DEVELOPMENT OF SEMI-AUTOMATIC SOLAR GATE SYSTEM FOR ELECTROMECHANICAL PART

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

Faculty of Mechanical Engineering
UNIVERSITI MALAYSIA PAHANG

NOVEMBER 2008

SUPERVISOR'S DECLARATION

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

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Date : ……..

STUDENT'S DECLARATION

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

Signature :……

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DEDICATION

Firstly, I would like to show my expression Allah s.w.t whose guidance, help and grace was instrumental in making this work become a reality. I would also like to thank my respected lecturer, Mr. Shahmi bin Junoh@Yacob and all lecturers who had guided and helped me a lot to complete this task.

This dedication also goes to my beloved family which is my father Mr. Muda bin Bakar, and my mother, Mrs. Jaharah binti Abdullah and family, without them my pursuit of higher education would not have been possible. Also thanks a lot to the university administration and friends in their support and advice towards this project. Lastly, thanks to all those had helped me to complete my task.

ACKNOWLEDGEMENTS

I would like to express my gratitude and appreciation to all those who gave me the possibility to complete this report. Special thanks is due to my supervisor, Mr. Shahmi bin Junoh@Yacob whose help, stimulating suggestions and encouragement helped me in all time of fabrication process and in writing this report. I am very grateful to him for his patience and his constructive comments that enriched this project.

I would also like to acknowledge with much appreciation the crucial role of the staff in Mechanical Laboratory, who gave me a permission to use the laboratory equipment and also the machine and giving a permission to use all the necessary tools in the laboratory.

Special thanks too go to Mr. Zamri Bin Ahmad, as the Final Year Coordinator, who has helping a lot and give some advice and share his knowledge on how to complete this task in the right way.

I also want to thank to all my friends for their support and help to complete the task and for sharing their knowledge on how to solve the problems. Finally, I thank my family for their continuous support and confidence in my efforts.

ABSTRACT

Development of semi-automatic solar gate system for electro-mechanical part is important to open and close the sliding gate. It is uses just a simple system and easy to overhaul this system. It is also safe for the children and to adult too. This system is divided into two groups such as mechanical part and electrical part. For mechanical part, it is designed to be a guard for electrical part. It is also designed to place a solar panel to convert sun light to be an electric current to recharge batteries. With this system, it can save the cost and safe to use. In general, this project is divided into two parts which are mechanical and electrical part.

ABSTRAK

Penghasilan pintu pagar separa automatik menggunakan bekalan kuasa daripada cahaya matahari yang berkawalan daripada sistem elektronik ini digunakan sebagai alat untuk mengawal pintu pagar untuk buka dan tutup. Sistem ini sangat ringkas dan mudah untuk digunakan oleh pengguna. Alat ini adalah selamat digunakan oleh semua pengguna. Sistem ini merangkumi bahagian mekanikal dan elektrikal. Untuk bahagian mekanikal, ia dicipta untuk menjadi pelindung kepada bahagian elektronik daripada terkena air. Ia juga dijadikan tempat untuk meletak ’solar panel’ diatasnya supaya dapat menerima cahaya matahari dan seterusnya dapat membekalkan kuasa kepada bateri. Dengan kaedah ini, ia dapat menjimatkan tenaga yang digunakan bateri untuk membuka dan menutup pintu pagar tersebut. Secara keseluruhannya, projek ini terbahagi kepada dua bahagian yang penting iaitu proses menyediakan bahagian mekanikal dan bahagian elektrikal.

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CHAPTER 1

INTRODUCTION

1.1 PROJECT SYNOPSIS

1.1.1 General project synopsis

Final year project is one of the subjects that are taken to all of final year student. This subject must take in this semester. In this project, it involves the student about designing and fabricating a electro-mechanical controller part for semi-automatic solar gate system. This controller part may different with other controller part in the market. As a 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 semi-automatic solar gate system for controller part could divide in two general groups, which are mechanical part and electrical part.

Mechanical part for semi-automatic solar gate system is equipped by using all necessary items and method such as L-shape metal, hollow rectangle metal, and skills in manufacturing process by perfume arc welding to weld the part of project. The advantage of this project is save the cost of electric power to generate the system to open and close the gate.

Electrical part for semi-automatic solar gate system is making a circuit of controller part. The equipment for making the circuit is resistor, motor, circuit board, solar panel and etc. This circuit is important in controller part. Without this circuit, the controller part is failed to activate this system.

The process of development is initiated from designing the mechanical and electrical part in this system. It would be considering the function as well. In order to produce user friendly product that is suitable to the customer, consideration to the ergonomic factor. It involve the measurement process before the material are cut into pieces before assembly together by using arc welding for mechanical and soldering for electrical part.[4]

1.1.2 Specific project synopsis

Development to make a electro-mechanical controller part is the main term in this project. This project title is development of semi-automatic gate system for controller part. This project involves small analysis for controller part. The new design is required to improve its durable of mechanical part. Test need to be done to verify the circuit of the controller. It is the most important and need to improve when this project launched.

1.2 Problem statement

This semi-automatic gate system for controller part will primarily can help student and university to save cost. Solar gate is one of the alternative sources to solve the problem. Now, when install the solar panel gate system it can save cost to pay a bill in a month. Today the semi-automatic gate is operated just using the battery power. From this project, the battery is recharge by the solar panel in a daylight hours. So that it can save the cost.

1.3 Project scope

a) Literature review: valuable data are searched and gathered. Considering the shape of the solar panel and method to produce.
b) Sketching & designing: sketching the idea to make a motor controller post and solar panel frame. Also sketching the circuit to control the rotation of motor. Design it with Solid Work software and DXP Propel software.
c) Fabrication: fabricate and produce controller for solar gate system by using all the necessary manufacturing.
d) Testing & evaluate: simulate the semi-automatic solar gate system with the expected functions to be.

1.4 Project Objective

1.4.1 General objective

Diploma final year project objective is to practice the knowledge and skill of the students that have been gathered before in solving problem using academic research, to born and engineer that have a lot 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 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 a capability to make a good research report in thesis form or in 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 knowledge and experiences.

Nevertheless, this project important to generate and increase interest in research in work field.

Our project should be finish until the block diagram was get. This project is apply the lesson and knowledgeable that we learn before. Then, we can practice the skill and solving the problem using academic study. This is a project also to create and train a student skill and have an ability to do work personally. It also gives us and experience and lesson. How can we solve the problem with several of way and also write with a good thesis research.[4]

1.4.2 Specific project objective

a) The objectives of this project are to design the electro-mechanical controller strategy of semi-automatic solar gate system.
b) It also teaches how to develop the electrical part of this semi-automatic solar gate system.
c) To develop a mechanical concept/ an electronic concept

1.5 Project planning

ACTIVITIES							W	E	E	K				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Briefing														
Literature Review														
Idea Development														
Concept Design														
Design Analysis														
Mid presentation														
Fabrication														
Report writing														
Final Presentation														

Table 1.1: Gantt chart

According to the table, the project starts with briefing from supervisor. He gives all tasks to do about the project.

