

CHAPTER 1

INTRODUCTION

1.1. Background

Since 2006, Universitas Atma Jaya Yogyakarta (UAJY), in collaboration with PT. Delcam Indonesia, started to run Delcam Total Solution in their curriculum by owning several licenses of Delcam CAD/CAM solution, i.e. PowerShape and CopyCAD for CAD, PowerMill and FeatureCAM for CAM and ArtCAM for Artistic CAD/CAM. This collaboration is now conducted by Production Process Laboratory in Faculty of Industrial Technology.

These CAD/CAM solutions enable UAJY to make several products with complex shape and contour. Starting on November 2009, UAJY began to introduce the CAD/CAM solution to make plastic chocolate molds. It is possible because a thermoforming machine is already available and this enables UAJY to make plastic chocolate molds in very competitive price.

CV Anugerah Mulia is a chocolate producer, located in Yogyakarta, which produces Chocolate Monggo brand, an international taste chocolate with Java characteristic. As a company which competes in souvenir business, CV Anugerah Mulia tries to develop some new designs for their chocolates. The chocolate taste is absolutely the most important thing which reflects the quality level of Chocolate Monggo. In contrary, the shape of the chocolate cannot be neglected. The shape is another unique part of chocolate as souvenir.

One of Java uniqueness which is tried to be introduced by CV Anugerah Mulia is Borobudur. Borobudur

is a wellknown and glorious Java inheritance and every foreign tourist knows it. The most attractive and representative part of Borobudur is its stuppa. This stuppa inspires CV Anugerah mulia to make chocolates with stuppa shape. CV Anugerah Mulia wants to make the biggest 3D Borobudur stuppa chocolate mold and consider its cost.

The problem can be easily approached by implementing rapid prototyping method. According to *Frank W. Liou (2008)*, rapid prototyping (RP) is defined as the physical modeling of a design using a special class of machine technology. It involves *adding* and *bonding* or *subtracting* materials to form objects. The advantages of RP include the fact that objects to a manageable, straightforward, and relatively fast process.

Using the existing CAD/CAM solutions from Delcam, UAJY tries to rapid prototype a Borobudur stuppa master mold which can be processed on Roland MDX-40 and on the thermoforming machine to create a chocolate mold. Hence, this thesis will present the rapid prototyping method to make the biggest 3D Borobudur stuppa chocolate mold, which is in accordance to CV Anugerah Mulia requirements, using the existing CAD/CAM solutions and machines in UAJY.

1.2. Problem Statement

Based on the background, the problem statement of this research is how to obtain the largest dimension of rapid-prototyped Borobudur stuppa chocolate mold which can be processed on Roland MDX-40 and is in accordance to CV Anugerah Mulia requirements.

1.3. Research Objective

The objectives of this research are:

1. Obtain the largest dimension of rapid-prototyped Borobudur stuppa master mold using Roland MDX-40.
2. Obtain the largest dimension of Borobudur stuppa chocolate mold which is in accordance to CV Anugerah Mulia requirements.
3. Obtain rapid prototyping cost for creating Borobudur Stuppa chocolate mold.

1.4. Scope of Research

1. The CAD and CAE phase is carried out on Delcam PowerShape 8.2.14, and the CAM phase is carried out on Delcam PowerMill 8.0.09 without comparing other software advantage.
2. The master mold is machined on Roland MDX-40.
3. The master mold material is Ebalta because its best quality of detail contour and it has been commonly used in some industries for prototyping purpose.
4. The plastic material is PVC rigid sheet because its ease of supply.
5. The method to produce chocolate will not be discussed in this research because this will be carried out by CV Anugerah Mulia.
6. Rapid Prototyping cost will be calculated based on design cost, mastering cost, and thermoforming cost standard, provided at Production Process Laboratory.

