

ASSISTANCE OF RAW MATERIAL INVENTORY TOWARDS THE SUCCESSFUL PRODUCTION PROCESS IN MSME RR SPORT

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Abstract

One of the industries with great potential for growth in Indonesia is the manufacturing industry, such as clothing, textiles and others. UMKM RR Sport is one of the MSMEs engaged in the apparel or convection industry by producing sports jerseys. The problem that arises is that the control of raw material inventory is less than optimal, causing non-fluency in the production process. This study aims to analyze raw material inventory control, analyze the smooth production process and analyze raw material inventory control using the MRP (Material Requirement Planning) method to improve the smooth production process.

This type of research is descriptive exploratory with case study method. The technique used is quantitative with the MRP (Material Requirement Planning) analysis method. Data collection was carried out using direct observation and interviews.

The results of the analysis that have been carried out can be seen that the control of the amount of raw material inventory needs at UMKM RR Sport is less than optimal, causing delays in production time but after using the MRP (Material Requirements Planning) method the production process is in the criteria quite smoothly. This certainly has a positive impact on the company because the delivery of orders to customers does not experience delays.

Keywords: Jersey, Smooth Production Process, Control of Raw Material Inventory, and Material Requirement Planning.

I. INTRODUCTION

In the current economic development where the business world is growin rapidly in Indonesia. Entrepreneurs, especially in industrial companies, are required to work more effectively and efficiently in the face of intense competition in order to maintain the continuity of the company's operations. The manufacturing industry is an industry that is engaged in the manufacture of products from raw materials into finished goods that are ready to be sold with the help of machines and controls, but still through manual supervision. Examples of manufacturing industries are the pharmaceutical, automotive, electronics, clothing, food & beverage, textile, and many others industries.

RR Sport is one of the micro and small businesses engaged in the manufacturing industry, namely the apparel or convection industry by producing sports apparel or commonly referred to as jersey as its products, ranging from soccer jersey , futsal, badminton, e-sports and other types of sports. . RR Sport produces orders according to the demands or orders of consumers who want and need. Production on the RR Sport is by

order system or based on orders that focuses on meeting demands from consumers according to the wishes and needs of orders, quantities and maturity. Therefore, the smooth production process for RR Sport is the most important factor for achieving success in competition in the business world. The following is the smooth production process for RR Sport SMEs:

TABLE I
SMOOTH RR SPORT JERSEY PRODUCTION IN 2020

Quarter	Order Quantity	Production result (pcs)	Average Production Target (Day)	Average Production Time Achievement (Day)	Smooth Production (%)
Q1	65 Team	1358	15	17	88
Q2	85 Team	1812	16	19	82
Q3	87 Team	1591	15	18	87
Q4	125 Team	2559	18	23	79

Source: RR Sport, (2020)

The smooth production process at RR Sport in the 2nd quarter and 4th quarter of 2020 did not go well, because in the second quarter it had a percentage of 82% and in the fourth quarter it had a percentage of 79% while the MSME owner RR Sport wanted a smooth production percentage of 85%. One way to support the smooth production process is to pay attention to the control of raw materials inventory. This is because the company's raw material determination system is not based on existing methods. Evidenced by the following data:

TABLE III
UMKM RR SPORT RAW MATERIALS IN 2020

No	Component Name	Necessary Requirements For Production	Available Components	Components Weaknesses / Advantages
1.	Zigzag Milan Milano Fabric	64.1 Roll	51.8 Roll	(12.3 Rolls)
2.	Polymesh Waffer Fabric	53.1 Roll	45 Roll	(8.1 Rolls)
3.	Magenta Sublimation Ink	60000 ml	53000 ml	(7000 ml)
4.	Cyan Sublimation Ink	61000 ml	55500 ml	(5500 ml)
5.	Black Sublimation Ink	57500 ml	61000 ml	3500 ml
6.	Yellow Sublimation Ink	62000 ml	53500 ml	(8500 ml)
7.	Sublimation Paper	176.1 Roll	160.5 Roll	(15.4 Rolls)
8.	PolyFlex PVC	17 Roll	18.6 Roll	1.6 Roll

Source: RR Sport, (2020)

Based on the data above, it can be seen that UMKM RR Sport are still having difficulty in determining the amount of purchasing the right raw material inventory. There are shortages and excess inventories can result in delays in the production process at the company. Therefore, the company must determine the exact amount of raw material needed so that the continuity of the production process can run smoothly. These problems can be solved using Material Requirement Planning (MRP) which is expected to know the schedule and quantity of ordering the right raw materials.