The process continued with literature review actual starting from week 2 until week 5. The literature review is all about gathering information about solar gate system.

The process continued with concept design and design analysis. In this task, the motor controller post and solar panel frame is sketched into two types of designs. This task takes time about week 5 to week 8. From the two designs, the combinations of design make a new part and a new design is produced. The new design is draw by solid work software.

The project continued with design of electrical part to control a motor rotation. The fabrication needs preparation of the material. It takes about week 8 to week 14 to finish all and it can function. The combination of electrical part and mechanical part will make a controller part to gate system.

The project continued with thesis writing starting on week 5. It makes a long time to write a good thesis about semi-automatic solar gate system. The thesis writing takes about 10 weeks starting to complete. All the task is scheduled about fourteen weeks overall.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The development of semi automatic solar gate system for electro-mechanical part is important to open and close a sliding gate. Nowadays, the technology to develop a controller to control open and close a sliding gate is spreading. Now, the technology uses the energy source from outside. The energy sources are renewable energy like a hydroelectric energy, solar energy or biomass. It also designed as a part of interior design and makes our periodicals neat and tidy. Uncertainty about the future of fusion research has increased the importance of "renewable" energy sources. Among the most important of these sources are hydroelectric, solar, and wind. In light of diminishing fossil fuels, however, renewable energy may end up as the energy of choice for the 21st century.[2]

2.2 Technical review

2.2.1 Solar energy

Figure 2.1: Solar resource

The name "solar power" is actually a little misleading. In fact, most of the energy known to man is derived in some way from the sun. In fact, there would be no life on earth without the sun, which provides energy needed for the growth of plants, and indirectly, the existence of all animal life. The solar energy scientists are interested in is energy obtained through the use of solar panels.[2]

Advantages

a) Inexhaustible fuel source
b) No pollution
c) Often an excellent supplement to other renewable sources
d) Versatile is used for powering items as diverse as solar cars and satellites

Disadvantages

a) Very diffuse source means low energy production large numbers of solar panels are required to produce useful amounts of heat or electricity
b) Only areas of the world with lots of sunlight are suitable for solar power generation

2.2.2 Hydroelectric energy

Figure 2.2: Hydroelectric resource

Man has utilized the power of water for years. Much of the growth of early colonial American industry can be attributed to hydro power. Because fuel such as coal and wood were not readily available to inland cities, American settlers were forced to turn to other alternatives. Falling water was ideal for powering sawmills and grist mills. As coal became a better-developed source of fuel, however, the importance of hydro power decreased.[2]

Advantages

a) Inexhaustible fuel source
b) Minimal environmental impact
c) Viable source--relatively useful levels of energy production

Disadvantages

a) Smaller models depend on availability of fast flowing streams or rivers
b) Run-of-the-River plants can impact the mobility of fish and other river life.

2.2.3 Biomass energy

Figure 2.3: Biomass resource

Although chances are that you have never heard of "biomass" before, it is one of the oldest and most well-established energy sources in the world. Biomass is simply the conversion of stored energy in plants into energy that we can use. Thus, burning wood is a method of producing biomass energy. If the burning of wood were the only biomass application, then that field of study would not be nearly as interesting as it is. In fact, biomass has many possibilities as a renewable energy source. High energy crops grown specifically to be used as fuel are being developed, and scientists are beginning to consider agricultural and animal waste products as possible fuel sources.[2]

Advantages

a) Theoretically inexhaustible fuel source
b) When direct combustion of plant mass is not used to generate energy
c) Alcohols and other fuels produced by biomass are efficient, viable, and relatively clean-burning
d) Available throughout the world

Disadvantages

a) Could contribute a great deal to global warming and particulate pollution if directly burned
b) Still an expensive source, both in terms of producing the biomass and converting it to alcohols
c) On a small scale there is most likely a net loss of energy--energy must be put in to grow the plant mass

2.3 Gas Metal Arc Welding (GMAW)

2.31 Basic theory of Metal Inert Gas (MIG) Welding

Gas metal arc welding (GMAW), also known as metal inert gas or MIG welding, is a semi-automatic or automatic process that uses a continuous wire feed as an electrode and an inert or semi-inert gas mixture to protect the weld from contamination. As with SMAW, reasonable operator proficiency can be achieved with modest training. Since the electrode is continuous, welding speeds are greater for GMAW than for SMAW. The mechanical part will be joined using this MIG welding process. **Figure 2.4** show the basic structure of the MIG welding.[3]

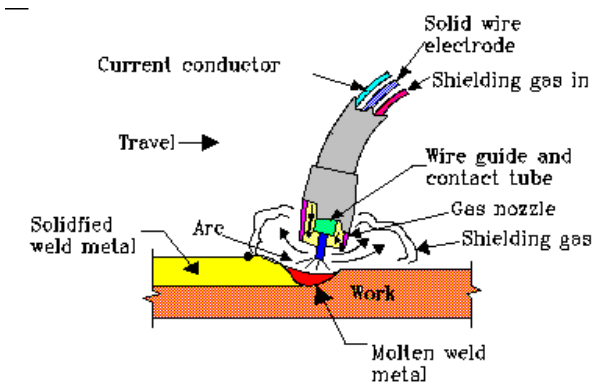


Figure 2.4: Basic structure of MIG welding

2.4 Floor cutter disc machine

A floor cutter disc machine uses a composite disc. Floor cutter disc machine can be used for woodworking, metal working, or for cutting a variety of other materials, and are particularly useful for cutting irregular shapes. The radius of a curve that can be cut on a particular saw is determined by the width of the band and its lateral flexibility. In this project, it is used to cut the raw material to the specific size that is needed.

2.5 Bolt and Nuts

After drilling and welding process, bolt and nuts are used to join the solar panel frame to motor controller post

2.6 Grinding / Finishing

The finishing process uses the grinding machine to make the solar panel frame and motor controller post surface smooth and neat.

2.7 Painting

The last process is painting process. Product will look more attractive and it also will prevent the product from corrosion.

