A STUDY ON INVENTORY MANAGEMENT AT A MANUFACTURING COMPANY

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project report and in my opinion this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Industrial Technology Management with Hons.

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

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Special dedication of this grateful feeling to my lovely parents and family; Othman bin Mohd, Norizam binti Embong, my brothers and sisters for being supportive during my degree's study. This dedication goes to my entire lecturer that has giving me a sincere taught and teaches me with no prejudices and did not giving up to give the best for me. Lastly this dedication goes to all my friends either from same faculty or not for their love, support and best wishes.

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ABSTRACT

A good inventory management will always give a competitive edge to the business environment, regardless of its nature. Inventory management also plays a very important role on improving the warehouse operation. Thus, with the effective and good inventory management, the operation in the warehouse can be improved and the operating cost can also be significantly reduced. This research will look into the issues arise as a result of poor inventory management. In this research, kanban system will be proposed to a manufacturing company. Primary and secondary data of raw materials were used to analyze the data collected. The weights of the raw materials were calculated to forecast the usage for a month. The kanban card will be applied to schedule the flow of operation. The production people must follow the kanban schedule and prepare to order raw materials if the stocks of raw materials reduces. First-in First-out (FIFO) also should be implemented to make sure the product movement becomes more smooth and efficient than before. From the result of this study, we will know whether the suggestion that had been proposed by the researcher to improve the inventory management system in the warehouse success or not. Therefore, the author hopes this research will help the manufacturing company to have effective inventory management.

ABSTRAK

Sebuah pengurusan inventori yang baik akan selalu memberikan daya saing kepada persekitaran perniagaan, tanpa mengira sifatnya. Pengurusan inventori juga memainkan peranan yang penting untuk meningkatkan operasi gudang. Oleh itu, dengan pengurusan inventori yang berkesan dan baik, operasi di dalam stor penyimpanan boleh ditingkatkan dan kos operasi juga boleh dikurangkan dengan ketara. Penyelidikan tersebut melihat kepada isu-isu yang menyumbang kepada pengurusan inventori yang lemah. Dalam kajian ini, sistem kanban akan dicadangkan kepada syarikat pembuatan. Data primer dan sekunder bahan-bahan mentah yang digunakan untuk menganalisis data yang dikumpulkan. Berat bahan mentah telah dikira untuk meramalkan penggunaan selama sebulan. Kad kanban akan digunakan untuk menjadualkan aliran operasi. Orang produksi harus mengikuti jadual kanban dan mempersiapkan diri untuk memesan bahan mentah jika stok bahan mentah hampir digunakan. FIFO juga perlu dilaksanakan untuk memastikan pergerakan produk menjadi lebih lancar dan cekap daripada sebelumnya. Dari hasil kajian ini, kita akan tahu apakah cadangan yang telah dicadangkan oleh penyelidik untuk meningkatkan sistem pengurusan inventori dalam kejayaan gudang atau tidak. Oleh itu, berharap kajian ini akan membantu syarikat pembuatan mempunyai pengurusan inventori yang berkesan.

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FIFO	First-in,First-out
JIT	Just-in-Time
PPA	Push–Pull Approach
WIP	Work-in-Process
PIK	Production Instruction Kanban
PWK	Production Withdrawal Kanban
WS	Workstation
FGS	Finish Goods Stock
DFG	Department Finish Goods
DMV	Department Machine Volpack
SB	Stock Bundle
DMG	Department Machine Grinding
SRB	Store Rempah Siap

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The word 'inventory' can be defined in many ways. According Ballou (2004), one of the definitions is "inventories are supply of raw materials, suppliers, work-in-process, components, and finished goods that appear at numerous points throughout a firm's production and logistics process". Whereas, inventory management is primarily about specifying the quantity and placement of stocked goods. The planning and controlling of these inventories are also known as inventory management. There are many definitions of inventory management. First, inventory management is "the practice of planning, directing and controlling inventory so that it contributes to the business' profitability".

Without a good inventory management, the company can never achieve a low-cost strategy according to Heizer and Render, (2005). These authors quoted inventory are classified into four categories which are raw material inventory, work-in- processes inventory, finished goods, and maintenance, repair, and operating inventory (MRO). Managing these inventories become complicated since it involved storage and holding costs, and space in manufacturing plant. Inventory management is a complex problem area owing to diversify of real life situations (Kobbacy and Liang 1999).

A good inventory management can help business to optimize their profit by lowering the cost of goods sold or by increasing the sales. It is an important concern for all types of businesses as effective inventory is essential for realizing the full potential of a supply chain.

Inventory management is also essential in a warehouse. This is because inventory and the warehouse are related to each other. But they are not same. Inventory management requires constant and careful evaluation of external and internal factors and control through planning and review.

1.2   PROBLEM BACKGROUND

There are many factors that determine a successful company. One of the factors which is having a reliable inventory management system. Inventory management system consists of many processes starting from record-keeping until receiving of products. Inventory management that is properly maintained can keep a company's operation running smoothly and efficiently. In addition, inventory management problems can affect company's profits and customer service. They can cost a business more money besides lead to an excess of inventory overstock that is difficult to move. A poor inventory management process can contribute many problems. But some of common problems come from inventory systems.

Many companies hire employees that are unqualified to be in charge of their inventory. These employees lack of experience, neglectful in their job or do not have adequate training. They should know and pay closer attention in overseeing their inventory management system. To avoid this problems arise, managers should provide proper training to their employees. There are many challenges to run the business well. It can slow down the operation process if the products do not enough in stock and this problem can lead to decreasing profit due to lost sales and higher inventory costs because the items must be re-ordered. Other than that, the company and employees wasting their time to track down those misplaced item.

On the other hand, excessive inventory in stock and unable to move it quickly enough is the most common problem for most businesses. The company can ends up losing money for buying amount of product for their inventory and they do not move it.

1.2   PROBLEM STATEMENT

Every enterprise needs inventory to ensure smooth running of its activities. From the researcher observation in a manufacturing company, the researcher got the company faced with poor inventory management in their warehouse. Effective warehousing and order fulfillment is vital for the whole process to run smoothly, but the company cannot manage their inventory management properly. If the warehouse inventory management is not managed properly, it can cause large financial losses to the organization itself.

There are also operation and production system problem faced by a company. The company did not implement the First-in, First-out (FIFO) method effectively resulting with inefficient product movement. One of the reasons for this condition is because the person in charge for FIFO inventory method is not understands of his duty to record the inventory data. FIFO is very important to implement especially for food industries because it involves the observation of product life- time by the employees. FIFO also shows the flow of the production process. Furthermore, the some of the employee were not trained to update the inventory system accurately.

Based on the researcher interview with the manager of the manufacturing company, miscommunication between production workers and warehouse was found to be the critical cause to the problem. As a result, the supervisor in charge of inventory management faced the problems to forecast and order the raw materials effectively. The storekeeper did not check properly the stock level kept in the store. They did not have a proper monitoring method to monitoring the stock level in the store. As a result, this problem causes waiting a long waiting time for

shipment and re-order of the raw materials. It can lead to bad customer relations because the company could not cater the customer demand due to not having enough stock on-hand.

1.4 RESEARCH OBJECTIVE

The objectives of the research are:

1. To identify issues of poor inventory management arise in a manufacturing company.
2. To propose kanban system to manufacturing company.

1.5 RESEARCH QUESTION

The questions arise from this research are:

1. What are the issues that contribute to poor inventory management?
2. What kind of system that can be used to improve the inventory management operation?

1.6 SCOPE OF STUDY

The scope of the study will focused on inventory management issues that arise at a manufacturing company that is located in Kuantan, Pahang. The researcher will focus on the inventory management especially about inventory data that was obtained from the company inventory system. From the researcher observation, based on site visit, the company faced many problems related to poor inventory system. Thus, the researcher wants to propose the most suitable inventory management system to this company.

1.7   SIGNIFICANCE OF STUDY

This study has a very significant impact to the inventory management in this company. From this study, the company can have an overview on solving their inventory management issues. This study will also propose an efficient inventory management system that can reduce the internal problems and to avoid excessive or not enough stock of raw materials. Thus, by improving the inventory management system, the company can optimize their profit and minimize the operating cost. With a good inventory management system, the company can improve their service to the customer and provide better employee working condition.

1.8   OPERATIONAL DEFINITION

1. **Inventory**

   Inventories are supply of raw materials, suppliers, work-in- process, components and finished goods that appear at numerous points throughout a firm's production and logistics channel (Ballou 2004).

2. **Inventory management**

   Inventory management is one of the important key activities of business logistics because of its role in business organizations; inventory is one of the most important instruments of logistics planning and controls (Schonsleben 2000).

3. **Warehouse**

   Warehouse is a planned space for the storage and handling of goods and materials. In general, warehouses are focal points for product and information flow between sources of supply and beneficiaries. However, in humanitarian, supply chains, warehouses vary greatly in terms of their roles and characteristics (Fritz Institute)

4. **Storage layout**

The practical approach to storage systems design problem mainly considers the criteria of where stock items are to be located and how they should be arranged in the distribution center (Wilson 1977).

5. **First-in, First-out (FIFO) Method**

FIFO is the abbreviated name for First- in First- Out. An inventory management method in which the oldest product is processed first and thus is the first to come out of the system. In FIFO, the production processes follow the same schedule and work in the same sequence.

6. **Kanban System**

Kanban system is a specific type of control system. This system is based on a category of colored cards. Cards appear as the emptied materials that monitoring the production and delivery of shortage develops.

7. **Raw material inventory**

The materials that are purchased from suppliers but have yet to enter the manufacturing process.

8. **Work in process (WIP)**

Products or components that are no longer raw materials but have yet to become finished goods.

9. **Finished goods inventory**

An end item is ready to be sold or promote, but still an asset on the company.

10. **Maintenance / repair / operating supply (MRO) inventory**

MRO's are inventories devoted to maintenance / repair / operating supplies necessary to keep machinery and processes productive.

1.9   EXPECTED RESULT

Through this research, this will help this company to have better inventory management and efficient warehouse. This study will also be beneficial to the organization since the company will obtain the information and the outcome about the issues that arise in the warehouse that contribute to poor management. With the result, the company can decide whether to implement the idea that had been proposed by the researcher or to continue with their current inventory management according to their operational efficiency.

Furthermore, at the end of the study, the implication with use of the card system in the warehouse will help the management team to improve their inventory management to become more systematic, to smoothen the movement of materials and to ease the handling of the goods that can be store in the warehouse. In directly, when the operational efficiency had been increase, the profit that the organization or company can gain also will be increase. The propose idea by the researcher would give either positive or negative result to the current inventory management in the warehouse, so the expectation of the study is the propose action or idea by the author would give positive impact to the organization and minimize the negative issues that arise in the warehouse and improve the inventory management.

