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FEASIBILITY STUDY AND CONCEPTUAL DESIGN ON THE AUTOMATIC FISH  
FEEDER

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This thesis is submitted in partial fulfillment of the requirements for the degree of  
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## DECLARATION

“I hereby acknowledge that this report is my own investigation except summaries and citations which every each of it that I state the sources”

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**Specially dedicated to my beloved family**

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## ABSTRAK

Projek ini adalah mengenai kajian tentang pemberi makanan ikan secara automatik. Fungsi utama produk ini adalah untuk memberi makanan ikan secara automatik pada masa yang tepat dan jumlah makanan yang sepatutnya supaya tidak berlaku pembaziran. Pemberian makanan ikan secara automatik juga menjadikan hidup pembela ikan menjadi mudah dan terurus. Kadangkala, kita terlupa sama ada kita telah memberi makanan kepada ikan atau tidak ataupun mungkin ada orang lain dalam keluarga kita yang telah memberi makanan kepada ikan tanpa disedari. Justeru, pemberi makanan ikan secara automatik akan mengatasi masalah terlupa memberi makanan atau terlebih memberi makanan ikan secara serentak. Kehadiran makanan yang terlalu banyak didalam air akan menyebabkan penapis mudah tersumbat, dan menyebabkan kita perlu meluangkan lebih masa untuk membersihkan akuarium. Melalui projek sarjana muda ini, penambahbaikan terhadap pemberi makanan ikan secara automatik yang sedia ada dapat dicapai dengan jaya. Projek pemberi makanan ikan secara automatik ini dianalisis menggunakan perisian Solidworks COSMOSWorks. Analisis yang dijalankan adalah analisis struktur dan analisis pergerakan pada mekanisme pemberi makanan ikan secara automatik.

## ABSTRACT

The project relates to a mechanism of automatic fish feeder. The main function of this product is to suit the fish feeding automatically by a machine and feed with the exact time and accurate amount of fish food so that there is no wasting in feeding. By using this gadget, the work to feed the fish become easier and efficient compared before. Automatic fish feeders help make our life as an aquarium owner much easier. It is often hard to remember whether or not we fed the fish, or if someone else in our house did already, and the automatic fish feeder eliminates missed feedings or over feeding altogether. Too much food in the water can easily clog up important filters, and cause us to have to spend more time cleaning our aquarium tank than enjoying it. Via this project, the improvement and enhancement of current automatic fish feeder can be done successfully. The automatic fish feeder will be analyses using Solidworks COSMOSWorks software. The analysis that be done on this design is structural analysis and motion analysis on mechanism.

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**LIST OF SYMBOL**

F	=	Fahrenheit
$\delta^{13}\text{C}$	=	A measure of the ratio of stable isotopes $^{13}\text{C}:^{12}\text{C}$
$\sigma$	=	Bending stress
n	=	Safety factor

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Project Background

Nowadays, there are many types of automatic fish feeder in the market. Every type of them has their own advantages, disadvantages, different design, and different mechanism and so on. Automatic fish feeder is one of the gadgets that help user to feed their fish automatically without do it manually everyday. Using this gadget, user only need to set the timer and the gadget will feed their fish automatically according to the user setting. This gadget also helps the person who is willing to travel for a long time, maybe for their business trip or family vocation to feed their fish automatically while they are away. Therefore, they do not need to worry about their fish anymore while they are not around.

The automatic fish feeder is designed to replace a manually fish feeding by a person. Before this gadget was introduced in the market, people have to feed their fish manually and sometimes they miss to feed their fish because they are busy or forgot to do so. For that case, the automatic fish feeder is designed to suit the fish feeding automatically by a machine and feed with the exact time and accurate amount of fish food so that there is no wasting in feeding. At the beginning stage, the design must

consider all aspect that required as a good automatic fish feeder and also environmental friendly.

