



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**IMPROVEMENT FOR KUIH KAPIT PRODUCTION
THROUGH WASTE ELIMINATION AND PROCESS
UPGRADING**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Mechanical Engineering Technology (Automotive) with Honours.

by

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This report is submitted to the Faculty of Mechanical and Manufacturing Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Mechanical Engineering Technology (Automotive) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Projek ini cuba meningkatkan pengeluaran di Perusahaan Bersaiz Kecil (SME) yang terletak di Kampung Parit Melana, Durian Tunggal, Melaka yang menghasilkan makanan tradisional, Kuih Kapit. Objektif kajian ini adalah mengkaji proses pengeluaran semasa dalam Perusahaan bersaiz kecil termasuk aliran kerja, kajian masa kitaran dan susun atur, mengenalpasti sisa pengeluaran di Perusahaan kecil dan sederhana dengan menggunakan pengeluaran yang tersedia dan mencadangkan penambahbaikan pengeluaran dalam Perusahaan kecil dan sederhana. Kaedah pengumpulan data yang digunakan untuk kajian ini adalah pemerhatian, video dan wawancara. Status pengeluaran semasa dan peluang untuk penambahbaikan telah dikenalpasti menggunakan Aliran Proses, Kajian Waktu Kitar dan Reka Bentuk Layar. Tiga strategi penambahbaikan telah dicadangkan dalam syarikat tersebut, yang merangkumi penambahbaikan susun atur, aliran proses yang standard dan dispenser automatik yang diubahsuai dengan jig keselamatan. Jumlah masa yang diambil untuk satu kitaran pengeluaran Kuih Kapit ialah 26.7 saat. Selepas penambahbaikan, jumlah masa adalah 15.8 saat. Oleh itu, pengurangan kitaran masa adalah 10.9 saat. Selain itu, pan yang diubahsuai dengan jig keselamatan dan dispenser automatik telah direka untuk menyediakan peningkatan pengeluaran. Produktiviti pengeluaran Kuih Kapit bertambah kerana perbezaan peratusan daripada pengeluaran sebelumnya dan peningkatan adalah 0.93%.

ABSTRACT

This project attempts to improve production in Small-Medium sized Enterprise (SME) located at Kampung Parit Melana, Durian Tunggal, Melaka which produce traditional foods, Kuih Kapit. The objectives of the study are to study current production process in Small-Medium sized Enterprise including process workflow, cycle time study and layout design, to identify production waste in Small-Medium sized Enterprise by using available production system and to propose production improvement in Small-Medium sized Enterprise. Data collection methods used for this study are observation, video and interview. The current production status and opportunities for improvements have been identified using Process Flow, Cycle Time Study and Layout Design. Three improvement strategies have been proposed in the case study company, which include layout improvement, standardized process flow and modified auto dispenser with safety jig pan. Total time taken for one cycle of Kuih Kapit production is 26.7 seconds. After improvement, the total time is 15.8 seconds. Therefore, the reduction of cycle time is 10.9 seconds. Other than that, modified pan with safety jig and auto dispenser have been designed in order to provide improvement of the production. The productivity of the Kuih Kapit production increases as the percentage difference of the previous and improved production is 0.93%.

DEDICATION

This Project Report is lovingly dedicated to my beloved family members, especially to my father, Idzham bin Yaacob and my mother, Norrita binti Norman who have been my constant source of inspiration. They have given me the drive and discipline to tackle any task with enthusiasm and determination. Without their love and support this project would not have been made possible.

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LIST OF ABBREVIATIONS

SME	:	Small-Medium sized Enterprise
GDP	:	Gross Domestic growth
TPS	:	Toyota Production System
LPS	:	Lean Production System
CI	:	Continuous Improvement

CHAPTER 1

INTRODUCTION

1.1 Background

Lately, Small-Medium sized Enterprise (SME) have played overwhelming part in manufacturing sector in Malaysia through years. Regardless of challenging environment in 2016, SMEs in Malaysia sustained at faster pace than overall economy. Nowadays, SMEs can be found whether in urban or rural area. Therefore, government given the chances and opportunities on the development of SMEs in relation to remarkable contribution of SMEs towards the development of the economy. In this connection, Malaysian government provide numerous programs and facilities to enhance their performance and competitiveness. Futhermore, the government established agencies such as SMECORP with objectives to provide guidance and production efficiency.

In the year 2016, SMEs has recorded a real Gross Domestic growth (GDP) of 5.2% which contributed 36.6% of whole country's GDP. Besides, Malaysia has 98.5% establishments on SMEs that lead to 36.6% share. The contribution increase by 4.4% from year 2010 to 2016. (SME Annual Report 2016/2017). Majority of the businesses were in services sector, mainly in wholesale & retail trade, followed by manufacturing, construction, agriculture and mining & quarrying. In addition, SMEs employment continued to growth of 2.1% with more than 140,00 of total Malaysian workforce. This shows that SMEs has a great positive impact on Malaysia's economy.

Nowadays, SMEs in Malaysia faced the most challenges issue is to consistently improve the quality and productivity on manufacturing process. This include lack of knowledge in new technologies and innovation. From big to small matter of production improvement have to embrace in order to catch up with the fast growing technology. Furthermore, SMEs should focus on improve the production by identify areas for improvement. To achieve solution for these problems, various lean production tools can be used in order to improve production such as 7 types of waste (MUDA), standardization of work process, design layout, cycle time study and 5S method. This project target to assist suggestion of suitable approaches on production improvement in a SME.