In addition, the methods used in this study were through interviewing, questioning, and observation, listening and collecting historical data that occurred in the warehouse. The researcher will use the historical data to propose the inventory management system. By using this inventory management system, it can reduce inventory problems and will be more clear and easy to understand to the reader.

CHAPTER 2

LITERATURE REVIEW

2.1   INTRODUCTION

A literature review is a text written by someone to consider the critical points of current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Besides that, literature review is secondary sources and do not report any new or original experimental work. It can be interpreted as a review of an abstract accomplishment. This chapter will discuss on the literature review that is related to the inventory management in the warehouse. It enables the researcher to show on inventory management which helps to ease the understanding on the title.

2.2   INVENTORY MANAGEMENT

Decision problem comes from management problem. All organizations have to take initiative because decision is an important task. Because of the allocation of resource is a common issue to all organizations, the organizations should to acquire, control and allocate the factors of production which are essential for the achievement of the business's goals. In addition, inventory management as one of the key activities of business logistics that contribute more to the company's survival and growth.

"Inventory management specifies to all the activities involved in managing the inventory levels of raw materials, semi-finished materials (work-in-process) and finished goods according to Kotler (2000), so that adequate supplies are available and the costs of over or under stocks is not too high. Rosenblatt (1977) stated that "the cost of maintaining inventory is involved in the final price paid by the customer. A cost to their owner depends on goods in inventory. The manufacturer has the expense of materials and labor.

The inventory management acts to keep the most economical amount of one kind of asset in order to facilitate an increase in the total value of all assets in the organization that stated by Morris (1995). Other than that, Keth et all. (1994) also stressed that the major objective of inventory management and control is to notify managers what the applicable safety stock is for minimizing stockouts.

Drury (1996) defined inventory as a stock of goods that is maintained by a business in anticipation of some future demand. This definition was also verified by Schroeder (2000) who stressed that inventory management has an impact on all business functions that is particularly in marketing, accounting operations and finance.

According to Wild (2002:4), organizes the availability of items to the customers is the activity of inventory control. It provides the manufacturing, purchasing and distribution functions to meet the marketing needs. The existence of too large inventory leads to increased costs and reduced cash flow and contributes to decreased sales. The mentioned aspects show the importance of accurate inventory management in enabling the company's competiveness Felea (2008).

2.3 INVENTORY MANAGEMENT SYSTEM

Inventory management system is generally considered as complex issue. On other hand, inventory management system acts as a multi-dimensional nature and involves complex decision-making processes with different items.

The companies are often confronted with a necessary to reassess inventory systems to balance different aspects and elements of inventory management systems. Inventory systems can be achieved through the approach advocated below aims at defining an Inventory Management Concept.

An Inventory Management Concept can be defined as a blueprint of the inventory management systems that includes the physical infrastructure, and the planning and control. Physical infrastructure relates to the way organizations produce goods and to the way goods and materials are distributed from supplier to the manufacturer and from manufacturer to the customers. Clearly, the production system depends on the need for inventories. Besides that, planning and control structure is a second significant area that is related to the inventory planning and control structure.

2.3.1 Introduction to Kanban System

According to Surendra et al (1999), when translated from kanban it means "visible record" or "visible part" Generally, it refers to a signal of cards in manufacturing. The Kanban system is depends on a customer of a part pulling the part from the supplier of that part. The customer of the part can be an actual consumer of a finished product or the production personnel at the succeeding station in a manufacturing facility. Correspondingly, the supplier could be the person at the preceding station in a manufacturing facility

The basic role of Kanban is that material will not be produced or moved until a customer sends the signal to do so Surendra et all (1999). Nowadays most organizations developed various techniques and methods to make their production operations productive and effective. Most Japanese companies implement the Kanban system because it can save the costs by eliminating over production, developing flexible work stations, reducing waste and scrap, minimizing the waiting times and logistics costs; thus reducing the inventory stock levels and overhead costs Surendra et all (1999).

Based on the literature, there were important keys in setting up the Kanban system. The factors should be considered such as inventory management, vendor and supplier participation, quality improvement, quality control and employee, and top management commitment in order to improve the implementation of Kanban system a success (Kumar, 2010).

2.3.2 Kanban Technique

Kanban is the technique that makes the Just-in-Time (JIT) principles practical Kanban means a signboard or billboard. (Kan = visual, Ban = card). Kanban is a signal to replace what has been used. If the authorization is present, one can act. Kanban is a way of controlling inventory. Nowadays, kanban is the special manufacturing system proposed by Toyota. A kanban can be representing in a card or just marked space. In addition, its purpose is to further flow smoothly. It is one of the ways to reduce overproduction or shortage. Many types of kanban can be used and the system is very flexible and easy to understand.

2.3.3 Types of Kanban System

Push–Pull Approach (PPA) acts as an effort to develop a general approach to adapt the use of the kanban system for a variety of production systems. Huang and Kusiak (1998), who proposed and tried improving the kanban system based on the differences between the same approach productive systems and two different production approaches which are pushed and pulled. The PPA has decentralized control, limited work-in-process (WIP), and uses two communication signals. The PPA has proved effective in complex production systems and processing time variability. A Kanban system includes two types which are the single card kanban system and two cards kanban system. Single card kanban system uses only one type of kanban card which is Production Instruction Kanban (PIK) to generate upstream production when it is needed. Whereas, the two card kanban system uses two types of card which are Production Withdrawal Kanban (PWK) and Production Instruction Kanban (PIK).

The kanban system is a powerful tool for reducing the waste during production because it is direct communications to produce material. It is the pull signal to produce. The kanban informs us exactly what the customer is using, and hence what the customer will need later when the product is withdrawn. This kanban move as fast as possible to the production line. In addition, the kanban system is acting as "talking" to the production system, informing it to produce because some product has been removed. The kanban system is dealing real time with the realities of what is happening on the line. Since each kanban represents a certain amount of stock, the number of kanban is controlled and this creates an upper limit on the inventory.

2.3.4 Push and Pull System

There are two types of production system, which are Push and Pull System. The conventional system of production is called Push System. It means this system is pushed to the next workstation where it requires processing or storing. It will be pushed when a job completes its process in a workstation In this system, job card is transferred systematically according to its sequence. In this method, the job happens to deviate from its schedule and it causes accumulation of work-in-process inventory due to unpredictable changes in demand. Consequently, inventory planners should fix the safety stock level on the higher side. By providing an average or balance level of total production for a cycle of kanban is the first step in preparation of Just-in-Time (JIT). The average number is the basis to determine the number of machines required, number of products for a cycle or the amount of raw materials required and labor required for the manufacturing processes that meet the needs of customers' orders. This is because when the production is complex and unstable, the setting of same level or average production per month is not easy.

A schematic representation of the Push System is shown in Figure 2.1. In the Pull System, from the current workstation (j), each job is withdrawn by its succeeding workstation (j+1). A sequence of workstations is a pull type production system consists involving value addition in each workstation (WS). On other hand, the job is pulled by the successive workstation in preference of being pushed by its

preceding workstation. The flow of product line is controlled by Kanban Cards. The general advantage of the Pull System is to reduce inventory and the associated cost of inventory reduction. The Figure 2.2 shows that a schematic view of the Pull System with two workstations and store.

Figure 2.1: Push System
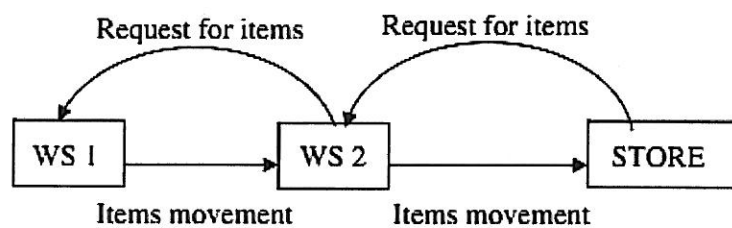
Figure 2.2: Pull System

2.4   INVENTORY

Inventory is a stock of goods that is maintained by a business in anticipation of some future demand according to Drury (1996) definition.

2.4.1   Types of Inventory

There are some types of inventories that have in an organization. Inventories consist of raw material, work-in-process, finished goods and maintenance / repair / operating supply (MRO) inventory which are held by a business in ordinary course of business for the purpose of using them in the process of producing goods and services.

1. Raw material

Raw material is a basic constituent of a product. The company should have manufacture goods from raw material.

2. Work-In-Process

Work-in-process inventory is partly complete and in the middle of production stage.

3. Finished Goods

Finished goods are ready for sale inventory which comes into existence after the production process in complete.

4. Maintenance / repair / operating supply (MRO) inventory

MRO's are inventories devoted to maintenance / repair / operating supplies necessary to make sure the machinery and processes productive. They exist because the need and time timing for maintenance and repair of some equipment are known.

2.4.2 Inventory costs

According to Gourdin (2001: 62-63), there are three types of costs that must be considered in setting inventory levels.

i. **Holding (or carrying) costs** are such handling, insurance, taxes, handling, obsolescence, theft and interest on funds financing the goods. These charges increases as inventory level increases. Management should make frequent orders of small quantities in order to minimize carrying cost.

ii. **Ordering cost** is cost that is related with placing in by placing a small number of orders, it can lower the cost.

iii. **Stock-out cost** involves revenue that is lost which are both short and long term. These charges are possibly the most difficult to compute, but the most important because they represent the costs incurred by customers which are

external and internal when inventory policies falter. If unable to understand these costs, it can lead management to maintain higher inventory levels than customer requirements.

2.4.3 Importance of Inventory

Stock or another word, inventory plays in important role in the growth of an organization to an effective and efficient management. Besides that, "inventory is an asset on the balance sheet of companies has taken an increased significance because of the strategy of many firms to decrease their investment in fixed assets, which is plants, warehouse, equipment and machinery, and so on according to Coyle, et all (2003:188). In addition, emphasizing on the importance of inventory on the balance sheet of companies.

Inventory management is also an important concern for managers in all types of businesses. According to Krajewski et all (1999: 544), the challenge is not to pare inventories to the bone to reduce costs or to have plenty around to satisfy all demands, but to have the right amount to achieve the competitive priorities for business most efficiently.

CHAPTER 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

Research methodology is the process used to collect data information for the purpose of making decisions. This chapter represents qualitative research. Qualitative is methods which generate words, rather than numbers, as data for analysis. Method such as data collection technique can be used in conducting research methodology. This chapter consists of information about workers, data collection technique and data analysis.

3.2   INFORMATION OF WORKERS

This research will focus on inventory management in a manufacturing company in Kuantan, Pahang. Since this research is about the inventory management in the private warehouse, workers that involves in this research are the people who are responsible on managing inventory in the warehouse. Mostly they are practical students who know more about the inventory problems in the company. A proper observation in the warehouse will help the researcher identifies the problems that arise in the private warehouse and the researcher will determine the best inventory system to approach to the company and improve their inventory system. Besides that, the researcher also

can identify the issues that arise in the warehouse and try to solve it through the workers.

