POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

GAS STOVE TIMER

NAMA	NO. PENDAFTARAN
ZAKARIA BIN AHMAD KHADZARI	08DKM18F1126
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JABATAN KEJURUTERAAN MEKANIKAL

JUN 2020

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Laporan ini dikemukakan kepada Jabatan Kejuruteraan Mekanikal sebagai memenuhi sebahagian syarat penganugerahan Diploma Kejuruteraan Mekanikal

JABATAN KEJURUTERAAN MEKANIKAL

JUN 2020

AKUAN KEASLIAN DAN HAK MILIK

TAJUK : GAS STOVE TIMER

SESI : JUNE 2020

1. Kami, **1. ZAKARIA BIN AHMAD KHADZARI (08DKM18F1126)**
2. FAREEN FARHANNA BINTI ABDUL MANAN (08DKM18F1139)
3. MUHAMMAD IRFAN THORIQ BIN SUFFIAN (08DKM18F1140)

Adalah pelajar tahun akhir **Diploma Kejuruteraan Mekanikal, Jabatan Kejuruteraan Mekanikal, Politeknik Sultan Salahuddin Abdul Aziz Shah**, yang beralamat di **Persiaran Usahawan, 40150, Shah Alam, Selangor**. (selepas ini dirujuk sebagai 'Politeknik tersebut').

2. Kami mengakui bahawa "Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasil karya/reka cipta asli kami tanpa mengambil atau meniru mana-mana harga intelek daripada pihak-pihak lain.

3. Kami bersetuju melepaskan pemilikan harta intelek 'projek tersebut' kepada 'Politeknik tersebut' bagi memenuhi keperluan untuk peanugerahan **Diploma Kejuruteraan Mekanikal** kepada kami.

Diperbuat dan dengan sebenar-benarnya diakui

Oleh yang tersebut;

a) ZAKARIA BIN AHMAD KHADZARI	)	…….
(No. Kad Pengenalan: 980510-14-5653)	)	ZAKARIA
b) FAREEN FARHANNA BINTI ABDUL MANAN	)	…….
(No. Kad Pengenalan: 001124-14-0342)	)	FAREEN FARHANNA
c) MUHAMMAD IRFAN THORIQ BIN SUFFIAN	)	…….
(No. Kad Pengenalan: 000523-10-0327)	)	MUHAMMAD IRFAN
Di hadapan saya, ZULKHAIRI BIN KHAIRUDIN (741128-05-5659)	)	…….
sebagai penyelia projek pada tarikh: 13/8/2020	)	ZULKHAIRI BIN KHAIRUDIN

DEDICATION

To our father and mother, thank you so much for the support and encouragement of both of your for the good of your children. Many thanks to our dear brothers and sisters who helped so much without knowing how hard it is to see them succeed. Don't forget to also thank the thousands of guests and thank you to the visiting lecturer who have given us a lot of guidance and support in reviewing our project. In addition, we would like to thank the individuals, whether directly of indirectly involved in the project's success. Without all of you, the success of this project report would not have been possible in the best possible way.

To all the partners involved in the project, the time of the unexpected challenges and the sweet experience of the final project was very meaningful and very valuable. This will also enable us to move forward, which will serve as a bridge to life as a student this semester. Thankfully, we are grateful to be blessed with the gift of the one and only God, the Creator of the universe.

APPECIATION

I would like to express my gratitude and appreciation to all those who gave me the possibility to complete this report.

This study is wholeheartedly dedicated to our beloved parents, who have been our source of inspiration and gave us strength when we thought of giving up, who continually provide their moral, spiritual, emotional and financial support.

A special thanks to our supervisor, Mr. Zulkhairi bin Khairudin whose help, stimulating suggestions and encouragement, helped me to prepare our project especially in writing this report. As an experienced person, she also acts as a supervisor who has given a lot of guidance and criticism in every job he does as working in this field requires high efficiency and skill to facilitate the work process.

Thanks to "Zull Design Autotronic" for giving us the opportunity to do the project there, and thank you to the supervisors there for helping us and guide to built the "Gas Stove Timer" project. To the supervisor who named Muhammad Asif b Noorazmy are taught us over 3 weeks and worked hard to set up the ‘Gas Stove Timer until it would work. Even a lot of obstacles and problems encountered, a supervisor who named Muhammad Asif b Noorazmy successfully guided it. Thank you again to all "Zull Design Autotronic" supervisor who are able to provide us with the tips and ideas until late afternoon.

To our family, relatives, mentor, friends, and classmates who shared their words of advice and encouragement to finish this study. Special thanks to my teammates who have helped to finished this project and report.

And lastly, we dedicated this report to the Almighty God, thank you for the guidance, strength, power of mind, protection and skills and for giving us a healthy life.

All of these, we offer to you.

ABSTRACT

The scope of this study is focusing on designing and developing the safety system on gas regulator which improvised by adding the fuctions adjustable timer from 30 minutes to the minimum limit time. Selecting a perfect design can be a difficult task which is required to consider every aspect including material,finish,safety and budget. Gas Stove Timer was designed to develop gas regulator with safety system for users without having minor careless mistake during heating the food.

Designing more safety design making it easier for users in terms of protect and provide the aspects of the process of timing and safety work, especially to the person who are always careless. In addition, Gas Stove Timer aims the user who have a trouble of remembering something that they already done in short term, such as amnesia person.

The Gas Stove Timer is enhanced by adding the Safety Valve concept on the connection valve of the regulator that aims to cut the system if there is any tendency for the regulating apparatus to vibrate in an unstable manner during operation. The objectives of this study is to design a adjustable timer which place on gas regulator. The innovation resulted a regulator with the ability of safety work through the timer which is notify the user when the time of heating or cooking is done.

CONTENT

CHAPTER 1

INTRODUCTION

5.1 INTRODUCTION

In the 21st century, a modern age, modern-in-year technology that can provide a pleasure of humans. This modern technology can also speed up the country's economic market so much rapidly and competitive with world countries. Not only that, this modern technology can also save the time for someone and reduce risk in humans. Therefore, we plan to make a project that are combination of gas regulator and timer we use that concept. This name of this project is Gas Stove Timer.

The Gas Stove Timer is a design of timer which placed on the gas regulator and to fabricate regulator that can be adjusted in timer by setting the timer manually or using gadget.Besides that,Gas Stove Timer suitable for who have difficulties on remembering something they done or careless.Normally everyone have this problem.Not only that,Gas Stove Timer also design with more safety aspects to reduce the risk which caused by the overheat during heating and cooking.

1.1 PROBLEM STATEMENT

The project is based on research done through observation,and research on the problems that exist in our environment. It needs to be added to ensure the smooth running of our projects and objectives and is in a 'tip-top' state

One of the problem that exists in our environment is difficulties to remember.People who have difficulty remembering after doing something especially during heating and cooking food.It can cause the food untasty and can lead to accident . This problem is often seen when we make survey in places such as home.

On top of that, the problem is taking a lot of safety aspects.It especially the people with difficulty on remembering are called Alzheimer or Amnesia.They have problems such as forget to turn off the gas stove after cooking and forget the food on the stove during heating.

1.2 OBJECTIVES

The objective of the ‘Gas Stove Timer’ project that we will achieve is to design a timer which placed on gas regulator and an initiative that will allow the wireless notification when the time is done.

In addition, these ‘Gas Stove Timer’ are also designed to prevent accident of users which can caused to death.It also makes the user enjoyable without having to spend a lot of energy go to see the heating or cooking is done.

Finally, the timer design is more safety to make the user safe. Not only for that, this safety design provides aspects such as cutting the gas flow after the time is done and give alarm/notifications to the user whan the time is done.This will make it easier and safe for users to launch their work.

1.3 SCOPE AND LIMITATION

This gas stove timer is designed or designed to make it easier for all users to use. This gas stove timer also have the same scope and limitations as other items. The type of gas can be used is Liquefied Petroleum Gas (LPG) with pressure 60 psi.The Gas Stove Timer is an adapter between gas tank and stove.It must use plug to switch on the adapter.The use of Gas Stove Timer is appropriate for users who have minor careless attitude at home.

1.4 ADVANTAGES AND DISADVANTAGES GAS STOVE TIMER

There are many advantages of Gas Stove Timer that we can take advantage of. One of there is that the timer used can be set with rotating it.It can save time of user because they can do other job while heating or cooking.

In addition, this Gas Stove Timer can also give reminder or alarm to the user.This happen when the time is done, the system on the solenoid valve will send reminder to user gadget either through email or message.

Lastly, this timer act as adapter between the gas tank and stove.So it can save the space in the kitchen.

Where there are advantages, there will be disadvantages. Every product produced must have an inevitable drawback.This ‘gas stove timer’ is not protable because need to use high voltage of power source. So it must use plug to start.

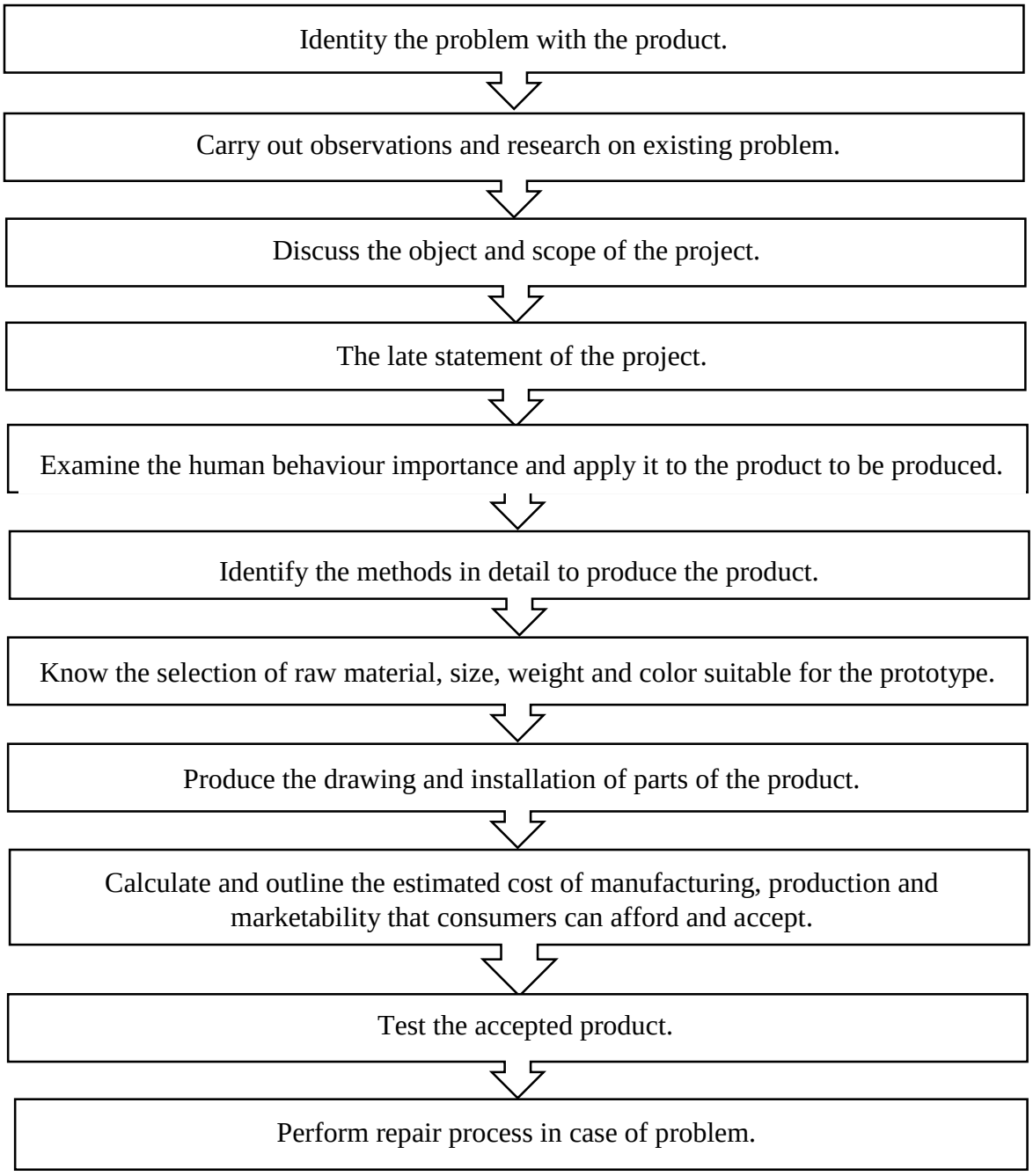
1.5 CONCEPT GAS STOVE TIMER

We use the concepts in this project is oven. A powerful oven operate by cook time is set when you start the oven and counts down the cooking time; it will turn the oven off when the cooking time is complete.

