

Analysis of Placement Maximizing Planning in Warehouse Using FSN Analysis Using Class Based Storage Method (Case Study: PT. XYZ)

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Abstract

The current era of Industrialization 4.0 has caused many new companies to emerge, including logistics companies. One of them is PT. XYZ, a state-owned company engaged in freight forwarding and warehousing services. Constraints in the placement of goods in the warehouse, namely, the goods stored are sometimes not in accordance with the specified place, the placement of goods on the empty side of the entrance to the warehouse makes a buildup, inhibits the process of inbound and outbound and unequal distance between goods makes the goods not neat. The Class Based Storage method in this study helps the arrangement and placement of goods in the warehouse. To classify goods based on intensity of movement of goods used Fast Slow Non Moving (FSN) analysis. FSN analysis results state the placement of goods in the warehouse, the maximum number of repairs before doing the repair is 4,482 units of goods and after doing repairs to the warehouse lay out of 5,500 units of goods, minimizing search time and shorter mileage with an efficiency level of 30% of the conditions previous.

Keywords: *warehouse, Class Based Storage, Fast Slow Non Moving analysis*

Introduction

The current era of Industrialization 4.0 has caused the industrial world to develop very rapidly. This caused many new companies to emerge, including logistics companies. The growth in the number of logistics companies spread both in Indonesia and abroad is not balanced with the growth in the number of consumers, this causes intense competition between companies to get consumers and obtain maximum profits. To be able to compete in these situations, companies are required to always have the ability to continue to develop and always have a change, especially in warehousing. Warehouse or storage in general will have a very important function in maintaining the smooth operation of goods in a factory.

According to Bowersox, (1978: 293) Warehouse is a location for storing products until demand is large enough to carry out its distribution. Storage is considered necessary to adjust the product to the needs of consumers. The principle of the use of time (time utility) is used as a reason to justify this reason. According to Apple (1990: 242), another understanding of a warehouse is a place that is burdened with the task of storing goods that will be used in production, until the goods are requested according to the production schedule. The warehouse can be described as a logistics system of a company that functions to store products and other production equipment and provide information about the status and condition of the material / products stored in the warehouse so that the information is easily accessed by anyone with an interest.

PT. XYZ is a state-owned company engaged in the field of freight forwarding services. This company provides leasing of product storage warehouses and is also trusted for the distribution of goods PT. Unilever throughout Indonesia in the form of ice cream wall cooler including its spare parts. However, in the implementation of the placement of goods in the warehouse is still experiencing problems, such as goods that are stored sometimes are not in accordance with a predetermined place, laying of goods on the empty side of

the entrance to the warehouse makes a buildup around the entrance, which sometimes inhibits the inbound process and outbound and also the distance between items that are not the same to make goods untidy. The application of Class Based Storage Method in this study helps the arrangement and placement of raw materials in the warehouse to be neat, able to maximize the area and the grouping of types of goods so that they are not randomly grouped. According to Heragu (1997) this Class-Based Storage Method is a storage procedure that divides goods into three classes A, B, and C based on the Pareto law by taking into account the level of Storage and Retrieval (S / R) activity in the warehouse. This method makes the arrangement of places designed more flexible by dividing the storage area into several parts. Each place can be filled randomly by several types of goods that have been classified based on the type and size of the goods.

Theory Study and the Formulation of Hypotheses

Activities generally carried out relating to storage of materials in warehouses, are Receiving, Prepacking, Put-away, Storage, Order picking, Packaging, Sorting and accumulation, Packing and Shipping. In designing the warehouse layout there are several principles that are commonly used as a reference, namely: Popularity, Similarity, Size, Characteristics and Space utilization. Some important component characteristics are: Perishable materials (easily damaged components), Oddly shaped and crushable items (Hazardous special components), Hazardous materials (dangerous components), Security items (components with special safeguards) and Compatibility (compatibility / compatibility suitability).

