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Relayout And Change Of Packaging Solvent Area In Chemical Company Warehouse In Indonesia

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Abstract– *The increasing competition between companies has made companies use various ways to gain profit, one of them by reducing operational costs. According to the company, non-added value activities such as picking must be minimized as much as possible. The reduction in non-added value activities will also reduce the company's operational costs. This also happened to PT ABC, a chemical company in Indonesia. It was found that activities that non-added value activities were that operators had to walk quite far to carry out weighing activities and pick up reuse jerry cans which were quite far away. Another problem that arose was that there were several types of products that fell into the slow-moving category but were stored in large packaging, reducing the space for storing reuse jerry cans. To solve this problem, goods were categorized based on the frequency and use of the product over the past few months and a decision was made to change the layout and product packaging so that it could enlarge the operator's movement area when picking. Based on the calculation of profits, savings were obtained from moving time and distance. In addition, the types of products stored were also greater than before.*
Keywords– *Relayout, Repackaging, Space requirement, Warehouse*

INTRODUCTION

To increase the competitiveness of the Company, many Companies try several ways to be able to compete in the market [1]. One way for the Company to survive is to reduce operational costs. The most effective way to reduce operational costs is to reduce activities that do not add value [2]. The warehouse is one of the active parts of the Company which is considered a part that contributes a lot of solid work [3]. By doing a little development will have a big effect on all activities and overall Warehouse costs. At the Company PT ABC which is engaged in the production of chemicals, one of the activities that takes a lot of time is preparation time [3]. To distribute solvents to the production area, the Warehouse uses reuse jerrycans and reuse jerrycans are specifically for one type of solvent only. The distance that the operator must travel from the reuse jerrycan rack to the weighing area is 7 meters. The time needed to move from the rack to the weighing scale is 19 seconds. The number of services per month reaches almost 3000 services or it can reach 11 hours. In addition, because the long distance makes the operator tired more quickly. In addition, it was also found that packaging that takes up space in the solvent service area. The product uses IBC packaging, but the frequency of service can also be said to be in the slow-moving category. This causes many places that can be used but cannot be used because the goods have not run out and use IBC packaging. If you want to make a solvent transaction, the operator must use great effort such as moving the IBC with a forklift and take the solvent from IBC. The operator also has to open the IBC lid and take the product from the top. Therefore, the packaging will be changed from IBC to a smaller that has 1000 m3 volume into drum that has 0.2 m3. Therefore, it is planned to change the layout in the packaging material service area so that it can shorten the distance between the reuse jerrycan and the scales. In addition, it can also place the placement of packaging for several solvents that fall into the slow-moving category with a smaller and more flexible packaging size to be moved.

METHODOLOGY

To find out the problems that need to be resolved, further monitoring is carried out regarding the achievement of Key Performance Indicators in the last 6 months. After calculating the percentage of achievement, the conclusion is drawn that the improvements that need to be made are regarding the

direct labour productivity. Then a further evaluation is carried out regarding the area that are most often activity, from the data it is known that activities in the solvent area are the most activities that occur in the raw material warehouse. Then a Pareto analysis is carried out to find out 20% of product types that have an 80% impact on all activities in the warehouse, especially in the solvent area. Furthermore, further observations are made regarding the layout and the condition of the area that will be relayed out. It was decided that 20% of the products from the pareto result that are often requested will be processed grouped in one special rack that is close to the weighing area which is the central transaction because all solvents must be weighed. The rack will be relayed depends of the distance with weighing area. In addition, after further observation, it turns out that there are several solvents that experience slow movement but are packaged in large sizes, namely IBC (0.9-1 m3) which causes the work area to become narrower so that the operator's room to move is limited, making it difficult for the operator to provide service. Several IBC packages supplied from PT ABC Warehouses in different areas are requested to change their sizes by considering the small number of usage frequencies. The packaging size will be changed, which was originally sent in the form of IBC and then requested to be sent in the form of drums.

RESULTS AND DISCUSSIONS

A. Collecting Data

The data collection process begins with observing the achievement of key performance indicators (KPI) of the Warehouse for the last 6 months. Of the 7 points, it turns out that 2 points have always failed to reach the target for the last 7 months, the number of months achieved was only 3 times or only 42% of the total period, is direct Labor productivity and supply accuracy which only reached 4 times during 7 months or only 57%.

