DESIGN AND FABRICATION OF IMPACT TEST DEVICE

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DEVELOPMENT OF IMPACT TEST DEVICE

MOHD NAQIUDDIN BIN MOHD SALLEH

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

Faculty of Mechanical Engineering
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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

Signature
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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.

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ABSTRACT

The objective of this project is to design and fabricate impact test device for ITS model. In Panasonic not have the suitable tester for impact test, so this project to make specific device test. This tester for KX-TS500 only with can adjust the height and width and the load of impact test is depends the weight of steel ball 1kg or equivalent. Before fabricate the impact test, on researches about drilling and welding. To get the suitable concept must have another concept and choose the best concept with some criteria. Finally, the best concept as a final concept. Choose the suitable material with have long life time. It have many work to fabricate the product such as measuring, cutting, drilling, and finally is painting to avoid the product become corrosion. To running this tester must have the procedure to avoid any accident. The purpose of this project is to know the condition of surface. If the surface is crack, so the strength of surface is not enoughly to produce the model.

ABSTRAK

Objektif projek ini adalah untuk melukis dan membuat ujian hentaman untuk *integrated telephone system* (ITS). Di panasonic tidak mempunyai alat yang sesuai untuk membuat ujian hentaman, jadi projek ini membuat satu alat spesifikasi untuk dijadikan alat hentaman. Ujian ini hanya digunakan untuk model panasonic KX-TS500 yang boleh dilaraskan ketinggian dan panjang dan berat untuk bebola besi biasanya 1 kilogram atau sama dengannya. Sebelum membuat ujian hentaman, satu kajian perlu dilakukan saperti penebukkan dan pencanuman bahan. Untuk mendapat satu konsep yang sesuai memerlukan beberapa konsep dan memilih konsep terbaik dengan beberapa kriteria. Akhir sekali konsep terbaik akan menjadi konsep yg utama. Kemudian memilih bahan yang sesuai untuk dijadikan sebagai bahan membuat produk yang mempunyai jangka hayat yang lama. Beberapa kerja perlu dilakukan saperti mengukur, memotong, menebuk lubang dan akhir sekali ialah mengecat produk untuk mengelakkan daripada karat. Untuk menjalankan proses ujian hentaman ini perlu kepada prosedur agar sebarang kemalangan tidak berlaku. Tujuan produk ini adalah untuk mengetahui keadaan permukaan. Jika keadaan retak, maka kekuatan permukaan masih tidak bagus untuk dipasarkan.

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LIST OF ABBREVIATIONS

CAD	Computer Aided Design
FYP	Final Year Project
GMAW	Gas Metal Arc Welding
ITS	Integrated Telephone System
MIG	Metal Inert Gas
SOP	Standard Operation Procedure

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

This chapter explained about the project statement, project objective, project scope that been conducted. Besides that, this chapter also covers project flow and the progress project are follows the flow chart and gantt chart duration of time.

1.1 PROBLEM STATEMENT

This project is to design a test device for the Integrated Telephone System (ITS) product. The device is specializing to conduct the Impact test for ITS product.

1.2 OBJECTIVE

The objective of this project is to design and fabricate impact test device for ITS model.

1.3 SCOPE

The scopes for this project are:

1.4.1 This test is only for Panasonic KX-TS500 model

1.4.2 The adjustable height for impact test is within range of 1mm until 200mm

1.4.3 The adjustable width for impact test is within range of 1mm until 150mm

1.4.4 The load of impact test is depends the weight of steel ball 1kg or equivalent.

1.4 PROCESS PLANNING

Figure 1.1 shows the flow chart for this project. Its shows start to the end of this project sequences.

The first is deciding the project title. This being done through discussion and consultation with project supervisor. Among the item discussed are suitable objective and scope for this project and method to conduct the project. Then, the literature review being done to guiding this project.

After the main problem was identified, the conceptual design has been generated to get the best idea for this project. The best concept has been selected for the final design.

After choosing the final design, fabrication process gets started. Fabricate must same as the final design drawing. All the material uses must defined early to ensure that the material is available in mechanical lab.