1.5. Research Methodology

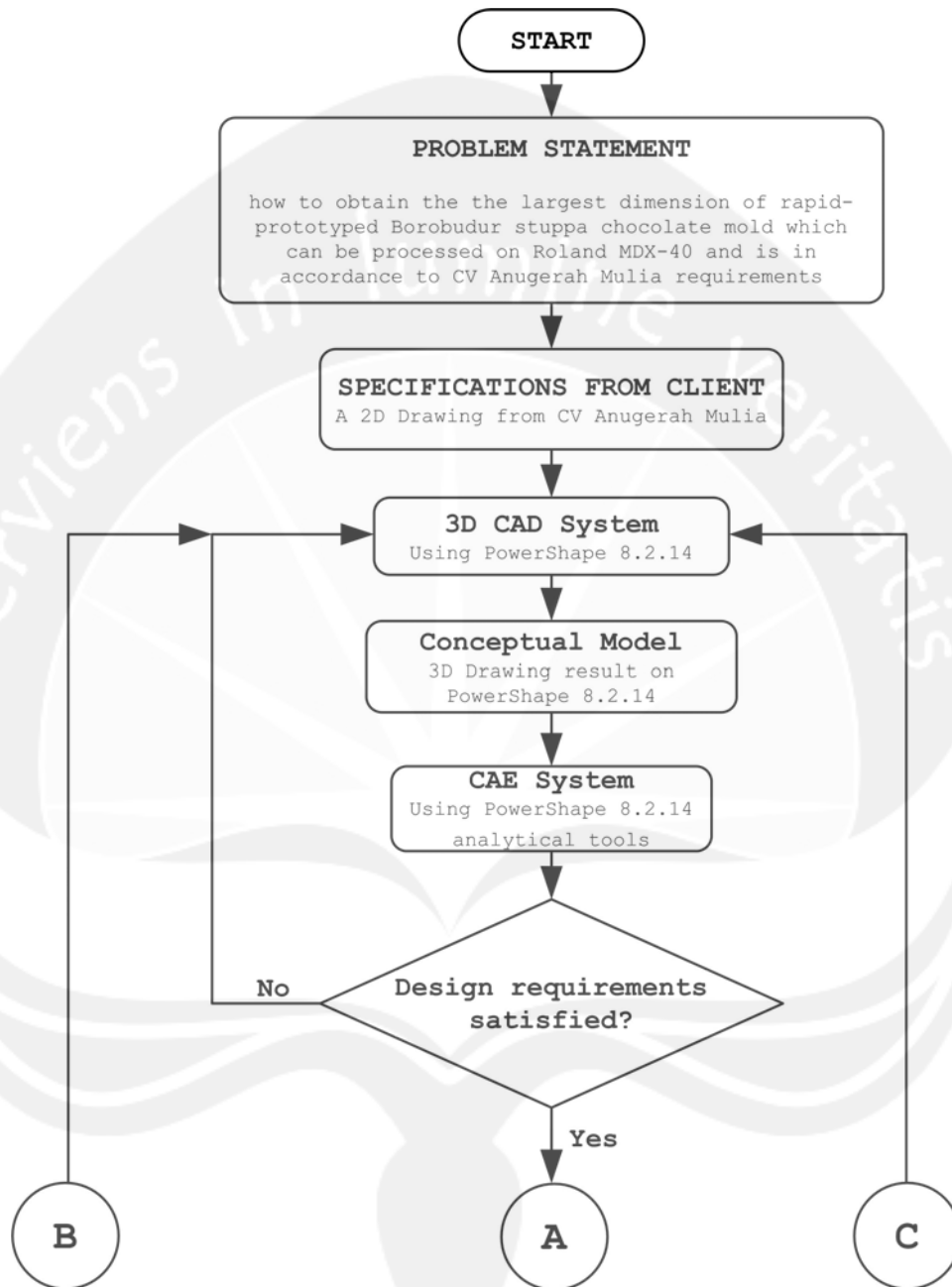


Figure 1.1 Research Methodology

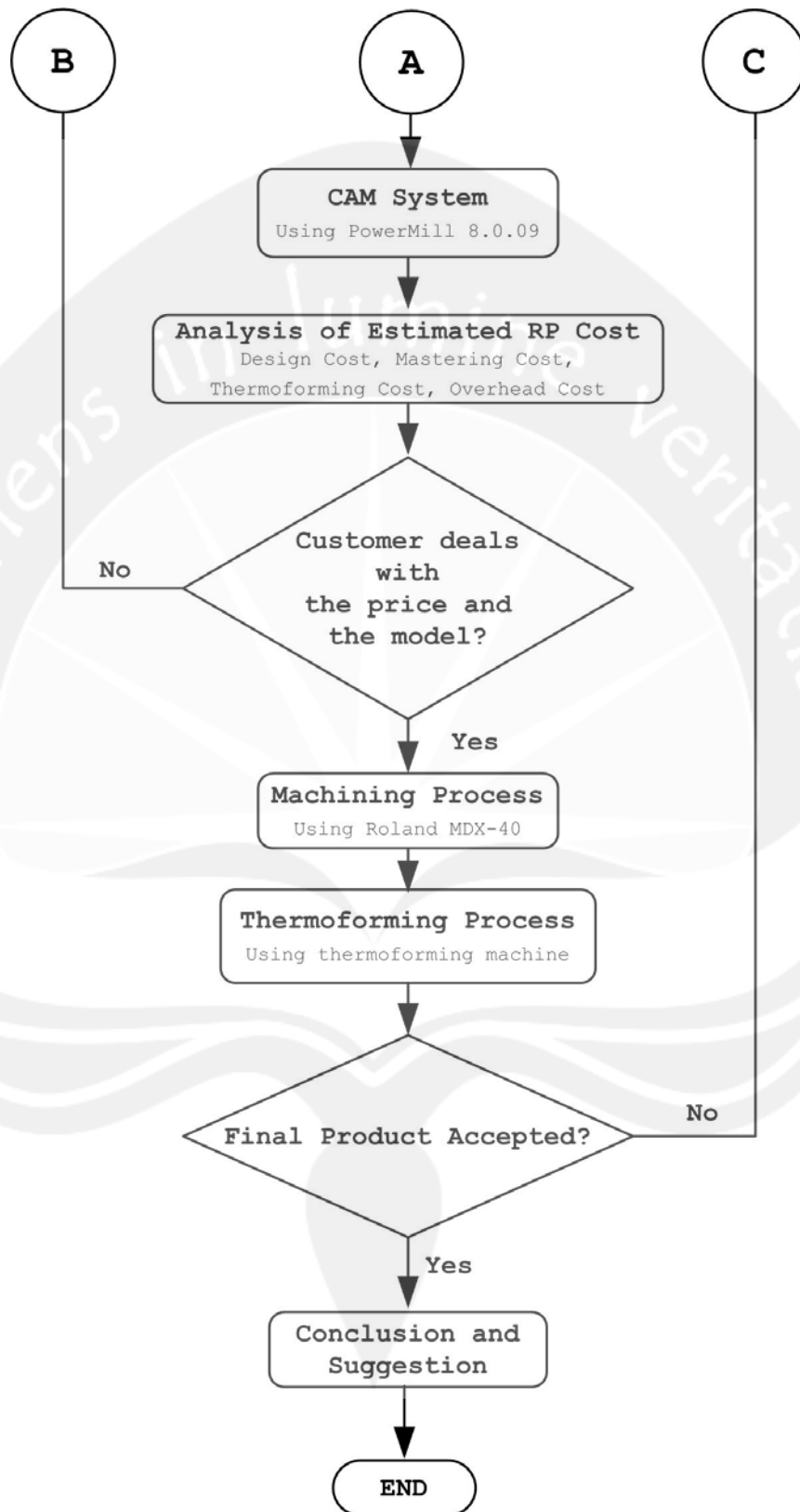


Figure 1.1 Research Methodology (Continued)

1.6. Report Outline

Chapter 1 : Introduction

This chapter consists of background, problem statement, objective, scope of research and research methodology.

Chapter 2 : Literature Review

This chapter consists of short review of later researches about prototyping and later analysis about this problem.

Chapter 3 : Basic Theory

This chapter consists of some basic theories related to the research.

Chapter 4 : Data and Company Profile

This chapter consists of observed data and collected data.

Chapter 5 : Analysis and Discussion

This chapter consists of the designing phase, the analysis phase, the CAM phase, the rapid prototyping cost and the review of the result.

Chapter 6 : Conclusion and Suggestion

This chapter consists of short review about the result of the research and suggestion to be carried out in the next research.