POLITEKNIK MALAYSIA
MUKAH

METAL BENDING MACHINE

BONY JAIN AK IGAI	20DKM14F1024
ADYLES ROBBIE JANGKA AK HOLLAND	20DKM14F1078
DINIE ASYRAF BIN MAHAT@SELAMAT	20DKM14F1027
BIBIANA TUIL	20DKM14F1048
INTAN NUR AIN BINTI MOHAMAD SULAIMAN	20DKM14F1084

DEPARTMENT OF MECHANICAL ENGINEERING
POLITEKNIK MUKAH

SESSION: DECEMBER 2016

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MR MOHD SAIFUL IZWAN BIN ABDULLAH

This report is submitted to the Department of Mechanical Engineering in partial fulfilment of the requirements for graduation Diploma in Mechanical Engineering

MECHANICAL ENGINEERING DEPARTMENT

DISEMBER 2016

CONFIRMATION OF PROJECT REPORT

Title: Metal Bending Machine

Session: December 2016

"We hereby declare that this report is our own work and product except for each part that we have been attached from the sources that have been mentioned."

1. Signature : .....
   Name : Bony Jain AkIgai
   Registration Number : 20DKM14F1024

2. Signature : .....
   Name : Adyles Robbie JangkaAk Holland
   Registration Number : 20DKM14F1078

3. Signature : .....
   Name : DinieAsyraf Bin Mahat@Selamat
   Registration Number : 20DKM14F1027

4. Signature : .....
   Name : BibianaTuil
   Registration Number : 20DKM14F1048

5. Signature : .....
   Name : IntanNur Ain BintiMohamadSulaiman
   Registration Number : 20DKM14F1084

This report has been submitted and reviewed as to meet the conditions and requirements of project writing as set.

Verified by:

Signature : .....

Supervisor Name : Mr. Mohd Saiful Izwan Bin Abdullah

Date : 31/3/2017

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ACKNOWLEDGMENT

We would like to say that we are very grateful with His permission we have successfully manage to complete the project for about 4 months. We have been designed the project during the last semester 5.

In completing and finishing this project, it is a successful one we had to take the help and guidance from respected person. First of all, we are grateful to almighty who gives us sound mind and sound health to accomplish our project. Then, we want to take this opportunity to express our special gratitude to our supervisor, Mr MohdSaifullzwan Bin Abdullah, panels and lecturers in Mechanical Engineering Department for giving us guidance to complete our project even though we face lot of problem because lack of knowledge in making Metal Bending Machine. The supervision, guidance and support from them give truly help the progression and smoothness of the project. We will not be able to complete this project without their helps.

Lastly, the great thanks and appreciation to our parents because give us moral support and also given to everyone especially to all of the teammates that have given a big contribution, cooperation, understand and hard worked from them during completing this project and it was great indeed. From this project, we realized the value of working together as a team and as a new experience in working environment which challenges us in every single minute. We pray for the long life and good health to all who had helped us and giving us so much guidance and support in completing this assignment.

ABSTRACT

Metal bending machine is a project that is designed and fabricate as a mean to help students of Mechanical Engineering Department at workshop to form a specific degree or shaping metal plate. The main components of this machine is an actuator that form a metal with specific degree and shape, it is similar with other bending machine by using force in forming metal. The linear actuator is powered with motor which control the actuator based on it voltage. This bending machine can form two shapes that are bending up to 90 degree and also curve shape can be form, with metal plate of thickness 2 mm and 50 widths. This bending machine is portable since is easy to carry, smaller and easy to use.

ABSTRAK

Mesin lenturan besi ialah satu projek yang direka dan dibuat bertujuan untuk membantu pelajar Jabatan Kejuruteraan Mekanikal di bengkel untuk membentuk darjah yang spesifik atau membentuk plat besi. Komponen utama untuk mesin ini ialah penggerak linear untuk membentuk besi dengan darjah yang spesifik dan bentuk, mesin ini adalah sama dengan mesin lentur yang menggunakan daya dalam membentuk besi. Penggerak linear ini menggunakan kuasa motor yang mengawal penggerak berdasarkan voltan. Mesin lenturan ini boleh membentuk dua bentuk iaitu lenturan 90 darjah dan bentuk lekuk dapat dibentuk dengan menggunakan plat besi 2 mm tebal dan 50 mm lebar. Mesin ini adalah mudah alih kerana ia mudah di bawa, kecil dan mudah untuk digunakan.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Bending machine is a forming machine that can form various types of shape and angle that we need. It is also become the most useful machine in our industry especially in term of mechanical. It has lot of benefits that we gain such as makes the work easier and saving time to do so. There are two type of bending machine which is bending it manually and automatically. The manual bending has disadvantage that is costing more time and energy use but automatic bending machine can shorten the time and energy use. A metal bending machine is a machine that has mechanism and gets electrical energy as a power supply for it to move rather than using human potential energy. This bending machine use an actuator with motor that connected to switch for it to move the actuator forward and backward for bend the metal. There are only two type of shapes that can be bend, that is curve and 90 degree angle with the maximum thickness of the metal 2mm and the width is 50mm.