Placement of goods is an activity related to what is based on the goods placed in the warehouse. Placement policy for this item. John Warman (Warehousing Management, 1988) states that the main function of warehousing is storage of raw materials, intermediate goods, as well as storage places for finished products, besides that it is also a place for storing goods to be sent or goods that have just arrived. And the warehouse has an important role to support the company's success in achieving its goals. Donal J. Bowersox (Logistics Management, 2000) said that the warehouse can be described as a logistics system of the company whose function is to store products and other production equipment (raw materials, good-in-process, finished goods, spare parts, supplies and dead stock) and provide status information on material / product conditions stored in the warehouse so that the information is easily accessible by anyone with an interest and is always up-to-date. The warehouse is made to have the main function of which is to hold goods temporarily, waiting for the goods to be used and to guarantee the continuity of work performance.

(Apple, 1990) A plant layout is a facility design, analyzing, conceptualizing, and realizing a system of making goods and services. This design is generally described as a floor design, which is an arrangement of physical facilities (equipment, land, buildings, and other facilities) to optimize the relationship between implementing officers, the flow of goods, information flow, and the procedures needed to achieve business objectives economically and secure. According to Heragu (1997), this Class-Based Storage Method is a storage procedure that divides goods into three classes A, B, and C based on the Pareto law by taking into account the level of Storage and Retrieval (S / R) activity in the warehouse. This method makes the arrangement of places designed more flexible by dividing the storage area into several parts. Each place can be filled randomly by several types of goods that have been classified based on the type and size of the goods.

Namely the placement of materials or materials based on the similarity of a type of material or material into a group. This group will be placed at a special location in the warehouse. The similarity of materials in a group can be in the form of similarity of items or similarities in a list of consumer orders.

FSN analysis is carried out to classify goods in warehouses based on the intensity of the movement of goods in the warehouse, namely the number of goods stored in the warehouse (average stay) and how often the entry and exit of goods in the warehouse (consumption rate). Classification will be obtained by the three categories of goods, namely (Sari, 2013) : Non Moving (70%): Goods with slow motion, Slow Moving (20%): Movement of goods is not too fast and often, but not too slow, Fast Moving (10%): Goods with frequent and fast movements. Classification of goods with FSN Analysis FSN classification based on average stay, FSN classification based on consumption rate and Final FSN classification, which can be obtained by comparing

the results of the FSN classification based on average stay and consumption rate. The final stage in the FSN Analysis is comparing the classification of the FSN average stay and consumption rate results. Liebherr 5553 is on average stay N which means goods with non-moving / not moving and very slow movements, and is at consumption rate F, means the results of the classification of the frequency of entry and exit of goods are in the frequency classification S which means the movement of goods is not too frequent / slow moving.

Methods

The variable used in this study is a single variable at PT. XYZ by maximizing the placement of goods in warehouses are still not suitable. In this study data collection techniques using interview, observation and literature study methods. Research data were analyzed using descriptive analysis, meaning that the data obtained in the field were processed in such a way as to provide systematic, factual, and accurate data regarding the problem under study.

Descriptive analysis is used to analyze data about the problem of placing goods in the warehouse. While the data analysis method the authors chose FSN analysis to classify goods in warehouses based on the intensity of movement of goods in warehouses. Classification will be obtained by the three categories of goods namely fast moving, slow moving, non moving. To get the classification of goods by FSN analysis based on average stay (how long the goods are stored in the warehouse) and consumption rate (how often in and out of goods in the warehouse).

Operational Definition and Variable Measurement

Warehouse Layout

A good warehouse layout must use the available space effectively to minimize storage costs and material handling costs. Some factors that must be considered in warehouse design are the shape and size of the aisles, the height of the warehouse, the location and orientation of the docking area, the type of shelves to be used for storage and the level of automation involved in storing and taking goods. The purpose of the warehouse layout are that is use of existing areas. Optimal layout planning will provide a solution to reduce the use of available space, utilization of greater use of machinery, labor and production facilities. Appropriate arrangements will reduce investment in production equipment and supplies

Class-Based Storage Method

is a storage procedure that divides goods into three classes A, B, and C based on the Pareto law by taking into account the level of Storage and Retrieval (S / R) activity in the warehouse. This method makes the arrangement of places designed more flexible by dividing the storage area into several parts. Each place can be filled randomly by several types of goods that have been classified based on the type and size of the goods.

