



UNIVERSITI TEKNIKA MALAYSIA MELAKA

DEVELOPMENT OF SELF WARM JACKET BY USING PELTIER MODULE

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electrical Engineering Technology (Industrial Automation and Robotics) with Honours.

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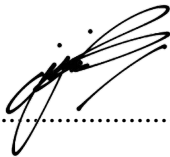
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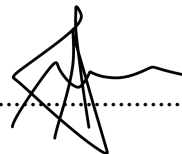
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ABSTRAK

Dengan kemajuan negara dan peningkatan ekonomi, pelbaga teknologi canggih telah dirancang dan digunakan secara meluas. Orang ramai selalu berfikir untuk membuat peralatan elektrik dan elektronik yang penting dalam kehidupan seharian. Melalui kertas kerja ini akan menyediakan mekanisme baru berdasarkan penggunaan Peltier Module. Tujuan utama prototaip ini adalah membolehkan pengguna untuk mengekalkan suhu badan mereka terutama bagi mereka yang menunggang motosikal mereka Ketika cuaca sejuk seperti hujan dan musim sejuk. Perubahan suhu badan yang mendadak boleh menyebabkan seseorang penunggang motorsikal itu terkena hipotermia. Apabila ini terjadi, ini menyebabkan individu tersebut akan mengalami beberapa gejala seperti hilang daya rangsang, badan menjadi mengigil dan ini boleh mengakibatkan kemalangan Unit termoelektrik adalah pam panas dengan keadaan pepejal yang berpotensi mengepam haba pada atau di bawah 100W. Salah satu permukaan modulnya akan berfungsi sebagai penyejuk sementara haba ditolak oleh lapisan modul yang lain. Ini menjadikan sebelah permukaan Peltier menjadi sejuk dan sebelah lagi akan menjadi panas. Hasilnya ini menunjukkan bahawa dengan melaksanakan projek ini dapat menolong penunggang menjaga suhu badan mereka semasa menunggang dalam keadaan sejuk

ABSTRACT

With the progress of the country and improvement of the economy. Various advanced technologies have been designed and are widely used. People always think to make an electrical and electronic equipment that are important in everyday life. Through this paperwork will present a new mechanism based on the use of Peltier Module. The main purpose of this prototype is allowing the user to maintain their body temperature especially for rider that ride their motorcycle during cold weather such as raining or winter. Rapid changing on body temperature can lead to hypothermia. When this happens, that certain motorcycle rider can get a few symptoms. For example, the rider will lose their sense, unpleasant shiver down the spine and it will cause the accident. The thermoelectric unit is a heat pump with a solid state that has the potential to pump heat at or below 100 W. One of its surfaces of the module will serve as a heat sink while heat is rejected by another module layer. This make Peltier Module become cold on one side and another side became hot. As the result, it shows that by implement this project can help the rider to maintain their body temperature during riding in cold condition



DEDICATION

I concede my sincere devotion, respect, and appreciation to both of my mom and dad throughout my life for their affection, motivation, guidance, and sacrifices. I cannot possibly get to this stage without their sacrifices and encouragement. Also dedicated special gratitude to all my siblings who always backing and strongly encourage me in whatever I do in my life. Special appreciation goes to all the lecturers who have taught and guided me in my studies Not to be forgotten, all my buddies who have always been with me all along this joyful journey. There are no words which can express my heartfelt gratitude to you all.



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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will address the context of the project, the description of the issue, the goals, the project scope, and the outline of the thesis.

1.2 Project Background

The emergence of digital information has contributed to a rapid change in the lifestyle of people. All kinds of apps have been created to help people do their daily lives. Every process that uses any software can be used to replace the existing product to make it easier for people to do their everyday lives.

The transport network in our country, Malaysia is being built and covers up to 63,445 km includes 1,630 km of expressways. The main highway links the 800 km stretch of Thai border with Singapore. Motorcyclists contribute significantly to road traffic injury mortality and morbidity rates. Based on a statistic from Kementerian Pengangkutan Malaysia, in 2018 states that 113,288 cases that involve motorcycle in an accident. (Ruíz, 2015)

Table 1. 1 : Accident statistic in Malaysia from 2009 to 2018(Ruíz, 2015)

