

DESIGN AND FABRICATE MULTIFUNCTION BABY STROLLER

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**BORANG PENGESAHAN STATUS TESIS**

**JUDUL : MULTIFUNCTION BABY STROLLER**

**SESI PENGAJIAN: 2010/2011**

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DESIGN AND FABRICATE MULTIFUNCTION BABY STROLLER

AZRIQ FILDZA BIN ANUARDI

Report submitted in partial fulfilment of the requirements  
for the award of Diploma in Mechanical Engineering

Faculty of Mechanical Engineering  
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DECEMBER 2010

### **SUPERVISOR'S DECLARATION**

I hereby declare that I have checked this project report and in my opinion this project is satisfactory in terms of scope and quality for the award of Diploma in Mechanical Engineering.

Signature :  
Name of Supervisor : Mohd Azrul Hisham Bin Mohd Adib  
Position : Lecturer  
Date : 5 December 2010

### STUDENT'S DECLARATION

I hereby declare that the work in this report is my own except for quotations and summaries which have been duly acknowledged. The report has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature :  
Name : Azriq Fildza Bin Anuradi  
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Date : 5 December 2010

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## **ABSTRACT**

This thesis shows the progress of the project entitled Design and Fabricate Multifunction Baby Stroller. The objective of this project is to design and fabricate the multifunction baby stroller according to the scoped discussed with my supervisor. The fabricating process is started after the final design is decided. Final design is chosen based on the scopes listed by me and my supervisor. The scopes is listed after thorough discussion with my supervisor based on the problem statements that happens around us, especially to the parents as they are the common users of the baby stroller to easily carry their babies or infant while travelling or just going outdoor. All this process is explained in detail in this thesis to show how the project when through the process to produce the multifunction baby stroller.

## **ABSTRAK**

Tesis ini menunjukkan proses projek berjudul ‘Design and Fabricate Multifunction Baby Stroller’. Tujuan projek ini adalah untuk merancang dan membuat kereta sorong bayi berbagai fungsi mengikut skop yang telah dibincangkan dengan penyelia saya. Proses pembuatan bermula selepas rancangan lakaran akhir ditentukan. Lakaran akhir ini dipilih berdasarkan skop yg dibincangkan oleh saya dan penyelia saya. Skop disenaraikan berdasarkan masalah yang dihadapi di sekitar kita, terutama untuk ibu-bapa kerana mereka adalah pengguna utama kereta sorong bayi bagi memudahkan mereka membawa bayi mereka bersama. Semua proses ini dijelaskan secara terperinci di dalam tesis ini untuk menunjukkan bagaimana projek ini melalui proses untuk menghasilkan kereta sorong bayi berbagai fungsi.



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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

The purpose of this chapter is to explain about the project problems statement, objectives and scopes. These 3 main things are crucial to start the project as it gives ideas and limitation so that this project could work out fine. It is the starting line of these projects to make sure that I could finish the project smoothly. From this part we can continue to the next process which is fabrication.

#### **1.2 PROBLEMS STATEMENT**

The problem that most parents have to face every day is that they have to buy baby stroller and car seat separately as the stroller could not be taken out and use as a car seat. Furthermore, most baby stroller cannot change the baby position between seating and lying down. While outdoor, parents have to bring many tools as a preparation for the baby. But most baby strollers have only small compartment and is not enough for the entire luggage of the baby.

