

**POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH**

**MULTIFUNCTION SHOES**

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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 : MULTIFUNCTION SHOES**

**SESI : JUN 2020**

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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 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;

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## **ACKNOWLEDGEMENT**

Alhamdulillah , In the name of Allah the most gracious and the most precious, first and foremost , I would like extend our deepest praise to Allah SWT who given us the patient , strength ,determination, obstacle that helping us to think wisely in making a decision and courage to completed this project .Plus, We would like to thank Sultan Salahuddin Abdul Aziz Shah Polytechnic and Mr. Noorazlan Bin Mohd Samsuddin as supervisor for helping us in terms of guidance, providing some information and ideas in making this final project a success.

## **ABSTRACT**

Shoes are the most important thing in our lives. Today, shoes that were originally created to protect the feet, have offered a wide range of uses. This design study was triggered when we looked at shoes that have a variety of shapes and functions, trying to put them together and combine them into two in one. The development of this product is to help people to be able to facilitate them in daily life. If we look today, everyone must have more than one pair of shoes, where these many shoes when mixed in a family will cause the shoe storage space to be limited and will be scattered which will make the house not beautiful to look at. A shoe design study was developed to address this problem. This shoe design has more special features than other shoes, where the soles of these shoes can be changed to other shoe soles according to their respective uses and purposes. The materials used to connect the shoes are made of strong and stainless material which makes the quality of the shoes more guaranteed. The findings of the study are also conducted, where the study shows, using these shoes can reduce the cost of shoes where the price of two pairs of shoes that previously cost RM150 can be reduced by 40% when there are two shoes in this one.

## **ABSTRAK**

Kasut merupakan benda yang paling penting didalam kehidupan kita. Pada hari ini, kasut yang pada asalnya dicipta untuk melindungi kaki, telah menawarkan kepelbagaian penggunaan. Kajian reka bentuk ini tercetus apabila kami melihat kasut yang mempunyai pelbagai bentuk dan fungsi, cuba disatukan dan digabungkan supaya menjadi dua dalam satu. Pembangunan produk ini adalah untuk membantu orang ramai supaya dapat memudahkan mereka dalam kehidupan seharian. Jika kita lihat pada hari ini, setiap orang pasti memiliki lebih daripada sepasang kasut, dimana kasut yang banyak ini apabila dicampurkan didalam sebuah keluarga akan menyebabkan ruang penyimpanan kasut menjadi terhad dan akan berselerak yang akan menjadikan rumah tersebut tidak cantik mata memandang. Satu kajian reka bentuk kasut dibangunkan bagi mengatasi masalah ini. Reka bentuk kasut ini mempunyai ciri yang lebih istimewa berbanding kasut-kasut yang lain, dimana tapak kasut ini mampu ditukar kepada tapak kasut yang lain mengikut kegunaan dan tujuan masing-masing. Bahan-bahan yang digunakan untuk menyambungkan kasut terdiri daripada bahan yang kuat dan tahan karat dimana ini menjadikan kualiti kasut tersebut lebih terjamin. Dapatan kajian juga dijalankan, dimana kajian menunjukkan, menggunakan kasut ini dapat mengurangkan harga kos kasut dimana harga dua pasang kasut yang sebelum ini berharga RM150 dapat dikurangkan sebanyak 40% apabila adanya kasut dua dalam satu ini.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 RESEARCH BACKGROUND**

Shoes are a shoe sole that aims to protect and soothe human feet. Shoes are also used as decorative and fashion items. Shoe design has varied greatly over time and from culture to culture, with appearances that were initially tied to function. Also, fashion often determines many design elements, such as whether the shoes have very high heels or flat ones. Contemporary shoes in 2010 vary in style, complexity and cost. High fashion shoes made by famous designers may be made of expensive materials, use complex construction and sell for hundreds or even thousands of dollars a pair. Some shoes are designed for a specific purpose, such as shoes specially designed for hiking or skiing.

Shoes are a product of everyday use owned by everyone in the world; there are more than 20 billion pairs of shoes produced each year. The manufacture of shoes generally poses many threats to the well-being of our planet as many toxins, chemicals and fossil fuels are produced.

To help avoid the effects of this environment, the best thing to do is to recycle or donate your used shoes so that they do not reach the landfill to avoid negative impact on the environment

### **1.2 PROBLEM STATEMENT**

Nowadays, as we have seen, shoes are increasingly being produced in many forms and various uses. Each shoe has its own shelf life depending on usage. The lifespan of shoes is likely to run out quickly in terms of site wear, if misused in inappropriate places.

Also, shoes that have a little damage will usually not be used again and discarded, moreover the existing shoes come with a complete pair of shoes that have no spare parts such as new shoe soles. Next to buy two types of shoes used for use different costs may increase, for example: climbing shoes priced at RM 80 plus sports shoes priced at RM70

will be RM150 and this will make the buyer have to spend more. In addition, a common problem is when someone buys a lot of shoes will causing congestion in the shoe storage space which can make the house littered. Too many shoes will also make it difficult for someone to carry them when the shoes make the bag narrow.

### **1.3 RESEARCH OBJECTIVES**

*The objectives to this research are:*

- i. To create a shoe that can be changeable on the site according to specific needs
- ii. To reduce the cost of shoes to consumers as there is no need to buy many shoes
- iii. To make it easier for users to carry and store footwear without having to carry too many shoes.
- iv. To prevent damaged shoes being wasted because there are no spare parts

### **1.4 RESEARCH QUESTIONS**

*This study will answer the following research questions:*

- i. Is it possible to create a portable shoe sole that are high in quality?
- ii. What type of material that can be used to make multifunction shoes cheaper?
- iii. What are the possibilities of making shoes as a material that can save space?

### **1.5 SCOPE OF RESEARCH**

The scope or limit of project implementation should be made as a reference to ensure that each project implementation does not deviate from the objectives to be achieved. The scope of this study involves the collection of data and information related to shoes. Information such as the cost of shoes is also taken into account to ensure that the product created is cheaper than buying two pairs of shoes. Also, to determine the comfort of shoes and the strength of shoes when worn. The longevity of shoes can also be long if they are well cared for and used.

### **1.6 SIGNIFICANCE OF RESEARCH**

Although the shoes used today are well made and people are willing to pay a high price for it. However, some people, such as some students, cannot afford shoes worth RM200-400. Therefore, the findings of this study will bring many benefits to many who cannot afford expensive shoes for just one use. Moreover, the findings of this study, it will benefit the public to carry it as it is lightweight and easy to store anywhere.

## **1.7 DEFINITION OF OPERATIONAL TERMS**

T-slot : A 'T' shaped connection using bolts and nuts

.Nail free glue: A glue used to attach the T-slot structure to the sole of the shoe

EVA: Ethylene-Vinyl Acetate, an elastic co-polymer very similar to rubber and also used in household and industrial applications

Neoprene: Neoprene is a type of polymer. A polymer is a large molecule composed of repeating structural units. It is produced by the polymerization of chloroprene

## **1.8 CHAPTER'S SUMMARY**

In this chapter, the study has explained the origin of ideas and inspiration. All objectives are made from all problem statements. The objective of this project together with its importance is to make the footwear mobile affordable and lightweight making it easier for users and the scope of this project is only focusing on mobile footwear for a variety of uses. It can be used for daily routines at low cost and is good for long time use.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

In this chapter, will be shown material used in making Multifunction Shoes in the current markets. These materials have its own advantages and disadvantages .Hence, all the characteristics of those materials will be compared to our own which has its own specialities and benefits. Since Multifunction Shoes are made from microfibre and rubber like they made the other shoes. Back in those days, the shoes are only made for people that rich only or people that can afford it.

