



**POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ
SHAH**

'I AM HERE'

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**MECHANICAL ENGINEERING DEPARTMENT SESSION
I: 2022/2023**

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**This report is submitted to the Department of Mechanical Engineering as
fulfilling part of the conditions of the award
Diploma in Mechanical Engineering**

MECHANICAL ENGINEERING DEPARTMENT

SESSION I: 2022/2023

AKUAN KEASLIAN DAN HAK MILIK

I AM HERE

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2. Kami mengakui bahawa 'Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasil karya/ reka cipta asli saya tanpa mengambil atau meniru mana-mana harta intelek daripada pihak-pihak lain.
3. Kami bersetuju melepaskan pemilikan harta intelek 'Projek tersebut' kepada 'Politeknik tersebut' bagi memenuhi keperluan untuk penganugerahan Diploma Kejuruteraan Mekanikal kepada kami.

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Sebagai Penyelia projek pada tarikh

APPRECIATION

Bismillahirrahmanirrahim. Firstly, thanks be to Allah S.W.T with permission and abundance, we manage to complete project report 'I AM HERE', in time with the existence of cooperation among the team member and lecturers.

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ABSTRACT

In Malaysia, cycling on the road has recently become popular among all age groups, including kids, teens, and adults. Statistics from the Department of Investigation and Traffic Enforcement (JSPT) recorded a total of 653 cases of accidents involving bicycles on roads throughout the country in the period from August 2018 until August 2020. A total of 399 individuals were reported dead, while 119 suffered serious injuries, followed by 135 minor injuries during the same period. Bicycle safety aid is a necessity and a must for every cyclist who rides on the road to prevent accidents. This project focuses on the safety of cyclists who ride bicycles on the road, especially at night. The objective of this project is to prevent accidents between cyclists and other vehicles while on the road and improve their safety. "I Am Here" is the jacket that is equipped with the safety aid and the motion sensor to display the desired output on the led lamp according to the instructions programmed on the arduino. The motion sensor will respond to the body posture to emit the signal light, whether to turn to the right or left. The aid can also detect the presence of other vehicles within a certain distance and alert the cyclist. This project will benefit cyclists and other drivers by preventing accidents from occurring and improving their safety.

Contents

APPRECIATION.....	i
ABSTRACT.....	ii
LIST OF TABLE	viii
LIST OF FIGURE.....	viii
CHAPTER 1 INTRODUCTION	1
1.1 INTRODUCTION.....	1
1.2 PROJECT BACKGROUND.....	2
1.3 PROBLEM STATEMENT	2
1.4 OBJECTIVE.....	3
1.5 PROJECT QUESTION	3
1.6 SCOPE OF THE PROJECT.....	3
1.7 IMPORTANCE OF THE PROJECT	3
1.8 DEFINITION OF TERMS/DEFINITION OF OPERATIONS	4
1.9 PROJECT EXPECTATIONS	4
1.10 SUMMARY.....	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 INTRODUCTION	5

2.2	CONCEPT/THEORY	6
2.2.1	CYCLING SAFETY ON THE ROAD	7
2.2.2	COMMON CAUSES OF CYCLING ACCIDENTS	7
2.2.3	BICYCLE ACCIDENT STATISTICS	9
2.2.4	CYCLING EQUIPMENT	9
2.2.5	SIGNAL LAMP	12
2.2.6	PRODUCT ON THE MARKET	14
2.4	SUMMARY	16
CHAPTER 3 METHODOLOGY		17
3.1	INTRODUCTION	17
3.2	DESIGN RESEARCH	17
3.2.1	DESIGN SELECTION PROCESS	17
3.2.2	METHODS/PROCESSES/TECHNIQUES OF PROJECT PRODUCTION	19
3.2.3	Data Analysis Method	28
3.3	SUMMARY	28
CHAPTER 4		29
RESEARCH INITIAL FINDINGS		29

4.1 INTRODUCTION	29
4.2 FINDING RESEARCH	29
4.3 RECOMMENDATION	35
4.4 RESULT AND DISCUSSION	36
CHAPTER 5	38
DISCUSSION & CONCLUSION	38
5.1 INTRODUCTION	38
5.2 DISCUSSION.....	38
5.3 CONCLUSION.....	38
5.4 PROPOSAL	39
5.4.1 Recommended to Jacket Details	39
5.5 SUMMARY	40
APPENDIX.....	41
REFERENCES	41
GANTT CHART	42
PROJECT COST ESTIMATES	45
QUESTIONARE.....	46

FLOW CHART.....52

LIST OF TABLE

TABLE NO.	TITLE	PAGES
2.2.6	Product on the market	16
3.2.2.1A	Flow Chart	19
3.2.2.1B	Operation Flow Chart	20
3.2.2.1D	Legend	21
3.2.2.4A	Material and overall cost	27
4.4I	Table data result	36

LIST OF FIGURE

FIGURE NO.	TITLE	PAGES
2.2.4A	Helmet	10
2.2.4B	Glasses	10
2.2.4C	Cycling Shoes	11
2.2.4D	Gloves	11
2.2.5A	Daytime Running Lamp	12
2.2.5B	Tail Lights	13
2.2.5C	Low Beam	13
2.2.5D	High Beam	14
3.2.1.1	Choice 1	18
3.2.1.2	Choice 2	18
3.2.1.3	Choice 3	18
3.2.2.1C	Drawing Circuit	21
3.2.2.2A	Prepare the materials	22
3.2.2.2B	Make coding in Arduino software	23
3.2.2.2C	Connect the Arduino components on the vest	23
3.2.2.2D	Attach the Arduino components on the vest	24
3.2.2.2E	Test run the Arduino on the vest	24
3.2.2.3A	Engineering Drawing	25
3.2.2.3B	Drawing Ortography	26
4.2Ai	Intial questionnaire i	30
4.2A ii	Intial questionnaire ii	31
4.2A iii	Intial questionnaire iii	31
4.2A iv	Intial questionnaire iv	32
4.2A v	Intial questionnaire v	32
4.2B i	Final questionnaire i	33
4.2B ii	Final questionnaire ii	34
4.2B iii	Final questionnaire ii	34
4.2B iv	Final questionnaire iv	35

4.4.1	Left signal	36
4.4.2	Right signal	36
4.4.3	Brake light	36

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Recently, cycling on the road is seen as a "trend" in all walks of life, including children, adolescents and adults in Malaysia. As cycling activities are currently becoming a favorite among the people in the country, every cyclist also needs to be exposed to knowledge about cycling safety and its use while riding a bike that has been set to be worn especially cycling at night and so on. Statistics from the Department of Investigation and Traffic Enforcement (JSPT) recorded a total of 653 cases of accidents involving bicycles on roads throughout the country in the period from August 2018 until August 2020 (Utusan Malaysia, 28 September 2020).

People are now willing to spend money to buy bicycle accessories and equipment. Furthermore, most cyclists need to purchase bicycle safety equipment while traveling to avoid unwanted accidents. For example, helmets, bicycle jerseys, gloves, lights and vests. Accident occur when cyclists who are not in the proper position so that it is difficult to be seen by other road users, especially at night. As a result, cyclists rarely turn or look back to see the arrival of other vehicles. Also, cyclists who are on the right or left are always at odds with other vehicles. Therefore, cyclists who ride at certain times are more dangerous and can cause accidents easily. For example, those who wear dark clothes are indeed difficult to be seen by other drivers.

Cycling has its disadvantages. The most serious is a bicycle-related road accident. Since bicycles do not provide any barriers to protect the rider from physical danger, these incidents are common and very dangerous. The most common cause of bicycle accidents is getting hit by a car. Falling, colliding with something on the road, a terrible road, hitting a fixed item, or turning to avoid an animal are all possible reasons for a bicycle accident. However, being hit by a car is the most prevalent, because bicycles are much smaller than automobiles and cyclists are often unprotected,

resulting in significant injury. A bike accident is caused by a number of different causes. Bicycles, for example, are less visible. When driving around on a bike, motorists must use particular caution. If they are distracted or inattentive while driving, it can have disastrous consequences for the bicycle.

1.2 PROJECT BACKGROUND

Cycling as an active mode of transportation holds the potential to reduce traffic congestion and air pollution, and promotes an active lifestyle which in turn improves public health (Andersen et al, 2000; Higgins, 2005; Mueller et al, 2015). The health benefits of active commuting by bicycle are well established (Mueller et al, 2015; De Geus et al., 2008, 2009; Oja et al., 2011). However, safety concerns may be a drawback, especially for children, adolescents and the elderly, age groups that incur more accidents than in adults (18–65 years) (Martensen, 2014). Cyclists often have to use the same infrastructure as cars, buses and trucks but are more vulnerable than the motorized road users as they are not protected by their vehicle in the case of an accident (Davis, 2001). Therefore, safety for cyclists must be improved if there is to be a modal shift from passive (motorized) transportation to active transportation. To create a safer cycling environment, people need to understand where, when and under what circumstances bicycle accidents occur.

1.3 PROBLEM STATEMENT

Accidents are caused by cyclists who are less aware of safety issues. Accidents are also caused by factors like the bicycle's poor condition and not wearing proper safety equipment when riding. Communication issues arise since there are no other ways to interact on the road than through horns and high beams. As more vehicles are added, the risk rises annually, adding to the number of fatal incidents. Additionally, not all spots in road regions offer dedicated lanes for bikers. Thus, motorists, motorcyclists, and other road users must share the road with cyclists. Vehicles including motorcycles, cars, and other vehicles are at blame for these bicycle accidents. Furthermore, bicyclists run the risk of being struck by other cars because they are difficult to see, especially at night. The failure of cyclists to signal turns to the right or left while riding is another factor in accidents.

