Junbiki Method Implementation and Mapping In The Part Stay Headrest Distribution Process Reviewed From Lean Manufacturing In The MRP Company, Indonesia

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Abstract

PT. MRP is one of the manufacturing companies engaged in the Automotive component; one of the products is Stay Headrest, Stamping, and wire. The company always lowers to produce products of good quality and delivery according to customer demand in its production activities. However, in the field, it shows that distribution is often late to the next process. In its development, PT. MRP is always confident to always be united from customers; things that need to be done are good things to do to send on time to customers. Control activities can help for more time, place until the resulting part. Junbiki is one of the distribution improvement methods that can affect the delay of assistance to the next process. in using Kanban and Value Stream Mapping through Future State Map depiction and analysis, where the Stay Headrest distribution process time is shorter and more efficient, where it can reduce the cycle time by 1174% where usually the distribution time requires 197 hours 2.4 Minutes, on Future Repairs, the distribution time only takes 16 hours 48 minutes. It can reduce operators by 30%, which is usually in distributing Live Headrest needing ten operators on Future Improve requires seven operators.

Keywords: Junbiki, Kanban, SIPOC, VSM, Lean Manufacturing

1. Introduction

According to Yoshiro Monden (1995), the Kanban method is a production order card that functions to control inventory; the form of a kanban is a kind of "square vinyl card" which is put in a transparent plastic bag and placed on a pallet where spare parts or materials are placed. The production kanban method is applied by planning an efficient Kanban flow. The Kanban planning method needs to be used optimally to be able to control inventory. This production process can be achieved if the company will produce the required products according to the number of requests. In the company, the Kanban method is not perfect for achieving all the demands of inventory efficiency, time efficiency, and area efficiency. Therefore the Junbiki method is born, which is a new method applied to the company.

Junbiki comes from Japanese, which means preparation, is a production sequence in the same production line as the order produced at the supplier. This powerfully supports the implementation of the JIT (Just In Time) system and can reduce inventory to a minimum. In other words, Junbiki is "a delivery system that uses an ordering system using facsimile or email by the Heijunka pattern on the production line. The Junbiki method is suitable for use at a large production level and variations; on the other hand, the smaller the production volume, the less effective the Junbiki method is. This JIT performance improvement will continue to be useful if the production volume increases due to the Junbiki method, the more effective it is when used in various production quantities and large quantities.

One of the savings in the Junbiki method is efficiency in the labor sector, working time, inventory area, and energy consumption efficiency. It can be seen that the two methods show efficient use of resources, but when compared, for energy use, both are balanced; this condition is caused by production factors, whereas in the Kanban system, the amount of energy released is determined by the level of production. From this condition, it can be stated that the Junbiki method is better applied for massive production levels. PT. MRP, with customers such as TBINA, FujiSeat, MMKI, BTI, KBU, and KBB. in producing four-wheeled vehicle components using various kinds of goods, and among them are Stamping Part, Wire Part, Assembly Part and Stay Headrest; this Part is a part in making seats on four-wheeled vehicles, Stamping Part is a part that is produced by pressing with certain weight so that the shape of a part you want. Wire Part is a part by bending to form the desired Part. Usually, the Part uses a CNC machine to bend it. Part Stay Headrest is a vehicle component that functions as a

seat back on four-wheeled vehicles; in the distribution of this Part, there is often a delay in the next process, which is caused by a long process lead time. So if a Stop line occurs, the distribution recovery is long and long enough.
This study aims to reduce queues during unloading, create queue scheduling, improve lead time on process, and make current mapping and future mapping.
There are several tools and methods regarding distribution with their respective characteristics. To measure how efficient the distribution is, the author will eliminate waste with SIPOC, Kanban Cycle, and mapping "Value Stream Mapping."