2.8 Soldering

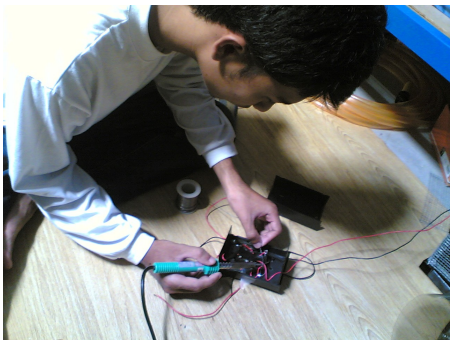


Figure 2.5: Soldering

Soldering is a process in which two or more metal items are joined together by melting and flowing a filler metal into the joint, the filler metal having a relatively low melting point. The filler metal used in the process is called solder. Soldering is distinguished from brazing by use of a lower melting-temperature filler metal; it is distinguished from welding by the base metals not being melted during the joining process. In a soldering process, heat is applied to the parts to be joined, causing the solder to melt and be drawn into the joint by capillary action and to bond to the materials to be joined by wetting action. After the metal cools, the resulting joints are not as strong as the base metal, but have adequate strength, electrical conductivity, and water-tightness for many uses.

2.8.1 Soldering Tools

2.8.1.1 Soldering Irons

There are several things to consider when choosing a soldering iron.

- adjustable or fixed temperature
- power source (electric or gas)
- portable or bench use

CHAPTER 3

METHODOLOGY

3.1 Project Flow Chart

From the flow chart, this project is started with introduction. In the introduction has a project background, objective and problem statement. The project background is important because to make what product we must do. The objective is to make a different point to finish a product. And also, the problem statement is to find what a problem why must design product.

Then the literature review study. In the literature review study, the researches to the existing product in the current market. The purpose of this research is to compare the advantages, disadvantages and design of the product in the current market base on the main objective of the project such as development of semi-automatic solar gate system for controller part.

After the literature review and find the product in current market. The sketching is manually on A4 paper. Mechanical and electrical concept designs into A4 paper for select a good design and circuit of product. In this sketch method, the design on the concept will be perform to find their abilities and good concept.

When this concept selection is done, an analysis of design is done on the cost and failures to the new product choose. The purpose of this analysis is to make sure the product followed the main objective of the project. After the final result of the analysis, the detail design will be develop (2D or 3D drawing). Circuit for electrical also develop in DXP software.

After all the drawing finished, the drawing was used as a reference for the next process, which it is fabrication stage. This process is consists fabricate all the parts that have design before by following all the dimension using various type of manufacturing process. The manufacturing process included in this process is welding by using MIG, cutting by using disc cutter, drilling and others. Also use the electrical process like a solder and make a circuit electrical part.

Then, all the process mentioned above is done; all the material for report writing is gathered. The report writing process will be guided by the UMP final year project report writing. This process also, preparation for presentation slides for the final presentation for this project.

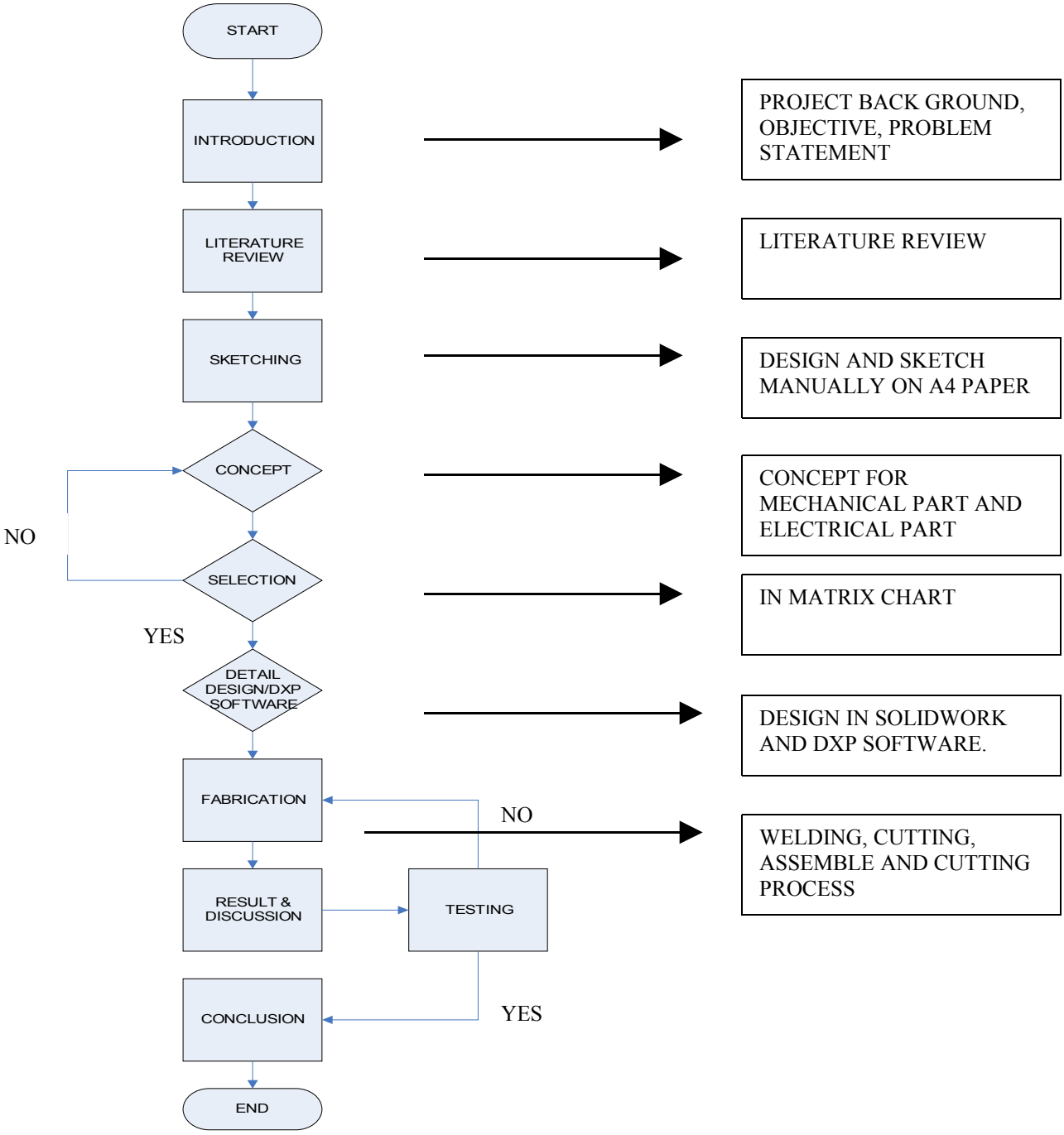


Figure 3.1: Flow chart

3.2 Design an electrical part

Development of semi-automatic solar gate system for controller part is important. It because the electrical system most important to move a gate. The circuit for controller part must be sketching and designing carefully. The design consideration must be done carefully so the design can be fabricated and functioning. The aspects that must be considered in controller part are:

a) Strength: it is important criteria in design the controller part because this system (motor) uses about 12-24 volts. Also need 1.50-2.00 ampere of current.
b) Material: availability of material is one of the aspects that have been considered. The material available can be use depend on their purpose.
c) Cost: cost to make a controller part must be reasonable.

