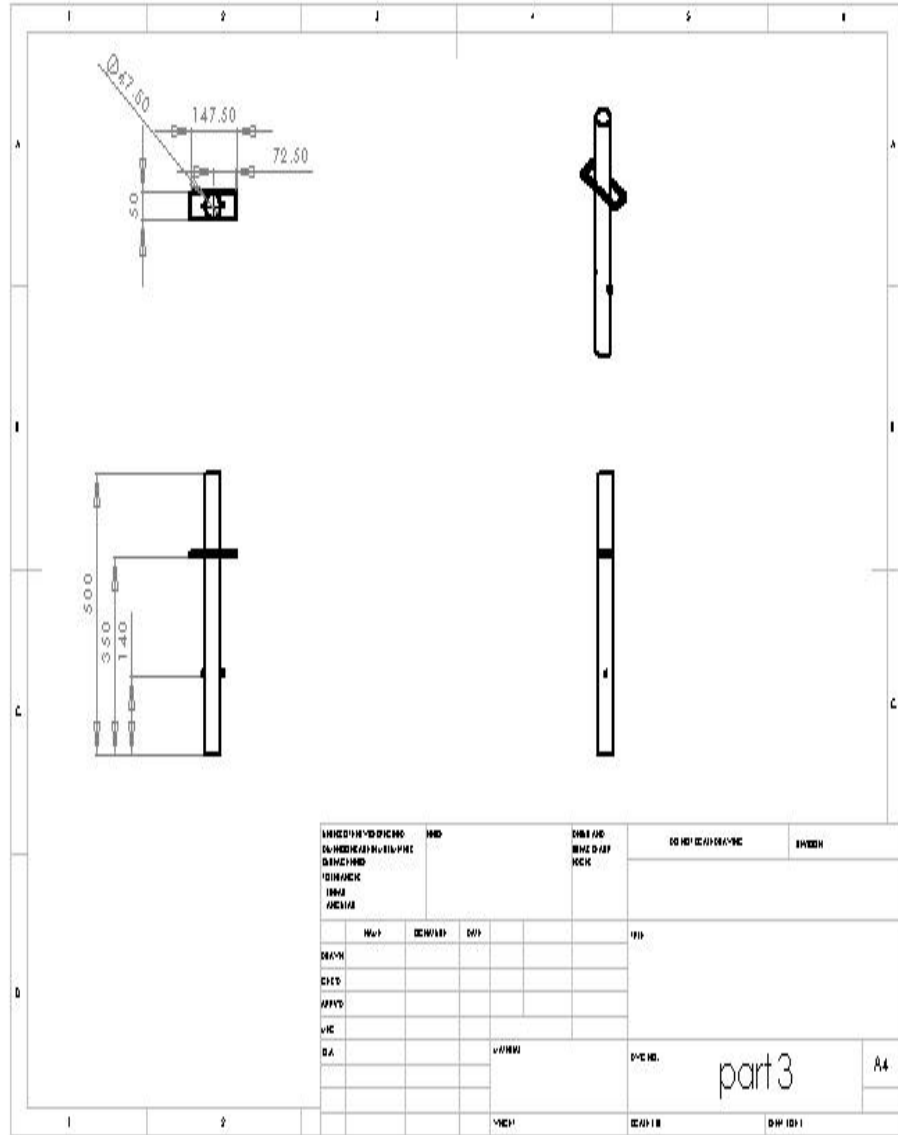
DETAILS DRAWING OF THE PARTS



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