2. Literature Review

Junbiki is a concept applied by the company to meet the increasing demand and very high fluctuation. The junbiki method is a way of approaching JIT (just in time) applications in manufacturing companies. Junbiki comes from Japanese, which means preparation, is a production sequence. In the same production line as the order produced at the supplier. This powerfully supports the implementation of the JIT (Just In Time) system and can reduce inventory to a minimum; in other words, Junbiki is "a delivery system that uses an older system using facsimile by the Heijunka pattern (production order). in the production line." (Kristina, 2003)
In applying the Junbiki method, the most influential thing that must be considered is the time (time), which is very decisive. In this case, the customer must take into account the production time (Takt time), production time at the supplier (production time), and delivery time (handling and delivery time). To send information regarding the production sequence and acting as a retrieval kanban, a dedicated fax machine is used for this purpose. This technology is called e-Kanban. When running a Junbiki system, the process lead time must be more than the delivery lead time plus the handling lead time, or it can be formulated as follows:
Takt time is the time available to produce one unit or part based on the available operational time compared to the number of products required. The Junbiki method is suitable for use at a large production level and variations; on the other hand, the smaller the production volume, the less effective the Junbiki method is. This JIT performance improvement will continue to be useful if the production volume increases because the Junbiki method will be more effective if used in various production quantities and large quantities (Ohno, 1995).
One of the savings in the Junbiki method is efficiency in the labor sector, working time, inventory area, and energy consumption efficiency. It can be seen that the two methods show efficient use of resources, but when compared, for energy use, both are balanced; this condition is caused by production factors, whereas in the Kanban system, the amount of energy released is determined by the level of production.

3. OBJECTIVE OF THE RESEARCH

The main objectives of this study are to:

1. Identify and eliminate waste, then take corrective actions in the logistics system and evaluate it.
2. Make Kanban Transport to Suppliers and calculate the number of distribution kanban, so that the number of Kanbans is controlled, to reduce Inventory and Loading and Unloading queues
3. Making Current Mapping and Future Mapping.

4. RESEARCH METHODOLOGY

In this research, the method of processing and analyzing data is based on the steps which are divided into several stages, namely:
1. Determination of the number of Kanban requests
Kaban Demand for goods (parts-ordering kanban), namely for ordering large quantities of goods to be sent to the production line. Usually, this type of kanban is sent to outside suppliers.
2. Formation of the Current State Map
The steps to form the current state map are as follows:

a. Define the value stream manager
Each operator generally only understands the process that it handles, so that data or information obtained from each process may not sync with one another when combined. Therefore it takes people who understand the entire distribution system and process that occurs in Logistics. This person is called the value stream manager, who is expected to assist researchers in understanding the distribution process's details.

b. Primary data testing includes data uniformity test and data adequacy test.

c. Creating a SIPOC diagram

The SIPOC diagram is used to show the limits and scope of the research. The steps for forming a SIPOC diagram are:

- Supplier determination
- Input Determination
- Determination of Process
- Determination of Output
- Customer Determination

d. Creating a flow map of the entire distribution process in Logistics that forms the current state map. After the Current State Map has been created, the total distribution time is calculated (the total time the product distribution process reaches the logistics customer).

3. Analysis of the Current State Map

Analysis of the current state map improvement is carried out by identifying what wastes are present along the Current state value stream. Then we will look for the root of the problem and how to solve it. Some of the steps taken are:

Analysis of the distribution lead time, whether the lead time is possible to reduce or not, detailing the total Value Added Time (VA) and the total Non-Value Added Time (NVA). Lead time includes storing materials in the warehouse until the materials are distributed to the assembly line. The reduction can be made by reducing the less efficient activity.

4. Formation of the Future State Map

The future state map is a description of the state the company wants to achieve in the future. Some steps that need to be done are:

a. Formulation of corrective actions.

b. Strive for the lean principle. Based on the condition of the company, an appropriate lean principle will be implemented.

c. Future state map depiction. The improvements made are drawn in the future state map, and the design result lead time is calculated.

5. Data analysis

After making improvements through the formation of a future state map, at this stage, an analysis of the design results is carried out. The analysis includes analyzing the distribution process lead time on the current state map and the future state map. At this stage, the distribution process's lead time will be compared between the current state map and the future state map created. Thus, it will be possible to know the company's different conditions today with the ideal conditions that may be applied in the company through future-state design.

5. RESULT AND DISCUSSION

Future State Map formation

Preparation of Corrective Actions

After identifying the waste in each process, improvements will be made to reduce the current non-value-added time.

