UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DESIGN AND FABRICATE ROLLER FOR STICKER ON CAR WINDSCREEN TO IMPROVE BLIND SPOT

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Automotive Technology) with Honours.

by

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DEDICATION

To my Beloved Parents

Mr. GANAPATHY

Mrs. VELLAIAMMAL

My Supervisor,

Mr. AZMAN BIN IBRAHIM

Others

Laboratory technicians especially to Mr. Basri, my friends and all the people that had guided me throughout completion of this project.

ABSTRACT

A person driving a vehicle depends on the rear view mirror and two side-mounted mirrors to observe the surrounding in order to see vehicles approaching from behind. However, that's not the only blind spot in a vehicle. There are other blind spot which is produced by A-pillar of a vehicle which obstruct the driver's vision on both front side of the vehicle. In Malaysia, users of the vehicle, do display some stickers on their windshield whereby some of it is mandatory and some of it is not. Those stickers make obstruction on the driver's vision also. This project mainly focuses on reducing the obstruction made by those windshield sticker which obstructs the driver's vision which is to fabricate roller for vehicle windshield sticker. The statistic of the average stickers being placed on the vehicle windshield is gathered to help in the fabrication process of the roller for windshield sticker. The aim of the product is to reduce blind spot created by those stickers and gather all those stickers at one place so that it doesn't obstruct the driver's vision. The mechanism of the roller which will be created is to display the sticker which is required at that particular moment when needed and hide other stickers on those fabricated roller for windshield sticker which is controlled by the driver input. A specified vehicle has been chosen to do the experiment which is PERODUA Myvi to analyse the blind spot and also to assist in the fabrication process. With thousands of expectations placed on the project, it is hoped all the stated objectives could be successfully achieved with perfectly and it will be useful in order to increase the safety level of the driver and in reducing the blind spot also.

ABSTRAK

Seseorang yang memandu kenderaan bergantung pada cermin pandangan belakang dan dua cermin sisi dipasang untuk memerhatikan sekitarnya untuk melihat kenderaan yang mendekati dari belakang. Walau bagaimanapun, itu bukan satu-satunya titik buta di dalam kenderaan. Terdapat titik buta lain seperti yang dihasilkan oleh A-pillar kenderaan yang menghalang penglihatan pemandu pada kedua-dua bahagian depan kenderaan. Di Malaysia, pengguna kenderaan, memaparkan beberapa pelekat pada kaca depannya di mana sebahagian daripadanya adalah wajib dan sebahagian daripadanya tidak. Pelekat mereka membuat halangan pada penglihatan pemandu juga. Projek ini terutamanya menumpukan kepada mengurangkan halangan yang dibuat oleh pelekat pada kaca itu yang menghalang penglihatan pemandu dengan membuat roller untuk pelekat kaca depan kenderaan. Statistik pelekat purata yang diletakkan pada kaca depan kenderaan berkumpul untuk membantu dalam proses fabrikasi roller untuk pelekat kaca depan. Tujuan produk ini adalah untuk mengurangkan titik buta yang dicipta oleh pelekat itu dan mengumpulkan semua pelekat tersebut di satu tempat supaya ia tidak menghalang penglihatan pemandu. Mekanisme roller yang akan dibuat adalah untuk memaparkan pelekat yang diperlukan pada saat tertentu apabila diperlukan dan menyembunyikan pelekat lain pada roller yang direka untuk pelekat kaca yang dikendalikan oleh kehendak pemandu. Kenderaan yang telah dipilih untuk melakukan eksperimen iaitu PERODUA Myvi untuk menganalisis titik buta dan juga untuk membantu dalam proses fabrikasi. Dengan beribu-ribu jangkaan yang diletakkan di atas projek itu, diharapkan semua objektif yang dinyatakan dapat dicapai dengan sempurna dan akan berguna untuk meningkatkan tahap keselamatan pemandu dan mengurangkan tempat buta juga.

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First of all thanks to God to give me the strength and a chance to finish this project with success. I have learned a lot and enjoyed while working on this project. I would like to sincerely thank all those who helped me with their valuable support during the entire process of this project. I would like to thank my supervisor Mr Azman Bin Ibrahim for his helpful guidance, support and contribution. Thanks again to my supervisor for his valuable advices helped make sense of my confusion and read my numerous revisions. I also thank the faculty members of University Technical Malaysia Melaka especially those who assisted me in those fabrication process in providing the necessary infrastructure, equipment and expertise in order for me to complete my project.. Last but not least, thanks to my family members because without their support and willingness I would not have been completed the project successfully. This achievement has been a pleasant experience in developing a roller for the car windshield sticker.

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ABBREVIATIONS		MEANING
cm	-	Centimetre
UTeM	-	Universiti Teknikal Malaysia Melaka
FTK	-	Fakulti Teknologi Kejuruteraan

CHAPTER 1

INTRODUCTION

1.1 Briefing

In this chapter introduction is made of some general information about the vehicle blind spots and types of blind spot in vehicle. Besides that, a brief explanation about the stickers on windshield which affect the blind spot in vehicle is explained. The problem faced by the drivers due to the blind spot created by the A-pillars and also the windshield stickers also explained a bit further. The approach of my windshield car sticker roller is also included. This project mainly focusses on increasing the driver's awareness on A-pillar blind spot and also ways to overcome the blind spot created by those windshield stickers to increase the safety of the driver and also the passengers in a vehicle.