As the project goes through, closed supervision by supervisor is important in order to sustain the improvement proposal. The best solution which will give better improvement result will be proposed this project.

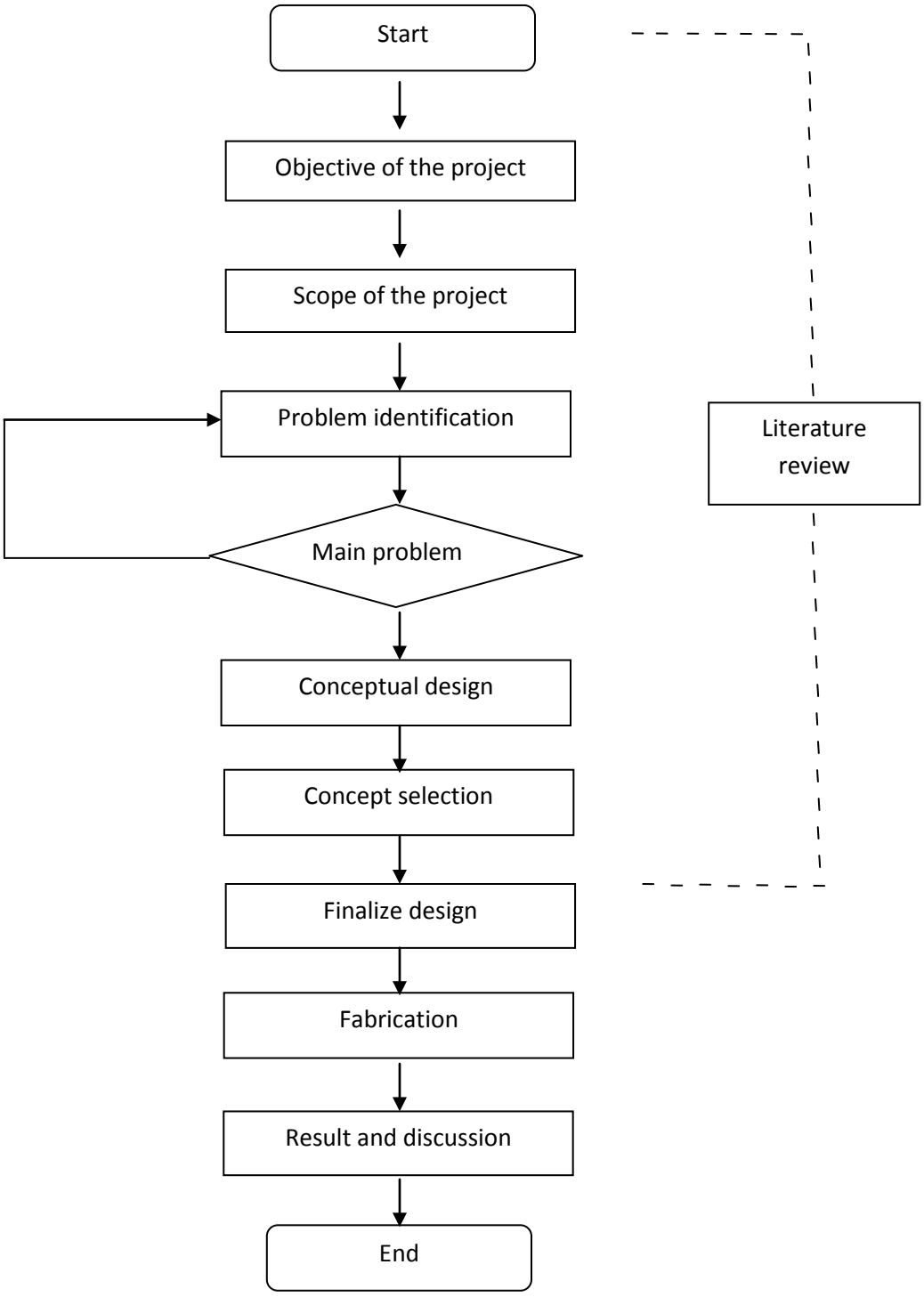


Figure 1.1:Project Flow Chart

Figure 1.2 below show that Gantt chart for the FYP of this project, respectively. It also show the duration of time needed for each task that carried out during the study.