1.4 OBJECTIVE

This study was conducted to achieve the following objectives:

- Design and develop safety aid for cyclists using motion sensors.
- Enhance the safety of cyclists.

1.5 PROJECT QUESTION

- 1) How does this safety aid work?
- 2) Can this safety aid reduce cyclist accident?
- 3) What are the types of features in choosing a safety aid ?

1.6 SCOPE OF THE PROJECT

This product is primarily intended for usage by cyclist. The motion sensor was used to equip this product. According to the instructions programming on the arduino, a motion sensor is utilised to display the desired output on the led light. Because cyclists have varying body shapes, the vest size should be considered when developing this product. As a result, the size of this product can be modified to the user's preference, and the anticipated cost is RM 250.

1.7 IMPORTANCE OF THE PROJECT

The importance of this project is one to reduce accidents, especially for cyclists either alone or in groups. Second, it can provide awareness to users about the need for safety aid. In addition, with this 'I AM HERE', cyclists do not have to worry about safety aid because the project uses the term all

for one, that is, this safety vest is equipped with the motion sensor. For example, cyclists do not have to look for a single such item such as looking for bicycle lights, safety vests, and traffic lights to put on the bike. This is because everything has been combined in the vest. Next, cyclists can get everything in one product and can work like the original just added with IoT because this vest uses motion sensors.

1.8 DEFINITION OF TERMS/DEFINITION OF OPERATIONS

The concept of this project is related to the safety and needs of cyclists to ensure the safety of cyclists while riding a bicycle. The project is to serve as a reminder of the importance of wearing safety aid. It seems that 'I AM HERE' telling other drivers the existence of the cyclist.

1.9 PROJECT EXPECTATIONS

The expectation of this project is that this product can help cyclists to be safe. This is because, it can convince users to use this product and can have a positive impact on users.

1.10 SUMMARY

In conclusion, the level of awareness about the positive effect of using this safety vest on road users can be seen, especially cyclists is low. Therefore, an idea was created to design this product.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

A bicycle safety vest is a tool for cyclists to draw attention from other drivers and prevent accidents. Generally speaking, the biker can be protected while using a signal to make a right or left turn while wearing this practical vest. Additionally, while worn, the vest can vibrate on the right shoulder to alert the rider that there are vehicles approaching from behind or stopping in front of them. Bicycle accidents are frequently caused by interactions between bikers and other road users who employ high lights and horns. Since cyclists do not use lights, it is challenging to spot their bikes, which might make abrupt manoeuvres to the right or left without drawing attention from other road users. Cycling enthusiasts will therefore be able to communicate well with other road users.

Next, many advantages will be possible with cycling, such as improving mental wellness. Research demonstrates that people who lead physically active lifestyles have wellness scores that are 32% higher than inactive people (Jam Graeme Obree, 2020). Cycling mixes outdoor activity, sight-seeing, and physical activity. You have the option of riding alone, which gives you time to process issues or anxieties, or with a group, which widens your social circle. Cycling also helps people lose a lot of calories, which is another benefit. Graeme Obree, who has battled depression his entire life, told us: "Going out and riding will help [people suffering from depression]. In fact, half an hour of cycling at a moderate pace weighing 155 pounds on a stationary bike burns 260 calories. If you have more weight and cycle at a higher intensity, you will burn more calories. Then the heart will be healthier (Lancet, 1990).

Cardiovascular health can be enhanced by cycling. Regular cycling lowers high blood pressure, regulates blood sugar, and also helps to ward off heart attacks. Regular cycling increases the heart's ability to pump blood effectively, which can lead to an improvement in heart health. Additionally,

cycling raises your body's levels of good cholesterol while lowering your levels of bad cholesterol. As a result, artery plaque can be lessened.

Finally, cycling can deepen relationships because you can do it with friends or join a riding group. The pedalling and exhaustion shared are undoubtedly worthwhile the longer the journey. You can actually take part in a variety of bicycle events or campaigns. You can join many cycling groups as well. All family members can participate in cycling. This makes it a fun family activity since kids can participate.

2.2 CONCEPT/THEORY

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

However, as more and more people begin to own and join bike organisations, the phenomenon of cycling in Malaysia has become a buzzword (Kosmo, 2020). As more and more cyclists are spotted in traffic and recreational parks and share photos of their rides on social media from both politicians and artists, this sport is proving to be a trend. This study was carried out to determine the motivational factors and advantages behind Malaysia's rising cycling trend. With this, Malaysians' hearts begin to change toward bike sports. This development appears to be extremely positive because Malaysians are already accustomed to leisure and recreational activities. However, there are a small number of people or groups who scratch the charcoal as a form of entertainment in our celebration of something positive. When anything becomes popular, it frequently experiences tempias, whether positive or negative. Even with the justification that they are doing it to fill their free time, many people who cycle for pleasure also do it pretty "extremely." Some residents of Rawang are eager to paddle and provide service at the "corner" of Bukit Fraser, Pahang. To get to Tanjung Malim, Perak, some people are ready to paddle from Putrajaya. every week, hundreds of kilometres. Because it involves other road users, the safety of individuals who are willing to ride a bike for tens of kilometres is particularly concerning.

2.2.1 CYCLING SAFETY ON THE ROAD

(NAZLIN BALQIS BINTI AZMI)

Every year, the number of accidents involving bikers and motorists on the road rises. The most crucial factor that every user must consider in order to protect themselves and other road users is road safety. When riding a motorcycle or cycling on the road, everyone needs to be extra cautious. This is due to the fact that they are among the most vulnerable and high-risk groups of road users when it comes to being involved in car accidents. Some road safety precautions can be followed to reduce the risk of accidents:

a) Wear brightly colored clothes

Get in the habit of wearing brightly coloured clothing, particularly at night. Its purpose is to ensure that other road users are aware of cyclists on the road. Wearing black jerseys makes it difficult for other drivers to notice the biker.

b) Wear a safety vest

If cyclists are wearing dark colored clothing, make sure they are wearing safety vests. Other road users will be able to see them better thanks to the light reflection from this jacket.

c) Avoid wearing earphones

When riding a bicycle, many riders now utilise 'earphones,' which interferes with their hearing indirectly. This move will jeopardise safety because they will be unable to hear other cars' horn signals.

2.2.2 COMMON CAUSES OF CYCLING ACCIDENTS

(NAZLIN BALQIS BINTI AZMI)

For many people, cycling is a favoured means of transportation. Cycling has a number of advantages in addition to being a wonderful method to get your daily exercise. Cycling is both calming and stress-relieving. It is also an environmentally sustainable mode of transportation. Cycling has gained a lot of popularity in recent years. People cycle not only for fun, but also to go to work and complete tasks. Cycling has its disadvantages, the most serious is a bicycle -related road accident. Since bicycles do not provide any barriers to protect the rider from physical danger, these incidents

are common and very dangerous. The most common causes of bicycle accidents are getting hit by a car. Falling, colliding with something on the road, a terrible road, hitting a fixed item, or turning to avoid an animal are all possible reasons of a bicycle accident. However, being hit by a car is the most prevalent, because bicycles are much smaller than automobiles, and bikers are often unprotected, resulting in significant injury. A bike accident is caused by a number of causes. Bicycles, for example, are less visible. When driving around a bike, motorists must use particular caution. If they are distracted or inattentive while driving, it can have disastrous consequences for the bicyclist.

The following are some of the most common causes of bicycle accidents:

1) Vehicles turning into the path of cyclists

This is one of the most common causes of bicycle accidents. This situation frequently occurs when a driver of another vehicle overtakes the bike and then abruptly slows down to turn, placing the vehicle directly in the rider's path. Car drivers nearly always presume that there is enough room and time for the bike to slow down and avoid colliding with them. Drivers frequently acknowledge that they were unaware of the bicycle on the side of the road and hence did not perceive the need to take any measures.

2) Drivers failing to see cyclists when turning or changing lanes

This is another important cause of cyclist -related accidents. Due to its much slower speed, the car may take turns at high speed and, unable to stop in time, collide with cyclists. Another situation is when a car or truck underestimates the speed of the bike and moves into the rider's lane, causing the rider to not have enough time to react.

3) Bad road conditions

Roads that are poorly maintained and riddled with potholes are a cyclist's worst nightmare. Because cycles are so light, they can lose their balance or be destroyed on uneven roads, resulting in accidents and injuries. A cyclist who is harmed in a pothole accident may be eligible to compensation if carelessness can be shown.

2.2.3 BICYCLE ACCIDENT STATISTICS

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

PETALING JAYA: There were 56 cycling-related deaths between January and October, says the Bukit Aman Traffic Investigation and Enforcement Department. The department's director Deputy Comm Datuk Azisman Alias said that the number of cycling-related accidents has decreased from 2019. (The Star, 11 December 2020)

"The statistics of road accidents involving cyclists in 2019 showed that out of 201 cases, 107 were fatal with 35 leading to grievous injuries. The same statistics for 2020 from January to October, showed that out of 137 cases, 56 were fatal accidents.

"While there aren't any restrictions for cycling on the road, the department urges all cyclists to obey the rules and laws that have been put in place to ensure their safety and the safety of other road users," said DCP Azisman in a statement on Friday (Dec 11).