Then into this day, a pair of multi-functional shoes that are made to ease the transition from outdoor and indoor environments and vice versa. The footwear is essentially a reimagination of the slipper. It features a removable EVA outsole that allows individuals to clip it on when they are going outside and then take it off as they come back in. Moreover, the multi-functional shoes are also designed with the utmost comfort in mind — and understandably so, after all, they do play the role of slippers.

So, in new modern days, people need to choose a shoes with a good quality that's Good quality shoes last for many more years than shoes of poor quality. Keep your shoes clean, hydrated and protected. Avoid wearing high heels constantly. Give your shoes a chance to breathe – do not wear the same pair of shoes two days in a row. By doing so, you extend the life of the shoes. You will find everything you need to extend the life of your shoes in. Where we will be happy to advise you. We recommend to always wear good quality shoes like the Multifunction Shoes that we maded.

#### **2.2 Size Of Shoes**

## 2.2.1 Introduction

For the shoe size we use is size 6 UK, as this is the standard size for adults in Malaysia. The measure of a foot for a shoe is from the heel to the longest toe. Shoe size is an alphanumeric indication of the fitting size of a shoe for a person. Often it just consists of a number indicating the length because many shoemakers only provide a standard width for economic reasons. There are several different shoe-size systems that are used worldwide. These systems differ in what they measure, what unit of measurement they use, and where the size 0 (or 1) is positioned. Only a few systems also take the width of the feet into account. Some regions use different shoe-size systems for different types of shoes (e.g., men's, women's, children's, sport, or safety shoes).

Units for shoe sizes vary widely around the world. European sizes are measured in Paris Points, which are worth two-thirds of a centimeter. The UK and American units result in whole-number sizes spaced at one barleycorn ( $1/3$  inch), with UK adult sizes starting at size  $1 = 8 \frac{2}{3}$  in (22.0 cm). In the US, this is two size . Men's and women's shoe sizes often have different scales. Shoe size is often measured using a Brannock Device, which can determine both the width and length size values of the foot. A metric standard for shoe sizing, the Mondopoint system, was introduced in the 1970s by International Standard

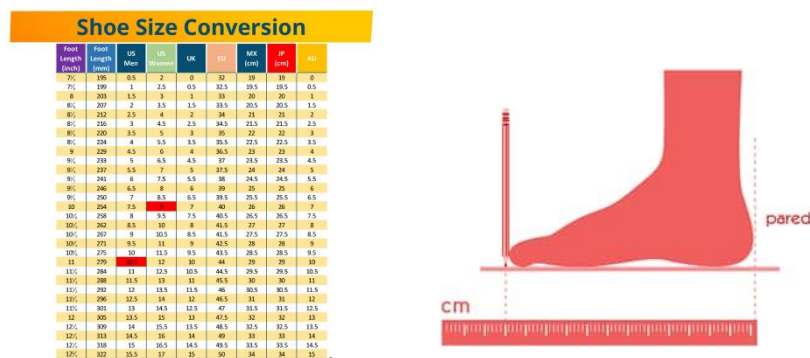


Figure 2.2.1 – Measurement Size Of Shoes

## 2.3 MATERIAL

The materials for the shoes we use are the same as the other shoes. Firstly, fabric is used because it is quite commonly used for making shoes. Like leather, textiles are available in a wide array of colors and varieties. With textiles, the possible variations include different fibers, denier (or fabric weight), weaves and knits. Textile shoes can also be found in rayon, lycra and polypropylene. One key advantage of textile shoes is their versatility in styles and designs. Each textile also has its own physical properties that must be considered when choosing whether or not to own or wear it, such as variations in breathability, support and temperature control (ie. hotness or coolness).

After that, other material like synthesis. Like their textile counterparts, synthetic materials also come in a variety of colors and textures. Factors in the composition of the two layers comprising synthetic materials, such as whether the polyester used for the backing is woven or non-woven, or the method of adhesion used, whether a wet or dry process, determine the quality and durability of the resulting synthetic. Lower quality synthetics may not have a perfectly smooth surface, even possibly showing creases and wrinkles. The advantage of shoes made from synthetics is that they tend to be comparatively quite inexpensive for both the manufacturer and consumer as compared with other types of shoes. Because the material is less durable than its leather and textile counterparts, however, synthetic shoes tend to degrade faster and need replacing more often.

Besides that, rubber is also most common used in shoes to make soles. While not the only material used to make outsoles, it is among the most popular in sports shoes, like running shoes and tennis shoes. While most shoe rubber over the years has been made from polyester, a more environmentally-sound natural rubber is increasing in popularity as an alternative.

Finally, we also insert the foam material to provide support in the uppers of shoes of all sorts, be they leather, textile, synthetic or even rubber. The different types of foam used for this purpose are innumerable, though they're all generally divided into two categories: open and closed cell. All foam is made from plastic. In open cell foam, the material is permeable, allowing water and air to pass through; in closed cell foam, these open cells are sealed, preventing the gasses inside them from escaping. Open cell foam, also known as KFF or KF foam, is made of polyurethane plastic and tends to be softer than closed cell foam. Open cell foam can often be found in the collars and tongues of shoes. There are many different types of



open foam, the most open of which is reticulated foam, frequently used to create ventilation features in shoes. Closed cell foam is a denser material commonly used to make shoe midsoles. Types of closed cell foam include polyurethane and polyethylene, EVA foam, Neoprene and Latex. Each type of closed cell foam features its own properties, such as waterproofness or elasticity. Knowing the various materials most prevalent in shoes helps immensely in choosing the right shoes to match your needs at the time.

## 2.4 MATERIAL SELECTION

### 2.4.1 T-SLOT NUT

A heavy-duty T-slot nut with a M12 bolt is rated to support 10000 N (about 1 imperial ton). Profile 40×40 (40 mm by 40 mm, with 8 mm grooves) extruded aluminum profile and the T-slot nuts to fit into them comprised the first modular system developed for use in mechanical engineering in 1980 by item Industrietechnik. The item aluminum framing system has since been expanded to include a variety of t-slot nuts that have been designed for specific applications. The item system is very similar to the "channel-and-groove design" used in some toys.

In our project, t-slot nut is used as an intermediary to connect bolts with t-slot structural framing. With its strong, light and stainless nature makes it suitable for use for connection purposes.



Figure 2.4.1 – T-slot Nut

## 2.4.2 T-SLOT STRUCTURAL FRAMMING

T-slot framing is divided into metric and fractional (imperial) categories. The T-slot is always centered along the long-axis of the piece. Pieces are available in each series with a square cross-section. Rectangular cross sections are available as well which measure x by 2x (where x is the defined width) - e.g. 40mx80mm for 40 series.

