DESIN AND FABRICATION OF PORTABLE "TABUNG MASJID"

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DESIGN AND FABRICATE OF PORTABLE "TABUNG MASJID"

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

> Faculty of Mechanical Engineering UNIVERSITI MALAYSIA PAHANG

> > NOVEMBER 2009

SUPERVISOR'S DECLARATION

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

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STUDENT'S 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 diploma and is not concurrently submitted for award of other diploma.

Signature

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ABSTRACT

This report presents about the design and fabrication of portable "Tabung Masjid" that always been used especially in mosque. This portable "Tabung Masjid" is a device which is important in order to make people comfortable in donation. The idea of the fabricating of this "Tabung Masjid" is based on student's creativity. The selection of suitable materials in fabricating of this "Tabung Masjid" is has minimum weight, long life-span and can detain heavy load. Material proposed for the fabrication of the "Tabung Masjid" is stainless steel material. In this report, we'll also be having more to the fabrication of this portable "Tabung Masjid".

ABSTRAK

Laporan ini membentangkan tentang tabung masjid mudah alih yang sering kali digunakan terutamanya di dalam makmal. Tabung masjid mudah alih merupakan suatu perkakas yang penting untuk memudahkan aktiviti pendermaan. Idea pembentukan tabung masjid mudah alih ini berdasarkan kreativiti pelajar sendiri. Pemilihan bahan yang sesuai untuk digunakan bagi pembentukkan tabung masjid mudah alih ini merupakan bahan yang mempunyai berat yang ringan, jangka hayat yang tahan lama dan boleh menahan beban yang berat. Bahan yang dicadangkan untuk pembentukkan tabung masjid mudah alih ini merupakan material jenis stainless steel. Dalam laporan ini juga akan lebih memfokuskan kepada pembentukkan tabung masjid mudah alih.

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LIST OF ABBREVIATION

ANSI	American National Standard Institute
CAD	Computer Aided Design
MIG	Metal Inert Gas Welding
OSHA	occupational Standard and Health Administration
UMP	Universiti Malaysia Pahang

LIST OF SYMBOL

- σ Stress
- A Area
- F Force
- P Pressure
- M Mass
- *m* Meter
- *mm* Millilitre

CHAPTER 1

INTRODUCTION

1.1 **PROJECT SYNOPSIS**

1.1.1 General Project Synopsis

The project involves designing and fabricating a portable "Tabung Masjid ". As the Diploma final year project allocates the duration of 1 semester, this large man-hour project therefore requires significant efforts of the students to participate. Basically the entire trolley could be divided into three stages, which are concept review and development, designing and fabrication.

The "Tabung Masjid " is equipped by using stainless steel material which include, stainless steel plate, hasp, and wheels in manufacturing process by perform MIG welding to joint the parts and etc. The advantages of the proposed " Tabung Masjid" to be developed the quality in design and security to ensure it is in good condition.

The process of development is initiated from designing the shape of the "Tabung Masjid" by considering the function as well. In order to produce user friendly product that is suitable to the consumer, consideration to the ergonomic factor is taken into account. It involves the measurement process before the materials are cut into pieces before joined together.

1.1.2 Specific Project Synopsis

My project title is Development of "Aluminum Alloy Tabung Masjid". The project involves small analysis of the "Tabung Masjid" body and fabrication of the "Tabung Masjid" itself with concerns regarding strength, durability, ergonomic factor, and convenience. Test need to be done to verify the strength of the "Tabung Masjid" right before the fabrication process to avoid material and fund wasting. The projects prerequisites are Static, Dynamic and Strength of Material. Overall, the project will meet acquire skills of design, analysis, and fabrication.