He added that other road users should also be more careful around cyclists as they were "quite exposed to dangers".

"The department also urges cyclists to pick their locations and time, such as areas with less traffic and not during rush hour. Bike owners should also ensure their equipment have safety features and that their cars are equipped with a roof rack carrier for those transporting bicycles," he said.

2.2.4 CYCLING EQUIPMENT

(NAZLIN BALQIS BINTI AZMI)

Road biking is great, we all know that. However, it carries some risks. Therefore, we must use certain equipment while riding a bicycle to avoid accidents.

A) Helmet



Figure2.2.4A: Helmet

The helmet is the most significant piece of riding safety equipment for reducing the danger of head and facial injuries to the rider. The inside layer of the cycling helmet is made of EPS foam to manage a crash or absorb a shock when cycling, while the outside shell is constructed of high-quality plastic and is coated with unique fibre to provide additional protection to the rider.

B) Glasses



Figure2.2.4B: Glasses

The single lens glasses are great for road races since they protect the rider's eyes from rain, sun, wind, dust, and other foreign particles. The cycling glasses are made to withstand the rider's movement.

C) Cycling shoes



Figure2.2.4C:Cycling shoes

Pedaling shoes are specially constructed footwear with custom-made bottoms that are specifically suited for pedalling. The thick soles help the cyclist grasp the pedals and provide proper grip and comfort. Other athletic shoes do not provide a secure grip on the pedal, resulting in injuries and accidents.

D) Gloves



Figure 2.2.4D: Gloves

The hand gloves aid in maintaining a secure grip on the handle bar. Cyclists are not permitted to hide their fingers during road races, according to UCI rules. Mitts are used to cover the fingers. The rider gains an aerodynamic advantage when speeding up the bike by wearing hand gloves.

2.2.5 SIGNAL LAMP

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

On the road, there are many different sorts of automobiles. Bicycles, motorcycles, automobiles, buses, and trucks are among them. Drivers rely heavily on lighting sources, especially when driving at night or in inclement weather, such as the rainy season. As a result, it's critical to take care of your car lights so that you can use them when the scenario calls for it while driving. Essentially, each car is outfitted with a variety of lights in various locations, each of which serves a distinct purpose.

A) Daytime Running lamp



Figure 2.2.5A: Daytime Running Lamp

Regardless of the weather or sunshine, it is a light that must be switched on when the car is running. This light is located on the headlight and will turn on as soon as the igniter is touched. LED lights are commonly used in city lights to save money.

B) Tail Lights



Figures 2.2.5B: Tail Lights

The back light is red, indicating that the vehicle in front of it will come to a halt. This light is a switch with a twilight light that is positioned in the back of the car. Because of its elegant and futuristic appearance, the lighting employed is usually a sort of LED lighting.

C) Low Beam

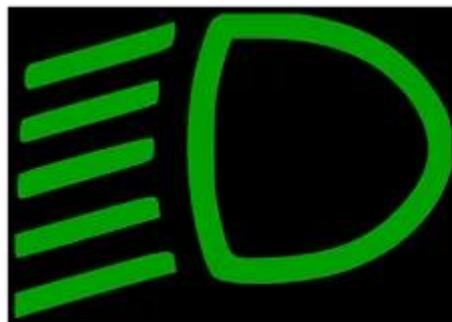


Figure 2.2.5C: Low Beam

Close-up lights' main purpose is to illuminate the road in front of the car across a short distance of roughly 5 metres. Low beams, as well as bright or well-lit lights, are widely utilised at night on crowded streets.

D) High Beam



Figure 2.2.5D: High Beam

When travelling at night with peaceful and dark road conditions, distant lights are utilised instead of close lights. This lamp has a range of around 10 metres.

E) Brake Lights

The brake lights have a distinguishing element, which is usually red. This light is situated in the back and serves as a warning to other drivers that your vehicle is about to come to a complete stop. When the brake pedal is pressed, this light will illuminate brightly. Keep an eye on all of your brake lights, including the third brake light, at all times.

F)Signal light



A signal light on another vehicle indicates whether the vehicle will turn right or left. These lights must be yellow to serve as a vehicle sign for plans and caution.

F) Hazard/Emergency Lights

These lights are only activated when the car is in an emergency and the left and right traffic lights are activated at the same time. To turn on this light, simply press the triangle key. However, this lamp should not be utilised when it is raining heavily.

2.2.6 PRODUCT ON THE MARKET

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

PRODUCT	MANUFACTURER	MATERIALS	FEATURES
 <p data-bbox="156 600 616 667">Adjustable Safety Cycling Running Visibility Reflective Vest</p>	Kuala Lumpur	Made of strong and well-constructed fabric	<ul data-bbox="1225 237 1425 371" style="list-style-type: none"> • Lightweight • Adjustable • Elastic reflective
 <p data-bbox="156 1055 616 1155">Usb Rechargeable Reflective Vest Backpack with LED Signal Remote Control</p>	Kuala Lumpur	Nylon + polyester	<ul data-bbox="1225 678 1441 1014" style="list-style-type: none"> • Adjustable shoulder straps and belts • Zippered pocket for LED panel • Breathable mesh pocket • Rechargeable
 <p data-bbox="156 1541 616 1603">X-TIGER Windproof Sleeveless Cycling Vest</p>	Overseas	Nylon	<ul data-bbox="1225 1167 1441 1440" style="list-style-type: none"> • Sleeveless design • Full length zipper • Elastic band on sleeve • Lightweight • Rainproof


 <p>High Visibility Reflective Vest Jacket</p>	Overseas	Polyester Mesh Cloth	<ul style="list-style-type: none"> • Reflective
 <p>Night Reflective Jacket Windbreaker Safety Jacket</p>	Kuala Lumpur	Polyester	<ul style="list-style-type: none"> • Fully Reflective • Breathability

Table 2.2.6 Product on The Market

2.4 SUMMARY

In conclusion, the cycling community must invest in this vest to ensure that bicycle accidents are significantly decreased and never occur again. Bicycle safety equipment is now used for more than just accident prevention; it is also intended to help manufacturers increase their sales. As a result, more people can ride bicycles on the road safely thanks to this vest. Finally, it's possible that the community will start to show more interest in this aspect of bicycles.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

The use of safety devices for cyclists should be prioritized. This chapter explains the methods and materials used to produce this product.

3.2 DESIGN RESEARCH

(NAZLIN BALQIS BINTI AZMI)

This study was conducted using an real type project to study the effectiveness of this vest for use on cyclists. The study was focused on discussions among group members about safety and reference data analysis. This research is also to have a positive impact to be applied to society.

3.2.1 DESIGN SELECTION PROCESS

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

For this project, several circuit and vest ideas have been chosen. One of them is the vest that is sold in stores. Following that, there are two different circuit methods: employing a receiver or a relay. The gyro sensor will be put on the hand to detect movement if utilising a receiver, which is one difference between the two features. The gyro sensor will be positioned on the top region of the shoulder if a relay is being used. Relays are therefore more practical and less expensive than receivers. Here are some samples of many vest types that are available.



Figure 3.2.1.1 Choice 1



Figure 3.2.1.2 Choice 2



Figure 3.2.1.3 Choice 3

As a result of this experimental , we found out that choice 3 is the best safety vest than other choice. Here are the factors why we choose choice 3 that might affect a few designs as follows:

A)Lightweight

Quality polyester material is durable and light, this professional cycling bag design is different from other backpack that is with larger figure, it is simple and super lightweight that is good for outdoor activities.

B)Aesthetic Value

The design produced is more practical, the latest and modern design and fulfil to the current market taste and can provide comfort.

C)Ergonomic

From Figure 3.2.1.3 it has an adjustable size.

D)Safety

Designed with reflective strips on the back and front that is conspicuous in the dark straps to keep you safe.

