

CHAPTER I

INTRODUCTION

This chapter explains the background of the research, problem formulation, research objectives, research scopes, and the outline of the report.

1.1 Background

Inventory is a resource or item stored and used to fulfill certain purposes, such as being used in the production process, as spare parts, or for resale (Herjanto, 2008). Generally, every company has an inventory in different quantities and conditions to maintain the production process. Inventory is seen as a waste because the costs incurred are bigger than usual, so it becomes a burden for a business. When the inventory lacks, it will lead to losses associated with downtime, unevenness of production, and others. Therefore, inventory is an important asset in the supply chain that must be completed and appropriately controlled.

One way to manage inventory is to control inventory. Inventory control is an activity related to planning, implementing, and supervising the determination of material requirements to meet operation needs on time. The investment in material inventories can be optimally suppressed (Indrajit and Djokopranoto, 2005). In any practical situation, inventory management faces barriers in the form of a tradeoff between minimizing total cost and maximizing service level (Aisyati et al., 2013). Inventory control can help companies to grow and be competitive with others in the industrial world. Many manufacturing companies have difficulty in controlling inventories, especially spare parts inventories. It is challenging to solve the problem of when and how many items to buy. It is needed to make the right decision in determining the appropriate inventory system policy for the company.

In manufacturing industries, materials are grouped into raw material and auxiliary material. The raw material is a basic substance in its natural, modified, or semi-processed state. It is used as an input to a production process for subsequent modification or transformation into a finished good. Auxiliary material is used as a rule for production maintenance needs and is not a part of production output. Without auxiliary materials, the production process can still run, but it will reduce product quality. Supplies of auxiliary materials are usually obtained from outside the company's system, such as those obtained from certain suppliers. One industry that is still less efficient in control its inventories is PT Batanghari Barisan.



PT. Batanghari Barisan (BHB) is an industry that produces and exports crumb rubber located in By Pass, Lubuk Begalung, Padang City. The type of product produced is Standard Indonesian Rubber (SIR) 20, used as raw material for tire factories. The average total production is 22,500 tons per year, with a license of 30,000 tons per year. There are two stages in produce SIR 20, namely the wet process and the dry process. Those two stages comprise several production processes. The processes are supported using various machines and equipment. To maintain the continuity of machine and equipment, PT Batanghari Barisan has Bengkel Division, which will record and manage maintenance problems. Maintenance activity is supported by the availability of spare parts or components needed in the inventory. Gudang Bahan Penolong Division is in charge of managing inventory activities of auxiliary material.

The company has more than 958 types of auxiliary materials that consist of various groups of items. Auxiliary materials categorize based on their frequency of use. There are 33 types of auxiliary materials included in consumable items, including spare parts and daily goods. The company focuses more on controlling inventory on consumable items through a minimum stock control form that was implemented in early 2020. The form had information about minimum stock order and order quantity. The spare parts included in the control form are used as replacement parts when there is a breakdown or maintenance schedule.

Based on interviews with the warehouse staff, the company is still facing several problems in the procurement of items. First, there are spare parts that are difficult to predict in terms of time and quantity of uses since the demand is influenced by machine or equipment conditions; it involves uncertainty. Second, orders are usually made for a single item needed, so the order frequency is high enough and lead to higher ordering cost. While some spare parts are procured from one supplier. To minimize ordering cost, it is supposed to order all spare parts required from the same supplier in one order time. Third, procurement still occurs though there are still many stocks at the warehouse. In addition, many orders are carried out in a large quantity. Warehouse administration did not calculate the control form parameters using a certain method but only based on estimates from the warehouse division. **Figure 1.1** shows the average number of usage, stock, and order quantity per month of Batu Gerinda 4". Conditions of usage and stock of consumable items from September 2018 till June 2020 can be seen in **Appendix A**.