TABLE I PERCENTAGE OF KPI ACHIEVEMENT

KPI	Number of months achieved	Percentage of Achievement
Opex Effectiveness	6.00	100%
Customer Complaint	5.00	83%
Direct Labour Productivity	3.00	50%
Production Supply Accuracy	4.00	67%
Failed Product	5.00	83%
Stock Deviation	6.00	100%
Zero Incident	6.00	100%

For this study, we will be more detailed about Direct Labor Productivity (DLP). The value of direct labour productivity is obtained through the following calculation

$$DLP = \frac{\text{Output Total Quantity per Transaction (Kg)}}{\text{Direct Labor Manhour RMWH per month}}$$

From the data, it can be seen that the total output produced by the operator, when compared to the number of hours worked, shows a smaller ratio, which does not reach the target. From the target, it is divided into semi-finished areas, solvents, resins, and remaining packaging, and packaging warehouses. This study focused on the solvent area only. Then, a further review of the area to be relayed was carried out. From the description, it was reviewed why productivity was not achieved, one of which was the time needed by the operator to make a transaction, which was quite long. This long transaction time was caused by the weighing area being far from the jerry can retrieval rack. Then, a further analysis was carried out regarding the layout shape and the distance between the weighing area and the rack area. From the following data, it can be seen that the distance between the rack and the weighing area, which is the end point that the operator will always go to when weighing the solvent, is 7 meters. Then a further review was carried out regarding the number of solvent product SKUs, which turned out to be 67 solvents served by the operator. The time needed for the operator to move from the rack to the scale averaged 19 seconds.

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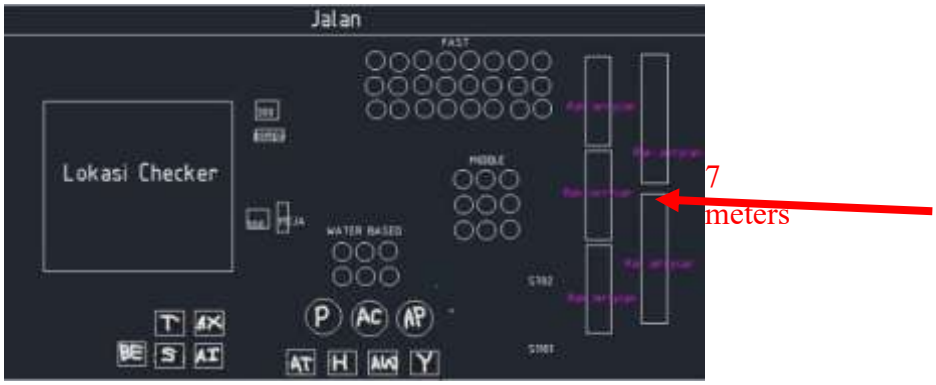

Fig. 1 Layout of Solvent Area Before

B. Data Processing

Data collection of all solvent services for the last 6 months was carried out to determine the frequency of service for each solvent. Each solvent has 2 types of packaging sizes, namely jerry cans and drums. Drums will be excluded from the calculation because this study only focuses on Jerry Can packaging. Then the calculation results are carried out using the Pareto process to take 20% of products that have an impact of 80% on service. And the following data was obtained (excel) there are 10 products that contribute 80% of all existing processes. This product will later be grouped into one and placed on a shelf closer to the scales. Based on this product, a further review was also carried out on several solvents that were packaged in IBC form but were not included in the products that contributed a large number of transactions to all activities, for example solvent types T, AX, BE, S, and AI. Because of its rare frequency, it was decided that the solvent would be changed to drum size packaging. The packaging replacement process was not too difficult because most of the solvents were supplied from other warehouses owned by PT ABC Company. Discussions were held on the existing data, and both warehouses agreed to change the size of the packaging shipment, which was originally IBC to drum. After the packaging was successfully changed to a drum, the area that was originally used to place the IBC packaging can be used for drum packaging. From the implementation results, it is known that the layout can accommodate more solvent quantities in the form of drums. Then the drums are grouped based on the type of drums that are fast-moving, slow moving and water-based.