3.2.2 METHODS/PROCESSES/TECHNIQUES OF PROJECT PRODUCTION

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

1) Method of Project Development

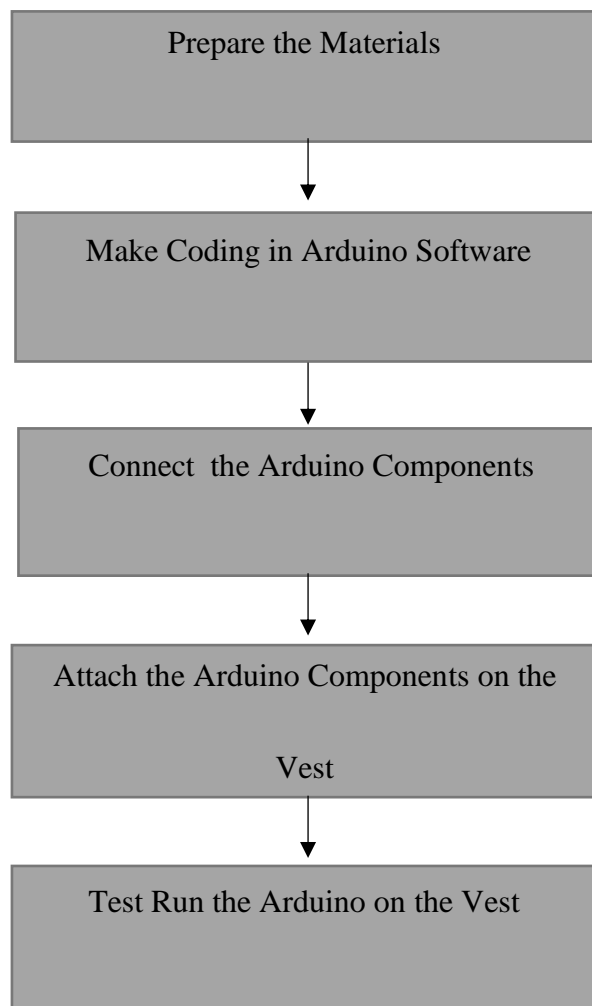


Table 3.2.2.1A Flow Chart

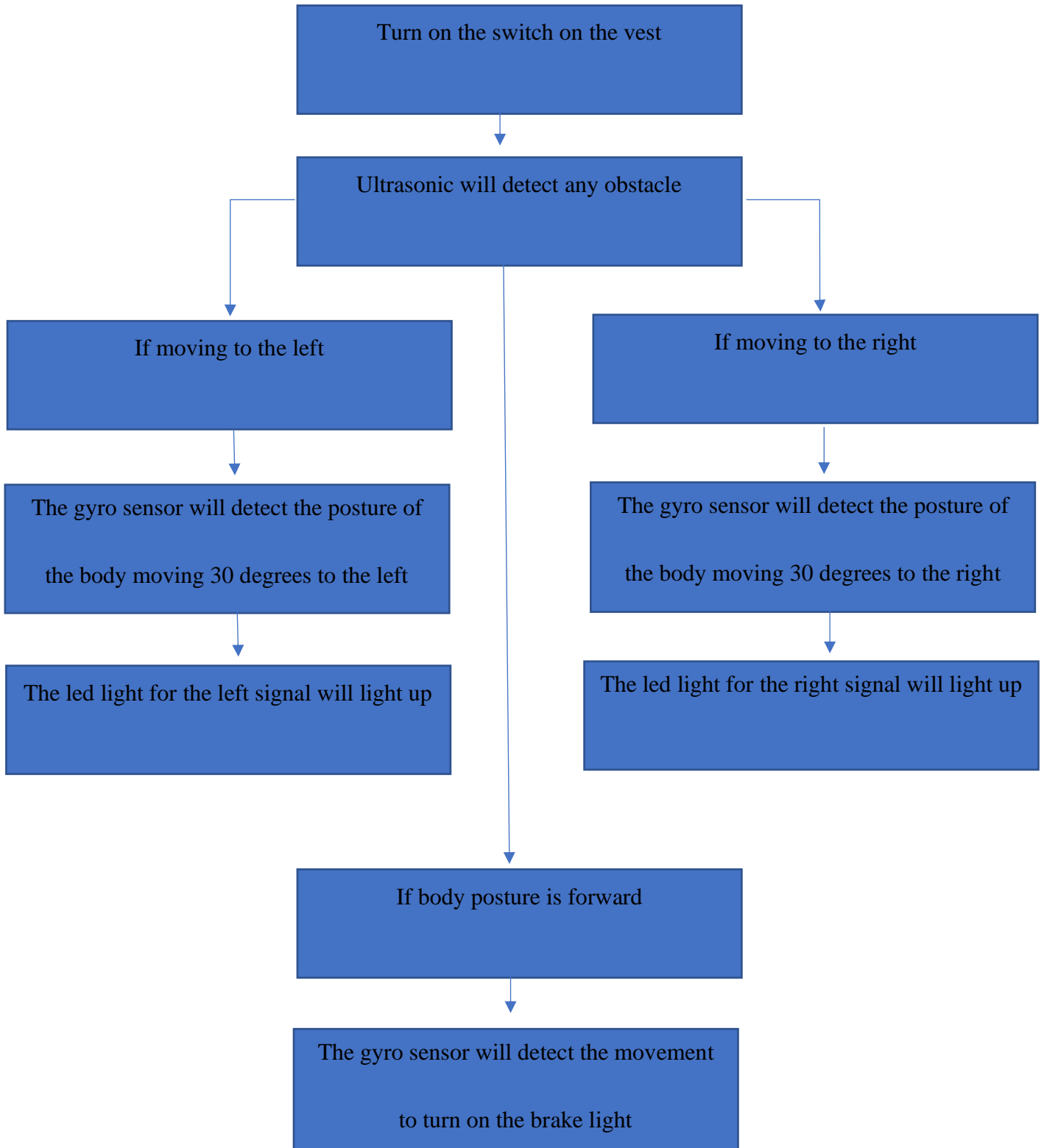


Table 3.2.2.1B Operation Flow Chart

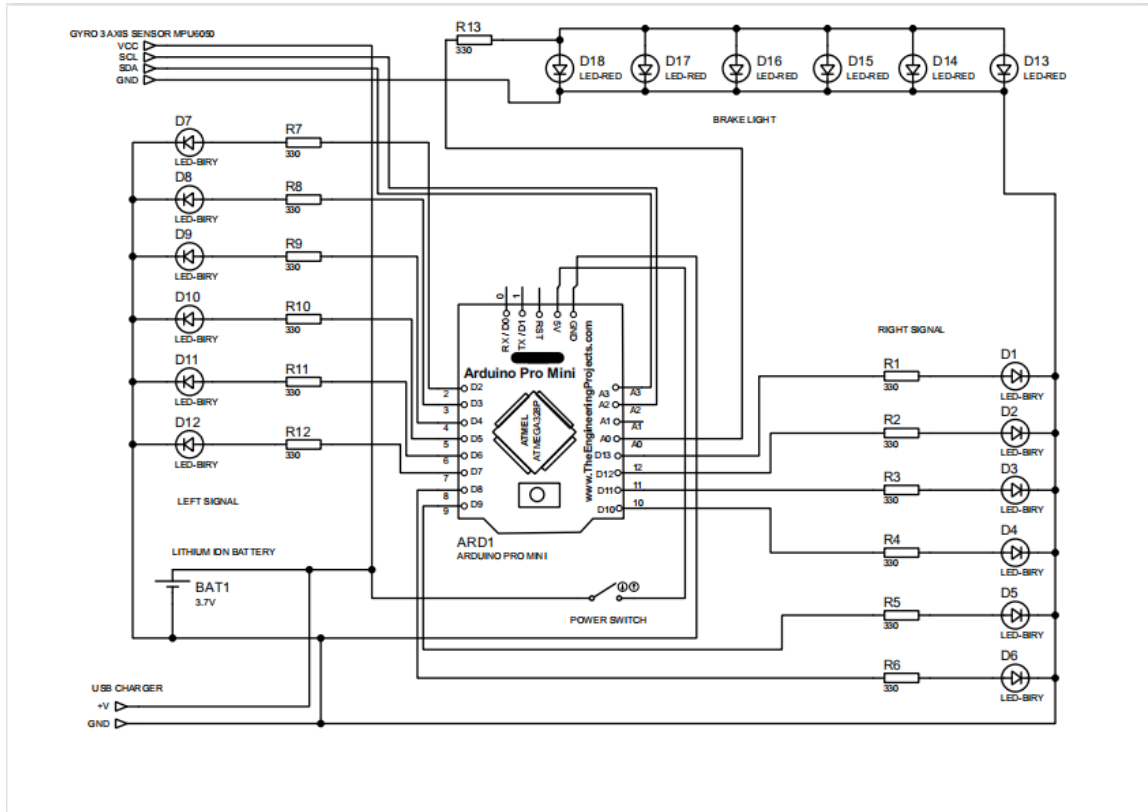

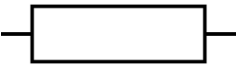



Figure 3.2.2.1C Drawing Circuit

	Diode
	Resistance
	Power Switch


	Battery
---	---------

Table 3.2.2.1D Legend

2)Processes of Project Production

Step 1:Prepare the materials

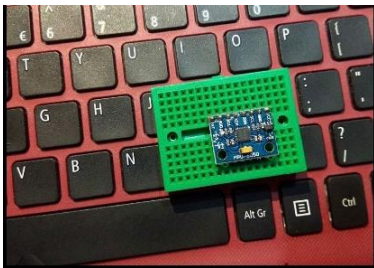
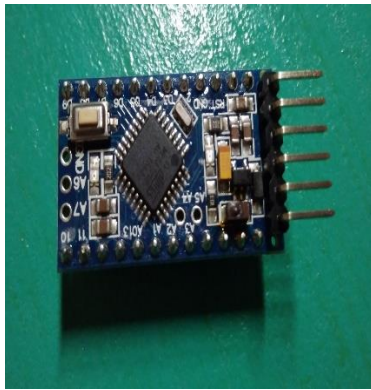


Figure 3.2.2.2A Prepare the materials

The figure 3.2.2.2 a shows the first step like the flow chart in the table 3.2.2.1 a which is to prepare the materials to produce this product.

Step 2:Make coding in Arduino software

```
Coding | Arduino 1.8.19
File Edit Sketch Tools Help
Coding
4
5 #define LD1 2
6 #define LD2 3
7 #define LD3 4
8 #define LD4 5
9 #define LD5 6
10 #define LD6 7
11
12 #define RD1 8
13 #define RD2 9
14 #define RD3 10
15 #define RD4 11
16 #define RD5 12
17 #define RD6 13
18
19 #define GLD A0
20 #define GRD A1
21
22 int signal=0;
23 int ALM=0;
24 int MODE=0;
25 int TimerSig=0;
Done compiling
Sketch uses 2818 bytes (8%) of program storage space. Maximum is 32256 bytes.
Global variables use 186 bytes (9%) of dynamic memory, leaving 1862 bytes for local variables. Maximum is 2048 bytes.
```

Figure 3.2.2.2B Make coding in Arduino software

The second step is to generate coding using adruino software. The production of coding is done together by using the library in this adruino software. This can simplify the process of producing coding to be included in the adruino pro mini.