3.2.1 The categories for electrical part are:

a) Sketching: Sketching the electrical circuit in paper and modify it.

b) DXP software practice: After sketch the circuit and the circuit can run. The circuit will be design in DXP software.

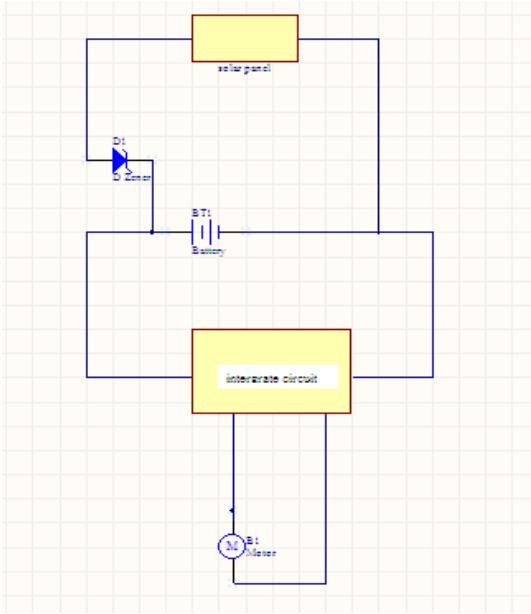


Figure 3.2: Diagram of whole electrical part

This diagram show the solar panel is the charger to the batteries. It always recharges the batteries in daylight only. The electric current will flow to the integrate circuit. In integrate circuit, the push button switch are the important thing to control the rotation of motor.

3.2.2 Sketching of integrates circuit

From the ideal that given from supervisor, the motor need to rotate in clockwise and counter clockwise when it control from push button switch.

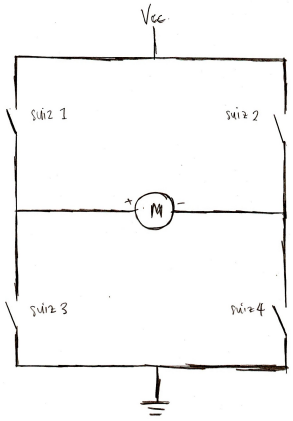


Figure 3.3: Concept A

3.2.2.1 Concept A

The design of electrical circuit in **figure 3.3** needs four push button switches. The circuit only can flow in 24 volts to below. The motor can rotate but not to smooth because of the voltage flow. Cost to make this circuit is expensive and difficult to user to push two buttons simultaneously to open and close the gate.

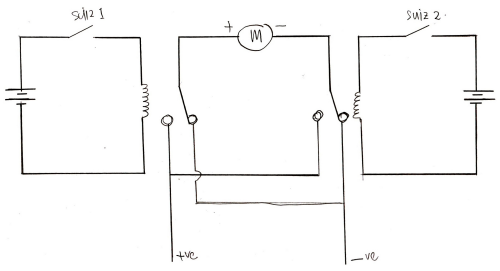


Figure 3.4: Concept B

3.2.2.2 Concept B

The design of electrical circuit in **figure 3.4** need only two push button switch. One of the push button is to open the gate and other one to close the gate. This circuit can flow about 12 volts and above and can flow the high ampere of current to rotate the motor. It is because used two relay to rotate the motor clockwise and other one. Just need to push one push button in one time to open and close.

3.2.3 Concept generation and evaluation

Two concepts for the electrical circuit are developed. These are evaluated again the datum of the standard electrical circuit.

a) Concept A: need four push buttons cannot ease to use, not easy to handling and need just small amount current can flow.
b) Concept B: need two push button, ease to use and ease to handling. Can flow high amount of current flow to rotate the gear of motor.

3.2.4 Finalize design of electrical circuit

After the selected design electrical circuit was chosen, now the selected design or concept sketched is transfer to DXP propel software to generate the circuit functioning. Below show the actual design of the electrical circuit to controller part.

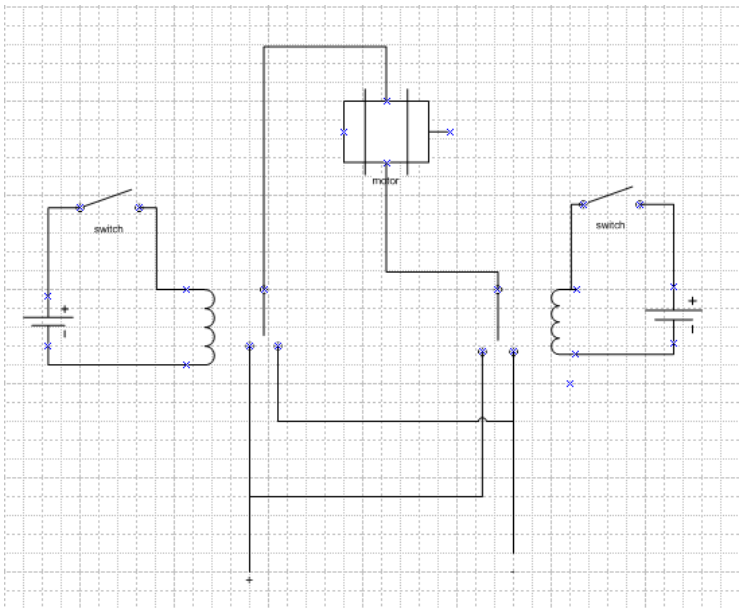


Figure 3.5: Electrical circuit

3.3 Material preparation

Material preparation as shown in figure is start after the design electrical circuit done. The materials that use to generate the electrical circuit are:

Figure 3.6: Relay

Figure 3.7: Diode zener

Figure 3.8: Push button switch

3.4 Fabrication process

The fabrication process is start with get the voltage of solar panel in daylight hours. It is important because the function of solar is to recharge the batteries in daylight hours.

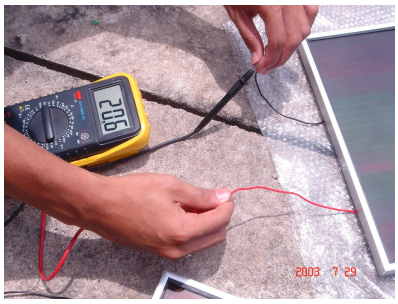


Figure 3.9: Check the voltage

The process is continued with soldering process of electrical part. This process use soldering iron and the solder to joint the relay with the wire using solder.