3.3   DATA COLLECTION TECHNIQUE

For data collection technique, one manufacturing company has been chosen to interview and their warehouse has been selected to ask questions about the inventory management in the warehouse. The company background and the target of the study in the company have been identified. The factors that influence the problems that arise in inventory management can be determined through analyze the inventory data that they save in their inventory database system. In this study, the data were collected in two major sources which is primary and secondary data collection.

In this study, the primary for data collection is done by obtaining relevant data from management inventory system and interview. Researcher chooses this method because it can provide the unique opportunity to uncover rich and complex information. Method used for this study is the pattern of interview, listening, questioning, and observation.

Besides that, secondary data also referring to the theoretical background information was gathered through review of related literature on inventory management. Therefore, secondary data were obtained from various sources such as journals, books, internet, reports or conferences, statistical abstracts, database and other sources. Usually researcher uses a secondary data in the literature review to support the statement and give better understanding on the research.

3.3.1   Interviewing

An interview is a conversation between two or more people where questions are asked by the interviewer to elicit facts or statements from interviewee. Interviewing is a philosophy of learning.

For this research, a site visit to the company is necessary to do the interview with manager and asking a question about the problems that arise in inventory management. The type of problems that affect the inventory management and the factors that may cause the poor inventory management also can be determined through the interview with the manager. It is very important because by interviewing, the researcher can know about the background of the company, the problems arise regarding the inventory management system. Besides that, the researcher can make a conclusion and can propose the best system to the manager to reduce the problems of inventory management.

3.3.2   Listening

In the research, the researcher needs to listen and evaluate whether the answer is on the right track or not and is as detailed and complete as expected. Second level is the researcher listens for what is not clearly been delivered but is being contradicted by non-verbal messages. The researcher has different roles and the answer was provided by the manager. The information given is important to the manager so the manager must listen very carefully.

3.3.3   Questioning

While an interviewer generally enters each interview with a predetermined, standardized set of questions, it is important that they also ask follow-up questions throughout the process. Additionally, it is important that an

interviewer ask clarifying questions when they are confused. So that, the researcher will prepare the questions about the inventory management to ask the manager of the company to get clearer answers from them.

3.3.4 Observation

Observational techniques are methods by which an individual or individuals gather firsthand data on programs, processes, or behaviors being studied. . Employee can be observed in their natural work environment and their activities and behaviors or other points of interest recorded. The researcher can play one of two roles while collecting observational data that are nonparticipant observer or participant observer. The researcher will stay in the warehouse and observe the inventory management inside the private warehouse.

Besides that, the researcher also will observe the problems occur in the company. So that, the researcher can approach a good inventory management and at the same time improve the warehouse. Other than that, the researcher will snap many photos as proven that the company had many problems about inventory management.

3.4   PROCESS FLOW FOR RESEARCH METHODOLOGY

Identify Problems
- Observation on a particular area to gain some informations about this research.
- Discussion with industry personnel to identify problems that happened at the inventory management area.

Interview Session
- Person who is responsible in managing the inventory.
- Discuss about the inventory management system used in the application area.
- Data or information about the inventory management.

Collection of Data
- Historical data are collected.
- Select the recent data for analyzing

Analayze Data
- Identify the issues of poor management through interviewing, observation, listening, and questioning.

Suggestion and Recommendation
- Find the best and suitable solution to reduce inventory problems.
- Propose kanban system as a signal to prevent overproduction or shortage.
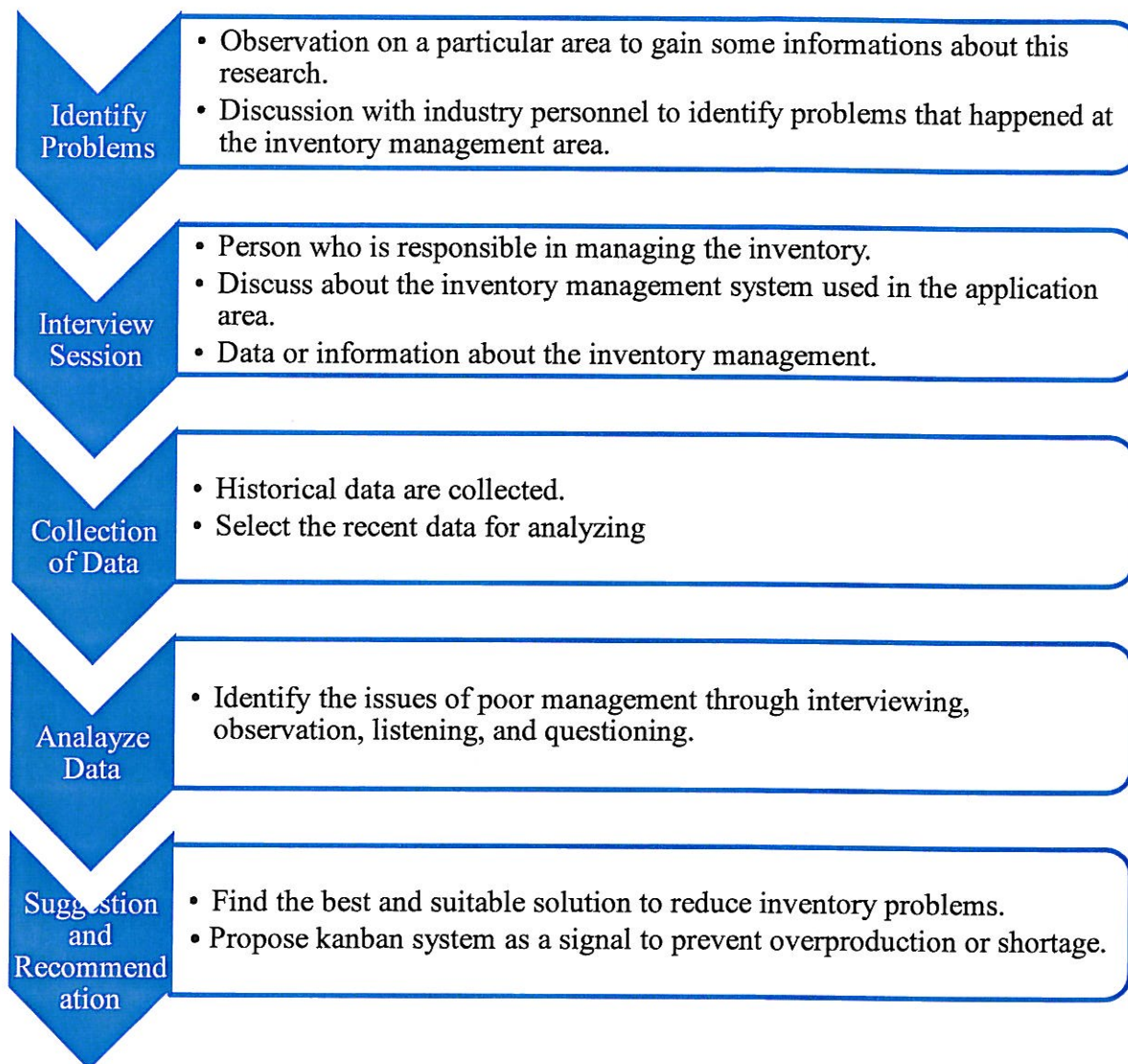
Figure 3.1: Process Flow for Research Methodology

The process flow has been developing to reaching the objectives of this study. There are five steps need to be follow to achieve the objective of this study. Refers to figure 3.1, the researcher followed the process flow as guidelines for his study.

Firstly, the researcher will do some discussion about the research. The researcher needs to identify the problems that arise in the inventory. After the researcher identifies the problems, researcher will go site visit to the private warehouse to do some observation and gain some information about the research. At that area the researcher can identifies specific issue that cause poor inventory management.

On top of that, in order to get an information or data, the interview session were conducted with a company that is located in Kuantan, Pahang. During the interview session, the inventory management system that has been used in the company was discussed, factors that contribute to the poor inventory management. In addition, step of inventory management system applied by the company that was obtained to ensure that the company have systematic step on managing the inventory. Therefore, through an interview it can give researcher a sufficient data for the research.

Hence, the data were collected during the interview. The researcher was asked for permission to gather the historical data of the inventory. However, the researcher was also collected the information by continuous reading the journal, article and books in order to supported the research. After the data were obtained, the researcher analyzes the data and evaluates the data to use in inventory management system. The researcher will propose kanban system to company. The researcher will make a simple calculation to determine whether researcher succeeds improve the inventory management. The result will be seen at the final by using the system whether the propose idea by the researcher had reduce the inventory management problem or not. Kanban system is the best solution to propose because the system is simple and easy to understand. In other hand, the system is accomplished by the reduction of inventory level.

The company is based on foods products. Thus, the system used is most suitable to improve the inventory management operation.

3.5 DATA ANALYSIS

Firstly, the researcher went to the company and did some observation and identified the issues that contribute to poor inventory management in that company. After identifying the issues, the researcher will propose the best inventory management system to reduce inventory management problems. Kanban system is the inventory management system that will be proposed to the company.

The researcher will collect the raw materials data to analyze the data usage for a month. The simple calculation for raw materials will analyze to predict the usage for a month. Kanban card system was selected to apply for this company. The employees will able to understand and follow the schedule information. The system contains internal pull signal. It consists three colors; red, yellow and green. The colors show the functions of production flow. The production people can forecast the raw materials for a month and manage the operations well. The propose idea by the researcher will improve the inventory management and overcome the issues that arise in the warehouse.

CHAPTER 4

FINDING AND DISCUSSION

4.1 INTRODUCTION

This chapter presents an analysis of all data collected and the summary of the result. The findings presented in the chapter are based on interviewing, questioning, listening, observation and historical data. The data will be presented and discussed in connection to the research questions.

4.2 FINDINGS

Type of Problems	Current condition
Inventory method	• First-In, First-Out (FIFO) inventory method was not implemented effectively and the product movement also not very good.
Employee errors	• The employees were not trained to update the inventory system accurately.
Misplaced inventory	• The company did not provide proper layout and details of location of products.
Miscommunication	• Lack of communication skills between production workers and warehouse.

Table 4.1: The Issues of Poor Management in Manufacturing Company

4.2.1 Inventory method

From the observation that researcher go to the site visit at manufacturing company, the researcher found that they did not implemented First-in, First-out (FIFO) effectively and the product movement also not good.

From the interview, the main problem is careless mistake from the workers. They did not alert and concern on their task. The problem arise because they did not know on how to record the data and some of them are lack of experience. Besides that, with the issue arise in the warehouse show that, the inventory management of the warehouse is poor and it can cause a bad impact to the company.

