POLITEKNIK
MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

POLYTECHNIC SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PORTABLE MOTORCYCLE TOWING

NAME	MATRICS NUMBER
MUHAMMAD HASIF ZIKRI BIN ZULKAFLI	08DKM17F1192
MUHAMMAD AIMAN DANIEL BIN ZAFARUDDIN	08DKM17F1225

DEPARTMENT OF MECHANICAL ENGINEERING

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VERIFICATION REPORT PROJECT

The report titled is *PORTABLE MOTORCYCLE TOWING* has been submitted, reviewed and certified as fulfill the requirements and requirements of writing the project as it has been set. We acknowledge that this work is our own work except that of an individual citation one we have explained the source

Checked By:

Supervisor Name : Madam Isnuraini Binti Kassim@Ismail

Supervisor Signature :

Date :

Name : MUHAMMAD AIMAN DANIEL BIN ZAFARUDDIN

Identification No. : 990603-14-5571

Signature :

Date :

Name : MUHAMMAD HASIF ZIKRI BIN ZULKAFLI

Identification No. : 991109-14-5781

Signature :

Date :

APPRECIATION

Thank the Almighty for His mercy. We have successfully completed our Final Year Project and this report meets the needs of polytechnic students to obtain a diploma. Despite the many challenges we face in solving this project and paperwork but with a lot of patience, effort and struggle among team members we are finally able to complete the task.

Appreciation is also given to friends and lecturers in Department of Mechanical Engineering who have helped and helped us directly or indirectly in the production of this project. We would like to express our deepest appreciation to all those who provided us the possibility to complete our project and this report. Our appreciation is given to our beloved supervisor, Madam Isnuraini Binti Kassim@Ismail, whose contribution giving suggestions, idea and encouragement to help us coordinate our project especially in writing this report and also during our final project for 2 semester.

Other than that, we don't forget to ask our parents for their support and encouragement especially give support in term of financial throughout our time studying and during our stay carry out project Portable Motorcycle Towing activities at the Polytechnic Sultan Salahuddin Abdul Aziz Shah.

Finally, we sincerely apologize for wrong and mistaken during the progress on this project. Hopefully this opportunity will always be our common benefits to future.

Thank you

ABSTRACT

The study aims to reduce the rate of accident & to facilitate the towing process of damaged motorcycles in Malaysia. The rate of road accidents from motorcyclists is very high and should be emphasized to reduce the harmful effects of other road users. The objective of this study is to build & create a more efficient towing equipment for motorcycle to help simplify the process of towing motorcycles with minor damage on the road. In this study, mostly motorcyclists are not good at tow motorcycle using leg. Furthermore, the process of towing the foot also takes a long time & not some safe to use. Therefore, this motorcycle towing device needs to be designed to reduce the risk of road accidents and prevent using leg to tow break down motorcycle.

CONTENT

CHAPTER 1
INTRODUCTION

1.0 INTRODUCTION

We would like to create a new motorcycle towing equipment that more efficient and cost-effective in Malaysia. Given that most damaged motorcyclists need to push the damaged motorcycles to the nearby workshop, it is very tiring and takes a long time to arrive at the workshop. This problem is very troublesome and harmful to motorcyclists who have damaged the motor. As a result, we have ideas and solutions for this problem and want to create a special tailor-made gear for motorcyclists.

This motorcycle towing equipment can facilitate towing of bicycles in a better and safer way. Some communities do not care about the safety of other road users. Therefore, the rate of road accidents in Malaysia is high and suffer from other road users. Communities need to be aware and more proactive with accidents that occur around to be mitigated and avoided. This tool also contributes to the reduction rate of road accidents. This is because the tool does not take a long time to set up and the way to put a broken motorbike safer than using the foot.

In addition, this tool can also be owned by any motorcycle rider and can be used when there is a small damage to the motorcycle. Additionally, this device is equipped with a light reflector tool and can be fastened and can be stored in a motorcycle basket or in a special place to be easily taken when needed. Hence, with this tool, the rate of road accidents by motorcyclists while delaying other motorcyclists is minimized so that the number of deaths can be reduced. We expect this project to be accepted and adopted by any motorcycle rider who wants to help with a broken motorcycle.

1.1 PROBLEM STATEMENT

- The motorcycle is not equipped with a towing equipment when needed
- Towing using leg will risk themself and others

1.2 OBJECTIVE

- Design and fabricate efficient motor towing equipment
- Simplifies the towing process safely

1.3 SCOPE AND LIMITS

There are some scope and limitations for our project, motorcycle towing equipment. Our motorcycle towing equipment is only possible for the motorcycle that only has minor damage such as :

- Broken chain
- Out of fuel
- Flat tyre only for front tyre
- Broken spark plug

Our Portable Motorcycle Towing is only for motorcycle that less than 150cc and also less 250cc based on the capabilities and strengths of our tools. Our Portable Motorcycle Towing is also capable of delaying a 150cc motorcycle and also less than 250cc. Whether it is, speed, (km/h) of 150cc motorcycle is less than 30-50km/h while for motorcycles with 250cc, motor speeds when delayed is only 30-50 km/h. In addition, the weight gain of the motor and the weight of the rider for the 150cc motor is as much as 200kg while for the 250cc motor weight of 250cc is only less than no. When passing the corner bend, the motorcycle angle for 150cc and 250cc is within 30 degrees according to physical law and capabilities of tools.Our Portable Motorcycle Towing is cannot be used for scooter.

In conclusion, we get the information about scope and limit of this motorcycle towing equipment is through survey and our surroundings people who are using the motorcycle as transport.

CHAPTER 2
LITERATURE REVIEW

2.0 INTRODUCTION

During this study, researchers have been using sources of printed materials as well as electronic materials such as reference books as well as sources of websites. Many of the research sites related to this study have been investigated by researchers. This is to get more information resources as well as additional information that can be used as input materials to complete this study. For this purpose, researchers have obtained referrals and advisory services from polytechnic lecturers to further improve this project. Researchers have used the student as a student in this polytechnic to optimally use the facilities that the library has to offer to use existing computers. In addition, the printed references supplied by colleges were sampled by researcher and also used as a reference source by the researchers in developing this study

2.1 LITERATURE REVIEW

By:Muhammad Hasif Zikri

2.1.1) Tow truck for car

The use of towing trucks for the car has been extensively used throughout the country or the world. The increase in the number of towing trucks is due to the public's demand when there is a problem on the car, on the road which cannot be switched on, damaged by accident and the car that violates the rules of carriage. Towing truck must have a license to suspend the customer's car.

Figure 2.1.1

2.1.2) Flatbed trailer

(also called a "rollback" or a "slide"): the entire back of the truck is fitted with a bed that can be hydraulically inclined and slid back to ground level, allowing the vehicle to be placed on it under its own power or pulled on by a winch. Because they carry rather than tow the vehicle, it can be completely immobilized; they are used to carry badly damaged cars from crashes and it also can carry a high- power motorcycle.

Figure 2.1.2

2.1.3) Tow truck for lorry

The use of towing trucks for buses and lorry is also widely used to tow buses and trucks. This tow truck can tow the lorry and buses because it has a large and powerful engine and is able to tow the bus or truck. To tow these lorries and buses it costs a lot because they are going to tow heavy loads.

