



**DEVELOPMENT AND IMPROVE OF HOME SAND
SEPARATION MACHINE**



**BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY
(MAINTENANCE TECHNOLOGY) WITH HONOURS**

2022



**Faculty of Mechanical and Manufacturing Engineering
Technology**



**DEVELOPMENT AND IMPROVE OF HOME SAND SEPARATION
MACHINE**

Mohd Faiz Bin Khalid

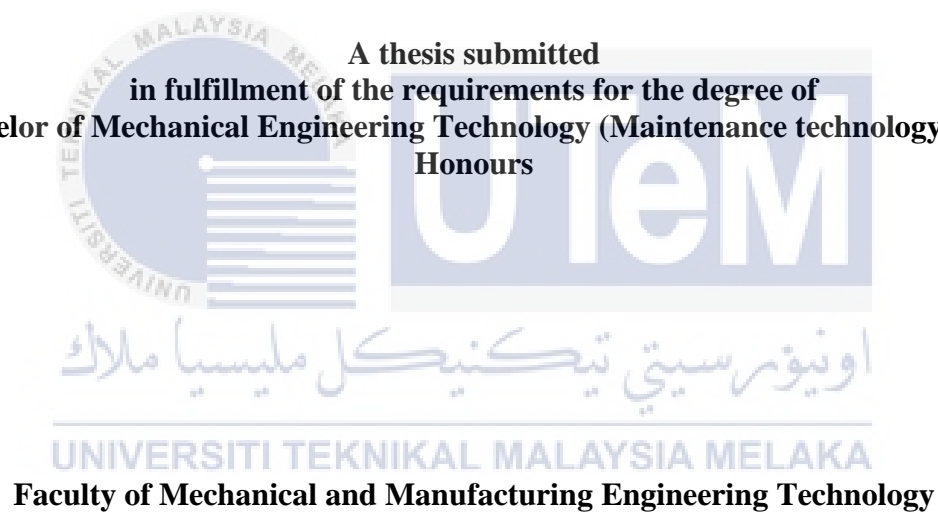
**Bachelor of Mechanical Engineering Technology (Maintenance Technology) with
Honours**

2022

DEVELOPMENT AND IMPROVE OF HOME SAND SEPARATION MACHINE

Mohd Faiz Bin Khalid

**A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Mechanical Engineering Technology (Maintenance technology) with
Honours**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2022

DECLARATION

I declare that this Choose an item. entitled “Development And Improve Of Sand Separation Machine For Mv Distribution Network Based On Machine Design is the result of my own research except as cited in the references. The Choose an item. has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Bachelor of Mechanical Engineering Technology (Maintenance technology) with Honours.

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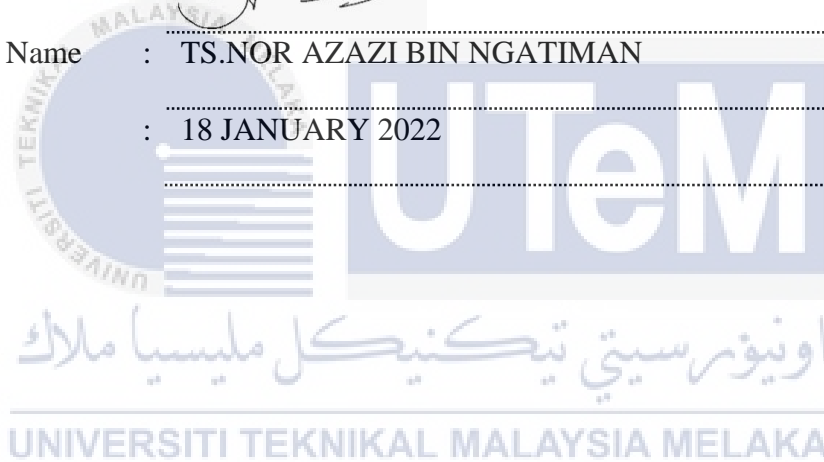
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: 18 JANUARY 2022



DEDICATION

To my beloved mother

Norizan Othman

To my beloved father

Khalid Johar

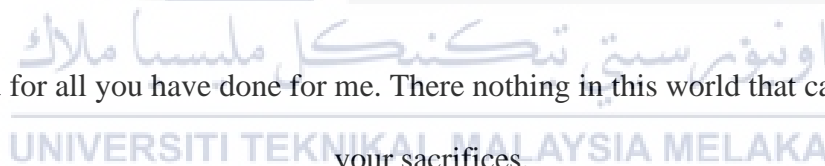


To My Siblings

Khuzaimah, Nazmi, Hizwan, Khairunniza



Thank you for all you have done for me. There nothing in this world that can compare to
your sacrifices.