Corrective Actions in Process

Improvement actions in the Bending process are carried out based on previously identified waste, namely:

Bending parts are stored in an area without Layout, and there is no identity label on the Dolly. The Logistic Operators have difficulty taking parts that have been bent to distribute, action for improvement by placing an identity or Kanban on Dolly. The picture of the improvement is presented in Figure 1

Before After

Figure 1 Identity on Dolly After Improvement

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Remedial Actions on the Notching Process

Improvement actions in the Notching process are carried out based on previously identified waste, namely:

- No WI for Notching, and identification on C / F. So that there is a Notching error, the improv action of giving plate labels to C / F so that there are no mistakes when Upset C / F in the Notching machine
- Many Dolly already filled with unnecessary material stored in the storage. Tidakan Improvement by adjusting or setting up the number of Kanban distributed on the production line. Moreover, updated every time there is an increase in the number of QTY PO. The distributed Kanban Qty is the same as the TTL kanban. The image is as shown in Table 1 and Table 2

Table 1 Settings for the number of distributed Kanban An improvement is made

	CNC PRODUKSI TO WAREHOUSE			QTY KNB	
MODEL	M011U001			1	4
MPV				COIL SPECT	
UNIQ NO	STAY HR FR			STKM 15C	D 12,7X2,0X781
				PROCESS	
M011	QTY / KBN	TYPE PALLET	STORE NAME	CNC BENDING	
	400 PCS	Dolly	A		

Table 2 Settings for the number of distributed Kanban An improvement is made

UNIQ	NO PART	PO Nov	cycle NAIK	PCS KBN	kanban position Lot	Lt	Safety	TTL KBN	STOCK MIN	QTY LOT (PCS)	QTY LOT+Lt+Sfty (PCS)
M11	M001U001	12210	1	400	3	0	1	4	1600	1200	1600
M15	M015U001	12210	1	400	3	0	1	4	1600	1200	1600
JA3	71941-X7U01-B	16000	1	400	3	0	1	4	1600	1200	1600
JA4	71941-X7U02	8000	2	400	2	0	1	3	1200	800	1200

Corrective Actions on the Sweging Process

Improvement actions in the Sweging process are carried out based on the previously identified waste, namely:

- Materials that have been prepared are stored for too long in storage so that the material becomes damaged and needs to be reworked because the parts become dusty and rusted
- Many Dolly already filled with unneeded material stored in the storage. By Determining the Lot Size for each process, especially Sweging and Buffing. Using the Lot Size can determine the Minimum Stock and Maximum Stock based on the number of shipping intervals to the next process. The picture of the improvement is presented in Figure 2

Before

After

Figure 2 Lot Size on Dolly After Improvement

Corrective Action in the Buffing Process

Improvement actions in the Buffing process are carried out based on previously identified waste, namely:

Too long processing and storage lead time. The part that will be buffed. Where Buffing Operators will Wait quite a long time, by carrying out investment to eliminate waste of storage and layout, each process is integrated. Pictures of these improvements are presented in Figures 3, 4, and table 2

Table 2 Comparison of Cycle Times Before and After Improvement

Process	Cycle Time (Minutes) per 400 Pcs	
	Before Improvement	After *Improvment*
Transfer - Bending	4,70	4,70
Bending Process	228,00	228,00
Transfer- Inventory	3,90	
Inventory	3.600,00	
Transfer - Notching	3,90	0,50
Process Notching	205,00	205,00
Transfer -Inspection	0,25	
Inspection	0,50	
Transfer - Sweging	0,25	0,50
Sweging	208,00	208,00
Transfer-Inspection	0,25	0,25
Inspection	0,50	0,50
Transfer-Inventory	3,80	
Inventory	3.600,00	
Transfer-Buffing	3,80	356,00
Process Buffing	356,00	
-Inventory Transfer	3,80	3,80
Inventory	3.600,00	
Total Distribution Cycle Time	**11.822,65**	**1.007,25**
Total Days	8,21	0,70

Table 2 compares before and future improvement, where the processing time of the Stay Headrest distribution is shorter and more efficient. This can reduce the cycle time as much as 1174%, where the distribution time usually takes as much as 197 hours 2.4 minutes; in Future Improvement, the distribution time only takes 16 hours 48 minutes. The following is a graph of Cycle and Transfer times in the process presented in Figure 4; it can reduce operators by 30%, where usually in the distribution process Stay Headrest requires ten operators on Future Improve requires seven operators, presented in table 3