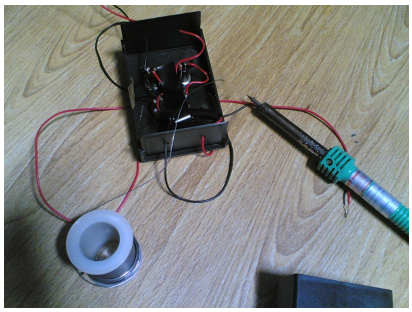


Figure 3.10: Soldering

The process continued with drill the casing of controller part. To drill, use table drilling machine to drill. Drill about two holes to locate the push button switch above the controller casing.

Figure 3.11: Drilling process

After the drilling process, the last process is combining all of electrical part to attach with the motor. The black wire (negative) will attach at ground motor, the red wire (positive) also attach with positive motor.

Figure 3.12: Controller box

3.5 Design the mechanical part

The design to make a place to put a controller part must be compliance to several aspects. The design consideration must be carefully because the design can be fabricated and the mechanical part must be functioning.

a) Durability: The solar panel frame must be durable so the frame can stand when solar panel are attach with frame.
b) Cost: The cost of whole project must be reasonable. Many of materials for the project have been provided by UMP Mechanical Lab.
c) Material: Material that will be used must be suit for making solar panel frame and motor controller post.
d) Shape of design: the design should be able the user to use ease.
e) Strength: the motor controller post must be strongly built to hold out a motor controller. It because a torque of motor rotation are strong.

3.5.1 Drawing

The drawings are divided in two phases, which are:

a) Sketching: all the ideas for mechanical part for controller part are sketched on the paper first, ideas selection can be made from these sketched ideas.
b) Solid Works application: the selected design or concept is then transfer to 3D modelling and drawing using this computer aided design application.

3.5.2 Sketching and drawing selection of solar panel frame

From the existing ideas, only two sketching that had been chosen to be consideration as the final ideas for solar panel frame, which are:

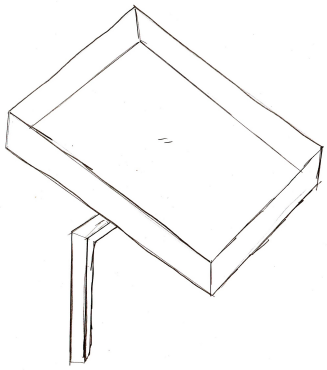


Figure 3.13: Concept A

3.5.2.1 Concept A

The design in **figure 3.13** just has one leg only. But the solar panel frame can put out from its leg. The user can attach solar panel frame anywhere such as ground or gate.

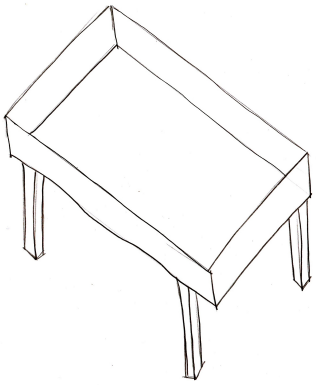


Figure 3.14: Concept B

3.5.2.2 Concept B

The design in **figure 3.14** has four leg and all the leg are attach with solar panel frame. So, the frame can't pull out from its leg. The user only can attach the solar panel frame on the ground. Also need big space to locate it.

3.5.2.3 Finalize design

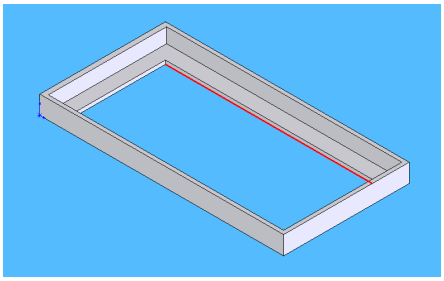


Figure 3.15: Finalize design

3.5.3 Sketching and drawing of motor controller post

With all of the ideas, only two sketching that had been chosen to consider as a final ideas for motor controller post, which are:

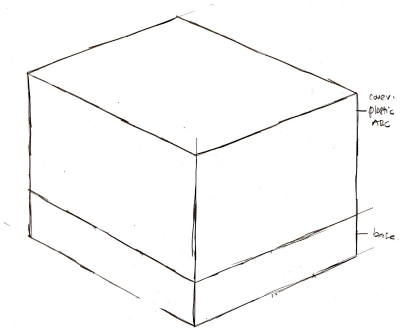


Figure 3.16: Concept A

3.5.3.1 Concept A

The design in **figure 3.16** just only has a stronger base. It can support a motor to rotate with high torque. The cover made from plastic ABS, but to make a cover need more financial and high skill to use moulding machine. It's light-weight than concept b.

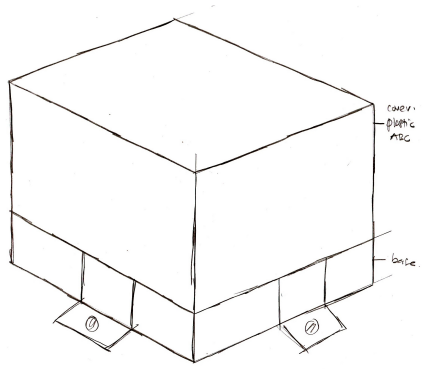


Figure 3.17: Concept B

3.5.3.2 Concept B

The design in **figure 3.17** has stronger base. It also can support the high torque and speed of rotation of motor controller. It looks like a box and the cover made from wire. The cost to make is cheaper than concept a. It needs intermediate welding skill, but it heavy.

3.5.3.3 Finalize design

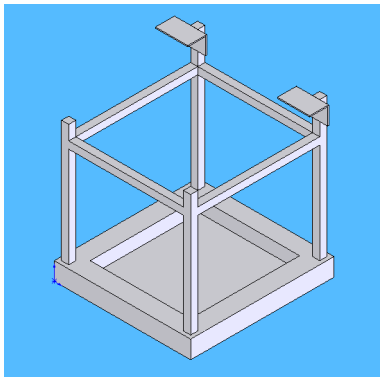


Figure 3.18: Finalize design

After several design consideration conducted, new design as the finalize design have been drawing with Solid Work software. The design can hold the rotation of motor, it because the motor have a high torque to rotate.

3.6 The design engineering drawing

After a design has been approved, the next step in the designing process is dimensioning. The dimensioning process is sketched on paper.

After dimensioning, design the engineering drawing using Solid Work software (refer **figure 3.19**) application at this stage solid modelling method is used. The design modelling created according to the dimension done before, after design create, it will converted into orthographic view.

3.7 Finalize design in Solid Work

After the selected design was chosen, now the selected design or concept sketched is transfer to solid modelling and engineering drawing using Solid Work software. Below show the actual attached of the motor controller post and solar panel frame.

