



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DESIGN AND ANALYSIS OF FACILITIES LAYOUT FOR
INCREASE PRODUCTION IN FOOD INDUSTRY**

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering (Manufacturing Management) (Hons.)

by

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This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Management) (Hons.). The member of the supervisory is as follow:

.....

(Dr. Seri Rahayu binti Kamat)

ABSTRAK

Industri kecil dan sederhana (IKS) merupakan syarikat kecil yang mengendalikan pengeluaran mengikut permintaan yang tidak menentu. Kesesuaian syarikat dari semasa ke semasa dalam mengikuti permintaan seperti ini boleh mengakibatkan kegagalan dalam pengeluaran syarikat. Melihat kepada situasi ini, projek ini ditubuhkan bertujuan bagi melaksanakan usaha untuk meningkatkan kemampuan produktiviti syarikat dalam memenuhi kehendak pelanggan yang tidak menentu. Oleh itu, syarikat yang bertuah dipilih untuk terlibat sama adalah Aneka Snek SDN BHD yang kini sedang beroperasi di Johor Bahru. Berdasarkan pemerhatian yang telah dilakukan, banyak masalah dilihat berpunca daripada keadaan susun atur syarikat terutamanya susun atur bahagian pengeluaran yang boleh mengakibatkan kos modal syarikat meningkat. Oleh yang demikian, objektif projek mula dikenalpasti dengan tujuan untuk menganalisa susun atur bahagian pengeluaran syarikat yang sedia ada dan peralatan pengendalian bahan yang digunakan. Setelah itu, cadangan akan dibuat terhadap susun atur dan peralatan pengendalian bahan yang boleh memajukan produktiviti syarikat sehingga 5%. Walaubagaimanapun, terdapat sesetengah produk syarikat dihasilkan apabila perlu dan tidak konsisten. Oleh itu, projek ini fokus kepada produk utama syarikat yang mempunyai tahap pengeluaran yang konsisten. Tambahan juga, produktiviti akan digunakan untuk menjangkakan pencapaian susun atur yang baru. Kaedah yang digunakan dalam projek ini ialah kaedah 'Graph Based' bagi mengkaji reka bentuk susun atur yang optimum. Pada masa yang sama, penggunaan kaedah lukisan 3D digunakan untuk memperlihatkan keberkesanan susun atur dengan menggunakan perisian CATIA V5. Keputusan yang dijangkakan bagi projek ini adalah akan ada terhasilnya susunatur fasiliti yang baik serta penggunaan peralatan pengendalian bahan yang bersesuaian supaya ianya dapat meningkatkan kesihatan dan keselamatan pekerja. Hasil daripada ini juga, dijangkakan syarikat dapat memperbaiki kemampuan pengeluaran dalam memenuhi permintaan pelanggan. Akhir kata, saya mencadangkan bahawa syarikat ini perlu mereka bentuk semula susun atur kilang dan menggunakan peralatan pengendalian bahan yang betul supaya mereka benar-benar boleh memaksimumkan keuntungan mereka melalui prestasi produktiviti yang konsisten.