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Fast Slow Non Moving (FSN) analysis

FSN analysis is carried out to classify goods in warehouses based on the intensity of the movement of goods in the warehouse, namely the number of goods stored in the warehouse (average stay) and how often the entry and exit of goods in the warehouse (consumption rate). Classification will be obtained by the three categories of goods, namely (Sari, 2013) that is non moving (70%): goods with slow motion, slow moving (20%): movement of goods is not too fast and often, but not too slow and fast moving (10%): goods with frequent and fast movements.

Here is the calculation formula for FSN analysis, (Andika, kk 2014) :

a. Calculation *Average Stay*

$$\text{Average stay} = \frac{\text{Inventory Holding Balance}}{(\text{Opening Balance} + \text{Total Receipt Quantity})}$$

b. Calculation Consumption Rate

$$\text{Consumption Rate} = \frac{\text{Total Issue Quantity}}{\text{Total Period Duration}}$$

c. FSN classification based average stay Liebherr efi5553

$$\text{Average stay} = \frac{\text{Inventory Holding Balance}}{(\text{Opening Balance} + \text{Total Receipt Quantity})}$$

Results and Discussion

Layout of Company Goods Storage Initial Conditions

PT. XYZ in the distribution of goods to all regions in Indonesia, and this requires a storage warehouse to store goods to be sent to consumers, and PT. XYZ provides a warehouse of goods storage with a warehouse area of 42 m x 74 m and a total area of 3208 m², with a maximum number of goods capable of being accommodated at the moment as many as 4,482 units. The table 1 below shows the types of goods and sizes of goods stored in the warehouse.

Table 1 Types of Goods in the Warehouse of PT. XYZ

Number	Item name	Size (liter)
1.	Cool sd90	300
2.	Haier econic	300
3.	Liebherr efi 2753	200
4.	Hiron sd136	100
5.	Hiron sd280	200
6.	Hiron sd352	300
7.	IARP EIS44.2	300
8.	Liebherr efi 4853	400
9.	Liebherr efi 5553	500
10.	Visimax iii ca	200
11.	Hiron sd260h	200
12.	Box bike	50
13.	Liebherr efi 2053	100
14.	Liebherr efi 4153	300
15.	Hiron bd-206	200
16.	Hiron sd361	300
17.	Hiron SD 151	100
18.	Hiron BD-711	700
7.	IARP EIS44.2	300
8.	Liebherr efi 4853	400
9.	Liebherr efi 5553	500
10.	Visimax iii ca	200
11.	Hiron sd260h	200
12.	Box bike	50
13.	Liebherr efi 2053	100
14.	Liebherr efi 4153	300
15.	Hiron bd-206	200

Table Cont...

16.	Hiron sd361	300
17.	Hiron SD 151	100
18.	Hiron BD-711	700

Source: Warehouse PT. XYZ

in the warehouse of PT. XYZ also has a stock of goods to anticipate an increase in buyer demand. The stock data is as in Table 2 below:

Table 2 Stock of goods in the warehouse 2018

Number	Item name	Total (Unit)
1.	Box bike	20
2.	Cool SD 90	30
3.	Haier Eonic	139
4.	Hiron BD 206	200
5.	Hiron SD 136	105
6.	Hiron SD 151	85
7.	Hiron SD 260 H	203
8.	Hiron SD 280	90
9.	Hiron SD 352	95
10.	Hiron SD 361	139
11.	IARP EIS 44.2	30
12.	Liebherr efi 2053	70
13.	Liebherr efi 2753	62
14.	Liebherr efi 4153	769
15.	Liebherr efi4853	177
16.	Liebherr efi5553	166
17.	Visimax iii CA	107
18.	Hiron BD-711	157
Jumlah		2.644

Source: Warehouse PT.XYZ

The current capacity of goods in the warehouse is 2,644 units of goods. With its many number of units of goods in the warehouse at the moment we can see the picture below shows the current warehouse layout image, the data obtained directly from PT. XYZ. It can be seen in Figure 1 below that is the current warehouse layout.