1.2 Background Study

Metal Bending Machine is machine that common use nowadays. It has been known to help human in bending a plate metal. According to Chester Roach, bending machine can facility and certainly bend or fold sheet-iron or other sheet metal.

People have used various types of bending machine in the workshop. Most of these bending machines can bend many type of metal and also pipe at any size and thickness. But, the disadvantage of this machine is not portable, heavy and also high cost.

This project work on to design and fabricate a Metal Bending Machine for our final project to overcome the problem that occur at bending machine nowadays. To build this bending machine, we need to study more about bending stress, wiring and design for our machine. Overall, the project will meet acquire skills of designing and fabrication.

1.3 Problem Statement

Bending a plate metal manually need more time and energy. It is also difficult to get the shape or angle that we needed. Besides, mechanical workshop at Polytechnic Mukah does not have any bending machine. Nowadays, bending machine is expensive, bigger and heavy. So, this project tends to solve the downside of bending a plate manually.

1.4 Objectives

The main objective of this study is:

i. To design and fabricate a metal bending machine.
ii. Bending metal with specific degree and shape.

iii. Can be use by final year student at polytechnic to fabricate project

1.5 Scope

The scope of this project is:

i. Angle bending up to 90°.
ii. Maximum plate thickness is 2mm and 50mm width of plate metal bar that can be bend.

1.6 Important of Project

This project have lots of benefits in industry, as we know that it is quite impossible to bend metal using our own strength and that why machine is invented to ease human work also it provide a short amount of time to use. We also know that bending machine is expensive, so we went to get the minimum cost required to build it.

1.7 Summary

At the end of this chapter, we are able to find out what we should do next for our project. This is because we have know that what is the objective should we achieve and the problems that we must solve. Besides, the scope of the project that we have list down will help us in manufacturing our product. All of the elements that state in this chapter are important for our design and manufacturing product so that our project will finish successfully.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature is an introduction and background of the study where the results of the previous study or research. This literature review covering all aspects and a detailed description of such theories, models, materials, formulations or conclusions from the results of relevant studies. The aim is to get the background information as well as helping students to reach their objectives. With this, every step and are fully prepared to implement the project was organized and systematic.

The resulting of this project is afinal project andfulfil the terms and scope have been assigned. Major important and usefulness of this metal bending machine is based on the objective of use by the final year students to fabricate project in mechanical workshop, to design and fabricate a metal bending machine and also bending machine with specific degree and shape.

2.2 Introduction Bending Machine

A bending machine is a forming machine tool. Its purpose is to assemble a bend on a work piece. A bends is manufactured by using a bending tool during a liner or rotating move.

Beside, a machine for bending and straightening metal is sheets and strips. Sheet-bending machines with a rotary bending beam are designed for cold linear bending to produce parts of various shapes, as well as pipes on mandrels; to form flanges and closed contours; and for straightening sheet material. A turning beam and a bending beam are mounted on the machine frame. Bending is accomplished by rotating the bending beam. The turning beam holds the part in place and may be positioned as required by the thickness of the bending radius. The drive of such machines may be mechanical or hydraulic.

The specially-assigned person must be responsible for the machine, the operator must be familiar with the performance and safety knowledge of this machine. Add the lubricant to all lubricating points before using. Determine the mould opening size according to the thickness. According to the processing sheet metal, with reference to the bending force and also determine the required pressure.

Slider work schedule must be adjusted according to the bending of the plate. During operator do not put hands between up and down mould to avoid accident. Cut offthe power when the sheet metal die, operates after stopping. Check the contact ratio of the upper and lower mould. Stop immediately when an exception occurs, check the reason and ruled out in time. After exiting the program control system, cut off power supply.

To produce metal plate bending machine, we decide to use linear actuator because it is suitable tool to use because it is design with motor that is suitable with the force needed is 6000 Newton that enough to bend a metal thickness of 2mm and also it most efficient.

2.3 History of Bending Machine

The invention relates to bending machines and, in particular it is concerned with machines and improvements there for angularly bending rods, bars, tubes and the like of metal or other flexible.

It is the primary object of this invention to provide a simple, inexpensive and reliable bending machine for making profile bends of variable radius or multiple radius in stock with the bending occurring in either a clockwise or counter-clockwise direction in a single operation or pass of the machine. Although an existing machine known as a Stretch Bender can do this type of bending, all of the bends produced by that machine can only be made in the same direction and the machine itself, as distinguished from the machine of this invention, is extremely expensive. It is a further object of this invention to provide a bending machine having the capacity to implant bends in structural members which have been traditionally shaped by drop forging through use of a punch press while the members are hot, thus providing substantial savings in time and costs.

It is further object of this invention to provide a bending machine having in addition to the above outlined advantage, the feature where in relatively large floor space heretofore necessary to accommodate movement of the bending stock and bending apparatus is no longer required. It is also my object to provide a superior bending apparatus which can be assembled and used with the standard bending machine now in existence.

2.4 Types of Bending Machine

2.4.1 Rotary Draw Bending Machine

A rotary bending is formed by drawing the work piece round a rotating bend former. The leading edge of the material to be bent is clamped to the bend forming die, while material rests between the forming die groove and the

opening force, commonly referred to as the counter bend or pressure die. The forming die rotates to the desired degree of bend, completing the process. This bending process is less costly than some and for more expensive than others, so it suitability depends largely on not your application and productivity but also on your budget.

