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Inventory Management Analysis at UD Nuada Truss Tabanan Branch

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ABSTRACT: Inventory management must be considered by the company so that the inventory costs incurred do not burden the company too high and anticipate the occurrence of inventory shortages. This research was conducted at UD Nuada Truss Tabanan branch with the aim of knowing whether the performance of inventory management is optimal or not. This study uses descriptive analysis techniques using quantitative and qualitative data obtained from observations and interviews. This descriptive analysis technique will be explained in stages starting with ABC analysis, calculating EOQ, safety stock, reorder point, maximum inventory, inventory turnover, and total inventory cost. The results showed that the inventory management implemented by UD Nuada Truss Tabanan branch was not optimal. This is shown by the comparison of the total inventory cost incurred by the company's inventory management which is higher than the inventory management using the EOQ method. the total inventory cost incurred by the company's inventory management was IDR 69,074,629, while the inventory management using the EOQ method was IDR 53,038,890. The application of inventory management using the EOQ method provides efficiency to the company in the amount of IDR 16,035,739 (23.22%).

KEYWORDS: ABC analysis, EOQ, safety stock, reorder point, total inventory cost

I. INTRODUCTION

Inventory management efficiency that is not optimal will result in companies facing the risk of fulfilling demand from customers (Hendy and Kenrick, 2018). Inventory management has an important role in the company, especially in reducing production costs such as raw material costs and storage costs and achieving profits (Yani et al., 2018). Managing inventory can be done by analyzing the economic order quantity (EOQ) method, which is part of the method to control inventory to reduce total storage and order costs (Heizer and Render, 2015). Its use can calculate the number of orders for the most economical raw materials needed by the company and the frequency of each purchase of raw materials from suppliers. Things that need to be considered in the use of the EOQ method are lead time, reorder points, and safety stock (Sanjaya and Purnawati, 2021).

In an effort to analyze the performance of an inventory management can use the inventory turnover rate where inventory looks at the ratio of the total cost of goods sold to the average inventory in a company. The high inventory turnover of a company, as well as the performance of a company because the company's performance will look efficient (Rambe and Swara, 2021). Problems related to inventory management, of course, can arise in every company, one of which is UD Nuada Truss Tabanan branch. UD Nuada Truss is a building materials and equipment business. The diversity of UD Nuada Truss Tabanan branch still does not prioritize merchandise products that need to be managed more strictly. This will result in overspending on less valuable products and neglecting more important products. Therefore, UD Nuada Truss Tabnan branch needs to classify products or goods owned using ABC analysis so that they can find out products or goods that have high investment value and risk. In placing orders for inventory, UD Nuada Truss Tabanan branch only conducts based on observations from shop owners and employees which results in overstock and out of stock merchandise.

Data from observations and interviews with the owner of UD Nuada Truss Tabanan branch in early February 2023, in 2022 C Kencana 75 x 0.75 small red (mild steel) products had experienced overstock and out of stock. Based on the results of interviews with store owners, the out of stock on these products also had an impact on declining sales in June 2022, due to customer dissatisfaction at the Tabanan branch of UD Nuada Truss regarding the availability of merchandise for C Kencana 75 x 0.75 small red products.The emergence of these problems indicates that there are fluctuations in product orders at UD Nuada Truss Tabanan branch. So, it can be concluded that UD Nuada Truss Tabanan branch requires a comparison between the company's inventory management system and inventory management system.

