



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF PLASTIC BOTTLE STRING STRIPPER

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

by

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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 () with Honours. The member of the supervisory is as follow:

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ABSTRAK

Botol plastik memainkan peranan penting dalam dunia moden ini. Botol plastik kitar semula seolah-olah menjadi sangat penting bagi sifat bumi kita kerana kita harus mempertimbangkannya. Seperti yang kita tahu semua bahan di dunia ini boleh dikitar semula dan digunakan semula. Kami juga tahu bahawa bahan kitar semula boleh diuraikan. Tujuan projek ini adalah untuk mengkaji dan membuat pelekat tali plastik yang mengitar semula botol plastik menjadi penari tali yang memenuhi keperluan kitar semula. Strip pelekat botol plastik direka bentuk dan dibangunkan dalam projek ini untuk mengatasi kelemahan alat penarik botol plastik sedia ada. Prototaip ini ditambah dengan motor DC tork yang tinggi yang tidak terdapat dalam produk sedia ada dan menjadikan prototaip ini sebagai produk semi automatik yang merendahkan kuasa manusia dalam keseluruhan proses pemotongan. Selain itu, pelan terpakai dan struktur yang diselesaikan telah menggunakan pengaturcaraan CAD sebelum meneruskan proses pilihan bahan. Juga, beberapa bahan berbeza dengan pelbagai komponen bersama-sama dengan menentukan bahan item yang layak untuk setiap bahagian model. Akujanji kemudiannya sedang diuji dan hasilnya direkodkan. Selain daripada itu analisis kecil juga telah dilakukan dengan membandingkan saiz diameter pemotongan botol iaitu 5mm, 3mm dan 2mm, jenis botol dan saiz botol. Oleh itu, dengan membangun alat perlekat botol plastik ini terbukti menjadi pertolongan hebat untuk penggantian tali raket badminton, penggantian jalur memancing, penggantian tali untuk mengikat khemah semasa berkhemah, penggantian tali busur, pemegang alat tangan (gunting , pisau, plier, cutleries, tukul) dan juga penggantungan.

ABSTRACT

Plastic bottles plays a major role in this modern world. Recycling plastic bottles seems to be very important to our mother nature as we should consider about it. As we know all the materials in this world can be recycled and reused as well. We also know that recycling materials can be decomposed. The purpose of this project is to study and fabricate a plastic bottle string stripper which recycle plastic bottles into string stripper which meets the recycling requirements. The plastic bottle string stripper is design and developed in this project to overcome the downside of existing plastic bottle string stripper. This prototype is added with high torque DC motor which is not available in the existing product and make this prototype as a semi-automated product which lessees the human power throughout the entire cutting process. Also, the applied plan and the settled structure were made utilizing CAD programming before continue to the material choice process. Also, some material was contrasted in various component all together with decide the viable item material for every piece of the model. The undertaking is then being tried and the outcome was recorded. Other than that a minor analysis also has been done by comparing the bottles cutting diameter sizes which is 5mm,3mm and 2mm, the type of bottles and size of the bottles. Hence by developing this plastic bottle string stripper it is proven to be a great help for replacement of badminton racquet string, replacement of fishing strip, replacement of rope to tie tent during camping, replacement of the string of bow, holder of hand tools (scissors,knife,plier,cutleries,hammer) and as suspension too.

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LIST OF SYMBOLS

D, d	-	Diameter
F	-	Force
g	-	Gravity = 9.81 m/s
I	-	Moment of inersia
l	-	Length
m	-	Mass
N	-	Rotaional velocity
P	-	Pressure
Q	-	Volumetric flow-rate
r	-	Radius
T	-	Torque
Re	-	Reynold number
V	-	Velocity
w	-	Angular velocity
x	-	Displacement
z	-	Height
q	-	Angle

CHAPTER 1

INTRODUCTION

1.1 Background

In this time, there is a considerable measure of rivalry in this world. The use of innovation is progress in our day by day life. Everybody is testing and making something new to tackle the issue looked by the group regular. Every one of this arrangement holds the way to the nation advancement. Other than that, if the economy is steady, the group will have a superior life and the legislature will have the capacity to design a superior advancement for what's to come.

Consequently, the new creation or redesign of an item as of now exist is one of the critical aptitudes required by every one of the person in every nation to make their nation truly outstanding on the planet. The information joined with abilities will have the capacity to deliver another item that can be promoted to pick up benefit.

Besides, the utilization of types of gear and hardware that are progress and high innovation required keeping in mind the end goal to expand human way of life by giving them fulfilment and solace that they long for. Human way of life increments as the time cruises by. There is parcel gear that ready to make human works less demanding keeping in mind the end goal to accomplish or finish the activity given.

Numerous innovations are made keeping in mind the end goal to help in overwhelming businesses or little and furthermore other division that adds to the development of world economy amid this period. This types of gear has its own wellbeing qualities when individuals apply the supplies in everyday life. That is the reason the item made must be present day and appropriate to be utilized on time to time.