Why we chose this material because strong in the hot or the cold places, corrosion resistant, extruded aluminum has everything that we need to get a project done quickly and efficiently. No need to paint or weld unlike steel parts. Get whatever we need built fast and strong with metric series profiles of extruded aluminum framing.

### 2.4.2.1 Advantages t-slot structure

For thousands of years humans have been fabricating useful, pleasing furnishings and other structures for the home and workplace out of an impressive range of materials, including straw, mud, stone, wood, brick, iron, steel, and other metals of various sorts. But it is only within the last hundred years or so that aluminum the most abundant metal in the Earth's crust has been utilized in an ever-increasing number of day-to-day applications. Partly this is because a cost-effective process for extracting aluminum from bauxite ore was not perfected until about 1920.

So there is one great advantage of employing aluminum for structural design purposes: it is plentiful. Its other advantageous properties include strength, lightness, formability, high ductility, and excellent corrosion-resistance. The innate utilitarian value of those properties is vastly magnified when the metal is formed into T-slot aluminum extrusions.

In a nutshell, T-slot aluminum forms the basis of a framing system for creating three-dimensional structural assemblies made with a variety of extruded and fabricated aluminum parts. With this system, each length of extruded aluminum contains one or more T-shaped indentations, or slots, into which various attachments (with ends also shaped like a "T"?)

conveniently fit and can slide up and down as needed. This allows you to interconnect other T-slotted aluminum parts into even the most complex configurations without having to clamp and weld them together as you would have to do with steel components.



Figure 2.4.2 – T-slot structure

## **2.5 CHAPTER'S SUMMARY**

In this chapter, literature review is very important so that the understanding of the project made can be further enhanced. After many materials and methods are discussed and research is done, the most suitable method for this project is the t-slot connection method, due to its advantages in terms of material type, in terms of its strength and resistance to rust

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

Methodology is a method of development that has a description systematic about the flow of activities used to complete problem. The choice of methodology in project development is an aspect. It is important to ensure that the project that is being developed can be implemented in a structured and systematic manner. The methodology of the study is a thorough planning in terms of travel this semester. In order to facilitate the final project journey, a rigorous methodology was developed as best we can. With this, every step of the journey of this project will not be out of the predefined path or, more precisely, the end result. The study will meet the needs of the issues to be resolved. Because of that, it is important to know and understand each process in depth within the structure of the study methodology.

Multifunction Shoes uses the project methodology as shown in Figure 3.2.1. Started with the help of product design with Autodesk Inventor Professional 2017 software. The best design is then produced for material selection. Among the material selection we use to make connections, such as, T-slot structural framing, T-slot nut, and bolt. The installation of the finished product is then tested in the actual application.

### 3.2 FLOW CHART

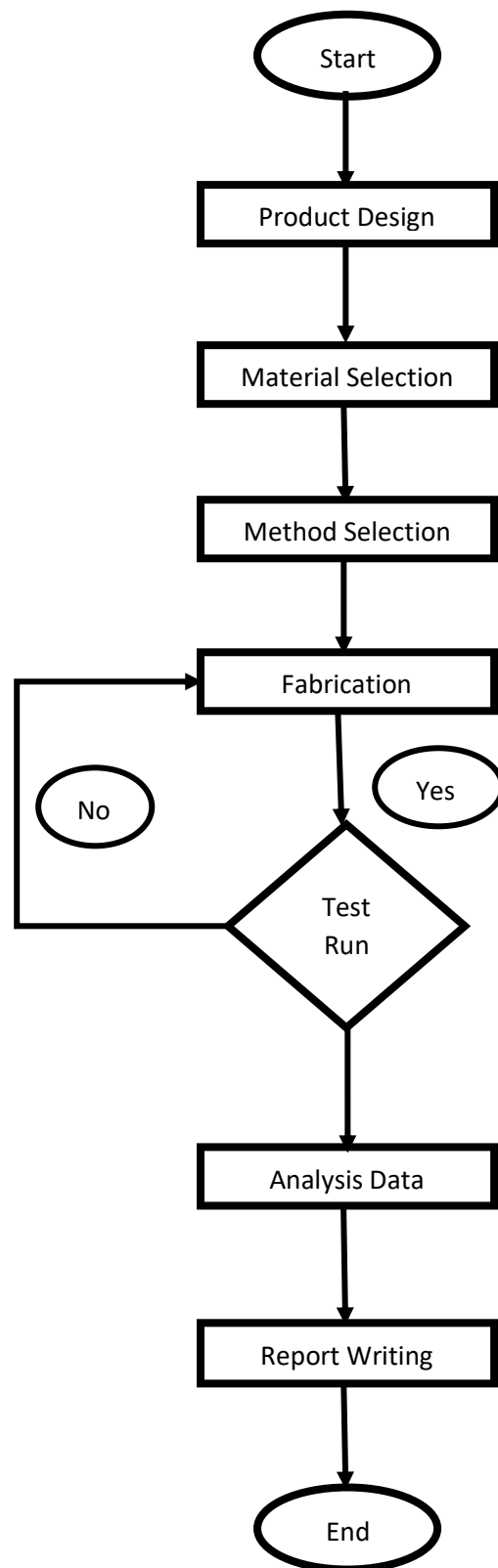


Figure 3.2.1 – Flow Chart

### 3.3 FLOW CHART EXPLANATION

Prepared by Sharifah Nurul Balqis Bt Syed Abdul Mutalib

- **Material Selection**

The process of material selection is one of the most important process in this final year project. The main factor of material selection is to discuss and finalized which materials that will be use in the project in order to avoid wasting of money and time. The material selection need to be done precisely so that the risks could be avoided.

- 1) T-slot Nut



Figure 3.3.1- T-slot Nut

A T-slot nut is used with a threaded clamp to position and secure pieces being worked on in a workshop. The T-slot nut slides along a T-slot track, which is set in workbench or table for a router, drill press, or bandsaw. T-slot nuts are also used with T-slot structural framing to build a variety of industrial structures and machines.

- 2) T-slot Structural Framming



Figure 3.3.2 – T-slot structure

In the project we created, this material has the characteristics of what we need because, One key aspect of this durability is its resistance to rusting. Rust is to steel as rot is to wood. Unlike steel, for all intents and purposes aluminum doesn't rust at all. A microscopic layer of oxide (which is responsible for the silvery-gray color of anodized aluminum) naturally forms on the surface of the metal and prevents that from happening. You don't even have to prime and paint it in order to protect it!

T-slot aluminum extrusions and accessories is that, unlike permanently welded steel, the system is modular by design i.e., it is easily changeable. we can connect, position, and fasten together the aluminum profiles however we like, using the appropriate fasteners , connectors , and desired accessories . Later on, as needed, we can then adjust and rearrange them in any configuration.

The most common type of aluminum fastener used to fasten parts together is the T-nut: just drop it into the T-slot and then twist it into a locked position. That is so much easier than welding!

### 3) Bolt



Figure 3.3.3 – Bolt

A bolt is a form of grooved fastener with an external helical male thread that engages the interior female thread of a nut. Bolts are closely related to, and often confused with, screws.

A screw is different from a bolt, because it does not take a nut, and its helical thread is used to penetrate (cut into) a softer material (such as wood).