ABSTRACT

A small medium industry (SME) is a small scale industry which operates their production according to unpredictable demands. The adaptability on changing demand from time after time makes the SME industry fails to achieve their optimum productivity. It could be better if there are any improvement efforts to support their production. Regarding to this needs, this project was created with the aim to improve the productivity in SME industry. The SME industry that has been chosen is Aneka Snek SDN BHD which located in Johor. According to my observation shows that, many problems was appears from the lack of improper layout condition in this company. In details, it has been captured that the current physical arrangement for production layout was poor and it may causing the higher capital cost for the company. Therefore, the aim for this project has been built so that this problem can be solved effectively. The objective for this project will cover on the finding the optimum facility layout, proper material handling equipment and its contribution to company productivity. It is cited that this project aim to analyse the recent facility layout/material handling equipment and to propose the optimum facility layout/material handling equipment that can improve company productivity up to 5%. However, there are limitations that need to consider before starts on implementing the project methodology. Since that there are unpredictable demands for certain product in Aneka Snek SDN BHD, this project will cover on main products for the company only. Moreover, this project focuses on redesign the production layout whereby productivity will facilitate as a counter measure to justify the expected achievement of the proposed layout. The method used to designing the layout is Graph Based method and the 3D drawing for this layout will be done using Plant Layout tools in CATIA V5. The element/data in Plant layout tools will be recorded using time study method and data are taken at a daily production. The expectation for this project is to helps the SME company to design a good facilities planning and by the same time to enhance the worker safety and healthy through the implementation of proper material handling equipment. It also expected that this company will able to follow their unpredictable demands as well as improving their productivity. In a nutshell, I would suggest that this company should redesign their plant layout and use the proper material handling equipment so that they can actually maximize their profits through a consistent productivity performance.

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CHAPTER 1

INTRODUCTION

This chapter describes the basic ideas and general background of the project. Moreover, it explains the purpose of this report and the constraints need to be taken during study undergoes. Generally, this chapter consists of five (5) main sections which are background, problem statement, objective, and the scope of project.

1.1 Background of Study

The facilities planning play an important role in industrial organization and has involved greatly in many different background of industry. This facility planning is an active area in field of research/paper for many type of industry such as manufacturing or service industry and the favourite issue to be addressed is about the facility layout problems (FLP). A review on manufacturing industry shows that facilities planning problem is one of the matter that have a significant effect upon manufacturing cost, processing lead time, and productivity. Moreover, it was stated that total operating expenditure in manufacturing industry are related to material handling cost up 20 to 50 percent of total expenses (S.P.Singh, 2005). The good

integration between facility layout and material handling design is the essential way to overcome this particular problem. This will require significant steps in making a good planning such set the FLP goals and use the suitable facility layout approaches for observed problem. Hence, in this report the work flow will starts with determining the objective and constraints of the FLP, a deals to the optimal facility arrangement using a proper approaches will be as a methodology and lastly proposing the better production layout that contribute with proper handling equipment as to improve the productivity.

1.2 Problem Statement

The countermeasure for a company to success in their business is not only just looking on the productivity that gives a high profitability but it need to consider on how the way productivity is been implemented. Is there is a waste of time and motion in the layout system during this productivity been carried out or maybe, is the recent layout best support the process to achieve an optimum productivity. This entire countermeasure can be best solved by implementing the strategic facilities planning. The importance of facility planning in improving the company productivity is greatly helps the company to impart in their competitive position in marketplace. It represents the relationship of material flow, information flow and its operating personnel to enhance the company output and profit. According my observation in the Aneka Snek SDN BHD, it is shows two factors/elements that should be highly improve which is facilities layout (production layout) and material handling equipment. Take on the example of production layout, the facility arrangement was poor and there were excessive flow between the work cells which result in waste of processing time. Furthermore, the inappropriate usage of material handling equipment to transfer load/material between departments will affect to the company productivity and the product quality.



Figure 1.1: The overloaded materials and inappropriate usage of material handling

1.3 Objective

The objective of the project is the essential part in report making as it controls the performance for the suggested layout. Therefore, the objectives for this project are set to:

1. Study the production layout and material handling equipment for selected SME industry.
2. Redesign the company layout as well as production layout by using the Layout Algorithmic Approaches (Graph Based Method) and propose the optimal facilities layout that increased the company production.
3. Identify the material handling used and proposing the suitable material handling equipment to improve productivity by performing the cost and benefit analysis.

1.4 Scope

The scope of this report is explaining the field of the research and project limitations towards the report result and recommendations. Therefore the scope for this project is as below:

1. The scope of this project/research is to evaluate facilities of company layout and material handling equipment in food industry.
2. Since that the time allocate to make a research is limited, it will only cover one (1) SME Company which named as Aneka Snek SDN BHD
3. Regarding to my past experience working in small industry, the product will not to be produce continuously and there is a certain product will be produce according to demand. Therefore, this project will only cover on the main product for the selected company. The reason is main product will being run every day, the demand is always available and it has a great positive impact on company profit.