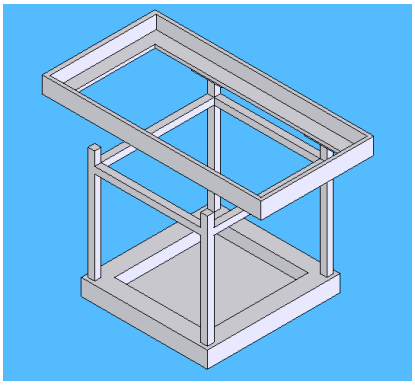


Figure 3.19: Finalize design in Solid Works

3.8 Material preparation

Material preparation as shown in figure is start after design process done. In this process, material was chosen according to the suitable material at mechanical laboratory. The materials that use to fabricate the solar panel frame and motor controller post are:

Figure 3.20: Material preparation

Solar panel frame

a) L-shape metal
    1. 25mmx25mm

Motor controller post

a) Hollow rectangle metal
    1. 20mmx20mm
    2. 10mmx10mm

b) Flat metal
    1. 125mmx135mmx10mm

3.9 Fabrication processes

The fabricate process is start with cut the L-shape and the hollow rectangle metal with using Floor Cutter Disc machine]. Before cut with machine, the work piece need to measure to the dimension that we need.

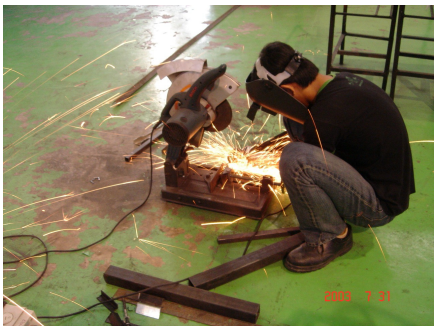


Figure 3.21: Floor Cutter Disc machine

Figure 3.22 below showing the product with the desired shape after cut with Floor Cutter Disc machine process is done.

Figure 3.22: Product after cut

After the cutting process is done, fabrication continues with welding process as shown in **figure 3.23**. The welding process will use MIG welding. This welding is only for the soft metal. This process is needed to join together the metal .

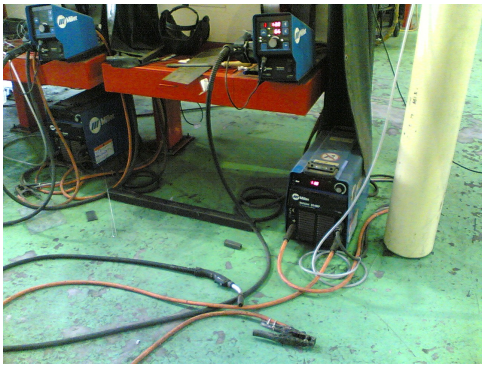


Figure 3.23: Welding process

After finishing the welding process, the next process is to grind to dispose the melted welding part at the joint of the work piece. This is the process that makes the work piece look clean and smooth.

Figure 3.24: Grinding process

The last process is painting the whole project. Product will look more attractive and can protect it from rust.

Figure 3.25: Painting process

CHAPTER 4

RESULT AND DISCUSSION

4.1 INTRODUCTION

This chapter is aim the analysis of the project. It included the completed fabrication, type of defeated, product specification and cause of the problem of the project. The analysis will help to improve the controller part of solar gate system. It will discuss about the product defect and how to troubleshoot the defeat. At the same time, this analysis also compare the target achieve by the product.

4.2 Result

After complete the fabrication process, the product had gone through the analysis process. At this stage, all information about the product is gathered. It is important to classify the product before it enters to the market. The complete fabrication of controller part with mechanical part is shown below in figure.

4.2.1 Electrical controller part

Figure 4.1: Controller part

4.2.1.1 Product specification

This is example of electrical analysis process. The product is classified to several categories, such as:

Category	result
Wide	60mm
Length	100mm
Red push button	Motor rotate in counter clockwise
Green push button	Motor rotate in clockwise
Red wire	Positive batteries and V cc motor
Black wire	Negative batteries and motor ground wire

Table 4.1: Product specification electrical part

4.2.2 Mechanical controller part

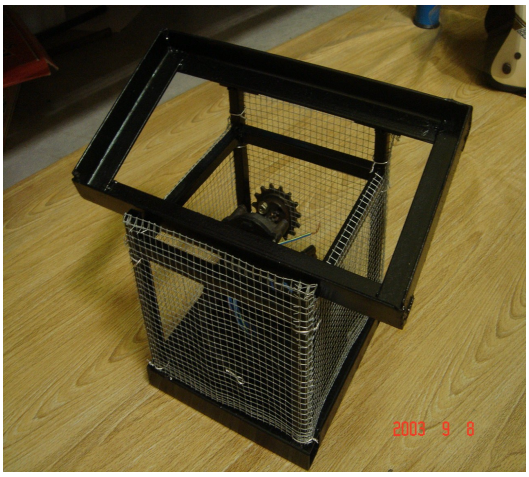


Figure 4.2: Mechanical part

4.2.2.1 Product specification

This is another example of analysis process. The product is classified to several categories such as:

category	result
Weight	4.8kg
Colour	Flat black
Wide	200mm
Length	190mm
Height	260mm

Table 4.2: Product specification of mechanical part

4.2.3 The whole product view

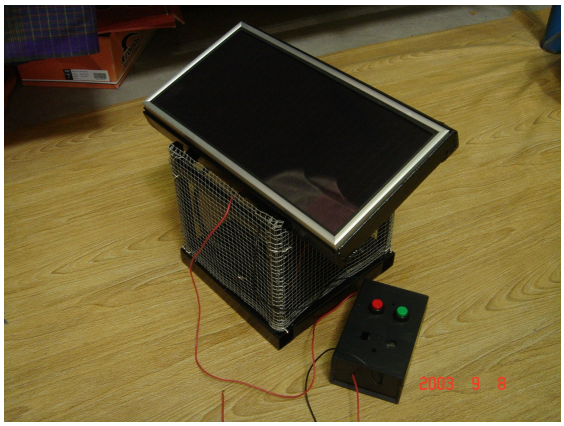


Figure 4.3: Isometric view

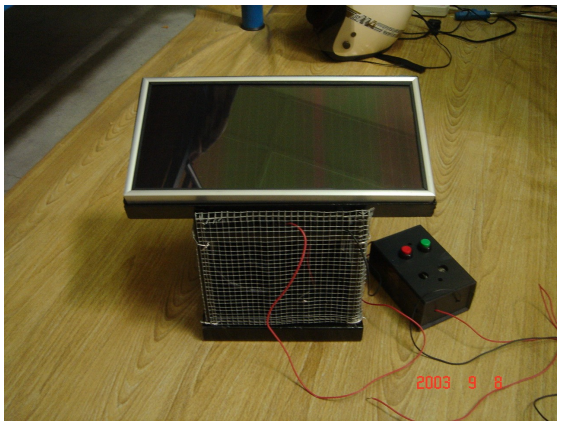


Figure 4.4: Front view

Figure 4.5: Back view

4.3 Type of defeats

After finish fabricating process, many type of defeated is created. It happens from fabrication process and the weakness using several machine and tool. At the same time, this event can give someone more experience and knowledge. The type of defeated is show in **figure 4.6** until **figure 4.8**.