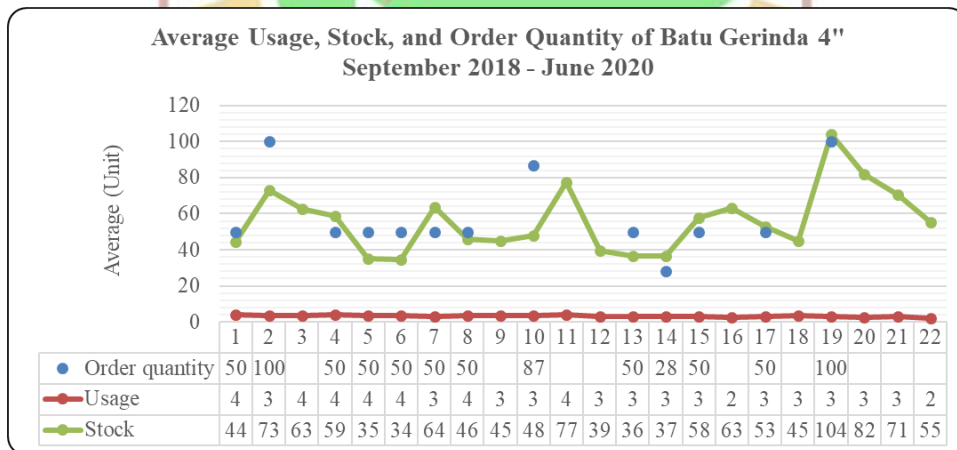


Figure 1.1 Average Usage, Stock, and Order Quantity of Batu Gerinda 4" September 2018 till June 2020 (Source: PT Batanghari Barisan, 2020)

From **Figure 1.1**, the difference between the average usage and stock of Batu Gerinda 4" every month is very big, which is more than 40 units. The average demand is minimal, around 4 units, while the average stock in warehouses is very big and varies. The high inventory in the warehouse will result in high holding costs and embedded capital funds. In fact, the embedded capital fund can be used for other productive activities that increase company profit. It can be increasing the

company's production target after several considerations. The investment value of 33 items in the control form at 27th June 2020 was IDR 61,268,710.89. Details of the contribution of investment items can be seen in **Table 1.1**. Fourth, although most items are overstocks, there was still stockout in six items of consumable items, but it rarely happened. Those items can be seen in the **Table 1.2**. It happened because of the uncertain use of items and miscalculations in stock.

Table 1.1 Details of The Investment Contribution of Consumable Items at 27th June 2020

No	Item	Item Group	Stock Investment
1	Bearing UCP 211	Bearing	Rp 2,921,968.74
2	Bearing UC 211	Bearing	Rp 1,950,000.00
3	Bearing 6205	Bearing	Rp 577,500.00
4	Bearing 6305	Bearing	Rp 400,000.00
5	Bearing 6307	Bearing	Rp 1,500,000.00
6	Bearing 23132	Bearing	Rp 33,748,826.40
7	Baut 5/16 x 1"	Baut	Rp 26,942.65
8	Baut 3/8 x 1"	Baut	Rp 139,400.00
9	Baut 1/2 x 1.1/2"	Baut	Rp 54,598.88
10	Baut 5/8 x 2"	Baut	Rp 99,995.25
11	Baut 5/8 x 2.1/2"	Baut	Rp 178,000.00
12	Baut 3/4 x 2.1/2"	Baut	Rp 196,430.00
13	Batu Gerinda 4"	Bengkel	Rp 380,438.86
14	Batu Gerinda 7"	Bengkel	Rp 1,461,999.32
15	Batu Gerinda Potong 16"	Bengkel	Rp 279,985.20
16	Kawat Las RB 26 3.2 mm	Bengkel	Rp 765,000.00
17	Kawat Las HV 600 3.2 mm	Bengkel	Rp 340,000.00
18	Kawat Las NSN 308 2.6 mm	Bengkel	Rp 1,700,000.00
19	Oxygen	Bengkel	Rp 300,000.00
20	Sarung Tangan Asbes	Bengkel	Rp 175,000.00
21	Batu Gerinda Potong 7"	Bengkel	Rp 2,547,640.32
22	Batu Gerinda Potong 4"	Bengkel	Rp 429,383.28
23	Gundar Kawat	Pabrik Umum	Rp 395,958.42
24	Gundar Ijuk	Pabrik Umum	Rp 372,400.00
25	Sarung Tangan Karet	Pabrik Umum	Rp 506,252.16
26	Sapu Ijuk	Pabrik Umum	Rp 137,571.42
27	Kuas 2.1/2"	Pabrik Umum	Rp 122,307.68
28	Lem UHU	Packing	Rp 5,912,064.27
29	Gergaji Kayu	Packing	Rp 1,777,777.75

