UNIVERSITI TEKNIKAL MALAYSIA MELAKA

TO STUDY THE CONCEPT OF PERPETUAL MOTION ON TABLE FAN BY USING PERMANENT MAGNET

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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TAJUK: **TO STUDY THE CONCEPT OF PERPETUAL MOTION ON TABLE FAN BY USING PERMANENT MAGNET**

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I hereby, declared this report entitled “To Study the Concept of Perpetual Motion on Table Fan by Using Permanent Magnet” is the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Automotive) with Honours. The member of the supervisory is as follow:

EN MUHAMMED NOOR BIN HASHIM

……

(Project Supervisor)

ABSTRAK

Pada masa kini, cuaca panas yang melampau kerana pemanasan global adalah membimbangkan. Orang ramai menggunakan kipas meja untuk menyediakan pengudaraan udara dan menyejukkan suhu sekitar. Tetapi, kipas meja menggunakan banyak penggunaan tenaga elektrik dan kos yang tinggi. Kipas meja tenaga percuma membantu pengguna untuk menyejukkan suhu sekitar tanpa menggunakan tenaga elektrik. Oleh itu, projek ini membincangkan reka bentuk dan fabrikasi prototaip kipas meja menggunakan magnet kekal. Konsep ini akan berdasarkan pergerakan kekal. Gerakan kekal adalah gerakan badan yang berterusan selama-lamanya. Semasa pembangunan kipas meja menggunakan magnet tetap, teknik reka bentuk keseluruhan digunakan. Tiga reka bentuk konseptual dihasilkan untuk pemilihan. Kemudian reka bentuk yang dipilih melalui proses penggambaran menggunakan CATIA Software dan proses fabrikasi untuk menghasilkan prototaip penggemar meja menggunakan magnet kekal.

ABSTRACT

Nowadays, extreme hot weather due to global warming is worrying. People tend to use table fan to provide air ventilation and to cool down surrounding temperature. But, table fan use a lot of electrical energy consumption and high cost. The free energy table fan help user to cool down surrounding temperature without using electric energy. Thus, this project discusses on designing and fabricating a prototype of table fan using permanent magnet. The concept will be based on perpetual motion. Perpetual motion is a motion of bodies that continues indefinitely. During the development of table fan using permanent magnet, total design technique was used. Three conceptual designs were generated for selection. Then the selected design go through a drawing process using CATIA Software and the fabricating process to produce a prototype of table fan using permanent magnet.

DEDICATION

Special dedication to my beloved family members, especially to my father Mohd Fauzi Bin Hj Samingon and my mother Rafidah Binti Paredi who always supported and encouraged me with motivation and love through my whole journey.

To my respected and professional supervisor, Sir Muhammed Noor Bin Hashim for endless guidance and support from bottom to the top.

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2D	-	Two-Dimensional
3D	-	Three-Dimensional
AC	-	Alternating Current
B_r	-	Remnant Flux Density/Remanance
BH_{max}	-	Energy Product
DC	-	Direct Current
CAD	-	Computer Aided Design
CATIA	-	Computer Aided Three-Dimensional Interactive Application
CFM	-	Cubic Feet Per Minute
H_{ci}	-	Coercivity
NdFeB	-	Neodymium Iron Boron
RPM	-	Rotational Per Minute
SmCo	-	Samarium Cobalt
T_c	-	Curie Temperature

CHAPTER 1

INTRODUCTION

1.0 Introduction

In this chapter we have discuss about background of study, problem statement, objective of this project and scope of work. This project focus on designing and fabricating a prototype of table fan using permanent magnet. The product that will be created in this project is called free energy table fan as the table fan does not required the use electric power to function. The permanent magnet is installed at the table fan which used its natural properties which are attraction and repulsion of the magnet poles to create a perpetual motion.

1.1 Background of study

Hot weather and prolonged drought has resulted in an increase in electricity consumption in the country. Tenaga Nasional Berhad in a statement that the demand of electricity in Peninsular Malaysia recorded a reading of 17,788 MW on 20 April 2016, an increase of 37.82 percent compared to January 1 where the reading recorded 12.906 MW. Hot conditions during the day and the effect of heat so early in the morning has led to the habit of using electrical appliances such as a table fan and air conditioning to reduce the temperature environments. Add all these factors contributed to an increase in electricity consumption dramatically, thus affecting the consumers' electricity bills. (Bernama, 2016).