Step 3: Connect the Arduino components

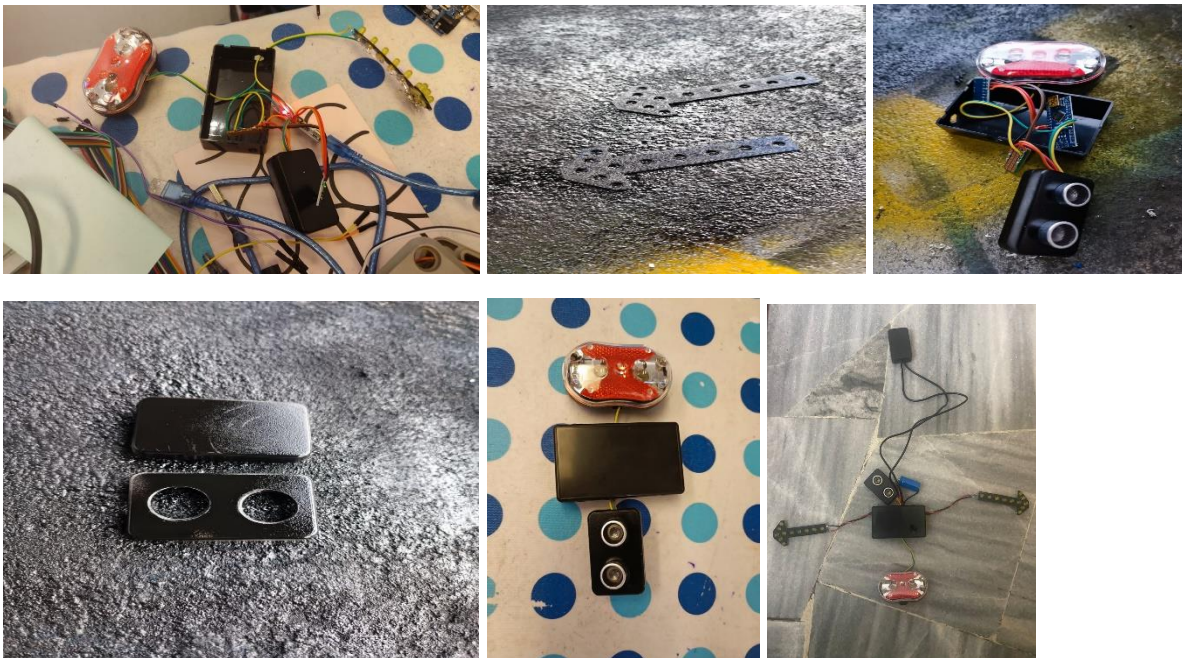


Figure 3.2.2.2C Connect the Arduino components

The third step is to connect the adruino components. The brake light is placed at the top, the left and right signals are placed at the side while the ultrasonic sensor is placed at the bottom.

Step 4: Attach the Arduino components on the vest



Figure 3.2.2.2D Attach the Arduino components on the vest

The fourth step is to place the adruino component to the vest being used. The joining process of this component uses a hot glue gun and several stitches to further strengthen the position of the component so that it does not fall or even be pulled from the vest.

Step 5: Test run the Arduino on the vest



Figure 3.2.2.2E Test run the Arduino on the vest

The last step is to test run this vest where it works as set in arduino.

3) Materials and Equipment

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

I) Engineering Drawing

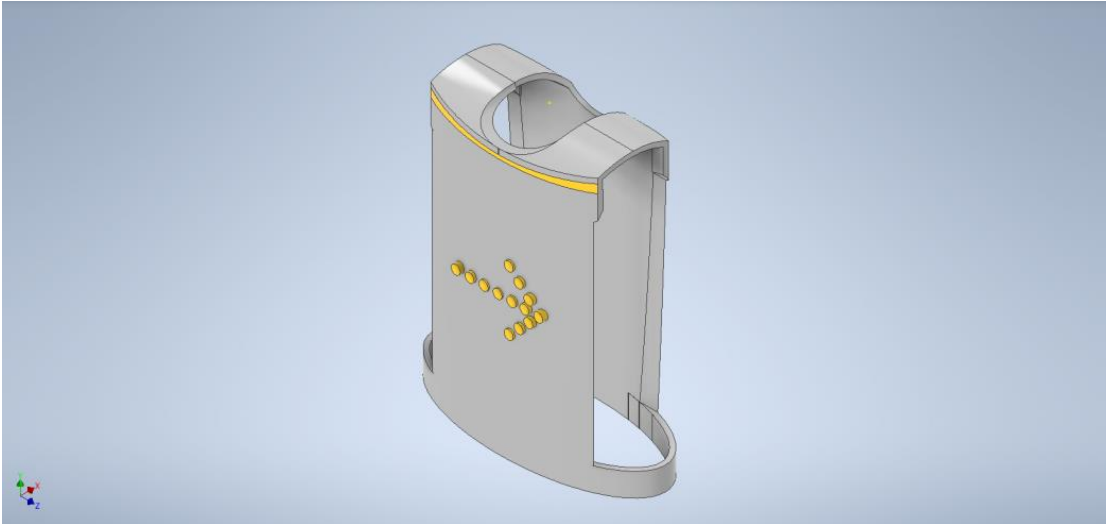


Figure 3.2.2.3A Engineering Drawing

II) Drawing Orthography

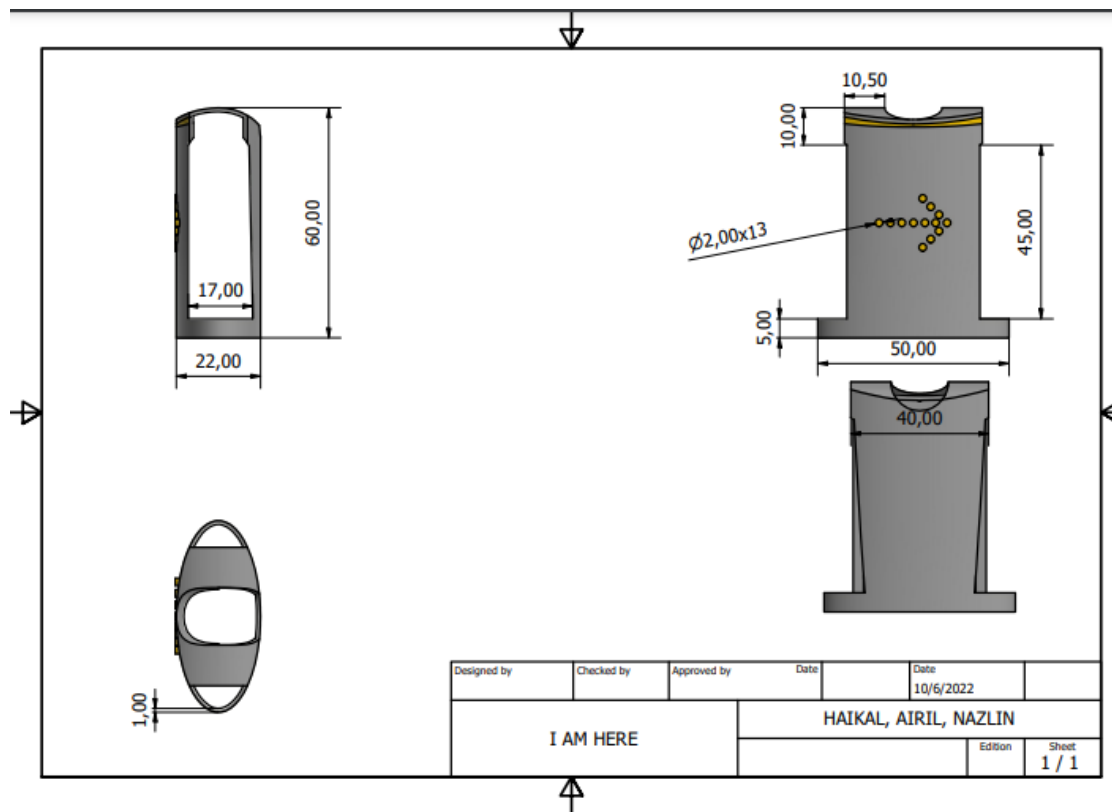


Figure 3.2.2.3B Drawing Orthography

**4) Cost Estimates for the Project
(NAZLIN BALQIS BINTI AZMI)**

Cost is an important consideration in the production process, especially when it comes to laws. The company will lose money if it fails to examine and calculate costs. The costs of production must be thoroughly and correctly calculated. All of the prices included in this section are materials for making project ‘I Am Here’. The cost of materials needed from start to finish is the cost of the safety vest.