II. LITERATURE REVIEW

The production process can be said to be smooth if production activities can run without any obstacles in producing an item from processing raw materials to becoming the final product. One of the obstacles that can occur in production activities is production delays caused by a shortage of raw materials to be processed in producing a product, so that it will have an impact on

delays in achieving production time and production time targets which can make customers wait more to receive the product.

Efforts that can be made so that the problem of shortage or excess material can be resolved properly is by controlling the company's raw material inventory. Inventory control is an effort to monitor and determine the optimal level of material composition that can create smooth operations in the company's production process. Therefore, by controlling inventory on raw material inventory that is stored or purchased from suppliers (suppliers) which will be processed into finished products, it can be precisely in accordance with the required quantity, and can guarantee the right processing time in the production process because it reduces the possibility of raw materials to be produced. used deficiency.

One of the methods used in inventory control is Material Requirement Planning (MRP). Material Requirement Planning (MRP) is a concept of planning material requirements from various components used in the company's production process which is useful for supporting the smooth production process. According to Heizer and Render (2016), in using MRP, you must pay attention to the requirements for raw material inventory, these requirements include the master production schedule, specifications or list of raw material requirements, and the availability of raw materials

III. RESEARCH METHOD

The type of research used in this research is descriptive exploratory research, with a case study research method that aims to collect data and research according to the problems that must be solved and solved. This research was conducted to analyze the control of raw material inventory on the smooth production process at UMKM RR Sport, using the Material Requirement Planning (MRP) method.

The research location is located on Jl. Raya Mayor Oking Jaya Atmaja, Ciriung Village, Cibinong District, Bogor Regency, West Java, Postal Code: 16917.

A. Method of Collecting Data

Data collection methods used by researchers in this study are as follows:

1. Primary Data Collection
The method used in primary data collection is direct observation and question and answer activities with owners and employees at the production site with the aim of knowing firsthand the inventory control and the smooth production process in the UMKM RR Sport jersey production activity.
2. Secondary Data Collection
Secondary data collection is carried out using manual methods such as photocopying books and collecting data by downloading (downloading) e-books.

B. Data Processing/Analysis Method

1. Descriptive analysis (explorative) which aims to describe and obtain an in-depth and objective picture of controlling raw material inventory to facilitate the production process carried out at UMKM RR Sport.
2. The data processing or analysis method use to carry out the process of determining the amount of raw material inventory needs is using the Material Requirement Planning (MRP) method with the Lot For Lot (LFL) approach. The steps in making a Material Requirement Planning (MRP), are as follows:

- a. Create a Master Production Schedule (MPS)
This step is to make a master production schedule (MPS) by detailing what will be made and when this schedule must be in accordance with the production plan.

TABLE III
MASTER PRODUCTION SCHEDULE (MPS)

Month	October				November				December			
Week	1	2	3	4	5	6	7	8	9	10	11	12
Order Quality	328		276		534		398		478		545	

Source: RR Sport, (2021)

- b. Bill of Materials (BOM)
The second step is to prepare a *Bill of Materials* (BOM). This step is the amount of material needed in the production process, so it can be seen how much will be produced in the period that will be adjusted to the amount of existing inventory.

TABLE IVV
LIST OF PRODUCTION MATERIALS

Level	Component Name	Necessary Requirements For Production	Information	Lead Time
1	Jersey	1 unit	assembled	3 days
2	Shirt (Upper)	1 unit	assembled	1 day
2	Pants (Bottom)	1 unit	assembled	1 day
3	Zigzag Milan Milano Fabric	2.4m ²	Bought	3 days
3	Polymesh Waffer Fabric	2.4m ²	Bought	3 days
3	Magenta Sublimation Ink	6 ml	Bought	1 day
3	Cyan Sublimation Ink	6 ml	Bought	1 day
3	Black Sublimation Ink	6 ml	Bought	1 day
3	Yellow Sublimation Ink	6 ml	Bought	1 day
3	Sublimation Paper	2.4m ²	Bought	2 days
3	PolyFlex PVC	0.012m ²	Bought	2 days

Source: RR Sport, (2021)

- c. Raw Material Inventory Data
The third step is to create inventory data containing the name of the component, how much inventory is there for that component, and

how much is the plan to receive the component in the future (in progress).