#### **1.3 OBJECTIVES**

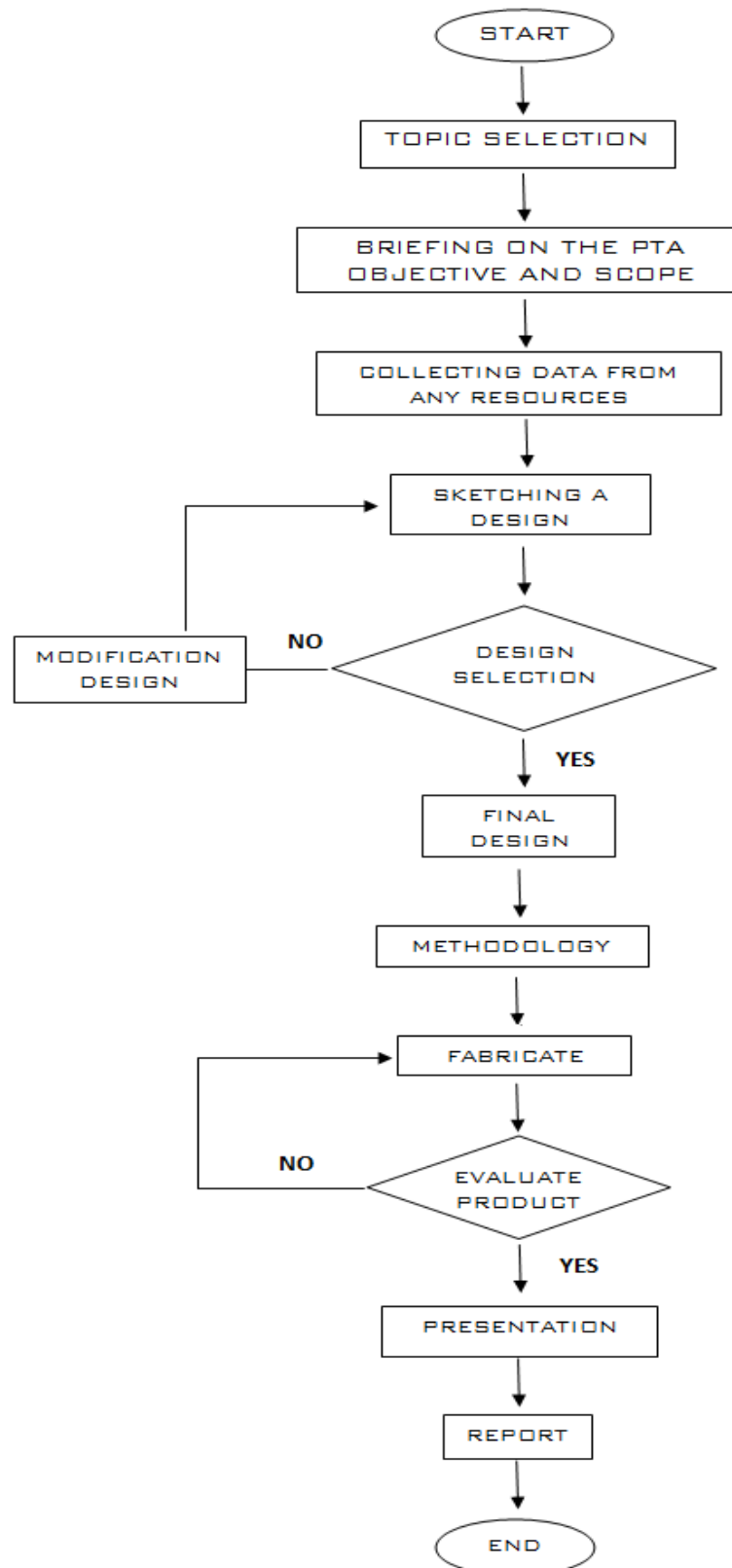
The objective of this project is to design and fabricate multifunction baby stroller, and then to make sure that it could function normally.

## **1.4 SCOPE**

The scope of this project is to make the baby stroller be multifunction. The suitable baby age for the baby stroller is between 2 to 10 months old. The baby stroller is suitable for indoor and outdoor usage. The handle bar could be adjusted into 2 set of angle. When the baby basket is taken out as a baby car seat, the stroller left could be use as a small trolley.

## **1.5 FLOW CHART**

A flow chart, or flow diagram, is a graphical representation of a process or system that details the sequencing of steps required to create output. This flow chart was present steps or process of final year project that will be present in this semester. Figure 1.0 shows that process to complete my final year project.