1.2 Background of Study

Vehicle has become the main mode of transportation in our country, and also contributes a lot to accident statistic. Annually the number of accidents due to land vehicle is on the rise and there are a lot of factors which contribute to the fatality. One of the main factors which is due to engineering error is blind spot in the vehicle. There is a lot of view which were obstructed in the vehicle. Among the most common blind spot is the rear view blind spot which can't be viewed even using those side mirrors which were provided by the vehicle manufacturer. Another not most famous blind spot is, A-pillar blind spot. A-pillar is the roof support structure on either side of a vehicle's windshield. Those A-pillars tend to create blind spot. In our country there are certain activities which we do tend to increase the A-pillars blind, those activities are placement of stickers in windshield normally near offside A-pillars.

Day by day the A-pillars design is being re-constructed to suit the vehicle in term of aerodynamic and also in their strength to withstand all the force which is being projected to the A-pillars. Due to this the A-pillars becomes thicker in size. In addition with all those stickers in place on windshield makes the angle of the obstructed view for the driver increases. There are certain stickers which are mandatory and need to be displayed

all time when we are on the road. There are also certain stickers which is not mandatorily need to be displayed all time. The stickers also have so many variants in shape and size. Some stickers are semi-transparent and some are block the driver's vision fully on that particular area. There are some stickers which is unnecessary which always being displayed. With those stickers on the vehicle windshield it adds the blind spot in the windshield. Certain sticker such as the road tax stickers is a must and need to be displayed all time when the vehicle is on road and those stickers follows certain standard which doesn't obstruct completely the driver's vision. But, certain custom made stickers doesn't follow those standards and most probably isn't need to be compulsorily to be displayed all time such as the residence sticker, work place sticker, and certain fast food stickers.

1.3 Problem Statement

In Malaysia, it's common to see a car with at least three stickers on the offside A-pillar windshield. Those stickers create and add the blind spot of the A-pillar which most probably makes the driver's vision to be more narrowed. This may lead to more accident due to blind spot. Those causalities can be reduced if we were to reduce the usage of the stickers or try to compile in one place and display the necessary stickers at that particular time. Now days, the drivers tend to make more head movement to have the view of the obstructed view, the stickers in addition makes the view of the driver to be more obstructed and makes to driver to have more head movement which makes the driver to have his or her vision to be off from the front to look at the obstructed side. There is a lot of assistive methods which were produced to reduce the blind spot of A-pillar but haven't released in mass production yet. Those stickers also need to be placed in the windshield which won't obstruct the driver's vision on the other vehicle on road. This is because normally the stickers will be placed near the bottom of the offside A-pillar windshield whereby normally the place where vehicle will be seen.

So this problem which is driver's vision obstructed by the windshield stickers need to be solved. So this project needs to be done in a way to reduce the blind spot and overcome the problem of too many stickers which were being displayed on the windshield. Finally the project is more focussed on displaying just a single sticker at a time which is necessary during that particular moment, with this more area which is always being covered by the windshield sticker can be reduced.

1.4 Proposed Solution

With all the information in the problem statement leads to this project initiation. This project mainly focuses on vehicle windshield sticker to be gathered and placed in a place and to reduce the area of the windshield sticker covers the windshield. Through this project which is vehicle windshield sticker roller, all the stickers can be placed in those sticker rollers thus reducing the area covered by those stickers and also reducing the vision obstructed by the stickers on the driver. Besides that, the positioning of the sticker roller is important to avoid that particular area of the sticker roller which will be placed on the vehicle windshield doesn't covers up the area where the driver's view on other vehicle.

1.5 Objective

There are certain targets need to be achieved in this project. These objectives should be achieved at the end of this project completion. The objective which have been considered are as below:

- To identify the area covered by the stickers and A-pillars on the windshield.
- To fabricate car sticker roller.
- To gather all the stickers placed in windshield at one place where will reduce the blind spot.
- To analyse the car sticker roller effect on drivers vision and blind spot.

1.6 Scope

The project is mainly focused on fabricating the car sticker roller to reduce the blind spot created by the sticker placed on the windshield. This fabrication is mainly focused for Malaysia citizen. This is because, Malaysian citizen tend to place a lot of stickers compared to other countries and they think it's somehow beautify their vehicle. Before proceeding with this project several limitation need to be considered and analysed. The main limitation was the fabrication of the particular car sticker roller can't be universal for usage on all type of vehicle. This is because, different vehicle will have different windshield curvature and angle it's been placed on the vehicle in accordance with the A-pillar. So, the implementation of this car sticker roller is narrowed to only one

type of vehicle. That particular vehicle brand is chosen in accordance with 2018 most sale vehicle in Malaysia. According to the statistic the vehicle which has been chosen is Perodua Myvi which had the most sales in Malaysia in 2018. (Perodua Press release, 2018)

