POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

DEPARTMENT OF MECHANICAL ENGINEERING

DJJ 6143: PROJECT 2

SPECIAL ROTATABLE CAR SEAT

CLASS: DKM5C

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JUN 2020

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

JABATAN KEJURUTERAAN MEKANIKAL

JUN 2020

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TAJUK : SPECIAL ROTATABLE CAR SEAT

SESI : JUNE 2020

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2. MUHAMMAD FAKRURRIZA BIN ABDUL MANAB
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adalah pelajar tahun akhir **Diploma Kejuruteraan Mekanikal, Jabatan Kejuruteraan Mekanikal, Politeknik Sultan Salahuddin Abdul Aziz Shah, Shah Alam, Selangor.**

2. Kami mengakui bahawa SPECIAL ROTATABLE CAR SEAT dan harta intelek yang ada didalamnya adalah hasil karya/ reka cipta asli kami tanpa mengambil atau meniru mana-mana harta intelek daripada pihak lain.

3. Kami bersetuju melepaskan pemilikan harta intelek SPECIAL ROTATABLE CAR SEAT kepada Politeknik Sultan Salahuddin Abdul Aziz Shah bagi memenuhi keperluan untuk penganugerahan **Diploma Kejuruteraan Mekanikal** kepada kami.

Dijalankan dan dengan sebenar-benarnya diakui oleh yang tersebut;

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Di hadapan SITI KHALIJAH BINTI JAMAL

…….

sebagai penyelia projek. (SITI KHALIJAH BINTI JAMAL)

Tarikh:

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ABSTRACT

Freely to ride a car for disable people is a major concern represent life freedom not limited to medical, leisure and work purposes. The current car seat position required of major bending posture results in load stress on particular part of body such as knee, hip and spine. Furthermore, totally paralyze patient need to be lift into car seat and most of time ambulance really needed. This project designed a "Special Rotatable Car Seat" allow the car seat to rotate ninety degree to the car door allow disable patent freely to be seat. This mechanism designed to easily adaptable for various type of car. The innovation of rotatable car seat involved steel tracks and cylindrical bearing. Special Rotatable Car Seat offers solutions not only for disable people, elderly and muscle joint patients are beneficial hence help them ride a car. Methodology employed in this project involve design the rotatable structure on fix car seat frame using large diameter thrust bearing. This solution accommodates market demand especially for elderly as statistics reported elderly population in Malaysia is expected to increase to 5.6 million by 2030. Load test carried out to analysed structure design 150kg load. For further improvement light structure material is suggested to reduce the car load.

ABSTRAK

Kajian ini meneroka bagaimana warga berusia bertindak balas terhadap keterbatasan sifat mereka dengan memeriksa gaya hidup, rutin harian mereka dan juga gambaran mengenai persekitaran termasuk juga tuntutan keluarga di Malaysia. Pada pertengahan tahun 1980-an, kurang dari 30 peratus warga tua dunia tinggal di Asia dan akan meningkat kepada hampir 60 peratus pada tahun 2025 berdasarkan kajian (Longman 2000). Walaupun beberapa kajian telah dilakukan pada masa lalu, kebanyakan kajian ini memfokuskan pada budaya tertentu dan terkait dengan pelbagai aspek. Kajian ini mengambil kira pandangan peribadi mereka mengenai perkara yang dialami semasa melakukan aktiviti atau rutin harian mereka. Projek ini memfokuskan kepada pembangunan mekanisme tempat duduk yang mudah digunakan untuk orang kurang upaya, terutama bagi mereka yang menghadapi kesukaran untuk masuk dan keluar dari kenderaan. Mekanisme ini mudah disesuaikan untuk mana-mana kenderaan dengan jenis yang sama. Mekanisme kinematik direka khas untuk orang tua dan orang yang mempunyai masalah pergerakan. Projek ini dapat membantu warga tua termasuk orang kurang upaya masuk dan keluar dari kereta tanpa bersusah payah.

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Malaysia is among the highest rates of accidents and deaths in the world. Statistics released by the Malaysian Institute of Road Safety Research (MIROS) between 2000 and 2014 saw a significant increase in the number of road accidents, from 250,429 cases to 476,196 cases. The number of fatalities due to road accidents is more than 6000 cases per year. A February 2014 study by the Transportation Research Institute, University of Michigan USA, has placed Malaysia in the top 17 in road fatalities in the world. The study was based on 2008 data from the World Health Organization (WHO) which involved 193 other countries. According to the Road Transport Act 1987, a road accident is defined as an accident or incident in which damage to any person, property, vehicle, structure or animal occurs on any public road including bridges, tunnels, sidewalks, roads staircases, bridges, toll plazas and more. Road accidents include motor vehicles, bicycles, pedestrians and other types of vehicles. The World Health Organization (WHO) defines road accidents as "violations or incidents that may or may not lead to injury, occur on public roads and involve at least one moving vehicle".

As a result, many Malaysians are struggling to survive. The Malaysian economic system is also relatively low in creating technologies that can help Malaysians. Although our innovations are already overseas, the costs are quite high and not affordable for everyone. Therefore, our innovation is cost-effective and uses simple mechanical principles.

1.2 PROBLEM STATEMENT

Many Malaysians suffer from chronic injuries and disabilities, suffering from daily stress such as going out of business, working or even going somewhere. They need special help to facilitate their movement such as self-driving cars like in developed countries. But in Malaysia it is difficult for us to find such a sophisticated tool. But if such advanced tools are introduced in Malaysia, not everyone can have them on the basis of affordability. Therefore, we have innovated to help the less fortunate by using low cost to make it accessible to every

citizen. This innovation is especially for those with foot problems and the elderly who are ill used to use the vehicle. This innovation was created to make it easier for people to get in the car. However, these innovations do not allow such users to be car drivers to avoid the possibility of accidents.

1.3 RESEARCH OBJECTIVE

- To design a Special Rotatable Car Seat with a bearing that can rotate 90 degrees.
- To fabricate a Special Rotatable Car Seat with a high quality and affordable equipment.
- To perform a loading test on a Special Rotatable Car Seat.

1.4 RESEARCH QUESTION

This study will answer the following research questions:

i. Does the seat work for users to prevent the pain?
ii. Is it worth it if you are given the opportunity to have a special seat that lets you get into the car easily?
iii. Does this seat simplify your day-to-day activities and save your time?

1.5 SCOPE OF RESEARCH

The scopes and limits to this research are:

1. This product is durable.
2. Suitable for all kind ages.
3. Could last for a long time with good care.
4. This product can handle up weight to 200Kg
5. This product cannot stand sharp objects

1.6 SIGNIFICANCE OF RESEARCH

Although, the rotating seat that is currently used in other countries can work well and people are willing to pay a high price for it.However, some average people could not afford $5000 to $10,000 in Malaysia worth of turny seat and moreover, the issue of economy in Malaysia are not suitable for this kind of product material in. Thus, the finding of this study will bring a lot of benefits to the disabled people that cannot afford an expensive turny seat. Moreover, it will absolutely benefit Malaysia since we are using affordable and good material for our product.

1.7 DEFINITION OF OPERATIONAL TERMS

Nylon: Is a generic designation for a family of synthetic polymers, based on aliphatic or semi-aromatic polyamides

Foam : A product of the petroleum industry and is the most common foam used in cushion

Stainless steel : A family of iron-based alloys that contain a minimum of approximately 11% chromium, a composition that prevents the iron from rusting as well as providing heat resistant properties

Welding : Join together (metal parts) by heating the surfaces to the point of melting with a blowpipe, electric, arc, or other means, and uniting them by pressing, hammering, etc.