**Figure 1.1:** Flow Chart

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

The purpose of this chapter is to provide a review of past research efforts related to the baby stroller that are already in the market. Although there many types of baby stroller in the market, research has been made to find the most common and popular stroller in the market. The review is organized chronologically from the most common baby stroller to the most uncommon baby stroller. The review is detailed so that the present research effort can be properly tailored to add to the present body of literature as well as to justly the scope and direction of the present research effort.



## 2.2 UMBRELLA STROLLER



**Figure 2.1:** Umbrella stroller

**Source:** <http://www.stroller-advisor.com>

Get their name from the curved double handles and from the fact that they fold up easily and compactly like an umbrella. It is the smallest, lightest and most basic baby strollers available.

### 2.3 LIGHTWEIGHT STROLLER



**Figure 2.2:** Lightweight Stroller

**Source:** <http://www.stroller-advisor.com>

It is a single mid-sized stroller. Provide a seat for your child and somewhere for you to push. Can have many more features depending on the price.

### 2.4 MULTI-CHILD STROLLER



**Figure 2.3:** Multi-child stroller

**Source:** <http://www.stroller-advisor.com>

Built for transporting twins, triplets and also good for two children who are close in age. Have storage compartment.

## 2.5 CARRIAGE STROLLER



**Figure 2.4:** Carriage Stroller

**Source:** <http://www.stroller-advisor.com>

Essentially a traditional solid backward-facing bassinet on a frame with four large wheels or a more modern bassinet attached to a frame with swivel wheels.

## 2.6 Stroller Travel System



**Figure 2.5:** Stroller Travel System

**Source:** <http://www.stroller-advisor.com>

It is convenience for a parent with a newborn. Basically, it is a good-sized stroller with an infant car seat that clips in and out.

## 2.7 Active Stroller



**Figure 2.6:** Active Stroller

**Source:** <http://www.stroller-advisor.com>

It is specially designed for health-minded parents who regularly enjoy physical activity with their children. They include all-terrain and jogging strollers.

## CHAPTER 3

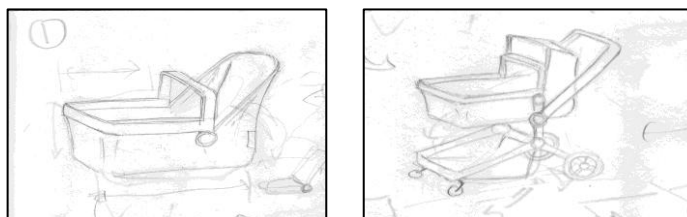
### METHODOLOGY

#### 3.1 INTRODUCTION

The purpose of this chapter is to explain about the designs that have been made during the projects. It also show the steps made to get the finalize design that will move to the next process, which is fabrication.

#### 3.2 CONCEPT DESIGN

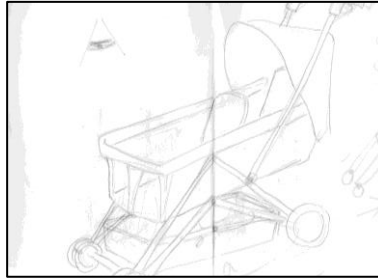
##### 3.2.1 Concept 1



**Figure 3.1:** First concept

This type of baby stroller is multifunction. It is very lightweight and easy to be fabricated. It has adjustable handle bar for users comfort. Below it is a small storage.

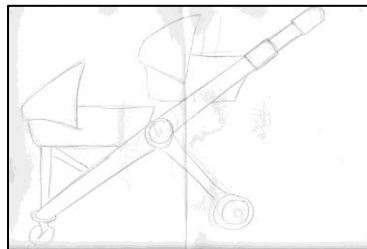
### 3.2.2 Concept 2



**Figure 3.2:** 2<sup>nd</sup> concept

This baby stroller is suitable for twins. It is good in strength as it has to withstand the weight of babies. However, the size is too big and it is a bit hard to be fabricated.