II. LITERATURE REVIEW

Supplies

Presenting inventory arises due to planning or uncertainty due to lack of information. Inventory that appears because it is planned is usually a company has more products than expected (Pujawan and Mahendrawati, 2017). While inventory that arises due to uncertainty is often found by most companies, especially companies that move with a made-by-order system. Inventory can be classified into three types, namely based on its shape, based on its function, and based on the nature of dependence. The function of inventory includes anticipating the unpredictable ups and downs of consumer demand, making savings on unit costs, making inventory to anticipate seasonal changes (Handoko, 2003). The benefits of inventory according to Eddy Herjanto (2017: 238) are reducing the risk of delays in the delivery of raw materials, reducing the risk of materials that are no longer available, suppressing the increase in prices of goods, storing seasonal goods so that the company does not experience problems and achieves maximum profits. Inventory costs are costs that arise due to the company's operational activities in meeting inventory needs. Inventory management is the process of procuring inventory in continuous operation with minimum costs (Lukas Setia Atmaja, 2003). Therefore, it is very important in managing the company's operating activities. The goal is to balance inventory investment with customer service using an inventory control model. Companies need measures to measure inventory management performance that have an orientation to operating efficiency on the one hand (suppliers) and the other (service to customers) (Pujawan and Mahendrawatim 2017). This research is a descriptive research so that it will be explained about the research flow:

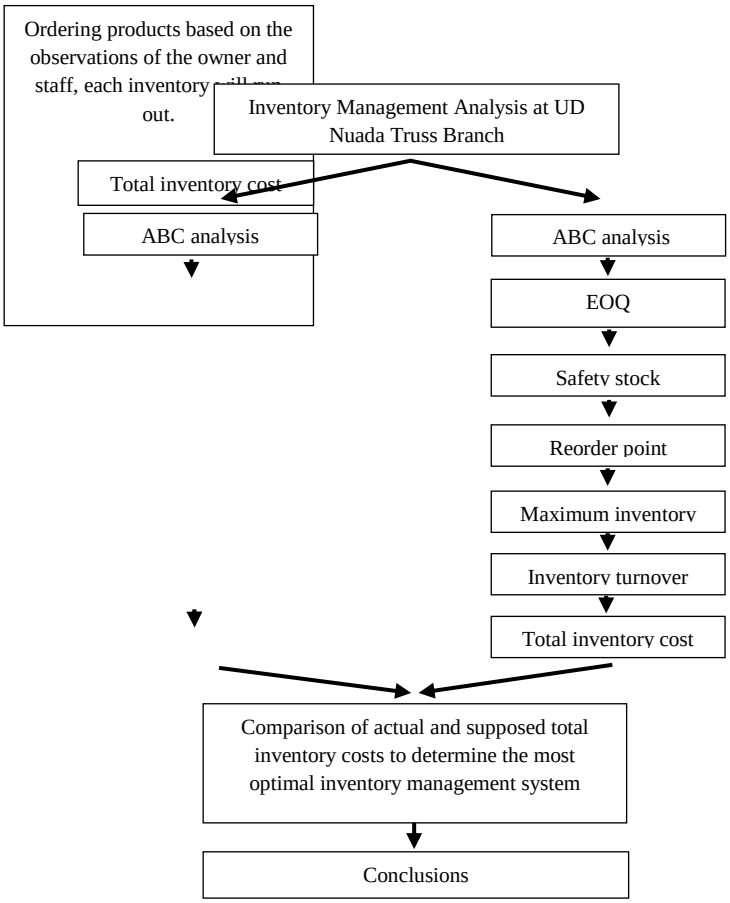

Figure 1. Research Flow of Inventory Management Analysis at UD Nuada Truss Tabanan branch

III. RESEARCH METHODS

This research is a descriptive research with a quantitative approach. The research is a case study related to inventory at UD Nuada Truss Tabanan branch to analyze company problems related to the inventory system and see whether the performance of inventory management at UD Nuada Truss Tabanan branch is optimal or not. This company is located on Jalan Dr. Ir. Soekarno, Dauh Peken, Tabanan District, Tabanan Regency. The object used is product inventory management at UD Nuada Truss Tabanan Branch. Conducting optimal and effective inventory measurements, variables are set, namely Economic Order Quantity (EOQ), Safety Stock, Reorder Point (ROP), Persediaan Maksimal, Inventory Turnover (ITO), and Total Inventory Cost (TIC).