Figure 2.1.3

2.1.4) Towing motorcycle using 4x4

Service towing motorcycles using this 4x4 car is something new in Malaysia to tow the damaged motorcycles. Many motorcycle service shops have this service to assist motorcycles damaged on the road and sent to workshops to repair. These services are featured on social media as well as numbers to facilitate the motorcycle rider if the their motorcycles have damaged

Figure 2.1.4

2.1.5) Motorcycle towing cradles

also known as motorcycle trailer hitch dollies and receiver hitch motorcycle caddies) allow you to hook the front wheel of your bike to the vehicle and let the back wheel roll freely behind. These cradles consist of a wheel cradle or chock that locks directly into the towing vehicle's hitch tube. All you have to do is lock the front wheel into this contraption and, in some cases, further secure the bike with towing straps.

Figure 2.1.5

By: Muhammad Aiman Daniel

2.1.6) Motorbike trailer loading

Motorbike trailer coupled to the tow vehicle whilst loading and un-loading your bike, which will prevent any chance of the trailer pitching up, or moving around as it is pushed on.

Figure 2.1.6

2.1.7) Fatz tow hitches

Using the FATZ hitch eliminates these stresses, your motorcycle is held upright and stable throughout the driving process, steering is achieved by the FATZ patented vertical stabilising system incorporated in our bracket. Special features include a ramp for easy loading; designed pivot-points built into the hitch, which eliminates stress, simplicity and ease of use.

Figure 2.1.7

2.1.8) Black widow steel motorcycle carrier

Heavy duty steel construction, an impressive 500 lb. weight capacity, and an included anti-tilt locking device makes hauling your dirt bike, motorcycle, or scooter both easy and safe. The included self-storing ramp attaches to either side of the carrier to make loading and unloading a breeze. The ramp stores flat on the carrier when not in use. Also includes an anti-rattle device to ensure stability during transport, and a spacer bar adapter for transporting youth 50-80cc dirt bikes.

Figure 2.1.8

2.1.9) Polaris "slingshot" rear wheel towing system / kit

A frame high coupler, trailer jack, safe chain and chain stops swivelling. This towing system is ideal for towing a high power motorcycle like 500cc and above because they have a bigger space to put the bigger tyre from that motorcycle. Vehicle ramp for loading (roll off curb can removed).This towing system connect by a car

Figure 2.1.9

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

. Methodology research is a neat plan in terms of project process 1 before starting a real project. To facilitate this project's 1 journey, the methodology study should be arranged as best as possible so that the process of completing the project does not exclude from the prescribed schedule or, more accurately, the final outcome of the study will be disbanded and confronted with various issues that need to be addressed. Hence, the methodology is very important to know and understand in depth each process in the methodology of the study methodology.

The objective of this study is to ensure the process of tow and facilitates MARSHALL and workshops that provide tow service in the event of motorcycle damage. Moreover, the existing towing (using the foot) is not safe and it is a danger to the safety of other road users. next, the existing motorcycle towers only use trucks or cars and are not conducive to use when in traffic congestion. In addition, the towing model used is influenced by several factors such as speed, stability and angle of bend when delaying.

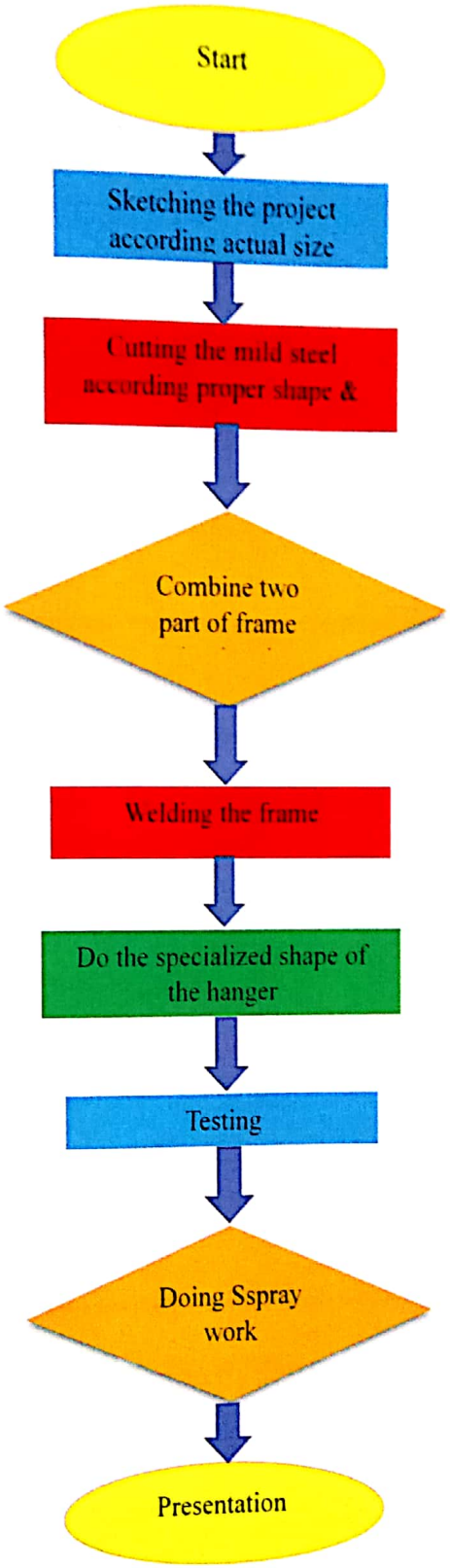
In order to ensure that the towing model works properly, it needs to be monitored and systematically monitored over time to ensure that the project safety level is in good working condition. Thus, the use of this towing model can last longer in terms of its physical shape and the usefulness of the model when towed or stored for saving cost to repair it. In fact, this towing model was the first model created to delay motorcycles using motorcycles.

By: Muhammad Aiman Daniel

3.1 GANTT CHART

ACTIVITY	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Gathering the information about the material of the project															
Research and got advice from the expert															
Survey material and item of project															
Design mechanical base and create prototype															
Calculation of budget															
Go to the workshop and create the project															
Combine the mechanical parts (bearing) and the frame of the project															
Develop a creative solution to hanging the equipment to the motorcycle															
Fabricate the dropping mechanism and the safety design															
Test run															
Collecting the data and analyse the result															
Presentation of project															
Improve and repair the project															