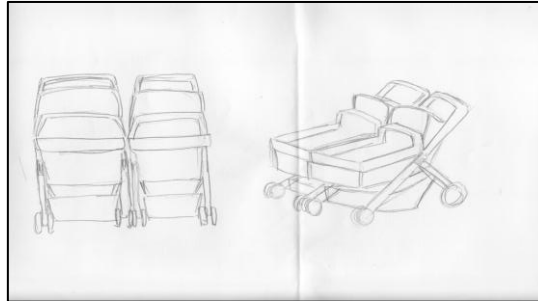
### 3.2.3 Concept 3



**Figure 3.3:** 3<sup>rd</sup> concept

This is also a stroller for twins because of its multiple basket to hold the baby. It has an adjustable handle bar for user's comfort. Although it is easy to be fabricated, it is not good in strength.

### 3.2.4 Concept 4



**Figure 3.4:** 4<sup>th</sup> Concept

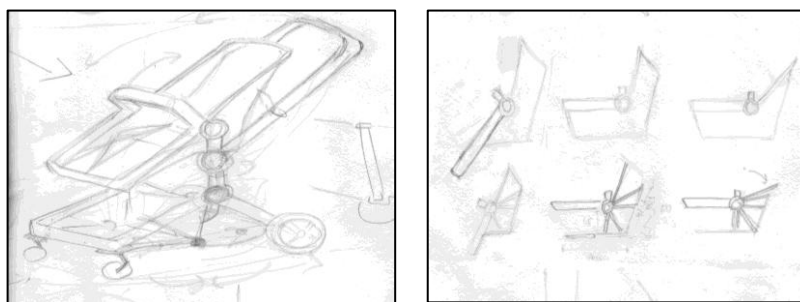
It is a single baby stroller that can stick with other stroller to form a twin's stroller. But it is not very functional for single use. It is easy to be fabricated.

### 3.3 CONCEPT SELECTION

**Table 3.1:** Concept selection

| Selection criteria    | Concept Variants |           |           |          | Datum |
|-----------------------|------------------|-----------|-----------|----------|-------|
|                       | Concept 1        | Concept 2 | Concept 3 | Concept4 |       |
| <b>Multifunction</b>  | +                | -         | -         | -        | 0     |
| <b>Easy to be use</b> | 0                | 0         | 0         | -        | 0     |
| <b>Fabrication</b>    | 0                | -         | +         | 0        | 0     |
| <b>strength</b>       | +                | +         | -         | +        | 0     |
| <b>Load</b>           | 0                | +         | 0         | +        | 0     |
| <b>Plusses</b>        | 2                | 2         | 1         | 2        | 0     |
| <b>Same</b>           | 3                | 1         | 2         | 0        | 0     |
| <b>Minuses</b>        | 0                | 2         | 2         | 2        | 0     |
| <b>Net</b>            | 2                | 0         | -1        | 0        | 0     |
| <b>Rank</b>           | 1                | 2         | 4         | 3        | 0     |
| <b>Continue?</b>      | YES              | NO        | NO        | NO       |       |

### 3.4 FINAL DESIGN



**Figure 3.5:** Final Design

I chose the first design as my final design because according to the concept screening, it is the most suitable design for my project to comply with the scope and objective.



## CHAPTER 4

### RESULT AND DISCUSSION

#### 4.1 INTRODUCTION

The purpose of this chapter is to discuss the results after the fabrication of the product. The functions and handling method of the products is explain thoroughly. This chapter will also discuss about some the problems of the product and how to improve it.

#### 4.2 FINAL PRODUCTS

The final products in several views are shown in the figure below.



**Figure 4.1:** Baby Stroller



**Figure 4.2:** Baby Stroller Side

### 4.3 PRODUCT FUNCTIONALITY

#### 4.3.1 Baby Stroller

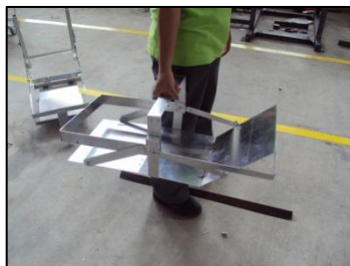
As a baby stroller, it is small and lightweight compared to other common baby stroller in market. It can be folded to make it small so that it can be put in the car without taking to much area. The handle bar can be adjusted to two different positions. It is depends on the users whether they want to stroll their baby from the front or backward.