By using existing concepts, we make improvements to the timer system. The function of the Arduino is to send reminders through the gadget while the adjustable rod serves to adjust the required height. Designing a secure system can prevent users from any danger such as fire.

1.6 SUMMARY OF IMPLEMENTATION

Project Planning Chart



CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

This Gas Stove Timer project is the result of an innovation from a common gas regulator or better known as a ‘Kepala Gas’ that is marketable and affordable price. We renovated this ‘Kepala Gas’ by incorporating a specially designed steel structure to combine with the gas regulator.

We create this project with design an adapter with safety aspects and to fabricate regulator that can be adjusted in timer. In fact, it aims to make it easier for users of all ages during heating and cooking. The fuction of Gas Stove Timer are designed to reduce risk in users. The timer can be setting in two method which is manually (press the number on the plate) or setting in the gadget (using application). With this it can save time of waiting for the food.

The Gas Stove Timer is enhanced by adding the Safety Valve concept on the connection valve of the regulator that aims to detect the system if there is any tendency for the regulating apparatus to vibrate in an unstable manner during operation such as gas leakage and fire. Designing a more safe design making it easier for users in terms of safe and provide aspects of the process of heating and cooking food,especially at home.And it also can make the food tasty.

2.1 HISTORY OF GAS REGULATOR

Win Gas Regulator W88M

Winn Gas Regulator type W88M is a mini-shaped regulator suitable for gas cylinders of 3 kg and 5 kg sizes. This product has also been certified with SNI, KAN, and ISO 9001: 2008 WQA standards so it is guaranteed to be very safe to use. It has specifications that make gas pressure and flow stable, making daily use of gas more economical.

Figure 1

1. Regulator Gas Starcam SC-23M

Starcam SC-23M brand gas regulator has a clamping system with two safety systems to prevent gas leakage. Compatible for 3 kg and 12 kg LPG gas cylinders, making it suitable for household use. How to use it is quite easy, slide to the side of the plate then enter the valve spindle to the gas cylinder and lock the hole until it feels no gas is flowing out.

Figure 2

Quantam Gas Regulator QRL032

If you buy the Quantum QRL032 regulator package, you will get all the accessories that you need at once. For example, such as a manometer or air pressure gauges on gases and hoses. To prevent leakage, the hose is equipped with a cover made of metal. For the locking system, simply by turning the side of the regulator.

Figure 3

2. Destec Com 201-MSS

The Destec Com 201-MSS regulator is specifically designed for low gas pressure situations that have proven to be safe and leak-proof with a screw system. Equipped with double safety rubber that can prevent leakage if the rubber seal on the gas cylinder is damaged. The addition of a pressure gauge helps you to find out the gas pressure in the tube.

Figure 4

3. Regulator Gas Kopana Pertamina

For a guaranteed security system, you need Pertamina's Kopana Gas Regulator which is equipped with an automatic safety lock system. So if there is a leak in the hose, the regulator will automatically turn off the gas flow to prevent things that are not desirable. This product is compatible with home gas cylinders that are often used such as 3 kg and 12 kg with the addition of a manometer.

Figure 5

4. Regulator Miyako RMS-106M

The Miyako RMS-106M regulator comes with a flexible hose that is safe and leak-proof even if it is rotated or wound around like anything. With a clamping system on each connection, making this product easy to install. Made from high quality materials so the regulator and hose are relatively durable. Also equipped with a gas volume marker indicator and automatic flow breaker in the event of a leak.

Figure 6

5. Starcam SC-TT202M Supreme Regulator Gas

Starcam SC-TT202M Supreme is a gas regulator intended for high-pressure cylinders with optional meters to maintain safety. Equipped with a manometer that shows the capacity of the gas cylinder and flat rubber seal as a double safety in connection with the tube. This regulator maintains a constant intake of gas so that the flame is always stable

Figure 7

8. Regulator Gas Katsura VKLC-2

The Katsura VKLC-2 Gas Regulator is a low-pressure tube regulator that has high performance with the use of technology from Japan. This product is very safe with a safety rubber diaphragm that is directly connected to the rubber on the gas cylinder valve. Another excellent feature is keeping the pressure out which will remain stable even though the gas in the cylinder is only a little.

Figure 8

2.2 SOLENOID VALVE

A Solenoid valves differ in the characteristics of the electric current they use, the strength of the magnetic field they generate, the mechanism they use to regulate the fluid, and the type and characteristics of fluid they control. The mechanism varies from linear action, plunger-type actuators to pivoted-armature actuators and rocker actuators. The valve can use a two-port design to regulate a flow or use a three or more port design to switch flows between ports. Multiple solenoid valves can be placed together on a manifold.

Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used, low control power and compact design.

2.3 HOW DOES SOLENOID VALVE WORK

Solenoid valve works is by controlling the flow of liquids or gases in a positive, fully-closed or fully-open mode. They are often used to replace manual valves or for remote control. Solenoid valve function involves either opening or closing an orifice in a valve body, which either allows or prevents flow through the valve. A plunger opens or closes the orifice by raising or lowering within a sleeve tube by energising the coil.

Solenoid valves consist of a coil, plunger and sleeve assembly. In normally closed valves, a plunger return spring holds the plunger against the orifice and prevents flow. Once the solenoid coil is energised, the resultant magnetic field raises the plunger, enabling flow. When the solenoid coil is energised in a normally open valve, the plunger seals off the orifice, which in turn prevents flow.

2.4 SENSOR

A sensor is a device that detects and responds to some type of input from the physical environment.The output is generally a signal that is converted to human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.

2.5TYPE OF SENSOR

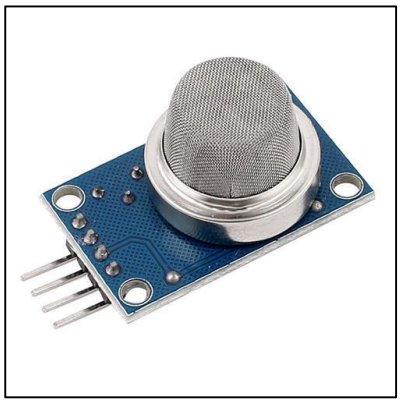


Figure 9

The MQ-2 smoke sensor is sensitive to smoke and the following flammable gas:

i. LPG
ii. Butane
iii. Propane
iv. Methane
v. Alcohol
vi. Hydrogen

2.6 HOW DOES SENSOR WORK

Sensors react to changing physical conditions by altering their electrical properties. Thus, most artificial sensors rely on electronic systems to capture, analyse and relay information about the environment. These electronic systems rely on the same principles as electrical circuits to work, so the ability to control the flow of electrical energy is very important.

Put simply, a sensor converts stimuli such as heat, light, sound and motion into electrical signals. These signals are passed through an interface that converts them into a binary code and passes this on to a computer to be processed.

2.7 ARDUINO

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

2.8 HOW DOES ARDUINO WORK

The Arduino board is connected to a computer via USB, where it connects with the Arduino development environment (IDE). The user writes the Arduino code in the IDE, then uploads it to the microcontroller which executes the code, interacting with inputs and outputs such as sensors, motors, and lights.

2.9 HOW TO AVOID STEEL RANGE

i. Covering iron or other metal with special iron paints sold in building materials stores.
ii. Make metal with the same or homogeneous mix when making or producing other iron or metal in the mill.
iii. On the surface of the oil is given oil or Vaseline
iv. Connect with active metals such as magnesium / Mg via wire so that rust is magnesium. This is mostly done to prevent iron or steel rods. Mg is planted not far from the electrical poles
v. Perform galvanizing process with iron metal coating with zinc or tin which is located to the left of the series of voltages.
vi. Perform electro-chemical processes by providing tin layers as is usually done on cans.

2.10 SAFETY

The safety rules are an aspect that should be emphasized and preferred during a job especially when in the workshop. According to R.J. Eilfler, the definition of security is a safe situation from or suffering from pain, discharge or loss. According to James D.W.B, the accident is defined as :

Unplanned incidents that may result in injuries to individuals, destruction to plants and reasons or both.

The workshop is one of the high-risk areas for a terrible accident. Realizing that, the responsible party should be compromised with anyone who violates the rules for their safety and therefore many rules to ensure safety has been issued and set by certain parties.

Security rules have been set in any indicators as well as the Occupational Health and Security Act 1994. It is a field aimed at protecting the health, safety and welfare of workers. Workplace safety is an important aspects of an organization. This Act is regulated by Department of Health and Security of the Employeeship Ministry of Human Resources. This Act was introduced following the incidence of Birht Sparkler's firecracles in the Sungai Buloh which took place in 1991. When the occurrence, tens of workers trapped and 26 people were killed in the incident.

The Occupational Health and Safety Act 1994 is based on 6 principles:

a) Accident prevention is an important part of good management and skills.
b) Management and employees must work together to ensure a safe workplace from any accident.
c) Top employer engagement is a priority in leading the implementation of workplace safety.
d) Workers' safety and health policies should be formulated and known to all workers in the workplace.
e) Necessary organizations and resources should be developed and provided to support occupational health and safety
f) The best available knowledge and methods.

2.11 EXAMPLE OF OCCUPATIONAL ENVIRONMENTAL

a. Hot
b. Dry
c. Pressure
d. Dusty
e. Noisy
f. Danger to hand

2.11.1 EXAMPLE OF WORK DISASTER

a. Overridden object
b. Fire
c. Slashed / stabbed sharp objects

2.11.2 EXAMPLE OF WORK ACCIDENT

a. Gas or smoke inhalation
b. Ion fire
c. Eyes get dust or dust
d. Overridden objects that fall
e. Step on sharp objects
f. Was hit by a dangerous band
g. Scratches / rash / itchy

2.11.3 GENERAL RULES

When doing work, workers should have a high degree of security and also practice 5S to ensure the safety and security of the place as it is safe and secure. Some of the general safety rules that employees must adhere to during workshops are :

a. Always wear safety clothing such as safety shoes workshops and eye protecting during workshops
b. Ensure workplaces are protected with first aid boxes to treat minor injuries
c. Do not wear loose clothing that can fit inside the moving parts of the machine.

d. Avoid moving the machine while the machine is in motion.
e. Never joking around while running a machine or playing in a workshop.
f. Make sure there is a fire extinguisher in the workshop as a precautionary measure.
g. Do not operate the machine while in a state of exhaustion or drowsiness.
h. Always place the appliance in its place so that no accident occurs.
i. Wipe the floor greasy or wet.
j. Always follow the machine operating procedure set.
k. Always use equipment that is in good condition an does not use damaged equipment.

2.11.4 STEPS PREVENT ACCIDENT

There are four main factors to avoid or prevent any accidents while working:

i. Work habits

ii. Personal safety

iii. Safety when using equipment and machines

iv. Workplace finish is a workshop

I. Work habits

Students are expected to have good morale and work habits while in the workshop to prevent accidents.

a. Prioritize hygiene and cleanliness of clothing.
b. Have a great attitude and responsibility.
c. Concerned about the welfare of classmates.
d. Focus on being careful and calm while working.
e. Not busy while doing any practical work.
f. Not careless.

II. Personal safety

Most accidents happen because of negligence and do not care about safety aspects. These accident factors can be prevent in a way :

a. Wear appropriate safety protection equipment at work place in the workshop
b. Wear practical activities. The safety clothing in the arc welding workshop is not the same as the safety clothing in the workshop.
c. Hair should be neat and short. the hair can be attached to a spinning machine or other device.
d. Do not joke around with a friend whether it involves workshop equipment or not
e. Avoid wearing jewelry such as watches, rings, chains or bracelets as they can be attached to machines and other tools.

III. Safety when using equipment and machines

The tidiness and cleanliness of the workplace not only prevent accidents but also improves work efficiency. Therefore, the following must be taken :

a. Do not allow the appliance to float on the floor.
b. Avoid oil or grease spilled on the floor. Wipe until there is no slippery effect on th floor.
c. Do not let the metal scroll or debris splatter on the floor and around the machine.
d. Workroom should have good air circulation. Have a safety line at work area and walking path.
e. Workshops should have access and emergency doors.
f. Fire prevention equipment should also be located in a convenient, easy to see and accessible area in the event of a fire.

2.11.5 STEPS TO TREAT LIGHT INJURY

While doing activities in the workshop or while doing work, sometimes injuries can occur. If the injury is serious we should act quickly by sending the victim to the hospital and reporting the incident to the appropriate party. However, if the injury is mild we can treat it ourselves. Treatment should be taken immediately so that the victim does not suffer from prolonged pain and ahs a more complicated effect.