Economic order quantity is a calculation to determine the best total product order every one order on inventory with classification A at UD Nuada Truss Tabanan branch. Safety stock is a safety preparation to anticipate uncertain demand and shortages in the inventory of goods with classification A at UD Nuada Truss Tabanan branch. Reorder point is the point of reordering which describes the level of inventory of goods with classification A at UD Nuada Truss Tabanan branch to carry out

product reorders. ROP must be calculated appropriately, because it is directly related to customer demand and inventory in the warehouse. The maximum inventory is the amount of inventory calculated by adding the EOQ and safety stock results. Inventory turnover is a ratio to measure several times the inventory of goods with classification A at UD Nuada Truss Tabanan branch sold on average in 2022. Total inventory cost is the total stock cost between ordering and storage costs.

The quantitative data is the cost when placing an order, the cost of storage, monthly needs data, price per unit of product, sales value, number of products, demand per day, lead time, and quantity of each order of merchandise products owned by the UD Nuada Truss Tabanan branch in a period, while qualitative data is the company's general description data. Primary data is related to UD Nuada Truss company policy, namely product inventory from interviews with UD Nuada Truss Tabanan branch store owners, while secondary data is data from trade product inventory reports, costs related to inventory, types of existing inventory, product order volume.

The data analysis technique used in this study is descriptive analysis technique that is discussed systematically using several stages. The first stage is grouping merchandise data based on the ABC concept, which will be grouped based on the value of the product. The second stage will be an analysis based on the inventory system using EOQ, safety stock, reorder point, maximum stock, and inventory turnover. The last stage is a comparison of the total inventory cost between the inventory management system and that applied by the UD Nuada Truss Tabanan branch of the company using the EOQ method.

IV. RESULT AND DISCUSSION

A. Overview UD Nuada Truss Tabanan Branch

UD Nuada Truss Tabanan branch has operational activities including product procurement, inventory management and maintenance, product sales and marketing, product distribution, to establish relationships with suppliers and customers. In carrying out these operational activities, UD Nuada Truss Tabanan branch has 10 employees with a composition of one person as the head of the store, one person as a cashier, two people as administrative staff, four people as warehouse staff, and two people as drivers. In 2022, UD Nuada Truss Tabanan branch is recorded to have an inventory of 374 types of products from various suppliers spread both from the island of Bali and outside the island of Bali. Products sold from UD Nuada Truss are quite diverse, such as all kinds of steel, iron, roofs, ceilings, ceiling frames, paint, and so on. In ordering products and checking the quantity of products available, UD Nuada Truss Tabanan branch still does it based on observations from shop heads and employees with the help of applications owned by the company. The total cost incurred by UD Nuada Truss Tabanan branch for ordering costs for products included in classification A is IDR 14,636,194 and storage costs for products included in classification A is IDR 54,438,435 so that the total inventory cost for UD Nuada Truss Tabanan branch in 2022 amounting to IDR 69,074,629.

B. Discussion of Reasearch Results

First Stage (ABC Analysis)

ABC's analysis is based on a percentage calculation of the number of products and the annual investment value of UD Nuada Truss Tabanan branch.

Table 1. Results of ABC Analysis at UD Nuada Truss Tabanan Branch in 2022

Class	Products		Investment Value	
	Total Products	Percentage	Total Investment	Percentage
A	38	10,2%	IDR 4.696.692.700	80,26%
B	71	19%	IDR 860.072.568	14,7%
C	265	70,8%	IDR 294.629.884	5,04%
Total	374	100%	IDR 5.851.395.152	100%