TABLE V
INVENTORY OF MATERIAL REQUIREMENTS

No	Component Name	Existing Supplies	Admission Plan	Week-
1.	Zigzag Milan Milano Fabric	0.5 Roll	3 Rolls	1
2.	Polymesh Waffer Fabric	1 Roll	2 Rolls	1
3.	Magenta Sublimation Ink	2 Rolls	6 Rolls	1
4.	Cyan Sublimation Ink	1000 ml	2000 ml	1
5.	Black Sublimation Ink	500 ml	4000 ml	1
6.	Yellow Sublimation Ink	1000 ml	3000 ml	1
7.	Sublimation Paper	1000 ml	2000 ml	1
8.	PolyFlex PVC	1.5 Roll	1 Roll	3

Source: RR Sport, (2021)

- d. Making MRP Schedule
The final step in applying MRP is to create an MRP schedule. Make an MRP schedule based on the Master Production Schedule (MPS), inventory data and Bill of Materials (BOM).

TABLE VI
JERSEY PRODUCT MRP SCHEDULE

Jersey	October			November			December					
	1	2	3	4	5	6	7	8	9	10	11	12
Gross Needs Schedule	3	2	5	3	4	5	8	6	4	3	7	4
Existing Supplies												
Net Requirements	3	2	5	3	4	5	8	6	4	3	7	4
Order Receipt Plan	3	2	5	3	4	5	8	6	4	3	7	4
Delivery Order Plan	2	7	3	9	7	4	8	6	4	8	5	

Source: RR Sport, (2021)

3. The smoothness of the production process is influenced by the determination of the quantity of raw material inventory. So that the implementation of inventory control must be good so that the raw

material inventory does not experience excess or shortage.

The formula for the smooth production process is as follows:

$$\frac{\text{Input}}{\text{Output}} \times 100\%$$

Input = Inventory data, production time target data by the project in one work.

Output = Production time data carried out by the project in on work.

IV. RESEARCH RESULT

A. Making MRP Schedule

The final step in applying MRP is to create an MRP schedule. Make an MRP schedule based on the Master Production Schedule (MPS), inventory data and Bill of Materials (BOM).

TABLE VII
 COMPLETE MRP SCHEDULE FOR JERSEY PRODUCTS

Component	Information	October				November				December			
		1	2	3	4	5	6	7	8	9	10	11	12
Jersey	KK		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	PT												
	PD												
	KB		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RNP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RPP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
Shirt (Upper)	KK		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	PT												
	PD												
	KB		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RNP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RPP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5

Pants (Bottom)	KK		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	PT												
	PD												
	KB		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RNP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
	RPP		3 2 8		2 7 6		5 3 4		3 9 8		4 7 8		5 4 5
Zigzag Milan Fabric	KK												
	PT												
	PD		0 . 5		0 . 5				0 . 5		0 . 5		
	KB		3		2				6		4		4 5
	RNP		3		2				6		4		4 5
	RPP		3		2				6		4		4 5

Information:

- KK: Gross Needs
- PT: Scheduled Admission
- PD: Projection of Receipts in Hand
- KB: Clean Needs
- RNP: Order Acceptance Plan
- RPP: Delivery Order Plan

From the table above, it can be concluded that controlling raw material inventory using MRP (Material Requirement Planning) at MSME RR Sport can provide advantages in making the order schedule better and more regular, so that in the production process there will be no delays because the raw materials needed are available in accordance with the production plan.

TABLE VIII
 SMOOTH PRODUCTION PROCESS AFTER USING MRP

Month	Week-	Production targets (pcs)	Production time target (Day)	Production time achievement (Day)	Smooth production (%)
October	2	328	16	17	94
	4	276	14	15	93
November	2	534	20	22	91
	4	398	18	19	95
December	2	478	19	21	90
	3	545	21	23	91

Source: RR Sport (processed), (2021)

From the table above, it can be seen that the smooth production process in October was 94% in the 2nd week and 93% in the 4th week, November in the

2nd week was 91% and the 4th week was 95% and month December in the 2nd week by 90% and the 3rd week by 91%, which means the production process at the UMKM RR Sport is more than what the owner expects, which is 85% so that the standard production time can be said to be quite smooth. It can be expected that with the use of the Material Requirement Planning (MRP) method the company will not experience problems such as shortages of raw materials and the production process runs smoothly.

B. Analysis Result

The results of data analysis that has been carried out using the MRP (Material Requirement Planning) method, by compiling a Master Production Schedule, Bill of Materials (BOM), making raw material inventory data, making Assembly-Time / Gant Charts and making an MRP schedule can show that Determination of the quantity of raw material inventory carried out by UMKM RR Sport can fulfill jersey orders.

Inventory control of raw materials carried out by MSME RR Sport is not optimal so that the smooth production time does not run well, which means that there are still delays in production due to shortages of raw materials.

