Improvement of Kanban Inventory System Management

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Abstract

An increase in scrap of Kanban inventory has been reported in a medical device company. The main causes of the reported condition are the lack of visibility of inventory levels and inadequate execution of firs-in-first-out practices in the shop floor. The processes regarding the release and allocation of the product manufactured per three product families were evaluated. An inventory tool that allows information to flow from the release of material to Kanban Area to the requisition conducted at downstream operations was implemented. This significantly improved the prioritization of work-in-process based on expiration risks.

Introduction

A business unit pertaining to a medical device company manufactures sub-assembly (SA) product codes pertaining to three product families. The sub-assembly have an established shelf-life requirement of 16-weeks per product specification. Work in process (WIP) material is properly identified with labeling material that includes variable information regarding the lot number, SA product code and expiration date prior to being allocated to the designated Kanban area per product family.

The business unit has a high inventory level of WIP material which requires to be allocated and consumed in the manufacturing of finished goods work orders (WO). Per current manufacturing practices, the prioritization of material consumption in a first-in-first-out (FIFO) manner is solely based on personnel performance regarding the assessment of the physical inventory availability when addressing service request per finished good demand.

Problem

The lack of information regarding the traceability of WIP material, as well as constraints based on expiration date, has led to the disposition of inventory as scrap due to the shelf life of the SA being surpassed prior to consumption.

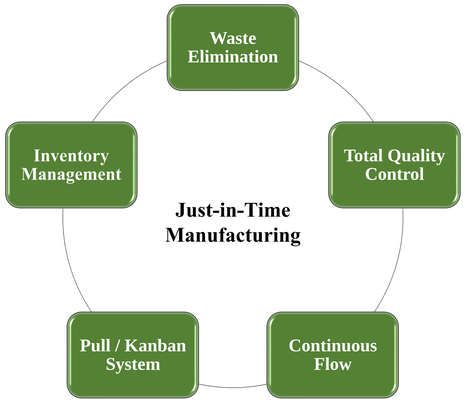

Figure 1
Continuous Improvement Tool

Methodology

Production Volume per Product Family

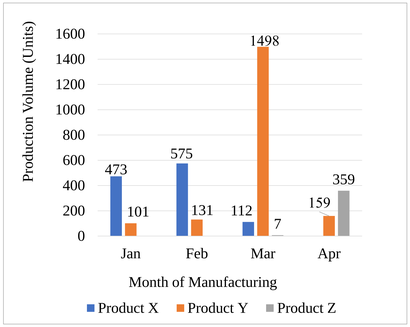

Figure 2
Monthly Production Volume per Product Family

Table 1
Assessment of Inventory Costs

	Manufactured Lots	Production Volume	Cost
Product Family X	19	1,160 units	$ 232,000.00
Product Family Y	30	1,889 units	$ 283,350.00
Product Family Z	4	366 units	$ 54,900.00
Totals	53	3,415 units	$570,250.00

Findings:

- Subassemblies manufactured for Product Families X and Y, enter a greater inventory hold period when compared to Product Family Z.
- Product Family Z has a low production rates, and higher output is yielded with lower inventory.

Product Assessment: Pristine and Non-Pristine Inventory Management

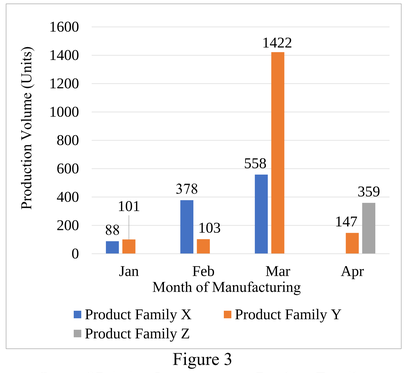

Figure 3
Sum of Pristine Inventory per Product Family

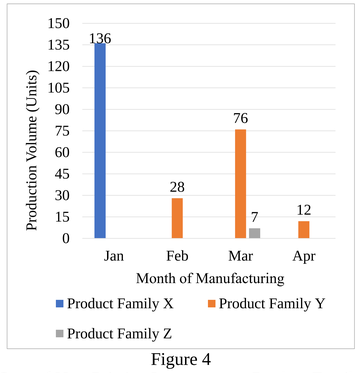

Figure 4
Sum of Non-Pristine Inventory per Product Family

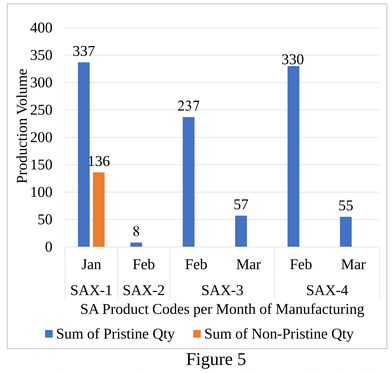

Figure 5
Inventory Assessment for Product Family X

Kanban System Assessment

Figure 6 Kanban Inventory System

Results

Based on the information gathered, it was identified that for Product Families X and Y, there is a higher level of inventory which is not being readily consumed in downstream operations; thus, waste regarding overproduction and inventory were identified. Per the implementation of the Kanban inventory tool developed, as shown in Figure 6, shop floor practices were assessed and structured through guidelines to ensure the proper prioritization of WIP material based on expiration risks. The inventory tool developed and implemented is to be accessed by manufacturing personnel executing the material release operation to enter information regarding the lot and product code manufactured, as well as the inventory transactions conducted regarding material classification as pristine and non-pristine, and expiration date. Based on the manual entries conducted, the inventory tool provides a counter as a visual aid of days remaining for material consumption based on expiration risks.

Conclusions

The principles of Lean Manufacturing were implemented during the evaluation of current Kanban inventory system. Per the evaluation conducted, it was identified that in order to increase the efficiency of the current system, an information system was required in order to provide visibility of inventory levels, as well as shelf-life constraints regarding the lead time available in order to consume material in downstream operations. The inventory tool implemented ensures the prioritization of material consumption in a first-in-first-out manner based on expiration risks. The inventory tool implemented was incorporated into the daily forum where business unit's requirements for service, inventory and quality are discussed with upper and middle management personnel.

Future Work

- Increase of storage capacity of the Kanban areas by adding an additional three level storage cart.
- Incorporation of guidelines for the physical organization of WIP material in Kanban storage cart level based on expiration risks.
- Discussion of Kanban Inventory in daily forum to improve mix attainment per the generation of the required work orders and mitigate impacts based on pass due work orders based on changes in product demand.

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References

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