To my respected supervisor,

Encik Nor Azazi Bin Ngatiman

To all UTeM lecturers and also lab instructors.

Thank you for guiding me and trust me with the opportunities to complete this project

thesis



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ABSTRACT

Sand filters have been widely used by any manufacturer or researcher. In most cases, the size of this machine is large. Sand filters are usually used in sites and construction projects involving urban development because it is an important building material for walls, floors, cement, ceramic tiles, etc. In addition, one function of the sand filter is to separate materials such as pebbles, rocks, grass, and small rocks. But some sand filters are designed for different functions because they can be used to remove suspended solids, as well as floating and sinking particles. The aim of the project is to design and manufacture a sand purifier that can be used for people in villages with limited buildings, homes, houses or equipment and motorized machines. Typically, people will only use a hoe or shovel as a gardening tool, and when they want to do small renovations to their home that involve the use of sand and dirt. In home decorating and small buildings, you will definitely want to use the lowest budget and mode to use the least amount of materials, such as sand. They intend to use the leftover sand from the project or construction site for a long time. As we all know, the price of sand is quite expensive nowadays. The project will also provide functions for construction workers at the project site to reduce the use of waste such as sand and dirt.



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ABSTRAK

Penapis pasir telah digunakan secara meluas oleh mana-mana pengeluar atau penyelidik. Dalam kebanyakan kes, saiz mesin ini besar. Penapis pasir biasanya digunakan di tapak dan projek pembinaan yang melibatkan pembangunan bandar kerana ia adalah bahan binaan yang penting untuk dinding, lantai, simen, jubin seramik, dan lain-lain. Selain itu, salah satu fungsi penapis pasir adalah untuk memisahkan bahan seperti kerikil, batu, rumput, dan batu kecil. Tetapi beberapa penapis pasir dirancang untuk fungsi yang berbeza kerana ia dapat digunakan untuk menghilangkan pepejal terampai, serta partikel terapung dan tenggelam. Tujuan projek ini adalah untuk merancang dan mengeluarkan alat pembersih pasir yang dapat digunakan untuk penduduk di kampung dengan bangunan, rumah, rumah atau peralatan dan mesin bermotor yang terhad. Biasanya, orang hanya akan menggunakan cangkul atau sekop sebagai alat berkebun, dan ketika mereka ingin melakukan pengubahsuaian kecil ke rumah mereka yang melibatkan penggunaan pasir dan kotoran. Dalam menghias rumah dan bangunan kecil, anda pasti ingin menggunakan anggaran dan mod terendah untuk menggunakan jumlah bahan paling sedikit, seperti pasir. Mereka berhasrat untuk menggunakan pasir yang tersisa dari projek atau tapak pembinaan untuk masa yang lama. Seperti yang kita semua ketahui, harga pasir sekarang agak mahal. Projek ini juga akan memberi fungsi kepada pekerja binaan di tapak projek untuk mengurangkan penggunaan sisa seperti pasir dan kotoran.

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Alhamdulillah to ALLAH (SWT). With his blessing and gift, I will not complete this project paper firmly and modestly. I wisely spent my time, energy and motivation to complete this thesis. In addition, I am very fortunate that the people around me keep giving me advice, love and their knowledge, just to make my journey easier. Deep down in my heart, I want to thank everyone who contributed their knowledge and skills to my project paper. I want to thank my supervisor Encik Nor Azazi Bin Ngatiman, his patience and infinite motivation have made me more and more confident in myself and have guided me throughout my project. He provided me with countless support and continuous supervision, told me all about the project document, and helped me prepare the presentation. Therefore, I would also like to thank my co-director Cik Nur Afifa Binti Hafiz for his trust in me. She gave me an inspiring project idea. She is also a great help in the design, and I know that one day the knowledge she gave me will bring me thousands of benefits, especially when it is related to my studies. Without both, this project paper will not be completed successfully. I would also like to thank my dear parents and family for their unconditional love and care when I started this project. In addition, I am also grateful to have friends who helped me along the way, listening to my pain and happy excitement. Finally, I would also like to thank those who directly or indirectly participated in helping me complete this project paper. For the last time, thank you very much for everything, and may Allah bless you.

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LIST OF SYMBOLS AND ABBREVIATIONS

D,d	-	Diameter
CAD	-	Computer Aided Design
MIG	-	Metal inert Gas
CAE	-	Computer Aided Engineering
	-	
	-	
	-	
	-	



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CHAPTER 1

INTRODUCTION

1.1 Research Background

Sand filter has been using widely by any manufacture or researcher. Mostly, this machine was built with a huge size of the measurement. Usually, the sand filter has been used at sites, building projects that involve in city development as it was the important material to build for wall, floor, using for cement, tiles, and many more. Moreover, some sand filter function is to separate material likes pebbles, rock, grass and small rocks. But some machines for sand filters are built for different functions as it can be used for the removal of suspended matter, as well as floating and sinkable particles.