1.2 PROBLEM STATEMENT

The concept of the "Tabung Masjid" is to facilitate people for donate during seat at the mosque. This "Tabung Masjid" will primarily help staff especially members of Faculty of Mechanical Engineering to donate the money for convenience. Members are facing problem while the need to bring things from one place to another due to unavailability of "Tabung Masjid". Thus, with the development of this "Tabung Masjid", it is hope that it can make the perfect movement while the "Tabung Masjid" running. Besides that, it also hope the "Tabung Masjid" will made with high security.

1.3 PROJECT SCOPE OF WORK

- 1. Literature Review: Valuable data are searched and gathered. Considering the shape of the "Tabung Masjid" in terms of its complexity and method to produce.
- Sketching & Designing: Sketching and designing using Autocad software in creating the design of the "Tabung Masjid".
- 3. **Fabrication**: Fabricate and produce the "Tabung Masjid" by using all necessary manufacturing process such as welding, cutting, grinding and etc.
- 4. **Testing & Evaluation**: Simulate the mechanism of the "Tabung Masjid" produce is in line with the expected function to be.

1.4 PROJECT OBJECTIVES

1.4.1 General Objectives

Diploma final year project objective is to practice the knowledge and skill of the student that have been gathered before in solving problem using academic research, to born an engineer that have enough knowledge and skill. This project also important to train and increase the student capability to get know, research, data gathering, analysis making and then solve a problem by research or scientific research.

The project also will educate the student in communication like in a presentation and educate them to defend their research in the presentation. The project also will generate students that have capability to make a good research report in thesis form or technical writing. This project also can produce and train student to capable of doing work with minimal supervisory and more independent in searching, detailing and expanding the experiences and knowledge.

1.4.2 Specific Project Objectives

The project objectives are to design a security, high durability, portable and user friendly "Tabung Masjid".

1.5 PROJECT SCOPE

- 1. To ensure the "Tabung Masjid" movement perfectly
- 2. To ensure the security of "Tabung Masjid" is always safe
- 3. To ensure the durability of "Tabung Masjid" when it's move is good

1.6 PROJECT GANTT CHART

For the diagram as shown as below, the project starts with research about the title. This consist a review of the concept of "Tabung Masjid". These tasks have been done through research on the internet, books and others sources. After I get the title, from that I also decide the objective of project and also the scope. Beside that, based on the current product I make the problem statement about it.

After gathering all the relevant information, the project undergoes design process. In this step, from the knowledge gather from the review is use to make a create and sketch design that suitable for the project. After several design sketched, design consideration have been made and one design have been chosen. The selected design sketched is then transfer to solid modeling and engineering drawing using Autocad program. Before I will start the fabrication process I must be present about my progress at the mid presentation. The materials and the measurement needed for the "Tabung Masjid" listed down and calculated to give an ergonomic shape of the "Tabung Masjid".

Next, after the needed material is listed, acquisition step take places. There are only a few materials that need to buy such as wheels. Some of the needed material is well-prepared by the university.

After all the parts needed had been gathered, the project proceeds to next step that is fabrication process. The finished drawing and sketching is used as a reference by following the measurement and the type of materials needed. The fabrication process that involved is cutting, welding, and others. If all the parts had been processed, the parts are joined together to produce full-scaled "Tabung Masjid". Here come the testing and evaluation process. The "Tabung Masjid" will be test to see if it fulfills the requirement such as ergonomic aspect, safety, strength and high durability. During the testing, if problem occur such as malfunction or unstable platform, the "Tabung Masjid" will step back to the previous process, where the error is fixed. The "Tabung Masjid" is expected to have an error that may cause the part to be re-designed and re-fabricate again. After all the parts had been joined together, here comes the last phase of process that is data discussion. In data discussion, the draft report and all the related articles are gathered and hand over to the supervisor for error checking. The finish product will be compared with the report to make sure that there is no mistake on both project and report.