Table 1.1 Details of The Investment Contribution of Consumable Items at 27th June 2020 (Cont')

No	Item	Item Group	Stock Investment
30	Oil Seal 35 x 48 x 8	Pompa Air	Rp 275,000.00
31	Van Belt B 52	Van Belt	Rp 226,568.93
32	Van Belt B 56	Van Belt	Rp 283,996.96
33	Van Belt C 85	Van Belt	Rp 1,085,704.40
Total in June 2020			Rp61,268,710.89

(Source: PT Batanghari Barisan, 2020)

Table 1.2 Stockout Items during September 2018 till June 2020

No	Item	Total Stockout
1	Bearing 6305	2 units
2	Baut 5/8 x 2"	4 units
3	Kawat Las RB 26 3.2 mm	10 kg
4	Oxygen	1 unit
5	Batu Gerinda Potong 7"	3 units
6	Van Belt B 56	6 units

(Source: PT Batanghari Barisan, 2020)

The existence of a fairly high overstock caused by inaccurate calculation from the warehouse division and rarely stockout still has a negative effect on the company, such as delays in maintenance activities that make machines or equipment did not run temporarily. Because of those problems, research is carried out to evaluate the company's inventory system and determine the appropriate consumable items inventory control policy to minimize inventory cost and maximize service level.

1.2 Problem Formulation

Based on the description from the background subsection, PT Batanghari Barisan often experiences overstock and sometimes is out of stock for consumable items. Therefore, the problem formulation in this research is how to propose an inventory control policy for consumable items so the total inventory cost can be minimized at PT Batanghari Barisan?

1.3 Research Objectives

The objectives to be achieved in this research are:

1. To know the critical items of consumable items based on ABC analysis
2. To know the implementation of company policy using Monte Carlo simulation
3. Proposed an inventory control policy (time to replenishment, order quantity, and safety stock) according to the lowest total inventory cost.

1.4 Research Scopes

The scopes of this research are as follows:

1. The inventory recapitulation data of consumable items used is data from 1st September 2018 till 27th June 2020
2. The items being researched were critical items of consumable items based on ABC analysis
3. The item price and order price of consumable items are considered constant

1.5 Outline of Report

The outline of the final project is arranged systematically and consists of six chapters, as follows:

CHAPTER I INTRODUCTION

This chapter describes the background of the research, problem formulation, research objective, research scopes, and the outline of the report.

CHAPTER II LITERATURE REVIEW

This chapter provides an overview of the theoretical basis and a review of previous research related to the final project topic.

CHAPTER III RESEARCH METHODOLOGY

This chapter describes the systematic steps to solve the research problem and is equipped with a research methodology flowchart.

CHAPTER IV RESULTS

This chapter describes collecting data and the stages in data processing, starting from ABC analysis, Monte Carlo simulation, and proposed inventory control policy.

CHAPTER V DISCUSSIONS

This chapter contains an analysis of the data processing results that have been done, include analysis of ABC, Monte Carlo simulation, proposed inventory control policy, and the comparison of total inventory cost.

CHAPTER VI CONCLUSION AND SUGGESTION

This chapter contains conclusions of the research and the suggestions given to the company and the next research.