2.11.6 ELECTRIC SHOCK

Electric shock is one of the most common accidents during workshops. .Accidents caused by these electrical crashes can not only lead to death but can be fatal. Therefore, knowledge of electrical equipment handling as well as knowledge to help people with electrical shock are important and should be learned by every worker.

The step to take in the event of electrical shock are :

a. Restore the respiratory of the victim of affected eco-firy immediately
b. Get the help immediately
c. Close the electric switch by turning off the main switch.
d. Wrap wounds on the victim if there is.

In order to prevent fires, workers must adhere to the rules. Among the step that can be taken are :

a. Make sure the wiring at work is perfect.
b. Make sure equipment and machines that use electrical power are always safe.
c. Make sure the flammable material is stored in a well ventilated area and away from the source of fire.
d. Make sure the fire extinguisher is in good condition. Fire extinguisher are also placed where they can be charged and easily accessible.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

As we know in every product or project's product or project , the main or scope of the worship and very important before the production of a product or project is a design. Design or known by the simple language of 'project painting' is a process where to plan and ensure that aspects of the material are used, arrangement, and structure of materials according to specifications in the production of a product.

Among its factors are based on the function, appearance material suitability. Durability, product costs, safety and commercial value. In production a design, a designer is very much needed in the construction of design based on the needs and needs of consumers according to current circulation.

Factor that affect a design :

a. Function

The designated establishment should work well and meet the needs of current users.

b. Shape

A design should have attractive, stable and practical concept and appearance when using.

c. The suitability of material

A design must use the materials are easily available and easily installed at the cost to pay.

d. Resistance

The durability of the design should be strong and stable. In addition, other aspects should be written like if a product is used outside must weather and attacks and not easily occurring damage to certain parts.

e. Product cost

A design is must be affordable with the cost of manufacturing and capable of purchased and owns by all consumers.

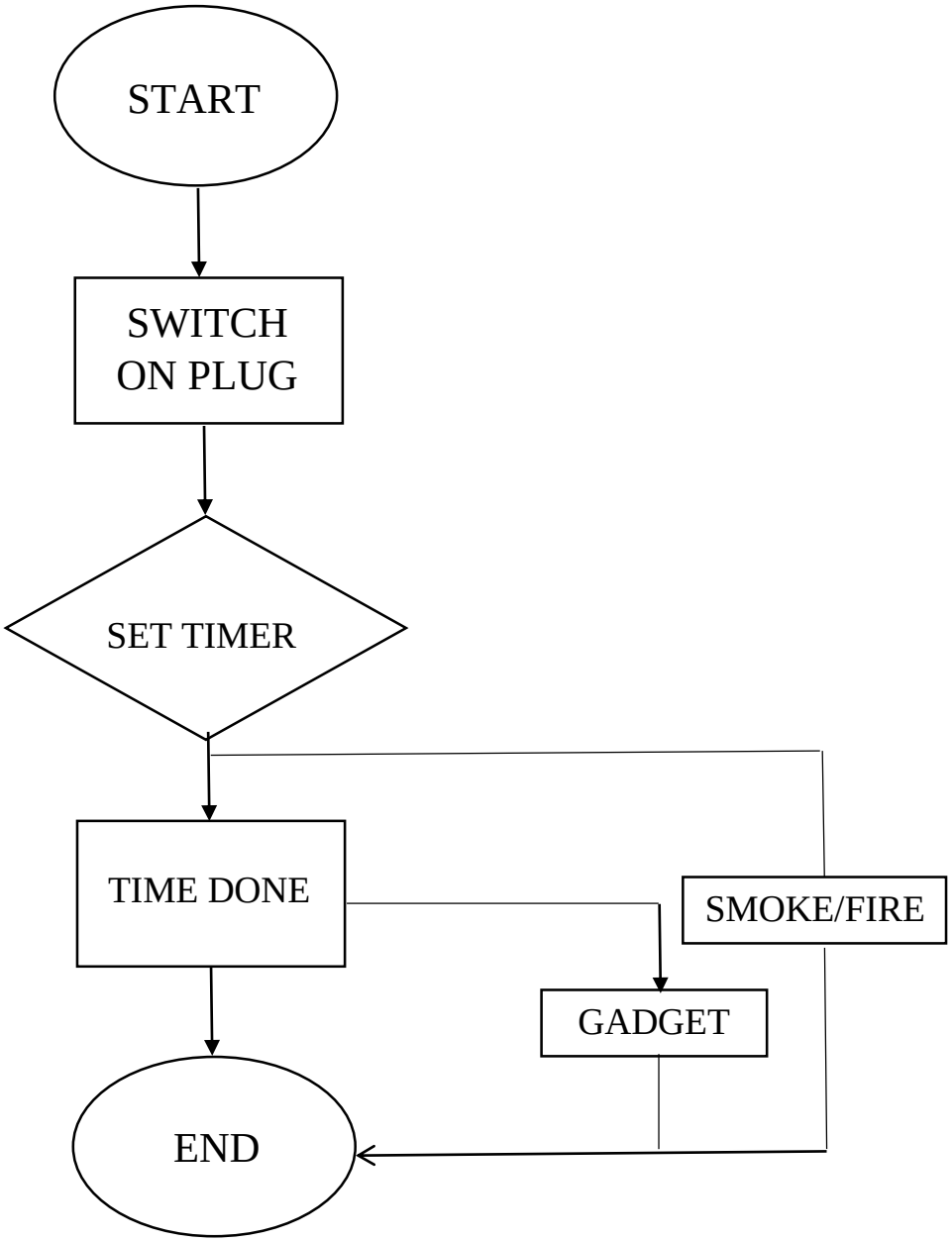
f. Safety

A product design should be in high security aspects to not harm and injury to consumers and have adverse affects on the environment.

g. Commercial value

Product design must be able to meet the present taste and are able to market a market higher and can meet market demands.

3.1 FLOW CHART PLAN OF PROJECT



3.2 GANNT CHART

WEEK / TITLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CHAPTER 1															
1. RESEARCH IMPLEMENTATION															
1.0 Introduction															
1.1 Problem Statement															
1.2 Objectives															
1.3 Scope and Limitations															
1.4 Advantages and Disadvantages of Gas Stove Timer															
1.5 Concept of Gas Stove Timer															
1.6 Summary of Implementation															
CHAPTER 2															
2.0 LITERATURE REVIEW															
2.1 Introduction															
2.2 History of Gas Regulator															
2.3 How Does Solenoid Valve Work?															
2.4 Sensor															
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2.6 How Does Sensor Work?															
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2.9 How to Avoid Steel Range?															
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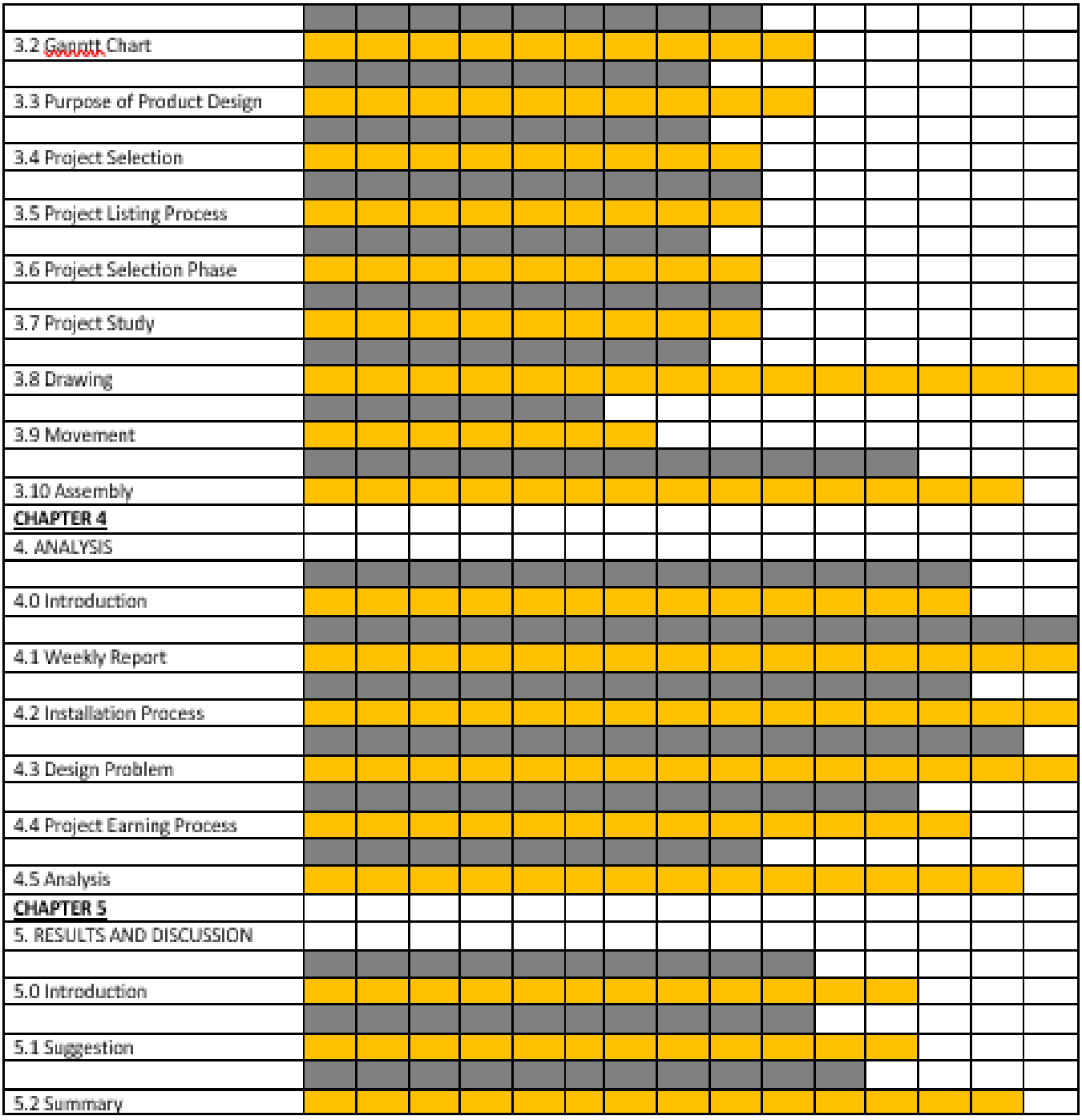
2.11 Example of Occupational Environmental															
CHAPTER 3															
3. METHODOLOGY															
3.0 Introduction															
3.1 Flow Chart Plan of Project															


3.2 Ganntt Chart
3.3 Purpose of Product Design
3.4 Project Selection
3.5 Project Listing Process
3.6 Project Selection Phase
3.7 Project Study
3.8 Drawing
3.9 Movement
3.10 Assembly
CHAPTER 4
4. ANALYSIS
4.0 Introduction
4.1 Weekly Report
4.2 Installation Process
4.3 Design Problem
4.4 Project Earning Process
4.5 Analysis
CHAPTER 5
5. RESULTS AND DISCUSSION
5.0 Introduction
5.1 Suggestion
5.2 Summary

3.3 PURPOSE OF PRODUCT DESIGN

Each created product must have benefits and goodness to consumers. Our products are purpose in the surrounding community they can benefit as well as possible.

The purpose of the Gas Stove Timer design is to reduce the burden and problems on the person who have Alzheimer and Amnesia.This is because, they also have problem to remember what they done even in short term activity.Not only that, the Gas Stove Timer also aim to reduce risk of the user during heating and cooking food.With the safety system, it will avoid the user from fire and death.

Gas Stove Timer also suitable for household as it combines gas tank with stove.The synchronization are open and close of the valve automatically will be easier to any party.Where it will make it easier for the user to turn off their gas stove even they’re not in the kitchen during the heating process.

3.4 PROJECT SELECTION

At this stage generally consists of several important processes in the implementation plan of a project. It serves as a starting point and a catalyst for the implementation of a project.

1) Project Listing process
2) Project Selection process

3.5 Project Listing Process

In the project listing process, each team member is assigned to come up with a project idea by discussing together the project title to make it a final project. During the discussion, we listed 20 more ideas to supervisor. The following are some project ideas that have been agreed upon and will make a joint decision to make and finalize :

a. Multitask Wheelchair
b. Easy Bin
c. Stick Sit
d. Anti-Sleep Watch
e. Gas Stove Timer

3.6 Project Selection Process

Once these ideas have been listed and studied, the project selection process needs to be implemented. This process is very important, where each factor needs to be taken into account, in terms of cost, materials, components, tools and methods that you want to implement into the project. As a result of the group discussion and the consent of the supervisors, we have all agreed to implement the ‘Gas Stove Timer’ project according by our group members.