1.8 CHAPTER'S SUMMARY

In this chapter, the studies were explained about its origin of ideas and inspirations. All the objectives were made out of all the problem statements. The objectives for this project are the importance of choosing good products that are eco-friendly and even the scope of this project only focusing on the comfort foam. Thus, this new Special Rotatable Car Seat could be used for daily life with a good care for a longer time.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION (prepared by Asyraf Hadi)

Literature refers to a research article that is referred to to understand and study research questions. The literature review is used to provide contextual research, to observe research in the research field, and not just to summarize research done by other researchers. In Automobiles, seat is very important part. The standard car seat is designed to support thighs, the buttocks, lower and upper back, and head support. The front driver and passenger seats of most vehicles have three main parts: the seat back (squab), seat base (cushion), and the head-rest. These components are usually constructed from foam to provide comfort to the rider. When choosing this product, foam manufacturers must consider the most suitable foam for balancing comfort, support, safety, and recycling properties. This paper gives overall idea of Automotive seating system.

In this chapter, we present three materials for car seats in the current market which we focus on bucket seats. These three materials have their pros and cons. Therefore, we compare all the properties of this material with our products, each with its own characteristics and advantages.

A car seat is a seat used in a car. Most car seats are made from cheap, yet durable materials, to withstand long-term use. The most common material is polyester. A bucket seat is a separate seat with a contoured platform designed to accommodate one person, distinct from a bench seat that is a flat platform designed to seat up to three people. Individual bucket seats typically have rounded backs and may offer a variety of adjustments to fit different passengers.

Most cars were available with an exterior rumble seat that folded open into an upholstered seat for one or two passengers. The lumbar is the region of the spine between the diaphragm and the pelvis; it supports the most weight and is the most flexible. The adjustable lumbar mechanisms in seats allow the user to change the

seat back shape in this region, to make it more comfortable and include adjustable lumbar cushion. Some seats are long enough to support full thigh and follow back curves.

The National Traffic and Motor Vehicle Safety Act enacted by the U.S. in 1966 established standards of strength for automobile seats. These included requirements for proper anchorage and construction of automobile vehicle seat assemblie The legal requirements in some jurisdictions for a child to sit up front is 5'0 and they must weigh more than 80 lbs. This shows that front passenger seats are reserved for adults. Some studies have shown that drivers have an aversion towards carrying the full capacity number of passengers due to concerns over insufficient vision through the back window.

Automotive seat is used to give comfort to the person who is driving. The cushioning agent is especially important when considering that moving cars can transmit vibrations near the human spine's resonant frequency of 3 Hz. The base can usually be moved forward and back on metal railings and may move up and down to adjust to different body types. This movement is accomplished either by manual latches or by electric levers. Now we will see the entire Seating System.

MAIN FUNCTION OF SEAT:-

Seat system is the very important part of the vehicle which always comes in contact with the occupant when the vehicle is used and is also directly responsible for the comfort/safety of the occupant.

1. Occupant Support:-

   a. Occupant should get stable support for long time.
   b. Occupant of various weights, sizes and proportions should be accommodated in the Seat.

2. Occupant Position:-

   a. Occupant position is very important for safe operation of the vehicle.
   b. Occupant should be positioned ergonomically so as to have clear field of vision.

c. Occupant should have good Head, leg and arm room.

3. Protect Occupant:-

a. During the crash occupant should not be unduly displaced from the seat.

b. Seat system parts should not injure occupant before/during/after vehicle crash

Figure 2.1

2.2 MATERIAL (prepared by Asyraf Hadi)

The automotive seating system consist of following parts:-

1. Head Rest:-

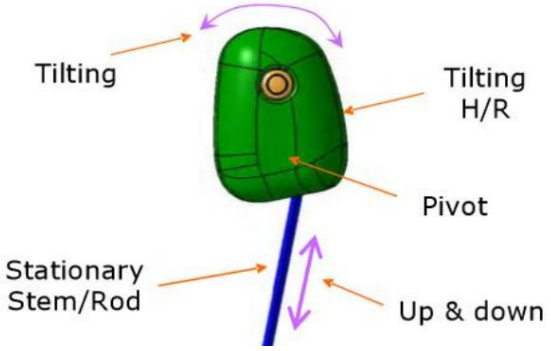


Figure 2.2

In most cars head restraints are kept relatively small in order not to unnecessarily obstruct the rear passenger visibility. Two seater sports cars often have a much larger head restraint area which is safer. A small head restraint has to be adjustable for the user and some are also adjustable in angle as if they might be

used as a head rest. An effective comfortable head rest, as for instance on a fireside chair, has to support the base of the skull near the top of the neck. This would be extremely dangerous in a car. It is this confusion and the simple fact that what can be adjusted right will usually be adjusted wrong that led Design to avoid any adjustment in head rests.

FUNCTION OF HEAD REST:-

a. Prevents head injury during vehicle crash.
b. Supports head.
c. DVD/VCD screen can be packaged in Head rest.

TYPES OF HEAD REST DEPENDING UPON SAFETY:-

a. Active – Activates during vehicle crash.
b. Passive – Does not activates during crash.

STANDARD MATERIAL USED IN HEAD REST:-

a. Head rest structure (Rod/Stem).
b. Plastic
c. Foam.
d. Trim.

HEAD REST CONFIGURATIONS:-

a. Can move up and down.
b. Can rotate (Tilt) along the pivot in forward and rearward direction.
c. Wings on the Head restraint can rotate and support head.

2. Seat Back :-

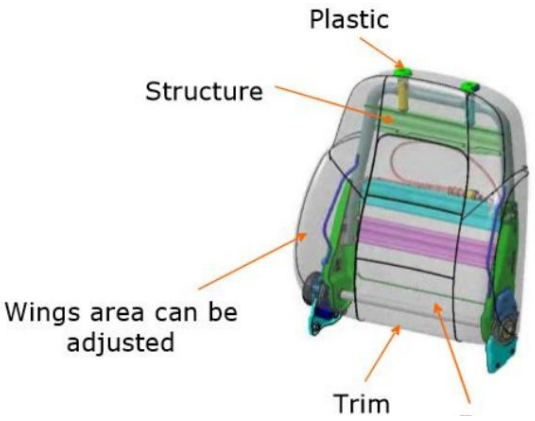


Figure 2.3

Seat back assembly mainly consist of 4 parts as shown in the picture above. It is very important in order to have comfortlness to the occupant

FUNCTION OF SEAT BACK :-

a. Supports occupant's back.
b. Positions occupant's back.

Standard seat back assembly consists of

a. Metal structure.
b. Plastic
c. Foam
d. Trim

There are a lot of features which are incorporated within the seat back assembly. Lumber support is one feature. Back of seat is so designed to have enough lumber support. In some cases it is also used as the heating and ventilation purpose. Folding pad, Lap top tray, Side Air bag, Knee air bag for Rear seat occupant are some of the important features.

3. Seat Cushion:-

Figure 2.4

Seat cushion is important in order to get the thighs support and position of occupants. During the manufacturing of seat cushions polyethers are used.

FUNCTION OF SEAT CUSHION:-

a. Supports occupant ischium and thighs.
b. Positions occupant.

STANDARD SEAT CUSHION ASSEMBLY CONSISTS OF

a. Metal structure.
b. Plastic
c. Foam.
d. Trim.

SEAT CUSHION CONFIGURATIONS:-

a. Can move in forward and rearward direction.
b. Can move up and down (Height adjustment).
c. Can tilt (Thigh support)
d. The Bolster can rotate.