After the product and the report had been approved by the supervisor, the report is rearrange and print out to submit at the supervisor, the project coordinator and faculty of Mechanical Engineering. In this stage, the final presentation was also being prepared and waited to be present.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The "Tabung Masjid" is a mechanism that allowed man to donate their money into the "Tabung Masjid". It's help man to donate their money without having a problem due to the donation. Its also helps to improve the security of "Tabung Masjid". From the statement above conclude that the "Tabung Masjid" a major role as an items using mechanism for people without having a problem of doing that. A "Tabung Masjid" also functioned as a helper to people donate their money.

2.2 TYPE AND FUNCTION OF PORTABLE "TABUNG MASJID"

- 1. Portable "Tabung Masjid": The fund is use when the people come to mosque on Friday and it is easier to people make the donation.
- 2. Permenent "Tabung Masjid": The fund is use when the people come to mosque anytime and it is always at the permanent place.

2.3 BASIC PARTS

2.3.1 Wheel

These Conventional Moldon rubber caster wheels have soft rubber tires molded onto iron centers. Soft rubber provides more desirable operating characteristics than any other wheel material. It is quiet, absorbs shock (prolonging equipment life and protecting cargo), can roll over small objects, protects costly floor surfaces, and minimizes vibration. The Conventional Moldon rubber caster wheel falls short of perfection in its limitation under load - it does not roll easily. Load capacity ratings do not take into account the effort required to manually move a load (drawbar pull measured in pounds). The figure 2.1 below is show the wheel is used in this project.



Figure 2.1: Rubber wheel

If cargo is to be moved manually on Conventional Moldon rubber caster wheels, reduce capacity ratings by 50% and select the largest practical wheel diameter. These caster wheels should not be left standing under load for extended periods as the tires may take a permanent "set" or develop flat spots. They can be used on almost any dry factory floor. The bonding agent which holds the rubber tire to its iron center can be affected by exposure to some chemicals, impact, overloading, and the buildup of heat. Tire hardness is 65 to 75 Durometer, Shore A. Temperature range is -20° to 159° F (Castercity. 2009). For my project I will use the 4" wheel.

2.3.2 Body

The many unique values provided by stainless steel make it a powerful candidate in materials selection. Engineers, specifiers and designers often underestimate or overlook these values because of what is viewed as the higher initial cost of stainless steel.



Figure 2.2 : Body

The figure above is shown the body of portable "Tabung Masjid" which is made from stainless steel, over the total life of a project, stainless is often the best value option. Stainless steel is essentially a low carbon steel which contains chromium at 10% or more by weight. It is this addition of chromium that gives the steel its unique stainless, corrosion resisting properties. So, for body on this part I will use stainless steel plate (Slice of Stainless. 2009).

2.3.3 Fund lock

The Abloy push button cabinet locks are one of the most reliable security locks for sliding doors and furniture. Designed for metal or wood cabinets, and sliding glass or wooden doors, these locks are spring loaded and require no key when locking, simply push to lock. This key lock is selected because of the function and material, it is suitable use for stainless steel plate. The figure 2.3 is shown the Abloy Push Button or is used in this project.



Figure 2.3: Key lock

Available in chrome-plated zinc, brass, or satin chrome (Midwest . 2009). To make the fund is always in high security in any condition this key lock is suitable for "Tabung Masjid"

2.3.4 Fund hole cover

For the other part of portable "Tabung Masjid" is cover of money hole, the function is to avoid the other people see the how much of money is donate. The figure 2.4 below is the part of money hole cover.



Figure 2.4: Cover

Moreover, to ensure the donor in safely while donate the money. The cover use the stainless steel plate, it is same material with body part.

2.4 JOINING METHOD

Joining involves in assembly stage. Commonly used method to join metal part is Metal Inert Gas (MIG) welding (N.G. Slavianoff. 2009). The figure 2.5 below is shown the joining process is used the MIG welding.



Figure 2.5: MIG welding

2.4.1 Metal Inert Gas (MIG) Welding

MIG (Metal Inert Gas) or as it even is called GMAW (Gas Metal Arc Welding) uses an aluminum alloy wire as a combined electrode and filler material. The filler metal is added continuously and welding without filler-material is therefore not possible. Since all welding parameters are controlled by the welding machine, the process is also called semi-automatic welding.