Year	Motorcycle	Car	Van	Bus	Lorry	Four Wheel Drive	Taxi	Bicycle	Others	Total
2009	113962	472307	19220	9380	46724	23581	8669	2486	9294	705623
2010	120156	511861	18788	9580	50438	25777	9899	2178	11756	760433
2011	129017	546702	17916	9986	53078	30828	11197	2033	16394	817151
2012	130080	655813	15143	10617	42158	32891	11680	1310	21540	921232
2013	121700	632602	17148	10123	39276	52512	11651	1370	15441	901823
2014	125712	617578	15041	9193	37481	41464	10856	1275	27743	886343
2015	123408	626758	14565	8804	34942	46163	9591	1119	29924	894274
2016	135181	670935	14470	9462	35064	48907	8399	1318	36833	960569
2017	108221	564491	13347	7258	34747	44297	5328	787	24047	802523
2018	113288	591399	17226	7328	36915	45757	3912	727	21143	837695

Based on an article by Muhammad Marizwan Abdul Manan on his research on “Motorcycle fatalities in Malaysia” 2012, road accidents and fatalities in Malaysia are an increasing worry, with over 6000 killed and over 25,000 injuries reported annually over the past 5 years. The figure below indicates that most road accident deaths include motorcyclists, accounting for over 50 percent of the total number of deaths. Motorcycle accidents reached 4070 in 2009 alone, top 10 in the last 10 years. Figure below also

indicates that motorcycle accidents are 3 times higher than car fatalities, Six times that of pedestrian fatalities and nearly fifty times that of bus passenger deaths.

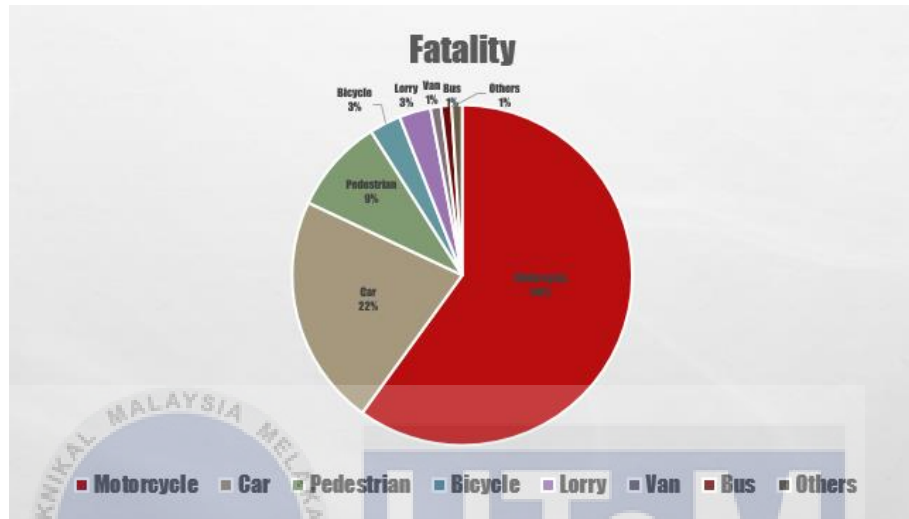


Figure 1. 1: Distribution of the deaths by means of transport

Table 1. 2: Severe road crash in Malaysia

	Fatalities	Several injured	Slightly injured	Several: Fatal	Slight: fatal
All types of accident	6527	8868	25747	1.4:1	4:1
Motorcycle accidents (rider and passenger)	3898	5472	10326	1.4:1	2.6:1

As the total number of motorcycles moved in Malaysia from 1999 to 2008 increased, motorcycle accidents also increased. See Figure below which indicates that the growth in exposure is involving motorcycle victims.

