

**UNIVERSITI TEKNOLOGI MARA**

**DESIGN AND FABRICATION OF  
SELF-CLEANING EATER FISH  
TANK FILTER**

**NUR NABILA SOFEA BINTI MOHD IZHAM**

Dissertation submitted in partial fulfillment  
of the requirements for the degree of  
**Diploma**  
**(Mechanical Engineering)**

**College of Engineering**

**Feb 2023**

## **ABSTRACT**

This project is about the design and fabrication of self-cleaning water fish tank filter that can be used for pet owners. The problem with the existing pumps on the market is that there is no self-cleaning system inside the filter. So, it is hard to clean it. Consumers tend to spend a lot of time for cleaning the filter system. Because of that, the idea of fabricating the self-cleaning water fish tank filter that can easier the work and reduce the time for cleaning it. The objective of this project is to create a system to clean the filter automatically. DC motor is used to rotate the filter container that attached with brushes. So, when the container is rotating, the brush will brush all the dirt inside the filter.

## **ACKNOWLEDGEMENT**

Firstly, I wish to thank God for giving me the opportunity to embark on my diploma and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor, Madam Nur Aini Sabrin binti Manssor @ Shukri for guiding and helping me during my Final Year Project 1 and 2.

Finally, this dissertation is dedicated to my father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah

# TABLE OF CONTENTS

<b>CONFIRMATION BY SUPERVISOR</b>	<b>ii</b>
<b>AUTHOR'S DECLARATION</b>	<b>iii</b>
<b>ABSTRACT</b>	<b>iv</b>
<b>ACKNOWLEDGEMENT</b>	<b>v</b>
<b>TABLE OF CONTENTS</b>	<b>vi</b>
<b>LIST OF TABLES</b>	<b>viii</b>
<b>LIST OF FIGURES</b>	<b>ix</b>
<b>LIST OF ABBREVIATIONS</b>	<b>x</b>
<b>CHAPTER ONE : INTRODUCTION</b>	<b>1-3</b>
1.1 Background of Study	1
1.2 Problem Statement	1
1.3 Objectives	2
1.4 Scope of Study	2
1.5 Significance of Study	3
<b>CHAPTER TWO : LITERATURE REVIEW</b>	<b>3-6</b>
2.1 Benchmarking/Comparison with Available Products	3
2.2 Related Manufacturing Process	3
2.3 Sustainability/Ergonomic Related Items	4
2.4 Patent and Intellectual Properties	5
2.5 Summary of Literature	6
<b>CHAPTER THREE : METHODOLOGY</b>	<b>8-20</b>
3.1 Overall Process Flow	8-9
3.2 Detail Drawing	10-12
3.3 Engineering Calculation and Analysis	13-14
3.4 Bill of Materials	15-16
3.5 Fabrication Process	17-19

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of Study**

Nowadays, there are many types of water fish tank filter at market that function to filter all the dirt inside the tank or aquarium. The function of the filter system is to filter the dirt inside the tank and to keep the water clean. However, this product needs to be clean at least once a month to make sure the system working well [1]. The reason of this project is to design and fabricate the self-cleaning water fish tank filter system using DC motor. An innovation will be added which is DC motor that helps to clean the filter automatically [2]. The DC motor will attach with the filter casing which can help to rotate the container and clean inside the filter system. This improvement will help the consumers to clean the filter part just by switch on the motor. They also can reduce the time taken for cleaning compare to the existing filter. Other than that, consumers also can keep the aquarium clean if they do not have time to clean it.

### **1.2 Problem Statement**

Existing literature related to the project of the self-cleaning water fish tank filter has demonstrate designer seeking to improve the existing pump filter either added extra function by modifying the structure of filter system or other mechanical parts. Since the pet owners (focus on aquatic animal) especially who has small outdoor aquarium have troubles to clean the filter due to lot of filter layers [2]. Despite, there are a lot of compartments with different type of filter mechanism which need to be clean. The ignorance by the busy people towards their pump filter has caused the build-up of toxins in the tank and it could eventually poison the fish. It also led to general decline in water quality.