This project is to design and fabricate a table fan using permanent magnet which does not use electricity to function. Electric table fan is one of the normal electric machines utilized as a part of houses, workplaces, shops and business foundations to give air flow and to cooldown temperature. Fan circulates the air, which enhances the evaporation rate of sweat from body, due to which body is cooled. (Zare et al, 2014). Table fan is an axial-flow fans have blades that force air to move parallel to the shaft about which the blades rotate. Basic elements of a typical table fan include the fan blade, base, armature and lead wires, motor, blade guard, motor housing, oscillator gearbox, and oscillator shaft. From the observation, an existing table fan was consuming 25-100 Watts on different speed levels which is slowest consuming 25 Watts and fastest 100 Watts. The existing table fan speed is around 700 to 2100 rpm. Table fans are manufactured 200 mm, 300 mm and 400 mm sweep sizes, but the one, which is most commonly used, is of 400 mm sweep size. Besides that, airflow rate of the domestic table fan is around 1000 to 28490 CFM (cubic feet per minute). (Cincinnatifan, 2017).

The history of electrical fan start between the years 1882 and 1886. Schuyler Skaats Wheeler was invented the first fan powered by electricity. It was commercially marketed by the American firm Crocker & Curtis Electric Motor Company. (Hurley, 2013). The early fan were all direct current powered, with all exposed workings. The early blade were adjusted from the windmill, with generally six pie molded level leafs of metal. The speed control was accomplished utilizing protection. In all cases protection wire was utilized, and in a couple of cases, the light was utilized a protection. These early fans are costly machine and just utilized as a part of huge workplaces or affluent homes. The time of 1910-1920 brought significant changes. Around 1910, electric fans were being made for private utilize. These "Residential Fans" were made for the room. They had six wings, and kept running at a slower speed for quietness. By 1950, air conditioning was getting to be noticeably accessible for homes. (Cunningham, 2010).

In this project, an overview of the concept of perpetual motion and its application of the design mechanism follow by the prototype development. Perpetual motion is a state in which set in function, continuous to function without supplying any energy. The motion is once activated, would run forever unless subject to an

external force or to wear. (Tsaousis, 2008). The CATIA software is used to design the prototype of the table fan using permanent magnet. The neodymium magnet have been choose to be use in this project as the permanent magnet. This project can solve the problem of high electricity costs faced by existing table fan because the table fan do not using electrical energy.

1.1 Problem statement

Hot weather in recent years led to users using a table fan as an alternative to reduce the temperature environments because the price of table fan is cheaper compare to air conditioning. Table fan have indeed been in use as long as there has been electricity. The energy used is directly and cannot be recycled. This problem causes a lot of electrical energy consumption and high cost. This project is focus to design and fabricate a prototype table fan by using permanent magnet. The concept will be based on perpetual motion that is motion of bodies that continues indefinitely.

The main problem faced is the increasing cost and electricity demand per capita of Malaysian. Based on the statistics from the energy commission of Malaysia, the electricity demand shows increment each year from 94748 GWh in 2009 to 102139 GWh in 2010. (Suruhanjaya Tenaga, 2010). The rapidly increasing electricity cost and demand per capita cause people to look for other alternate source of energy.

To achieve the objective of project, the table fan must be free energy and able to work as perpetual motion machine that create continuous movement.

1.2 Objective

i. To design a table fan using permanent magnet by Computer Aided Three-Dimensional Interactive Application Software (CATIA)
ii. To fabricate a table fan using permanent magnet by manual process.

1.3 Scope of work

In this task, it covers several work scope which will be followed to complete this project accordingly to the objectives without any misjudgement. The scope of this project are divided into two main parts. The first main part will focus on designing the

prototype of the table fan using permanent magnet and for the second main part is focusing on fabricating the prototype of the table fan using permanent magnet.