One of the advantages of using FIFO is to reduce the ancient inventory. Ancient inventory refers to the inventory that is old or outmoded and is not suitable for use in production. In now, many businesses require ancient inventory to be written off against its bottom line since its last usage. One of the reason use FIFO is to prevent ancient inventory by using the inventory first received before using newer inventory. Furthermore, "the company also can ensure that the ending inventory values on the balance sheet are indicative of current market prices for the items", according to the Justin Johnson in his article. This shows that FIFO inventory method is important in managing the inventory and it also brings a big impact to the company on improving their inventory management.

Figure 4.1: FIFO Inventory Method Was not implemented

4.2.2 Employee errors

From interviewing and observation, the employees were not trained to update the inventory management system accurately. Mostly they are uneducated workers. They just qualified in PMR and SPM. Thus, they did not know how to use the inventory management system properly. This problem may cause inaccuracies in the inventory records, which can cause purchasing to fail to purchase materials or to acquire an excessive amount of inventory.

Figure 4.2: Non-Educated Employees

4.2.3 Misplaced Inventory

Based on listening and observation, the company had problem with misplaced inventory. The company did not provide proper layout that contains details of its location. So that, the workers wasted their time as they search for lost materials. The time delays may cause late deliveries to customers.

Figure 4.3: Semi-Finished Goods

Figure 4.4: Finished Goods

4.2.4 Miscommunication

The main problem of the poor management in the company is miscommunication between production workers and warehouse. They had lack of communication skills between each other. Therefore, the raw materials become shortage. The flow of operations is not systematic and run smoothly.

Figure 4.5: Raw Materials in Progress

4.3 PROBLEM SUMMARY

Based on the interview with manager of the company, the issues of inventory method and miscommunication are the critical problems that contribute to poor inventory management. The issues should be come up with the good suggestion to improve better inventory management. In the current warehouse, the implementation of FIFO in the inventory management was not so efficient. Based on the observation, the researcher had been seen in the site visit at the warehouse, researcher got that the movement of products moved slowly. Sometimes, they had to face problems that always arise in the warehouse such as mix product issue when they rushing to deliver the products to the customers. This situation happened because they did not use rack to store the products, they just stack the

products with each other so the probability for mix product to happen is very high. Thus, the researcher will propose to company a rack in the warehouse to store the products. So that, the movement of the product become more smooth and the implementation of First-in, First-out (FIFO) method in their inventory management become more efficient than before. The FIFO inventory method refers to the timing at which inventory is purchased and subsequently used. Inventory that is purchased first is sold or used in production before inventory that is purchased at a later date.
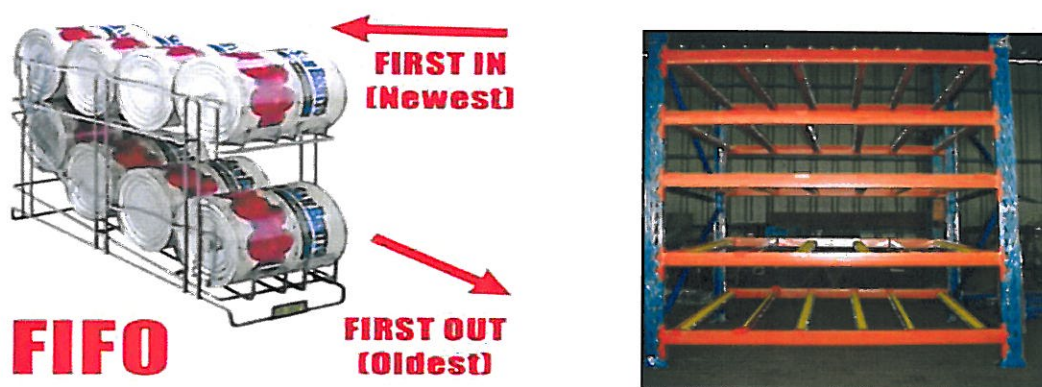
Figure 4.6: Rack for First-In, First-Out Method that will be proposed in the warehouse retrieved from https://malaysia.images.search.yahoo.com/images/view

Second, the issue of miscommunication. The issue can be control by using kanban system. Kanban system is the one of concept behind lean manufacturing tool that reduces costs in high volume production lines. This system is the one-way to smooth and balance materials flows by means of controlled inventories. It is also can be translated as signal that allows an organization to reduce production lead time which in turn reduces the amount of inventory required. One of the examples of kanban system is pull system. Pull system is a kanban scheduling system that signals what to produce, and which only produces the items customers' needs. Besides that, it can control the production of products and the flow of resources to make products. In the case, kanban system will be propose to company by using card system.
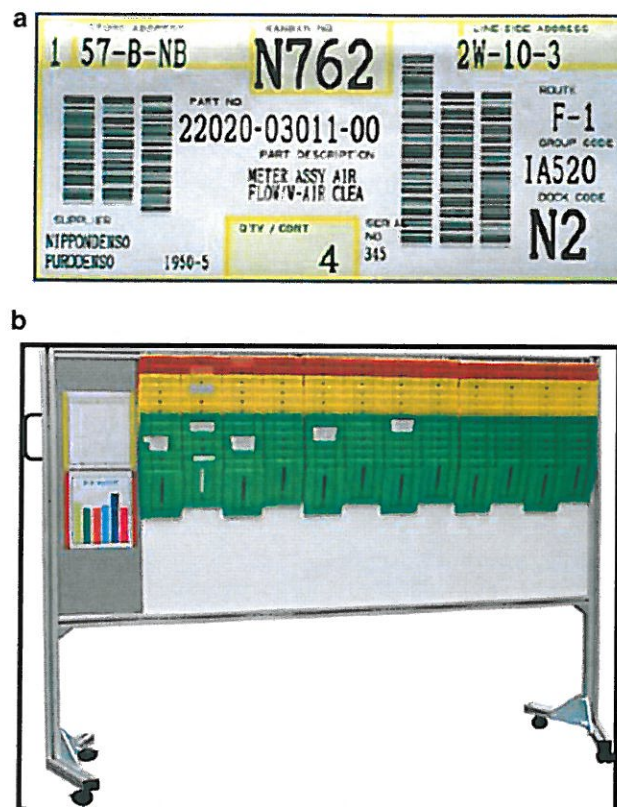
Figure 4.7: Kanban cards that will be proposed in the warehouse retrieved by
https://malaysia.images.search.yahoo.com/images/view

4.4   PROBLEM RECOMMENDATION

Kanban system is the most suitable system that will be propose to company. This system can focus on a continuous flow of work. For this research, kanban pull control system will be applied to push production through a factory based on a schedule of work required. A person in charge should uses customer orders, historical data and a few guesses to try to figure out what the factory should be making and then loads the raw materials in at the front end for processing. A Kanban is like an empty space on the shelf, it is a signal for the previous operation to produce a part to fill that space. One of the examples of kanban is card system that is most suitable to apply for this company.

For this research, the data of raw materials are required. The company produces more products of spices and flours. The researcher chose product A to apply for kanban system. This is because this product is well-received among customers and they usually order this product. In this product, the raw materials used also were needed for other products.

4.4.1 Data of Product A

No	Items	Weight (gram)
1	Induri Split 100%	40.000
2	Jintan Manis	28.000
3	Jintan Putih	18.000
4	Cili Byady	10.000
5	Kunyit	6.000
6	Beras	17.000
7	Lada Hitam	0.900
8	Pelaga	0.400
9	Cengkih Tangkai	2.500
10	K.Manis Broken	7.500
11	Pala	0.700
12	Bunga Lawang	0.900
13	Serai	2.000
14	Lengkuas	1.800
15	Halia Kering	1.600
Total		**137.300**

Table 4.2: Raw Materials of Product A
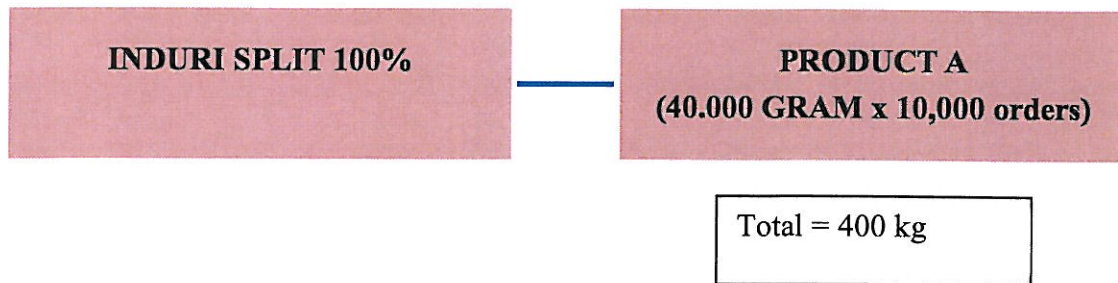
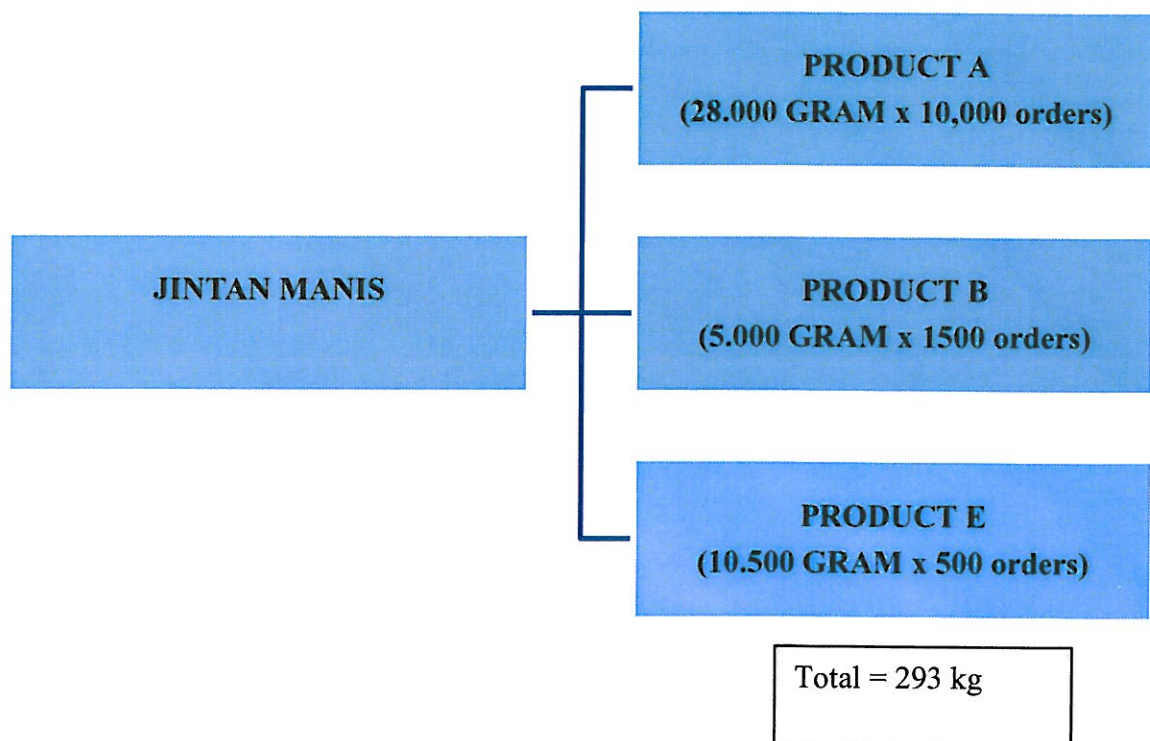**Diagram 4.1:** Induri Split 100% of Product A