NO	MATERIAL	QUANTITY	PRICE (RM)
1.	Arduino Pro Mini	1	RM 59.00
2	Resistance 330 Ohm	50 pieces	RM 5.00

3	Rocker Switch Poles: DPDT Size: 31 x 25 x 35mm Rated Voltage:AC 250V/16A 125V/20A Material	1	RM 6.00
4	Gyro 3 Axis Sensor MPU6050	1	RM10.50
5	Lithium ion battery 3.7v	1	RM 15.00
6	759 Premium Male/Male Jumper Wires, 40 x 3" (75mm)	50 pieces	RM4.50
7.	MCBB400 Breadboard, Solderless, ABS (Acrylonitrile Butadiene Styrene), 8.3mm, 54.5mm x 83.5mm	1	RM6.00
8	B3F-1000 Tactile Switch, B3F Series, Top Actuated, Through Hole, Round Button, 100 gf, 50mA at 24VDC	1	RM1.36
9	Soldering iron with wire	1	RM15
10	5L Running Bag Women Men Running Vest Outdoor Cycling Backpack Hydration Backpack Sport Riding Hiking Water Bag	1	RM52.99
11.	Grove Ultrasonic Sensor Measure Distance for Arduino Raspberry Pi Microbit	1	RM25.90
			RM 201.25

Table 3.2.2.4A Material and Overall Cost

3.2.3 Data Analysis Method

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

In general, the research or level of need for these facilities has been determined using the quantitative methodology that has been indicated regarding the level of demand for amenities. This has also been investigated and evaluated, it has the potential to increase the safety level of cyclists. Because of how simple it is to operate, the Arduino Pro Mini was chosen to be used on the vest. According to the program's purpose, one of the advantages of 'I Am Here' is that it can aid in reducing the number of bicycle accidents. This is because led lights can be used in many other ways.

3.3 SUMMARY

After researching the study methodology, a lot of information can be gathered about safety vest. This information provides reference on the design concepts, dimensions and cost estimates that will be used in the production of the project. This information is also very useful as a guide to help simplify the design process as well as develop portable study prototypes.

CHAPTER 4

RESEARCH INITIAL FINDINGS

4.1 INTRODUCTION

(NAZLIN BALQIS BINTI AZMI)

This is the study's final chapter, and it will address the benefits and standards employed, as well as research recommendations for cycling safety jackets. The experimental design's test findings have demonstrated to have a favourable impact on users.

4.2 FINDING RESEARCH

(MOHAMAD HAIKAL AIMAN BIN MOHD HASHIM)

The results of the survey and discussions with the supervisor showed that this safety vest is very helpful and has a positive impact on its use. On the whole once this 'I Am Here' safety vest is successfully produced and used then all the objectives of the study stated in chapter 1 can be produced.

Every project implemented and completed must have its own advantages and disadvantages. After the manufacture and testing of this project, it was found that this "I Am Here" safety vest has several advantages and disadvantages. As stated in the purpose of this project, one of the advantages is that it can emit signals that have been programmed into the arduino such as right and left arrows and brake signals. Furthermore, this "I Am Here" safety vest has an IoT feature that uses some electronic equipment such as arduino pro mini. Furthermore, at the same time it can reduce its major road accidents on cyclists. This is because the wearer of this vest can be seen at night and the color of the lights on the vest has good lighting. The downside to this project is the way to replace the battery when the lights are not working.

So we have made a survey using google form for 5 days to ensure that this project gets response from

other people. In addition, the survey received feedback from 29 people. The next question that we want to emphasize in google form is as follow:

A)Initial Survey



Figure 4.2A i

Figure 4.2A i

As can be seen in Figure 4.2A i, the majority say safety equipment is affordable for every consumer. Therefore, we set the estimated cost of this vest at RM250.

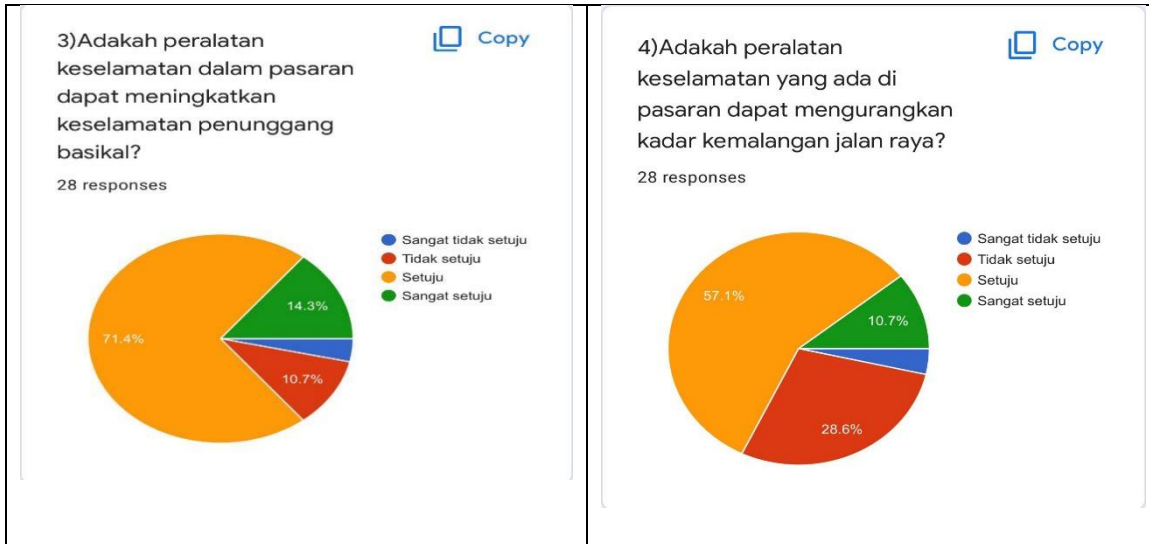


Figure 4.2A ii

Figure 4.2A ii

As can be seen in figure 4.2A ii, they agreed that bicycle safety equipment can help prevent road accidents. As a result, we came to an agreement to develop this safety vest in order to limit the number of bicycle accidents.



Figure 4.2A iii

Figure 4.2A iii

As can be seen in figure 4.2A iii, 78.6% of respondents agreed that this safety equipment is simple

to use. As a result, a sensor motion system is used. Users may find it easier to signal to other road users as a result of this.



Figure 4.2A iv

Figure 4.2A iv

As can be seen in figure 4.2A iv, this safety equipment has to be improved, according to 53.6 percent of respondents. As a result, we enhanced the existing safety vest. Where we employ an IoT system that is current with the globalisation period.



Figure 4.2A v

Figure 4.2A v

As can be seen in figure 4.2A v, according to the data, 67.9% of cyclists have safety equipment on their bikes. As a result, we agreed to work on this project because there is a strong demand for bicycle safety equipment.

Conclusion

Based on the preceding sentence, we can conclude that there are a large number of favourable responses. Furthermore, consumers reacted well to this novel product. As a result, if this product is sold, consumers, particularly cyclists, are likely to respond positively.

B)Final Survey

This survey is done after the vest has been completed and is working as planned.



Figure 4.2B i

Figure 4.2B i

According to the figure, 68.8% of respondents believe that this device can lower traffic accidents. while 31.3% disagreed. This survey demonstrates that this product can lower the rate of traffic accidents.



Figure 4.2B ii

Figure 4.2B ii

The market response to this product is the subject of this survey. More over half strongly agree with 62.5 percent, while the remaining respondents agree, as seen in the pie chart. Consequently, the market will accept this goods favourably.



Figure 4.2 B iii

Figure 4.2 B iii

Indicate whether or not motorcycle riders can use this product in the figure. A quarter of respondents agreed, up to half indicated strong agreement, while the remaining respondents disagreed. In conclusion, riders of motorcycles can use this product.



Figure 4.2 B iv

Figure 4.2 B iv

According to the pie chart, up to 75% of respondents indicated yes, while 25% indicated that led lighting was a possibility. In order to improve this product, the battery voltage must be raised in order to provide better lighting.

CONCLUSION

After reviewing and evaluating the complete final survey. This project has the potential to advance further and benefit users.

4.3 RECOMMENDATION

(MUHAMMAD AIRIL MIKHAIL BIN OSRIZAM)

Finding a more suitable design approach, such as including a spot to put the phone on the vest, is one proposal that might be made. Another suggestion is to make the vest so that it may be used with a GPS tracker to speed up search efforts in the event of an emergency.

4.4 RESULT AND DISCUSSION

(NAZLIN BALQIS BINTI AZMI)

RESULT

DATA TABLE	TURN LEFT	TURN RIGHT	BRAKE
Right LED	0	1	0
Left LED	1	0	0
Brake	1	1	1
Gyro Sensor	1Left	1 Right	1 Front
Ultrasonic Sensor	150 cm	150 cm	150 cm

Table 4.41 Table Data Result



Figure 4.4.1 Left signal



Figure 4.4.2 Right signal



Figure 4.4.3 Brake light

DISCUSSION

The project's intended outcome is to equip a cyclist with safety aid using a modified vest and sensor function. The application of Arduino Pro Mini helps to integrate the signal lights, brake lights, and alarm on

ultrasonic features on this vest can let other drivers see and alert on the existence of the cyclist. This project easily to use, where user only need to make a movement to alert other vehicle driver when they need to make a turn or stop the bicycle.

4.5 SUMMARY OF CHAPTER

At the end of this chapter, each experiment performed must be appropriate for the project to succeed well. In addition, the need for this 'I Am Here' is to create awareness of the importance of safety equipment on cyclists. One of its advantages is that it can reduce the accident rate, especially among cyclists.

CHAPTER 5

DISCUSSION & CONCLUSION

5.1 INTRODUCTION

The choices chosen for this chapter are based on all of the findings from the experiments carried out and the discussions in the preceding chapters. The goals of the study and the recommendations made for the study are also connected topics in this chapter. Additionally, conclusions for this test have been drawn.