Source: secondary data processed, 2023

Based on the results of ABC's analysis above, the inventory of UD Nuada Truss Tabanan branch products during 2022 can be interpreted as follows; 1) The inventory of UD Nuada Truss Tabanan branch products included in classification A is 38 products (10.2%) and an investment of IDR 4,696,692,700 with a percentage of 80.26% so that it is included in the category of critical inventory or products with the highest inventory value and risk; 2) UD Nuada Truss Tabanan branch product inventory which is included in classification B is 71 products (19%) and an investment of Rp 860,072,568 with a percentage of 14.7% so that it is included in the category of inventory that is quite critical or products with moderate inventory value and risk; and 3) The inventory of UD Nuada Truss Tabanan branch products included in classification C is 265 products (70.8%) and an investment of Rp 294,629,884 with a percentage of 5.04% so that it is included in the category of less critical inventory or products with the lowest inventory value and risk. Inventory at UD Nuada Truss Tabanan branch which is included in classification A with a critical inventory category must carry out strict inventory control in its management. This is because products belonging to classification

A have a high investment value and level of damage risk so that in this study inventory management will be carried out only for products included in classification A with critical inventory categories.

Second Stage (Product Inventory Management Classification A)

The second stage is to carry out inventory management on product classification A. EOQ calculation to determine the quantity and frequency of products ordered for each product unit in one period, safety stock calculation to determine how many product units need to be provided for safety stock, reorder point to determine at what point the number of units of product that must be re-ordered, maximum inventory to determine the maximum amount of inventory in the warehouse, to inventory turnover to measure the speed of inventory turnover. The following is the result of an analysis of the calculations that have been carried out on the inventory of UD Nuada Truss Tabanan branch which is included in classification A:

Table 2. Calculating Result of Product Inventory Management Classification A at UD Nuada Truss Tabanan Branch in 2022

Product	EOQ	SS	ROP	Max. Inventory	Company's ITO	EOQ's ITO
C Kencana 75 X 0.75 Small Red	124	92	204	216	24	67
Trimdek 750 X 0.25 X 6.2m Silver	41	15	25	56	46	119
Trimdek 0,25 X 750mm X 6.2 M Blue Resin	37	11	18	48	41	57
Reng Kencana Fold 0,40(Yellow)	269	84	185	353	16	18
C Bima 75 X 0.75 (Blue)	92	15	52	107	42	56
Trimdeck 0.25 X 750 X 5m	38	7	11	45	39	102
Stal 2 X 4 X 1.5k Galvanil (M) (0.7mm)	140	35	108	175	25	122
Reng Kencana Fold 0,45(Red)	197	42	93	239	12	14
Aplus Plank Teak 8mm	188	24	53	211	53	67
Gypsum A-Plus 9mmx120x240	128	16	36	144	27	36
Trimdeck 0,25 X 750 X 4 Mtr	42	6	10	48	17	45
Stal 2 X 4 X 1,5b Galvanil (M/H) (0.8mm)	108	22	70	131	17	272
Trimdek 0,25 X 750mm X 5m Blue Resin	32	4	7	36	32	59
C Bima 75 X 0.65 (Red)	86	9	30	94	15	92
Reng Bima 0.45 (Blue)	155	13	46	168	14	109
Rd 2mm - 460	90	13	66	102	9	33
Stal 2 X 4 X 1,4k Galvanis (K) (0.6mm)	129	21	67	150	17	16
Stal 3 X 3 X 1,5k Galvanis (M) (0.7mm)	114	19	61	133	20	15
Stal 4 X 6 X 1,5b Galvanis Full (M/H) (0.8mm)	44	7	21	51	7	7
Stal 3 X 3 X 1,6 K Galvanis (H) (0.9mm)	70	9	30	79	7	26
Trimdek Transparent 0.8mmx76.5x6m	6	1	1	7	13	15
Silica Board 4mm (120x240)	94	8	17	102	29	27
Sds 12 X 50 (L) (500)	9283	2127	6665	11409	57	139
Stal 4 X 6 X 1.5b Galvanis (M/H) (0.8mm)	50	8	25	58	8	8
Trimdeck 0.30 X 750mm X 6.2	14	1	2	15	7	11
Reng Bima 0.40 (Red)	137	10	35	147	203	56
Sds 12 X 20 (L) (500)	12003	2291	7179	14293	44	47
Siku 4 X 4 X 6 Inti (B)	55	8	25	63	11	9
Drewel 6 X 1 (1000)	60526	5346	15126	65872	29	55
Stal 3 X 3 X 1,5b Galvanil (M/H) (0.8mm)	73	9	27	82	12	30
Kalsiplank Jt 8mm (20 X 300)	128	17	33	145	32	50
Sds 10 X 1/2(10x16) (1000)	20150	3597	11274	23747	26	30
Stal 4 X 6 X 1,5k Galvanil Full(M) (0.7mm)	40	4	14	44	9	22
Merapi Red Sun Tile 0.25 (80x80)	143	10	29	153	4	6
Trimdek 0,25 X 750mm X 6,2m Silver Test	10	1	1	10	212	35
Wall Angle Lipat 0.20	465	34	54	499	15	42
Siku 4 X 4 Ks A (H.J)	40	5	15	45	7	9
Siku 3 X 3 X 6 K (K)	94	8	25	102	4	6