Diagram 4.2: Relationships between Jintan Manis of Product A, Product B and Product E
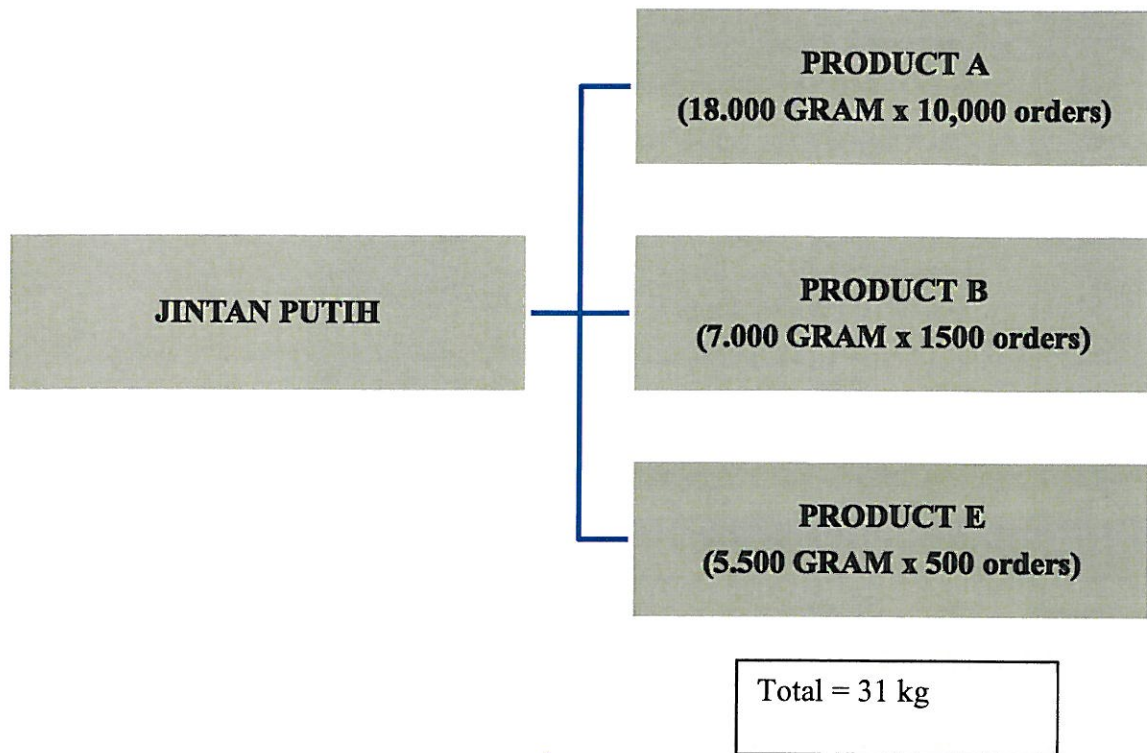
Diagram 4.3: Relationships between Jintan Putih of Product A, Product B and Product E
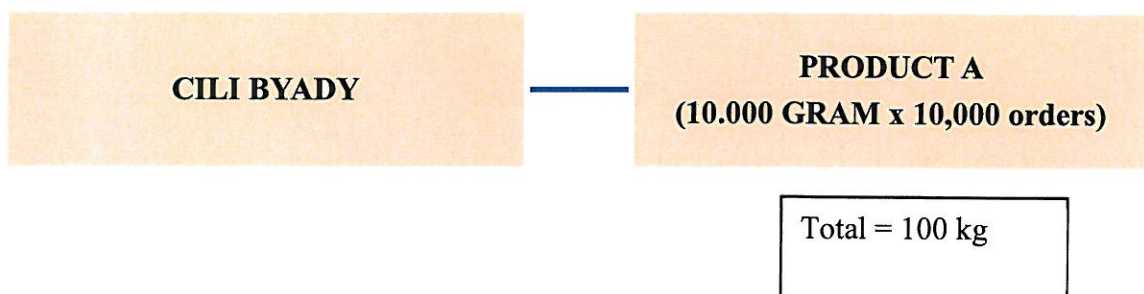

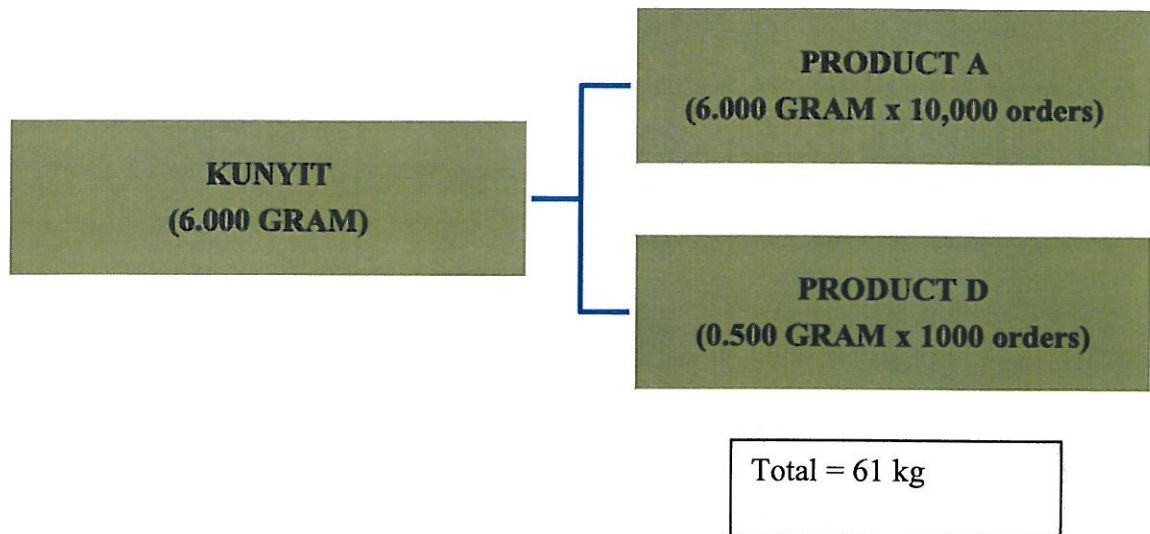**Diagram 4.4:** Cili Byady of Product A

Diagram 4.5: Relationships between Kunyit of Product A, and Product D
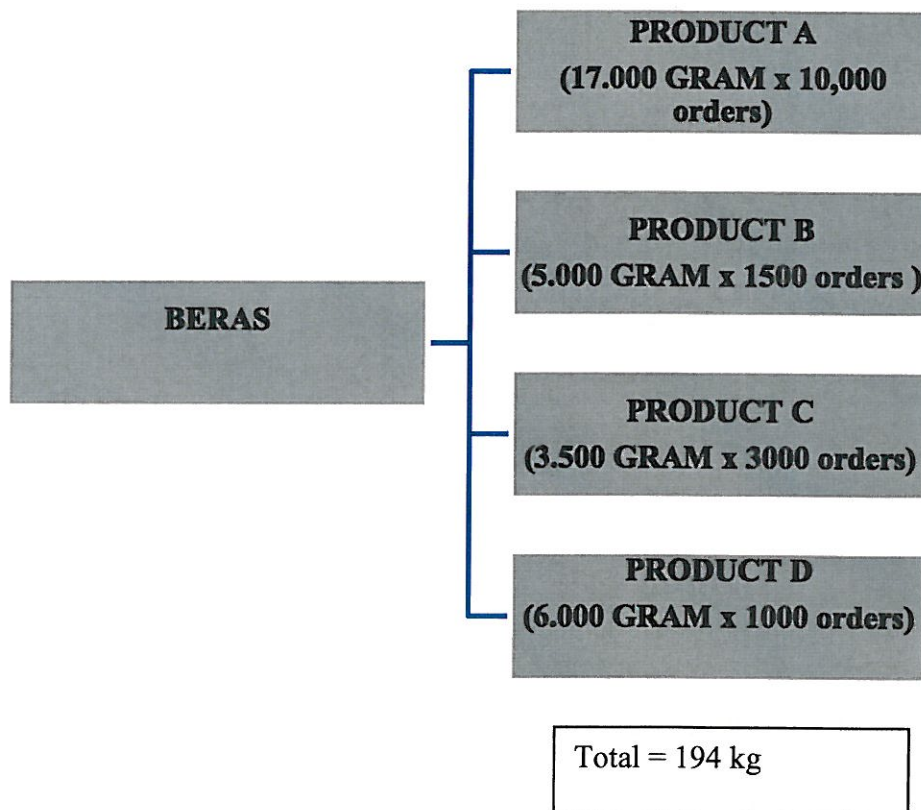

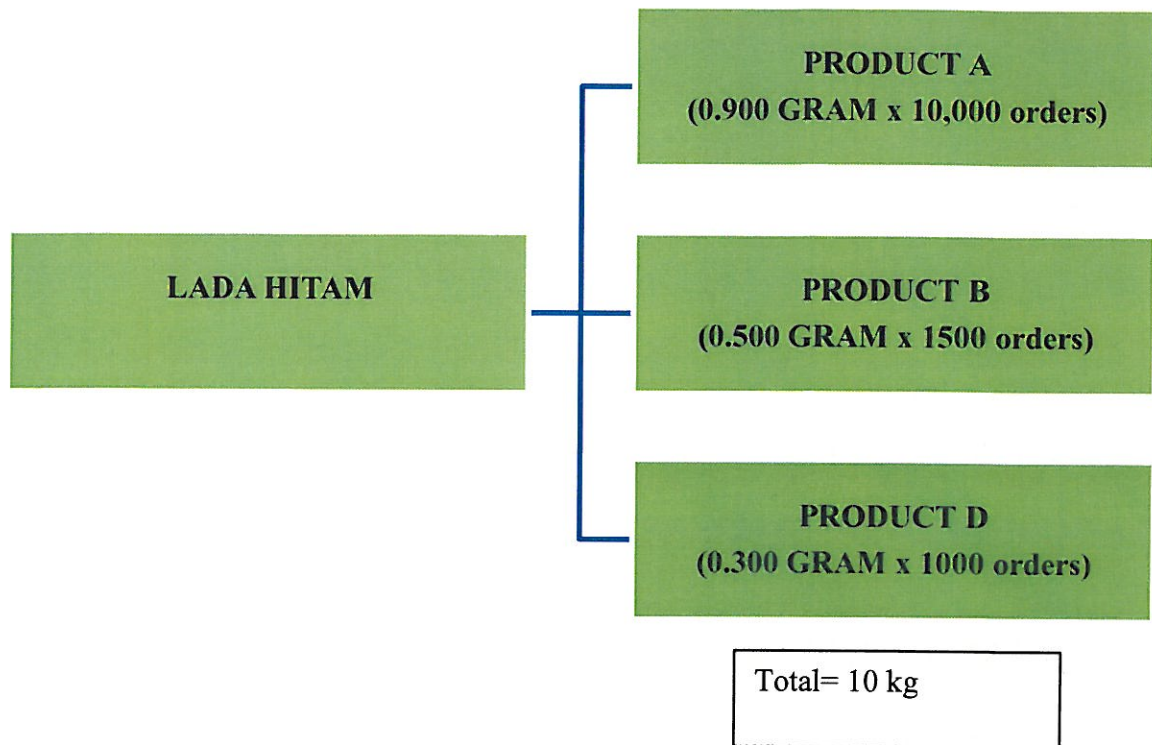**Diagram 4.6:** Relationships between Beras of Product A, Product B, Product C and Product D