Brand	Total Sales			Passenger Vehicles			Commercial Vehicles		
	Dec-18	Nov-18	YTD	Dec-18	Nov-18	YTD	Dec-18	Nov-18	YTD
Perodua	18,402 ↓	21,110	227,243	18,402 ↓	21,110	227,243	0 -	0	0
Honda	8,021 ↑	7,100	102,282	8,021 ↑	7,100	102,282	0 -	0	0
Proton	5,598 ↑	4,820	64,744	5,598 ↑	4,820	64,744	0 -	0	0
Toyota	4,310 ↑	3,835	65,551	2,115 ↑	1,952	43,446	2,195 ↑	1,883	22,105
Nissan	2,870 ↑	2,507	28,610	2,499 ↑	2,031	21,956	371 ↓	476	6,654
Mazda	1,451 ↓	1,889	16,038	1,450 ↓	1,881	15,765	1 ↓	8	273
Isuzu	1,221 ↑	784	11,178	0 ↓	2	75	1,221 ↑	782	11,103
Mercedes	1,126 ↑	956	13,463	1,102 ↑	938	13,118	24 ↑	18	345
BMW	1,017 ↓	1,080	12,008	1,017 ↓	1,080	12,008	0 -	0	0
Mitsubishi	685 ↑	624	9,261	325 ↑	292	3,603	360 ↑	332	5,658
Hino	518 ↑	501	5,808	0 -	0	0	518 ↑	501	5,808
Kia	510 ↓	520	5,658	510 ↓	520	5,658	0 -	0	0
Ford	471 ↓	494	6,755	0 ↓	4	84	471 ↓	490	6,671
Subaru	294 ↑	239	5,175	294 ↑	239	5,175	0 -	0	0
Volkswagen	241 ↓	635	7,001	241 ↓	635	7,001	0 -	0	0
Hyundai	185 ↓	193	2,949	185 ↓	189	2,808	0 ↓	4	141
Fuso	172 ↑	161	2,307	0 -	0	0	172 ↑	161	2,307
Peugeot	171 ↑	163	2,302	171 ↑	163	2,302	0 -	0	0
Daihatsu	170 ↑	75	991	0 -	0	0	170 ↑	75	991
Renault	155 ↑	40	1,009	155 ↑	40	1,009	0 -	0	0
Volvo	105 ↓	107	1,384	105 ↓	107	1,384	0 -	0	0
MINI	79 ↓	105	1,200	79 ↓	105	1,200	0 -	0	0
Lexus	70 ↑	56	1,011	70 ↑	56	1,011	0 -	0	0
UD Trucks	64 ↑	34	676	0 -	0	0	64 ↑	34	676
CAM	45 ↑	41	442	45 ↑	41	442	0 -	0	0
Volvo Trucks	45 ↑	32	447	0 -	0	0	45 ↑	32	447
Bison	40 ↑	21	212	0 -	0	0	40 ↑	21	212
Sinotruk	36 ↓	38	652	0 -	0	0	36 ↓	38	652
Scania	26 ↑	16	562	0 -	0	0	26 ↑	16	562
Land Rover	17 ↓	26	216	16 ↓	26	183	1 ↑	0	33
King Long	14 ↑	8	118	14 ↑	8	118	0 -	0	0
CAMC	13 ↓	18	182	0 -	0	0	13 ↓	18	182
MAN	11 ↑	7	180	0 -	0	0	11 ↑	7	180
Porsche	10 ↓	25	342	10 ↓	25	342	0 -	0	0
Chana	9 ↑	5	77	0 -	0	0	9 ↑	5	77
Tata	8 ↑	5	53	0 -	0	0	8 ↑	5	53
Chevrolet	3 ↓	6	234	2 ↑	0	51	1 ↓	6	183
JMC	3 ↑	2	41	0 -	0	0	3 ↑	2	41
Auman	1 ↓	2	57	0 -	0	0	1 ↓	2	57
JAC	1 ↓	2	59	0 -	0	0	1 ↓	2	59
Audi	0* -	0*	150	0* -	0*	150	0 -	0	0
BAW	0 -	0	2	0 -	0	2	0 -	0	0
Bei Ben	0 -	0	27	0 -	0	0	0 -	0	27
Hoka	0 -	0	2	0 -	0	0	0 -	0	1
Jaguar	0 -	0	42	0 -	0	42	0 -	0	0
JBC	0 -	0	12	0 -	0	0	0 -	0	12
Shandong Kama	0 -	0	2	0 -	0	0	0 -	0	2
Ssangyong	0 -	0	0	0 -	0	0	0 -	0	0
Total	**48,188** ↓	**48,282**	**598,714**	**42,426** ↓	**43,364**	**533,202**	**5,762** ↑	**4,918**	**65,512**

*Audi sales figure not available.

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Figure 1.1 : Shows the data of car sales in Dec 2018 according brands. (Paultan, 2019)

Another limitation which need to overcome is sticker dimension. This is because, not all the windshield sticker have the same dimension so we need to find out the maximum sticker size before proceeding on the fabrication of car sticker roller. Besides that, we also need to identify the average sticker which is being placed on the car windshield. This is to select a fixed value of slot need to be made for the sticker being