3.7 PROJECT STUDY

In this stage, our group members are required to cooperate in conducting a review of several factors to produce a product including the main design, safety aspect, materials, stability and tools used in project procedures.

We have made a survey with references to supervisor about the surrounding community such as senior citizen,housewives who getting problem to switch off the stove. In addition, we have also made a questionnaire by going to seeing with parents, housewives and neighbors about their problem.

3.7.1 Drawing

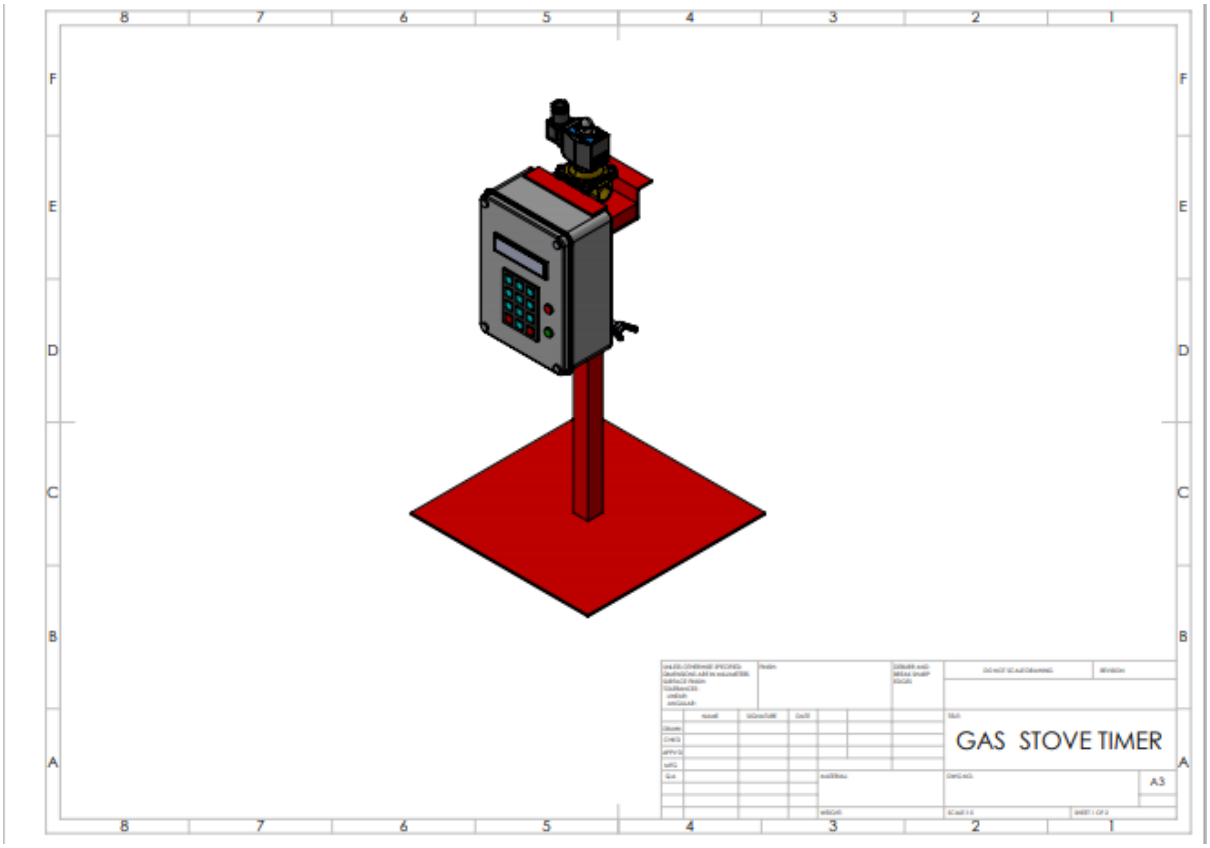


Figure 10

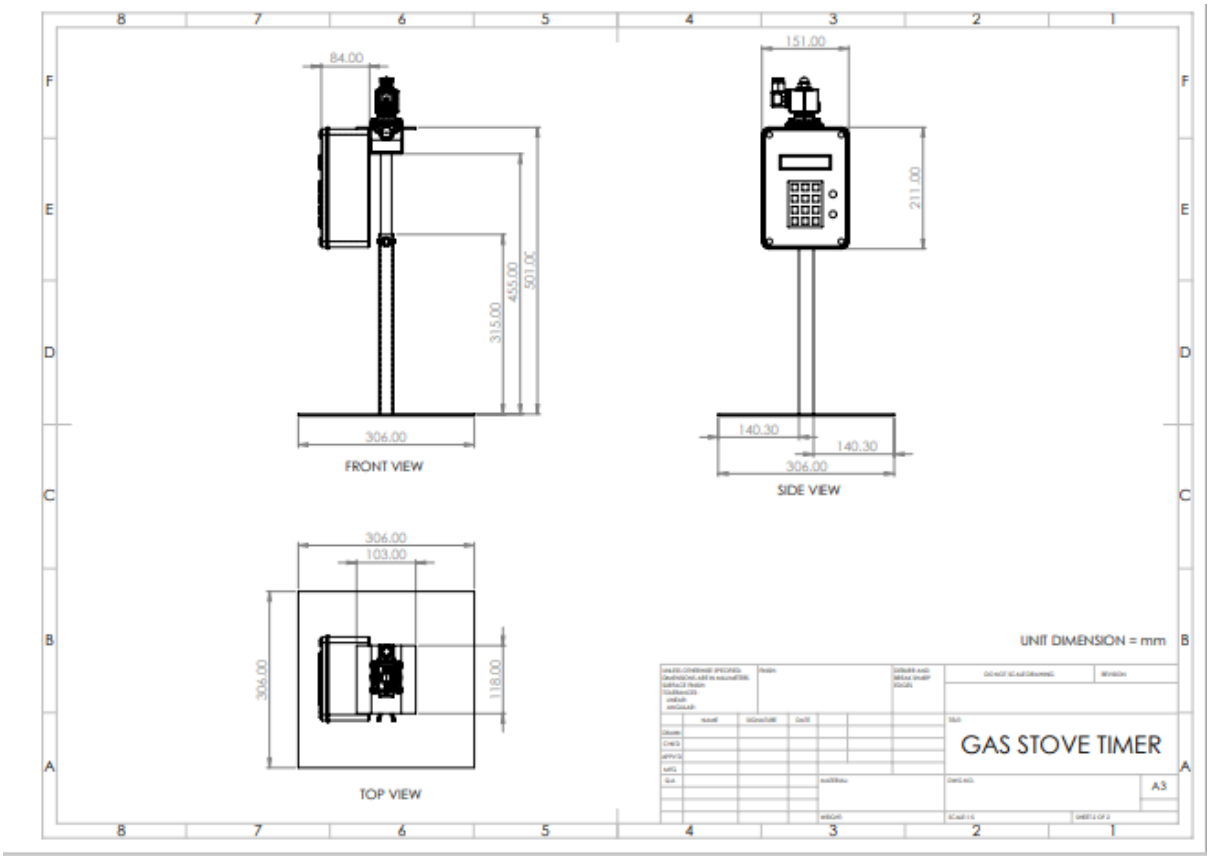

84.00
315.00
455.00
901.00
306.00
FRONT VIEW
151.00
211.00
140.30
140.30
306.00
SIDE VIEW
306.00
103.00
306.00
118.00
TOP VIEW
UNIT DIMENSION = mm
GAS STOVE TIMER
A3

Figure 11

3.8 PHYSICAL REQUITMENT

To create a good project design is important in keeping up with current trends and taking into account marketing costs as well as consumer satisfaction should also be taken into consideration. On the other hand, user safety and comfort factors are the most important elements when implementing this project. This is because to give our customers the satisfaction of out product service. In addition, the project outline must follow the specifications and logical logic in order for the project to work successfully.

3.8.1 Neatness

Fineness is also the most important aspects of producing a product. Through neatness, outsiders or users will evaluate the success and reliability of our product. From there, the neatness is important. Through the finely tuned texture, a product will look and attractive.

The valve of the is located on the adapter. Solenoid valve installation is important as it is a key step in the manufacture of Gas Stove Timer. It should look neat and in accordance with the predetermined size. In addition, the choice of spray color is also selection will influence and attract the user.

3.9 PROJECT TOOL SELECTION

a) Measuring tape

Is used to measure the length, width of material, depth and even the thickness of a material or product to be used before the cutting process. Has readings in centimeter and millimeters.

Figure 12

b) L square

"**L**" **Square** The "**L**" **square** is one of the most basic of the pattern making rulers. This ruler helps to create accurate 90° angles and straight edges. It measures, rules, and squares simultaneously. Hip Curve The hip curve helps to shape the hip line, hem, and lapels.

Figure 13

c) Pensil and paper

Used to draw and make design notes before the correct design is drawn and moved to the inventory. Any corrections and corrections to the drawing are modified through the inventory application (Auto Cad).

Figure 14

d) Combination spanner

Combination spanners have two heads: one with an open-ended profile and the other with a ring profile. Combination spanners are hand held tools used for fastening and loosening nuts or bolt heads with a hexagonal shape.

Figure 15

3.9.1 MACHINE USE

a) Iron cutting machine

A cutting tool or cutter is any tool that is used to remove material from the work piece by means of shear deformation. Cutting may be accomplished by single-point or multipoint tools. Single-point tools are used in turning, shaping, planing and similar operations, and remove material by means of one cutting edge. Milling and drilling tools are often multipoint tools. It is a body having teeth or cutting edges on it. Grinding tools are also multipoint tools.

Figure 16

b) Grinder

Angle grinders may be used for removing excess material from a piece. There are many different kinds of discs that are used for various materials and tasks, such as cut-off discs (diamond blade), abrasive grinding discs, grinding stones, sanding discs, wire brush wheels and polishing pads.

Figure 17

3.9.2 MATERIAL USES

a. Mild steel hollow (1" x 1" x 1.2 mm)

A hollow structural section (HSS) is a type of metal profile with hollow cross section. The term is used predominantly in the United States, or other countries which follow US construction or engineering terminology. HSS members can be circular, square, or rectangular sections, although other shapes such as elliptical are also available. HSS is only composed of structural steel per code.

HSS, especially rectangular sections, are commonly used in welded steel frames where members experience loading in multiple directions. Square and circular HSS have very efficient shapes for this multiple-axis loading as they have uniform geometry along two or more cross-sectional axes, and thus uniform strength characteristics. This makes them good choices for columns. They also have excellent resistance to torsion.

HSS can also be used as beams, although wide flange or I-beam shapes are in many cases a more efficient structural shape for this application. However, the HSS has superior resistance to lateral torsional buckling. The flat square surfaces of rectangular HSS can ease construction, and they are sometimes preferred for architectural aesthetics in exposed structures, although elliptical HSS are becoming more popular in exposed structures for the same aesthetic reasons.

Figure 18 Mild steel hollow

b. Mild Steel Plate

Mild steel is the most commonly used steel. It is used in the industries as well in the different everyday objects we use. Even the pans and spoons of the kitchen are sometimes made of mild steel. The main target of this article is to discuss about different mild steel properties. The mild steel is very important in the manufacturing of metal items. Almost 90% steel products of the world is made up of mild steel because it is the cheapest form of steel.

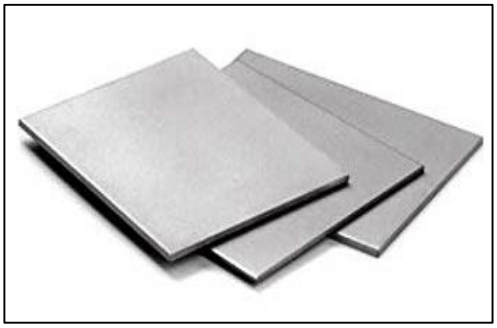


Figure 19 Mild Steel Plate

a. Mild Steel Bolt & Nuts

The nuts, bolts and fasteners are made from a variety of aluminum alloys. These are generally with elements such as silicon, iron, magnesium, manganese, copper and much more. Main material types that use in making nuts, bolt are :

i) Steel

Be it a threaded bar or a nut, bolt and fastener, steel is a most commonly used material. Due to its abundance, it is widely available and can be obtained from iron ores with various surface treatments as well. Some of these treatments are galvanization, zinc plating and chrome plating. The grade of steel required depends upon the user's requirements. Overall, there are 4 different steel grades in which nuts, bolts and fastener are available.

ii) Alloy steel

Bolts made from alloy steel have extreme strength. They are separately heated to incorporate the added strength. An anchor bolt, for instance, that is made from alloy steel is not coated and has a dull black finish. As the bolts are strong, nuts made from this material are brittle at the same time.

iii) Brass

Brass is an alloy of copper and zinc. Although this alloy is used very rarely due to its relative softness but the fasteners which are made from brass are highly corrosion resistant as well as electrically conductive.

iv) Silicon bronze

It is generally known as Bronze and it a mixture of copper and tin. Small amount of silicon is also present in it. The nuts and bolts that are made from it are mainly catered towards marine environments. Also this alloy is preferred over stainless steel is wooden structure construction too. For example, the fasteners instilled on a wooden boat made up of silicon bronze.

v) Aluminum

This is a light weighted, soft but highly corrosion resistant metal which is much a like stainless steel. The nuts, bolts and fasteners are made from a variety of aluminum alloys. These are generally with elements such as silicon, iron, magnesium, manganese, copper and much more.