The MIG-process uses a direct current power source, with the electrode positive (DC, EP). By using a positive electrode, the oxide layer is efficiently removed from the aluminum surface, which is essential for avoiding lack of fusion and oxide inclusions. The metal is transferred from the filler wire to the weld bead by magnetic forces as small droplets, spray transfer. This gives a deep penetration capability of the process and makes it possible to weld in all positions. It is important for the quality of the weld that the spray transfer is obtained. There are two different MIG-welding processes, conventional MIG and pulsed MIG:

- Conventional MIG uses a constant voltage DC power source. Since the spray transfer is limited to a certain range of arc current, the conventional MIG process has a lower limit of arc current (or heat input). This also limits the application of conventional MIG to weld material thicknesses above 4 mm. Below 6 mm it is recommended that backing is used to control the weld bead.
- 2. Pulsed MIG uses a DC power source with superimposed periodic pulses of high current. During the low current level the arc is maintained without metal transfer. During the high current pulses the metal is transferred in the spray mode. In this way pulsed MIG is possible to operate with lower average current and heat input compared to conventional MIG. This makes it possible to weld thinner sections and weld much easily in difficult welding positions.

Gas Metal Arc Welding (GMAW) is frequently referred to as MIG welding. MIG welding is a commonly used high deposition rate welding process. Wire is continuously fed from a spool. MIG welding is therefore referred to as a semiautomatic welding process. There are some advantages and disadvantages in using MIG welding:

The advantages of MIG welding:

- 1. All position capability
- 2. Higher deposition rates than SMAW
- 3. Less operator skill required
- 4. Long welds can be made without starts and stops
- 5. Minimal post weld cleaning is required

The disadvantages of MIG welding:

- 1. Costs money of consumable, such as tips and nozzles
- 2. Is not worth a dang on paint, rust, or dirty surfaces
- 3. No good for thick steel because it does not get the proper penetration.

2.5 SHEARING PROCESS

Shearing is a metalworking process which cuts stock without the formation of chips or the use of burning or melting. Strictly speaking, if the cutting blades are straight the process is called shearing; if the cutting blades are curved then they are shearing-type operations. This figure 2.6 below is shown how the shearing machine work.



Figure 2.6: Shearing process

The most commonly sheared materials are in the form of sheet metal or plates; however rods can also be sheared. Shearing-type operations include blanking, piercing, roll slitting, and trimming (Global Spec. 2009).

Materials that are commonly sheared include Aluminum, Brass, Bronze, Mild steel and Stainless steel. The shearing process uses three types of tool systems.

They are used for shearing:

- 1. Sheet metal and plate using a squaring or bow tie shear
- 2. Angle materials using and angle shear, and
- 3. Bar stock using a bar shear.

2.6 BENDING PROCESS

Bending is a process by which metal can be deformed by plastically deforming the material and changing its shape. The material is stressed beyond the yield strength but below the ultimate tensile strength. The surface area of the material does not change much. Bending usually refers to deformation about one axis.



Figure 2.7: Bending Machine

For this project by using bending machine it is easy to bend according what shape I want. The figure 2.7 is shown example of bending machine which is used in UMP lab. Bending is a flexible process by which many different shapes can be produced. Standard die sets are used to produce a wide variety of shapes. The material is placed on the die, and positioned in place with stops and/or gages. It is held in place with hold-downs. The upper part of the press, the ram with the appropriately shaped punch descends and forms the v-shaped bend.

Bending is done using Press Brakes. Press Brakes normally have a capacity of 20 to 200 tons to accommodate stock from 1m to 4.5m (3 feet to 15 feet). Larger and smaller presses are used for specialized applications. Programmable back gages, and multiple die sets available currently can make for a very economical process (Global Spec. 2009).