Advantage:

- Compared to many other style of standard bending
- The process that often more closely controls the material flow during and push on the same bender

Disadvantage:

- There is a limit on how large a radius can be
- Some rotary draw benders can be converted so they can both draw and push on the same bender

2.4.2 Press Brake Bending Machine

Press brake is a machine tool for bending sheet and plate metal. It forms predetermined bends by clamping the work piece between a matching punch and die. Typically, two C-fromes from the sides of the press brake, connected to a table at the bottom and on a moveable beam at the top. The bottom tool is mounted in the table with the top tool mounted on the upper beam.

Advantage:

- High strength in thin parts that can have complex shape and for reasonable price
- Easy to make parts in different colour and finishes

Disadvantage:

- The requires high volume quantities to be economical
- Expensive and noisy

2.5 Introduction of Actuator

An actuator is a component of a machine that is responsible for moving or controlling a mechanism or system.

An actuator requires a control signal and a source of energy. The control signal is relatively low energy and may be electric voltage or current pneumatic or hydraulic pressure or even human power. The supplied main energy source may be electric current, hydraulic fluid pressure, or pneumatic pressure. When the control signal is received the actuator responds by converting the energy into mechanical motion.

An actuator is the mechanism by which a control system acts upon an environment. The control system can be simple (a fixed mechanical or electronic system) software based (e.g. printer driver, robot control system, a human, or any other input.

2.6 Introduction of Adapter

An adapter is a device that converts attributes of one electrical device system to those of an otherwise incompatible device or system. Some modify power or signal attributes, while others merely adapt the physical form of one electrical connector to another.

2.7 Introduction Switch ON/OFF Toggle

In electrical engineering, a switch is an electrical component that can "make" or "break" an electrical circuit, interrupting the current or diverting it form one conductor to another. The mechanism of a switch removes or restores the conducting path in a circuit when it operated. It may be operated manually, for example, a light switch or a keyboard button may be operated by a moving object such as a door or may be operated by some sensing element for pressure, temperature or flow.

2.8 Introduction Switch Power Window

Power window or electric window are automobile windows which can be raised and lowered by pressing a button or switch, as opposed to using a hand-turned crank handle.

In a typical installation, there is an individual switch at each window and a set of switches in the driver's door. Power windows are usually inoperable, when the car is not running, as the electrical system is not "live" once the ignition has been turned off. The power window is a mechanism that allowed the window moving up and down automatically. But in this project, the power window switch used connected to the actuator for moving the V-block.

2.9 Introduction of Screw

Screw a rod or cylinder with a helical groove on the surface. Its primary use is as a blinder to hold or plugging two objects together. In this project, it used as the connecting screws to the metal plate, retaining the rear actuator and retaining the centre part of the metal plate screws so that the centre of the actuator is not raised. Screw is used because it is easy to open and install.

CHAPTER 3

METHODOLOGY

3.1 Introduction

Methodology is the systematic, theoretical analysis of the methods applied to a field of study, or the theoretical analysis of the body methods and principles associated with a branch of knowledge. It typically, encompasses concept such as paradigm, theoretical model, phases and quantitative or qualitative techniques. A methodology does not set out to provide solutions but offers the theoretical underpinning for understanding which methods, set of methods or so called "best practice" can be applied to a specific case. In other word, methodology can be defined as the process used to collect information and data for the purpose of making business decisions. The methodology may include publication research, interview, survey and other research techniques and could include both present and historical information.