Figure 20 Mild Steel Bolt and Nuts

c. Angle Iron

Angle iron is formed in a specific shape to be extremely stable and able to bear excessive amounts of pressure and weight. Normally bent into an L- shape (always 90 degrees), angle iron is often used to frame or built various pieces of furniture, supporting structures, walls or shelves. Angle iron in the project use for built frame at platform.

This is some of benefit use angle iron such us;

i. Have been recycling steel for over 150 years

It sounds amazing. but recycling efforts for steel such as angle iron has been going on since the 1800s. Most of the steel objects that you use in your life can contain from 25 percent up to 100 percent of recycled steel. So, you are in fact contributing to a greener environment without even knowing it.

ii. Steel is 100 % recyclable

Not many objects can be recycled as fully as steel. From metal beams to aluminum cans, steel can be remade into other objects over again. For the household objects that we don't need anymore, the steel is taken to material recovery facilities where it becomes processed. For larger steel objects and bales, these objects are melted in furnaces at refineries before turned into new steel. Beam and angle iron can also be given to steel suppliers as is so other companies and individuals can purchase the materials for the construction and personal projects

Figure 21 Angel Iron

d. PVC Controller Box

This Controller box is made from a self-extinguishing thermoplastic material that is halogen free and RoHS compliant. The housing has smooth sides and is fitted with a screw-on patented lid and a seal to provide IP65 protection.

Features and Benefits

•High resistance to heat, chemical and atmospheric agents

•Patented lid produced in a single pressing phase and fitted with seal

•Components can be fitted to the back of the box using 3.5 x 9.5 mm self-tapping screws

•Smooth sided box with screw-on lid

•Self-extinguishing thermoplastic material

•Installation temperature from -25°C to +60°C

•IP65 protection

•IK08 shock resistant

•RoHS compliant

•Halogen free

Figure 22

e. 3 Pin Plug

3 pin plugs are designed so that mains electricity can be supplied to electrical appliances safely.It consists of three pins (hence the name). Each pin must be correctly connected to the three wires in the electrical cable. Each wire has its own specified colour so as it can be easily identified.

The LIVE wire is BROWN.

This is connected to a fuse on the live pin. The electric current uses the live wire as its route in.

The NEUTRAL wire is BLUE.

This is the route the electric current takes when it exits an appliance; it is for this reason the neutral wire has a voltage close to zero.

The EARTH wire is GREEN & YELLOW

and connected to the earth pin. This is used when the appliance has a metal casing to take any current away if the live wire comes in contact with the casing.

Figure 23

f. Matrix Keypad

Matrix keypad use a combination of four rows and four columns to provide button states to the host device, typically a microcontroller. Underneath each key is a push button, with one end connected to one row, and the other end connected to one column.This 16-button keypad provides a useful human interface component for microcontroller projects.Convenient adhesive backing provides a simple way to mount the keypad in a variety of applications.Click here for datasheet.

Specifications

Maximum Rating: 24 VDC, 30 mA

Interface: 8-pin access to 4x4 matrix

Operating temperature: 32 to 122 °F(0 to 50°C)

Dimensions:Keypad, 2.7 x 3.0 in (6.9 x 7.6 cm),Cable: 0.78 x 3.5 in (2.0 x 8.8 cm)

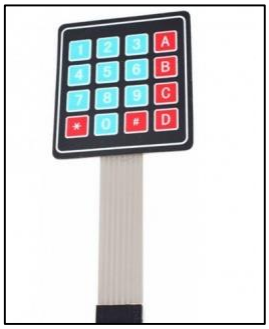


Figure 24

g. LCD

Liquid crystal displays (LCDs) are a commonly used to display data in devices such as calculators, microwave ovens, and many other electronic devices..

The 16x2 LCD has a total of 16 pins. As shown in the table below, eight of the pins are data lines (pins 7-14), two are for power and ground (pins 1 and 16), three are used to control the operation of LCD (pins 4-6), and one is used to adjust the LCD screen brightness (pin 3). The remaining two pins (15 and 16) power the backlight.The details of the LCD terminals are as follows:

Terminal 1	GND
Terminal 2	+5V
Terminal 3	Mid terminal of potentiometer (for brightness control)
Terminal 4	Register Select (RS)
Terminal 5	Read/Write (RW)
Terminal 6	Enable (EN)
Terminal 7	DB0
Terminal 8	DB1
Terminal 9	DB2
Terminal 10	DB3
Terminal 11	DB4
Terminal 12	DB5
Terminal 13	DB6
Terminal 14	DB7
Terminal 15	+4.2-5V
Terminal 16	GND

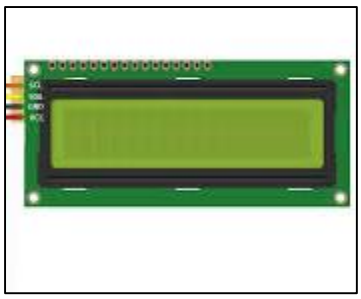


Figure 25

h. Spray silver 48 & Spray clear

a. Spray red 48 & grey 48

This product is made of the advanced petroleum manufacturing techniques. It is easy and gives an even fine spraying surface. The product possesses multiple strengths including weather resistant, hard, soft & durable, abrasion resistant, of strong adhesion and provides a long-lasting colorings. It should be widely used in spraying and repairing of surfaces of metal, wood, glass , leather, porcelain and many other kinds of materials.

b. Spray clear

A clear acrylic coating is a good spray to use to permanently protect artwork and give it a bright gloss finish. Test the spray on similar materials to see what the effect will be on the finished piece before you apply it.Clear enamel spray paint is a transparent finish that provides extra protection against rust, corrosion, tarnishing and chipping. This paint has non- yellowing formula to provide a crystal- clear look to suit your painting needs. Featuring a gloss finish, this paint ideal for use on metal, wood and concrete.

Figure 26

Figure 27

Figure 28

3.10 BUDGET

NO	MATERIAL	QUANTITY	PRICE (RM)	TOTAL (RM)
1	Mild Steel Hollow	1	2.50	2.50
2	Mild Steel Plate	2	12.50	12.50
3	Mild Steel Bolt & Nuts	4	0.30	1.20
4	PVC Controller Box (Medium)	1	13.00	13.00
5	3 Pin Plug	1	3.90	3.90
6	Matrix Keypad	1	3.87	3.87
7	LCD Arduino	1	4.18	4.18
8	Red Spray 48	1	6.50	6.50
9	Clear Spray	1	6.50	6.50
10	Hose Nipple	2	5.00	10.00
11	Hose Clipper	2	2.00	4.00
12	Gas Hose	1	15.00	15.00
13	Solenoid Valve	1	120.00	120.00
14	Arduino Set	1	127.00	127.00
15	Sensor		5.90	5.90
16	Buzzer	1	1.27	1.27
				TOTAL = RM 337.32

3.11 MOVEMENT

Every product created must have the movement to function properly in order to function. In Gas Stove Timer products, the material used to move it and function properly is Vertical Stand.

a) Vertical Stand

The main function of the vertical stand is to make the height solenoid valve suitable with the height of gas. It made by Mild Steel Hollow. The motion can be adjusted manually by adjust the screw and lock.

3.12 ASSEMBLY

3.12.1 Welding

There are 4 types of welding that we know. You can read that types of welding that we describes below.

i) Shielded Metal Arc Welding (SMAW)

With this particular type of welding, the welder follows a manual process of stick welding. The stick uses an electric current to form an electric arc between the stick and the metals to be joined. This type is often used in the construction of steel structures and in industrial fabrication to weld iron and steel.

ii) Gas Metal Arc Welding (GMAW/MIG)

This style of welding is also referred to as Metal Inert Gas (MIG). It uses a shielding gas along the wire electrode, which heats up the two metals to be joined. This method requires a constant voltage and direct-current power source, and is the most common industrial welding process. It has four primary methods of metal transfer : globular, short-circuiting, spray and pulsed-spray.

iii) Flux Cored Arc Welding (FCAW)

This was developed as an alternative to shield welding. The semi-automatic are weld is often used in construction projects, thanks to its high welding speed and portability.

iv) Gas Tungsten Arc Gas Welding (GTAW/TIG)

Welding together thick sections of sections of stainless steel or non-ferrous metals is the most common use for this method. It is also an arc-welding process that uses a tungsten electrode to produce the weld. This process is much more time consuming than the other three and much more complex too. The weld we use is a type of GMAW/MIG. This type of welding have advantages and limitations.

Advantages:

a. Low hydrogen deposits

Since solid does not pick up moisture like flux-cored wires and stick electrodes it consistently deposits welds with low levels of diffusible hydrogen. You can learn more about why this is important by reading ‘’WHY WELDS CRACK’’

b. Can weld almost all metals

By simple changing your filler wire and at times the shielding gas you can weld form carbon steel, to stainless steel, to nickel alloys and aluminum.

c. Low levels of spatter

Low spatter can achieved by selecting the right mode of metal transfer. Spray and pulse welding can provide this benefit.

d. Unlimited thickness

This process allows for welding light gage material and up to unlimited thickness by using multiple passes. Higher amperages and proper joint configuration are needed to weld.

e. Easy to learn

Unlike TIG welding or stick welding, MIG welding is easy to learn

f. Little clean up

Since MIG welding is a slagless process it does not require chipping slag, cleaning up flux or discarding unused stick stubs.

Limitations.

a. Sensitive to contaminants

The process can only handle low to moderate levels of surface contaminants such as rust, mill scale, dirt, oil and paint. All these have potential to create problems such as porosity, incomplete fusion, bad bead appearance and even cracking.

b. Portability

Moving the welding equipment may not be that tough, but you also have to handle the high pressure cylinders that contain the shielding gas. Proper care must be taken.

c. Sensitive to wind

The shielding gas used for MIG welding can easily be blown away when welding outdoors. Even inside, a fan or a wind draft of as low as 5mph can be enough to cause porosity.

d. Lack of fusion

Due to the ability to weld at low currents this process has the potential for lack fusion when running in short circuit mode. Make sure you always use the correct procedure for the thickness of material you are welding. There is a reason why the American Welding Society does not have pre-qualified procedures using the short-circuit mode of metal transfer.

e. Open arc process.

As with most welding process, GMAW exhibits an open arc. Proper care must be taking to shield the welder and bystanders from the harmful UV rays.

3.12.2 Wiring

In this project we use some of wiring that function to on and off 'Gas Stove Timer'.. A few of things that we using is a push button, port battery and so on. The function of wiring in this project are to improve our innovation Gas Stove Timer and making it easier for users to use it. If don't have wiring in this project then there is no innovation our project.

(a) Push Button

The push button that we use in Gas Stove Timer are use for open and close the solenoid valve. The green push button used for open the valve while the red push button used for close the valve. We use the push button because it easy for users to use and push button is common switch always use in daily life. Moreover, the push button also easy to find and buy.

The push button or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed.

Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.

The specification of push button :

Figure 29

- Outer diameter of the actuating element is 29.5mm
- Silver colour standard front ring
- Metal, high gloss material of the front ring
- Ambient temperature during operation -25°C to +70°C
- Dimension of 29.5mm x 29.5mm (H x W)

b) Port Battery

A port battery are connecting device between the wire and the battery. It connects the wire to the battery because to move the Lift Seat up and down. If a port battery didn't have, Gas Stove Timer can't functions properly.

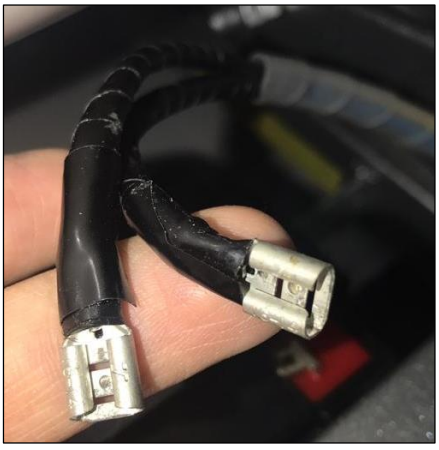


Figure 30 Port battery

c) Network wrap cable

Wire wrapping was used for splices and for finishing cable ends in suspension bridge wires and other wire rope rigging, usually with a smaller diameter wire wrapped around a larger wire or bundle of wires. Such techniques were purely mechanical, to add strength or prevent fraying.