For the first main part, market survey method and analyzing the basic concept of perpetual motion machine will be used to design purpose. All technical data from market survey will be apply to design the prototype of table fan using permanent magnet. Next, the best concept will be choose and the CATIA Software will be used to design the prototype of table fan using permanent magnet.

A prototype of the table fan using permanent magnet will be fabricated. Manual process is expected to be used to fabricate the prototype of table fan using permanent magnet that had been drawn in CATIA Software. Neodymium magnet is expected to be used as permanent magnets because this magnets the strongest magnet available. The prototype will be testing to measure the fan speed (RPM) and airflow rate (CFM).

CHAPTER 2
LITERATURE REVIEW

2.0 Introduction

This chapter contains the relevant research as well as the research regarding to this project. Furthermore, some of the published information and recommendations from previous times can be applied for this project. This chapter brief more description about permanent magnet and perpetual motion. Besides, this chapter reviews on electricity demand, free energy, fan, magnet and permanent magnet motor.

2.1 Electricity demand

Household electricity demand is from the electrical equipment used by the households. As all know, electricity is mainly used in the domestic sector for lighting and to run devices such as air conditioners, refrigerators, fans, kitchen appliances, water-heater, television and music system. (Tewathia, 2014).

Starting from the low level of U-shaped non-linear temperature electricity curve, the temperature is rising but the demand of electricity is decrease due to lower heating demand in cold weather. After the level of temperature is increase and pass the minimum electricity limit, the electricity demand is increase due to higher cooling demand in hot weather. (Gupta, 2011).

In Peninsular Malaysia, the electricity demand is increased by 7.8 percent from 94748 GWh in 2009 to 102139 GWh in 2010. The same trend was show for the sales of electricity with increased by 8.8 percent from 83411 GWh in 2009 to 90770 GWh in 2010. This is positive trend because it prove that the country situation is recovering from economic turmoil in 2009. Besides that, the other factor which influenced the electricity demand was the weather or the climate change. (Suruhanjaya Tenaga, 2010).

Figure 2.1 shows the ownership level of household appliances that was survey in 2009. From the figure, almost all the respondent of the survey own at least one unit of the first five item which is television (100%), refrigerator (99%), washing machine (96%), rice cooker (95%) and ceiling fan (93%). As shown, about 57% of the respondents use stand or wall fan. (Kubota *et al.*, 2011).

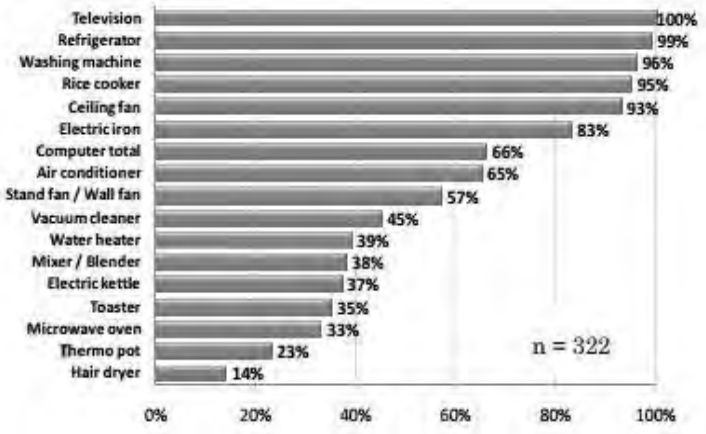

Figure 2.1: Ownership level

Figure 2.2 indicated the average yearly electricity consumption that was calculated for each item. It calculated based on the number, usage time and electric capacity of the items. Hot-humid climate all the year in Malaysia and the consistent month to month mean air temperature and humidity in most of the town, was assumed that the usage pattern of household appliances to be constant throughout the year. Air conditioners is the major contributor. Why the air-conditioners are the major contributor is because the averaged electricity consumption of air-conditioners is 1167 kWh while the averaged electricity consumption of stand fan or table fan is 93 kWh. (Kubota *et al.*, 2011).