3.2 Flow Chart

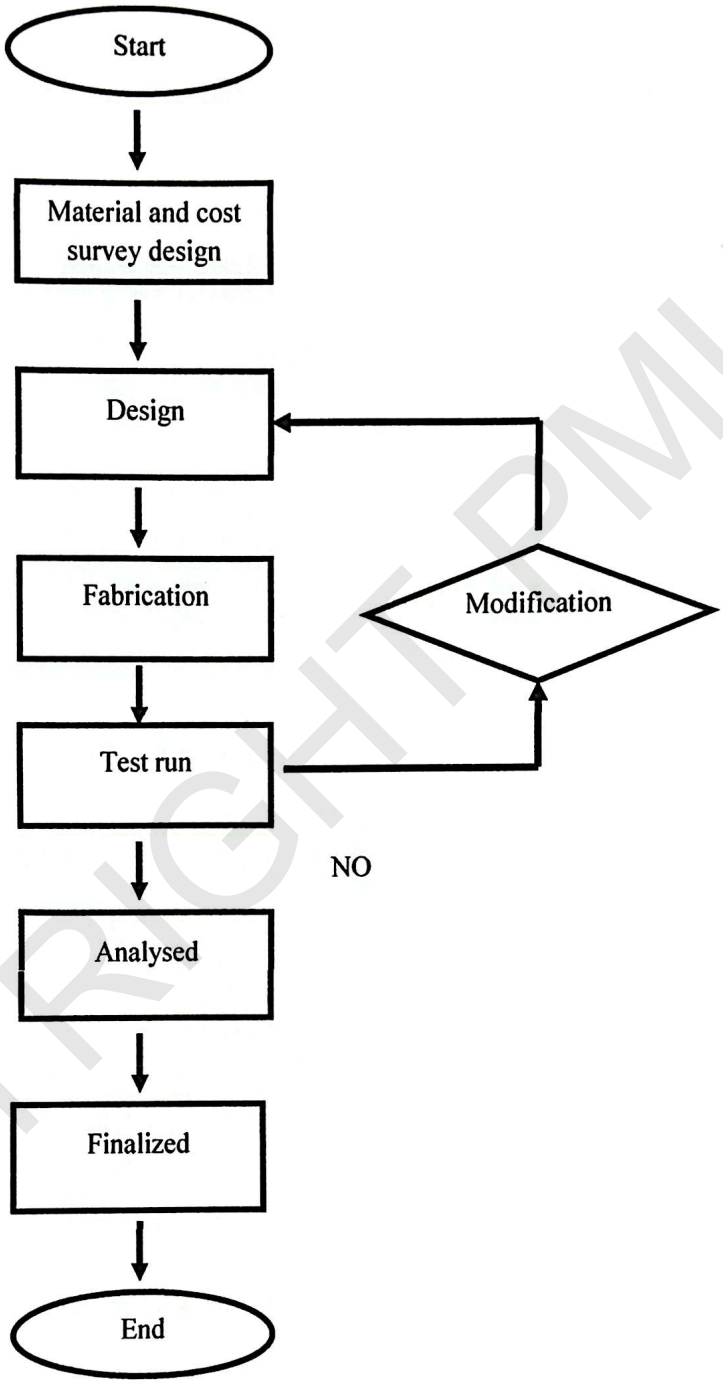


Figure 3.2 Flow Chart

3.3 Design

Design is the important part in manufacturing a project. Before manufacture a product, there must be a design as a guard line for produce a product. Below is the design of our project:

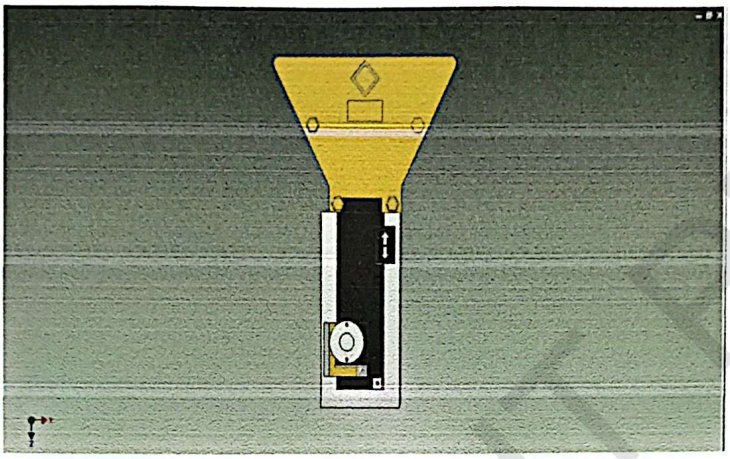


Figure 3.3.1: Plan View

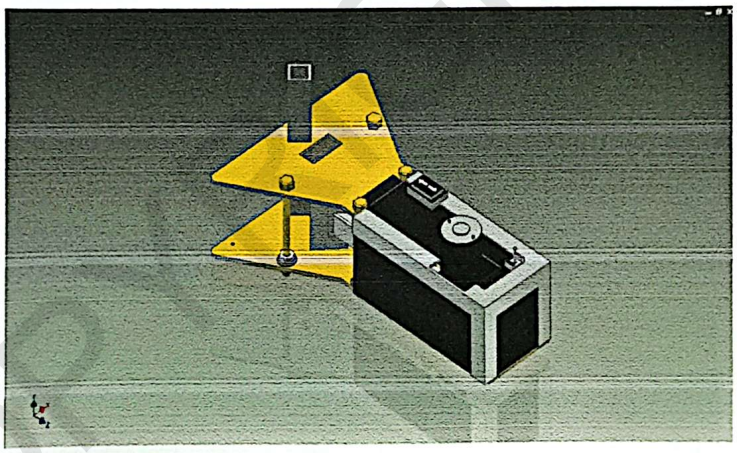


Figure 3.3.2: Side view

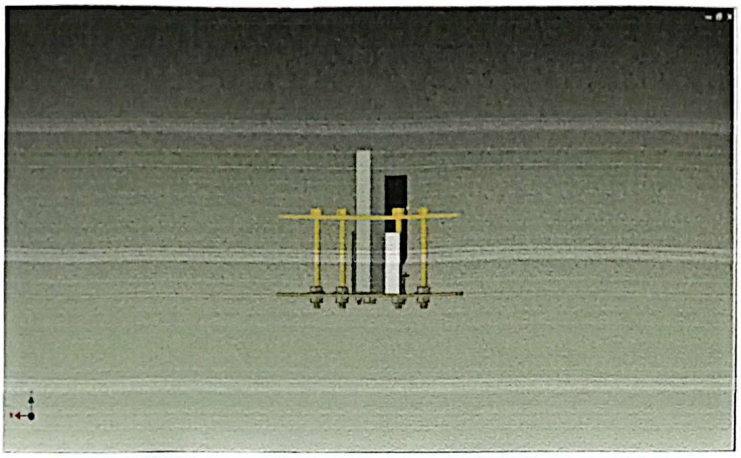


Figure 3.3.3: Front view

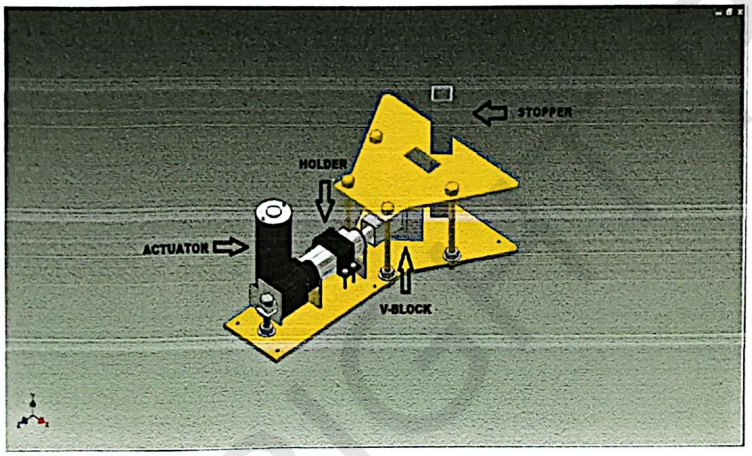


Figure 3.3.4: Metal bending machine uncover with label

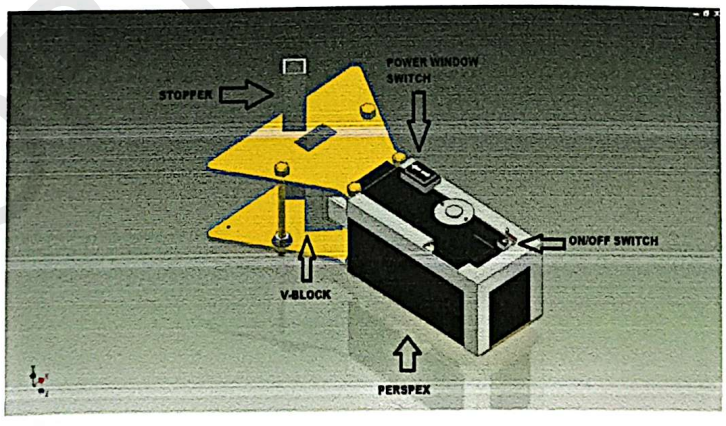


Figure 3.3.5: Metal bending machine cover with label

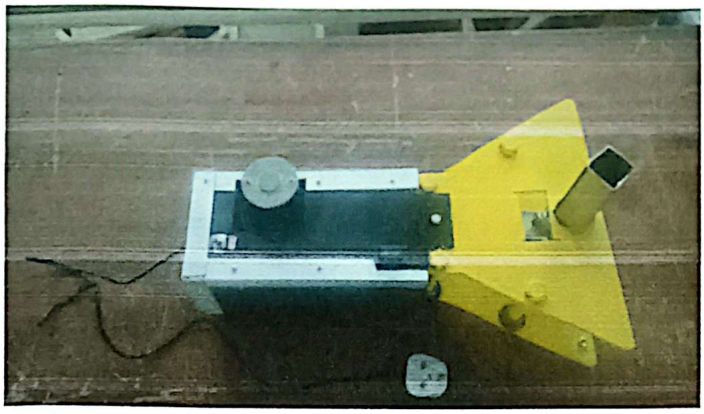


Figure 3.3.6: Final product

3.4 Idea Analysis

There are several methods that we used to produce the machine. There are:

i. Problem
ii. Expansion of data
iii. Idea selection
iv. Material selection
v. Fabricating
vi. Test run
vii. Modification
viii. Data record

3.4.1 Problem

After doing some discussion with our supervisor, we had agreed to choose Metal Bending Machine as our project. After do some research on internet, we found that the metal bending machines nowadays are bigger, heavy and expensive. Besides, manual bending also use more energy and need more time to bend the metal. The manual bending methods sometimes may cause injury to people. On the other hand, for the existing machine, the problem that we see is the machine is hard to bring anywhere.

3.4.2 Expansion of Idea

The machine is expected can be used in workshop especially during making a lot of work that need to bend the metal. This machine is expected to reduce time needed to bend the metal and to facilitate the worker. It also can bend the metal with the specific degree and shape.

3.4.3 Idea Selection

The idea selection is determine by selecting the best idea among ideas that we have discussed by comparing the advantages and disadvantages each of the idea. The best design is the one we used on our project.

3.4.4 Material Selection

Material used is based on the machine size and suitable with machine utilization. The material that we used is as follow:

i. Plate metal (3mm thickness)
ii. Hollow bar
iii. Angle bar
iv. Perspex

We also used universal adapter to convert Alternating Current (AC) to Direct Current (DC). The actuator that we used in our project is stroke linear actuator 12 volts (12V).

