TO INCREASE MATERIAL EFFICIENCY BY FIFO AND TRACEABILITY

[1]Totlani Kamlesh Sureshbhai, [2]Prof. Jagdish Pampania, [3]Mr. Bupesh Goyal
[1]Student, [23]Assistant Professor
[123]Mechanical Engineering
[123]Parul Institute of Technology, Vadodara, India

Abstract: First in first out(FIFO) is an asset-management and valuation method in which the assets produced first are sold, used or disposed first. FIFO method is used for inventory valuation or inventory control and works on a cost flow assumption that the first goods purchased are also the first goods sold. In most of the companies, this assumption closely matches the actual flow of goods, and so is considered as the most theoretically correct inventory valuation method. The FIFO flow concept is a logical one for a business to follow, since selling off the oldest goods first reduces the risk of obsolescence. So here FIFO is used for rust prevention of material so as to increase its efficiency and to ensure a smooth flow of material in a systematic way.

Index Terms **– FIFO, stacker, pallet truck, SF1, SF2, SF3, inventory, material planning, Zinc, CED;**

I INTRODUCTION

- Under FIFO the assumption is that the oldest inventory is used first.
- As a result, the ending inventory is valued on your balance sheet at a cost closest to the current cost since prices tend increase over time.
- It ensures that the goods which are produced first should be processed first and are the first ones that are sold.
- FIFO manages cost flow and relates the stock and repurchased stock.
- Traceability is locating the material which is kept in material storage area.
- It ensures all raw materials come in identified as discrete lots and can be traced easily when required.

II METHODOLOGY

2.1 Parts produced in KA Roll forming

- OC- outer channel.
- IC- inner or intermediate channel.
- TK- Track.
- BC- ball cage**.**
- The above types are produced in different sizes ranging from 250mm to 700mm.
- The above parts the produced in roll forming are kept in bin.
- A slip containing all the details of that part is attached to the bin with quality sign.
- Material movement member moves that bin to material storage area.
- SF1 (Semi finished-1) material is then transferred to Zinc and CED plating as per the plan given to operator.
- After plating (SF2 material) is kept in a material storage area.
- It is then supplied to Assembly area to assemble the parts and produce set of channels.

Figure 2.1 Outer Channel (OC), Inner Channel (IC) & Track.

2.2 Work Done and Analysis

- Earlier in one bin different quantity of parts were placed of same item and size.
- For e.g.:- A bin containing 500mm OC was stored with 1000, 1105, 1502 no's, etc. Hence the bin which is full is selected for plating and the rest are left behind.
- So to make full utilization of the bin a standard regarding quantity stored in bin is fixed which is given below:-

Size	OC	IC	TK
250	4000	4000	8000
300	3000	3000	6500
350	2800	2800	5000
400	2500	2800	5000
450	2200	2400	4000
500	1800	2200	4000
550	1700	1800	3000
600	1500	1600	2500
650	1200	1400	2000
700	1200	1400	1800

Table 2.1 Components Data

2.3 Bins requirement and its calculation

- Bins are required to store the components. According to different sizes on an average 2000 parts can be stored in these bins.
- So for producing 1.5 Lakh components daily approx. 75 bins are required and for storing 6 Lakh components around 300 bins are required in Roll forming.
- For ball cage 15 bins are required for 1.5 Lakh components as avg. 10000 components can be stored in it and 10 bins are required for design scrap and process setting.
- Total bins required on Ground floor will be 400.
- Now for 1st floor there are two plating plants and the required amount of inventory is 30K sets of Zinc and 10K sets of Black which means 240000 components.
- Avg components can be filled in bin is 1500 so 160 bins are required for WIP area.
- For online plated bins and process control and for providing material to assembly lines 100 bins are required.
- Empty bins to be given for Rework and rejection are around 80 and for process and scrap 50 bins are required. Total no. of bins required on 1st floor is 390 bins.
- And total no. of bins required for whole KA plant is 790 bins.

2.4 Material storage area for SF-1(semi-finished) material:-

- Earlier material was placed in Roll forming line itself and Ball cage was kept behind the Ball cage machine.
- Now according to bin calculation material storage area is defined. Which is near to Ball cage and Roll forming department.
- Also empty bin and bin repairing area is defined so as to avoid mess up of bins.