2.7 DRILLING

Drilling is easily the most common machining process. One estimate is that 75% of all metal-cutting material removed comes from drilling operations. Drilling involves the creation of holes that are right circular cylinders. This is accomplished most typically by using a twist drill, something most readers will have seen before. The figure below is the process to make the hole with use the drilling machine.



Figure 2.8: Drilling process

The chips must exit through the flutes to the outside of the tool. As can be seen in the figure, the cutting front is embedded within the workpiece, making cooling difficult. The cutting area can be flooded, coolant spray mist can be applied, or coolant can be delivered through the drill bit shaft (Efunda. 2009).

2.7.1 Drill Press

A typical manual drill press is shown in the figure below. Compared to other powered metal cutting tools, a drill press is fairly simple, but it has evolved into a versatile necessity for every machine shop.

2.8 GRINDING PROCESS

Grinding is a finishing process used to improve surface finish, abrade hard materials, and tighten the tolerance on flat and cylindrical surfaces by removing a small amount of material. Information in this section is organized according to the subcategory links in the menu bar to the left. For this project the grinding process is some of finishing process it is used to remove the burr from the workpieces. The figure 2.9 is shown the hand grinding used.



Figure 2.9: Grinding process

In grinding, an abrasive material rubs against the metal part and removes tiny pieces of material. The abrasive material is typically on the surface of a wheel or belt and abrades material in a way similar to sanding. On a microscopic scale, the chip formation in grinding is the same as that found in other machining processes. The abrasive action of grinding generates excessive heat so that flooding of the cutting area with fluid is necessary (Fabenco. 2009).

2.9 RIVET PROCESS

A rivet is a permanent 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 punched or 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.



Figure 2.10: Rivet process

The figure 2.10 above is shown the rivet process. 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 (Smith Carroll 1990).

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 and, where they are remembered, are usually classified among the nails and bolts respectively $\$

2.10 VERTICAL BAND SAW

For the good finishing of cutting and accurate shape I will used the vertical band saw, moreover it is easy to handle. The figure 2.11 below is cutting process with using the vertical band saw.



Figure 2.11: Cutting process

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Project methodology is a body of practices, procedures and rules used by those who work in a discipline or engage in an inquiry and a set of working methods. In this chapter, I will explain about the process that involved during the fabrication process. I also will explain about the design and analysis that had been chosen to be as the final idea to be producing or fabricate. All the fabrication process in this project is going to be explained in details.



3.2 FLOW CHART

Overall process according on figure 3.1. The flow chart starts of with the title selection. Here, the title is selected from the numbers of other final year project. Three main titles are selected according to the preferences. The topics are submitted to the Final Year Project coordinator. Here, the titles will be allocated depending on the grade point average. After receiving the title, students are allowed to switch titles with the permission of the supervisor. A declaration is then sign to be under the new supervisor and weekly meetings were scheduled.

Once the title is confirmed, the supervisor request for understanding of the project and go through to make the objective and scope based of the problem statement. Thus, literature review on the title is done thoroughly covering all aspects of the project. The medium researches are via internet and books. Essential information related to the project is gathered for referencing.

After that, do few designs and sketching of portable "Tabung Msjid". Then, propose and discussed the designs with supervisor to choose the suitable drawing. Later, convert the selected design to the three dimensional drawing by using autocad software. Then, after finish select the concept I will explain about that at the mid presentation.

Next, select the materials to fabricate the portable Tabung Masjid". Survey and bought the appropriate materials with supervisor's permission. Once the raw materials received, start the fabricating process. After the fabricating process completed, finalize the portable "Tabung Masjid".

Then, do the testing to the portable "Tabung Masjid". The results were collected and continue with the discussion. On the same time, prepare for the final presentation and write the draft report.

After the presentation, the draft report must be submitted to the supervisor. Supervisor will check for errors and do the correction in the draft report. The final thesis must be complete and submit at the Faculty of Mechanical Engineering.