4. Seat belt:-

Figure 2.5

In a severe collision, the occupant can either strike the dashboard, or strike the seat belt. How much trauma the body of the occupant experiences will depend on the time period over which the force is applied and the stiffness of the body parts absorbing the force. Stretching the time epoch of the collision for the occupants and redistributing the crash forces to the stiffest parts of the human anatomy is the duty of the seat belt. Equally important, seat belts are the best way to prevent ejection from the vehicle.

The seat belt restraint system contains some or all of these components

1. shoulder guide loop
2. webbing
3. non-locking retractor
4. automatic locking retractor
5. emergency locking retractor
6. vehicle sensitive retractors
7. webbing sensitive retractors
8. buckle
9. buckle release
10. tongue (latch plate)
11. selvage

5. Airbags:-

Figure 2.7

All cars feature dual-stage front airbags as well as front side-impact and side curtain airbags, controlled by a "smart" airbag system that detects passenger weight, seatbelt use and driver's seat position, then deploys the front airbags accordingly while ensuring the sideimpact and side curtain airbags only deploy when needed. The dual-stage means they can be deployed in one of two ways: a low to medium speed collision will cause a single-stage deployment, while a severe impact will trigger a full deployment. The front side-impact airbags are built right into the front seats to ensure they are in proper position at all times. The side curtain airbags deploy from above the side windows to almost completely cover the front and rear side windows and the center pillar, helping to protect against injury and intrusions into the cabin in a side impact.

6. Recliners:-

Figure 2.6

FUNCTION OF RECLINER:-

- Allow to tilt Seat back in forward and rearward direction by specified angle.

7. Cushion height adjustment/tilt:-

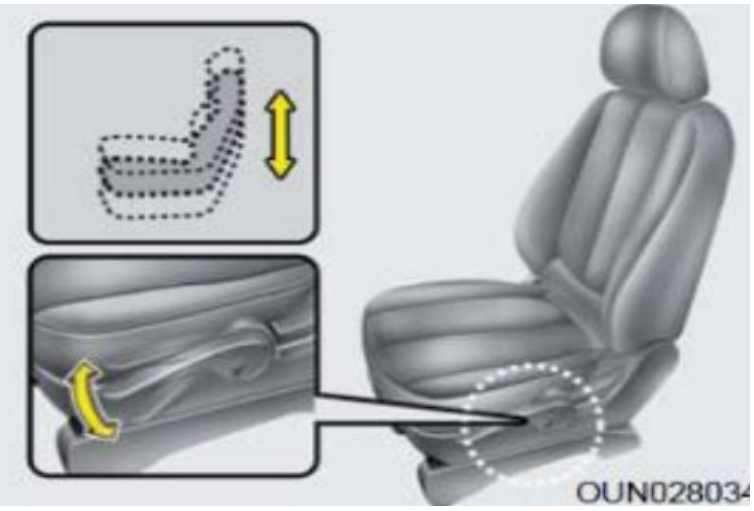


Figure 2.8

FUNCTION OF CUSHION HEIGHT ADJUSTMENT:-

- Allows to move Seat up and down direction by specified distance.

2.3 MATERIAL SELECTION (prepared by Danial Izzuddin)

Selected materials must comply with required features, such as product durability, reasonable cost, product safety level assurance, and more.

(1)

Figure 2.9 (Car seat)

Car seat covers are accessories that protect the original seat upholstery from wear and add a custom look to a vehicle's interior. They can help to maintain the resale value of the vehicle and maximize the comfort of the driver and passengers.

If you use your vehicle where is common to abuse the car seat and you fear the way it's being abused can result in early wear and tear of the car upholstery. You will need seat covers that can protect your seat from wear and tear. You also have the challenge of meet the cost as you are on a lean budget such that an affordable is what is ideal for you. In that case, you may have to consider getting Nylon seat cover materials because it is both durable and cheap. Budget matters. Hardly anyone who will reject living a luxury life if the opportunity is offered, event the richest of the wealthy want to play within their budget framework to have what they need

according to how much they can afford to spend. Therefore, one determinant of what is best for you is the price.

(2)

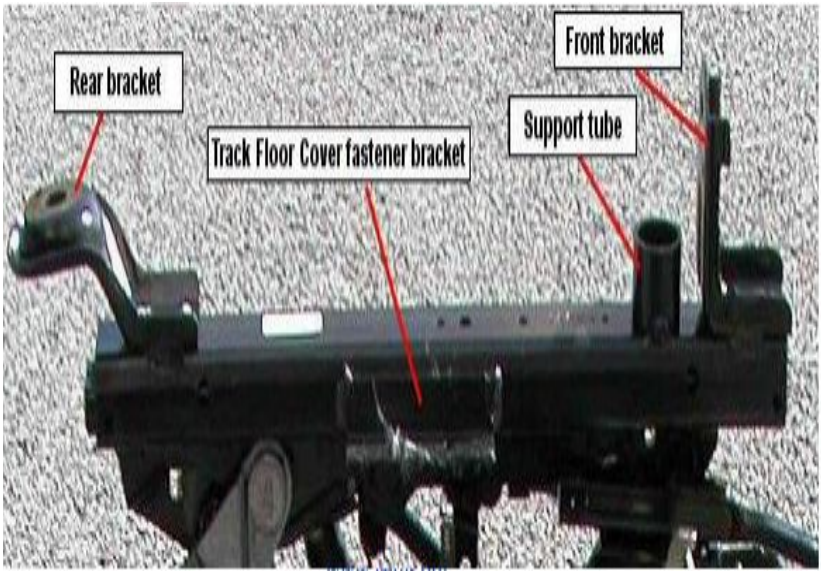


Figure 2.9.1 Tracks(steel)

FUNCTION OFTRACKS:-

- The Function of track is to allow movement of Seat in forward and reverse direction by specified distance.

Selection of Track depends upon following factors:-

1. Safety and regulation – The load which track going to take
2. Manual / Power – It depends upon whether seat is luxurious or not.
3. Price
4. Availability

We prefer to use steel as a material than aluminum because of the features we need, such as product durability, reasonable cost, and product safety in line with our products.

Cost and price are always important factors to consider when creating any product. Steel and aluminum prices fluctuate depending on global supply and demand, fuel costs and prices, and availability of iron ore and bauxite; However, steel is generally

cheaper (per pound) than aluminum. The cost of raw materials has a direct impact on the price of the finished turnover. Aluminum is much more expensive than carbon steel. Aluminum repairs are also more expensive than steel repairs

Aluminum is an excellent metal because it is softer and more elastic than steel. Aluminum can be a place and create a shape that it cannot, usually forming a deeper or more complex spin. Particularly for straight and deep wall sections. However, the material needed for this product is steel, a very tough and durable metal that generally cannot be pushed to the same extreme dimensions as cracked or broken aluminum during curves for long-term sustainable purposes.

Although malleability is very important for manufacture, the main attribute of aluminum is corrosion resistance without any further treatment after it spun. Aluminum is not rusty. With aluminum, there is no paint or coating to wear or scratch off. Steel or "carbon steel" in the metal world should usually be painted or treated after spinning to protect it from rustand corrosion, especially if the steel part will work in a moist, damp or rough environment. However, galvanized carbon steel, chemically treated, and painted is still cheaper than aluminum..