Diagram 4.7: Relationships between Lada Hitam of Product A, Product B and Product D
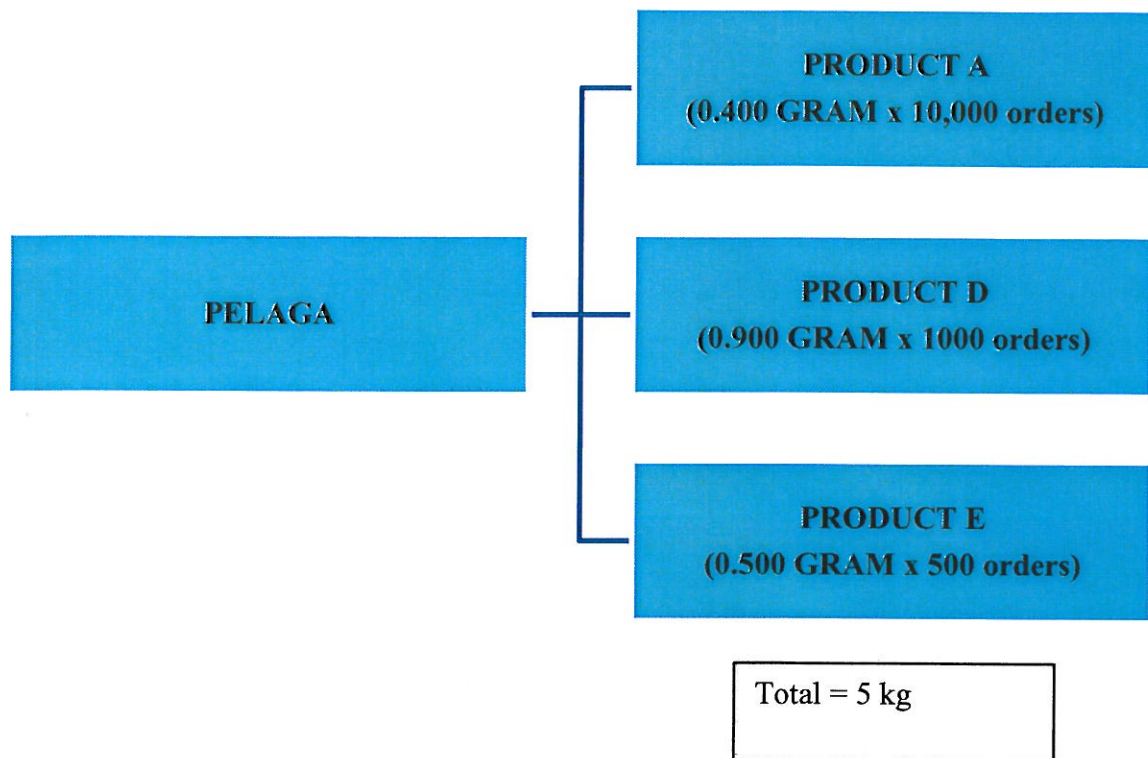
Diagram 4.8: Relationships between Pelaga of Product A, Product D and Product E
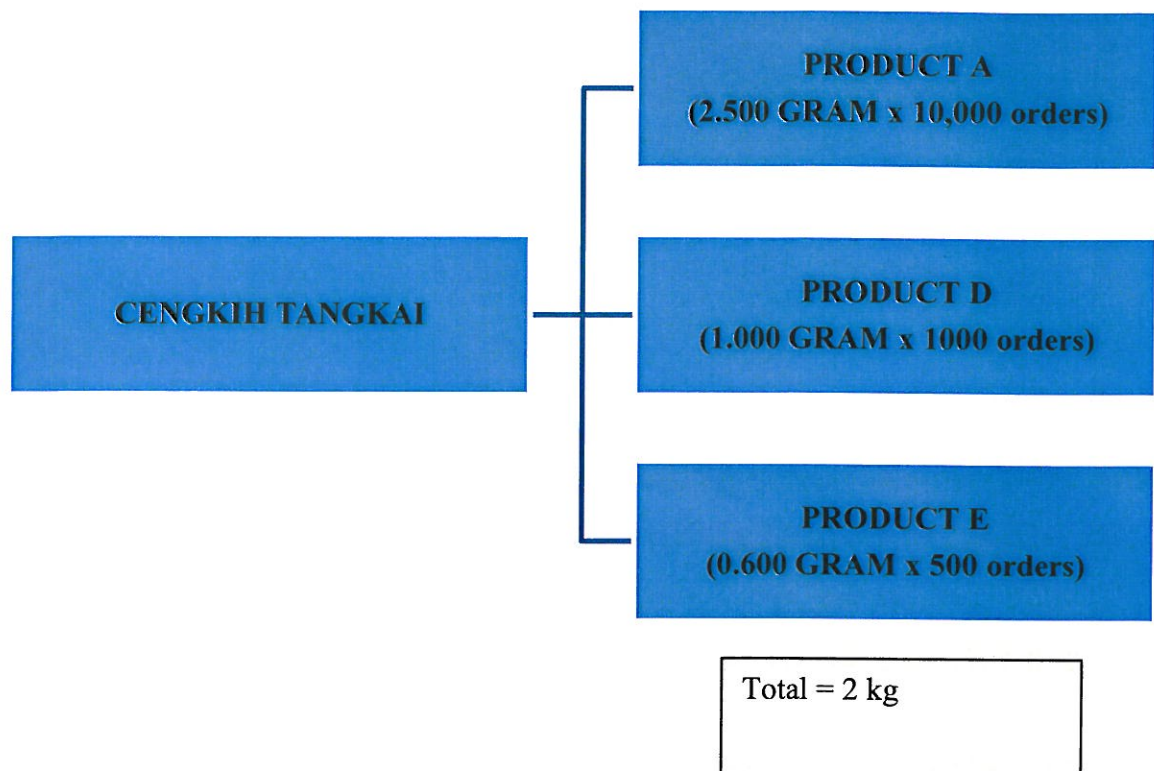
Diagram 4.9: Relationships between Cengkih Tangkai of Product A, Product D and Product E
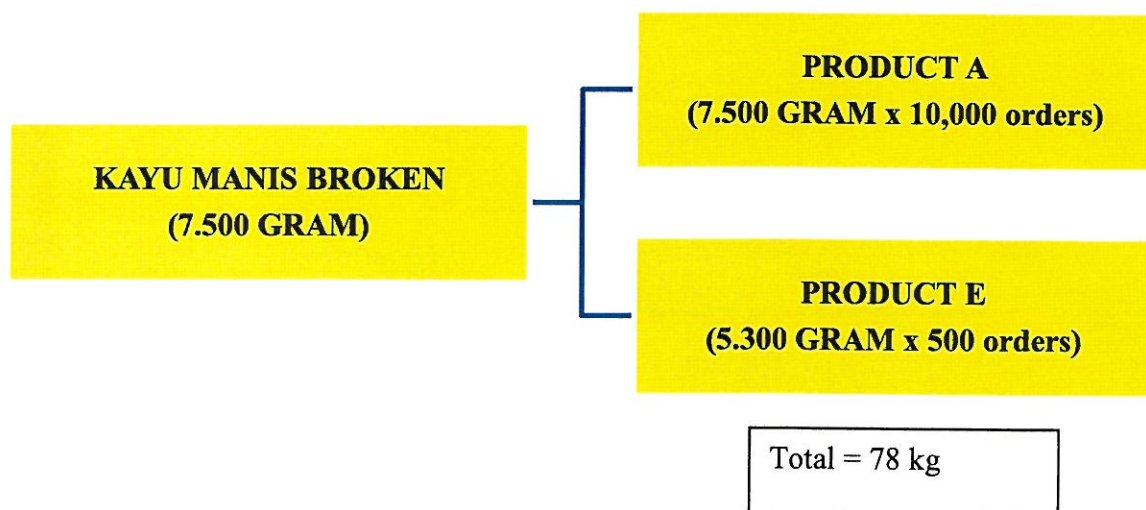
Diagram 4.10: Relationships between Kayu Manis Broken of Product A and Product E

| PALA | — | PRODUCT A
(0.700 GRAM x 10,000 orders) |

Total = 7 kg
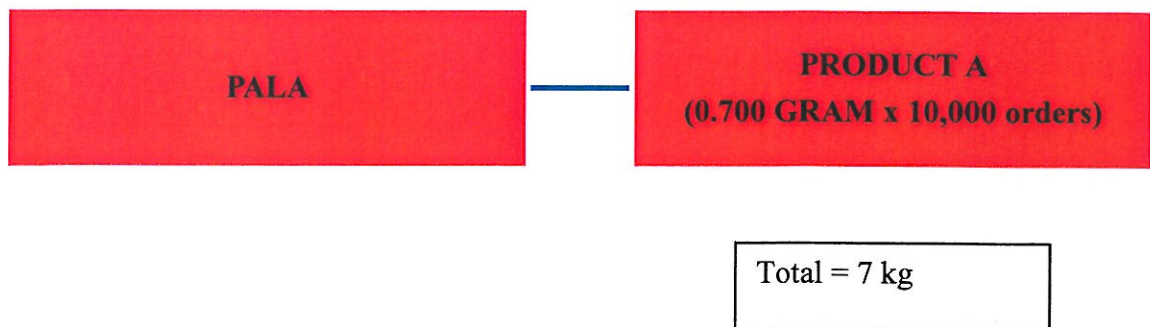
Diagram 4.11: Pala of Product A