ID	TASK		WEEK													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Title Confirmation	Plan														
		Actual														
2	Literature Review	Plan														
		Actual														
3	Find design	Plan														
		Actual														
4	Drawing 2D	Plan														
		Actual														
5	Drawing 3D	Plan														
		Actual														
6	Prepare for mid Presentation	Plan														
		Actual														
7	Mid Presentation	Plan														
		Actual														
8	Fabricate	Plan														
		Actual														
9	Prepare for final Presentation	Plan														
		Actual														
10	Make report	Plan														
		Actual														
11	Final Presentation	Plan														
		Actual														

Figure 1.2:FYP Gantt chart

Base on the Gantt chart, title has been confirmation with supervisor and literature review has been find until week eight. To find design planning is from first week until week five but in the first week have a problem to know the purpose of this project..

Drawing 2D was planning after find the design from week five until week six but have a problem in week five because to learn about autoCAD to make a design. The drawing 3D was planning from week five until week eight and also late one week because to learn about autoCAD to make 3D design.

In week seven until week eight to prepare for mid presentation and mid presentation start in week eight. After mid presentation, the fabrication process is continued until week fourteen and planning for prepare for final presentation is week twelve until week fourteen but in the week twelve the fabrication is not complete.

To make the report is planning week nine until week fourteen but have a problem in week nine because the fabrication process not be done. And final design is held in week fourteen.

1.5 PROJECT REPORT ARRANGEMENT

CHAPTER 1 is the introduction chapter for this project. Its generally discuss about the project background, the objective and scope and the project flow. Beside that, it tells about the flow of this project.

CHAPTER 2 is the literature review of this project. This chapter will explain about the research of the project that has been chosen and explained about Panasonic phone KX-TS500. It also tells about the impact and button strength test and its equipment for this test.

CHAPTER 3 is the design concept and selection of this project. Its discuses about the data and information for get design. This chapter explain about to get the final design by using concept variants

CHAPTER 4 is the fabrication process. It explain about to fabricate the product based on the final design and it consists the material selection

CHAPTER 5 is the result and discussion. It explain about operating procedure to run the product and also discuss about the problem during fabrication process.

CHAPTER 6 is the last chapter for this project report. It covers the overall result of this project. Besides that, this project is the new design because in Panasonic companies not have the device test and a few suggestions for further study in the future to increase the productivity of this company.

1.6 CONCLUSION

For this chapter, we can conclude this chapter can clear about the objective and do the project easily. In Panasonic companies not have the specific device test, so this project is to design and fabricate the new device test. In conducting a project like this project, well arrangement of works is really important to keep the momentum of this study.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter will explain about the research of the project that has been chosen and explained about Panasonic phone KX-TS500 features and specification. It also tell about the impact and button strength test. This chapter also shows the project concept from gear concept and spring concept.

2.1 PANASONIC KX-TS500

The KX-TS500 from Panasonic is a basic corded phone designed for users who don't need a lot of bells and whistles. A corded phone with single line operation, the KX-TS500 is call waiting compatible (requires a subscription) and requires no batteries to operate. Handset and ringer volume controls allow you to adjust levels to your liking, and you can switch between tone and pulse dialing modes. A redial button lets you quickly dial the last outgoing number, while the flash button provides access to call waiting. The KX-TS500 is wall-mountable, allowing you to keep countertop space free from unnecessary clutter [1]. The table 2.1 shown the specification of the KX-TS500 model.

Specifications	Ability
Dial Mode	Tone / pulse
Redial	One-touch (32 digits)
Flash 600 ms	600 ms
Power Source	Telephone line
Dimensions (H x W x D)	96 mm x 150 mm x 200 mm
Weight	475 g
Phone type	Corded
Call waiting capability	Yes
Distinctive ring	No
Voice mail message indicator	No
Integrated answering system	No
Speakerphone	No
Number of lines	1
One touch dialer	No
Emergency dialer	No
Speed dial	No
Data port	No
Multi-user expandable	No
Handset volume	Yes
Ringer indicator lamp	No
3-way conferencing	No
Headset compatible	No
Local call mode	No
Flash	Yes
Redial	Yes
Pause	No
Hold	No
Mute	No
Call transfer	No
Intercom	No
Wall mountable	Yes
Tone/pulse dialing	Yes
Hearing aid compatible	Information not available