Nowadays as we know recycling seems to be very important to our mother nature as we should consider about it. As we know all the materials in this world can be recycled and reused as well. We also know that recycling materials can be decomposed. But do you know that plastic is the only material which cannot be decomposed?

As in this case we know that plastic bottles can be reused as well but we have come up with a new idea whereby using the plastic bottles to be used in various way in the form of strip. Our product as the project outcome is plastic strips. What is actually plastic strips and what can we do by using these plastic strips? Plastic strips are known as in simple form length which depends on the size of bottle whereas the diameter of the strip depends on the purpose of uses.

Here comes the interesting part of our project outcome. Do you know that we can use these plastic strips in our daily bases? Here are some examples of our product usage which are replacement of badminton racquet string, replacement of fishing strip, replacement of rope to tie tent during camping, replacement of the string of bow, holder of hand tools (scissors,knife,plier,cutleries,hammer) and as suspension too.

Last but not least this is a very economical product yet has plenty uses. The project is called “Plastic Bottle String Stripper”.

This has heightened our concern on the limited mechanical tools that can recycle harmful materials to save time and nature. However, it is noted that various materials are available on building a tool with that specific needs.

With the proper material and design the usage of the tool could be very easy and user friendly.

1.2 Statement of the purpose

The purpose of the research is to investigate the effect of fibre treatment on the mechanical properties such as tensile, flexural and impact properties and water absorption of kenaf/polyester composite.

1.3 Problem statemen

Wastage of plastic bottles as it is just used as the bottle again and at a certain time as it is disposable it is unused so here we come with a new idea to use those plastic bottles as string which is stripped out as the result of our project outcome.

Waste can be viewed as a human idea as there seems, by all accounts, to be no such thing as waste in nature. The waste items made by a characteristic procedure or living being rapidly turns into the crude items utilized by different procedures and living beings. Reusing is prevalent, thusly generation and decay are all around adjusted and supplement cycles ceaselessly bolster the following cycles of creation. This is the

purported hover of life and is a methodology plainly identified with guaranteeing security and supportability in characteristic frameworks.

Then again, there are man-made frameworks which underscore the financial estimation of materials and vitality, and where generation and utilization are the predominant monetary exercises. Such frameworks have a tendency to be profoundly dangerous of the earth as they require monstrous utilization of normal capital and vitality, restore the finished result (squander) to the earth in a shape that harms the earth and require more common capital be expended so as to nourish the framework. Where assets and space are limited (the Earth isn't getting any greater) this is eventually not supportable. The nearness of waste means that overconsumption and that materials are not being utilized productively. This is indiscreetly decreasing the Earths ability to supply new crude materials later on. The limit of the regular habitat to assimilate and process these materials is likewise under pressure. Important assets as issue and vitality are lost amid squander transfer, requiring that a more prominent weight be put on biological systems to give these. The fundamental issue is the sheer volume of waste being created and how we manage it.

1.4 Project aim

The main aim that we want and wish to achieve from this project is we would like to help the mother nature by reducing the consumption of plastic bottles as to get use the unused plastic bottles to be used as plastic string strips which is the outcome product of our project. Our project also is aimed to be user friendly and environment friendly where it would be. The importance to the users is our first priority as well.

1.5 Objectives

The main purpose that we want and wish to achieve from this project is we would like to help the mother nature by reducing the consumption of plastic bottles as to get use the unused plastic bottles to be used as plastic string strips which is the outcome product of our project. Our project also is aimed to be user friendly and environment friendly where it would be. The importance to the users is our first priority as well.

To achieve our objective, we are going;

- To provide something new to industry by recycling plastic bottles.
- To save mother nature by creating something new using disposable and decomposable material.
- To provide a very economical product yet has plenty uses.

1.6 Project scope

To guarantee the task running easily, there are couple of extensions have been recorded as a direction to ensure that the goals of this undertaking is accomplished effectively. There are three principle extensions being examined in the accompanying passage.

The first scope of our project is to provide something new to industry by recycling plastic bottles. Especially for the user of this project would be a marvellous as well as beneficial for industrial usage.

Secondly, our scope of our project is to save mother nature by creating something new using undisputable and decomposable material which is plastic in the bottle form. As an individual we are responsible to save our planet and it can be said it is compulsory too.

Lastly, the scope of our project is to make a very economical product yet has plenty uses for the consumer. The product will have plenty of usage and it would be excellent yet affordable too.