**Figure 4.3:** Baby Stroller Front

#### 4.3.2 Baby Seat

The upper part, which is the baby seat, could be use separately as a baby basket. Users can hold them freely and bring together their child in it without having to keep strolling. Besides, when put in car, it could be use as a baby car seat. As an additional function; the baby seat could be converted between baby seating positions to lying down position.



**Figure 4.4:** Baby Seat

### 4.3.3 Stroller

When separated the lower part, which is the stroller, could be use as a small trolley. It is suitable to be put a small basket at the flat compartment in it and be pushed anywhere as a trolley



**Figure 4.5:** Stroller

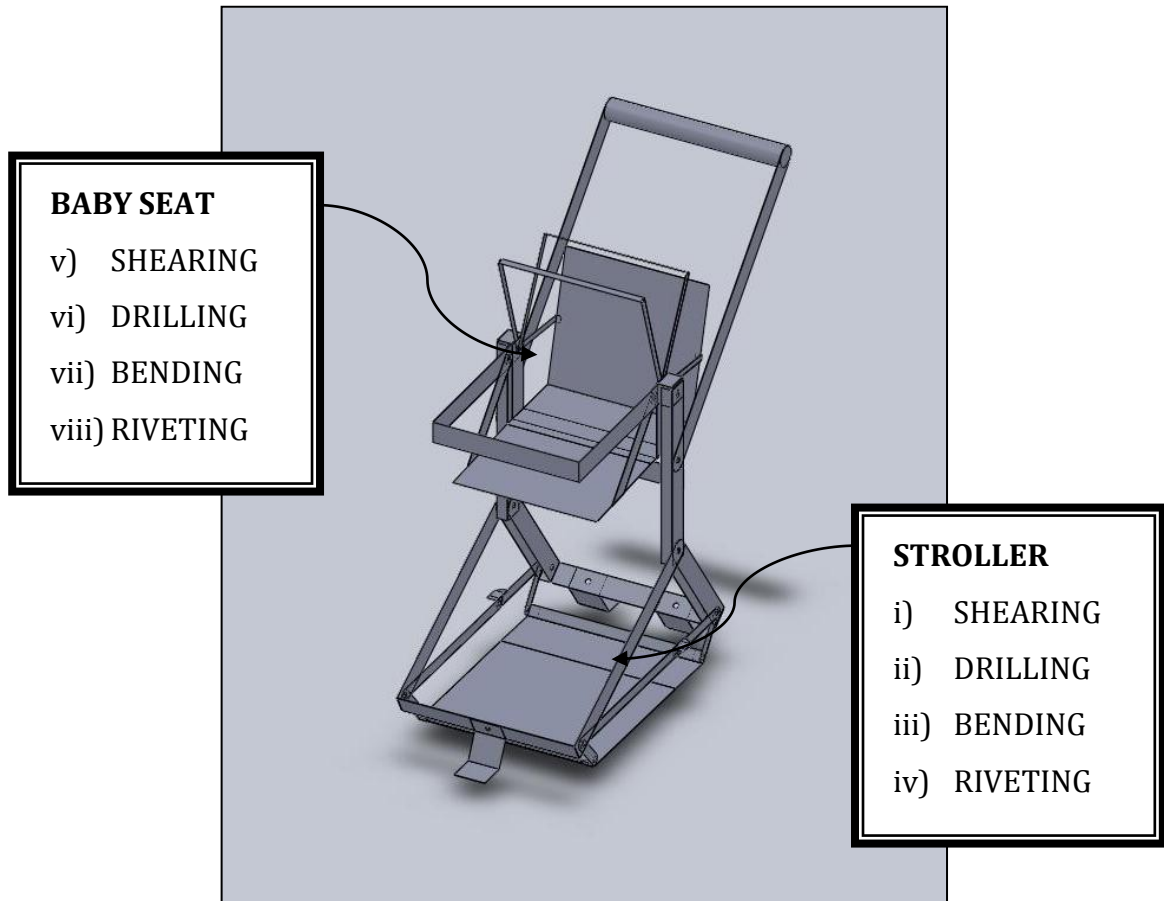
## 4.4 Discussion

The product, Multifunction Baby Stroller, functionality is very useful for users. It's multifunction ability has reduce the energy and time needed to bring their child with all the luggage for the child. It has achieved the objective of this project. For example, the baby seat could be used as a baby car seat.

However, this multifunction baby stroller is not very strong due to the unsuitable material chosen for the fabrication process. The lightweight property of the aluminum was perfect for the baby stroller, but the lack of strength is unsuitable for the product. Using thicker aluminum could make the material stronger.

Riveting as joining for the product has reduced the cost of the product. However, it makes the product not last very long. This is because it has to withstand heavy load of infants and the entire luggage for the baby. Using screws at the movable part and replaced the edge joining with hard plastic can solved this problem.

#### 4.5 FABRICATING METHOD

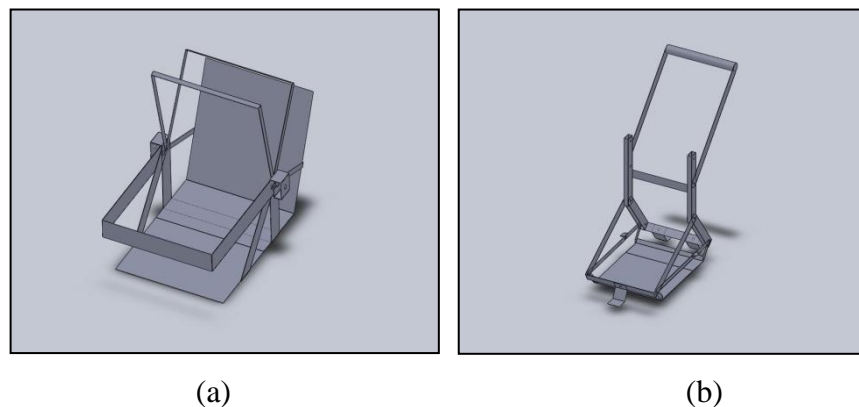