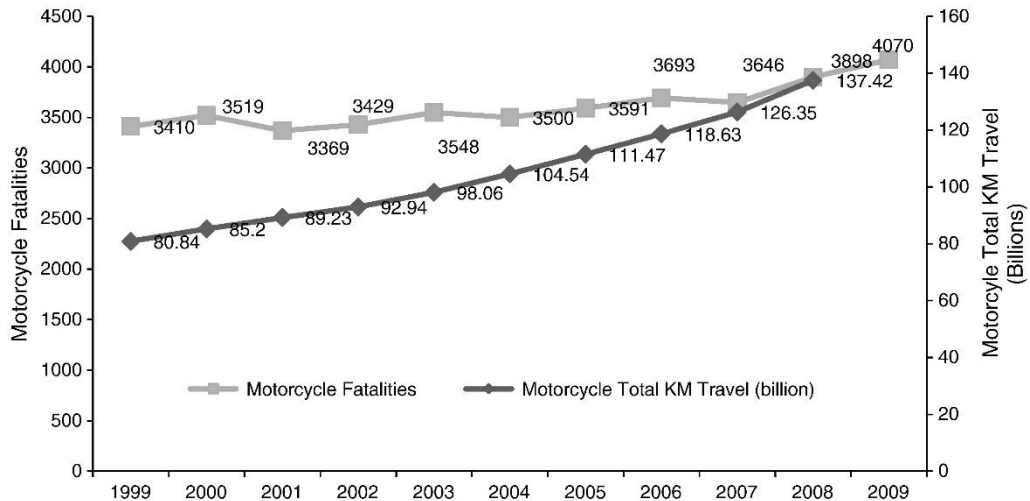


Figure 1. 2: Total motorcycles kilometres travelled and motorcycle fatalities between 1998 and 2009 (Ruíz, 2015)

Based on the author also, motorcycles are generally the biggest contributor to road deaths in Malaysia, with no indication of decline in the future. In fact, motorcyclists have a greater death rate by distance travelled than other automobiles, for example, 32,2 deaths per billion kilometres travelled in 2004, while 8,39 deaths per billion in passenger cars

Therefore, the Peltier-based model is being produced. Every So Often called a thermoelectric cooler module or a Peltier cooler is a semiconductor-based electrical component that acts as a small heat pump.

Through applying a low voltage direct current (DC) source to a thermoelectric cooler module, heat is transferred from 1 side to the other through the tube, thereby cooling one face of the module while simultaneously heating the opposite face. Therefore, in this project, the Peltier module is suitable for use. Based on the Peltier effect, thermoelectric coolers are used. The effect creates a difference in temperature by transferring heat between two electrical connections. To generate an electrical current, a

voltage is applied through unified conductors. When the current passes through the junctions of the two conductors, the heat is lost at one junction, and cooling occurs.

1.3 Problem Statement

Today, with the rapid pace of technology, the world is moving as quickly as light. With the new technology, people need to move quickly and ensure that they are not left behind. With the transition in this generation, it becomes lazier for all people in this world to train themselves to save energy. Malaysia or other place has many types of weather and seasons which is raining, hot and dry season.

Over the years, numerous road safety campaigns have been initiated targeted at this community of road users. These include encouraging the proper use of safety helmets, the "ride bright" campaigns that encouraged motorcyclists to be adequately lit, particularly at night, and proper riding. Many people discussed several ways of keeping riders warm when driving their motorcycles. Staying warm, though, is not just a matter of comfort. The truth is, you could be in serious trouble if your body temperature gets too low.



Figure 1. 3: Road safety campaign

According to Thomas F.Panetta on his research, hypothermia is a condition caused by a significant drop in the core body temperature of someone. Hypothermia's early symptoms may seem relatively begin as you may experience an unpleasant shiver down the spine. Your judgment may become impaired as the condition progresses. Eventually, you may experience uncontrolled shivering and chattering of teeth. Perhaps most seriously, the muscles may become stiff and you may start feeling dizzy or intoxicated. Obviously, these symptoms may make the safe operation of a motorcycle very difficult.(Gerber, 1994)

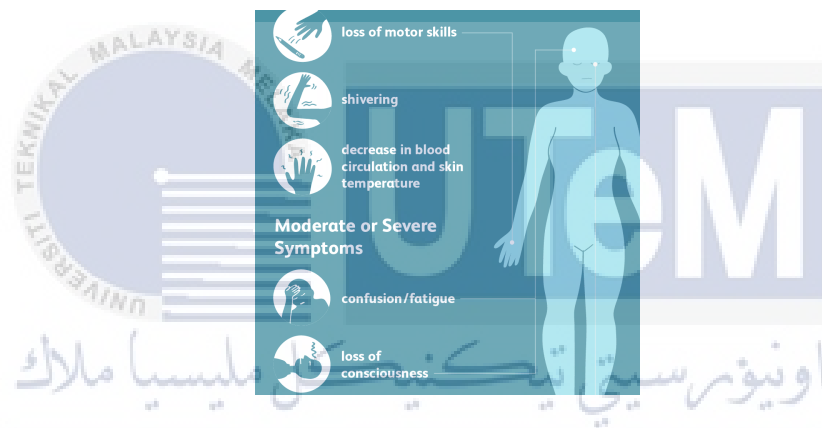


Figure 1. 4: Hypothermia symptom

When these symptoms happen, worse situation such as accident may happen. This hypothermia can slow down that particular person reactions times and cause severe lapses in judgement. When that things happen, you cannot operate the motorcycles in the safest ways.