In October the company had to fulfill orders for 604 jersey units , in November 932 jersey units and in December 1,023 jersey units, therefore the company needed to have a plan for sending orders for raw materials listed in the MRP based on the master production schedule that had been made in order to meet the requirements all orders as follows:

No	Component Name	Amount Required					
		1st week	3rd week	5th week	7th week	9th week	10th week
1	Zigzag Milan Milano Fabric	3 rolls	2 rolls	6 rolls	4 rolls	4 rolls	5 rolls
2	Polymesh Waffer Fabric	2 rolls	2 rolls	3 rolls	3 rolls	3 rolls	4 rolls
3	Sublimation Paper	6 rolls	7 rolls	13 rolls	10 rolls	12 rolls	13 rolls
4	Magenta Sublimation Ink	2000 ml	2000 ml	3000 ml	2000 ml	2000 ml	4000 ml
5	Cyan Sublimation Ink	4000 ml	2000 ml	4000 ml	2000 ml	3000 ml	4000 ml
6	Yellow Sublimation Ink	2000 ml	2000 ml	3000 ml	2000 ml	3000 ml	3000 ml
7	Black Sublimation Ink	3000 ml	1000 ml	3000 ml	3000 ml	5000 ml	2000 ml
8	Polyflex PVC	-	1 roll	1 roll	1 roll	2 rolls	1 roll

TABLE IX
RAW MATERIAL NEEDS

Source: RR Sport (processed), (2021)

Based on the results of the analysis that has been carried out, it can be seen that the control of the amount of raw material inventory needs at MSME RR Sport is less than optimal, causing delays in production time but after using the MRP (Material Requirement Planning) method the production process is in a fairly smooth criterion. This certainly has a positive impact on the company because the delivery of orders to customers does not experience delays.

V. CLOSING

A. Conclusion

Based on the research results from the discussion on the analysis of raw material inventory control in jersey products in order to improve the smooth production process at UMKM RR Sport, the author can draw several conclusions from this final project including:

1. Control of raw material inventory at RR Sport is still not optimal. This can be seen because the raw material inventory control is carried out based on past experience, which makes a discrepancy in the need for raw materials and results in a lack of raw materials. Inventories of raw materials that are not optimal at MSME RR Sport are the main obstacle to the smooth production process because the raw material inventory control system used is not based on existing methods and causes shortages in some of the raw materials needed.
2. The non-fluency in the production process at RR Sport MSMEs based on data obtained from the company, the percentage of the company's production process smoothness does not show anything positive because the percentage of the company's production process smoothness is still below 85%, especially in the fourth quarter, which has an average percentage of 79%. This is caused by the control of raw material inventory that is not optimal so that the company must increase production time that exceeds the initial target limit and makes deliveries to customers late.
3. Inventory control of raw materials at UMKM RR Sport can be optimized using the MRP method so that determination of the amount of raw material needs in the company will be more structured. After analyzing raw materials using MRP (Material Requirement Planning) it was proven that the smooth production process in October in the 2nd week was 94% and in the 4th week it was 93%, in November in the 2nd week it was 91% and in the

4th week by 95%, and in December in the 2nd week by 90% and in the 3rd week by 91% which means that the production process at MSME RR Sport is more than expected from the 85% standard time specified by the company running quite fluent. It is hoped that with the use of the MRP (Material Requirement Planning) method the company will not face problems such as shortages of raw materials and the production process in making jersey products can run smoothly.

B. Suggestion

After conducting research using the MRP (Material Requirement Planning) method based on data obtained from UMKM RR Sport, the authors propose suggestions that are expected to be input for companies and the academic field. The following suggestions are proposed by the author:

1. UMKM RR Sport should abandon the old method, so that it can determine the optimal amount of raw material needs according to the number of needs in order to meet the needs of the production process. Because the inventory of raw materials should be carried out properly, the company can make a master production schedule in advance so that the ordering of raw materials can be detailed such as the type of raw material, quantity, and when the order is made. If control is carried out based on accurate determination, the production process will run smoothly, the target production time will be achieved according to the predetermined timeliness and delivery of goods will be more on time.
2. To improve the smooth production process at UMM RR Sport, it is hoped that the company will pay attention to determining the amount of raw materials needed for jersey production, because if the raw material inventory can be controlled properly, the production process will also run smoothly, the planned target will be achieved.
3. UMKM RR Sport is expected to be able to apply the MRP (Material Requirement Planning) method where this method is useful in optimizing the determination of the company's raw material inventory, because it is more structured by making steps that can support the implementation of the MRP (Material Requirement Planning) method so that the production process runs smoothly. can be done well.

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