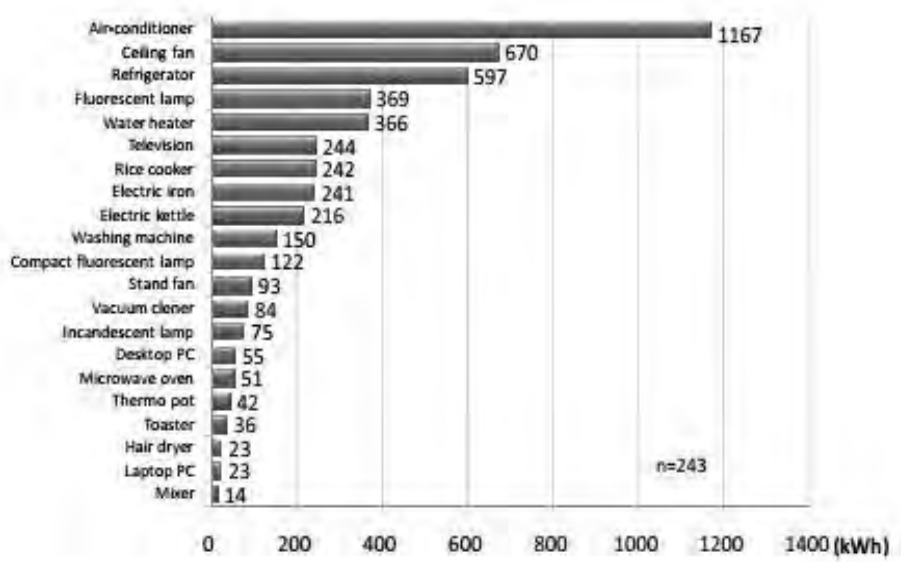

Figure 2.2: Yearly electricity consumption

2.2 Free energy

The definition of "Free-Energy" is a method where no need to burn a fuel or coal to drawing power from the local environment. The example of free energy devices are windmills and water wheels that have been use for pumping water, lifting overwhelming burden, processing grain and producing power for quite a while and both of these gadgets does not use fuel. The energy which powers windmills originates from wind and water wheels originates from river. The energy is come from the local environment and it will keep coming whether we use it or not. (Kelly, 2017).

Free energy means the energy will only be free if we do not need to pay charges for electric power produced through these non-regular methods for generating electric power. The example of non-conventional method are solar power, hydro- electric power and wind power. (Grover *et al*., 2014).

2.3 Fan

The fan in industrial applications are commonly used to provide ventilation or combustion air to the other air and it circulated through the equipment, exhaust of air or other steam equipment. The other name is “air flow” mean a flow of air or the other gas ingredient. (Cunha *et al.*, 2008).

A domestic table fan can be found in every average house in the world. This is because table fans offer an alternative method to provide an air circulation and to cool down the surrounding temperature.(Zare *et al.*, 2014).

2.3.1 Type of fan

There are two primary types of fan which is axial fans and centrifugal fans.

i. **Axial fan**

Axial fan have blades that use to force air to move parallel to the shaft when the blades is rotate. The blades generate the aerodynamic lift to pressurize the air same as propeller. Axial fans are normally used in clean air, high-volume, and low-pressure applications. The different between axial fans and centrifugal fans are axial fans have less rotating mass, more compact, require high rotational speeds and more noisier compare to centrifugal fans. The example of axial fan are table fan, ceiling fan and computer cooling fan. (Cunha *et al.,* 2008). Figure 2.3 show the example of axial fan.

Figure 2.3: Axial fan.

(Source :< http://www.pelonistechnologies.com/blog/axial-vs.-centrifugal-fans>20/4/2017)

ii. **Centrifugal fan**

Centrifugal fan have rotating impeller that use to move air quick radially outwards far from the sharp edge tips. The wind current in parallel to the impeller center point and afterward turns radially outwards towards the impeller and cutting edge tips. Centrifugal fans can generate high pressures and they are normally used in dirty airstream (high moisture) and in systems what is more, in frameworks worked at higher temperatures. The example of centrifugal fan are leaf blower, blowdryers and air mattress inflator. (Cunha *et al.,* 2008). Figure 2.4 show the example of centrifugal fan.