Table 2.1: Specification of Panasonic KX-TS500

2.2 IMPACT TEST

Impact is a high force or shock applied over a short time period. Such a force or acceleration can sometimes have a greater effect than a lower force applied over a proportionally longer time period. At normal speeds, during a perfectly inelastic collision, an object struck by a projectile will deform, and this deformation will absorb most, or even all, of the force of the collision. Viewed from the conservation of energy perspective, the kinetic energy of the projectile is changed into heat and sound energy, as a result of the deformations and vibrations induced in the struck object. However, these deformations and vibrations can not occur instantaneously. A high velocity collision (an impact) does not provide sufficient time for these deformations and vibrations to occur. Thus, the struck material behaves as if it were more brittle than it is, and the majority of the applied force goes into fracturing the material [2].

2.3 JOINING METHOD

Joining involves in assembly stage. Commonly used method to join metal part is Metal Inert Gas (MIG) welding such as in figure 2.1

Figure 2.1: Metal Inert Gas (MIG) Welding

Sources: Wikipedia, 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. 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.

There are two different MIG-welding processes, conventional MIG and pulsed MIG. For the conventional MIG uses a constant voltage 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.

For the pulsed MIG uses a 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 [3].

2.4 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 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 work piece, 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.

A typical manual drill press is shown in the figure 2.2. 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 [4].

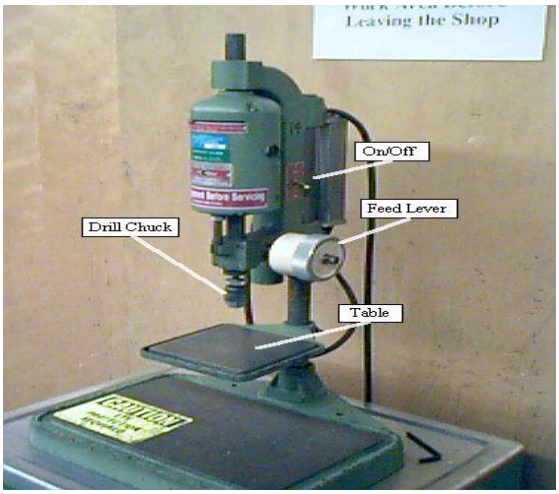


Figure 2.2: Drill Press Machine

Sources: Engineering Dartmouth, Drill Press Machine (2004)

2.5 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.

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 [5]. The figure 2.3 show example of grinding.

Figure 2.3: Grinder

Sources: Tradevv, Grinder (2005)

2.6 CONCLUSION

For this chapter, we can conclude this chapter is a body of text that aims to review this project of current knowledge. Beside that, this chapter shows the project guidelines to generate this project successfully. From this chapter, it can give more information to do the project base on the design of the project.

CHAPTER 3

DESIGN CONCEPT AND SELECTION

3.0 INTRODUCTION

This chapter consists about the conceptual design, concept selection, and selection for the final design. It also explained about the concept selection and concept generation to get the final design

3.1 DESIGN

The Design of the impact test must comply 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 product is strength because it must have certain strength to ensure it stable when the load is release and safety because it must safety when do the test to avoid any accidents.

3.2 DRAWING

All the ideas for the impact test device are sketched on the paper first to ensure that idea selection can be made. The final idea is drawn into the AutoCAD drawing format with details features.

3.3 CONCEPT SELECTION

For this project three concepts has been generated. From the three concept, one of the best concept has been chosen based on concept variants as a final design.

3.3.1 Concept A

Figure 3.1 show the design of concept A. This concept has been generated with some criteria. This concept use the six metals and the pendulum is very sharp. For this advantage it easy to use because it only running by hand and not have electrical system. For another advantages, manufacturing is very ease because it not have complex shape and it not safety because the pendulum is very sharp. For another disadvantages is not long life time because the base is not stable

Figure 3.1: Concept A

3.3.2 Concept B

Figure 3.2 show the design of concept B. This concept has been generated with some criteria. This concept use eight metal and pendulum like a hammer. For the advantage, this concepts is stable base and easy to use because it running by hand and not have electrical system. It also safety to use because the pendulum not sharp. For the another disadvantage it have many part to welding.