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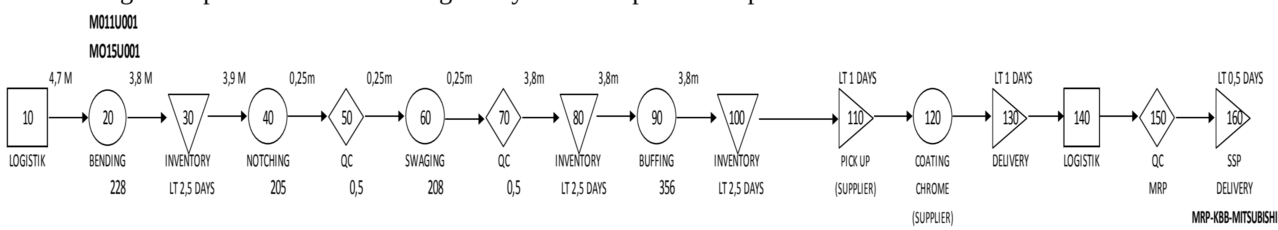
Table 3 Comparison of the Number of Operators Before and After Improvement

NO	*Section*	Man Power (person)	
		Before	After
1	Logistic	3	2
2	Bending	2	1
3	Notching	1	1
4	Sweging	1	1
5	Buffing	1	1
6	Quality	2	1
TOTAL		10	7

• The following is the process flow of making a Stay Headrest prior to Improvment.



• The following is the Future Flow process of making Stay Headrest

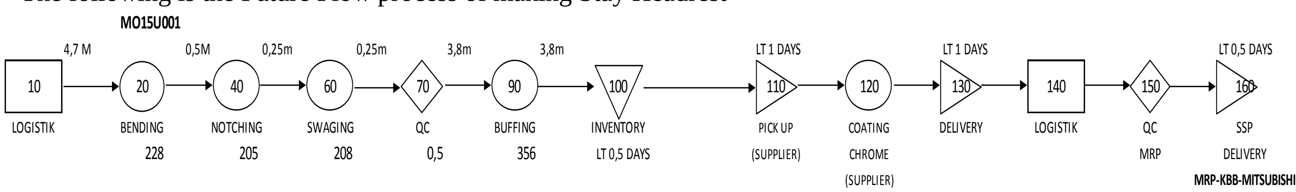


Figure 3 Flow Diagram Process Current and Future Process Flow Diagram

Future State Map

The improvements made are illustrated in the future state map and the change in value-added and non-value added times is calculated as a result of corrective action. The picture of the proposed future state map can be seen in Figure 4

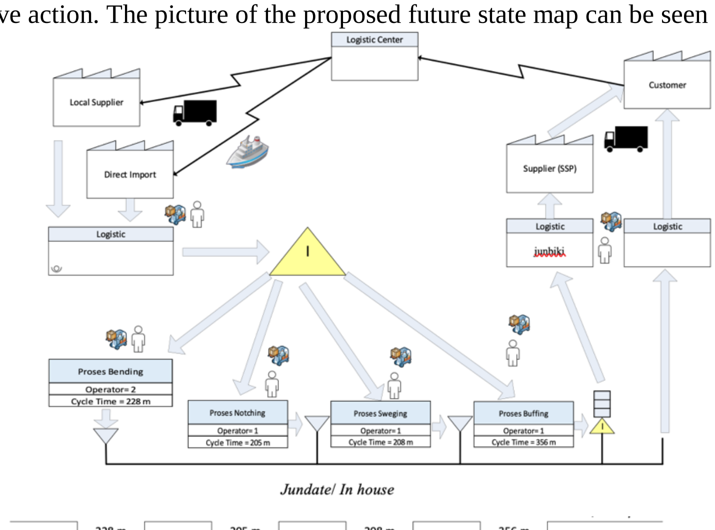


Figure 4 Future State Map Stay Headrest Process

6. CONCLUSION

Conclusion

Based on the analysis and discussion that the author has done in the previous chapter, the author can draw the following conclusions:

a. Where the Stay Headrest distribution process time is shorter and more efficient. Moreover, it can reduce the cycle time as much as 1174%, where usually the distribution time takes as much as 197 hours 2.4 minutes; in Future Improvement, the distribution time only takes 16 hours 48 minutes.

b. Can reduce operators by 30%, where usually in the distribution process Stay Headrest requires ten operators, Future Improve requires seven operators

The corrective actions taken are improving work procedures using Kanban at several work stations, re-layout areas at several work stations, conducting training to reduce the occurrence of errors in work, which can increase processing time. Using Kanban and Value Stream Mapping tools, through the drawing and analysis of the Future State Map.

Suggestion

Based on the research results, it is hoped that the following suggestions can be taken into consideration:

a. The company must see market demand well and make a suitable strategy for the production and distribution system for a product.

b. Distribution control is carried out every day, both Inhouse and Outhouse, where there are no queues or supply delays.

c. The company creates a schedule for loading and unloading so that there are no long queues.

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