| BUNGA LAWANG | — | PRODUCT A
(0.900 GRAM x 10,000 orders) |

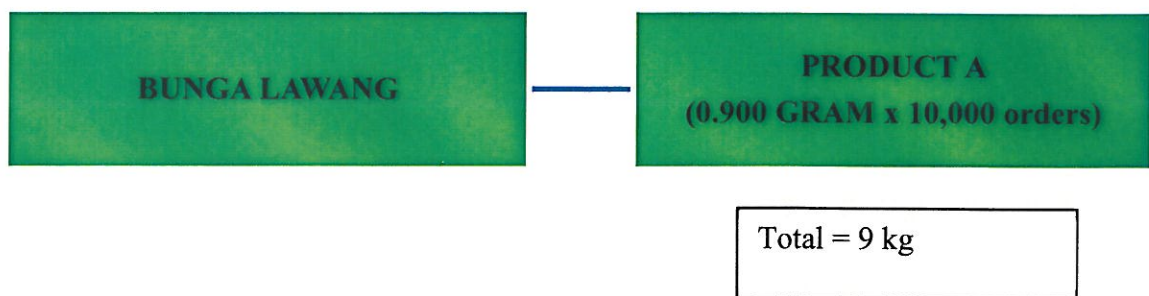Total = 9 kg
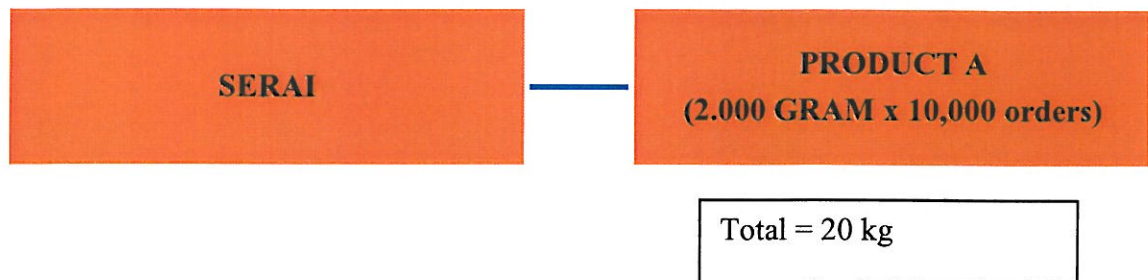
Diagram 4.12: Bunga Lawang of Product A

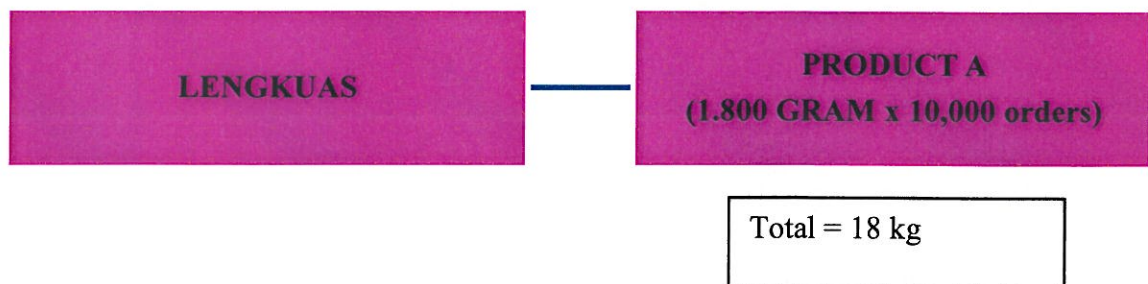**Diagram 4.13:** Serai of Product A

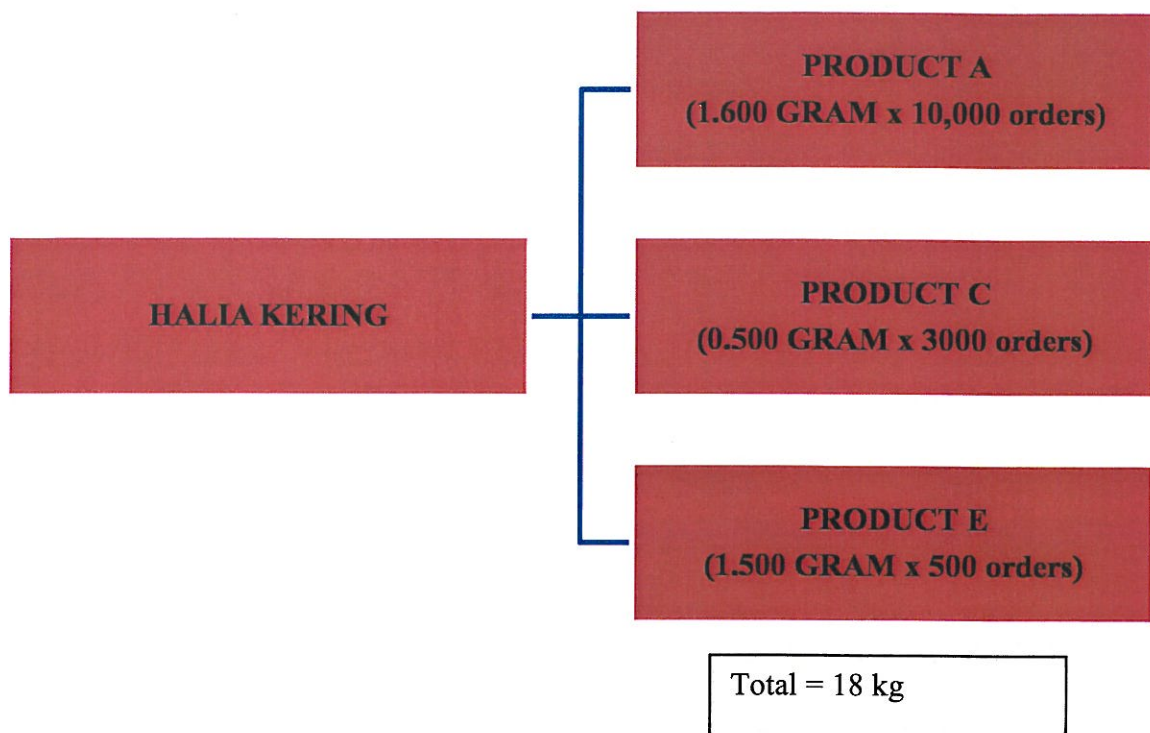**Diagram 4.14:** Lengkuas of Product A

Diagram 4.15: Relationships between Halia Kering of Product A, Product C and Product E

4.4.2   Push- Pull System

This company should come up with a strategy of push-pull system. By using the push-pull system, the production people can use this system for short and long term production. Besides that, Kanban card will be used to signal when a part is ready to move from one part of the production process to another. Based on diagram 4.16, there are parts of production process. The Kanban card will send to production process. Once the parts are used, the card is returned as a signal to send the same number of the same part back.

| Customer | → | FGS | → | DFG | → | DMV | → | SB | → | DMG | → | SRB |

PULL SYSTEM

PUSH SYSTEM

| SRB | ← | DMG | ← | SB |
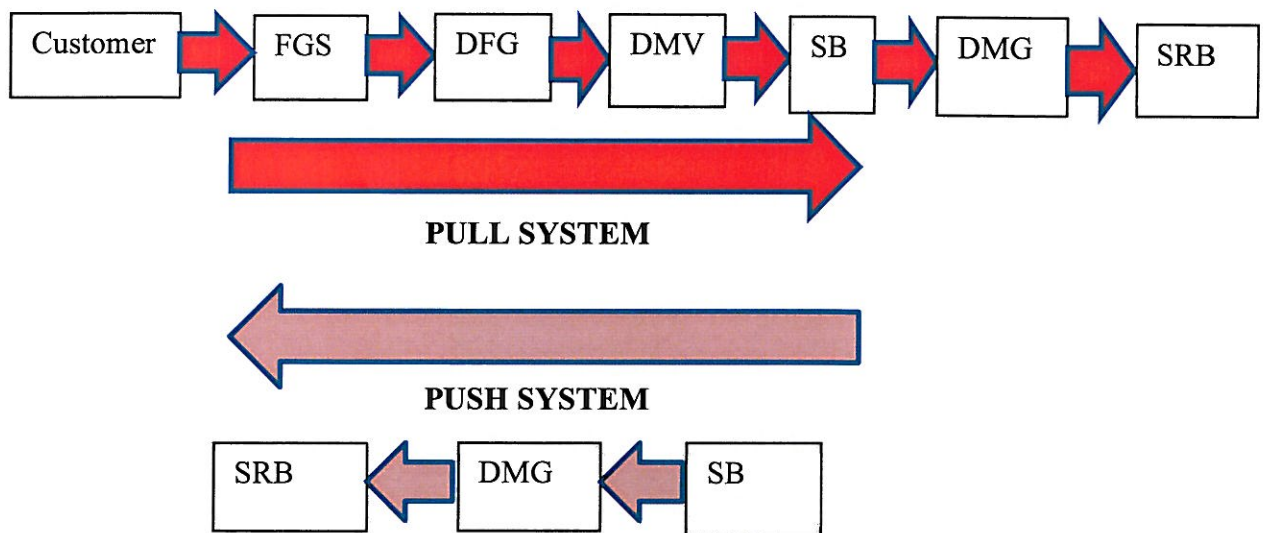
Diagram 4.16: Push-pull System

4.4.3   Proposed of Kanban

There are a lot of kanban can be used to control the shortage of products. In this research, the researcher will propose traditional kanban system. Kanban card is one of example traditional kanban system. It functions as a component that gives a signal the need to move raw materials into production. The production people must check the cards. If the cards were taken by person in charge at other departments, they must check the cards either decreases or not. If the cards missing, it means the raw materials decrease. Thus, the person in charge should observe the signal of cards. The signal shows the production was running out.