This distinction is not always clear, and sometimes screws are regarded as bolts without a nut

#### 4) Screw



Figure 3.3.4 - Screw

A screw and a bolt are similar types of fastener typically made of metal, and characterized by a helical ridge, known as a male thread (external thread). Screws and bolts are used to fasten materials by the engagement of the screw thread with a similar female thread (internal thread) in the matching part.



Screws are often self-threading where the thread cuts into the material when the screw is turned, creating an internal thread that helps pull fastened materials together and prevent pull-out.

Because the screws we used were placed on the front of the shoe, so it was quite difficult for the screws to thread, because the front of the shoe was quite thin, so we had to use a screw clip as an aid to lock the screw from detaching.

#### 5) U-clip



Figure 3.3.5 – U-Clip

U-clips can be used to clamp panels together, retain cables and insulation, or to provide a spring catch. They are an economical and easily reusable fastening which requires no tools. They are typically made from zinc plated sprung steel — but are also available in stainless steel, copper and bronze.

U-clips allow rapid assembly and also do not require holes, welds, screws or rivets. They can, however, be used as a form of captive nut, providing a threaded hole for the attachment of a bolt or self-tapping screw. A U-clip is fitted by placing it at a slight angle to the panel, so that the legs can be led over the edge of the panel, and then pushing the clip so that it seats squarely against the edge of the panel.

Additionally in this project, U-clips do not have any preformed thread but are designed to accept a self-tapping screw. In this case, one leg typically has a clearance hole while the

other leg has a smaller hole or bent tabs, designed to take the thread from a self-tapping screw. When U-clips are designed to accept self-tapping screws, they may also be referred to as U-nuts — but, more commonly, these are simply called U-clips.

#### 6) Nail free glue



Figure 3.3.6 -Nail free glue

Nail free glue is an odorless and very strong material for attaching an object with the right means of glue. This glue will start to harden in 24 hours, and to achieve a perfect hardness level, it takes about 74 hours. After hardening, this glue will be waterproof. This glue is also, non-toxic, no solvent, no contamination and does not corrode.

In our project, this glue is used to attach the t-slot structure framing to the sole of the shoe.

- **Material Purchase**

The process of purchasing materials is very important for us to gather and get all the necessary materials so that the risk of wasting materials or running out of money does not occur. However, before buying a material purchase, good purchase planning must be made. First, we will find information about the stores that sell the goods we want. If the store has the goods we want, the supplier will be contacted to ensure the availability of materials. After the price survey is done, we will determine the physical characteristics of the material to meet the characteristics we want. Finally, the purchase is made.

- **Method Selection**

This method selection process is important so that the method choose is accurate and suitable for the product. This method selection will avoid money-lost and time taking processes. Hence, it is important to carry out this method selection process.

#### T-slot sliding joint

To connect the top with the shoe foot section.T-slot nut is used and T-slot track is made on the shoe footing.

T-slots are the most widely used technique. It is known for its durability (tensile strength), Usually t-slots are used to connect work objects with the help of structural framing t-slots. T-slot nuts are connected using bolts.

- **Fabrication**

Measurement :

- i. Measure the length of the desired material using an L angle and mark it using a marker pen .

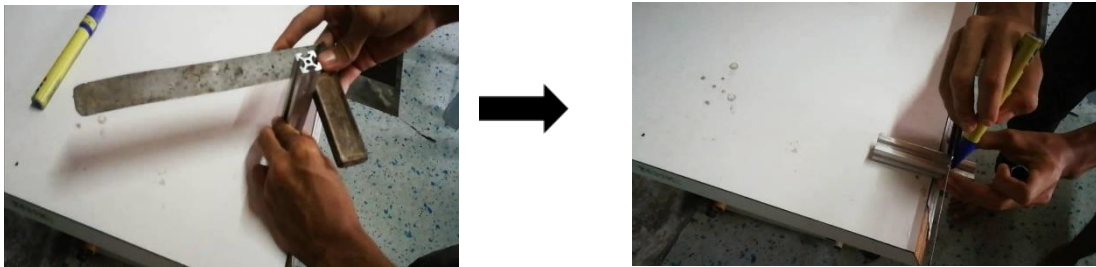


Figure 3.3.7 - Measurement

The Process Of Removal and Cutting :

- i. Removal of shoes with soles to get the desired type of soles
- The soles of the shoes were removed using scissors and thread pullers
  - The size of the sole used is the same as the size of the shoe to be connected
- ii. Cut the material that has been marked earlier, using a hacksaw or any suitable power tools machine .

- iii. Smooth out uneven or sharp materials using a sandpaper machine.
- iv. Make a hole in the sole of the shoe, to place the t-slot structure in its position



Figure 3.3.8 - Cutting

#### Installation & Connections :

- i. The T-slot structure is glued to its position and before that, the T-slot nut is inserted into the t-slot structure
- ii. Next wait until the glue hardens perfectly in 64 hours
- iii. Spray a little paint to cover the white marks that were glued earlier
- iv. Holes are made in the shoes and bolts are inserted into the holes
- v. Tighten the bolts on all parts gradually
- vi. Finally, put a shoe pad in the shoe to provide full comfort to the feet

