UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DESIGN EVALUATION OF WIPER SYSTEM FOR URBAN CONCEPT CAR

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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I hereby, declared this report entitled DESIGN EVALUATION OF WIPER SYSTEM FOR URBAN CONCEPT CAR is the result of my own research except as cited in references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Automotive Technology) with Honours. The member of the supervisory is as follow:

Signature: …….

Supervisor : Ts. KHAIRUL AMRI BIN TOFROWAIH

ABSTRAK

Projek ini bertujuan untuk membangunkan sistem pengelap automatik dengan pemberitahuan untuk kereta konsep bandar dengan menggunakan perisian boleh diprogram. Sistem ini terdiri daripada dua bahagian bahagian perkakasan dan bahagian perisian. Sistem ini menggunakan penderia dan pengawal untuk mengaktifkan pengelap apabila terdapat titisan air. Selain itu, sistem ini berfungsi untuk memberitahu dan memberi amaran kepada pemilik kenderaan untuk menukar bilah pengelap dengan dalam tempoh masa. Ini akan memberi amaran kepada pemacu mengenai masa bilah telah digunakan lebih daripada tempoh yang disyorkan. Sistem yang di bina, menguji dan menilai kawasan yang diliputi mengelap untuk digunakan pada kreta konsep bandar di pertandingan Shell Eco-Marathon. Ini adalah kerana; parameter kaca depan untuk kereta konsep bandar adalah berbeza dari kereta sebenar. Penggunaan imbasan 3D untuk kejuruteraan terbalik akan di lakukan untuk mendapatkan pengukuran yang sebenar pada setiap komponen pengelap untuk di simulasikan pada kaca depan kereta konsep bandar untuk meramalkan kawasan yang di liputi. Kawasan pengelap di kaca depan kereta konsep Bandar di nilai menggunakan perisian pandangan ADAMS dan CATIA V5 R21 menunjukkan bahawa kawasan yang diliputi oleh mengelap 36% dari kawasan cermin hadapan dan pelepasan dari bahagian yang lain adalah sesuai untuk kereta konsep bandar.

ABSTRACT

This project aims to develop of automatic wiper system with notification for urban concept car by using programmable software. This system consists of two parts the hardware part and the software part. The system uses a raindrop sensor and controller to activate the wiper whenever a water droplet is detected. This may reduce human effort and increase comfort, especially during rainy days. Furthermore, this system also equipped with notification in which the driver will be triggered with blade change reminders in the smartphone chat apps. This will alert the drive about its period blade had been use more than it moths recommended. The wiper system design for the urban concept car for the Shell Eco-Marathon competition is evaluated based on the off-shelf part to measure the feasibility of the off-shelf part to be installed into the urban concept car. This is because; the parameter of the windshield for the urban concept car is different from the actual car. The wiping area is evaluated through wiper kinematic simulation using ADAMS view software. The wiping area on the windshield of the urban concept car evaluate using ADAMS view software and CATIA V5 R21 show that the wiping area covers 36% of the windshield and clearance from the other part is suit for the urban concept car.

DEDICATION

I dedicated my work to my lovely family, lectures, and friends. To complete my bachelor's degree project I realize that every challenging work needs a self- effort and helps from the lecturer. Also, a special appreciation to my beloved parents, Baba bin Ali and Marhuma Binti Lapacho who give moral support, prayer of a day and night. I also dedicate my work to my supervisor Ts. Khairul Amri Bin Tofrowaih who has guided me to do the real of work-self until I finish this project. Encouragement and advice from them I am able to get such a success. I also want to dedicate my work to my fellow friends are deserved to be partnership in my success of the project especially my supervisor mates. They have provided me a lot of miscellaneous aids and words of encouragement which make me to think in a positive manner when things go wrong.

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LIST OF SYMBOLS

cm - centimetre

mm - millimetre

Nm - Newton meter

v - Voltage

MHz - Mega Hertz

m^2 - meter square

LIST OF ABBREVIATIONS

SUV	Sport Utility Vehicle
MPV	Multi-purpose Vehicle
MIROS	Malaysian Institute of Road Safety Research
ASEAN	Association of Southeast Asian Nations
MBD	Multibody Dynamic
CATIA	Computer Aided Three-Dimensional Interactive Application
EPDM	ethylene-propylene-diene elastic
CR	chloroprene elastic
TPE	polyester thermoplastic elastomer
US	United State
U.S FMVSS	United State Federal Motor Vehicle Safety Standards
NBR	acrylonitrile-butadiene elastic
COM	Common
NO	Normally Opened
NC	Normally Closed

CHAPTER 1

INTRODUCTION

1.1 Background

A wiper is a device to wipe rain or dirt on vehicle windscreen, most of the wiper systems available in the market are the wipers operated manually although some of the high variant vehicles offer automatic wiper activation. Most of the conventional cars had been installed with two wipers on the windscreen on the driver and the passenger. Some of the hatchback and SUV cars may have wiper at rear window There six parts of the wiper are wiper arm holding blade, rubber material blade, spring linkage, and wiper pivots. There are six points of the wiper that calls a point of pressure also known as a claw that exists under the wiper (Hashim, Husin, Ja'afar, & Hamid, 2013)

This project is to reverse engineering the conventional wiper system that uses a conventional car nowadays to be applied to the urban concept car by modifying and upgrading the existing system. The wiper system has three main parts such as electric motor, wipers and wiper linkage that allow them to operate simultaneously. The current that provides through the motor will provide torque to give motion via linkage for the wiper arm moving the blade.