1.7 Justification

- a) Pay attention how the prototype works perfectly.
- b) Understand how deep the existing planning system.
- c) To complete the project in appropriate given time.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Plastic is a standout amongst the most well-known and valuable materials of present day times. Its prevalence is a piece of the issue: we now use around 20 times more plastic than we completed 50 years back (Elias 2003). Nonetheless, we can improve the life expectancy of plastics by reusing and reusing things however many circumstances as could reasonably be expected. (Becker, G.W. and Braun 2016)

2.2 K chart

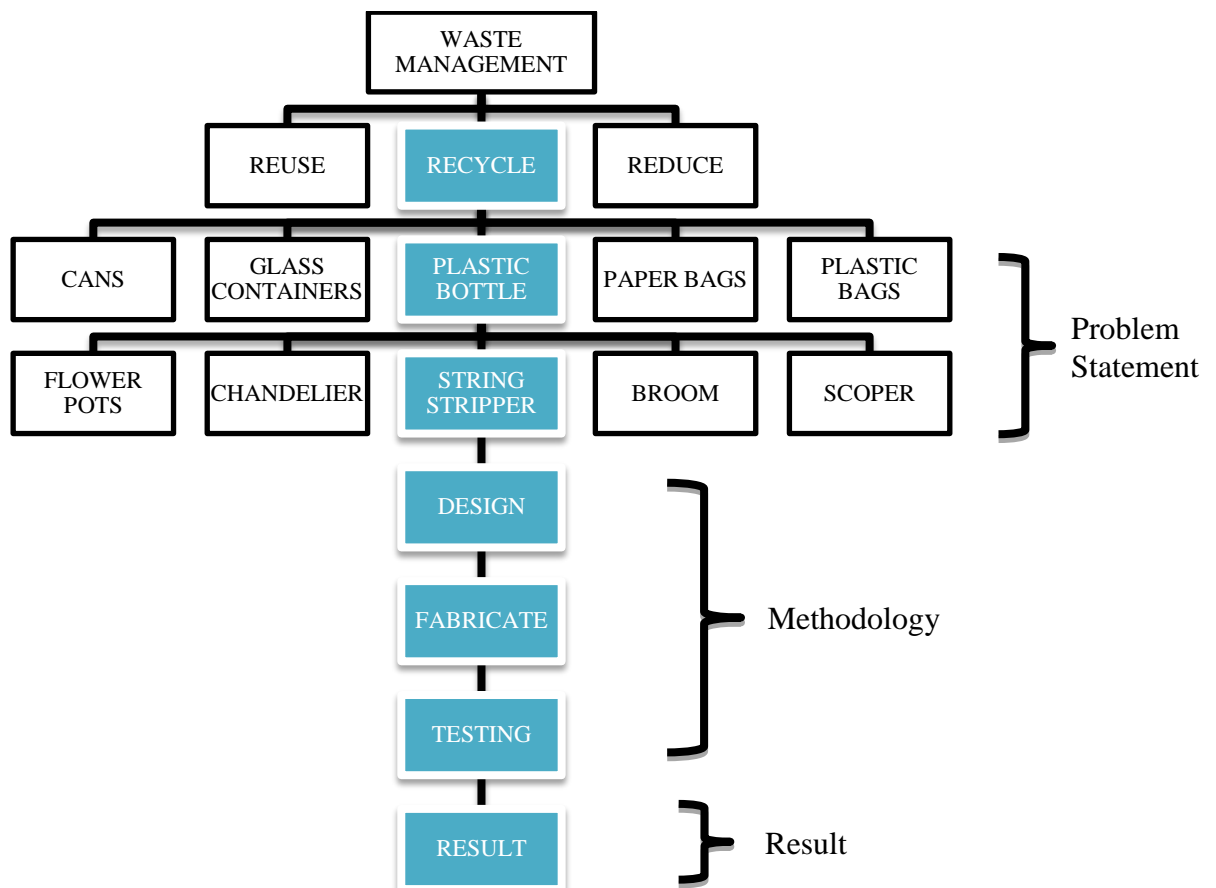


Figure 2-1 K chart

2.3 The types of plastic

2.3.1 Degradable plastics

Frequently alluded to as 'Oxo-degradable' plastic, these are oil based and contain added substances. They either in the end separate or scatter in to littler sections with delayed introduction to light, oxygen, warm or mechanical stress. They may then possibly biodegrade or separate further to decrease the material to water, CO₂, biomass and follow components.

Degradable plastics are not appropriate for natural waste medications like anaerobic processing or treating the soil and are not prone to separate in a landfill site due to the absence of UV light and oxygen. Also, they could possibly influence the nature of reused plastic on the off chance that they enter the plastic reusing framework in high fixations. There are additionally worries about the fracture of the material into little particles, which can stay in nature for quite a long time.(Griffin 1993).



Figure 2-2 Degradable plastic

2.3.2 Bioplastics

A term given to a wider group of plastics that can be either biodegradable, bio-based, or both. Biodegradable plastics: not to be mistaken for degradable plastic, they are regularly gotten from sustainable material that can be separated into straightforward mixes, for example, carbon dioxide and water, by normally happening microorganisms. The term 'biodegradable' regularly does not infer a specific time scale or condition for biodegradation to happen, nor the degree (Thielen 2014).



Figure 2-3 Bioplastic