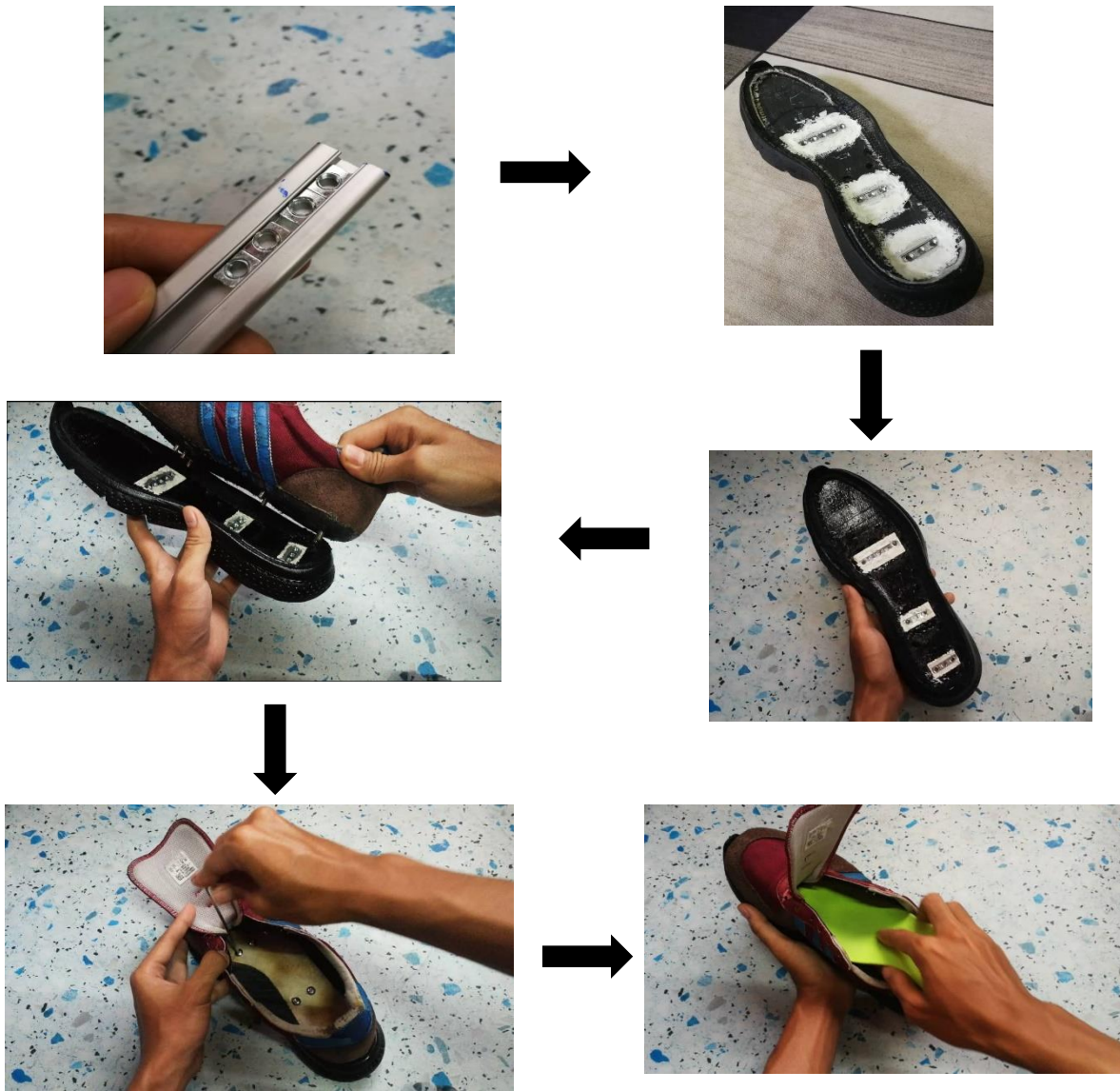


Figure 3.3.9 – Installation Method

- **Test Run**

After all the materials are ready to be assembled and tightened, Multifunction Shoes will be tested to determine the strength of the final result of the project. In this test, the shoes will be worn and we will try to make an indoor run to test the durability of the shoes, whether the

glue used is really strong or the bolts used will break or not to withstand the student load. We also tested the level of tension of the shoe where when pulled with a weight of 10kg, this shoe is able to last longer, but for the weight of 20kg the glue has started not strong but the bolt & nut connection remains strong in its position.

- **Report Writing**

Report writing is one of the most crucial step in every project invented. It is important to make a report based on the project, test run and analysis so that future improvements nor expansion of knowledge could be done. Our report writing is based on the analysis and findings that we collected throughout this whole process of completing this project.

### **3.4 PRODUCT DESIGN**

This design idea is the result of common connection techniques used to connect workpieces & workpiece tracks by mechanical methods. The design of this product is made with the help of Autodesk Inventor Professional 2017 software. In the first design, we found it less suitable to be applied because, the side of the shoe will have less space when installed later, which causes sand and water to enter between the shoes and shoe soles. Next the first design as well, will make it difficult for us to tighten the bolts on the front of the shoe due to the narrow space and it takes a long time to tighten it. So with that, we slightly changed the design by changing the position of the t-slot structure so that it becomes horizontal which can be seen on the second design.