3.2 FLOW CHART



By: Muhammad Hasif Zikri

3.3 THE FIRST PROJECT DRAWING

Project overview

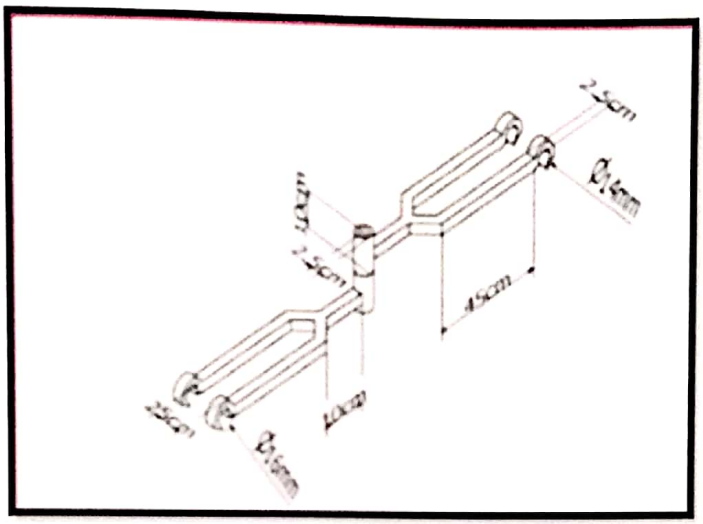


Figure 3.3.1

This tool can follow the motorcycle when cornering

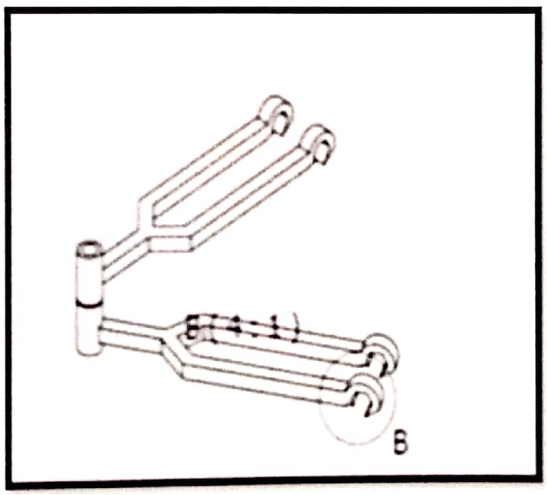


Figure 3.3.2

Option 1: The specialized hanger to connect the motorcycle

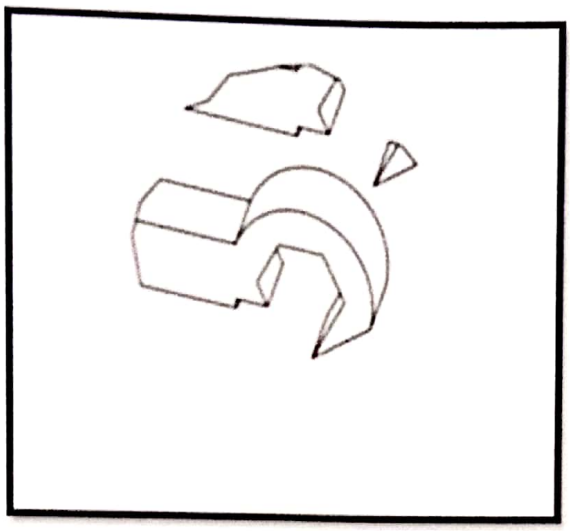


Figure 3.3.3

Option 2: The specialized hanger to connect the motorcycle

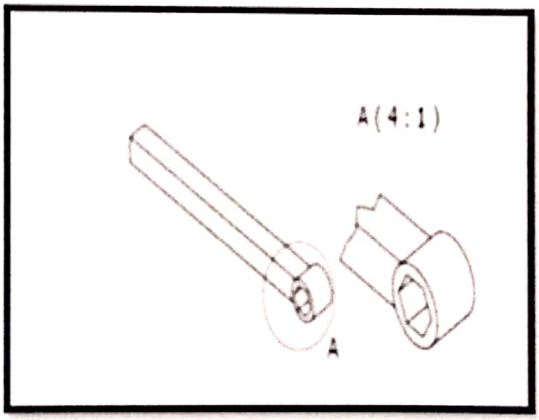


Figure 3.3.4

3.4 THE LATEST PROJECT DRAWING

Project overview

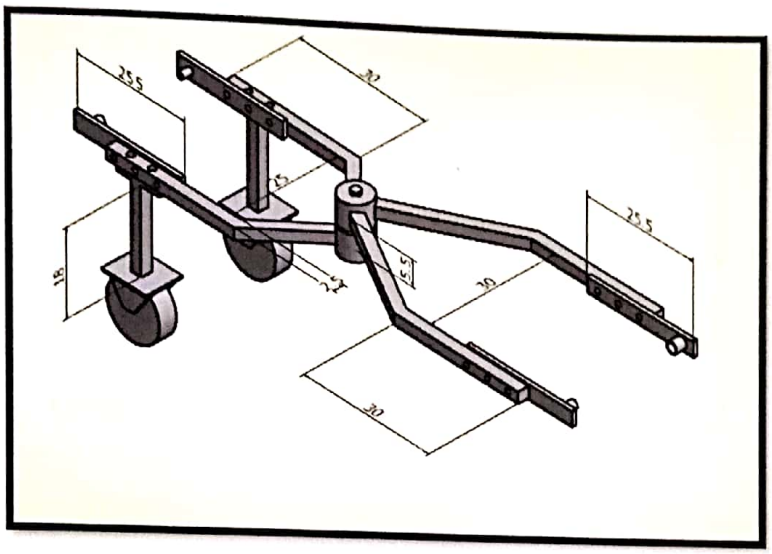


Figure 3.4.1

Front part

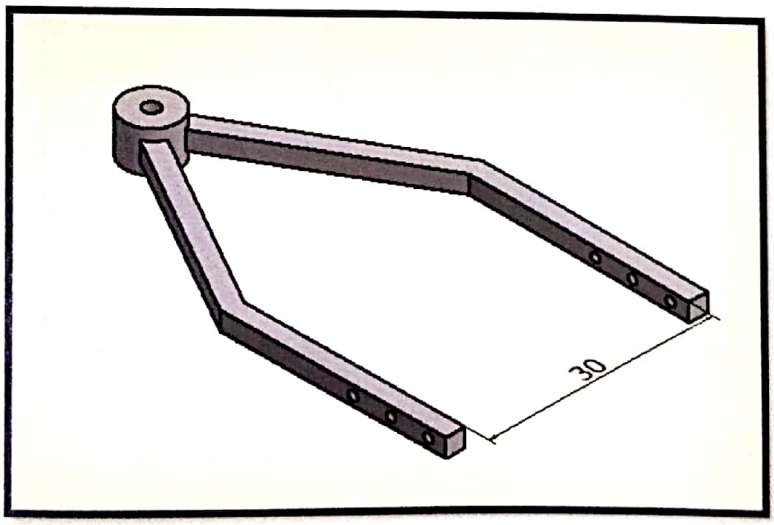


Figure 3.4.2

Rear part

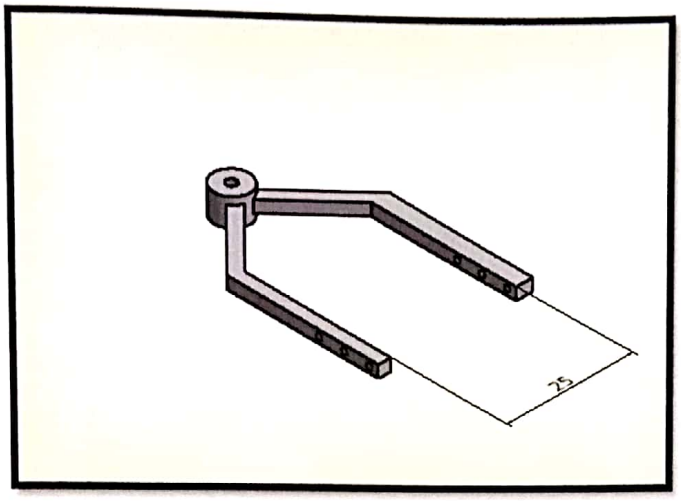


Figure 3.4.3

Plate bar to connect motorcycle by using hexagon bush pipe

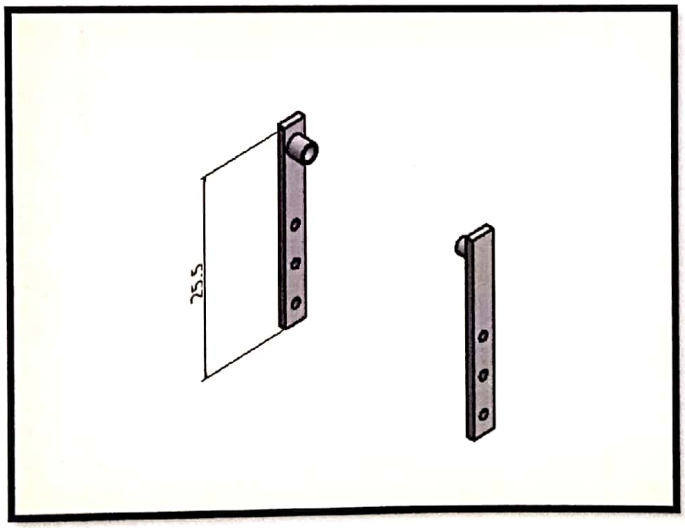


Figure 3.4.4

Swivel caster wheel that connect to the rear part

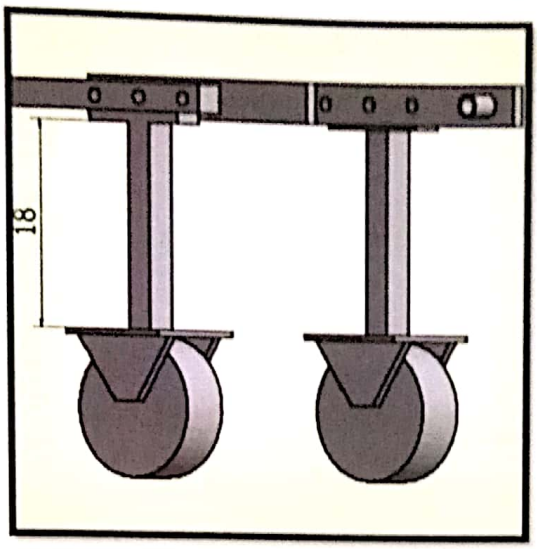


Figure 3.4.5

Fixed caster wheel to be installed on the paddle at motorcycle that have minor damage

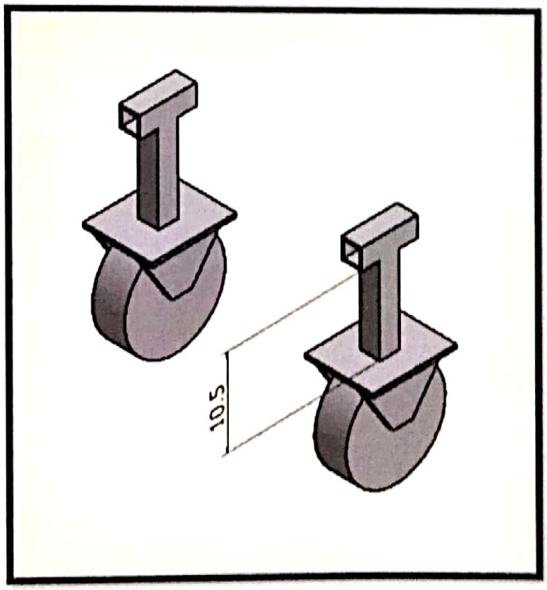


Figure 3.4.6

Stainless steel shaft to combine front and rear part

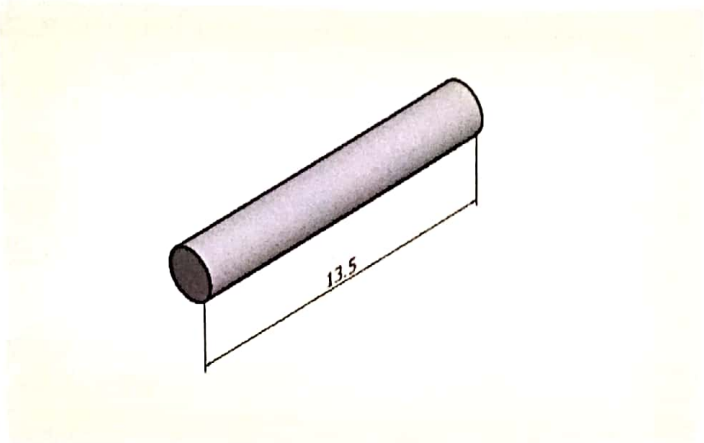


Figure 3.4.7

3.5 SAFETY MEASURE

- Wearing the suitable and safety shoes that fit in the workplace.
- Wearing eye protection during the work.