4.3.1 Dimensioning

Figure 4.6 show a defeat of the solar panel frame cannot fix with solar panel. It fix because the dimensioning of the work piece before cutting with Floor Cutter Disc machine.

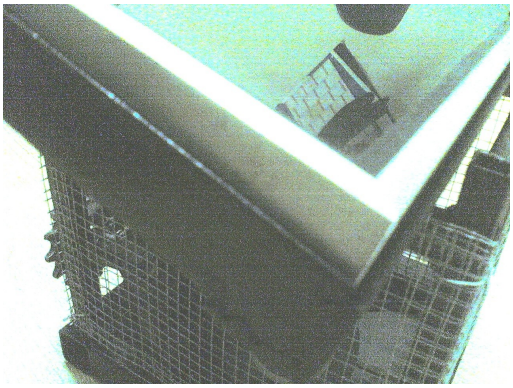


Figure 4.6: Not fix with solar panel frame

4.3.2 Bead

Figure 4.7 is example a defeated cause by welding process. The bead is not smooth. This problem occurs when the voltage and the wire speed while doing welding process is not match.

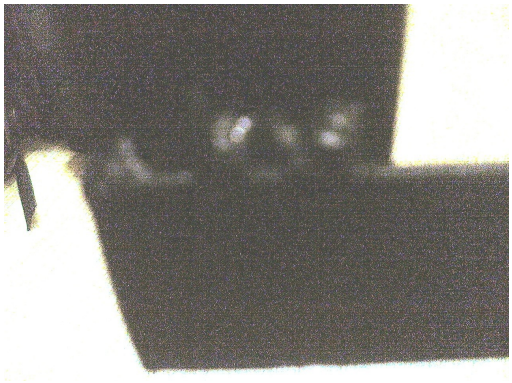


Figure 4.7: Bead at the welding part

4.3.3 Measuring mistake

Figure 4.8 is example of a mistake that done after drilling process. The controller part has unused holes. It because of the understanding in chose the right electrical circuit.

Figure 4.8: Unused holes

4.4 Discussion

Defeat from the fabrication process is because by numbers of problem. The dimensioning problem is mainly because of the measure with measuring tape.

Beads are cause by welding process. Some of the part is not suitable for welding process because of thickness and other problem. Therefore, part will slightly be damaged.

The electrical circuit must be done before drilling the hole to the controller part. It’s important to make the project look tidy.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter is mainly about the problem encountered during the whole project was been carried out. In this chapter also will discuss about the conclusion of the project, including all the process that involve.

5.2 Project Problem

a) Material preparation: Some materials are not having in mechanical lab. It may cause the fabrication to this project are undone. To have the material, it needs to buy at the city. University should prepare the materials or either provides the place here the material can be obtained from.

b) Designing and sketching: Supervisor just gives the title of the project. Because of it, the idea just from the student directly. That no other references that can be referred. All of the drawing and anything else need to generate by student itself.

c) Fabrication process: students need to be given more time to finish fabricating their product because of slackness of training. Student should give more attention in the class.

d) Skill: the student need more skill in electrical, not just for mechanical only. They need to know how to soldering and how to make a combination electrical and mechanical in one project.

5.3 Recommendation

Precise planning of the work progress will make sure that the project can be done in the shorter time. Having a good time management can guaranty that any of student tasks to complete in a good way and in good time. Also give more time to focus on other subject. Below is a several recommendation that our student like to express oneself for final year project.

a) The planning of the project must be done before the project started.
b) More time given to complete this project.
c) The task that given to all of student must be explaining more detail about the title that given.
d) The involvement of the student must be observed more efficient.
e) Each project must have the expertise guidance.

5.4 Suggestion for Future Work

5.4.1 Material

Many type of gear can be used in fabricate with motor controller. It needs a wide gear to rotate with smooth and clearance. Gear thread steel bar needed a wide gear to move it. It's because we used a high torque of motor.

5.4.2 Shape

The motor controller post should no be static with one shape only. It need more shape to look safety to children. It because the motor controller post are on the ground. It need more safety and can protect the motor from water.

5.4.3 Function

The controller for semi-automatic solar gate system will look more interesting when it can run smooth without a problem. It needs more function such as can open without to push the button. Also can open and close the gate easily.

5.5 Future work

For the conclusion, overall perception of the project carried out was good. Due to some problem, this electrical part was burned twice. With help from friends from faculty of electrical and supervisor, this project is finish and functional.

5.6 Conclusion

For this conclusion, the project achieves several objectives but several objectives are not achieved due to several problem. This project can be use by the student to gain knowledge and understanding of mechanical process of machining such as bending, drilling and other. Also gain the knowledge about electrical process such as soldering and other.

REFERENCE

[1] http://www.solargate.com.au/htm dated on July 13th, 2008.