3.4.5 Manufacturing

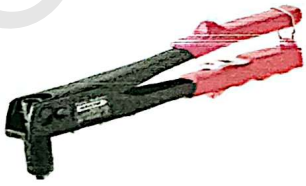
During the process to complete our project, the fabrication process mostly carried out at welding workshop. The work that has been carried out will be noted into logbook. The improvements of our design during the manufacturing process are based on the discussion with our supervisor.

3.4.6 Manufacturing Process

Manufacturing process is very important to ensure the fabrication of our project is in good condition. There are several tools and machine we used:

Table 3.4.6: Tools / Machines

Bil	Tools / Machines	Function
1	Hand drill 	- Used for drilling a range of sizes of hole
2	Hand grinder 	- A handheld power tool used for grinding (abrasive cutting) and polishing.
3	Arc welding 	- Used for fabrication work
4	Bench drill 	- Used for boring holes in various materials

5	Measuring tape 	- Used to measure required length
6	Chipping hammer 	- Used to remove welding slag from a weld and welding spatter from alongside welds.
7	Wire brush 	- Used to brush the welding surface after chipped off the slag
8	Wire 	- Use to connect with power supply
9	Rivet gun 	- Used to drive rivet

Apart from that, tools below also used during the fabrication process:

i. Hammer
ii. Bolt and nut
iii. "Sesiku L"
iv. Face shield
v. Round and flat file
vi. Drill bit
vii. Dist cutting
viii. Ruler
ix. Washer
x. Adjustable spanner
xi. Black and yellow paint
xii. Vernier calliper
xiii. Wiring tape

3.4.7 Test Run

Test run on machine has been done after the fabrication work has been completed. It is to ensure the actuator and adapter can function well to achieve the objective of this project.

3.4.8 Modification

There is a lot of modification on the machine design. This is to ensure that our project design is suitable, durable, and tidy and look very attractive.

3.4.9 Data Record

The last part to produce Metal Bending Machine is to record all that happened during manufacturing process such as the cost, problem occur and how to overcome the problem.

3.5 Project Fabrication

3.5.1 Fitting

Before making the base and body of the project, one of the key element that need to be done is measure the length of the metal according to a predetermine size. This process is very important in order to avoid wastage of time and time to do work can be saved.

3.5.2 Cutting Process

We use the grinder to cut the metal. Type of metal that have been cut is plate metal. We use the grinder with cutting dist to cut the specific length that is suitable of the design. We also use the grinder for cleaning the surface of the metal. This grinding is used to reduce scratch.

3.5.3 Grinding Process

After cutting process, we usually grind the metal so that it will safe to be hold. Type of grind that we use is hand grinder that was obtained in our workshop. Grinding is a finishing process used to improve surface finish, abrade hard materials and tighten the tolerance on flat by removing a small amount of

material. In grinding, an abrasive material rubs against the metal part and removes tiny pieces of material.

Figure 3.5.3: Grinding base process

3.5.4 Welding Process

The type of welding that we use is arc welding. The electric current that being use is different according to the type of work piece. The thickness of the metal also affects the chosen of electric current. Typically we used current from 75Amp-100Amp. Every part must be weld strong to ensure the debility of our project.

Figure 3.5.4: Welding stand actuator process

3.5.5 Drilling

Drilling is the cutting process that uses a drill bit to cut or enlarge a hole of circular cross-section in solid materials. The drill bit is a rotary cutting tool, often multipoint. The bit is pressed against the work pice and rotated at rates from hundred to thousand of revolutions per minute. This force is cutting edge against the work piece, cutting off chips from the hole as it drilled.

3.5.6 Assembly Process

For installation work, make sure all bolts and nuts are sufficient and appropriate of the hole in each side of the connection. We didn't do any mistake in the process of installation of all the equipment to produce Metal Plate Bending Machine.

3.6 Cost

Cost suitability aspect is also aspect that should give attention in producing a product. This case is related to certain item cost used to produce products with the good quality product. It should be balance to prevent loss to all parties. Apart from that, if the manufacturing is cheap, so the maintenance cost also cheap. This case will please consumer to make the product maintenance without having to burden them financially. Even though we face problems to buy materials used to produce the machine because place factor (Mukah) that relatively isolated and quite expensive item, however we succeeded plan expenses for conduct the machine cost well.

Schedule below stated the cost to produce Metal Bending Machine:

Table 3.6: Cost

	Materials	Quantity	Cost (RM)
i.	Switch toogle	1	12.00
ii.	Actuator	1	175.00
iii.	Universal adapter	1	45.00
vi.	Screw	6	18.00
vii.	Power window switch	1	20.00
	Grand Total		RM270.00

3.7 Summary

In the conclusion, the session were held week to discuss the project development. The entire problems are discussed so that it can be solved quickly. Problem that can't be handled were addressed quickly to the project supervisor. To make project difficult everything that is going to be done must be planned properly (proper planning). This can ensure the project flow is smooth without any interruptions.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

In this chapter, we will discuss about the result obtained from the making of this project. Upon completion of the project, finding and analysis should be recorded and analysed in describing manufacturing principle of Metal Bending Machine. There are many techniques in order to finish our project. Every member has been given their own task based on their skills and experience. This is important so that the project is done on time. Besides, it is a must for us to have safety while doing any work in workshop.