Diagram 4.17: Proposed Kanban card system

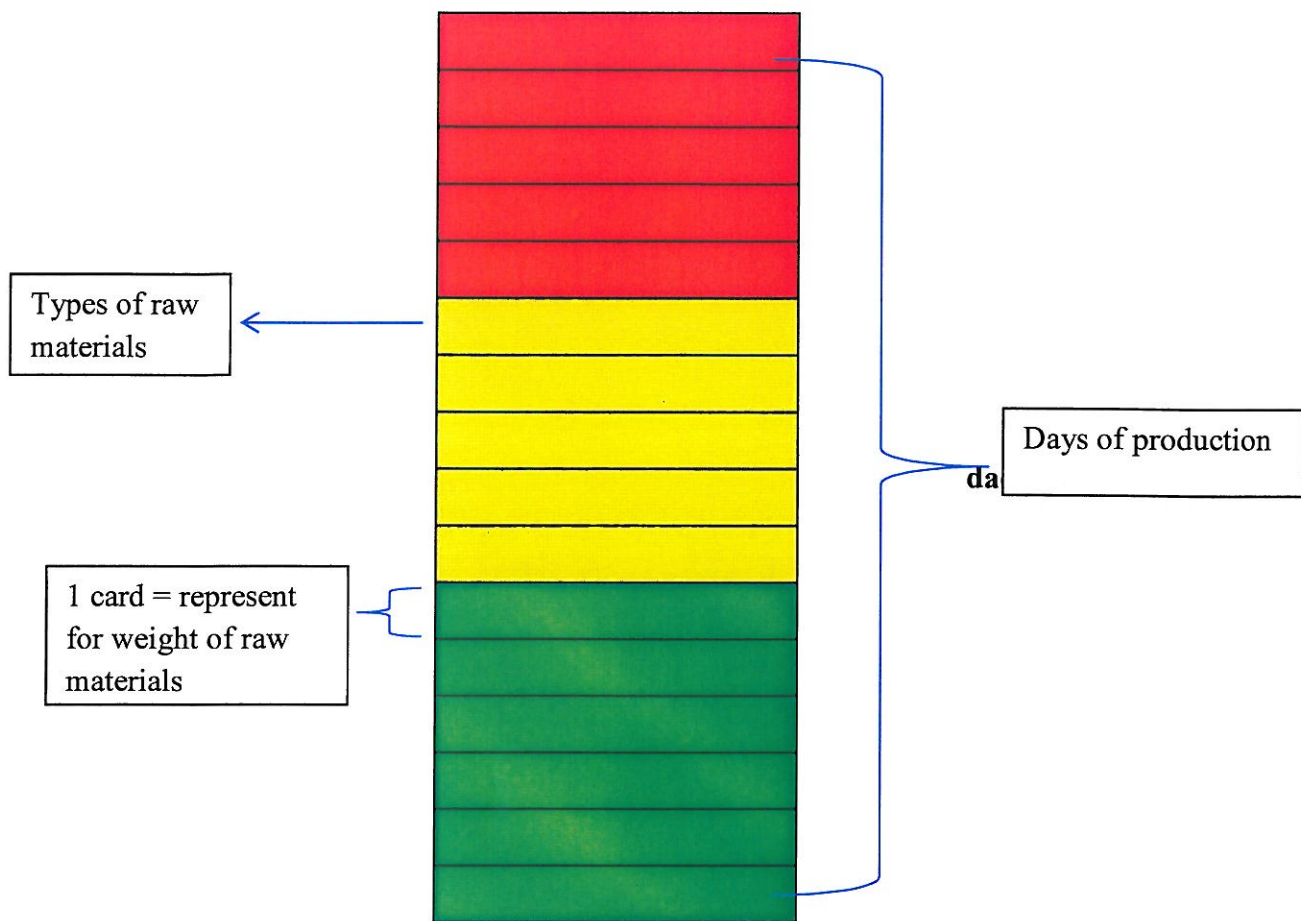| Types of cards	Functions
	Immediately order raw materials from supplier
	Prepare to order raw materials
	No action

Table 4.3: Functions of cards

Raw Materials	Total Weights Usage for A Month (kg)	Represent Weights for one card (red,yellow,green card) (kg)
Induri Split 100%	400	50
Jintan Manis	293	30
Jintan Putih	31	5
Cili Byady	100	20
Kunyit	61	20
Beras	194	30
Lada Hitam	10	2
Pelaga	5	1
Cengkih Tangkai	2	1
Kayu Manis Broken	78	10
Pala	7	1
Bunga Lawang	9	1
Serai	20	5
Lengkuas	18	5
Halia Kering	18	5

Table 4.4: Raw Materials Needed for A Month

Refers on table 4.4, it shows the relationship between total weights of raw materials usage for a month and represent weights for one card ; red, yellow and green card. To determine the represent weights for one card, it depends on total weights usage for a month. The researcher forecasts the weights required for a month. The represent weights for one card appear as a small quantity of weight. It depends on forecasting of weights required for a month. For example, if total weights usage for a month of Induri Split 100% is 400kg, the represent weight for one card appears in 50kg. It means the production people should prepare eight cards for Induri Split 100%. Besides that, the production people should forecast the days of production to divide the different colors of card. The colors of card depend on production timing.
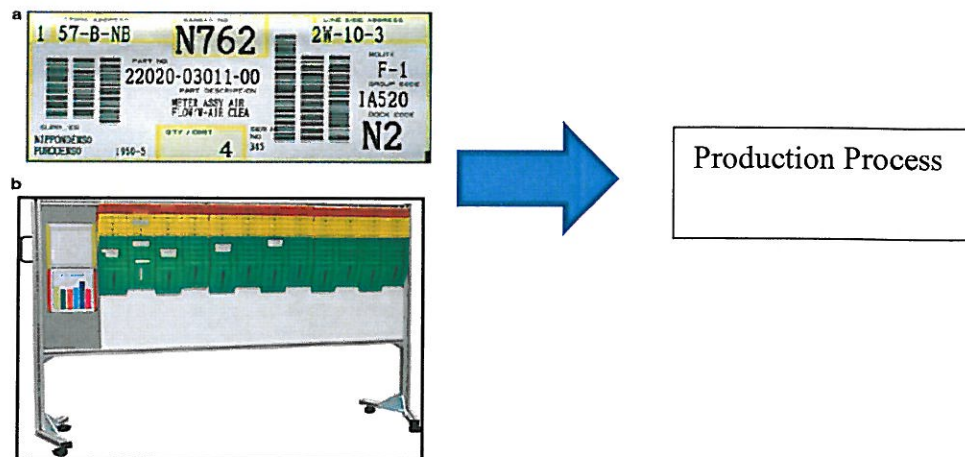
4.4.4 Flow of Kanban System

Figure 4.8: Flow of Kanban Card System

4.5 SUMMARY

Based on the figure 4.8, the cards will be put into the signal of cards. Then, cards will be taken to move to production process. The cards represent the signal of production flow. Each card represents for raw material and each them will forecast depends on weight needed. The signal of card depends on days of production used. The supervisor should forecast the usage of raw materials for a month. If the cards touch red signal, they should immediately to order the raw materials from supplier. Every workers must alert and follow the rules of kanban system. It is easier to understand and forecast for ordering raw materials systematically. Based on push-pull system by following the kanban system, it can prevent from products shortage.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1   INTRODUCTION

This chapter will discuss on the conclusion of the overall data analysis about the improvement of inventory management system in a warehouse whether the before improvement and after improvement. The inventory method, employee errors, misplaced inventory and miscommunication also can be concluded. Besides that, the recommendations also will be given as alternatives for the company in order to take action to improve inventory management in the warehouse.

5.2   CONCLUSION

In this study, inventory management plays an important role in the whole supply chain system. Warehouses are a key aspect of modern supply chains and play a vital role in the success, or failure of business today (Frazella, 2002). Without managing the better inventory management, operation and production cannot run functionally. Good inventory management practices in the company should have good control and maintain lean inventory. Inventory should not be too much or too less. Normally, the issues of poor management arise in the company because lot of inefficiencies builds up over a period of time without the knowledge of the management. Production and operation people should have basic knowledge as well as operations run smoothly.

Kanban system is the simple learning process of management. It teaches on how to scheduling work flow. In addition, kanban is also defined as demand scheduling. In the research, the researcher will propose kanban card system to schedule the operation process. The kanban system replaces the traditional production schedule. This schedule is replaced with the visual signals and predetermined decision rules that production operators need to follow to schedule the line. Besides that, kanban system is able to improve the flow of production. This is because the system can manage the inventory levels better. For example, excess inventory can result in cash flow problems. To solve this problem, kanban system combined with good inventory practices smooth out inventory levels and eliminates carrying costs. Secondly, the manufacturing flow runs smoothly as kanban system focuses on current conditions and production levels. Last but not least, kanban system can also reduce the risk of inventory obsolescence. Many products have a shelf life or product lifecycle that can expire. First-in, First-out (FIFO) method is interrelated to kanban system. The system functions almost same.

On top of that, the manager should also be responsible to make sure that the employees are able to understand their task in the warehouse. It can prevent the issues of miscommunication between production and warehouse. They just follow the rules and the manager should create the rules. The manager should also solve the misplaced inventory to overcome the mixing products because of improper layouts with the details of products location.

5.3   RECOMMENDATION

The manufacturing of company that is located in Kuantan, Pahang was selected for the study to improve the inventory management. There are four issues that contribute to poor inventory management. First, the First-in, First out (FIFO) inventory method was not implemented effectively and the product movement also not very good. The problem should be solving as the company manufactured food products. Food industries must implement FIFO method because products have a shelf life or product lifecycle that can expire.

Second issue is the employees were not trained to update the inventory system accurately. Employee awareness is the best recommendation to apply for this company. It is a level to which employees should know certain policies, situations, documents or any other important information. They must improve their communications and commitment. Besides that, they should also learn more practical knowledge on the corporate policies and workplace, comprising routine operations, business process and emergency actions. Thus, the company and organization should provide the programs for improvement on employee awareness that includes knowledge on company's goals, policies to reduce energy and time waste, decreasing operational costs and increasing efficiency, improving knowledge and professional attitudes because the higher employee awareness, the better competitiveness of company.

The third issue is misplaced inventory. The company did not arrange layouts in proper and did not provide the details of products location. The workers wasted their time as they search for lost materials. The time delays may cause late deliveries to the customers. To solve this problem, the manager should discuss with the production people to rearrange layouts in proper. Besides that, labels the items by section in the warehouse. By labeling, it will help employees to identify the items.

The last issue that contributes to poor management is miscommunication between production and warehouse. Therefore, the researcher proposes kanban system to solve this problem. Kanban card system will applied in the company as the system is simple and easy to understand. For the future, the company can apply electronics kanban system. It is technologically concept that uses RFID-codes or bar-codes in production batch identification. Bar-codes are applied more often to manage material flow between companies, because the containers are used for different batches. RFID tags are more applicable in inter-company situations because the same containers are used many times.

5.4   LIMITATION OF STUDY

The limitation of this study is the proposed idea that is not easy to accept. The researcher must be confident and shows with improvement and it can be explaining the detail with brainstorming meeting. As a student, loyalty from others is low. So that, the researcher tries the best way for give trust and collaboration any time for observation and interview. The application of the proposed idea will affect the company in operation and production sales.

In this study, the researcher tried to observe all aspect of process and activities employees in the private warehouse but there have a limitation on collecting the data. Researcher could not take all the data from the inventory management because some of the data are confidential for the company. In observation, the researcher just chooses one or three employees to interview. Researcher could not observe longer in the warehouse because of the limitation of the time.

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APPENDICES

QUESTIONS FOR INTERVIEW

1) What kind of inventory system this company used?

2) What are the factors that cause poor inventory management in your company?

3) How long the inventory system had been used?

4) Does the company change the inventory system?

5) How your company overcomes the problems that arise in the warehouse?

6) How you measure the accuracy of the inventory management system?

7) What type of system that your company used to store the inventory data?

8) What are the factors or criteria that your company required on choosing the inventory management systems?

9) What systems or software that your company use to overcome the inventory problems?