Source: secondary data processed, 2023

The result of inventory analysis in table 2, involving 38 products included in classification A demonstrate varied outcomes. The EOQ calculation results indicate that the highest number of orders is obtained Drewel 6 X 1 (1000) product with 60,526 units per once order with an order frequency in one year as many as 16 times, while the product with the lowest number of orders is the Transparent Trimdek 0.8mmx76.5x6m products with 6 units per once order with an order frequency in one year as many as 18

times. Safety stock can be calculated by multiplying at the service level in meeting customer demand on time and according to expectations with the average demand per day and lead time of UD Nuada Truss Tabanan branch products. Based on the results of the safety stock calculation, the higest safety stock quantity is obtained for Drewel 6 X 1 (1000) product with 5,436 units of products, while the products with the lowest amount of safety stock were Transparent Trimdek 0.8mmx76.5x6m, Trimdeck 0.30 X 750mm X 6.2, and Trimdek 0.25 X 750mm X 6.2m Silver Test product as many as 1 unit of product. Reorder points can be calculated by multiplying the average demand per day in each product by the lead time, then adding it up by the safety stock. with safety stock. The average demand per day is determined by dividing the annual demand contained in the type of product with the working days of UD Nuada Truss Tabanan branch during 2022, which is 300 days and is considered constant. Then the lead time referred to in the calculation of this reorder point is the time to place an order until the receipt of goods. Based on calculation result, the highest number of reorder points is obtained which is Drewel 6 X 1 (1000) product when the remaining products are 15,126 units of products, while the products with the lowest reorder point is Trimdek Transparent 0.8mmx76.5x6m and Trimdek 0.25 X 750mm X 6.2m Silver Test product when the remaining product is 1 unit of product. The maximum inventory is calculated by summing the EOQ and safety stock on UD Nuada Truss Tabanan branch products which are included in classification A. The highest maximum inventory result is Drewel 6 X 1 (1000) product as many as 65,872 units of products, while the product with the lowest maximum inventory amount is Trimdek Transparent 0.8mmx76.5x6m product as many as 7 units of products. Inventory turnover can be calculated on the division of total sales by the average total inventory of UD Nuada Truss Tabanan branch. The calculation is carried out on the application of inventory management carried out by UD Nuada Truss Tabanan branch and the EOQ inventory management method, then it will be compared with each other to obtain the most effective method of turnover rate. it can be seen that applying the EOQ method produces a higher inventory turnover rate compared to company inventory management with details of 30 products with the EOQ method producing higher ITO, 2 products produce the same ITO, namely in Stal 4 X 6 X 1.5b Galvanized Full (M/H) (0.8mm) and Stal 4 X 6 X 1.5b Galvanized (M/H) (0.8mm), and 6 products with inventory management resulting in greater ITO than using the EOQ method. The six products include Stal 2 X 4 X 1.4k Galvanized (K) (0.6mm), Stal 3 X 3 X 1.5k Galvanized (M) (0.7mm), Silica Board 4mm (120x240), Reng Bima 0.40 (Red), Siku 4 X 4 X 6 Core (B), and Trimdek 0.25 X 750mm X 6.2m Silver Test. Based on these results, it shows that inventory turnover using the EOQ method provides inventory turnover and turns it into cash or accounts receivable so that the utilization of UD Nuada Truss Tabanan branch profits is maximized.