Figure 31 Network wrap cable

3.12.3 Coding

```
#include "Keypad.h"

#include <LiquidCrystal_I2C.h>

#include <Wire.h>

#include <SoftwareSerial.h>


#define SMOKEDTR  A0  // MQ2 Smoke Detector Pin A0 - 5V --> VCC Place anywhere above

#define FLAMEDTR  A1  // Flame Detector Pin A1 - 5V --> VCC Place anywhere near probable fire breakout

#define GASVALVE1 A2  // Relay 2 Channel IN1 Gas Valve (+)

#define GASIGNITE A3  // Relay 2 Channel IN2 Gas iGnitor

#define BUZZER    A4  // Buzzer Pin

#define FIRESENSR A5  // Flame Sensor Pin A5 - 5V --> VCC Place within 80cm to 100cm towards fire stove

#define SIMVTX    9   //SIM900A 5VT TX

#define SIMVTR    10  //SIM900A 5VR RX
```

```
#define SW_ONOFF  11  // Available Switch ON / OFF
#define SW_STOP   12  // Available Switch STOP


LiquidCrystal_I2C lcd(0x27, 2, 1, 0, 4, 5, 6, 7, 3, POSITIVE);
char keys[4][3] =    {
   {'1','2','3' },
   {'4','5','6' },
   {'7','8','9' },
   {'*','0','#' }
};
byte rowPins[4] = {8, 7, 6, 5 };
byte colPins[3] = {4, 3, 2 };
Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, 4, 3 );
SoftwareSerial mySim900(SIMVTX, SIMVTR);


boolean msg_show = false;
boolean fire_detect = false;
boolean start_cook = false;
boolean alertsent = false;


int sensorThres = 500;
String input_time = "";
int startTime = 0;
int time_tocook = 0;
```

```
int time_now = 0;
int secleft = 0;
int xsecs = 0;
int xmins = 0;
int xissecs = 0;
String hpno = "0173997240";
String temphpno = "";
int options = 0;
const int timeout = 10000;       //define timeout of 10 sec
long time0 = 0;

void setbuzzer(int millsecs) {
  tone(BUZZER, 2000);
  delay(millsecs);
  noTone(BUZZER);
}

void LCDprint(String info, int line) {
  lcd.clear();
  lcd.setCursor(0, line);
  lcd.print(info);
}

String appendChar(String str) {
```

```
  for ( int i=str.length(); i<16; i++ ) {
    str += " ";
  }
  return str;
}

void showReady() {
  LCDprint(appendChar("Auto Gas Stove"), 0);
  LCDprint(appendChar("Ready To Use"), 1);
}

void checkConnection()  {
  //String conns = "SIM900A SIM Card Connection";
  //Serial.println("Configuring " + conns);
  LCDprint(appendChar("SIM900A Check"), 0);
  LCDprint(appendChar("Line Connection"), 1);
  mySim900.println("AT"); /* Check Communication */
  delay(5000);
  while(mySim900.available()!=0)  { /* If data is available on serial port */
    Serial.write(char (mySim900.read())); /* Print character received on to the serial monitor
*/
  }
  setbuzzer(2000);
  //Serial.println(conns + " OK");
  LCDprint(appendChar("Line Ready OK"), 1);
```

```
}

void setup() {
  Serial.begin(9600);
  Serial.println("Configuring access point");
  pinMode(SMOKEDTR, INPUT);
  pinMode(FLAMEDTR, INPUT);
  pinMode(GASVALVE1, OUTPUT);
  pinMode(GASIGNITE, OUTPUT);
  pinMode(BUZZER, OUTPUT);       // set the Buzzer pin mode
  pinMode(FIRESENSR, INPUT);
  pinMode(SW_ONOFF, INPUT);      // set the Switch pin Switch ON / OFF
  pinMode(SW_STOP, INPUT);      // set the Switch pin Switch STOP
  digitalWrite(GASVALVE1, LOW);
  digitalWrite(GASIGNITE, LOW);
  input_time.reserve(6);
  lcd.begin(16, 2);
  lcd.backlight();//To Power ON the back light
  mySim900.begin(9600);
  checkConnection();
  showReady();
  Serial.println("Your Gas Stove is Ready To Use");
}
```

```
void SendMessage(int type) {
  String msg = "Message from GAS STOVE #00";
  //Serial.println("Message Notify To " + hpno);
  LCDprint(appendChar("Notify " + hpno), 0);
  mySim900.println("AT+CMGF=1");
  delay(1000);
  mySim900.println("AT+CMGS=\" +6" +hpno+ "\"\r");
  delay(1000);
  if ( type == 0 ) {
    mySim900.println(msg + "1 SMS. Testing from workbench. Not installed yet. The Gas Stove Notification is Ready. TQ");
  }  else if ( type == 1 ) {
    mySim900.println(msg + "2 ALERT SMS. The Gas Stove has detected Fire, Smoke or Gas Leakage. TQ");
  }
  delay(100);
  mySim900.println((char)26);
  LCDprint(appendChar("Message Sent"), 1);
  delay(1000);
  //Serial.println("Message Successfully Sent");
}

void showStart() {
  if ( options == 0 ) {
      LCDprint(appendChar("HP: "+hpno), 0);
```

```
    LCDprint(appendChar("No: "), 1);
  }  else  {
    LCDprint(appendChar("Set Cook Time"), 0);
    LCDprint(appendChar("Mins: "), 1);
    input_time = ""; // Clear time input string
  }
}

void showInput(char key)  {
  lcd.setCursor(6, 0);
  if ( options == 0 ) {
    if ( temphpno.length()<=11 ) {
      temphpno += key;
      lcd.print(temphpno);
    }
    if ( time0==0 ) {
      time0 = millis();
    }
  }  else  {
    if ( input_time.length()<3 ) {
      input_time += key;
      lcd.print(input_time + " Mins");
    }
  }
```

```
}

void isCookOn()  {
  while ( 1==1 ) {
    int isFlame = analogRead(FIRESENSR);
    if ( isFlame<300 && start_cook==true ) {
      digitalWrite(GASIGNITE, LOW);
      return ;
    }
  }
}

void isEnter()  {
  if ( options == 0 ) {
    options++;
    if ( temphpno.length()>=10 ) {
      hpno = "+6" + temphpno;
    }
    showStart();
  }  else  {
    msg_show = false;
    start_cook = true;
    time_tocook = input_time.toInt()*60*1000;
    LCDprint(appendChar("Start Cook ON"), 0);
```

```
    msg_show = false;
    digitalWrite(GASIGNITE, HIGH);
    digitalWrite(GASVALVE1, HIGH);
    isCookOn();
    LCDprint(appendChar("Timer: "), 1);
    time_now = (millis()/1000);
    options = 0;
  }
}

void readKeypad() {
  if ( msg_show==true ) {
    char key = keypad.getKey();
    if (key != NO_KEY)   {
      switch(key)  {
      case '*':
        showStart();
        break;
      case '#':
        isEnter();
        break;
      default:
        showInput(key);
      }
```

```
    }
  }
}

void runTimer()  {
  if ( start_cook==true )  {
    secleft = (time_tocook+time_now)-(millis() / 1000);
    xsecs = secleft; // set the seconds remaining
    xissecs = xsecs;
    xmins = xsecs / 60; //convert seconds to minutes
    if ( xsecs>59 ) {
      xissecs = xsecs-(xmins*60);
    }
    lcd.setCursor(8, 1);
    if ( xmins<10 )  {
      lcd.print("0");
    }
    lcd.print(xmins);
    lcd.print(":");
    if ( xissecs<10 ) {
      lcd.print("0");
    }
    lcd.print(xissecs);
    if ( secleft<=0 ) {
```

```
      input_time = "";
      secleft = 0;
    }
  }
}

void loop() {
  if ( digitalRead(SW_ONOFF)==HIGH && start_cook==false ) {
    if ( msg_show==false ) {
      msg_show = true;
      input_time = "";
      options = 0;
      showStart();
    }
  }
  readKeypad();
  runTimer();
  isCookOn();
  if ( digitalRead(SW_STOP)==HIGH || (secleft==0 && start_cook==true) ) {
    LCDprint(appendChar("Auto Gas Stove"), 0);
    digitalWrite(GASVALVE1, HIGH);
    SendMessage(0);
    msg_show = false;
    fire_detect = false;
```

```
    start_cook = false;
    setbuzzer(2000);
    tone(BUZZER, 2000);
    delay(1000);
    noTone(BUZZER);
    startTime = 0;
    options = 0;
    LCDprint(appendChar("Cooking Done"), 1);
  }
  checkFlame();
}

void sendAlert(String show, String msg, String type, String det)  {
    LCDprint(appendChar(show), 1);
    Serial.println(msg + type + det);
    if ( alertsent==false ) {
      SendMessage(1);
      alertsent = true;
    }
}

void checkFlame() {
  String msg = "Sensor Flame: ";
  String det = " Has Been Detected";
```

```
int isFlame = analogRead(FLAMEDTR);
int isSmoke = analogRead(SMOKEDTR);
if ( isFlame<300 || isSmoke>sensorThres ) {
  fire_detect = true;
  secleft = 0;
  start_cook = false;
  LCDprint("ALERT!! ALEERT!!", 0);
  Serial.println(msg + det);
  if ( isFlame<300 ) {
    sendAlert("Fire Detected", msg, "Fire", det);
  } else if ( isSmoke>sensorThres ) {
    sendAlert("Smoke Detected", msg, "Smoke", det);
  }
  if ( start_cook==true ) {
    tone(BUZZER, 2000);
    digitalWrite(GASVALVE1, LOW);
    digitalWrite(GASIGNITE, LOW);
  }
}
if ( fire_detect==true ) {
  if ( isFlame>300 || isSmoke<sensorThres ) {
    noTone(BUZZER);
    digitalWrite(GASVALVE1, LOW);
    digitalWrite(GASIGNITE, LOW);
```

```
      fire_detect = false;
      start_cook = false;
      showReady();
      alertsent = false;
    }
  }
}
```

Chapter 4

MANUFACTURING PROCESS

4.0 INTRODUCTION

The manufacturing process is an introductory process that deals with tools, materials, methods of conduct, measures, and safety regulations that must be followed in great detail. In order to properly plan and execute a project, some aspects and methods or procedures need to be known and understood in advance.

Therefore, the aspects and methods for implementing a project are knowing the equipment and materials used during the project. It also makes it easier for students to recognize and understand each and every use of the equipment and components.

Therefore, the necessary aspects and methods for carrying out a project are to know the equipment and components used during the project. This is to make it easier for students to identify and understand each and every use of the equipment and components. In order to produce high quality and quality products, the manufacturing process must be done in stages so that the results obtained can be satisfactory and in accordance with the specifications set according to the plan.

Therefore, an initial scheduling schedule has been prepared so that project completion can be completed within a specified time. The design and development outlined in the approach are widely used. indirectly, this method is used as a design guide to ensure the project is completed successfully.

Beginning with identifying problems and justifying the scope, the project identifies the problem of 'lift seats' until the machining process. Scope the project is necessary to ensure that the key objectives of the project are met. To begin the process of product development, a model search is performed to find the right method for design, at the same time, customer needs are identified by conducting in-market research. From this stage the product targets meetup to provide machine design needs based on customer needs.

4.1 WEEKLY REPORT

4.1 First Week

The student meeting with the supervising lecturer was held for the first time. Classroom divisions and descriptions of project types and introductions to several supervising lecturers. These include:

i. Mrs. Nazratulhuda bt Awang@Hashim
ii. Mr.Zulkarnain bin Hamid
iii. Mr.Zulkhairi bin Khairudin

Students should then choose each member of their group willingly given their own choice. Subsequently, the supervisor will make a random draw to select the student.

4.2 Second week

This week we met with a selected supervisor, Mr.Zulkhairi bin Khairudin to discuss the project titles and projects we would like to work on. Each student will need to present at least 5 different types of titles regarding our final project. here is our project proposal :

a. Multitask Wheelchair
b. Easy Bin
c. Stick Sit
d. Anti-Sleep Watch
e. Gas Stove Timer

4.3 Third week

We talk about the selection of titles and projects we will be able to work on until we get the project we decide on. After getting approval from our supervisor on the project title called ‘Gas Stove Timer’. We discuss how to complete the project as well as calculate the cost of each to purchase items such as solenoid valve, arduino, wire, spray and so on.