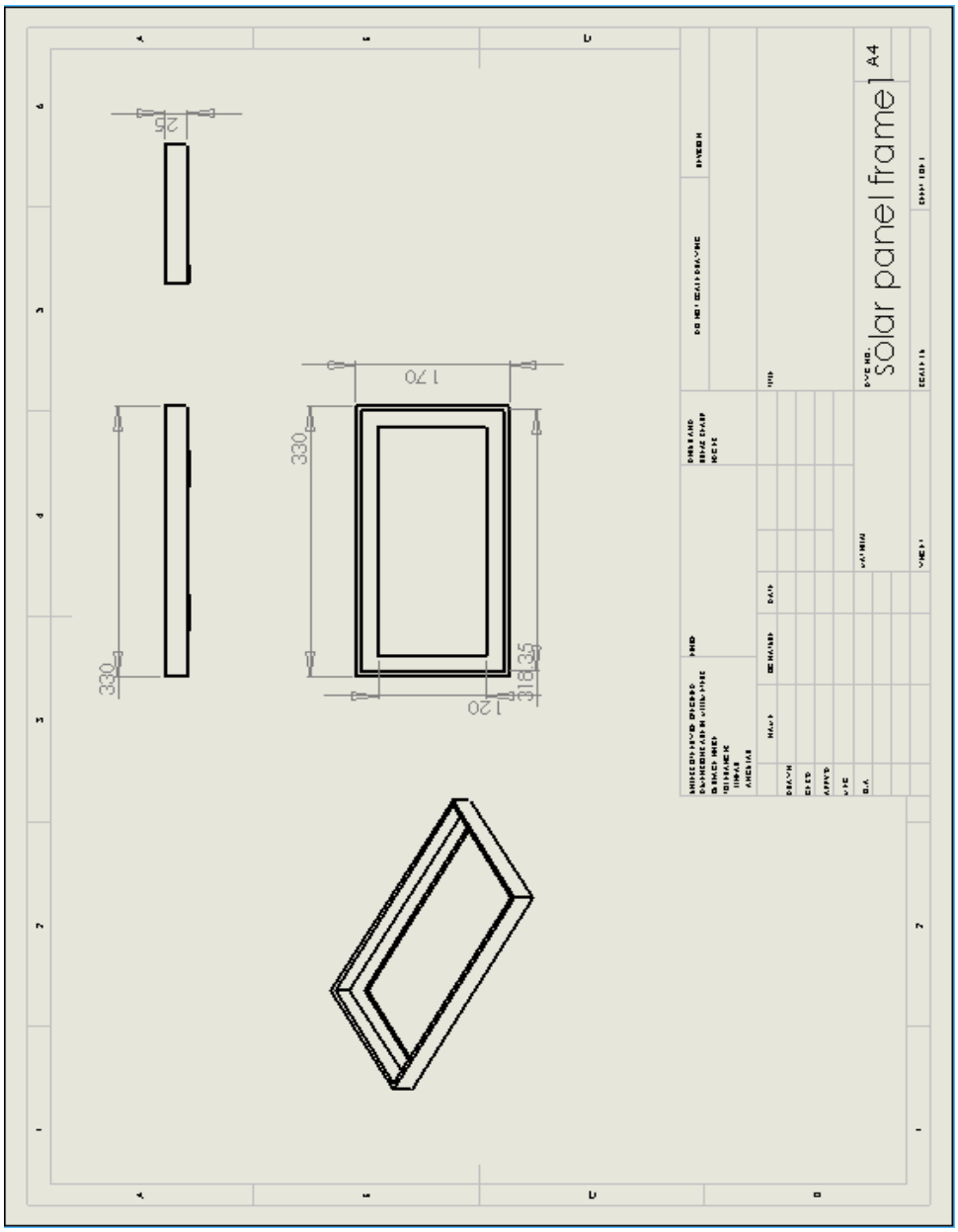
[2] http://library.thinkquest.org dated on July 28th, 2008

[3] http://en.wikipedia.org/wiki/Welding dated on August 26th 2008

[4] Mohd Tarmizi Bin Abd Aziz, (2007), "Development of Automatic Gate Opener System", Universiti Malaysia Pahang

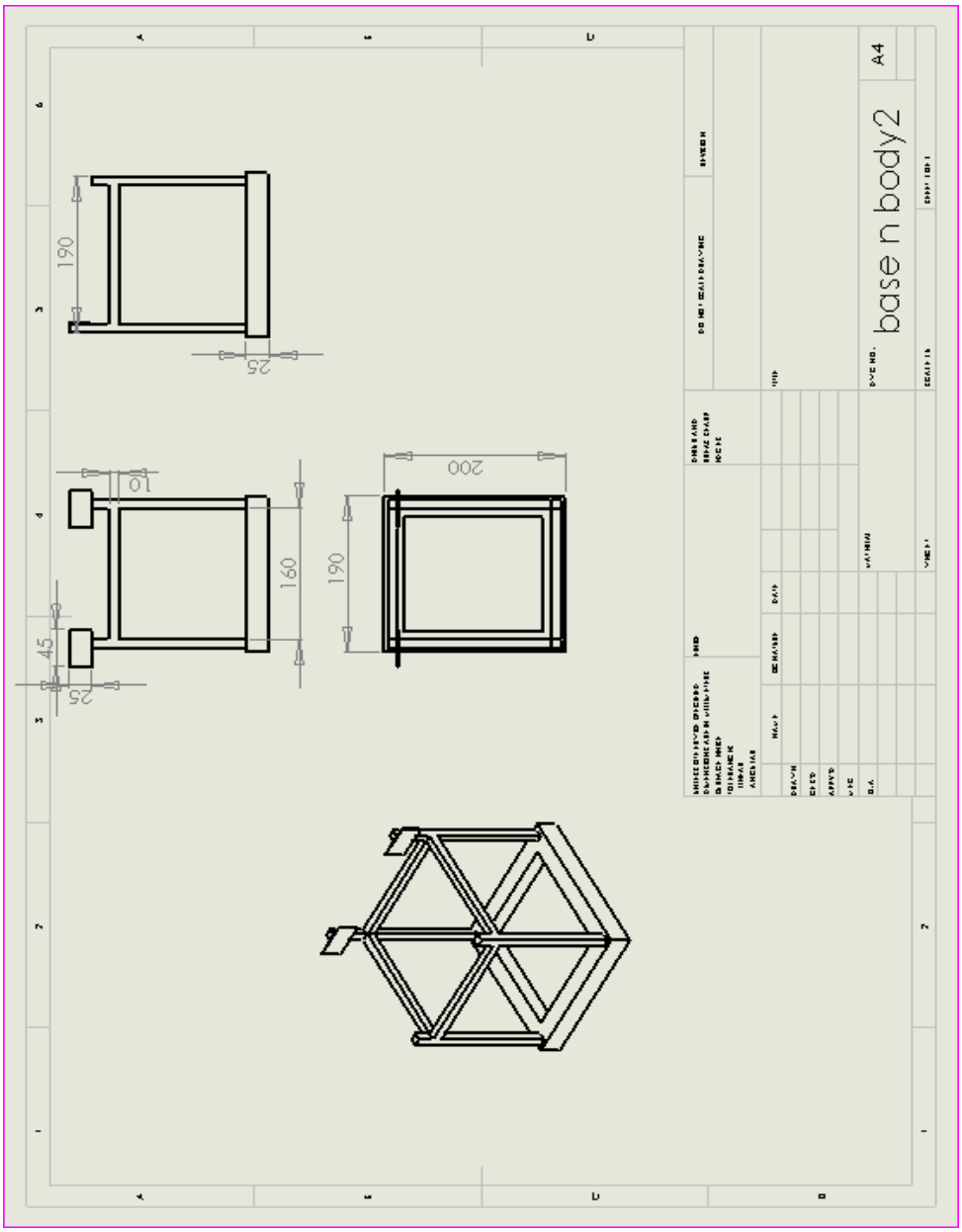
APPENDIX A

Solid Work 2D Drawing (solar panel frame)



APPENDIX B

Solid Work 2D drawing (motor controller post



APPENDIX C

Solid Work 2D Drawing (assembly of mechanical part)