Third Stage (Comparison of Total Inventory Costs)

The components used in determining total inventory costs in both methods are ordering and storage costs incurred in the 2022 period. The following is a comparison of total inventory costs on UD Nuada Truss Tabanan branch products which are included in classification A.

Table 3. Total Inventory Cost Comparison Results

Company Methods		**EOQ Methods**	
Storage Cost	**Booking Fee**	**Storage Cost**	**Booking Fee**
54.438.435	14.636.194	26.560.013	26.478.877
69.074.629		53.038.890	

Source: secondary data processed, 2023

Table 3. Shows that the company's total inventory costs are higher when compared to the application of inventory management with the EOQ method. This method incurs a total inventory cost of IDR 69,074,629, and from the inventory management method with EOQ of IDR 53,038,890. This indicates that the company was able to reduce total inventory costs by IDR 16,035,739 (23.22%). The results of the study explained that inventory management in the EOQ method was able to provide efficiency in the total inventory costs incurred by UD Nuada Truss Tabanan branch. Theoretical benefits that support previous research and can be used as a reference for future research related to inventory management. Practically utilized by UD Nuada Truss Tabanan branch in inventory management. Based on the results of ABC analysis, companies can classify their inventory products. The calculation of Economic Order Quantity (EOQ) can provide a company with information regarding the quantity and frequency of product orders for each individual product within a given period. On the other hand, the calculation of safety stock can provide the company with information about the necessary quantity of products to be kept in inventory as a buffer, along with the reorder point to determine when to initiate a reordering process. By implementing these strategies, the company aims to optimize the total inventory costs, thus maximizing profits and enhancing the performance of inventory management for the products in question Furthermore, the adoption of such inventory management practices can also be extended to similar companies or those requiring inventory for their operational or business activities. This approach facilitates efficient supply chain management, reduces stockouts, and ensures timely product availability. Ultimately, implementing effective inventory management contributes to overall operational efficiency and potentially creates a competitive advantage for businesses operating in various industries.

V. CONCLUSIONS

The conclusion that can be explained is that the product inventory management applied by UD Nuada Truss Tabanan branch is still not optimal as evidenced by simple inventory management. Therefore, companies can implement an inventory management system with the following results: 1) Based on ABC analysis, which includes classification A with critical category as many as 38 products (10.2%) with an investment value of 80.26%, classification B with a moderately critical category as many as 71 products (19%) with an investment value of 14.7%, and classification C with a less critical category as many as 265 products (70.8%) with an investment value of 5.04%; 2) Based on EOQ analysis, the economic order quantity for classification A products varies from 6 to 60,526 units with order frequency from 8 to 70 times; 3) Based on the analysis of safety stock, reorder points, and maximum inventory for classification A products, the number of safety stocks varies from 1 to 5,346 units, reorder points vary from 1 to 15,126 units, and maximum inventory varies from 7 to 65,872 units; 4) Based on inventory turnover (ITO) analysis, it was found that applying the EOQ method resulted in higher inventory turnover than the company's ITO with 30 products, 2 products produced the same ITO, and 6 products with inventory management applied by the company produced higher ITO compared to using the EOQ method; and 5) Based on the results of the comparison of total inventory costs between inventory management applied by the company and the EOQ method, the inventory management method applied by the company incurred a total inventory cost of IDR 69,074,629, while the inventory management method with EOQ incurred a total inventory cost of IDR 53,038,890. This indicates that the company can save total inventory costs as much as IDR 16,035,739 (23.22%).

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