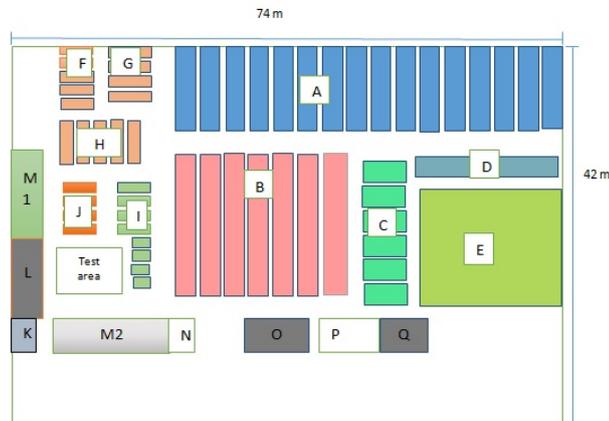


Figure 1 Ware House PT.XYZ

Table 3 below is a specification of the size of goods in the warehouse that will be calculated to determine the layout of the items that fit in the warehouse.

Table 3 Data Size of Goods in the Warehouse

Number	Item Name	Long (m)	Wide (m)	High (m)
1	Box bike	1,5	0,5	1
2	Cool SD 90	0,6	0,5	0,6
3	Haier Econic	1,3	0,8	1
4	Hiron BD 206	0,6	1	0,8
5	Hiron SD 136	0,6	0,7	0,7
6	Hiron SD 151	0,7	0,6	0,8
7	Hiron SD 260 H	1	0,7	0,9
8	Hiron SD 280	1	0,7	0,9
9	Hiron SD 352	1,2	0,6	0,9
10	Hiron SD 361	1,2	0,6	0,9
11	IARP EIS 44.2	0,6	0,6	2
12	Liebherr efi 2053	0,7	1,5	0,7
13	Liebherr efi 2753	1,1	0,7	0,8
14	Liebherr efi 4153	0,6	1,4	0,8
15	Liebherr efi4853	1,7	0,7	0,8
16	Liebherr efi5553	1,9	0,7	0,8
17	Visimax III CA	1,3	0,8	1,4
18	Hiron BD-711	2,3	0,8	0,9

Source: Warehouse PT. XYZ

Table 4 below shows the data of Inbound goods in warehouses in 2018, In bound of goods, namely the process of loading goods into warehouses, the process of this activity is definitely in each warehouse.

Table 4. Inbound Goods Data for 2018

Number	Item Name	The a mount of goods (Unit)
1.	Box bike	230
2.	Cool SD 90	570
3.	Haier Econic	1790
4.	Hiron BD 206	1670
5.	Hiron SD 136	2400
6.	Hiron SD 151	1810
7.	Hiron SD 260 H	3560
8.	Hiron SD 280	1670
9.	Hiron SD 352	1820
10.	Hiron SD 361	1812
11.	IARP EIS 44.2	600
12.	Liebherr efi 2053	1800
13	Liebherr efi 2753	1800

Table Cont...

14.	Liebherr efi 4153	5350
15.	Liebherr efi4853	3600
16.	Liebherr efi5553	3600
17.	Visimax III CA	850
18.	Hiron BD-711	3601
	Total	38623

Source: Warehouse PT. XYZ

Table 5 below shows the out bound data of goods in 2018, the data out bound of goods is data that contains about the expenditure of goods in warehouses.

Table 5 Outbound Goods Data for 2018

Number	Item Name	The amount of goods (Unit)
1.	Box bike	156
2.	Cool SD 90	504
3.	Haier Econic	1752
4.	Hiron BD 206	1596
5.	Hiron SD 136	2232
6.	Hiron SD 151	1740
7.	Hiron SD 260 H	2940
8.	Hiron SD 280	1560
9.	Hiron SD 352	1716
10.	Hiron SD 361	1704
11.	IARP EIS 44.2	540
12.	Liebherr efi 2053	1776
13.	Liebherr efi 2753	1740
14.	Liebherr efi 4153	5136
15.	Liebherr efi4853	3348
16.	Liebherr efi5553	3360
17.	Visimax III CA	720
18.	Hiron BD-711	3516
	Total	36036