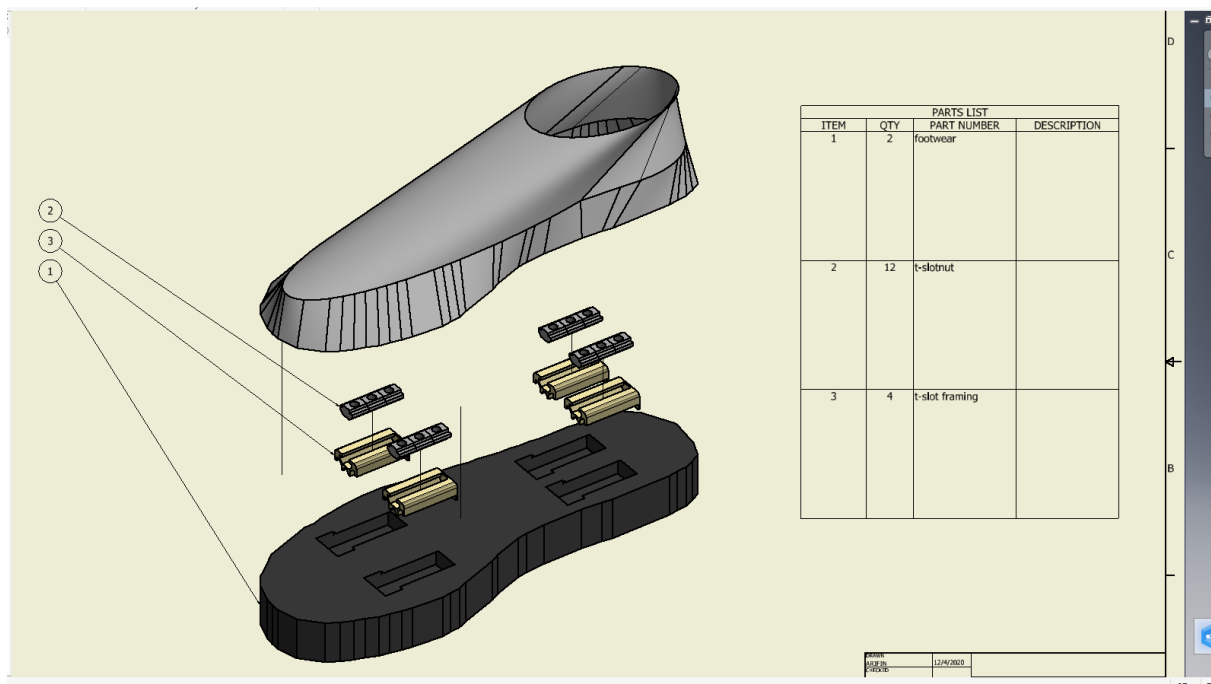


Figure 3.4.1 – First Design

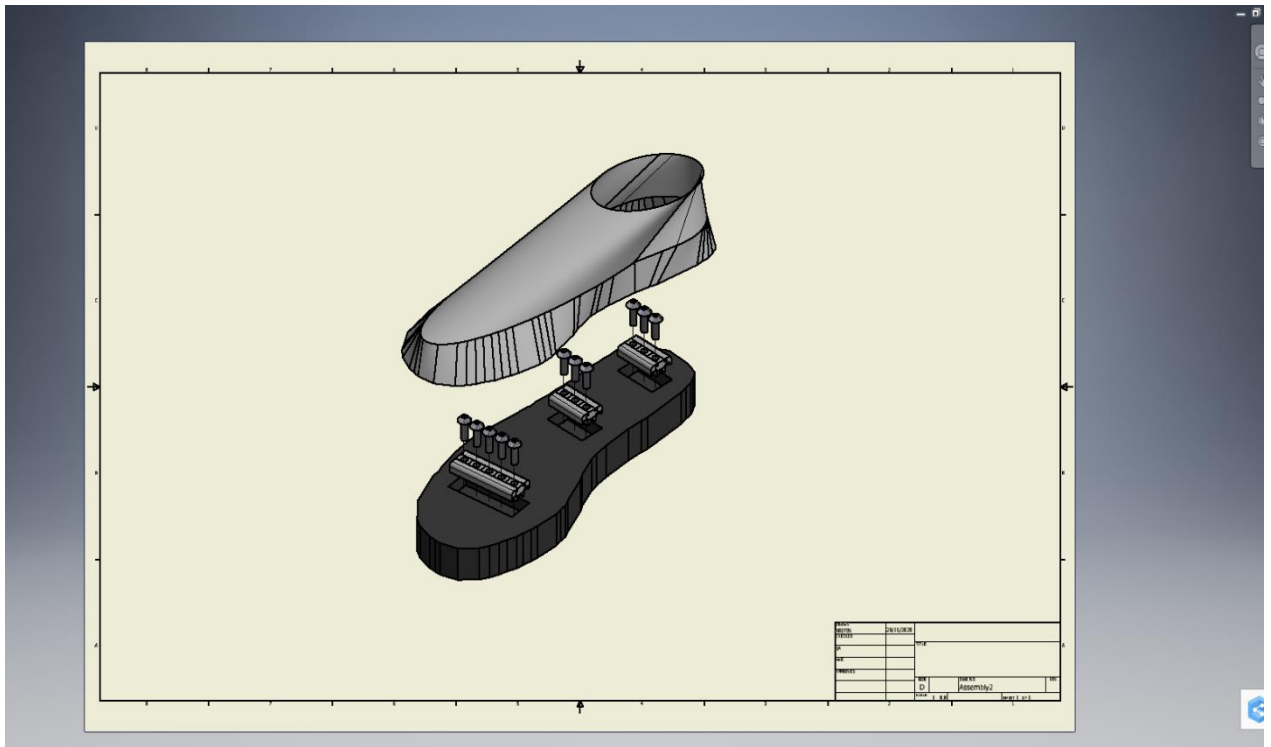
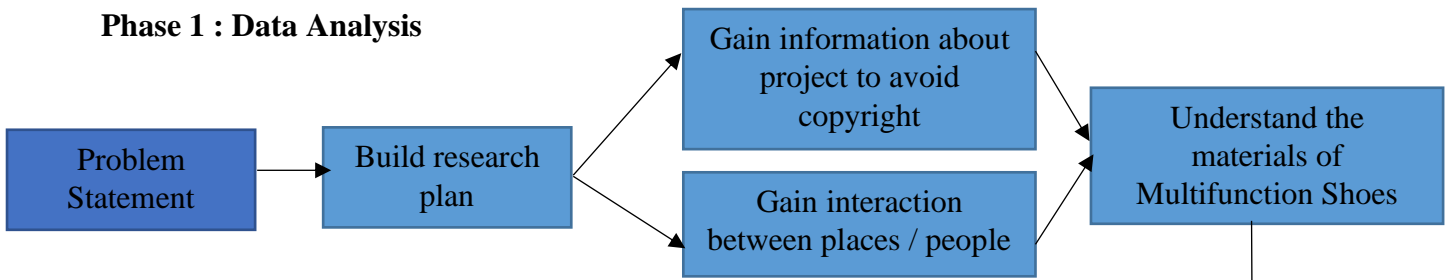


Figure 3.4.2 – Second Design

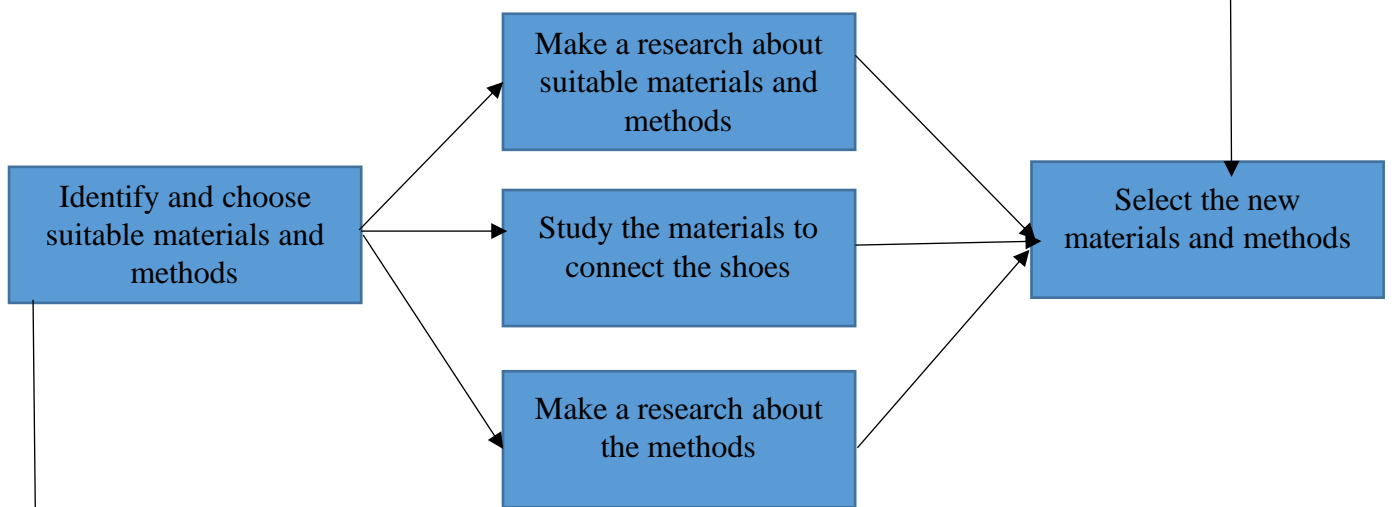


### 3.5 METHODOLOGY PHASE

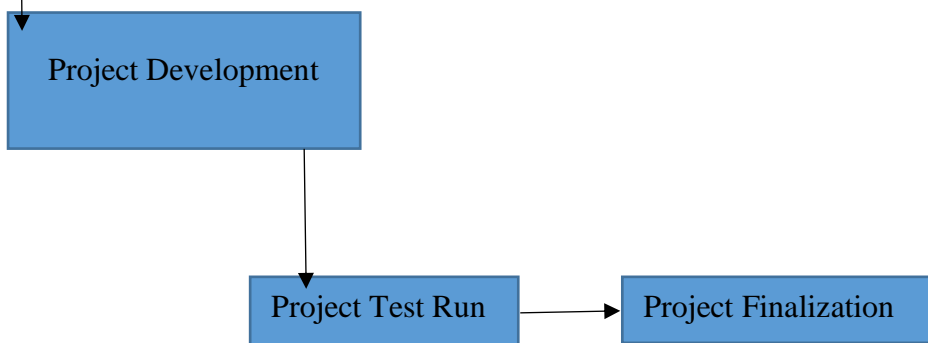
#### Phase 1 : Data Analysis



#### Phase 2 : Method and Material



#### Phase 3 : Preliminary Study



### 3.6 PROJECT ACTIVITY

project Activity	weeks														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Briefing and Project Planning	Green														
	Red														
Project Design		Green													
	Red														
Material Selection			Green												
		Red	Red												
Materials Purchase				Green											
			Red	Red											
Method Selection					Green										
					Red										
Fabrication						Green	Green	Green							
						Red	Red	Red							
Test Run									Green						
									Red						
Analysis Data										Green					
										Red					

Report Writing											█			
	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Video and Slide making												█		
	█	█	█	█	█	█	█	█	█	█	█	█	█	█
PITEX preparations													█	
	█	█	█	█	█	█	█	█	█	█	█	█	█	█
PITEX presentation														█
	█	█	█	█	█	█	█	█	█	█	█	█	█	█

Table 3.8.1

█ Planning  
 █ Actual

### **3.7 SUMMARY**

As a conclusion, the methods implemented in this project are very crucial and important to complete the project. . The materials used in the project will create a stainless and very strong shoes yet very cheap, hence this project is very convenient to the amputees and also the environment because of it can changeable and recycle footwear . However, this method will affect the result totally if one of the method is change.