**Figure 4.6:** Solidwork Model

#### 4.6 PRODUCT HANDLING



**Figure 4.7:** Baby Stroller Model



**Figure 4.8:** Baby Stroller (a) Baby Seat, (b) Stroller

As a whole, the multifunction baby stroller can be use as a common baby stroller. It has a small compartment for storage of baby items under the basket. The handle bar can be adjusted to 2 set of fix angle for users to choose whether to push the baby stroller from front or backward.

When separated, the basket, which is the upper part of the baby stroller can be used as a baby car seat. Besides, the position of the baby can be change from seating to lying down. The other part, which is the stroller, could be use as a small trolley. It is suitable for handling small item such as baby pillow, bottles and diapers.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 INTRODUCTION**

The purpose of this chapter is to give conclusion and recommendation of this project. It will also include the objective of this project whether it is fulfilled or not and gives suggestion to improve the product.

#### **5.2 CONCLUSION**

This project has given more knowledge on mechanical skills such as machining and hand drilling process. This skill will be very useful in the future as to become a good engineer. The products also have shown improvement compare to the other baby stroller in the market. It solved many users' problems with the existed baby stroller as it has multifunction and improves some other products function. Also, the objective of this project, which is to design and fabricate multifunction baby stroller is achieved.

### **5.3 RECOMMENDATION**

There are a few recommendations to improve the Multifunction Baby Stroller for future use:

- i. Use better joining such as screws or hard plastic cover. This could make sure that the baby stroller will be stable and long-lasting.
- ii. Use lighter and stronger material so that users can carry it along wherever they go easily.
- iii. Design better locking mechanism so that it is more reliable and easier to be handled by users.