Source: Warehouse PT. XYZ

FSN Analysis Based on Average Stay

The average stay calculation of goods is carried out to find out the average length of product stored in the warehouse. At this stage, after the average stay value is obtained for each item, the average stay value is sorted from smallest to smallest. 70% of the accumulated value is included in the non-moving category, 20% of the accumulated value is included in the slow moving category, and 10% of the accumulation falls into the fast moving category. Previously calculated the average stay of each item. From the above calculation a new table can be made to see the average stay value of all goods, such as table 6 below:

Table 6 Value Data From the Average Stay Formula

Number	Item Name	Inventory Holding Balance	Opening Balance	Total Receipt Quantity	Average Stay
1.	Box Bike	386	20	230	1,54
2.	Cool SD 90	1074	30	570	1,79
3.	Haier Econic	3542	139	1790	1,83
4.	Hiron BD 206	3266	200	1670	1,74
5.	Hiron SD 136	4632	105	2400	1,84
6.	Hiron SD 151	3550	85	1810	1,87
7.	Hiron SD 260 H	6500	203	3560	1,72
8.	Hiron SD 280	3230	90	1670	1,83
9.	Hiron SD 352	3436	95	1820	1,85
10.	Hiron SD 361	3516	139	1812	1,80
11.	IARP EIS 44.2	1140	30	600	1,80
12.	Liebherr efi 2053	3576	70	1800	1,27
13.	Liebherr efi 2753	3540	62	1800	1,90
14.	Liebherr efi 4153	10486	769	5350	1,71
15.	Liebherr efi4853	6948	177	3600	1,83
16.	Liebherr efi5553	6960	166	3600	1,84
17.	Visimax III CA	1570	107	850	1,64
18.	Hiron BD-711	7117	157	3601	1,89

Source: Data processed by the researcher

Table 7 FSN Classification Based Average Stay

Number	Item Name	Average Stay	Kumulatif Average Stay	Average Stay (%)	FSN
1.	Liebherr efi 2753	1,90	1,90	5,9	N
2.	Hiron BD-711	1,89	3,79	11,9	N
3.	Hiron SD 151	1,87	5,66	17,8	N
4.	Hiron SD 352	1,85	7,51	23,6	N
5.	Liebherr efi5553	1,84	9,35	29,5	N
6.	Hiron SD 136	1,84	11,19	35,3	N
7.	Liebherr efi4853	1,83	13,02	41	N
8.	Haier Econic	1,83	14,85	46,8	N
9.	Hiron SD 280	1,83	16,68	52,6	N
10.	Hiron SD 361	1,80	18,48	58,3	N
11.	IARP EIS 44.2	1,80	20,28	63,9	N
12.	Cool SD 90	1,79	22,07	69,6	N
13.	Hiron BD 206	1,74	23,81	75,1	S
14.	Hiron SD 260 H	1,72	25,53	80,5	S
15.	Liebherr efi 4153	1,71	27,24	85,9	S
16.	Visimax III CA	1,64	28,88	91,1	F
17.	Box bike	1,54	30,42	95,9	F
18.	Liebherr efi 2053	1,27	31,69	100	F

Source: Data processed by the researcher

Average stay value shows how long the goods are stored in the warehouse until the goods are sent to the customer. From the calculation results show that goods from Liebherr efi 2753 to Cool SD 90 have an average stay of 0% -70% of the accumulation which means these items are non-moving goods. For Hiron BD 206 to Liebherr efi 4153 goods have an average stay of 70% -90%, which means slow moving goods and lastly Visimax III goods so that Liebherr efi 2053 has the highest average stay of 90% -100% is fast-moving goods.

FSN Analysis Based on Consumption Rate

The value of the consumption rate shows the intensity of the goods in the warehouse, how often goods come in and out of the warehouse. The following is an example of the Consumption Rate data for each product that will be used for the calculation of the Consumption Rate as Table 8 below.