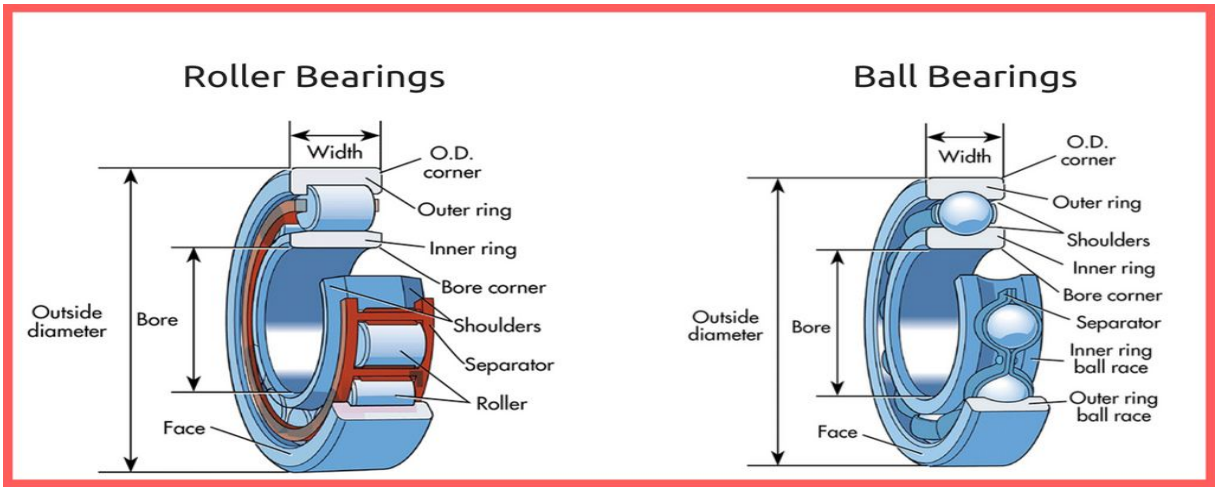
Even with the possibility of corrosion, steel is harder than aluminum. Steel is heavier denser than aluminum. Steel is usually 2.5 times thicker than aluminum while Aluminum is lighter than steel because it is less dense.

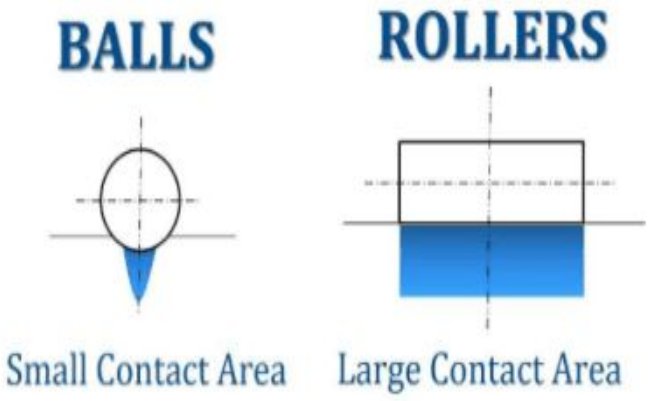
(3)

Figure 2.9.2(Bearing)

For bearings we prefer to use cylindrical bearings that we feel are most appropriate for our project.

A roller bearing is a cylindrical unit that is used to provide low-friction movement for a bushing or bearing block. A ball bearing is a spherical unit that accomplishes the same objective as a roller bearing. The real difference has to do with the contact surface between the bearing and the rail. For ball bearings (assuming a perfectly spherical bearing and no deformation), the contact surface is just a single point. Even once deformation is accounted for, the amount of surface where the ball is contacting the rail is limited. This creates an inherent strength limit for the balls. Roller bearings on the other hand, have an entire line of contact. This greatly increases the rigidity, stability, and maximum load capacity of the system.





We also compare whether single-row or multiple-row uses need to be considered in terms of cost and convenience.

The single-row cylindrical roller bearing is one separable type bearing. Generally, a single-row cylindrical roller ring consists of four major components as follows: inner ring, outer ring, rollers, and cage. The rollers are typically guided by two ribs of bearing ring.This kind of bearing is easy to assemble,disassemble and applicable for high-speed rotation cases. So, compared with a normal radial ball bearing with same size, the cylindrical roller bearing is more suitable to the condition which require to bear higher radial load and higher impact resistance.

2.4 METHODS (prepared by Fakrurriza)

FACTORS NEED TO BE CONSIDERED WHILE DESIGNING THE SEAT:-

1. Sheet metal design:-

   a) In most of the seats, sheet metal contribute more than 70% of weight, so it is important to understand sheet metal design thoroughly.
   b) One should know all the processes of the sheet metal – Blanking, piercing, Bending, Drawing, Deep drawing, hemming, Lancing, forming etc.
   c) The designer should understand the importance of part in terms of safety, support etc.
   d) Selection of material – It depends upon
      i. Yield stress.
      ii. Thickness of the sheet.
      iii. Availability in particular region.
      iv. Cost.
   e) Process to manufacture –
      i. The designed Sheet metal part should have manufacturability.
      ii. The cost for the tooling should be minimum

2. Tube Structure Design:-

   a) Few of the seats are made up of tube structure. The tube may have circular, box type cross section.

b) One should know the processes of the tube structure design – Bending, flattening etc.

c) The designer should understand the importance of part in terms of safety, support etc.

d) Selection of material – It depends upon

   I. Yield stress.

   II. Diameter/Thickness of the tube.

   III. Availability in particular region.

   IV. Cost.

e) Process to manufacture –

   I. The designed tube part should have manufacturability.

   II. The cost for the tooling should be minimum.

3. Wire structure design:-

   a) Mainly wire structure is used to give support to foam and trim. ISO fix and Top tether anchorages are made up of wires.

   b) One should know the processes of the wire structure design – Mainly bending

   c) The designer should understand the importance of part in terms of safety, support etc.

4. Foam Design:–

   a) Foam is designed by considering A-surface and structure of the seat.

   b) Design of the foam directly affects the comfort of the occupant.

5. Trimming consideration:– It mainly deals with the craftsmanship issues

6. Plastics: - It mainly deals with the craftsmanship issues and covers the metal structure.

7. Joints:-

   a) Welding - CO2/Gas metal arc welding, spot welding are generally used in Seating. Welding length, welding overlapping of two parts need to be considered.

b) Bolting - Selection of particular bolt size for required application is important. E.g. Cushion and Back marriage bolts should be minimum of size M10, Self tapping screws like M4 are used to attach plastic part to Seat.

c) Rivet - At few places riveting is used as a joint.

d) Free pivot – Free pivot is used where the joint is required but two parts needs to rotate freely with respect to each other

8. Assembly sequence:-

a) By understanding assembling sequence different assemblies and sub-assemblies are created.

b) Generally following is the assembly sequence – Welded parts-Bolted/riveted/free pivot parts-foam-Trim-Plastic

c) JIT line will have different assembly sequence.

9. Assembly/Part drawing:-

a) Every drawing should have all the important dimensions with GD & T.

b) Drawing should be made in specific Template e.g. Nissan will have Nissan template.

c) If required, BOM, welding information, Torque table etc. Should be provided.

d) Tolerance stack up is done where ever required.

10. Packaging:–

a) During the packaging of the Seat in Vehicle environment or individual component of seat with in seat, kinematics of the seat or part should be done to check the interference.

b) Tool runner access and welding gun access should be checked.

c) Meat to metal should be checked between Manikin and Seat Hard points.