4.2 Result

The first test run was carried out during 50% presentation when actuator and v block was attached. In the first test run, we found that the metal bend doesn't reach 90°, the actuator is also bending upward in the middle, the v-block loose and the base of the bending machine also bend. After being examined, we found that the base needs to add with some plate to support it and the v-block need to attach with rubber.

After the base was added on with thick plate metal and the v-block was attach with rubber, the second test run was carried out. There is an improvement at metal that have been bend but it also doesn't reach 90°. The bending of the base also decreases but the actuator still bending upward in the middle. Then, we found that the die opening of the v block is doesn't enough to bend the metal and the actuator still bend upward.

When the v block was replace with the new one that have large die opening than the first one and the holder are place at the middle of the actuator, then the third test run are made. Finally, machine that we produce are successfully.

4.3 Discussion

4.3.1 Problem with Actuator

- We found that when the actuator push the metal towards the stopper. The actuator is lifted due to the forces that apply at both directions making the base at the middle lifted along with the actuator.
- To prevent the metal base bending along with the actuator, we add on thick metal bar at the bottom of the metal base to prevent it lifting up. Also we attach metal plate tightly that connect with metal base using screw at the top of the actuator as a holder to make it stronger from lifting up.

4.3.2 Problem with V-Block

- The die opening of the v-block is too small when we try to bend the metal up to 90° and curve. It does not achieve the objective that we want.
- Therefore, we make the die opening wider that can achieve our objective.

4.3.3 Problem with US 2 pin plug

- The original plug for the actuator is US 2 pin plug. It is not suitable and hard for us to connect it to the plug.
- To overcome this problem, we replace it with 3 pin plug. This plug can be easily used to connect to the plug.

4.4 Summary

Analysis data is an important thing that must do in any type of project. This can help us in detecting any problem that occurs to our project. Analysis data can carry out many times until we satisfied with the result. By analysing the data, we can make sure and inspect earlier the improper things happen with our product so that we can solve the problem earlier before the product is fully fabricate and successfully done.

CHAPTER 5

SUGGESTION AND CONCLUSION

5.1 Introduction

Upon successful completion of this metal bending machine, this project seems will gives lot of benefits to the students. The project was produced based on specifications that have been decide and designed. Besides, there also good security features of project so that no problem occurs during test run the project. The project that has been created need to go through test run because it is important to identify the effectiveness of the project result. The project can be determined either the Metal Bending Machine has reached the objectives. Besides, the cost incurred should also be profitable with the results that had been carried out. This factor is an important thing for the success of this project.

5.2 Suggestion

In semester 6 project 2 DJJ6143 is the final project for mechanical students in Polytechnic Mukah Sarawak, which has been a range of experience and has a wide process of learning and knowledgement that can be obtained. Also this subject is a good exposure for student instead just learning in class, they also can develop new

skill and experience in producing a project based on the conclusion and discussions of the project outcomes. There are some advantage and disadvantage that can we identify in this project and here are some suggestions for the next student that taking this subject in order to improve and to manage this project more manageable. It is important to improve the quality of the project and time management. Our suggestion is:

1. The scheduled for producing the project should be prolonged from a couple of hour to half of the day. So that student can manage time for other study and didn't have to worry too much about the time given to complete the project.
2. The plate metal use as the base must be more thickness so it can support the body of the machine when the actuator is in process bending the machine.
3. Area of the base part of the machine need to increase so that the machine will be more stable
4. The die opening of the v block must be suitable with the applied force and the stopper.
5. The v block and the stopper need to be parallel so the bending metal will produce a good bending of metal.

5.3 Conclusion

Project 2 is a subject that must be taken by every last semester or final year students of Mechanical Engineering Department. It is one of the requirement subjects in award of Diploma in Mechanical Engineering. There are lots of benefits that can be obtained while progressing this project especially in term of mechanical engineering knowledgement. In addition, making this project is one of the best experience that useful for us because many things and knowledge that we gain. This is the best expose because it can be use in a daily life.

One of the benefits in this project is, it helps help us to create our own project through our own idea which in this case we combine it with theory for creating this project. This shows that we are capable to think about the materials, revise budget and

making summary for this project. Besides, it will bring good name for Polytechnic Mukah and also producing polytechnic students experience in industry.

There have been earlier inventions of various types in bending machine. We try to do a bending machine that using a different methods and materials. It helps us to improve from time to time and make the minimum cost of the machine that has already been made.

Although there is failure and trial that we have to face during completing this project, it did not make us to give up upon the research rather it made us search for more knowledge and experience when encounter the problem and we met solution for it.

Besides, while completing the project, we all gather information and pouring idea for this project. We cooperate to make the project as the best and succeed the project. In addition, the key of the project is work as a team to move forward as giving the best contribution to complete this final project.

The project was successful and had an addition from the planned one, there is lots of benefits that we gain from this subject not only knowledge and skill but also experience that we will use after graduating from polytechnic. We as a student appreciate the knowledge that we got during studying in Polytechnic Mukah Sarawak also we grateful that lecture guided us during completing this project.