TABLE 2 PARETO ALL TOTAL TRANSACTIONS PER PRODUCT

Material	Total Transacation	%	Pareto
P	12075	33%	33%
AP	5557	15%	48%
H	2049	6%	54%
Y	1850	5%	59%
AW	1431	4%	63%
AR	1297	4%	66%
AC	1160	3%	70%
BM	984	3%	72%
AT	942	3%	75%
O	936	3%	77%
AO	712	2%	79%
V	675	2%	81%
BE	619	2%	83%

T	584	2%	85%
BK	573	2%	86%
AX	560	2%	88%
AU	484	1%	89%
W	463	1%	90%
U	458	1%	92%
Q	330	1%	92%
AS	303	1%	93%
J	259	1%	94%
AJ	229	1%	95%
K	198	1%	95%
AA	193	1%	96%
D	186	1%	96%
AH	178	0%	97%
AQ	140	0%	97%
BH	105	0%	97%
BL	104	0%	98%
L	100	0%	98%

Material	Total Transacation	%	Pareto
X	98	0%	98%
F	88	0%	98%
BB	74	0%	99%
S	58	0%	99%
AY	54	0%	99%
AG	48	0%	99%
BI	44	0%	99%
BZ	42	0%	99%
Z	33	0%	99%
R	31	0%	99%
AI	26	0%	100%
BD	24	0%	100%
AV	19	0%	100%
AB	16	0%	100%
B	16	0%	100%
E	16	0%	100%
BC	13	0%	100%
BF	12	0%	100%
AE	11	0%	100%
AZ	10	0%	100%
M	10	0%	100%
AD	7	0%	100%
BA	6	0%	100%

AF	1	0%	100%
BG	1	0%	100%
C	0	0%	100%
G	0	0%	100%
I	0	0%	100%
Q	0	0%	100%
AK	0	0%	100%
AL	0	0%	100%
AM	0	0%	100%
AN	0	0%	100%
BJ	0	0%	100%

C. Results and Discussion

After the shelf transfer, the average operator transfer time from the shelf to the jerrycan only took 13 seconds or decreased by 33% from the initial time. Then for products that are included in the slow-moving category, the packaging has been changed from IBC to drum packaging. From the acceleration of this time, it can save operator service time of 11 hours or the same as 1.38 operators with an average total of 3000 transactions within 1 month. If converted into money, it can save IDR 8,307,000 / month or the same as IDR 99,683,000 / year. In addition, the place that initially could only contain 5 IBCs was replaced with 9 drums with different types of products. In addition, the place for water-based products can be placed in an area far from the scales and expand the service area because most water-based products are slow-moving products.

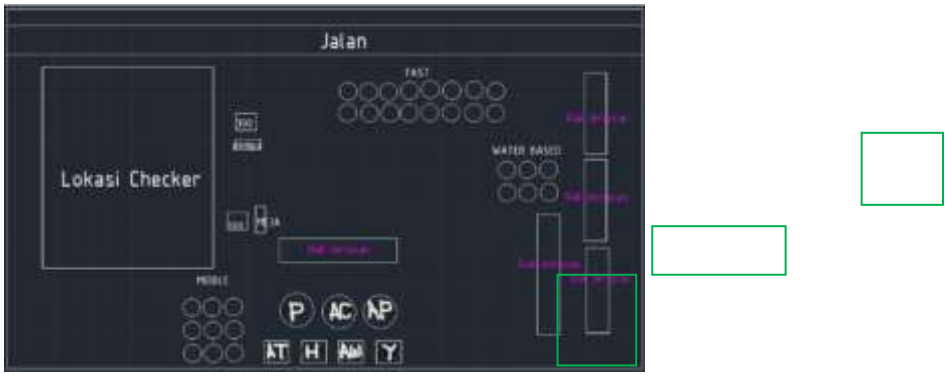

Fig. 1 Layout of Solvent Area After

CONCLUSIONS

To speed up the process of taking jerrycan solvent, one way is to move one of the shelves and change the size of the packaging, which was originally an IBC, to a drum, so that the space to place the drum-sized solvent is wider. In addition, it can also be seen that it can save a total of Rp 99,683,000/year.

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