Figure 3.2: Concept B

3.3.3 Concept C

Figure 3.3 show the design of concept C. This concept has been generated with some criteria. This concept use eight metal and pendulum like a cylinder. For the advantage this part mainly use gear to adjust the height and width. It also easy to use because to adjust the height and width just rotate the gear. For another advantages is long life time because the base is very stable. For the disadvantage, the manufacturing is very complex because to make a gear is very comlpex

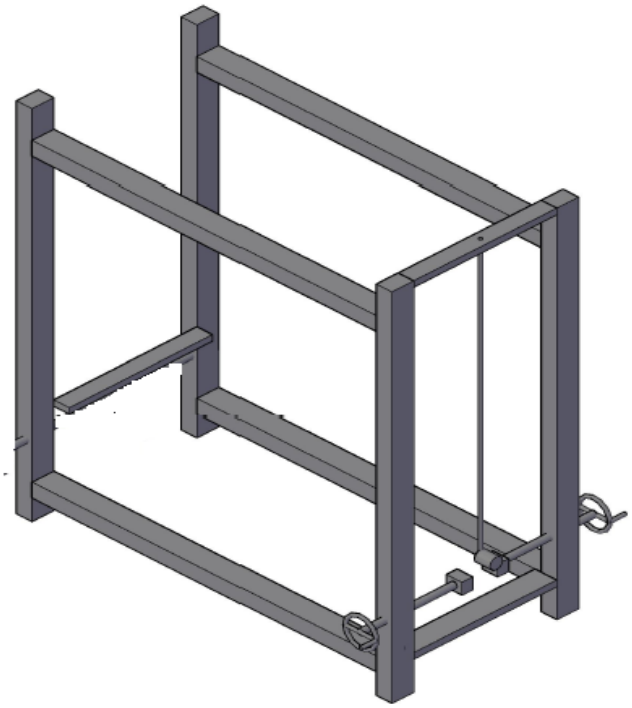


Figure 3.3: Concept C

3.4 CONCEPT GENERATION

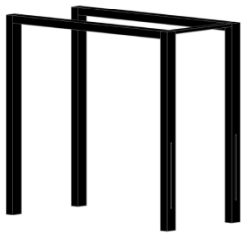
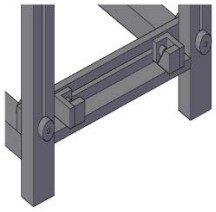
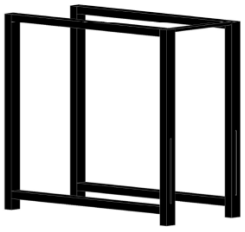
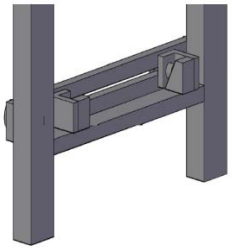
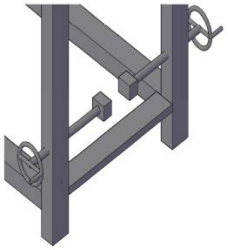
Concept	Base	Impact load	Adjustable height and width
A			
B			
C			

Table 3.1: Concept Generation

Figure 3.4 shown the concept generation. For the concept A, the base is unstable and the load is very sharp and for adjustable height and width is very simple. For the concept B, the base is very stable and the load is same with hammer and adjustable height and width is very simple. For the concept C, the base is very stable but the shape load same with cylinder and adjustable height and width is very complex because it use gear.

3.5 CONCEPTUAL DESIGN

Concept variants

CONCEPT VARIANTS				
SELECTION CRITERIA		A	B	C
Ease to use		+	+	+
Manufacturing ease		+	0	-
Strength		0	+	0
Long life time		-	0	+
Safety		-	+	+
	Pluses	2	3	3
	Same	1	2	1
	Minuses	2	1	2
	Net	0	2	1
	Rank	3	1	2

Notes

+ = better than

- = worse than

0 = same as

Table 3.2: Concept Variants

Table 3.1 shown the concept variants. For selected some criteria and do the calculation. Concept B get the first ranking and finally concept B as a final design. Therefore, concept B is the best concept to be produce.