## **CHAPTER 4**

# **FINDINGS AND ANALYSIS**

## **4.1 INTRODUCTION**

This chapter combine data and analysis of the Multifunction Shoes and its materials calculations, in terms of its durability and strength. This data and analysis are very important for this project to achieve the objectives and scope of the project. This data indicates the successful results of the materials testing. After getting all of this data, we analyze every pros and cons of our project to make it perfect.

## **4.2 ADVANTAGE AND DISADVANTAGE**

Every project has its pros and cons, the pros will help the community as well as the environment. However, the disadvantages of each project must be improved for the future so that we can improve the product. Therefore, the advantage of our project is, these shoes are not only cheap and easy to carry, but the materials used are also strong and stainless materials. Its design also provides many functions for various uses, where the sites used, can be customized according to specific circumstances. Next, the disadvantage of our project is, these shoes require two tools used such as an allen key & one screw driver for the purpose of installation. Although these shoes use lightweight materials such as aluminum placed on the shoes, they are still slightly heavier than shoes that use thread and glue. Besides of the advantages, this project also disadvantages that we must overcome it in the future for the better good.

## **4.3 INTERVIEW AND RESEARCH**

From experience and observation, sports shoes are usually built only 350-500 miles. Although the shoe is used only for walking not as a run, the shoe may not be able to support after passing 500 miles. Weight, too, is a factor because the more weight the faster the shoes will wear out. Most shoes that have passed 500 miles need to be recycled or stored for purposes that do not involve running. In addition, research done using Google Form found that the estimated shoes that are always bought are priced at around RM100 and below. Although our objective is to reduce the use of shoes, but from the data we find, consumers always buy new shoes and they are also comfortable owning a lot of shoes. However, many also agree that when

the soles of shoes can be changed, it can reduce the cost of buying a lot of shoes. The picture at appendix section shows the analysis of respondents' questionnaires on the design of these shoes.

#### 4.4 PRODUCT COSTS

No	Materials / Equipment	Amount	Price
1.	T-Slot structure framing	26cm	RM6
2.	T-Slot nut	22unit	RM13.5
3.	Bolt	22unit	RM10
4.	Screw	2unit	RM1
5.	U-Clip	2 unit	RM1
6.	Pad shoe	1 pair	RM10
7.	Shoe Sole	2unit	Recycle
8.	Nail Free Glue	100g	RM25
9.	Spray Paint	1 unit	RM8
10.			
		Total	RM74.5

#### 4.5 MATERIAL STRENGTH

<b>Materials</b>	<b>Safety</b>	<b>Strength</b>	<b>Rust Resistance</b>	<b>Cost</b>
T-slot structural framing	Safe and easy to machine	High and light material strength	Stainless and easy to clean	Costly
T-slot nut	Safe	High and light material strength	Stainless and need to be careful on the thread so that it does not come loose	Costly
Bolt	Safe and easy to machine	High material strength to withstand loads	Stainless	low price
Screw	Less safe due to the sharp nozzle, but easy to machine	The strength of the material is simple	Rusty	low price
Nail free glue	Safe to use	The strength of the material is high and takes a long time to harden	non-toxic, no solvent, no contamination and does not corrode.	Costly
Screw clip	Safe and easy to use	Low material strength	Stainless	Low price

#### **4.6 CHAPTER'S SUMMARY**

As a conclusion for this chapter , the analysis and findings have been made.This Multifunction Shoes has a lot of advantages however there are every cons to pros. Hence, the challenges are taken as a room for improvements and more developments for future generation and well as to enhance their knowledge on the project we carried out. So clearly,this shoes will be like by 8 from 10 people as the percentages.This shoes will carry out as many advantages to their users for give the users an excellent experience for wearing a Multifunction Shoes.

## **CHAPTER 5**



# **DISCUSSION , CONCLUSION AND UPGRADE PLAN**

## **5.1 INTRODUCTION**

This chapter will explain about discussion and conclusion of the project.

## **5.2 DISCUSSION**

Based on our investigation that have been collected, we know that shoes nowadays must have upgraded for a better functions. We must upgraded the shoe for can be use more functionally. A pair of shoe can only be wear for only 1 function, so it will a waste of space and money. Nowadays, many types and expensive shoes that have been sold until now in the entire world. This will make poor and middle types of family earn a little hard to buy those shoes. If a pair of shoe they are not compatible to buy, how about two pair of shoes, or maybe more. So, our product here is to facilitate them to buy a pair of shoe especially poor and middle family because this shoe can be wear in variety of surface.

This product can be change the shoe tread, that makes it totally difference from nowadays shoe. To change the shoe tread is very simple. When you want to go hiking after do warm up using this shoe, you no need to change the shoe like other shoes. What you need to do is just change the shoe tread only. So you no need to waste space to bring two shoes for go hiking and exercise shoe. We also will give the allen key and mini screw driver for ease customer to change shoe tread.

## **CONCLUSION**

Based on this through out project , it is confident to say that our product will totally help people especially that want to leisure during their free time. Not only that, our product also will be cheaper if want to compare with two expensive shoes for the two functions. Not only that we also believe that our shoe also will save space if compared with two shoes also. This product also will help customer because this product will also come with allen key and mini screw driver.

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# APPENDIX

## Appendix Section A: Poster



# MULTIFUNCTION SHOES

LY2020004881

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Institusi:Politeknik Sultan Salahuddin Abdul Aziz Shah  
Nama ahli kumpulan 1:Mohammad Arifin Bin Endri  
Institusi:Politeknik Sultan Salahuddin Abdul Aziz Shah  
Nama ahli kumpulan 2:Mohammad Hafiy Haziq Bin  
Mohammad Nassir  
institusi:Politeknik Sultan Salahuddin Abdul Aziz Shah



### PENERANGAN INOVASI

Background>Nowadays, footwear is one of the most important fashion for society around the world. Shoe also have some prices depends on our taste.

Problem Statement>Once you get your first pair of soles,you can just exchange the fleet when do you want to use it.You decrease your cost when buy this Multifunction Shoes.

Idea>to make the footwear mobile affordable and lightweight making it easier for users.

### IMPAK INOVASI

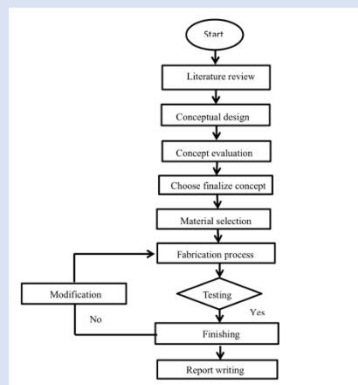
Advantages> •Easy to carry,cam combine two types of shoes in a pair of shoes.