- Wearing glove during welding work.
- Always check the equipment and the machine to use.
- Turn off the switch after using the machine.

By:Muhammad Aiman Daniel

3.6 MATERIAL SELECTION

3.6.1) Mild steel plate bar 1x1x3.5 (6m)

Figure 3.6.1

3.6.2) Mild steel hollow 1x3 (6m)

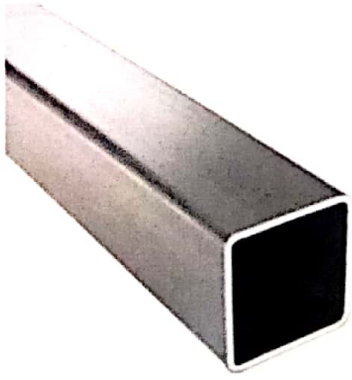


Figure 3.6.2

3.6.3) Mild steel hollow pipe d =6cm (1m)

Figure 3.6.3

3.6.4) Bearing D in=2cm (2 unit)

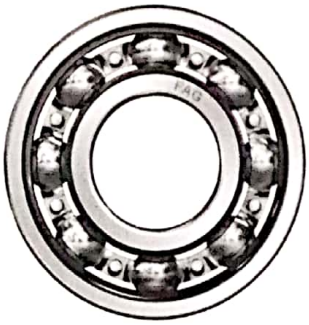


Figure 3.6.4

3.6.5) Wing screw M10x40 (14 pcs)

Figure 3.6.5

3.6.6) Nut M10 (14pcs)

Figure 3.6.6

3.6.7) . Head hex screw M5x10 (12pcs)

Figure 3.6.7

3.6.8) Nut M5 (12pcs)

Figure 3.6.8

3.6.9) Fixed caster wheel 5' (2 unit)

Figure 3.6.9

3.6.10) Swivel caster wheel 5' (2 unit)

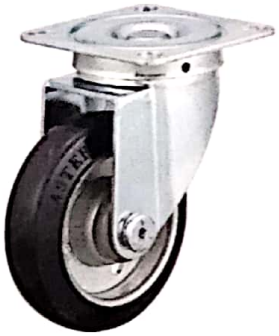


Figure 3.6.10

3.6.11) Hexagon bush pipe 1.5cm (1), 2.0cm (2), 2.5cm (1)

Figure 3.6.11

3.6.12) Stainless steel shaft 2x1 (1 unit)

Figure 3.6.12

3.6.13) HSS drill bit (10.5)

Figure 3.6.13

3.7 PROJECT STEPS

3.7.1) Sketching the project according actual size

Figure 3.7.1

Firstly, draw the sketch using a pencil (Figure) and also the computer design (inventor) (Figure) to see the initial drawing of the model in terms of specific size and fit to the position motorcycles . A good quality of project requires a first draft as a guide to create the project.