1.5 Company Background

The selected SME Company for this project is Aneka Snek SDN BHD. Aneka Snek SDN BHD is one of the Bumiputra Company that was established in August 2006 and located in Kg. Ulu Pulai, Gelang Patah, Johor with land area of approximately 8880 square feet. The company has 15 workers which 11 of them will locate at production department and the remaining are located at administration department.

Apart from that, this company supply variety types of snacks food, cake and packaging foods. In terms of sales marketing, this company has a great demand and request around the suppliers from the Malaysia and Singapore such as Senai Airport, Johor and Mustafa Centre, Singapore. The objectives of the company itself are to be one of the local SME Company that expands their sale to international level and able to compete with others successful snacks company. In order to fulfil their objectives, this company has made a great cooperation with government and non-government

agency such as FAMA, MARDI, SIRIM and TEKUN Nasional by participate the entire exhibition conducted by these agencies.

Furthermore, this company has created a strategic organizational structure so that the company profit and sales could be sustained. The organizational of Aneka Snek SDN BHD are stated as below:

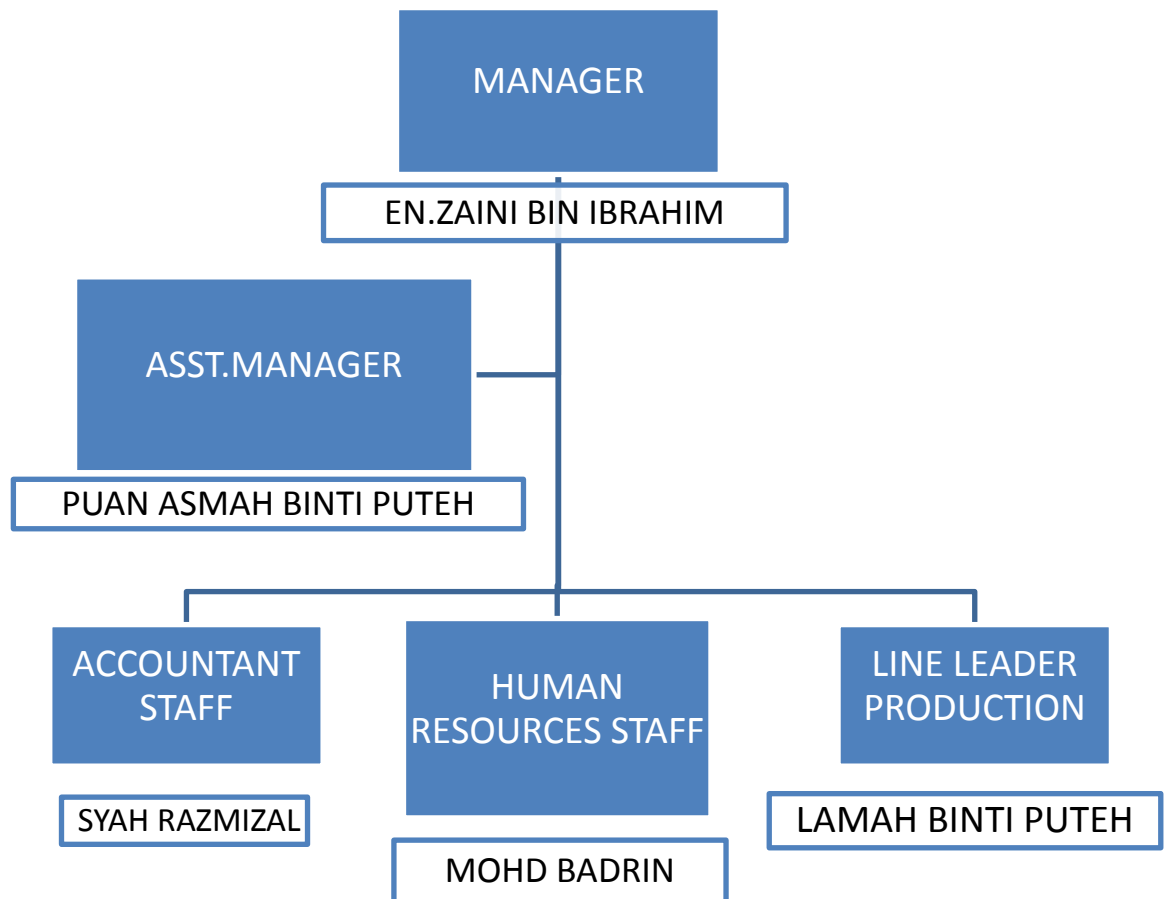


Figure 1.2: The organization chart of Aneka Snek SDN BHD

1.6 Project Gantt chart

This project Gantt chart is designed to ensure the project accomplishment due to the given time. The activities will set orderly followed by the week to finish each of the activities. By making this, it will work as a guidelines to the report progress and assist the project to be finished at the right time. Below are the project Gantt chart for PSM 1 and PSM2.

Table 1.1: Gantt chart for PSM 1

Week Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Determination of project title	Yellow														
Introduction		Yellow	Yellow												
Literature Review					Yellow	Yellow	Yellow	Yellow							
Methodology									Yellow	Yellow	Yellow				
Finalizing Report													Yellow		
Submission Report PSM 1														Yellow	
Presentation PSM 1															Yellow

Table 1.2: Gantt chart for PSM 2