5.2 DISCUSSION

As for the discussions we have had, safety tests on cyclists have been carried out throughout this process. The test has been carried out according to safety aspects, traffic rules, and causes of bicycle accidents that can be applied to cyclists while cycling on the road. This product has been tested by experienced cyclists and friends. Next, we have also done this study on the road, and the results of using the I AM HERE vest on the road can be tracked and can be noticed by other road users, especially at night. In addition, the level of effectiveness of this vest is evaluated based on road users who can detect the existence of the cyclist. In fact, this vest can illuminate the signal and brake lights that can be seen by other road users.

5.3 CONCLUSION

The main objective of this study is to determine the number of bicycle accidents that occur throughout Malaysia. The collection of data and information on safety aspects and accident factors for bicycles is done through news reports and interviews with bicycle club association members as well as cyclists on the road for whom cycling has become a hobby and a daily activity on the weekends. The data obtained from us will be evaluated with the help of experienced road cyclists. A safety study was conducted to prove that the jackets worn by individuals who ride bicycles are effective and help in

their safety. In this study, the effectiveness of this safety vest was more focused on impacting the rider's existence when turning. When turning right or left, most drivers can see the cyclist if they flash their turn signal. From the evaluation made, overall, the signal lights installed on the vest are effective, comply with the specified design characteristics, and require a low cost to provide safety to the cyclists. In addition, the workforce required in the manufacturing process of this product is as many as four people. This safety vest is able to provide guaranteed safety during the day and at night. If the battery in this 'I AM HERE' vest is low, it must be charged in order to provide bright and clear lighting. Overall, with the existence of the 'I AM HERE' vest, it can prevent road accidents involving cyclists and other road users with the presence of a signal light that informs if the cyclist wants to turn. With its guaranteed safety, the 'I AM HERE' jacket also helps the community make cycling a hobby.

5.4 PROPOSAL

A safety vest is a method used to protect the safety of cyclists riding on the road, especially at night, in order to reduce the number of road accidents involving cyclists. Here are some things that are suggested to further improve the research that will be done on the safety vest to find out its level of effectiveness:

- 1) Propose the distance of the ultrasonic sensor, which was originally 1.5 metres to 4 meters, to be able to detect other vehicles earlier before the vehicle approaches closer.
- 2) Recommend not using the gyro sensor to turn on the sensor light and replacing it with a button switch placed on the bicycle handle to make it easier for the cyclist to just press the switch and provide comfort.
- 3) Suggest replacing the type of jacket fabric with DWR-grade fabric because it is more waterproof when it rains.

5.4.1 Recommended to Jacket Details

The signal attached to this vest is designed according to the shape and size used on cars or motorbikes, signal left and right because it will be easy to see, and the size of the signal is 200mm. According to the specified specifications, the size of the ultrasonic sensor used is 45 mm wide and 20 mm high, and

the distance needed to detect the car's presence is 1500 mm. This 'I AM HERE' vest can emit right and left signals to let drivers know which way the cyclist is going, as well as emit a sound when the ultrasonic sensor detects the presence of other road users. In addition, the 'I AM HERE' vest should also lower its shoulders at a 135-degree angle to send out the signal, while if you want to break, you should bend your body slightly. This happens because the signal that occurs involves the gyro sensor. Some detailed information about the proposed safety vest:

- Type – Vest Outdoor Cycling Backpack Hydration
- Cost – RM203.14
- Material – Polyester & LED strips
- Advantages - Safety is guaranteed by informing other road users in which direction to go (signal).

5.5 SUMMARY

Based on the results of the tests conducted on cyclist safety vests, it is possible to conclude that the 'I AM HERE' vest has achieved the study's goal of increasing cyclist safety on the road. In addition, road accidents involving cyclists can be avoided. Therefore, other communities will be more interested in this cycling activity because they are confident that the existence of this 'I AM HERE' vest can provide more reliable safety.

APPENDIX

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safety/?gclid=Cj0KCQjw17qSBhD-

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GANTT CHART

SESSION : 2:2021/2022

DEPARTMENT : MECHANICAL ENGINEERING

CODE/COURSE : DJJ40182 PROJECT 1

WEEK/ PROJECT ACTIVITY	STATUS	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14
		Project briefing. Brainstorming.	P	█											
	A	█													
Introduction of the project - Define Problem Statement. - Identify project objectives - Project scopes and limitations - Identify project title	P		█	█	█										
	A		█	█	█										
Organize and write the project proposal	P					█	█	█	█	█	█	█	█	█	█
	A					█	█	█	█	█	█	█	█	█	█
Literature Review						█	█	█	█						

- Include at least 5 cases from - Citation references	P																
	A																
Project Methodology - Define specific research and method used - Able to specify the project scope and the significance to mankind - Design and develop product	P																
	A																
Resources (materials, tools, software, hardware, etc) identification and selection	P																
	A																

Legend:



Planning



Actual



SESSION : 1:2022/2023

DEPARTMENT : MECHANICAL ENGINEERING

CODE/COURSE : DJJ50193 PROJECT 2

	WEEK/ PROJECT ACTIVITY	STATUS	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
1	Project briefing, iSOLMS briefing	P															
		A															
2	design thinking / Arduino workshop	P															
		A															
3	Technical writing workshop	P															
		A															
4	Project Planning	P															

	project requirement		■	■															
	project plan		■	■															
	project scope and limitation		■	■															
	project methodology		■	■															
		A																	
5	Project Development	P		■	■	■													
	project development details	P		■	■	■													
	project techniques and tools	P		■	■	■													
		A																	
6	validity and reliability measurement	P				■													
	project results and analysis	P				■													
		A																	
7	Project report writing	P				■	■	■	■	■	■	■	■	■	■	■	■	■	■
		A																	
8	Technical Paper review by supervisor	P																■	
		A																	
9	Project Inventory Form submission	P																■	
	Poster review by supervisor	P																■	
		A																	
10	PITEC JKM (Project Exhibition and Presentation)	P																	■
	Logbook and report submission	P																	■
		A																	
11	PITEC 3 PSA (Project Exhibition and Presentation)	P																	■
		A																	

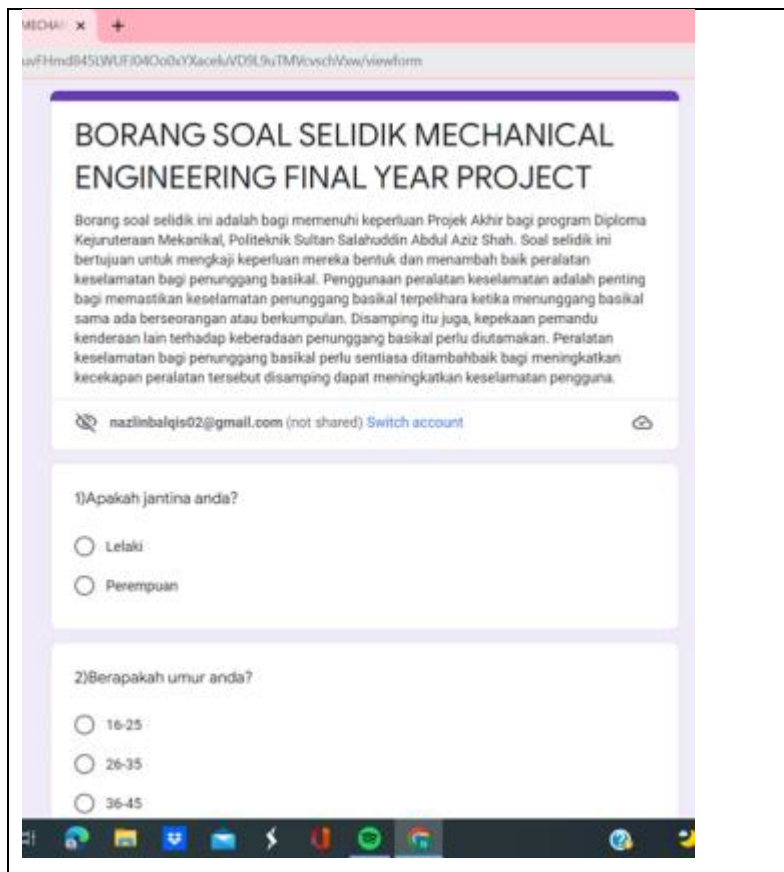
 Planning
 Actual

PROJECT COST ESTIMATES

NO	NAME	COST (RM)
1	<p>Material</p> <ul style="list-style-type: none"> - Arduino Pro Mini - Resistance 330 Ohm - Rocker Switch Poles: DPDT Size: 31 x 25 x 35mm Rated Voltage:AC 250V/16A 125V/20A Material - Gyro 3 Axis Sensor MPU6050 - Lithium ion battery 3.7v - 759 Premium Male/Male Jumper Wires, 40 x 3" (75mm) - MCBB400 Breadboard, Solderless, ABS (Acrylonitrile Butadiene Styrene), 8.3mm, 54.5mm x 83.5mm - Soldering iron with wire - 5L Running Bag Women Men Running Vest Outdoor Cycling Backpack Hydration Backpack Sport Riding HikingWater Bag - Grove Ultrasonic Sensor Measure Distance for Arduino Raspberry Pi Microbit 	201.25
2	<p>Equipment</p> <ul style="list-style-type: none"> - Cutter - Hot glue gun 	10.00
3	Workers' wages (3 People)	30.00
4	Delivery Item	40.00

**TOTAL:
RM281.25**

QUESTIONARE



The image shows a screenshot of a Google Form titled "BORANG SOAL SELIDIK MECHANICAL ENGINEERING FINAL YEAR PROJECT". The form is displayed in a browser window with the URL "uwFHmd8H5lWUF104Co0uYXaceluV08L9uTM/cvschVaw/viewform". The form content includes a detailed introduction paragraph about the purpose of the questionnaire for a diploma project at Politeknik Sultan Salahuddin Abdul Aziz Shah, focusing on motorcycle safety equipment. Below the text, there is a user profile for "nazlinbalqis02@gmail.com" and two multiple-choice questions: "1)Apakah jantina anda?" with options "Lelaki" and "Perempuan", and "2)Berapakah umur anda?" with options "16-25", "26-35", and "36-45". The Windows taskbar is visible at the bottom of the screenshot.