3.7.2) Cutting the mild steel according proper shape & size

Figure 3.7.2

Before cutting the iron, marking and measurement are essential to getting the results better with the size specified. Each size that want to cut needs to be marked with an engraver so that the cut size is accurate and zero-error. the visual eyes must angle 90 ° before cutting. We use cutting machines to cut steel of different types and sizes. Apit-G is also used for cutting work to make work better and simplify the cutting process.

3.7.3) Welding the frame

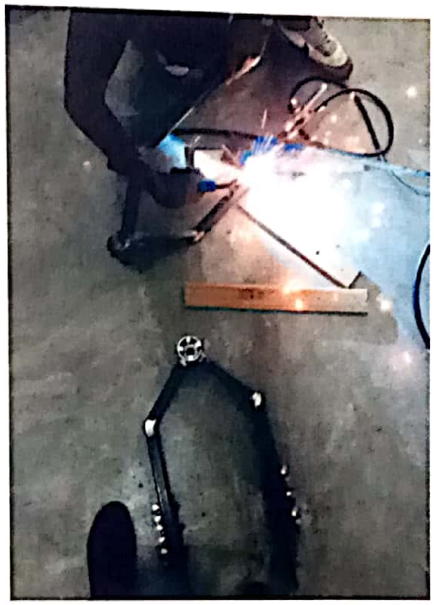


Figure 3.7.3

The process of welding the project model frame should follow the sketch provided. We use a MIG (Metal Inner Gas Welding) machine or better known as an Ink Metal Welding as a two-step welding process. Welding is a fabrication process or arc that combines with materials, usually welding use only metal. Welding requires high heat to adjust the parts that you want to attach. This process occurs after the electrode is melted and mixed with the molten metal to form the weld. Therefore, the electrode must be supplied with a constant current throughout the welding process. For continuous supply of electrodes, electrodes are made in the form of wires which can be released out of the nozzle automatically at a specified speed. MIG equipment fittings are more complex as the process requires continuous and uniform electrodes. The process of welding on steel should be done carefully by using face protection equipment, using special gloves for work welding and even safety boots.

3.7.4) Combine two part of frame using bearing

Figure 3.7.4

After the cutting work, a stainless steel shaft (2x1) 13.5cm was inserted into a hole both bearing 5cm using rubber ivory to separate the two movements

3.7.5) Do the specialized shape of the hanger

Figure 3.7.5

Fabricate a new specialise of hanger for the towing process. The hanger should fit and not damage any of the components on the motorcycle in the long term. The best specialise hanger must suit all types of motors regardless of brand or motorcycle position.

3.7.6) Testing

Figure 3.7.6

Testing the model is important to ensure that the project achieves its objectives or not. Our testing model through 4 test run to get the best project data and results for safe use.

3.7.7) Doing spray work

Figure 3.7.7

Neat work has been done to create a good project model and to attract users to use it. For example, grinding work on all components and painting work using Anti-Coat and Fluorescent Red spray. We use this spray as it prevents model projects from corrosion when exposed to rain and sunlight. In addition, the color used is a hazardous color and can reflect light at night when the tow is done. Therefore, the process of towing a damaged motorcycle is safer and more environmentally friendly at all times by using this project model

3.8 PROJECT PROCESS IN MECHANICAL

3.8.1) Model installation on motorcycles

1. Double stand both motors
2. Place the project model between the two motors that want to tow
3. Put the 4 specialize hanger on the motorcycle according to the appropriate mounting size and position (front & back) and tighten the screws
4. Slot 2 flexible wheels on the motors that are tow under a special hanger to lift up the motorcycle's front tire and tighten the screws
5. Remove the rubber at the towing motorcycle pedal
6. Insert 2 fixed wheels on the provided pedal holes and tighten the screws
7. Lower both motors simultaneously

3.8.2) The function of the model works when tow

3.8.2.1) 4 Special hangers:

Figure 3.8.2.1

To pull the motor safely towed and not damage the each motorcycle components

3.8.2.2) 2 Bearing :

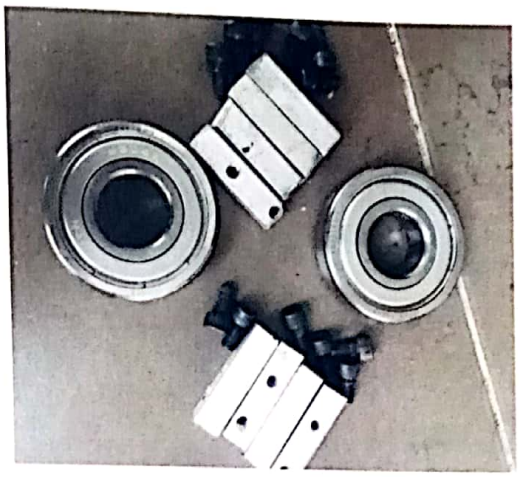


Figure 3.8.2.2

To rotate the model freely during the tow process at the road

3.8.2.3) 2 Swivel caster wheels:

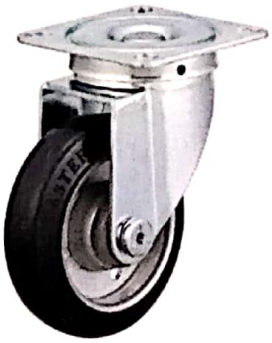


Figure 3.8.2.3

To lift the motorcycle's front tire and move the model to the left and right of the motorcycle

3.8.2.4) 2 Fixed caster wheels:

Figure 3.8.2.4

To set the motion of the motorcycle towed in the direction of the a delayed motorcycle (trolley)

3.8.3) Model storage

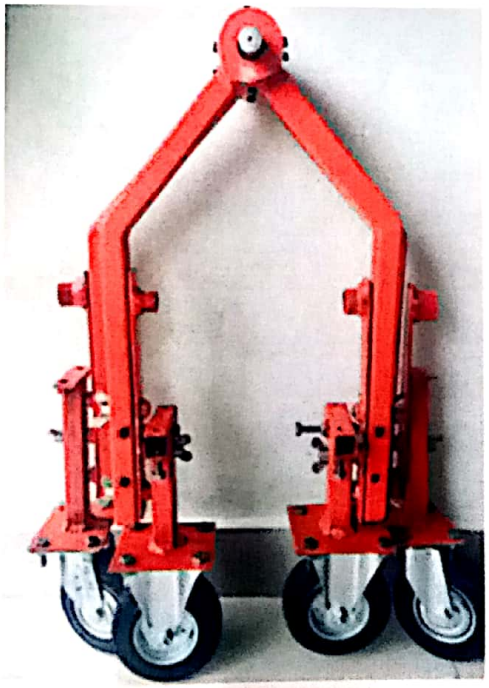


Figure 3.8.3

1.Double stand motorcycle again

2.Remove all components project model from the motorcycle

3. Turn 360 ° of project model into U-shaped

4. Fold in all special hangers and attach screws to the model

5. Place 2 flexible wheels on the bottom of the model and tighten the screws

6. Place 2 fixed wheels on top of model and tighten screws

7. Ready for storage

3.9 CONCLUSION OF METHODOLOGY

This chapter begins with an introduction and then describes the research design used in this study. Population and sample studies were also mentioned before discussing the methodological research used to conduct this study. In collecting data, libraries and field research are used. For field research, a qualitative method is selected whereby the inventor group is thought to be involved in the procedure research. The data collected is then analyzed and discussed and the results presented.