A research by Mohd Reza Esa (2017)(Esa et al., 2019), Increased environmental awareness has promoted a change in the mindset of stakeholders in the Malaysian construction industry. The Malaysian government has made efforts to prioritize construction and demolition (C&D) waste management to reduce its environmental impact, but the recycling rate is still as low as 15%. The increasing amount of material waste generated by construction activities is becoming a challenging problem for construction site operators. The Malaysian construction industry continues to produce, which benefits the country's economy and provides the necessary infrastructure.

In this literature review chapter, we will discuss some of the studies that have been taken as previous studies for comparison as well as generating ideas for the improvement of this project. The project can be obtained from websites, journals, observations as well as

experience. It also can be found in some of the literature and will be elaborated in this study to support that study

In the description of the methodology, methods and project will be planning. Before producing designs to form of a project, several things need to be considered among them. For example in terms of selection materials, design concepts, measurement analysis, laboratory tests and engineering drawings. Others, there are several user factors such as experience, project maintenance and project impact in construction that should be taken seriously. This method has several things involved namely manufacturing process, theory or design problems and list of materials and tools.

1.2 Problem Statement

Usually, after a project for city or home development or home renovation that also includes adding rooms or toilets, there will be always some waste of sand or any materials left over for example like cement, bricks, and so on. Nagapan 2012 commented that there have been increasing construction wastes attributable to insufficient waste management practices in the construction projects since the last two decades (Saadi Nurzalikha et al., 2016). Taha 2015 also stated that Solid Waste and Public Cleansing Management Corporation of Malaysia confirms that approximately 8 million tonnes of construction wastes per year are generated from construction projects. After that, these issues not only seem loss and waste to normal people but also for the gardener that thinks it was such a big waste for not using the sand waste or soil for important activities such as gardening. Other than that, lately, the cost of sand and soil is quite pricey for some people and gardeners. Sand that has been left for too long might had mixed with other materials such as dirt, small rocks, grass, and soil. But usually, around residence and home, there is no such as sand filter machine or suitable

equipment to separate it. Therefore, this design and fabrication will help people or gardener that have a hard time or just manually to collect clean sand or soil.

Sand materials are an important role in building construction as they include in components of making building concrete aside from water and cement(Ngugi et al., 2014). Sand characteristic is loose, fragmented, naturally occurring material consisting of very small particles of decomposed that is rocks, corals, or shells. It was made up of the loose fragment that comes from the result of rocks and has been broken down by wind and rain. From rock into the loose fragment, people have thought of having many simple ways of acquiring fine sand that suitable to be used in construction. The increasing demand of sieving sand for concrete mix is difficult to sustain by just doing it manually. So the use of sand sieve machine does necessary.

As we all know there are many types of machine use in screening sand and can be classified on the mechanism it uses. it was reciprocating, vibratory, and rotary motion. Mostly common sieve machines are used in small until medium-scale construction sites and usually, it was rotary, reciprocating, and vibratory.

Nowadays people mostly use the most suitable way to cut their cost and time. Examples that we can see are at the construction where they have to finishes their project before the due date given. Not that all, the problem also comes when the size of the sand that available in the market. These days we need to spend more money if we want the sand in a specific size or category. Without a doubt, it suddenly will increase our budget and time to wait for the supplier to prepare for good quality sand.

However, in some companies, there actually has a high technician for the machine. The most company also has capable of making this sand separation. Not only for one function but also

capable in the build of sand sieve that can sub stand in any mixture. But sometimes in some companies also just need a suitable sand separation machine type that was easy to operate and comfortable without using more energy workers.

1.3 Research Objective

The objectives of this research are as the following:

- a) To compare the advantages and development of function with the existing machine
- b) To design a machine that easy to operate for household
- c) To analyze the function of the sand separation machine

1.4 Scope of Research

The priority of this project is for designing and fabrication of sand purification machine that can be used for people around construction, home, residence, or village that has limited equipment and motorized machine. Usually, people will only use a hoe or shovel as their gardening tools and also when they want to make a small renovation at home that involves in using sand and soil. On the side of renovation and small construction at home, they will surely want to use a small budget and modal for the least amount of material for example sand. So they will intend to use sand that has been left over for long period from the project sites or construction. As we all know the sand price is quite pricey these days. This project also will be functional for construction workers in project sites so the amount of waste materials used such as sand and soil will be decreased.

For a machine that needs to be done perfectly running smoothly, all the scope project implementation limits are very important in order to get a good project outcome. The aims