1.2 Statement of the Purpose

This project attempts to improve production of a Small-Medium sized Enterprise (SME) located at Kampung Parit Melana, Durian Tunggal, Melaka which produce traditional foods, Kuih Kapit. In Malaysia, SMEs are rapidly growing and SMEs are compete in market to sell their products. However, many of them are facing problems in the production that caused loss of money and time. Among the problems were identified including waiting time, long lead time and unnecessary motion during the production. So, the application of lean production techniques such as 7 waste method, standardization of work process, production work layout, cycle time analysis and 5S method and were used to improve the production system.

1.3 Objectives

The objectives of this project are :

- a) To study current production process in Small-Medium sized Enterprise including process workflow, cycle time study and layout design.
- b) To identify production waste in Small-Medium sized Enterprise by using available lean production system.
- c) To propose production improvement in Small-Medium sized Enterprise.

1.4 Scope

The scopes of this project are as follows :

- a) Design a layout of the work process, identify the flow of the process and build a time chart of every process in the making of Kuih Kapit.
- b) Identify production waste by using lean method including 7 types of waste, cycle time study and design work layout.
- c) Modify or redesign the current equipment such as auto-dispenser and pan jig.

1.5 Rational of Study

This project is to encourage the of improvement production system and method in the Kuih Kapit production company. Besides, this study target to identify the problems waste by using lean production approaches and implement in case study company. Lastly, to assist Kuih Kapit production company in production improvement and costs reduction.

1.6 Expected Result

The main outcome of this project involves suggestions and initial application of several lean production tools that can be used for production improvement in the case study company. Moreover, this project expect to be able design a modified pan with safety jig and an electronic auto dispenser of Kuih Kapit making to improve production in the case study company.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Many theories have been proposed to explain the improvement of production in Small-Medium sized Enterprise (SME's). Although, the literature covers a wide variety of such theories, this review will focus on six major themes which emerge repeatedly throughout the literature reviewed. The themes including are production engineering, production improvements in SMEs, lean production and Toyota Production System (TPS), layout design, process flow and cycle time analysis, continuous improvement and food industry in SME's. Although the literature presents these themes in a variety of contexts, this paper will primarily focus on their application to kuih kapit production in SME's.

2.2 Production Engineering

2.2.1 Overview of Production Engineering

First of all, production engineering is defined as a branch of engineering that associate with the design, control and continuous improvement of incorporated systems to serve customers with economical in terms of high-quality goods and services (Hill, 2003). Also, McGraw emphasis production engineering is related to obtain effectiveness and value through planning and control of the mechanical shape, condition and relationship of materials. Moreover, discipline of the production engineering includes studies, design, manages and encourage productive systems (Cardoso and Barradas, 2016).

2.2.2 Responsible as a Production Engineer

Certificate shows the ability of an engineer to a given set of standards relevant to features related to production engineering. Other than academic requirements, certification relates to the actual experience required of the production engineer. These includes :

- a) Process planning and choosing suitable procedure.
- b) Scheming appliances for fabrication
- c) Enquiry and create a new methods to improve previous operation.
- d) Conduct all production operations associated with facilities and production management systems.

2.2.3 The Future of Production Engineering

Rapid and massive changes will occur in the factory and in production in future years ahead according to study funded by Society of Manufacturing Engineers. These include:

- a) The endured expansion of utilized computer-oriented technological know-how to manufacturing.
- b) The automation of groups of operations in production, collectively with computerized assembly, automated inspection, and the software of adaptive controls and diagnostics, leading ultimately to computer-integrated factory.
- c) Group technology.
- d) Expanded use of lightweight substances in products.
- e) Development of energy-efficient production techniques and materials conservative product designs.

- f) Compliance with regulatory or legal necessities related to product safety, worker hazards, and production wastes, effluents and emissions.
- g) Job enrichment in the production industry.

2.3 Production improvement in Small-Medium Sized Enterprise (SMEs)

2.3.1 Overview of production improvement in SMEs

Recently, SMEs have received abundant of attention from academic literature in terms of strategic sustainable development. According to Nor Azian Abdul Rahman in her study emphasized that Kanban system works effectively in Malaysian SMEs to lesser costs and minimize inventory (Rahman, Sharif and Esa, 2013). Small enterprises have been analyze the critical factors of suitable improvement methods and it shown there are potential for the small enterprises to survive in the industry (Matt and Rauch, 2013). However, variables characteristics of production processes and requirements have been the main problems to implement the Lean Production System (LPS) to SMEs industry. For the moment, SMEs had trouble with the knowledge of developing the right LPS techniques themselves (Sieckmann *et al.*, 2018).

2.3.2 Impact of production improvements in SMEs

In recent years, competitiveness between SMEs have been increased due various factors that related with the application of lean production in SMEs (Zhou, 2016). Futhermore, lean development in SMEs environment provide the community with knowledge of practical lean plans to improve their own industry (Hu *et al.*, 2015). Besides, lean manufacturing are successfully implemented in the industry such as automotive industry. The success indicated that lean methods and practices provide stable organization's operations (Mamat *et al.*, 2015). Other than that, trends and the future scope of the performance has been discussed by intergrated review of researches and identified the possible growth development in the lean production system (Jasti and Kodali, 2015). The impact of this improvement had provide the businees practise the idea to establish 'lean and green thinking'. It called 'lean and green thinkin' through waste reducing, increasing material efficiency and cost reduction (Caldera, Desha and Dawes, 2018).

2.4 Lean Production and Toyota Production System (TPS)

2.4.1 Comparison between Lean and TPS

The terms Lean Production and TPS are often alternate from each other characteristics. However, Lean Producing generally are more focusing to reduce materials used, reduce investment required, minimize inventory and minimize working space. While Toyota Production System (TPS) is more concern of production systems with total elimination of waste and reducing costs (Wilson, 2009).