## **1.2 Importance of the Project**

The significant of this project is to provide a high quality of automatic fish feeder compared to the product that available in the market nowadays. By using this gadget, the work to feed the fish become easier and efficient compared before. Automatic fish feeders help make your life as an aquarium or pond owner much easier. It is often hard to remember whether or not you fed the fish, or if someone else in your house did already, and the automatic fish feeder eliminates missed feedings or over feeding altogether. Too much food in the water can easily clog up important filters, and cause you to have to spend more time cleaning your aquarium tank than enjoying it.

Besides, this design has a high commercial value. Because of the cost of this gadget is not very expansive, everyone can afford for it. This gadget is not too expensive because it uses a simple mechanism to work. Besides, the materials used are easy to obtain. This design also will provide big opportunities towards continuous development on design technique of any similar automatic feeder such as for birds, goats, cows and etcetera.

## **1.3 Objectives**

Objectives are important element in the design. It must be clearly stated and understood to easier the designer to imagine or determine the goal of the project.

- To study about automatic fish feeder.

- To design and improve the current automatic fish feeder.

#### **1.4 Scopes**

The scopes of the project are as follow:

- This project focuses on development of a working mechanism.
- The development includes simple analysis to show the effectiveness of the working mechanism using Solidworks COSMOSWorks software.

#### **1.5 Problem Statement**

The idea of developing a new automatic fish feeder is because the current automatic fish feeder in the market nowadays very expensive and quiet difficult to handle. The designs of the automatic fish feeder also not meet the customer taste and lack ergonomics.

The main factors that need to consider while choosing and determine the specification of the product are:

- a) Design
- b) Ergonomic
- c) Function

## CHAPTER 2

### LITERATURE REVIEW

Literature review is needed to get information and detail background that related about the project as such histories, articles and journals. This information is going to use in order to finish the project.

#### 2.1 Feeding

Knowing how much to feed fish without overfeeding is a problem in any type of fish production. Feeding rates are usually based on fish size. Small fish consume a higher percent of their body weight per day than do larger fish (**Table 2.1**). Most fish being grown for food will be stocked as fingerlings. Fingerlings consume 3 to 4 percent of their body weight per day until they reach 1/4 to 1/2 pound, then consume 2 to 3 percent of their body weight until being harvested at 1 to 2 pounds. A rule-of-thumb for pond culture is to feed all the fish will consume in 5 to 10 minutes. Unfortunately, this method can easily lead to overfeeding. Overfeeding wastes feed, degrades water quality, and can overload the biofilter.

**Table 2.2** approximates a feeding schedule for a warmwater fish (e.g., tilapia) stocked into an 84° F recirculating system as fry and harvested at a weight of 1 pound after 250 feeding days. Feed conversion is estimated at 1.5: 1, or 1.5 pounds of feed to obtain 1 pound of gain. **Tables 2.1** and **2.2** are estimate and should be used only as guidelines which can change with differing species and temperatures. Growth and feed conversion are estimated by weighing a sample of fish from each tank and then calculating the feed conversion ratios and new feeding rates from this sample. For example, 1,000 fish in a tank have been consuming 10 pounds of feed a day for the last 10 days (100 pounds total). The fish were sampled 10 days earlier and weighed an average of 0.33 pounds or an estimated total of 330 pounds.

Table 2.1: Estimated food consumption by size of a typical warmwater fish.

(Source: Southern Regional Aquaculture Centre (SRAC publication no. 452, March '99)

Average weight per fish		Body weight consumed (%)
(lbs.)	(g)	
0.02	9	5.0
0.04	18	4.0
0.06	27	3.3
0.25	113	3.0
0.50	227	2.75
0.75	340	2.5
1.00	454	2.2
1.50	681	1.8

A new sample of 25 fish is collected from the tank and weighed. The 25 fish weigh 10 pounds or an average of 0.4 pounds per fish. If this is a representative sample, then 1,000 fish should weigh 400 pounds. Therefore, the change in total fish weight for this tank is 400 minus 330, or 70 pounds. The fish were fed 100 pounds of feed in the last 10 days and gained 70 pounds in weight. Feed conversion then is equal to 1.43 to 1 (i.e.,  $100 \div 70$ ). In other words, the fish gained 1 pound of weight for each 1.43 pounds