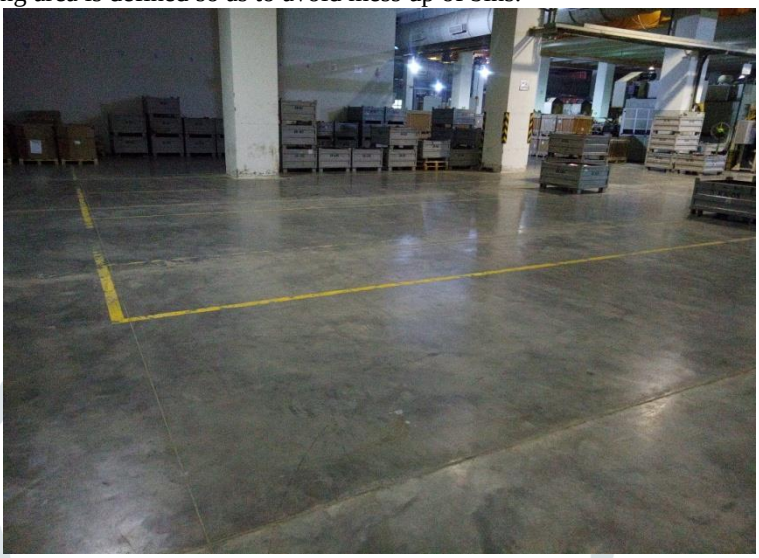


Figure 2.2 Material storage area SF-1

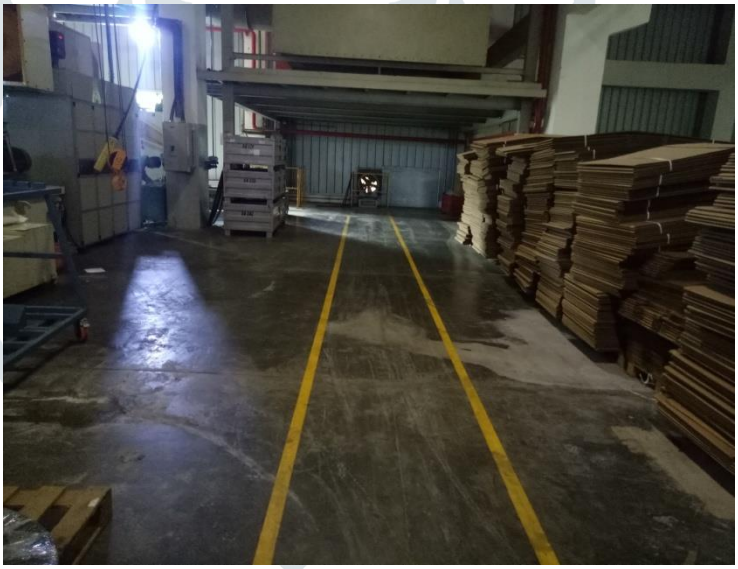


Figure 2.3 Empty bin storage area

Figure 2.4 Empty bin storage area

2.5 Material storage handling equipment:-

- Earlier pallet truck was used for transferring bins from ground floor to first floor for plating the material.
- Now electric stacker is used so that the SF-1 bins can be stacked (stacking of 3 bins) and can be placed in the defined storage area.
- From this storage area the bins are unloaded by stacker and are transferred to plating plant for further process.

Figure 2.5 Electric stacker

2.6 Traceability:-

- Alphabetical order is given to each row and numerical order is given to each column as shown in the below picture.
- This increases the location traceability of components kept in material storage area.

- Here 3 rows for OC, 3 rows for IC and 2 rows for TK is maintained; so that any operator may not find difficulty in locating the respective item bins.
- For proper location of components a register is made so that entry of the bins can be done and when the required that bin can be easily found out from FIFO area.

Figure 2.6 alphabetically arranged rows.

Figure 2.7 Numerically arranged columns.

Date	Bin no.	Item	Size	Quantity	Location
21/01/19	753	OC	500	1800	A-2
01/02/19	589	IC	350	2800	D-6
05/02/19	048	TK	450	4000	G-5

Figure 2.8 Register format

2.7 Collection Bin receipt:-

- Earlier a paper was used with includes very few details of the parts.
- Now a Collection Bin receipt is made and now every details of the parts including its coil details are mentioned which increases its traceability and it can be located easily.

Hettich	Hettich India Private Limited					Format No.	HIN2/PRD/FMT/0016
						Issue Date	17-Aug-2015
	Collection Bin Receipt					Rev No.	0
						Rev Date	--
						Page	1 of 1