Table 8 Data Consumption Rate Every Product

Number	Item Name	Total Demand for (Unit)	Total Demand Goods (Month)	Consumption Rate (Unit)
1	Box Bike	156	12	13
2.	Cool SD 90	504	12	42
3.	Haier Econic	1752	12	146
4.	Hiron BD 206	1596	12	133
5.	Hiron SD 136	2232	12	186
6.	Hiron SD 151	1740	12	145
7.	Hiron SD 260 H	2940	12	245
8.	Hiron SD 280	1560	12	130
9.	Hiron SD 352	1716	12	143
10.	Hiron SD 361	1704	12	142
11.	IARP EIS 44.2	540	12	45
12.	Liebherr efi 2053	1776	12	148
13	Liebherr efi 2753	1740	12	145
14.	Liebherr efi 4153	5136	12	428
15.	Liebherr efi4853	3348	12	279
16.	Liebherr efi5553	3360	12	280
17.	Visimax III CA	720	12	60
18.	Hiron BD-711	3516	12	293

Source: Data processed by the researcher

After calculating the value of the consumption rate on all goods, then the value is sorted from the largest to the smallest so that it can calculate the cumulative consumption rate. Furthermore, the cumulative value is presented and calculates the cumulative percentage so that the goods can be classified into the classification of the FSN analysis based on the consumption rate. Can be seen in table 9 below.

Table 9 FSN Classification Based Consumption Rate

Number	Item Name	Consumption Rate (Unit)	Kumulatif Consumption rate	Consumption rate %	FSN
1.	Liebherr efi 4153	428	428	14,2	F
2.	Hiron BD-711	293	721	24	F
3.	Liebher efi 5553	280	1001	33,3	F
4.	Liebher efi 4853	279	1280	42,6	F
5.	Hiron SD 260 H	245	1525	50,7	F
6.	Hiron SD 136	186	1711	56,9	F
7.	Liebherr efi 2053	148	1859	61,9	F
8.	Haier Econic	146	2005	66,8	F
9.	Hiron SD 151	145	2150	71,5	S
10.	Liebher efi 2753	145	2290	76,2	S
11.	Hiron SD 352	143	2438	81,1	S
12.	Hiron SD 361	142	2580	85,9	S
13.	Hiron BD 206	133	2713	90,3	N
14.	Hiron SD 280	130	2843	94,6	N
15.	Visimax III CA	60	2903	96,6	N
16.	IARP EIS 44.2	45	2948	98,1	N
17.	Cool SD 90	42	2990	99,5	N
18.	Box Bike	13	3003	100	N

Source: Data processed by the researcher

The value of the consumption rate shows the intensity of the goods in the warehouse. How often goods enter and exit the warehouse. After getting a value that is Liebherr efi 4153 to Haier Econic including fast-moving that is 0% -70%, Hiron SD 151 to Hiron SD 361 including slow-moving that is 70% -90% and Hiron BD 206 to Box Bike / Bicycles including non- that is, 90% -100%.

Final Classification

The final stage in the FSN Analysis is comparing the classification of the FSN average stay and consumption rate results. Can be seen in table 10 below.

Table 10 Final Classification FSN Analysis

Number	Item Name	FSN Average Stay	FSN Consumption Rate	Final FSN
1.	Hiron SD 260 H	S	F	F
2.	Liebherr efi 2053	F	F	F
3.	Hiron SD 361	F	S	F
4.	Liebherr efi 4153	S	F	S
5.	Hiron BD-711	N	F	S
6.	Liebher efi 5553	N	F	S
7.	Liebher efi 4853	N	F	S
8.	Haier Econic	N	F	S
9.	Visimax III CA	F	N	S
10.	Box Bike/ Sepeda	F	N	S

Table Cont...

11.	Hiron SD 136	N	F	N
12.	Hiron SD 151	N	S	N
13.	Liebher efi 2753	N	S	N
14.	Hiron SD 352	N	S	N
15.	Hiron BD 206	S	N	N
16.	Hiron SD 280	N	N	N
17.	IARP EIS 44.2	N	N	N
18.	Cool SD 90	N	N	N

Source: Data processed by the researcher

Based on the FSN analysis, product classifications are obtained based on the frequency of entry and exit at the warehouse. Products included in class F are Hiron SD 260 H, Liebherr efi 2053, Hiron SD 361, items in class F must be placed close to the door, and products included in class Syaitu Liebherr efi 4153, Hiron BD-711, Liebher efi 5553, Liebher efi 4853, Haier Econic, Visimax III CA, Box Bike / Bicycle, This product is placed between classes F and S, for products that are included in the N product, namely the Hiron SD 136, Hiron SD 151, Liebher efi 2753, Hiron SD 352, Hiron BD 206, Hiron SD 280, IARP EIS 44.2, Cool SD 90, For class N is located farthest from the entrance to the warehouse. The placement will be made after all classes F and S have been allocated. The structuring of the class based storage method using FSN analysis can minimize the time of collection of goods.