BORANG SOAL SELIDIK MECHANICAL ENGINEERING FINAL YEAR PROJECT

Borang soal selidik ini adalah bagi memenuhi keperluan Projek Akhir bagi program Diploma Kejuruteraan Mekanikal, Politeknik Sultan Salahuddin Abdul Aziz Shah. Soal selidik ini bertujuan untuk mengkaji keperluan mereka bentuk dan menambah baik peralatan keselamatan bagi penunggang basikal. Penggunaan peralatan keselamatan adalah penting bagi memastikan keselamatan penunggang basikal terpelihara ketika menunggang basikal sama ada berseorangan atau berkumpulan. Disamping itu juga, kepekaan pemandu kenderaan lain terhadap keberadaan penunggang basikal perlu diutamakan. Peralatan keselamatan bagi penunggang basikal perlu sentiasa ditambahbaik bagi meningkatkan kecekapan peralatan tersebut disamping dapat meningkatkan keselamatan pengguna.

nazlinbalqis02@gmail.com (not shared) [Switch account](#)

1)Apakah jantina anda?

Lelaki

Perempuan

2)Berapakah umur anda?

16-25

26-35

36-45

MECHA: x +
PuvFHmd845LWUFJ04Oo0xYXaceluVD9L9uTMVcvschVxw/viewform

2) Berapakah umur anda?

16-25

26-35

36-45

46 dan ke atas

3) Berapa jam seminggu anda menunggang basikal?

Kurang daripada 5 jam

5-10 jam

11-20 jam

21 jam dan ke atas

4) Apakah sebab anda menunggang basikal?

Riadah

Pertandingan

Hobi

Pengangkutan

MECHA: x +
7Hmd845LWUFJ04Oo0xYXaceluVD9L9uTMVcvschVxw/viewform

5) Apakah jenis basikal yang anda guna?

BMX

Mountain bike

Racing bike

Hybrid bike

Other: _____

PERNYATAAN
ARAHAN: Pilih salah satu pernyataan di bawah yang paling sesuai dengan penilaian anda. Skala penilaian adalah seperti berikut:

- Sangat tidak setuju
- Tidak setuju
- Setuju
- Sangat setuju

1) Adakah anda/basikal anda dilengkapi dengan alat keselamatan semasa menunggang basikal?

Sangat tidak setuju

Tidak setuju

Setuju

Sangat setuju

1041 x +

fHmdB45LWUFJ04Oo0xYXaceluVD9L9uTMVcschVww/viewform

2)Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran mampu dimiliki oleh semua penunggang basikal?

Sangat tidak setuju

Tidak setuju

Setuju

Sangat setuju

3)Adakah peralatan keselamatan dalam pasaran dapat meningkatkan keselamatan penunggang basikal?

Sangat tidak setuju

Tidak setuju

Setuju

Sangat setuju

4)Adakah peralatan keselamatan yang ada di pasaran dapat mengurangkan kadar kemalangan jalan raya?

Sangat tidak setuju

Tidak setuju

MECHA1 x +

lvfHmdB45LWUFJ04Oo0xYXaceluVD9L9uTMVcschVww/viewform

Tidak setuju

Setuju

Sangat setuju

5)Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran mudah untuk digunakan?

Sangat tidak setuju

Tidak setuju

Setuju

Sangat setuju

6)Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran perlu ditambahbaik?

Sangat tidak setuju

Tidak setuju

Setuju

Sangat setuju

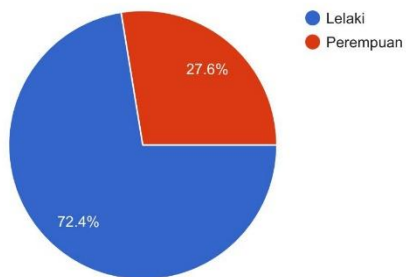
Submit Clear form



1)Apakah jantina anda?

29 responses

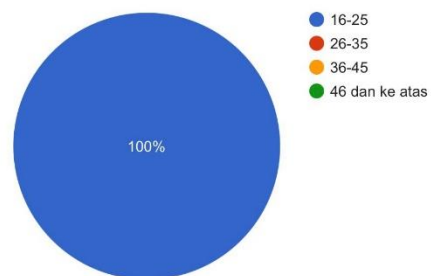
 Copy



2)Berapakah umur anda?

29 responses

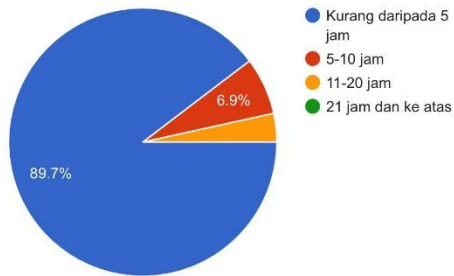
 Copy



3) Berapa jam seminggu anda menunggang basikal?



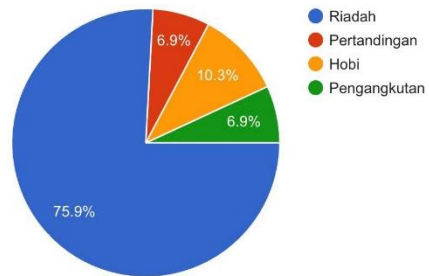
29 responses



4) Apakah sebab anda menunggang basikal?



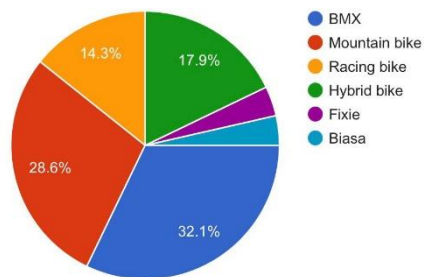
29 responses



5) Apakah jenis basikal yang anda guna?



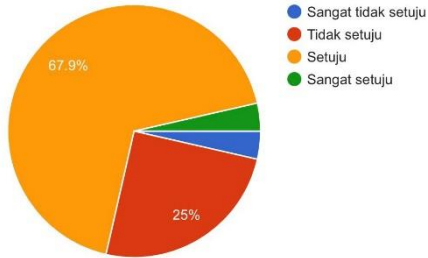
28 responses



1) Adakah anda/basikal anda dilengkapi dengan alat keselamatan semasa menunggang basikal?



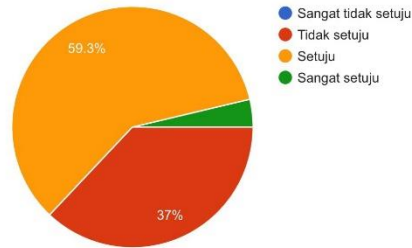
28 responses



2) Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran mampu dimiliki oleh semua penunggang basikal?



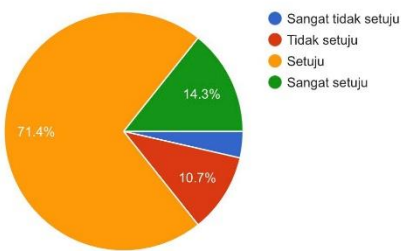
27 responses



3) Adakah peralatan keselamatan dalam pasaran dapat meningkatkan keselamatan penunggang basikal?



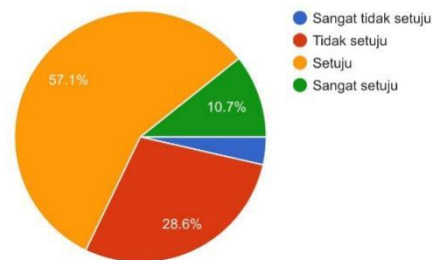
28 responses



4) Adakah peralatan keselamatan yang ada di pasaran dapat mengurangkan kadar kemalangan jalan raya?



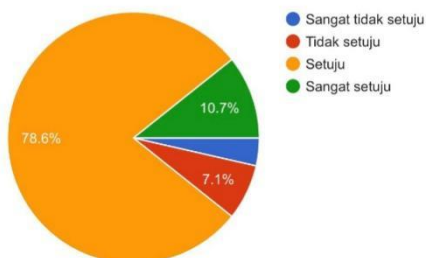
28 responses



5) Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran mudah untuk digunakan?



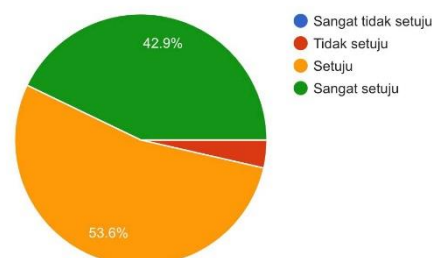
28 responses



6) Adakah peralatan keselamatan bagi penunggang basikal dalam pasaran perlu ditambahbaik?



28 responses



FLOW CHART