Week Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Data Collection and Analysis															
Result															
Discussion															
Conclusion															
Finalizing Report															
Submission Report PSM 2															
Presentation PSM 2															

CHAPTER 2

LITERATURE REVIEW

This chapter describes the previous study on research regarding to the stated problems. This literature review highlights the relevant study to support the decision-making in project development. Furthermore, the content of literature review is aligned with the objectives of the project. For the purpose of my report, it will describe the literature study of facility layout problems, layout design principles and as well as material handling principles.

2.1 A basic in facilities planning

A facility planning is a field of study that relevant to the discipline of plant layout for a company. In other words, this facility planning may very useful in solving the issues of facility layout problem. Basically, it comprise many of stages such deciding the best facilities location, creating a good facilities design and as well as providing the best facility layout for expected company. The goals are to improve the company productivity and eliminating all waste elements that appears in the

recent/new plant layout. In that case, this section will discuss more about the facilities location, facilities design and facilities layout so that a clear understanding about this basis knowledge could be achieved.

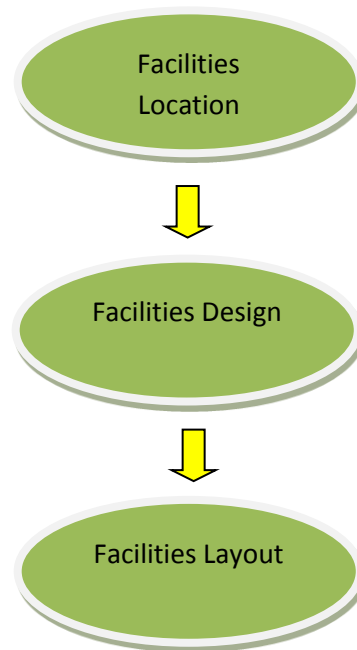


Figure 2.1: A flow chart for the basic knowledge in facilities planning

2.1.1 Facilities Location

The *facilities location* means the location of the facility refers to its placement with respect to customer, suppliers, and other facilities with which it interfaces. The location decision should be implemented carefully to avoid from selecting a poor location which may cause a constant source of higher cost, higher investment and frequent interruptions of production. Therefore, the facilities location should be made based on a careful consideration of all factors that are essentially gives the value-added in efficient running the company productivity.