Calculation of Maximum Amount of Goods in Warehouse

Based on the data that has been taken and by observing directly in the warehouse, it can be seen that the number of goods in the warehouse can still be maximized, the maximum number of goods before the existence of 4,482 units of goods, therefore the maximization of warehouse layout is made again. The following is table 11 data items that have been maximized again.

Table 11 The Amount of Goods After Maximizing

Number	Item Name	The Amunt of Goods (Unit)
1.	Hiron SD 260 H	700
2.	Liebherr efi 2053	560
3.	Hiron SD 361	700
4.	Liebherr efi 4153	560
5.	Hiron BD-711	250
6.	Liebher efi 5553	500
7.	Liebher efi 4853	500
8.	Haier Econic	250
9.	Visimax III CA	150
10.	Box Bike	55
11.	Hiron SD 136	250
12.	Hiron SD 151	250
13.	Liebher efi 2753	125
14.	Hiron SD 352	250
15.	Hiron BD 206	125
16.	Hiron SD 280	125
17.	IARP EIS 44.2	70
18.	Cool SD 90	80
	Jumlah	5.500

Source: Data processed by the researcher, 2019

Letter Description

A = *Office*

1. B = WC
2. C = Musollah
3. D = *Office*
4. E = *Test Area*
5. F = Barang rusak dan *Spare part*
6. G = Hiron 260
7. H = Hiron 361
8. I = Liebher efi 2053
9. J = Liebherr efi 4153
10. K = Liebherr efi 5553
11. L = Liebherr efi 4853
12. M = hiron BD-711
13. N = Haier Econic
14. O = Hiron 352
15. P = Visimax III CA
16. Q = Box Bike
17. R = Liebher efi 2753
18. S = Hiron SD 136
19. T = Hiron SD 151
20. U = Hiron BD 206
21. V = Hiron SD 280
22. W = IARP EIS 44.2
23. X = Cool SD 9
- 24.

The results of warehouse repairs that have been repaired using FNS analysis and Class Based Storage methods, where the warehouse can maximize its function as a storage area and increase the capacity for goods so that the warehouse can maximize the amount of goods stored, not only that, the main function uses the Class Based method Storage, namely grouping goods according to the type of goods, so that the goods stored are neat and easy when taking goods, because the goods have been stored according to the type and size of each item, thus shortening the time of searching for goods and also the goods have been arranged according with how often the goods enter the warehouse, then it can be seen in Figure 2 above.

Conclusions

Based on the description of the chapter above we get the results of the discussion above, it can be drawn several conclusions as follows 1) The amount of each item and the order of its location after using FSN analysis and the Class Based Storage method of Hiron SD 260 H as many as 700 units, Liebher efi 2053 as many as 560 units, Hiron SD 361 as many as 700 units, Liebher efi 4153 as many as 560 units, Hiron BD-711 as many as 250 units, Liebher efi 5553 as many as 500 units, Liebher efi 4853 as many as 500 units, Haieren Econic as many as 250 units, Visimax III CA as many as 150 units, Box Bike / Bicycle as many as 55 units, Hiron SD 151 as many as 250 units, Liebher efi 2753 as many as 125 units, Hiron SD 352 as many as 250 units, Hiron BD 206 as many as 125 units, Hiron SD 280 as many as 125 units, IARP EIS 44.2 as many as 70 units and Cool SD 90 as many as 80 units. 2) The maximum number of items before doing the repair lay out is 4,482 units of goods and after doing it repairs the warehouse layout using the Class Based Storage method to 5,500 units of goods.

Suggestions

Companies should maximize the amount of goods and the layout of goods that can be accommodated in warehouses in warehouses by using FNS analysis and Class Based Stora methods. The company should not accumulate goods in an empty place that impedes the process of getting in and out of the warehouse.

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