CHAPTER I
INTRODUCTION

This chapter explains about the introduction of research which consists of research background, problem formulation, problem restriction, objectives, and the writing system report.

1.1 Background

Micro business still become the main income for a part of people especially in rural area. Usually, people in rural area never improve their business because of low knowledge and financial. Besides, micro business in rural area is hereditary business which still use traditional tools. Therefore many problems are still founded. One of micro business which still survive in West Sumatera is business of *saka* in Nagari Bukik Batabuah, District Agam.

Nagari Bukik Batabuah is located in Sub District Canduang. As the largest sugarcane plantation area, the sugarcane farmers also give the added value to the sugarcane processing in order to increase their income by producing *saka* (kind of sugar). The *saka* production in Nagari Bukik Batabuah reaches 2.825,75 ton/year. Based on Agriculture Instructor of Sub District Canduang and Agriculture Department of District Agam, the quality of *saka* from Nagari Bukik Batabuah is the best quality in District Agam (Zikri, 2016).

Imrefli (Agriculture instructor of Sub District Canduang) stated that the area of sugarcane plantation in Nagari Bukik Batabuah reaches 1100 Ha with 752 farmers and 352 units of refining factories. Based on the explanation, the farmers have enough area of plantations but still difficult develop their business. The main problem faced by farmers is low efficiency because of some obstacles.

Saka is the hereditary business in Nagari Bukik Batabuah. According to policy of Financial Ministry No.40/KMK.06/2003 29 of January 2003, the small business is the individual or family business which income less than Rp 100.000.000 per year. Therefore, this business is classified into small business. All of the production processes are conducted by farmers. So, farmers in Nagari Bukik Batabuah are also called as **workers** or **operators**. The process of *saka* begins with sugarcane refining to get the sugarcane juice. The refining process is divided into two ways, refining by machine and refining by utilizing the animal power, usually buffalo. Then, the juice is heated on the big stove for three hours to make it cloggy. The cloggy juice pours into the molds made of coconut shell. After a few minutes, the cloggy juice becomes dry and solid which is called "*saka*". Finally, *saka* is stored in the container. Figure 1.1 shows the heating process of the juice to make *saka*.

Figure 1.1 The Juice Heating Process

Some researches related to the *saka* processing in Nagari Bukik Batabuah had been conducted, as follows:

1. The redesign of sugarcane refining machine by considering ergonomic aspects using QFD and KANO methods (Zikri, 2016).

2. The improvements of working environment using 10 physical ergonomic principles (Harahap, 2015).

The improvements conducted by previous researchers have not solved the whole problems of *saka* production process in Nagari Bukik Batabuah. Based on the observation and discussion with farmers on Mei 30th 2016, some problems are still founded especially in the molding work station. The problems are:

1. The size of *saka* is not uniform. The difference size of *saka* is caused by the traditional mold. The workers still use the coconut shell as the mold. The coconut shell is placed on the floor production. The rounded shape of coconut shell causes unbalancing position. When the juice is poured into the mold (unbalanced coconut shell), it causes un symmetry of *saka* sizes. Because of ununiform coconut shell size, it also influences to the ununiform size and shape of *saka*. Usually, the customer buy *saka* in mass unit. The *saka* sold in the market has no mass standardization. If the customers want to buy *saka*, the seller must cut *saka* to get the desired mass. Figure 1.2 shows the shape of the *saka* which is not neat and uniform.

Figure 1.2 Unconformity of *Saka* Sizes

2. The molding process is impractical because the coconut shells are separated and scattered, thus the workers have to pour the juice one by one into the mold which is resulted to the longer time process. Figure 1.3 shows the separated and scattered mold.

Figure 1.3 Separated and Scattered *Saka* Mold

3. The existing *saka* molding process is not efficient. The molding process spend much time because the operator needs two times of molding to produce a *saka*. First mold produces half part looked like plan concave lens. After the first part done, it is taken out of the mold and the operator pours again another cloggy juice into the mold. After a few minutes, the first part taken out before is fused with the other part by putting it on the mold. It purposes to make the shape looked like figure 1.2. Finally, the operator must wait until a whole them are perfect drying and take them out again. From the explanations, it can conclude that the molding process is not efficient because the operator molds two times just to make a *saka*. It affects to the long time process.
4. The working posture of operator in molding process is not ergonomic. Figure 1.4 shows the existing working posture of operator in molding workstation.

Figure 1.4 Working Position of Molding Operator

The molding operators work with not recommended working posture. The operators sit and reach *saka* poured into the mold by folding their foot. The *saka* molded separates on the floor and far from the operator arm's reach. The operator works about five hours a day. Based on the observation using Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA) related to the working posture of operator, the scores of RULA and REBA of the existing working posture are 6 and 8 **(Appendix A)**. Based on these scores, the working posture of operators are not recommended and have to change soon, because it can cause musculoskeletal disorder. Based on the interview with operators, they feel pain on their legs and back while working.

Based on the four main problems in the molding workstation, it needs to redesign the *saka* molding workstation in order to increase working efficiency.

1.2 Problem Formulation

The problem formulation of the research is how the design of *saka* molding workstation considering the ergonomic aspects in order to get uniform size of *saka* and to decrease musculoskeletal disorder risk of sugarcane farmers especially molding operators in Nagari Bukik Batabuah, District Agam.

1.3 Research Objectives

The objective of the research is to redesign the *saka* molding workstation in Nagari Bukik Batabuah, District Agam in order to get uniform size of *saka* and decrease the risk of musculoskeletal disorder of the operator.

1.4 Problem Restrictions

The problem restrictions of the research are:

1. The voices of customer are obtained from a group of farmer (20 persons) in Nagari Bukik Batabuah.
2. The QFD method is only used until phase II.
3. The anthropometric data are taken from general Indonesian people.

1.5 Writing System Report

The writing system of this report is divided into six chapters. The wholes chapters will be described as follows:

CHAPTER I INTRODUCTION

This chapter explains the background of research, problem formulation, research objectives, problem restrictions, and writing system report.

CHAPTER II LITERATURE REVIEW

This chapter explains about the theories related to problem of this research. The theories are taken from the books, journals, previous research, articles and statistic data.

CHAPTER III RESEARCH METHODOLOGY

This chapters explains the steps to solve the problem of the final project research. The steps are shown with the flowchart.

CHAPTER IV RESULTS

This chapter explains about data collection and data analysis. The data that have been collected is processed by following steps of flowchart.

CHAPTER V DICUSSIONS

This chapter explains analysis of data that have been processed in previous chapter.

CHAPTER VI CONCLUSIONS

This chapter consist of two sub chapters. Conclusions of the research and suggestions for the next research.