3.3 DESIGN

The Design of the "Tabung Masjid" must be compliance to several aspects. The design consideration must be done carefully so the design can be fabricated and the parts are all functioning. The aspects that must be considered in designing the "Tabung Masjid" are:

- 1. **Strength**: Must have certain strength to ensure that it can load heavy items.
- 2. **Ergonomic Factors**: "Tabung Masjid" must be user friendly as easy and convenience.
- 3. **Suit to environment**: The "Tabung Masjid" must be suitable to be use in factory area.
- 4. **High durability:** The "Tabung Masjid" must be durability in perfect movement while it in use.

3.3 DRAWING

The drawings are divided into two categories, which are:

- 1. **Sketching**: All the ideas for the trolley fabrication are sketched on the paper first to ensure that idea selection an be made after this, and
- 2. **CAD Drawing**: The final idea is drawn into the CAD drawing format with details features.

3.4 DESIGN SPECIFICATION

The design of the "Tabung Masjid" must be considered that it can endure several specifications, which are two part of "Tabung Masjid" it is upper and lower part, maximum load for the platform: 3kg –5kg, overall materials are 400mm X 175mm X 1.2mm Stainless Steel plate (2 plate), fund hole cover, fund lock and also wheels (4 wheels) and lastly convenience.

3.5 CONCEPT DESIGN

From the existing ideas, only three sketching that had been chosen to be considered as the final ideas, which are:

3.5.1 Concept 1

The concept 1 is the concept made from waste material. It is from refrigerant tank. This concept made with modified the tank, first modification is make at the top of the tank which is make the money hole and put three of wheel at the bottom. After finish I will testing then the result is unsuccessful because the wheel cannot accommodate the load which is the body of tank is overweight then not stabilize.



Figure 3.2 : Concept 1

3.5.2 Concept 2

For the concept 2, the material is use is aluminum plate, as you know the aluminum plate is soft material so, the body of this product is not enough strength. Moreover, this body of this product is easy to bend and also the joining was damage.



Figure 3.3 : concept 2

3.5.3 Concept 3

The concept three is made from stainless steel then it is use Abloy push button key lock and also have money hole cover. All of the part above have more advantages compared the other concept. To make more security I choose to use the Abloy push button. To use this key lock is when the upper part is close we just push the button to lock the fun the to open just used the key.



Figure 3.4 : Concept 3

3.6 CONCEPT SELECTION

3.6.1 Suggested Drawing



Figure 3.5 : Final selection

I'm choosing this sketching as my project concept is because it is simple but yet convenience. Thus, the fun hole cover will be make the donor in safely.

3.7 COMPUTER AIDED DESIGN DRAWING

After a design has been selected, the next step in the designing process is dimensioning. The dimensioning is base on relevant dimensions and also referring to the existence trolley so that the design is fit into others part.

After dimensioning, the engineering drawing of the design is drawn using AutoCAD application, at this stage CAD modeling method is used. Part by part Cad modeling created according to the dimension done before, after all part created, the 3D model is assembled with each other base on the design.

3.8 OVERALL VIEW OF THE DESIGN

3.8.1 Design Descriptions



Figure 3.6 : Final selection



Figure 3.7 : Product review

3.9 FABRICATION PROCESS

After designing phase, comes fabrication process. These processes is about using the material selection and make the product base on the design and by followed the design dimension. Many methods can be used to fabricate a product, like fastening, cutting, drilling, joining and many more method. Fabrication process is difference from manufacturing process in term of production quantity. Fabrication process is a process to make only one product rather then manufacturing process that focus to large scale production. In the project fabrication process needed to make the base plate, framework of display board and display board. Fabrication process was used at the whole system production. This was include part by part fabrication until assembly to others component.