5.5 SUMMARY

We had finished our project successfully. There are some problems that we face in finishing this project, but we have discussed properly how to solve and overcome the problems in making this project. Teamwork is very important when doing the work. Besides, we have divided the task to each other so that the short time needed to finish the work. Another time balance we used to do the finishing for the project and we also can do the test run many times until we satisfied with the result. Then, after finish with the product, we can focus to finish our report.

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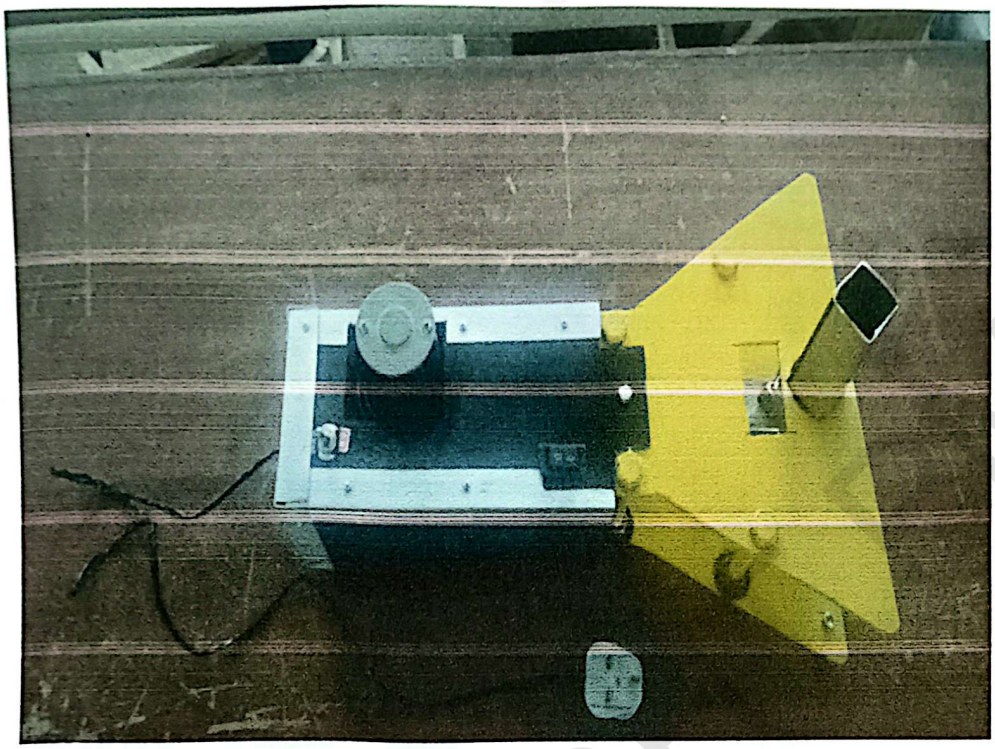
APPENDIX



POLITEKNIK MALAYSIA
MUKAH

CARTA GANTT PROJEK PELAJAR

SESI : DISEMBER 2016
JABATAN : KEJURUTERAAN MEKANIKAL
KOD/KURSUS : DJJ5141 PROJEK 1

MINGGU/ AKTIVITI PROJEK	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17
1. Course Registration				CUTI KHAS PERAYAAN									CUTI PERTENGAHAN SEMESTER				PEPERIKSAAN AKHIR SESI JUN 2016
2. Project 1 Briefing																	
a. Group Formation																	
b. Project Discussion																	
3. Brainstorming																	
a. Problem statement																	
b. Objectives																	
c. Scopes																	
4. Proposal writing																	
5. Report writing																	
a. Chapter 1- Introduction																	
b. Chapter 2- Literature Review																	

c. **Chapter 3- Methodology**																		
6. Proposal Presentation																		
a. **Preparation presentation**																		

Nota:

: *tarikh rancang*

: *tarikh laksana*

POLITEKNIK MALAYSIA
MUKAH

CARTA GANTT PROJEK PELAJAR

SESI : DISEMBER 2016
JABATAN : KEJURUTERAAN MEKANIKAL
KOD/KURSUS : DJJ6143 PROJEK 2

MINGGU/ AKTIVITI PROJEK	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20
1. Pendaftaran Kursus						CUTI KHAS SEMESTER					CUTI PERTENGAHAN SEMESTER									PEPERIKSAAN AKHIR SESI DISEMBER 2016
2. Taklimat Projek 2																				
3. Fabrikasi Projek																				
a. Perolehan bahan																				
b. Proses mengukur																				
c. Proses menanda																				
d. Proses memotong																				
e. Proses menebuk																				
f. Proses mengimpal																				
g. Proses kemasan																				
h. Fabrikasi projek sehingga 1rogress 50%																				
i. Pembentangan 50% progress projek																				

j. Pemasangan projek	
k. Proses mengecat	
4. Proses Uji Lari	
a. Menguji ketahanan/kelancaran mesin	
b. Proses akhir dan mengemaskini projek	
5. Pembentangan Akhir	
a. Persediaan pembentangan akhir	

Nota:

: *tarikh rancang*

: *tarikh laksana*