3.6 FINAL DESIGN

Figure 3.4 show the design of concept B. This concept has been generated with some criteria. It very stable than another concept. It also ease to manufacturing and not difficult to use it.

Figure 3.4: Final Design

3.7 CONCLUSION

For this chapter, we can conclude is a important to generate the best concept with do the concept selection and concept generation. And finally do the concept variants to get final design.

CHAPTER 4

FABRICATION PROCESS

4.0 INTRODUCTION

After designing phase, comes fabrication process. This process is about using the material selection and makes the product base on the design and by followed the design dimension. Many methods can be used to fabricate a product, like welding, fastening, cutting, drilling 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 than 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.

4.1 MATERIAL OF THE PROJECT

Material of the project is totally using stainless steel and mild steel. This material has excellent forming and welding characteristics. The balanced austenitic structure enables it to be severely deep drawn without intermediate annealing, which has made this grade dominant in the manufacture of drawn stainless parts such as sinks, hollow-ware and saucepans. The figure 4.1 shown the material use for fabricate product.

Figure 4.1: Hollow Steel

4.2 PROCESS INVOLVE

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 measuring, cutting, drilling, welding, grinding and lastly is finishing

4.3 MEASURING

Materials are measured to desired dimensions or location. To dimension and location it use the measurement tape. Basically it measure by use in millimeter. It must carefully when measure to get the same dimension with the drawing. The figure 4.2 shown the measurement process.

Figure 4.2: Measurement process

4.4 CUTTING

After measuring, marked materials are then cut into pieces. This part use cut-off to cutting large material. Clamp the material properly to avoid any accident and must wear goggle. The figure 4.3 shown the cutting process by use cut off.

Figure 4.3: Cutting process

4.5 DRILLING

Drilling involves the creation of holes that are right circular cylinders by drill machine. For the design it use 10 millimeter as a diameter of drill. Before do drill, make sure the material is clamp properly. It must calculate the revolution per minute (RPM) to avoid any accident if the speed is very fast. The figure 4.4 shown the drilling process

Figure 4.4: Drilling process

4.6 WELDING

Welding is the process of permanently joining two or more metal parts, by melting both materials. For this design it has many part of welding. When do the welding make sure wear the mask and glove to avoid any accident and welding it must carefully. The figure 4.5 shown the welding process by using MIG welding

Figure 4.5: Welding process using MIG welding

4.7 GRINDING

Grinding process used to improve surface finish, abrade hard materials, and tighten the tolerance on flat. In grinding, an abrasive material rubs against the metal part and removes tiny pieces of material. When do the grinding, it must wear goggle to avoid any accident.The figure 4.6 shown the grinding process

Figure 4.6: Grinding process

4.8 FINISHING

Any rough surface cause by welding spark were grind to give smooth and safe surface using grinding machine and followed by painting process. For the painting, the colour brown and white it use because it only available in mechanical lab. It must painting all of surface to avoid corrosion. The figure 4.7 shown the finishing process.

Figure 4.7: Finishing process

4.9 DESIGN AND FABRICATION STEP

Define the product. State the required parts or components and do calculation and dimension . After that, sketch the product and draw the component manually. Decide the most suitable design and than draw by using software. Specify the appropriate and suitable materials used to fabricate each component based on the finished design. After that find the materials and do the fabricate the parts and then attach them together.

4.10 FINAL PRODUCT

Finally the product has been completed. The final product in several views is shown below. The figure 4.8 shown the overall of final product and figure 4.9 shown the final product view by front side and position of pendulum when impact the model of KX-TS500.and the figure 4.10 shown the holder of pendulum to clamp the pendulum with properly.