CHAPTER 4
DATA ANALYSIS

4.0 INTRODUCTION

Once all the data and information has been obtained, the analysis is performed for see the effectiveness of the function Portable Motorcycle Towing. The results obtained in this chapter are the results derived from the questionnaire and experiments conducted in research area. Data obtained from experiments in the study area were analyzed in more detail to draw conclusions based on the objectives of the study as already stated.

By: Muhammad Aiman Daniel

4.1 DATA ANALYSIS FROM QUESTIONNAIRE

4.2.1) Have you ever towed the break down motorcycle?

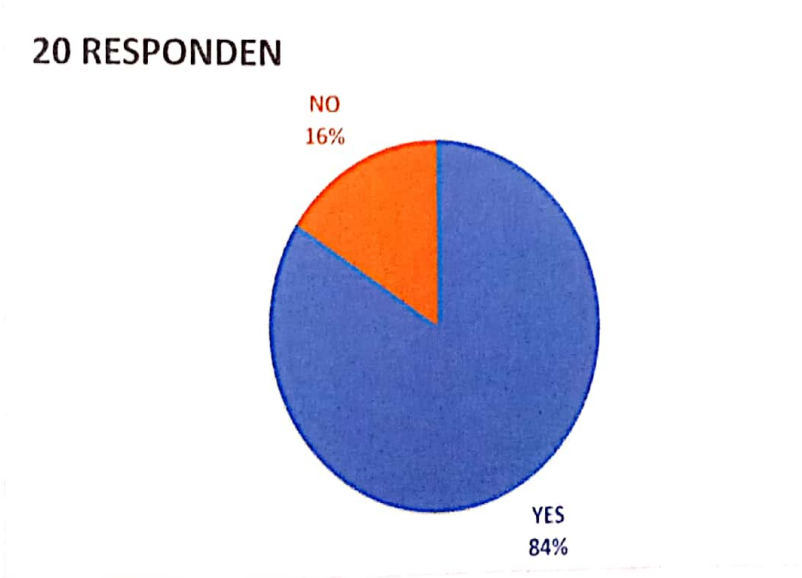


Figure 4.2.1

Generally in this pie chart shows the most people has been towed the break down motorcycle

4.2.2) Is it difficult to tow break down motorcycle using leg?

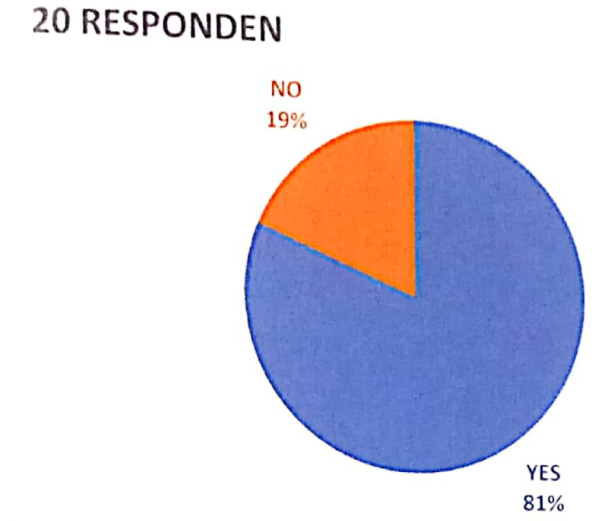


Figure 4.2.2

81 percents from all the responden says it difficult when tow the breakdown motorcycle

4.2.3) Is it safe for you to tow the motorcycle by using leg?

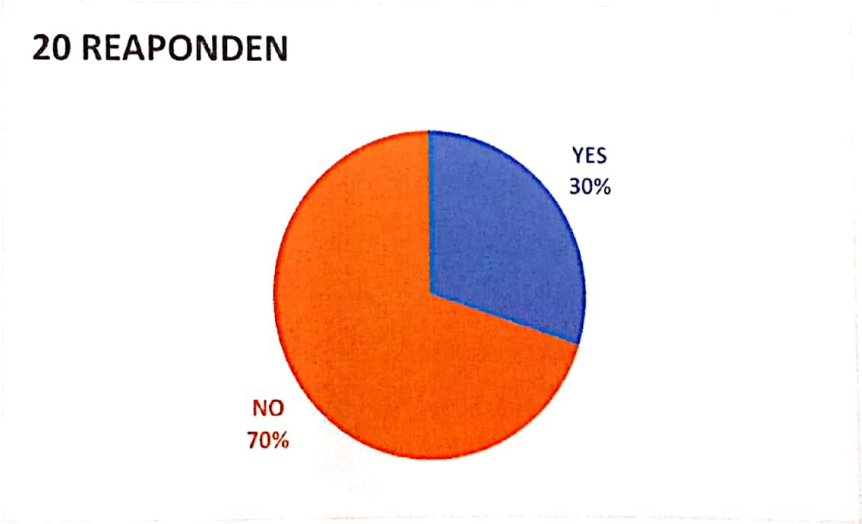


Figure 4.2.3

This pie chart shows that they have know the risk when using leg to towing break down motorcycle

4.2.4) Do you need a Portable Motorcycle Towing to ease you to tow the break down motorcycle?

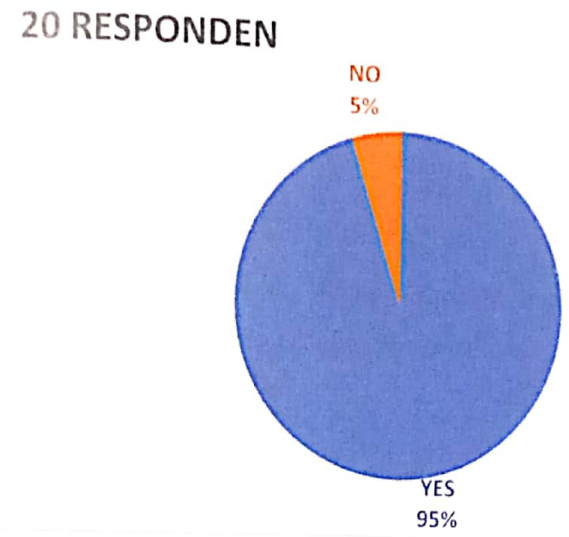


Figure 4.2.4

Yes for sure from this pie chart they need Portable Motorcycle Towing because our project objective is simplifies towing process safely

4.2.5) Do you think this product can decrease the risk of road accidents?