2.5 CHAPTER'S SUMMARY (prepared by Danial Izzuddin)

Conclusion:-

In conclusion, according to the above information should be considered while designing the seat. It gives the information about different parts of seat which will surely helpful to the designer. After conducting a review of the materials and

components required for the construction of this project, it was found that components with appropriate specifications should be used for improvement and convenience. At the same time, the materials used to repair existing projects are much better than previous products

CHAPTER 3
METHODOLOGY

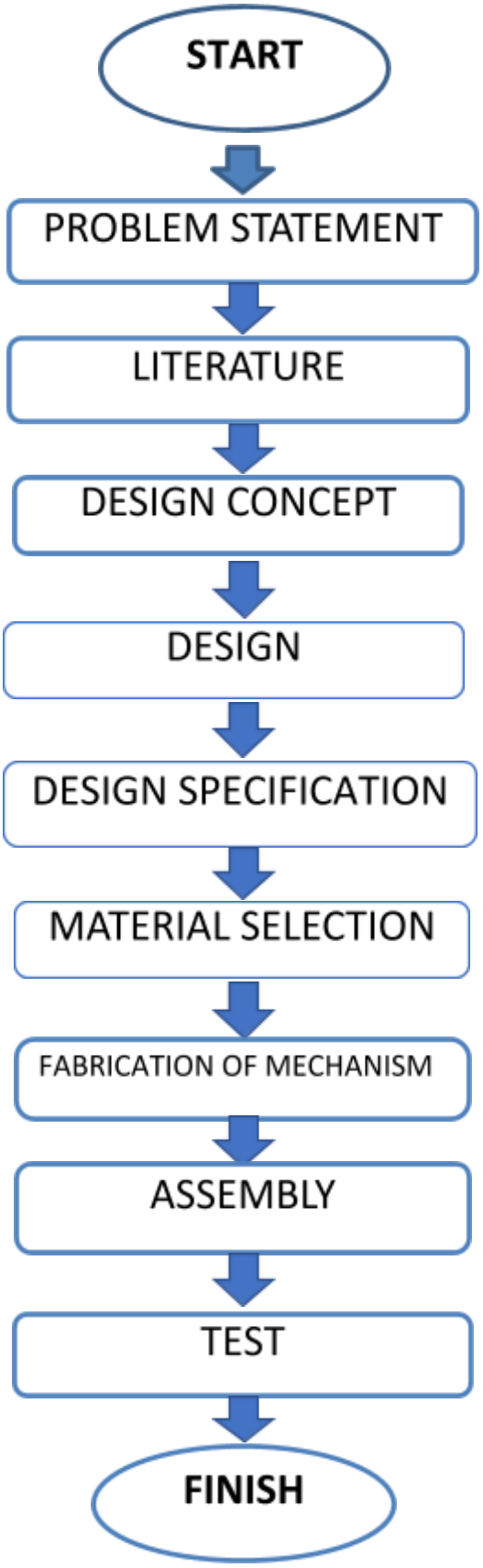
3.1 **INTRODUCTION** (prepared by Fakrurriza)

What is the methodology? The method is a methodological attack, especially if repeatedly used. This may be obvious, but the methodology of the word is related to the method of theword method. In fact, methodology is a system of methods that is constantly followed. For example, scientists use different methods because they conduct experiments. The world seems to be nothing but chaos and chaos. But in fact, sometimes there are methods to this frenzy. And sometimes there are methods.

The methodology is a systematic theoretical analysis of the methods used in the study area. This includes a theoretical analysis of methods and principles related to the knowledge branch. It generally covers concepts such as paradigm, theoretical model, phases, and quantitative or qualitative techniques. The methodology is not intended to provide solutions - therefore, it is not the same as the method. Instead, the methodology provides a theoretical basis for understanding which method, set of techniques or best practices can be applied to a specific case, such as calculating a given result.

In this chapter, you will find a lot of information about the process and the path of our final project. There will be a flow chart showing the process of developing the process. This chart explains what we do. Next, the Gantt chart showing the current and planning for each of the 13 weeks of our project trip last year. However, in this chapter, we will also present three methods that we have explored to implement our project since last year. However, these three methods have their own advantages and disadvantages and are explained individually by teammates.

3.2 FLOW CHART (prepared by Asyraf Hadi)



3.3 FLOW CHART EXPLAINATION (prepared by Asyraf Hadi)

- **MATERIAL SELECTION**

The process of material selection is one of the most important processes in this final year project. The choice of materials is very important because it wants to avoid high risks such as money and time. Therefore, it is important to make sure that you do not choose the materials that will be used for the project.

- **CAR SEAT**

Seat system is the very important part of the vehicle which always comes in contact with the occupant when the vehicle is used and is also directly responsible for the comfort/safety of the occupant. Occupant position is very important for safe operation of the vehicle.

- **TRACKS**

The Function of track is to allow movement of Seat in forward and reverse direction by specified distance.

- **BEARING**

A **bearing** is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts.

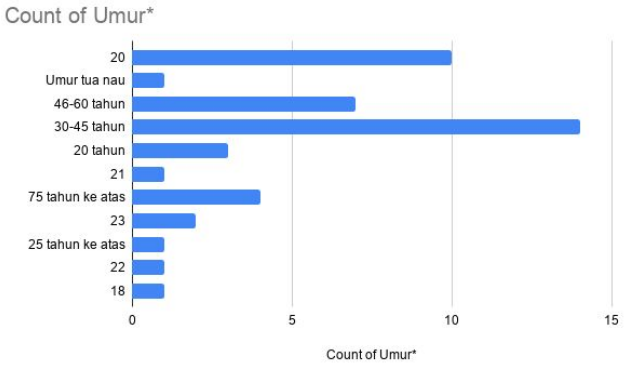
3.4 GANTT CHART (prepared by Fakrurriza)

WEEK	STATUS	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
DATE		13/8–19/8	20/8–26/8	27/8–2/9	3/9–9/9	10/9–16/9	17/9–23/9	24/9–30/9	1/10–6/10	7/10–13/10	14/10–20/10	21/10–27/10	28/10–3/11	4/11–10/11	11/11–17/11	18/11–24/11
Project Activities																
Project																
Literature review																
Mathodolgy																
Problem statement																
Objektives																
Survey component																
Conclusion																
Presentation																
Submit proposal																
Submit log book																

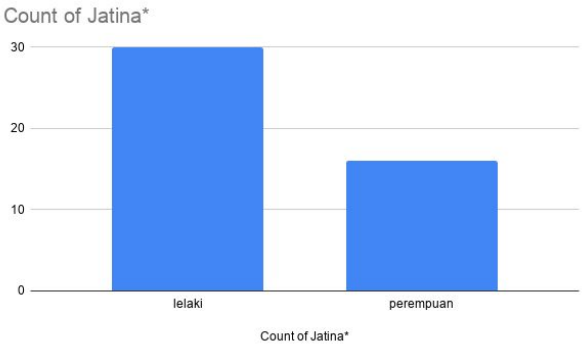
3.5 INTERVIEW AND RESEARCH (prepared by Fakrurriza)

We've done some research on the projects we're about to create. The purpose of this research question is to determine whether the project we are planning to work on is responsive or not. Throughout the interview, some of the questions about the advantage of special rotatable seats are specially made for disable and older people that might need this type of product for them. Besides, we do some improvement to put first of user comfortness.