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

- 1. **Measuring**: Materials are measured to desired dimensions or location with using measurement tape.
- 2. **Marking**: All measured materials need to be marked to give precise dimension.
- 3. **Cutting**: Marked materials are then cut into pieces with using the vertical band saw
- 4. **Drilling**: Marked holes are then drilled to make holes for bolts with using hand drill
- 5. **Joining**: Materials joined by the method of MIG welding, rivet and using bolt and nut.
- 6. Finishing: Put all accessories like locking systems, deburring and painting.

3.10 MATERIAL OF PROJECT

Material of the project is totally using stainless steel plate according to the title given. It is the most versatile and most widely used stainless steel, available in a wider range of products, forms and finishes than any other. It has excellent forming and welding characteristics. The austenitic structure also gives these grades excellent toughness, even down to cryogenic temperatures. The figure 3.8 below is shown the materials are used.



(a)

(b)



(c)

(d)



(e)

Figure 3.8 : (a) Stainless steel plate (b) Moldon rubber caster wheels (c) Abloy push button lock (d) Ruspa grab handles (e) Hasp

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

In this chapter, I will explain about the final fabrication of the "Tabung Masjid" is done from only limited times due to several problems occur to the project. In this chapter will discuss mainly about the function and problems encountered during the whole project was been carried out and simple analysis. For the main function of the portable "Tabung Masjid" is easy to donor do the donation. It is because of the selecting of type of material. The movement of portable "Tabung Masjid" is clearly because of the wheel be use is 4" wheel made from rubber it is suitable for mosque floor surface. Then the locking system I choose to use Abloy push button key lock because it is easy to handle and give high security. Besides that, the body of portable "Tabung Masjid" made from stainless steel and it is good strength also not easier to damage. The portable "Tabung Masjid" also complete with handle, it is helps to open the upper part. Lastly for information think is at the inside of portable "Tabung Masjid" has dividing to separated the coin and note money.

4.2 FINAL PRODUCT

The figure 4.1 below is shown the final product is portable "Tabung Masjid". This product already to use with having the problem and this product also pass in testing evaluation. For ensure the portable "Tabung Masjid" is clearly while operate I have be done retesting this product for many times to make the excellent result. This product is safety fluently because in finishing process this product I already remove the burr. To operate this product is easily, it is commonly use at mosque while the people listen the "khutbah", to operate just lock the fun then push the fun, the fun fill

pushed from the people to other people until the last people. Then to open the fun by using the key open the Abloy push button lock.



4.3 **PROJECT PROBLEMS**

- 1. **Literature Review**: The concept and ideas review for this project are not very wide because it is not widely modified by the manufacturer. Students should come with their ideas on the project.
- 2. **Designing & Sketching**: Because of the idea were from the student directly, so there are no references that can be referred. All the drawing and dimension need to generate by student itself.
- 3. **Fabrication Process**: Students need to be given more time to finish fabricating their product because of slackness of skill and training, the joining finishing was not so god but yet can still reliable.
- 4. **Material Preparation**: Some of the needed material needs to buy at the city. University should prepare the material or either provides the place where the material can be obtained from.
- 5. **Budget Preparation**: It is not so effective to use student's money to get the materials. University should provide budget at first stage so that student's expenses are not interfere

4.4 CALCULATION

4.4.1 Stress analysis

If weight = 3kg $a = 9.81ms^{-2}$

$$\sigma = \frac{P}{A} = \frac{F}{A}$$

Calculate the force

$$F = ma$$

= (3)(9.81)
= 29.43 N

Then calculate the area

A = H×L
= (400mm)× (175mm)
=70000mm²
=
$$0.07m^{2}$$

Get stress analysis

$$\sigma = \frac{F}{A}$$
$$= \frac{29.43N}{0.07m^2}$$
$$= 420.43 \text{ KPa}$$

4.5 DESIGN SPECIFICATION

The design of the "Tabung Masjid" must be considered that it can endure several specifications, which are

- 1. Maximum load for upper platform: 3 kg.
- 2. Overall wide: 0.4 meters
- 3. Wheel

4.5 "TABUNG MASJID" SAFETY

- 1. Before the "Tabung Masjid", check that it meets the safety standards set by load capacity duty rating.
- 2. For key lock of fund make sure in good condition.