Figure 4.2.5

All of them are agree with our project because can decrease the risk of road accidents

4.2 CONCLUSION FROM QUESTIONNAIRE

This data analysis was based on the research records we obtained after questioning the 20 students who rode motorcycles at Polytechnic Sultan Salahuddin Abdul Aziz Shah in Shah Alam. We found that most motorcyclists here are not good at towing motorcycles. Some of them tow break down motorcycles with only legs. Techniques to tow using legs are very difficult and not some safe for the safety of towers and motorcyclists who are delayed on the road. Therefore, most motorcyclist students support our idea of creating this Portable Motorcycle Towing so this tool can reduce the rate of road accidents and facilitate the towing of defective motorcycles.

4.3 COSTING

Item (cm)	Price (RM)
1. Mild steel plate bar 1x1x3.5 (6m)	19
2. Mild steel hollow 1x3 (6m)	30
3. Mild steel hollow pipe d =6cm (1m)	10
4. Bearing d=2cm (2 unit)	36
5. Wing screw M10x40 (14 pcs)	19.6
6. Nut M10 (14pcs)	2
7. Head hex screw M5x10 (12pcs)	5
8. Nut M5 (12pcs)	2
9. Fixed caster wheel 5' (2 unit)	17.6
10. Swivel caster wheel 5' (2 unit)	38
11. Red fluorescent spray (3 unit)	48
12. Anti-rust spray (1 unit)	7
13. HSS drill bit (10.5)	18
14. Grinding disc	1.2
15. Hexagon bush pipe 1.5cm (1), 2.0cm (2), 2.5cm (1)	14.6
16. Stainless steel shaft 2x1 (1 unit)	30
Total	**RM298**

Table 4.3

By: Muhammad Hasif Zikri

4.4 RESULT

4.4.1) FIRST TEST RUN

Date: 24 September 2019

Time: 5:00pm

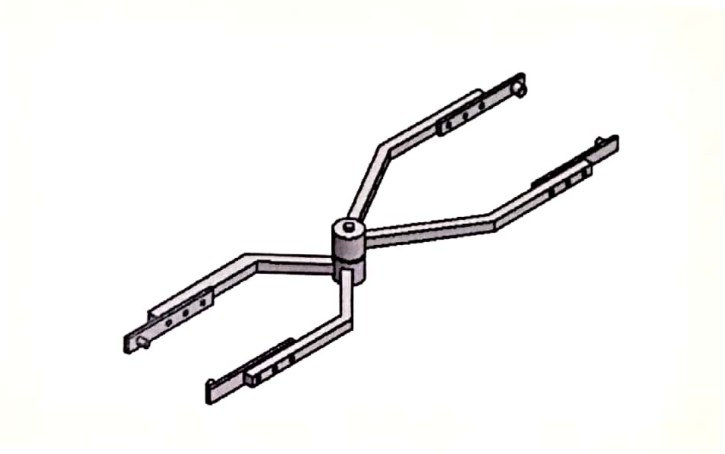


Figure 4.4.1

In the first experiment to test the reliability of our project.We found that our specialized hanger motorcycle is functionable when tow the motorcycle. In addition, we find that the motorcycle behind it has problems is stabilizing that motorcycle. Furthermore, we also encountered problems when we made the turn, when making turn the plate bar bend and our specialized hanger indirectly pull it from its original place

4.4.2) SECOND TEST RUN

Date: 3 October 2019

Time: 5:00pm

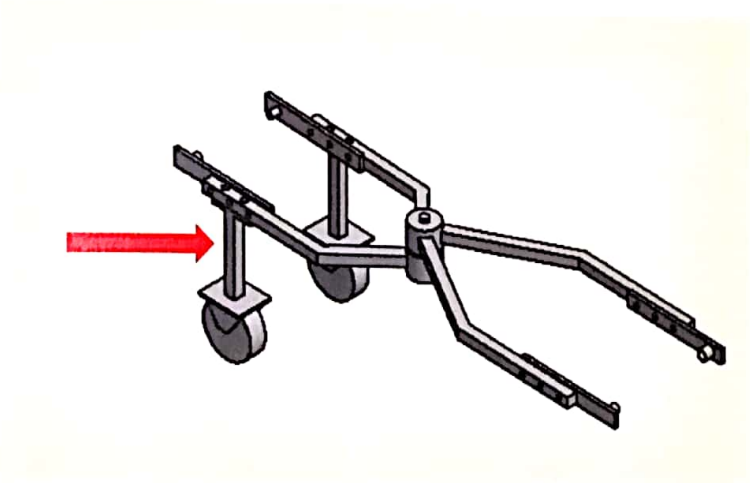


Figure 4.4.2

When there is instability in the rear motorcycle, we come out the idea which we added 2 swivel caster wheels to the rear frame. We have get a good result, which the behind can stable a person on the motorcycle and when turning no longer the plate bar is bend. But we still do not satisfied with our stability the behind motorcycle.

4.4.3 THIRD TEST RUN

Date: 4 October 2019

Time: 6:00 pm

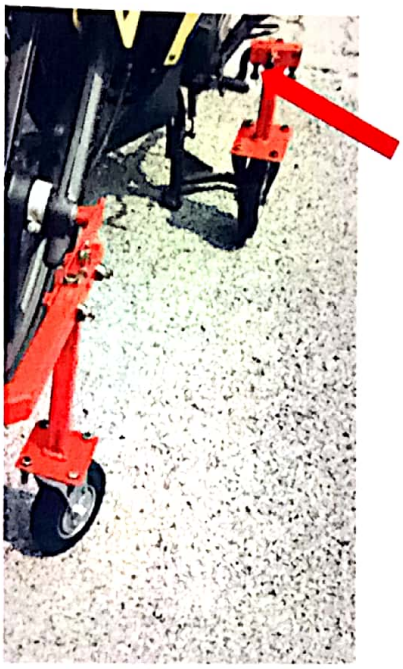


Figure 4.4.3.i and figure 4.4.3.ii

We added 2 more caster wheels but the type is fixed caster wheel. Fixed caster wheel is placed on the motorcycle paddle on the back. When we do our test run we are very happy that our project is more stable and our project can turn at the corner or make a u-turn without any problems. But this fixed caster wheel is loose when mounted on the paddle motorcycle because we tight them use the M5 screw. The arrow the at the first photos show the hole for M5 screw and arrow and the second photos shows the fixed caster wheel is mounted on the motorcycle paddle

4.4.4 FOURTH TEST RUN

Date: 10 October 2019

Time: 6:00 pm

Figure 4.4.4

We've dug a new hole to use the M8 screw. The larger use of the screw is to fasten it to the motorcycle's paddle more firmly. Both motorcycle is more stable, there is no problem when using at straight road or bumpy road and when turning at corner or make a u-turn also don't have a problem.

4.5 DATA ANALYSIS FROM LAST TEST RUN

- run a test with a distance of 100 meters in 2 rounds
- run test at a speed of 25 km/h
- time taken to complete 100 meters is 12.13s
- when towing on the corner road (90°), the an angle for towing is between 0°-30 °

CHAPTER 5
DISCUSSION AND CONCLUSION

5.0 INTRODUCTION

For this chapter, decisions are made based on all decisions derived from the experiments conducted and the discussions in the chapters the previous one. In this chapter also, the relevant matters are relevant the objectives of the study as well as the recommendations of the study conducted. Besides,conclusions have been drawn for this experiment.

In planning an activity and project related work conducted, a discussion within the group to reach a consensus the best has been done to make sure the activity goes on like that designed and organized. Each week there will be a meeting with the project supervisor to discuss recent developments related to reporting and progressproject planned.