Potential Market>•Student,working adult.

### OBJEKTIF

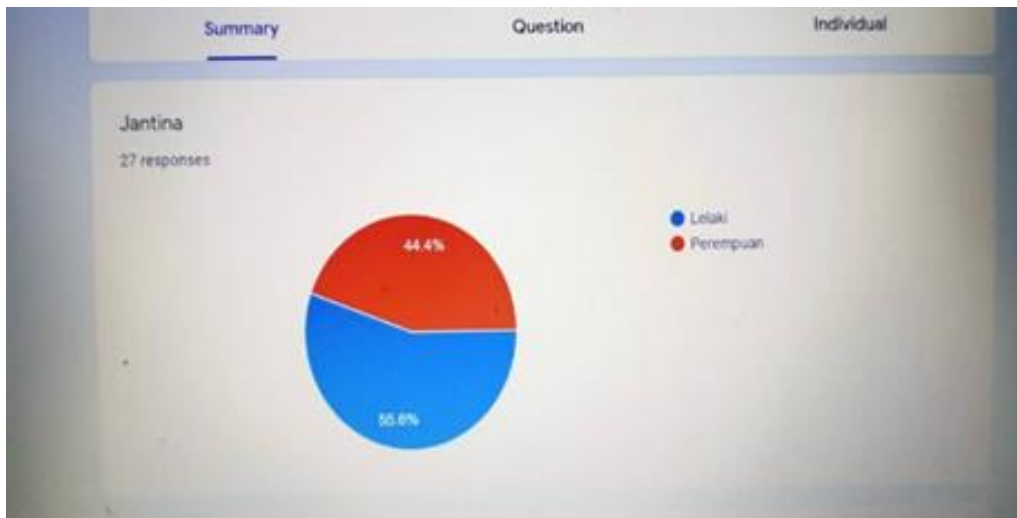
- To create a shoe that can be changeable on the site according to specific needs
- To reduce the cost of shoes to consumers as there is no need to buy many shoes
- To make it easier for users to carry and store footwear without having to carry too many shoes.

### BLOK DIAGRAM/CARTA ALIR OPERASI

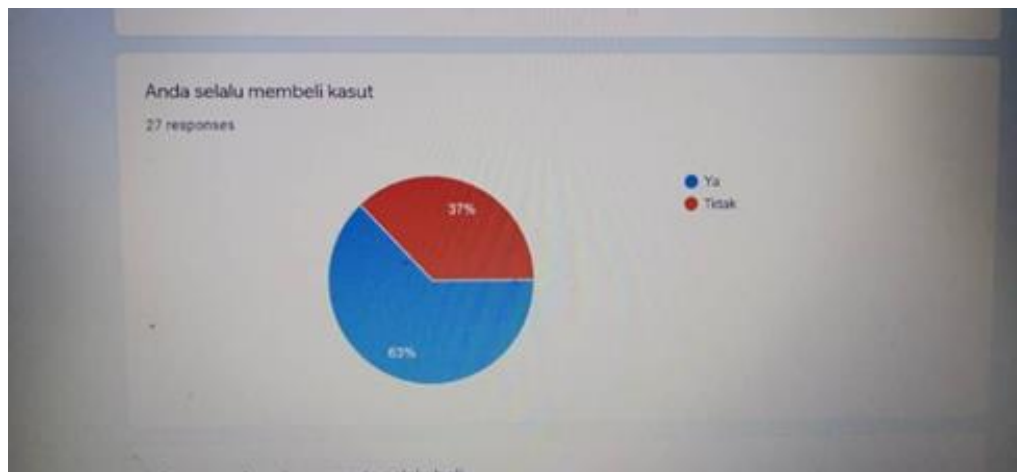


## Appendix Section B : Questionnaire

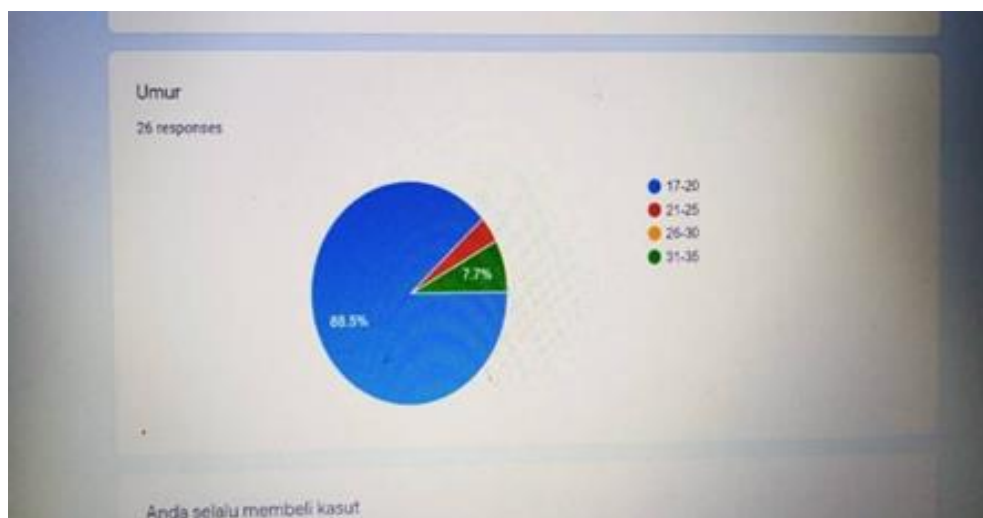
I.



II.



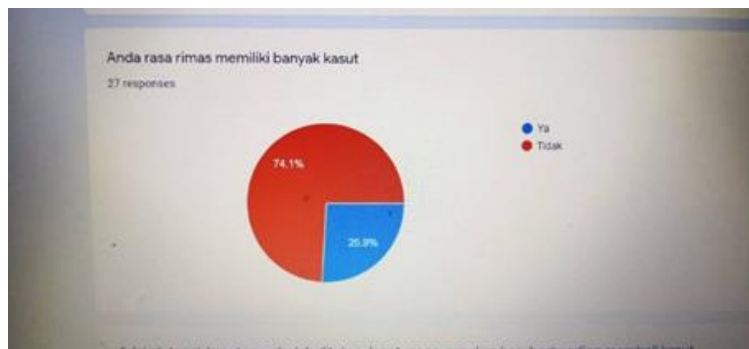
III.



IV.



V.



VI.



VII.

Apakah cadangan anda untuk menambalbak kasut yang sedia ada supaya memudahkan pengguna untuk kemana sahaja terpa perlu membawa banyak kasut

18 responses

- beli kasut untuk fkt dan kwan kwanya
- kasut yang mudah aih mungkin
- Tapak kasut tahan lasak dan bahan untuk fabrik halus bahan
- Kasut yang boleh lipat
- Buat kasut yg boleh digunakan dan sesuai utk kelengkapan kwan
- Menjadikan kasut pelbagai fungsi dan tahan lama seperti kasut bertapis yang sesuai untuk berlari dan pada masa yang sama sesuai untuk bekerja dalam keadaan formal
- sds
- Membuat kasut dua fungsi seperti kasut boot digunakan (jika beberapa komponen kasut) menjadi sepadan