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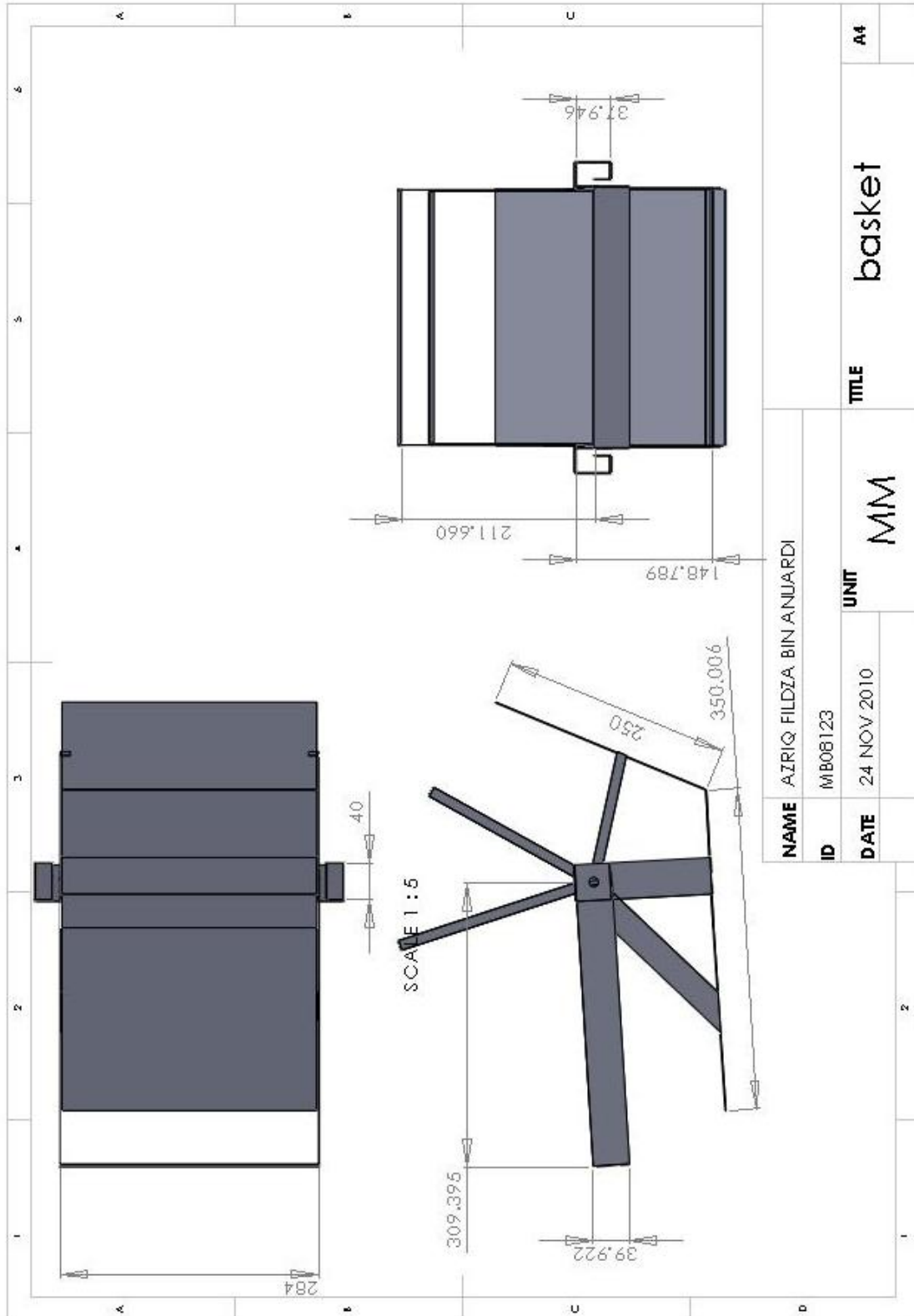




APPENDIX A2



APPENDIX A3



APPENDIX A4