4.4 Fourth week

This week we shared the task with members of the group Fareen Farhanna binti Abdul Manan , Zakaria bin Ahmad Khadzari and Muhammad Irfan Thoriq bin Suffian. The sharing of these tasks is important to speed up the manufacturing process. We're looking the metal from suppliers. After that, we made a joint proposal with the project we were working on.

4.5 Fifth week

This week after our proposal was approved by the supervisor, we have started to create a 'chart of the project'. We have started with a rough outline of the project we have set. Before starting a cutting and welding job, this sketch is necessary because the size is so important that no mistakes are made while doing work in the workshop.

4.6 Sixth week

This week our group is doing a work of cutting metal that has been measured according to the set size. Cut metal size is 12 inch (wide) x 12 inch (length). We do the symmetry line for the stand on the base.

Figure 32

4.7 Seventh week

We assemble the base of the 'Gas Stove Timer' and forth by welding or connecting. Before we weld, we will smooth the surface of the metal using a grinder machine for a smooth connection. The up and down sides are connected.

Figure 33

4.8 Eighth week

This week, we continue our work. We did an metal cutting job called a flat bar to make a place for the solenoid valve. The flat bar is made up of 5 bar, each bar size that are 5 inch (length) x 2 inch (width). We combine it through welding and placed on top of the stand.

Figure 34

4.9 Ninth week

Upon completion of the gas stove timer installation last week, the stand installation process was installed between the bar on the top, the adjustable stand and base. The solenoid valve was initially in good condition, having been mounted to the top. Solenoid Valve is placed with a nut and screw. We did the coating with 3 layer coat. It start with clear coating, metal coating and red coating.

Figure 35

4.10 Tenth week

This week, we did the measurement and cutting of PVC Box and combine to place the Arduino and the battery. The Arduino position is as vertical as the front of the 'Gas Stove Timer'. There was no problem during installation.

Figure 36

4.11 Eleventh week

We're hoping to make it easier for users to use 'Gas Stove Timer' by adding emergency button. Once done, there was minor problem on Arduino system. Our programmer advice us to add 12 V battery because the power for Arduino are not enough if only depending on wire which connected to 3 pin plug.

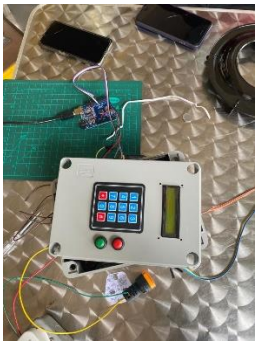


Figure 37

4.12 Twelfth week

This week we made the wiring for the battery 12V. Wiring connecting the Arduino and battery to synchronize the system. When ready to connect, we try to on the system and it is not functioning well as we expect. Suddenly , one of the cable on the Arduino was burn and we replace with the new cable. The cable burn caused by the quality of the wire.

4.13 Thirteenth week

This week, we did a 'finishing' process, such as organize the cable in the PVC box and . The 'Gas Stove Timer' spray is designed to appeal to users.

4.14 Fourteenth week

Once all the processes are ready, we carry out the final testing process to determine whether the Arduino can functionally well and allow the valve to close when the time end.

4.2 INSTALLATION PROCESS

Provides equipment to be used during the installation and cutting process so that work can be done quickly. Then make sure each size is created based on the project sketch created so that it does not suffer from size defects during the cutting process.

To know each of the parts that need to be connected in the right position and angle in order to facilitate project work. For the purpose of incorporating components and parts in our overall steel project and we are gearing up to make it a stable base, there are components such as valve required for a neatly integrated process, screws used to attach parts to a 'Solenoid Valve' that requires repairs to be upgraded and lowered well.

The installation process is a very complicated process and requires detailed research. The wiring process also needs to be done to get our project working together in collaboration between groups as it is important as it helps to save time and can simplify the work and production of this product.

4.2 DESIGN PROBLEM

The objectives of this phase are to test the product function, state the product problem, solve the problem and try to modify the product as needed to solve the problem. Some tests need to be performed on this product for the purpose of ensuring that it works properly and does not cause any problems. We have listed some of the tests we have run including:

a) The solenoid valve test, the solenoid valve movement up and down that we did. In addition, the solenoid valve wire connection to the plug we tested by connecting to the plug socket.

b) Valve lifting stability test is crucial to our product development, this test is intended to test ' Solenoid Valve ' which uses the concept of lift to stand up properly. The test of ' Gas Stove Timer' stability is to raise and lower in order to move well.

   The results of this test will determine whether the system we want to implement on our panel is effective or not. As a result of the tests we have, the tests are positive and negative. The negative is that we try to find where the problem is and we try our best to solve it. If you have problems finding a dead end, we will customize this project to make it easier for users.

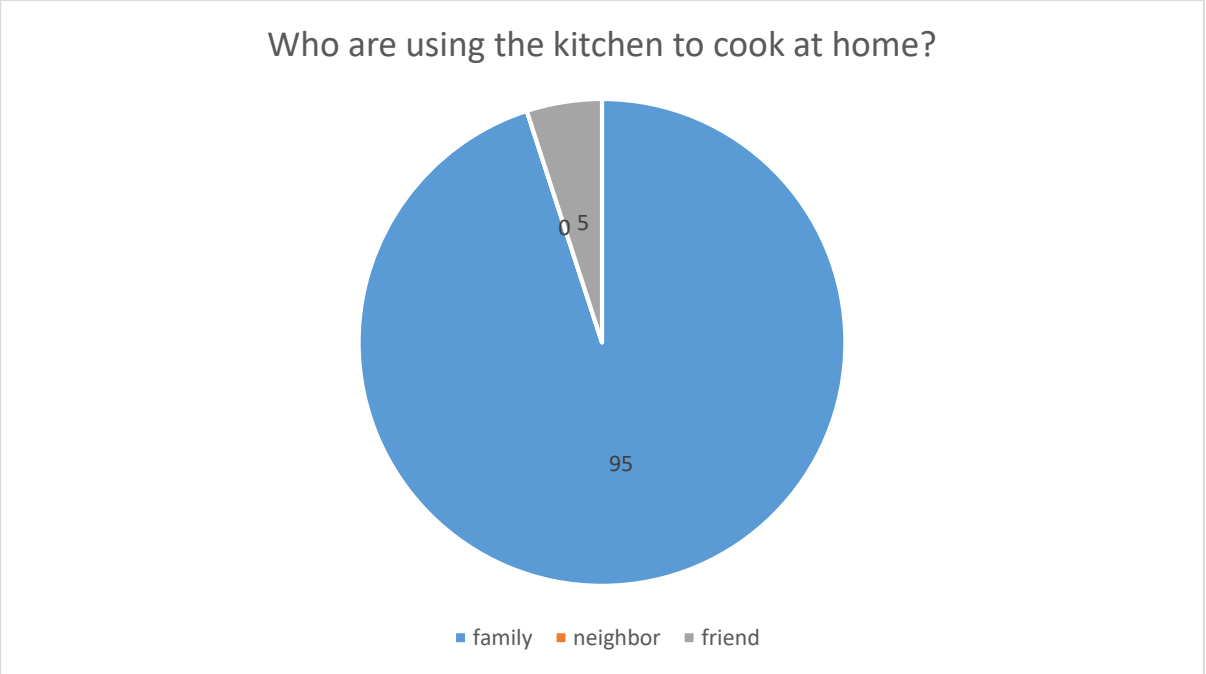
4.3 PROJECT EARNINGS PROCESS

Project creation should be carried out according to schedule. Selection of materials used, cutting process, wiring process and installation process is a steel connection that needs to be done by ensuring the size and accuracy as planned in the table.

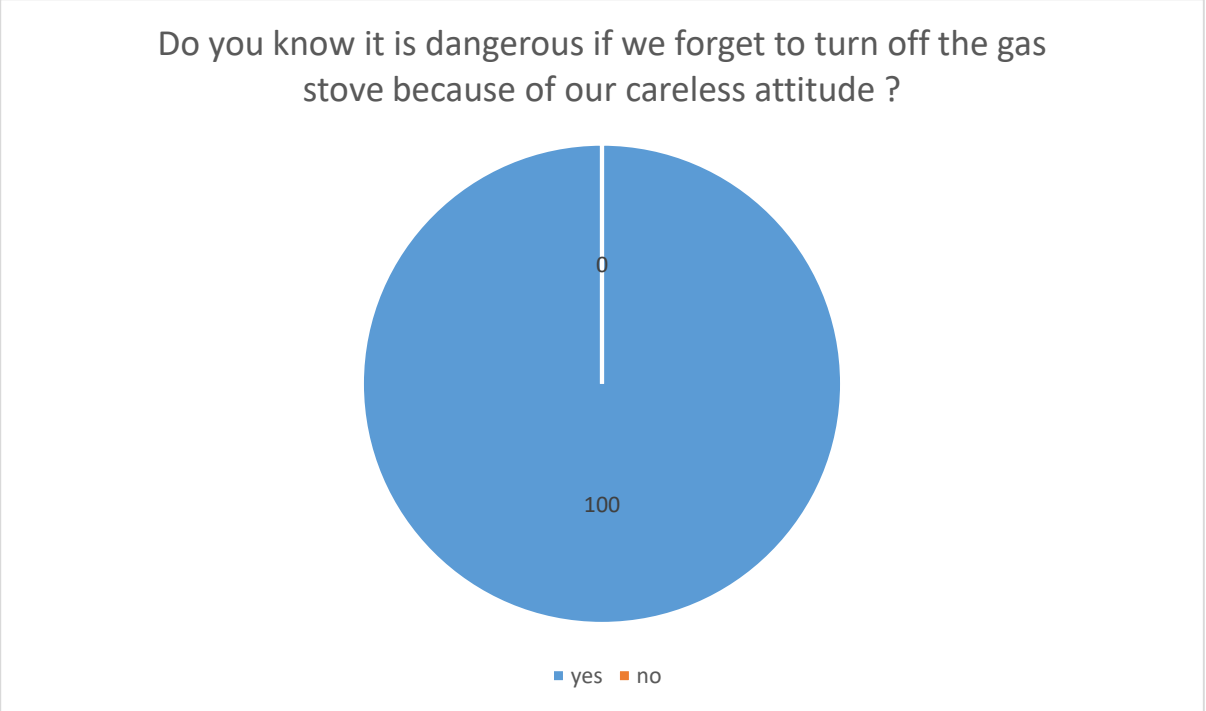
a) Selection of desired material.
b) The process of cutting the workpiece according to the specified size.
c) Installation and connection process (welding)
d) Wiring process of arduino wires and batteries.