Figure 4.8: Final product

Figure 4.9: Final product view front side

Figure 4.10 Holder of pendulum

4.11 CONCLUSION

For this chapter, we can conclude the fabrication process is important to make a product with use mechanical lab equipment. It consists measurement, cutting, welding, grinding and painting

CHAPTER 5

RESULTS AND DISCUSSION

5.0 INTRODUCTION

The final fabrication of the impact test is done from only limited times due to several problems occur to the project. In this chapter show how to use this tester and discuss mainly about the problems encountered during the whole project was been carried out.

5.1 OPERATING PROCEDURE

This test must running by have a guiding. If it not have a guiding, any accident can happen when do this test. The procedures to do this test that involve are put the pendulum at holder and make sure it hold tightly as a figure 5.1 and then adjust the length adjustable with you likely and clamp the Panasonic model (KX-TS500) as a figure 5.2. After that adjust the height adjustable with you likely as a figure 5.3and lastly open the holder of impact quickly as a figure 5.4. For the test analysis it show in appendix A1.

Figure 5.1: holder of pendulum

Figure 5.2: Adjustable length

Figure 5.3: adjustable height

Figure 5.4: Holder the pendulum

5.2 PROBLEM ENCOUNTER

The clamping parts are not use after the last design decision. It is because of the clamping will take much time to open and close back to clamp the impact load.

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 when handling arc welding and MIG welding machine. There is many type of defect occur during the fabrication such as gap, and bead.

Problem during this stage is very critical that make the project schedule is delayed. The problem comes when the material buying handle by supervisor is undergoing strict procedure and the budget for the project is in unknown situation. Because of this problem the fabrication process cannot be run according to schedule. This is because, no material needed is ready to fabricate.

5.3 CONCLUSION

This chapter can conclude the operating procedure to use correctly. It also discuss about project problem during fabrication process.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.0 INTRODUCTION

For the final chapter it represent about conclusion and recommendation for the project. In this chapter will discuss mainly about the conclusion of the project, concluding all the process that involved. Besides that this chapter also contains recommendation about the project. So for this recommendation it can make improvement about the project in the future

6.1 CONCLUSION

The objective of the project is to design and fabricates. The objective has successfully done and achieved. This product is the new design, so many problem to select the best good design and more safety. Finally the problem when do this project was can solve with discuss and get some advise with supervisor.

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 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. 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 impact test.

6.2 RECOMMENDATION

For my design, lighter material can be used to decrease the weight of the impact test and thus improve the mobility of the product. Impact test with different colors and designs can be attractive as well. Besides that, come up with a impact test that can use different types of holder. However, this product can be further improved by taking into consideration different types of clamp part. The pendulum can change another shape and weight and the height of rod can adjustable, not fix 1 meter and the holder can open by electric system, just push the button

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.

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.

REFERENCES

This guide is prepared based on the following references

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3) http://en.wikipedia.org/wiki/Welding, dated on Oct 15th, 2009

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6) welding principles and application, fifth edition by larry jeffus, 2004

APPENDIX A

TEST DEVICE : IMPACT TEST MAIN FUNCTION : IMPACT FOR KX-TS500	NO : H01 CODE : 5555-32-1

MADE BY : FINAL YEAR PROJECT ADDRESS : UNIVERSITY MALAYSIA PAHANG

ENGINEER : EN MOHD NAQIUDDIN SALLEH TECHNICIAN : EN MOHAMMAD IZZAT HASLAN APPROVED BY : EN MUHAMMAD ZAIRI BAHAROM DATED : 4 OKTOBER 2009

BASIC OPERATION METHOD

Method before operating the tester

1) put the pendulum at holder and make sure it hold tightly
2) adjust the length adjustable with you likely and clamp the Panasonic model (KX-TS500)
3) adjust the height adjustable with you likely
4) open the holder of impact quickly

After operating the tester

1) checks the surface to know the condition of the surface. If the surface was crack, the strength of surface is not good to produce the model
2) shakes to know the condition in the model. If it has sounds of crack or

broken, the product also cannot produce. The structure in the model is not enough toughly

3) Try connects the model in line to know it functions or not. If is function, the model was strongly when it has been impact any object

PRECAUTION

Anything happened broke during the test, please refer to the engineer and technician

REMARK

Do not use handle the test personally if not fully know the function. Get engineer or technician required before any action taking if problem occurred.