- **AGE**

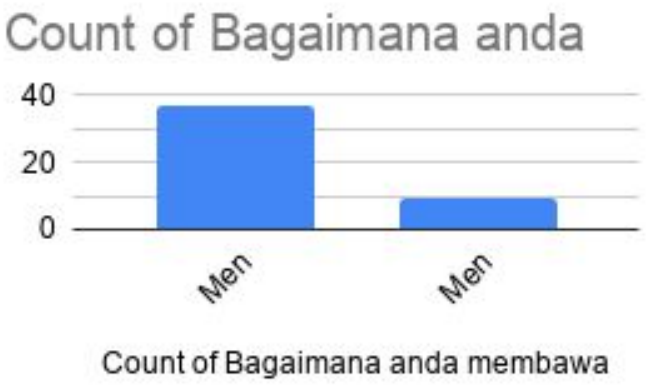


- **GENDER**

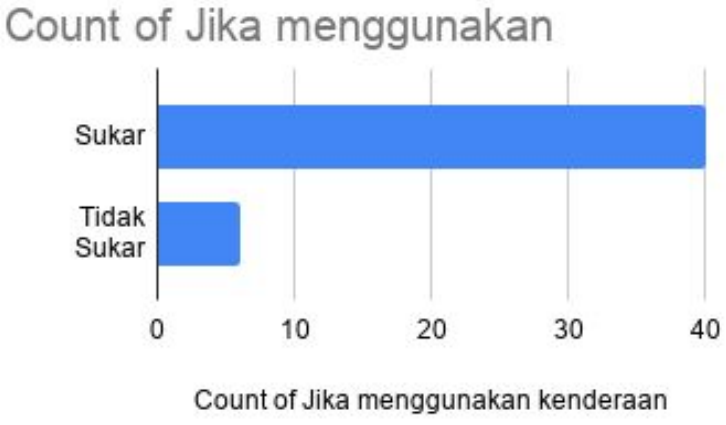


- **HAVE YOU EVER HAD AN INJURY THAT MADE IT DIFFICULT TO MOVE?**

- **HOW DO YOU TAKE A PATIENT FROM HOME TO HOSPITAL?**



- **IF USING YOUR OWN VEHICLE, DO YOU FIND IT DIFFICULT TO GET THE PATIENT INTO THE VEHICLE?**



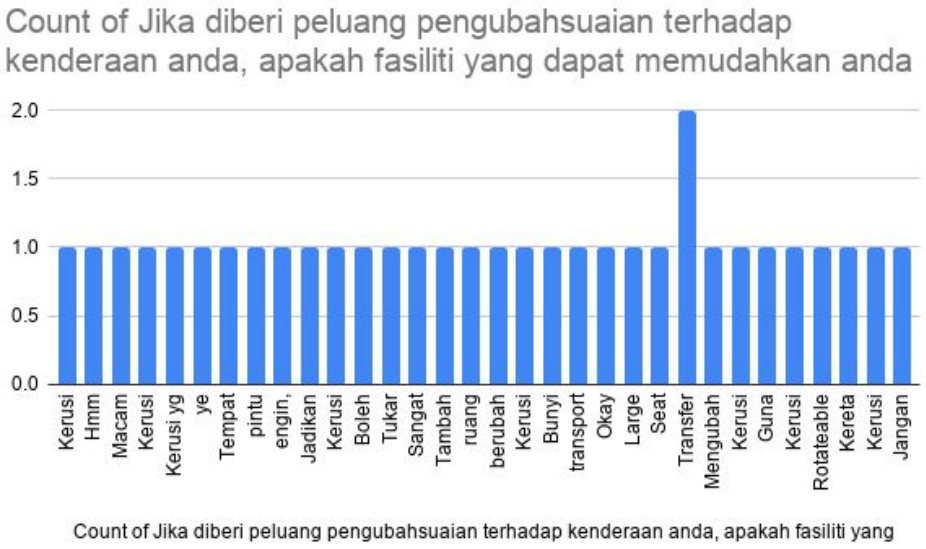
- **IF USING HOSPITAL SERVICES, HOW MUCH DOES THE HOSPITAL CHARGE?**

Count of Jika menggunakan perkhidmatan hospital , berapakah kos yang dicaj oleh pihak

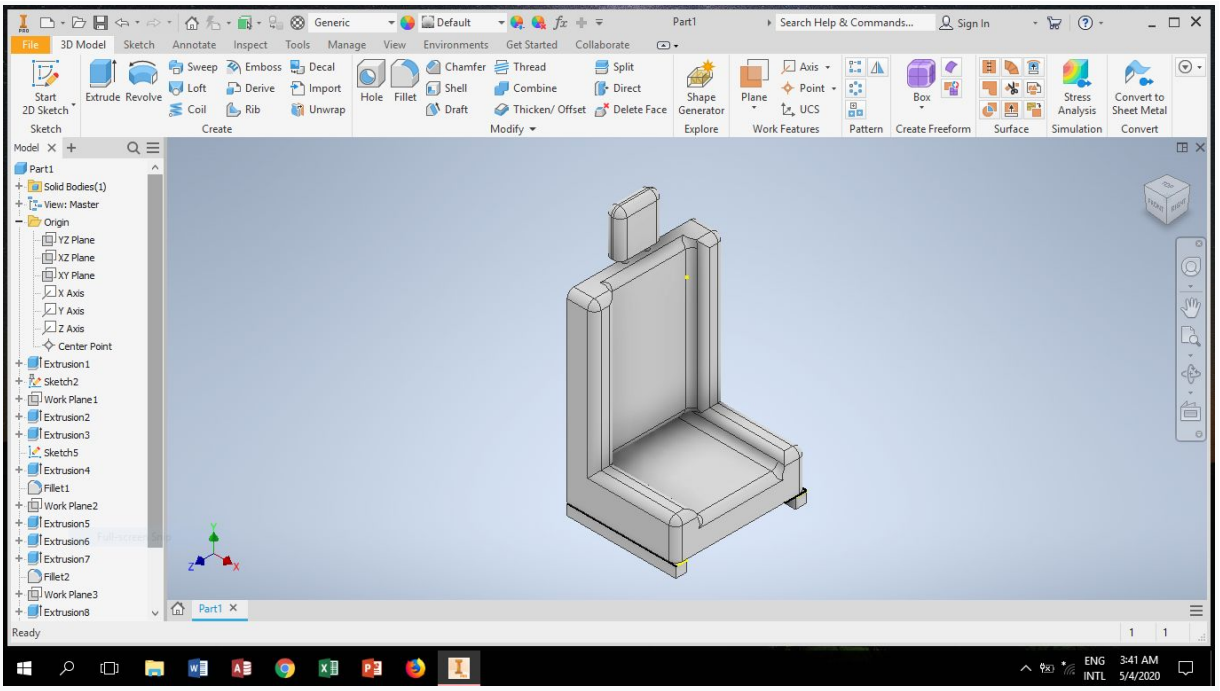
- **IS THIS CAR SEAT ABLE TO FACILITATE THE PATIENT'S ENTRY INTO THE VEHICLE?**

Count of Adakah kerusi kereta ini mampu untuk memudahkan kemasukan pesakit ke dalam