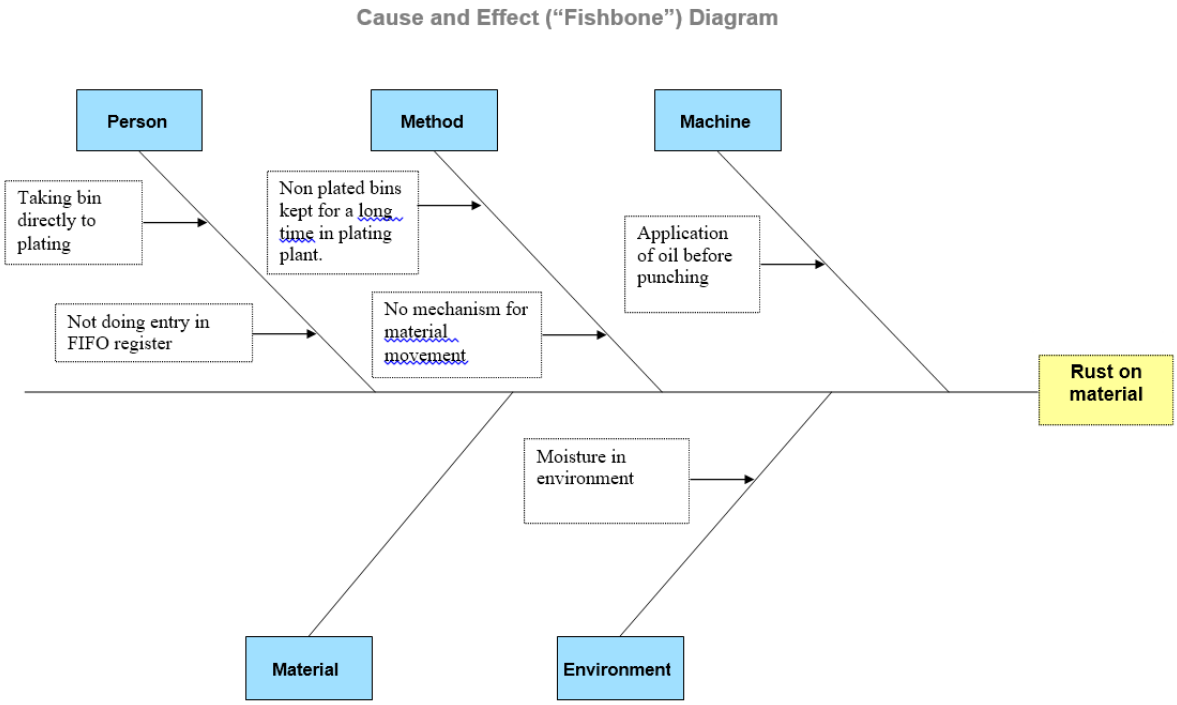
Product Name	Sap Code	Stage	Unit	Quantity	Bin Number	Pallet weight	Total Weight (in KG)
		Roll Forming					
		Plating Zn/CED					
		Assembly					

		Roll Forming	Plating Zn/CED
Coil No.			
Machine No:	Production – Name		
Shift:	Production – Time		
Is special released for CED Plating ?? ◯	Production – Date		
Remarks:	QA – Sign		
	QA – Date		

Figure 2.9 Collection bin receipt

2.8 Probable causes of rust on components:-

- Operator directly taking bins to plating plant.
- Operator not doing entry in register.
- Rust preventive oil not applied.
- Environment condition.
- Non-plated bin kept for a long time in plating plant.



2.9 Corrective and preventive actions :-

- Allocated different areas for material storage and made FIFO register
- Application of rust preventive oil instead of stamping oil
- Wrapping of bins with cover at SF1 level.
- A system is made for material movement of bins from SF1 to SF3 level.
- Only required amount of bins to be kept in plating plant.

3 RESULTS AND ANALYSIS :-

- Results before improvement and after improvement are given below:-

Time Study- BEFORE				Time Study- AFTER		
Sr. no.	Activity	Time		Sr. no.	Activity	Time
1	(i) RF line to material storage area (1 Bin)	10:30 min		1	(i) RF line to material storage area (1 Bin)	2:30 min
	(ii) RF line to material storage area	7:35 min			(ii) RF line to material storage area (3 Bin stacked)	5:30 min
	(iii) Entry of bin details in FIFO register (3 bin stacked)	NA			(iii) Entry of bin details in FIFO register (3 bin stacked)	2:15 min
2	Material Storage area to Zn (4 Bins)	88:18 min		2	Material Storage area to Zn (4 Bins)	33:18 min
	(i) Material Storage area to Hoist	11:13 min			(i) Material Storage area to Hoist (4 Bins)	14:18 min
	Material placing inside hoist	2:06 min			Material placing inside hoist (4 Bins)	7:06 min
	(ii) Hoist Timing	2:40 min			(ii) Hoist Timing	2:40 min
	(iii) From Hoist to Zn plating	8:05 min			(iii) From Hoist to Zn plating	8:05 min
	Entry in SF1 file	2:02 min			Entry in SF1 file	2:02 min
3	Empty Bins to RF(4 Bins)	8:16 min		3	Empty Bins to RF(6 Bins)	8:16 min

Figure 3 Comparison of cycle

- Manpower used before was 13(thirteen) but now after improvement it is reduced to 5(Five).

- Earlier there was a rejection of 4.75 Ton material costing around 4.27 Lakh rupees but after improvement rejection due to rust is reduced to ZERO Kg. So about 4.27 Lakh rupees are saved.
- Material Efficiency is by 0.1% i.e. earlier it was 88.12% and now it is 88.22%.

4 CONCLUSION

- By using FIFO and traceability it is ensured that material will not get rust on it and handling of material will be done in a systematical way.
- Inventory of material can be done in a controlled way.
- Online material can be provided to plating plant from Roll Forming.
- Enhancement in material planning as readily in process stock is available.

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