On top of that, all the problems that are encountered such as project malfunction, problems getting project-related information and so on also voiced for the best views and solutions from the perspective of our supervisor. All planning is done carefully.With this, issues and developments of this project can be shared. Everything concerns and issues regarding the project are being discussed at this time point of agreement by mutual agreement.

5.1 DISCUSSION

For Portable Motorcycle Towing, stability tests have been conducted throughout this process. We did 4 test runs before we made the video intended for release on PITEX. With each test run, we got the result that can be fixed so we could aim the objective for our project. This product has been tested by both of us and our friends at PSA. Next, we also conducted a study on a round test and found that during the fourth test run, the steel plate bar was in good shape and not bent.

5.3 RECOMMENDATION

This motor's towing device is inspired by a rail system that uses bearings, bolts and nuts to twist & tie between other wagons and wagons. In addition, this idea also comes when some of us are not good at towing break down motorcycle using the legs and the risk of delaying it is very high. As a result, it is our idea to create a motor deflector to facilitate the process of tow the motor in a safer & faster way without any accident or injury.

So with this product it helps to simplify the process of towing motorcyclists who have a small problem suddenly and thus reduce the risk of accident & death from occurring when delayed.

Here are some recommendation for listing for our product improvement:

- use stronger & non-corrosive metal to avoid brittle
- Use lighter steel and stronger steel
- Design a new component to support motor stability during delay
- Fabricate an adjustable hanger to connect two different types of motorcycles
- Use propeller shaft to control the movement of motors and avoid damage to the model
- Use a reflective light equipment

5.4 CONCLUSION

The objective of the Portable Motorcycle Towing project carried out over the years has been to achieve the original objective of design and fabricate efficient motor towing equipment and simplifies the towing process safely. This project model also solved the problem of riders not being equipped with a towing device and minimizing accidents while delaying a damaged motor. Also, riders do not have to worry about the safety of the foot or other road users after using this motor. Moreover, the cost of this project is not too high and reasonable if the motor towers are marketed. Therefore, the idea of this project needs to be embraced and considered by road riders wanting to pound MARSHALL or workshops that provide towing services.

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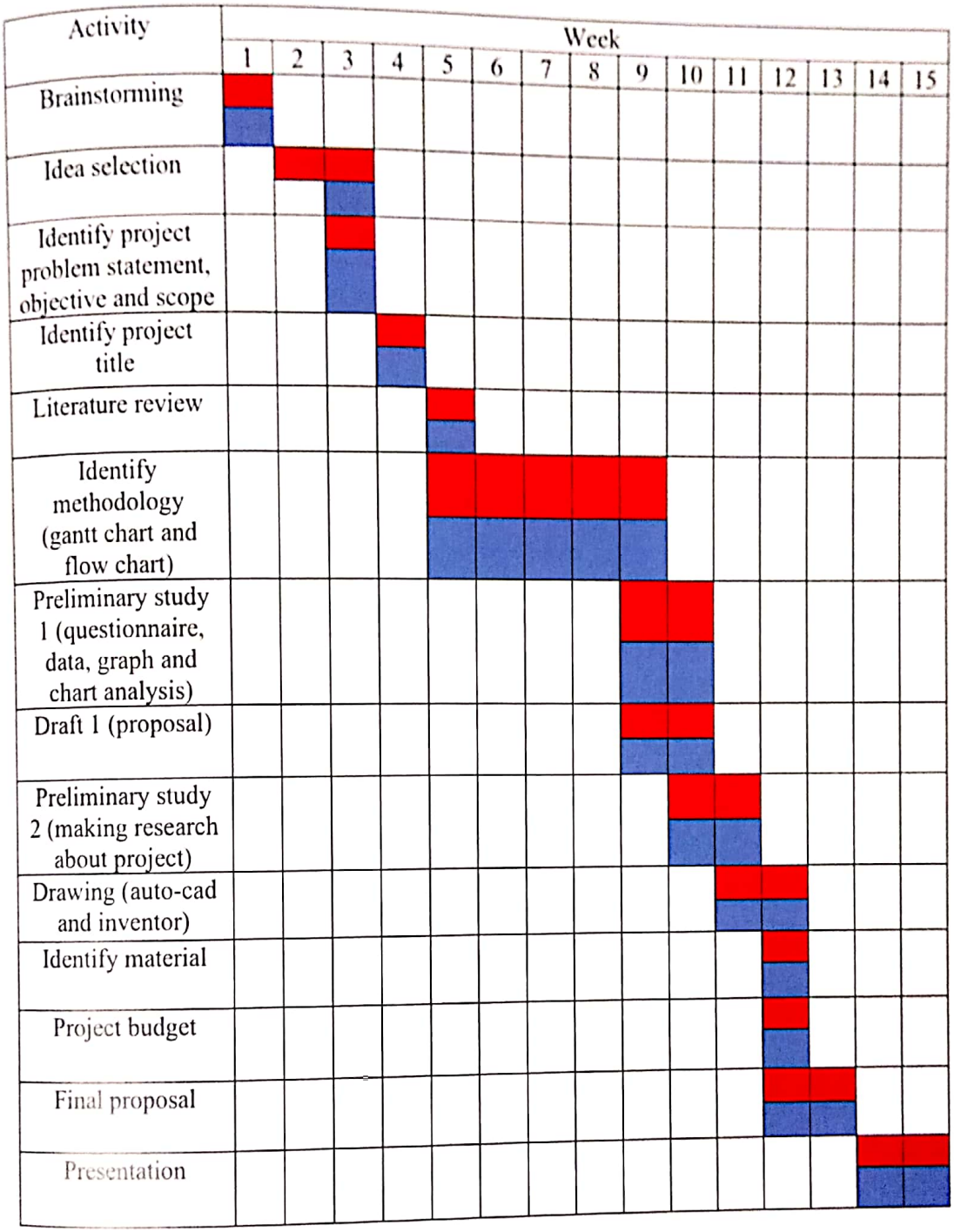
APPENDIX

Appendix 1.0: Our project result

Appendix 2.0: Gantt Chart (Project 1)



Appendix 3.0: Questionnaire

POLITEKNIK MALAYSIA
SULTAN SALAHUDDIN ABDUL AZIZ SHAH

MECHANICHAL ENGINEERING DEPARTMENT
POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

QUESTIONNAIRE

This survey is carried out to fulfil the requirement of our final year project. This survey is to identify the needs to design and fabricate an equipment to tow a break down motorcycle in better and safe ways. Feel free to give feedback on the questionnaire.

SECTION A

AGE: ☐ 17-BELOW ☐ 18-23 ☐ 24 & ABOVE

GENDER: ☐ MALE ☐ FEMALE

OCCUPATION: _____

SECTION B

PLEASE TICK (/) FOR THE AGREED ANSWER ON THE QUESTIONS.

NO	QUESTION	YES	NO
1.	Have you ever towed a break down motorcycle? If yes, I used _____ to tow		
2.	Do you think by towing break down motorcycle using leg is difficult?		
3.	Do you think by towing break down motorcycle using leg is safe?		
4.	Do you think motorcycle towing equipment to ease in towing the break down motorcycle is needed?		

Thank you for your cooperation