4.6 MATERIAL COST

All material to fabricate the "Tabung Masjid" must buy at hardware because at lab not prepare this material.

	TOTAL	RM53.5(
Abloy key lock	1pcs	RM5.50
Wheel 4"	4pcs	RM10
Door handle	1pcs	RM1
Hasp 3"	2pcs	RM2
Stainless steel plate	$1500mm \times 350mm \times 1.2mm$	RM35
MATERIAL	UNIT	PRICE

Tab	le	4.1	: (Cost
Tab	le	4.1	: (Cost

Source: Lepar Jaya Enterprise (Re.No:01254)

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In this chapter the problems encountered during the whole project are discussed. Then it goes to conclusion of the project and recommendation.

5.2 CONCLUSION

As a conclusion I think my project had been practice me before start the practical. It is because I had learned a lot of skills and method of using several of machines. I also had using internet to search a lot of things that connect with my project. Based on this literature review, I had found many types of "Tabung Masjid" and with different design. Besides that, I also can gain my knowledge about the material type, structure and others else. Within a short time to finish the project, there are a lot of problems quickly because there is no enough time if I delay to settle it.

This project also generates my capabilities as a responsibility person. This is because I had to take care and take a look for my project. Besides that, I also had made a private meeting with my supervisor for a discussion about my progress of work and the progress of report. So by the time I also can make some improvement and learn how to share others opinion and idea to make my product better.

Finally for the last, I can conclude that final year project is very important because it can make our self more discipline and be punctually on time in whatever work I do. I also have achieved my objective and a scope of project about design and fabricate a trolley using my idea.

5.3 **RECOMENDATION**

5.3.1 Facilities

Based on the progress of the project that I had done, so many things in facilities aspects can be improved especially in welding process. It is because the MIG welding machine doesn't have enough quantity for the student user. So the faculty especially must provide more welding machine for the student user because amount of student is increase by a year.

5.3.2 Student Budget

Some of the materials also need the student to buy such the things that doesn't have in mechanical laboratory. For the budget, the faculty should provide the budget to student at first. Precise planning of the work progress will make sure that the project can be done in a shorter time. Having a good time management can guaranty that any of student task to complete in a good ways and also give more time to focus on others subject.

5.3.3 Design

Base on consumer needs, design the "Tabung Masjid" must more portable. On the design in the future can deign the ladder with adjustable high. Then can propose with the sit site on the ladder for easier to consumer when use it. If the project like this give more time to fabricate all the needs can achieved with more research.

5.4 FUTURE WORK

The final year project is a most important subject that must be learns in the final semester. It is because this project can make the student practice their skill of machining process since semester one. Its include using welding machine, shearing machine, bending machine, drilling machine, CAD software, and others else. So for my "Tabung Masjid" project, I think a lot of things can be improved in the future. The improvement could be in the characteristics and functioning of the existed "Tabung Masjid". Besides that, the financial is very important to develop this "Tabung Masjid" sophisticated and could be produce to the market in the future.

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APPENDIX A

GANTT CHART

PROGRESS						#	EEK							
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SCOPE														
PROBLEM STATEMENT														
FIND LETERATURE REVIEW				0										
CREATE CONCEPT					\mathbf{o}									
SELECT FINAL CONCEPT & SKETCHING														
DRAW IN SOLIDWORK							0	0						
MID PRESENTATION														
FABRICATION											0			
REPORT WRITING														
FINAL PRESENTATION													0	
SUBMIT REPORT												<u> </u>		

APPENDIX B1

ISOMETRIC DRAWING



APPENDIX B2

ORTHOGRAPHIC DRAWING