4.5 ANALYSIS

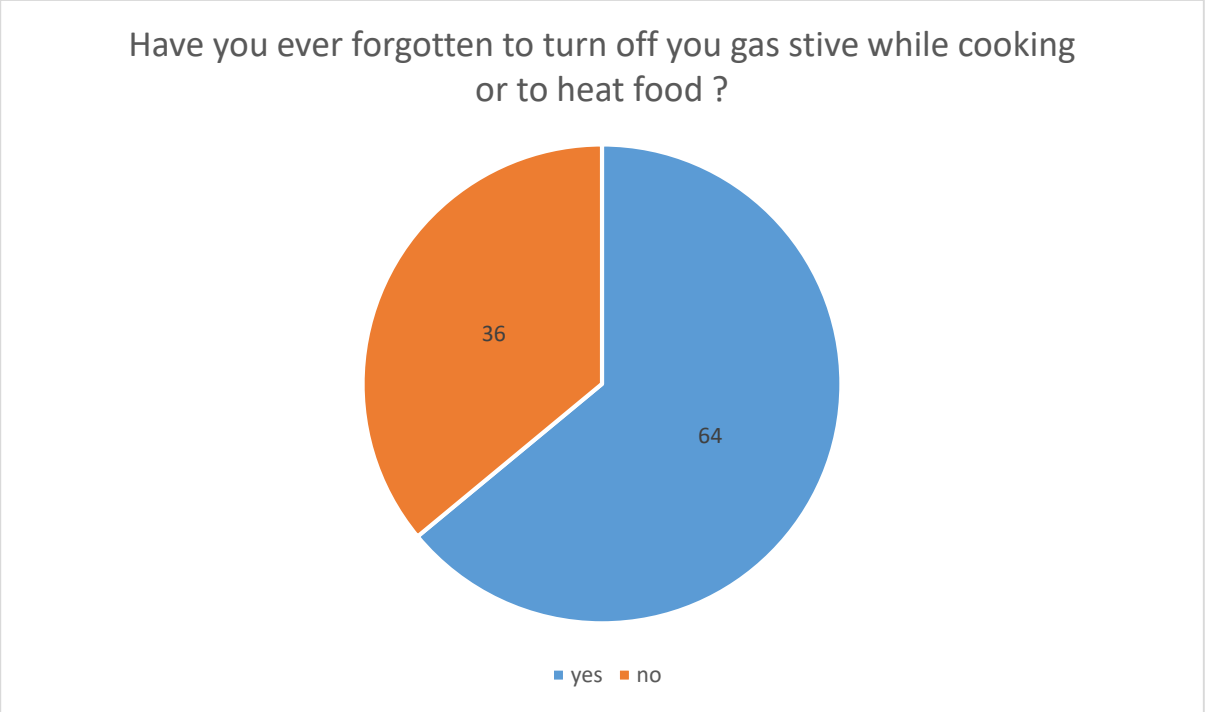
4.5.1 Project findings and analysis



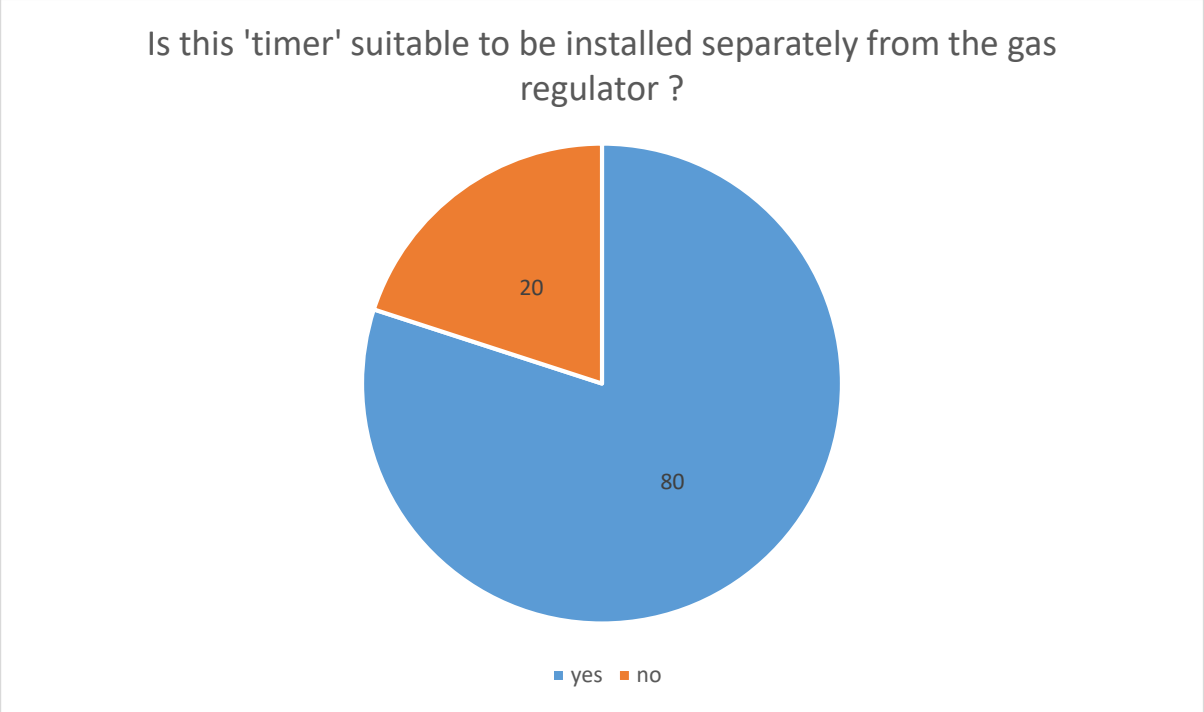
Like the above pie chart, it is a pie chart on the number of responses who vote for family,neighbor or friend. Number for family is the largest compare to neighbor and friend. None of the responses vote for the neighbor.



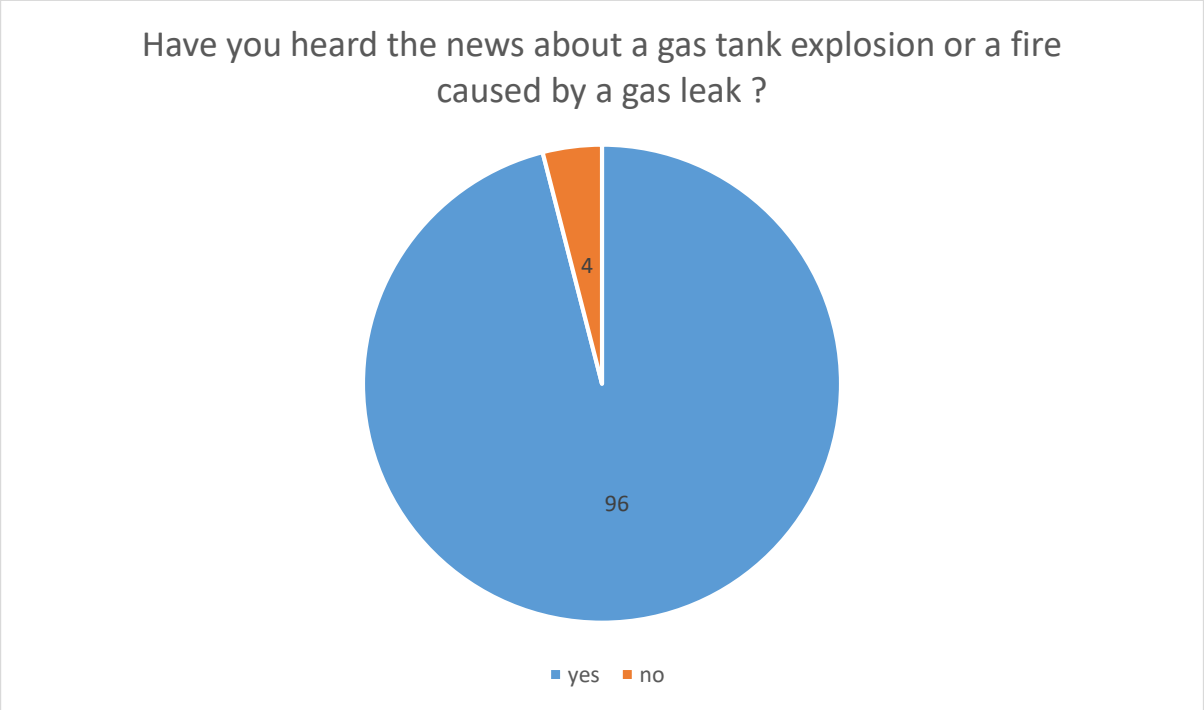
The pie chart shown above is a pie chart showing the answer yes or no of the responding. By this chart, we can conclude that the responses are really concern about accident such as explosion or fire which caused by the careless attitude during heating or cooking the food.



The pie chart shown above is a pie chart showing the answer yes or no of the responding for the question above. It shows that, 64 out of 100 respondent vote for yes while the rest vote for no. We can conclude that, most of the respondent are forgot to turn off their gas stove during cooking or heating food.

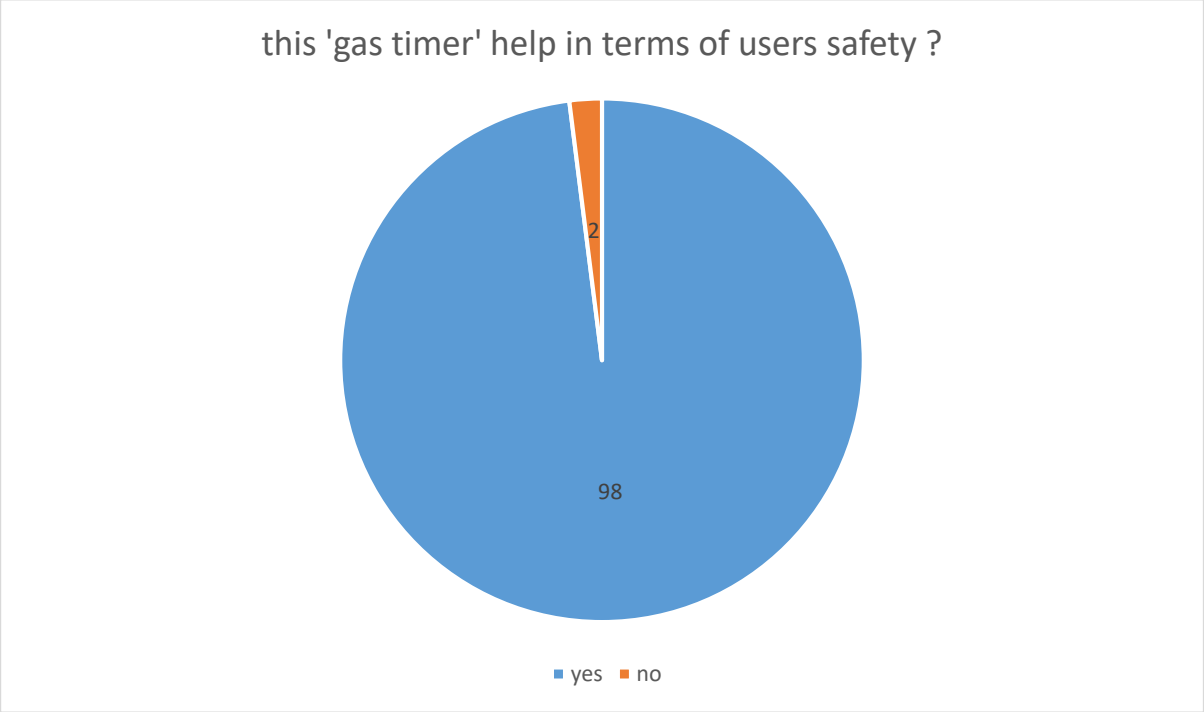


Like the above pie chart, it is a pie chart on the number of responses who vote for yes or no for the question above. This pie chart shows that, majority of the respondent are agree if the ‘gas timer’ installed separately from the gas regulator. It can be, if the ‘timer’ installed on the valve which placed on gas regulator.



Next, this pie chart shows that majority of the respondent are vote for yes which means they used to heard the news about gas tank explosion or a fire caused by gas leaking.

By this data, it shows that the gas regulator in the market nowadays are not well in the aspects of safety.



Lastly, this pie chart shown above that 98 out of 100 respondent are agree with the statement of ‘gas time’ help in terms of users safety. It means, this gas timer help them to reduce the risk and the accident which caused by the gas stove or gas tank itself.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.0 INTRODUCTION

Based on the observations of each group member, we recommend some improvements to this Gas Stove Timer. Among the improvements is:

5.1 Hollow Steel

We use hollow steel as it is a stainless steel and lightweight. This material is used on the seat surface to strengthen and balance this Lift Seat. They are also heat-resistant, non-corrosive and can be used for a long time. Therefore, we use this type of steel to strengthen this Gas Stove Timer. In general, we use 100% hollow steel for the structure.

5.2 Solenoid Valve

We use solenoid valve as ‘safety valve’ because it is an electromechanically-operated valve.In addition, we do not need to modified because it already has a plunger itself which allow or cut off the gas flow.The election of ‘Safety Valve’ because of its common use industry.

5.3 Rechargeable Battery

Choosing this rechargeable battery for arduino can save the money as it can be recharged if it runs out of battery. These batteries are easy to find in workshops. In addition, these rechargeable batteries can be submitted for recycling according to local environmental regulations for waste disposal. Therefore, the rechargeable use of these batteries can save the environment from pollution.

5.1 SUGGESTION

The following are some suggestions and additional ideas related for this "Gas Stove Timer".

- Make it in convenient size which can save the space in kitchen.
- Portable which means no need to plug in when use it.
- It can be setting from the phone itself.

5.2 SUMMARY

Each project developed has its own advantages and disadvantages, as well as this ‘Gas Stove Timer’ project. In order to fully automate this process there are a number of problems that we face in relation to this “Gas Stove Timer”. However, no problem cannot be resolved. We work together with our team members and helped from our supervisor, Mr Zulkhairi bin Khairudin to resolve the problem.

CHAPTER 6

CONCLUSION AND SUGGESTION

6.0 INTRODUCTION

In making this Gas Stove Timer, we had to come to a conclusion as a group before implement it. We need to meet and discuss with our supervisor, Mr Zulkhairi bin Khairudin about our progress of the project for every week. This action taken to make sure that we can get relevant advises and information needed to improve our project, Gas Stove Timer is simple but it is also having their own prpoblems and difficulties when implementing it.

So, for this part we will explain about the problems that we faced and their solutions to handle it. Recommendations for future research and work are also outlined. The recommendations can be summarixed as improvements to the design, material used or working principles.

6.1 APPENDIX

Figure 38

Figure 39

Figure 40