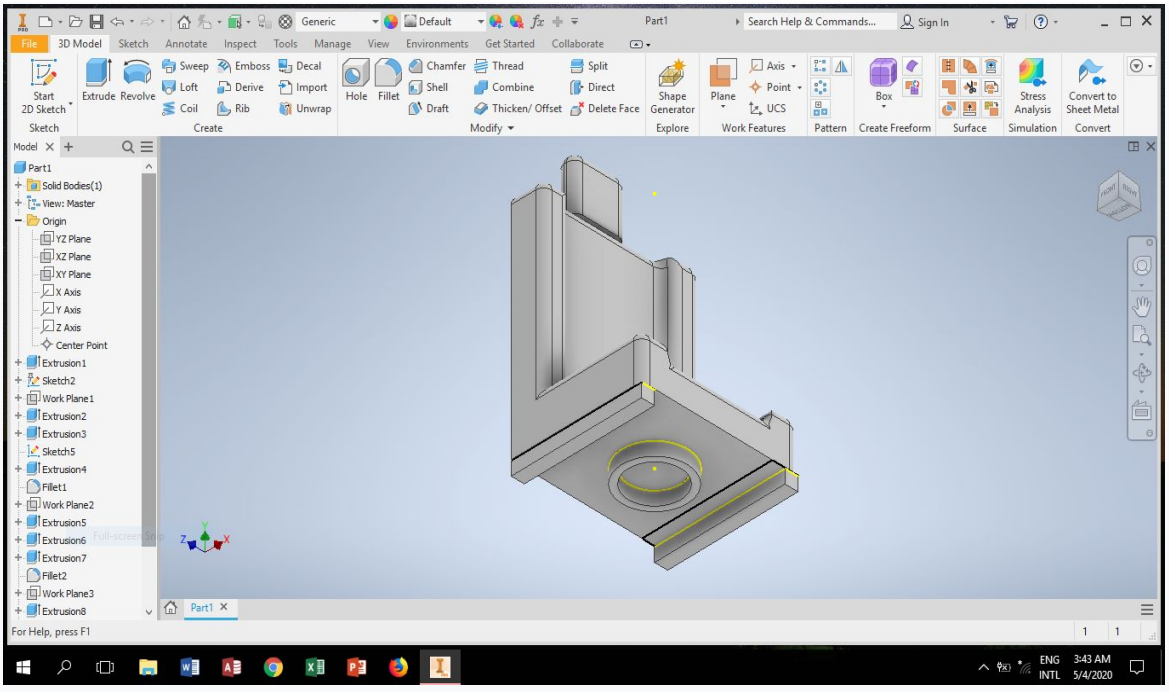
- **IF GIVEN THE OPPORTUNITY TO CUSTOMIZE YOUR VEHICLE, WHAT FACILITIES WOULD MAKE IT EASIER FOR YOU TO TAKE THE PATIENT TO THE HOSPITAL?**



3.6 PRODUCT DESIGN (prepared by Danial Izzuddin)



- Firstly, this is the seat from the front side. It looks like a normal seat but more comfortable.



- After that, this is the look from the bottom of the seat. There is a bearing that makes the seat turn around.

3.7 BUDGET CALCULATION (prepared by Danial Izzuddin)

No.	Materials/Equipments	Amount	Price (RM)
1	Bucket seat	1	250
2	Nylon cover	1	70
3	Stainless steel rail/track	1	100
4	Bearing	1	80
5	Welding & modification		350
total			± 850

CHAPTER 4

RESULT AND PROJECT ANALYSIS

4.1 INTRODUCTION (prepared by Asyraf Hadi)

Chapter 4 is more focused on the results and analysis of all the data obtained through the collected questionnaire. This section at first will explain the respondent's demographic profile. It will show by the percentages and the frequencies of the age and gender. The second section will be analysed about the frequencies and will continue with the reliability of analysis. Then, it will be followed by the descriptive analysis for all the variables. For the next section which is regression analysis is also very important in order to analyse to test whether the hypothesis and research question is accepted or not in this research.

4.1.2 Seat Height

Adjust the seat height up until your hips are at least as high as your knees. Make sure you can still see the road and the instruments. Make sure you are not so high so that you have to bend your head down or to the side in order to see.

Figure 4.0

Make sure the backs of your knees do not touch the car seat bottom, as this is bad for your knees and your circulation. There should be at least a two finger gap between the back of your knee and the seat.

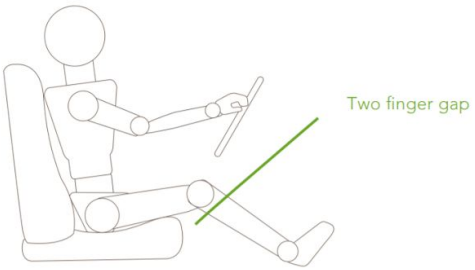


Figure 4.2

4.1.3 Seat Position

Next adjust the seat forwards so you can reach and completely depress all the foot pedals without your back moving away from the back of the seat. Make sure you have a small bend in your knees of at least 20-30 degrees - having your knees too straight can cause knee pain.

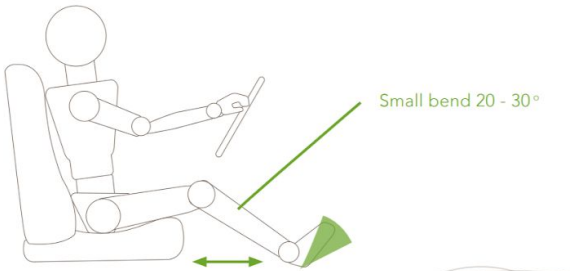


Figure 4.3

4.1.4 Tilt of the Seat

Traditionally the bottom of the car set is set with the rear of the seat down and the front uppermost. This position is often recommended as it helps to stop you from moving forward on the seat bottom (known as 'submarining') when you brake, or in the event of an accident. However, modern car seats have largely overcome this problem with the addition of seat belt pre-tensioners, which stop you from slipping under the seat belt, and the backwards angle has actually been shown to decrease the hip angle and increase the pressure on your lower

back/spine. Instead, you should position the seat bottom horizontally whenever possible

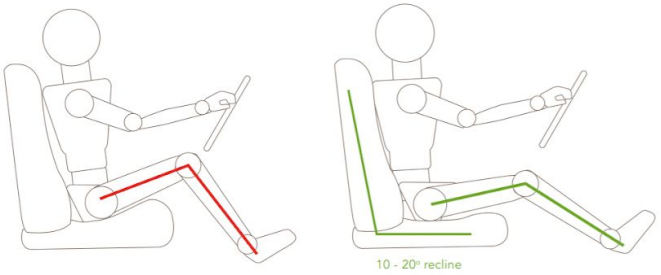


Figure 4.4

4.1.5 The Inclination of the Seat Back

Raise the inclination of the seat back to an angle of 100-110 degrees. This angle decreases the pressure on the discs in your low back.

4.2 Analysis Of Survey (prepared by Asyraf Hadi)

KUALA LUMPUR, According to market research firm Ipsos Sdn Bhd (Ipsos), Malaysia is fourth out of 29 countries whose population is afraid of getting old. In a statement released yesterday, Ipsos revealed that Malaysia ranks fourth after Brazil, China and Russia, based on their new 'Ageing in Malaysia' survey. 62 percent of Malaysians worry about old age, compared to the global average of 52 per cent, according to the survey.By contrast, the population of India (45 percent), the United States (48 percent) and the United Kingdom (50 percent) are less concerned about getting older, the study said The study also showed that 49 percent of Malaysians are not positive about aging and are nervous about getting older. 73 per cent of the respondents in India and 67 per cent in Turkey are wildly positive as they age. The study said that the interest of Malaysians in facing old age can be interpreted as a great opportunity for marketers.

Nevertheless the study found that 76% of the population of Malaysia believed that it was possible to prepare for old age, and this assumption stems from the fact that 85% of locals expect old age to be in good health. The study also showed that the lack of hope among Malaysians about aging can be offset by technology, as 60 percent of Malaysians believe that technological progress can ease their lives during old age.By comparison, about 50% of Europeans (44% in France and Belgium, 46% in Sweden, 48% in Hungary and the Czech Republic, and 51% in the United Kingdom) believe that according to the survey, technology will significantly enhance the lives of the elderly.

Furthermore the study also showed that 56 is considered by Malaysians to be the beginning of old age. This is much earlier than the global understanding of the start of old age ten years ago. The survey showed that respondents in most countries agree that in some cases, old age starts in the late 60s or early 70s. For example, respondents in the United Kingdom and the United States see 68 as the beginning of old age, it said. The Global Advisor survey conducted through the Ipsos Online Panel framework between August 24 and Sept 7 last year, involved 20,788 individuals aged 16 to 64 in 29 countries, including Malaysia. —Bernama

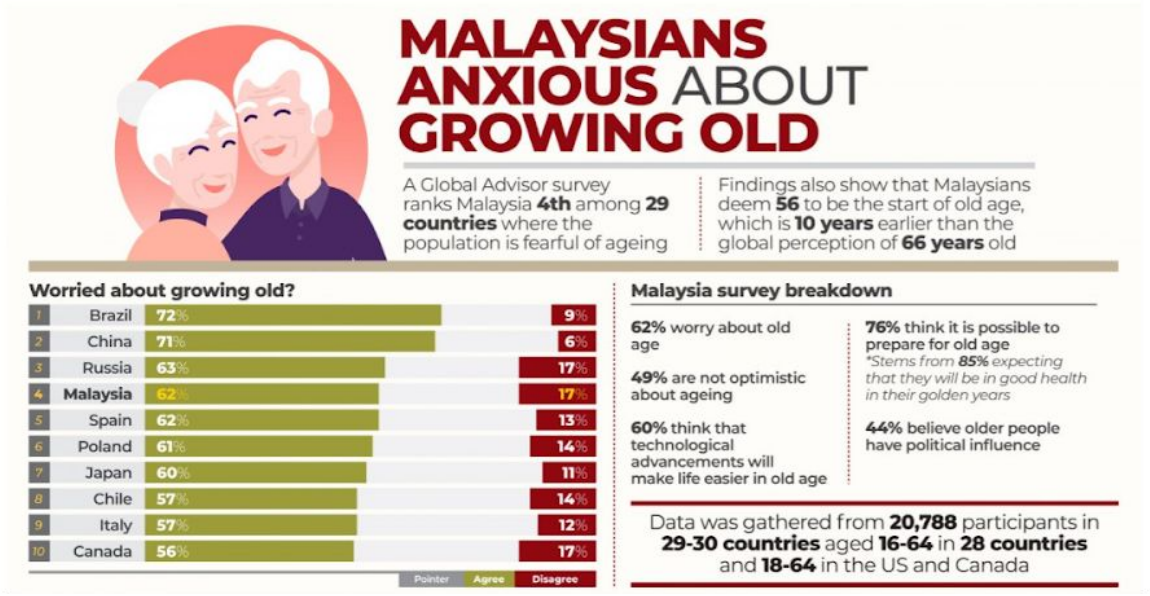


Figure 4.5

4.3 Advantages And Disadvantages (prepared by Fakrurriza)

After we survey, there are advantages and disadvantages from this project.We consider our project to be balanced from benefits and weakness.

Advantages

- Make it easier for people to enter and come out
- Material of the seat is durable.
- Low cost.
- Can be maintained by yourself.
- Provide convenience to those in need

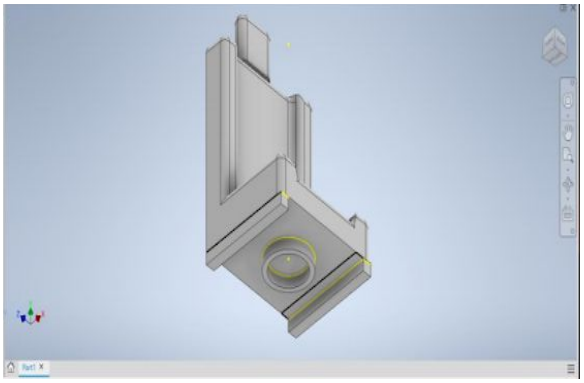
Disadvantages

- The mechanical part is risky to be jammed.
- The rusting of iron can lead to
- In order not to be overweight, more attention must be paid to the bearing

4.4 PROJECT ANALYSIS (prepared by Fakrurriza)

With the development of the auto industry, the safety of the car has increasingly become an important research field of modern automobile development design.As an important safety component, a vehicle seat is a hot spot in the study of automobile safety and it provides a decisive protection for passengers. This project is designed to make it easier for users to get in and out of the vehicle. This project also aims to use cheap and quality goods to help low-income parties apply this project on their vehicle. This car seat can rotate 90 degrees towards the car door without using electronic components.

This can reduce the maintenance cost of the project and users also can save Project Design was successfully proposed and fabricated according to designed material and fabrication method as exhibited in Figure 4.6.



(a) Product Design

(b) Product Fabrication

Figure 4.6

4.5 Product testing (prepared by Danial Izzuddin)

On the other hand, the special feature of the project is it can rotate 90 degrees towards the car door based on the user's preference. We make this car seat with no electronic components . So, the maintenance of this product was not too high . Users also can move their seat like usual according to them , but when they want to use SRCR it has to be repositioned so that the car seat can rotate properly .Finally, it can be concluded that the stated objectives were achieved and implemented effectively. Figure 5 exhibits the finished product achieved design objectives.

Figure 4.7

4.6Chapter Summary (prepared by Danial Izzuddin)

In conclusion, in this chapter, we have found that the seats that are manufactured are safe for people to use. We also achieved the scope of work we wanted to accomplish. Based on the computation and analysis of the data we do, it shows that our projects are safe and created to the best of our ability. Based on the computation and analysis of the data we do, it shows that our projects work and are created to the best of our ability.

CHAPTER 5

DISCUSSION, CONCLUSION AND UPGRADE PLAN

1.0 INTRODUCTION

Based on the results obtained in Chapter 4, a discussion of the finding is presented in this chapter. The findings from the study are used to discuss whether the proposed hypotheses are supported. All research questions will be answered subsequently and finally the achievement of research objectives are determined. Vendors are provided with managerial implications and recommendations to enable them to draft appropriate strategies in gaining consumers' intention to purchase car seats for disable people .Finally, the contributions of the study are discussed based on theoretical, methodological, practical approaches and end with suggestions for future research.

2.0 BENEFITS FOR THE SOCIETY

The advantage of this car seat is for disabled people or wheelchair users to get in and out of the car. through our search in Italy there was a man who produced this product. There are many Italians who have installed this product on their vehicles to facilitate daily business. Also, this product is cheaper than the products in Italy. So that, this product is created for people who are cashless but the quality of this product is no less than the product in Italy. This product is also suitable in Malaysia who have a lot of old men.

For the industry, this product will be successful due to its low cost and good quality. According to the Ministry of Health Malaysia, Malaysia will be an elderly friendly country by 2030, this is because the number of older people in the country is increasing. WHO, the World Health Organization has released a statement that this elderly friendly country has a

15% population of old people in one country. So this product will be one of the best products for Malaysia to grow its industry even in the crisis of more older people

3.0 SUGGESTION TO FURTHER THIS STUDY TO FUTURE:

For me taxis can also install this product on their vehicles. This will advance the tourism industry in Malaysia as travelers with less mobility will be able to easily get to the tourist spot in Malaysia without any problems. Although it may seem small but it has the potential to advance the country in the health sector as this product can speed up the entry and exit of cars for older people. Let's say the old man is sick and wants to go to the hospital, waiting for the ambulance to come takes a long time. Therefore this product can help owners to go on theirs and even save their lovely parents.

CONCLUSION

As we can see this product has a high potential for Malaysia to thrive despite the growing elderly population. If Malaysia uses this technology more effectively, we will see many advantages as developed countries such as Italy. It's fine if we are not the first country to use this technology but we are also considered the earliest country and maybe other countries will follow and emulate Malaysia.

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