Multi-Site Spare Part Monitoring Plan at RM Manufacturing Puerto Rico

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Abstract

At RM Manufacturing, increase in downtime was observed due to spare parts unavailability. Spare parts monitoring strategy plays a key role in ensuring a manufacturing plant's uptime. The objective of this project was to reduce the downtime due to spare parts unavailability. The areas of improvement identified were the standardization of information required for part creation, and re-ordering process approval flow. New information requirements were implemented in order to ensure key information is provided by the staff creating the new inventory item. Also, a risk-based process approval flow for each part was developed based on the risk they represent for the organization. The results attained were reducing order cycle time and overall department's overtime expenses, hence, developing a tailored spare parts strategy yielded great improvements.

Introduction

The objective of this project was to reduce the downtime due to spare parts unavailability. To accomplish this, it was intended to create uniformity on a network basis and establish a tracking tool in which users provide a timely response of spare parts that are found in the status of zero balance on hand. This would serve as a notification to the client and as a prioritization tool for inventory staff.

Background

RM Manufacturing is a Multi-National Pharmaceutical Company focused on Bulk Manufacturing of Drug Substances and Active Pharmaceutical Ingredients (API). The RM Manufacturing Puerto Rico location consists of six individual plants within the established location. These plants produce 80% of the overall company revenue. Additional smaller scale plants are located around the world which produces similar products but on a smaller scale. These smaller plants serve as a contingency plan to support demand variance.

Problem

The sites have been experiencing an increase in spare parts unavailability, contributing to an increase in downtime hours through the network. In addition, re-work has been observed by the inventory staff while assessing parts for ordering since there is no standard format for creating parts in the system. Furthermore, duplicity has been observed.

As the manufacturing run rate increases, a diminution in downtime tolerance is observed. Having the right parts on hand ensures the mitigation of downtime. Hence, this results in an overall site efficiency increase.

Methodology

The first step was evaluating the current inventory practices. The purpose of the evaluation was to understand the life cycle of creating, purchasing, supplying, and refurbishing spare parts. During this evaluation, it was observed that multiple clients had a different definition of what is a spare part. Also, most of the system entries did not provide clear information that will be helpful for part identification. Due to the lack of information provided, the inventory staff had noticed that once quotes were received, they were quoting two items that are the same part. Parts are tracked utilizing a validated inventory system named Maximo.

A risk-based matrix was developed for RM Manufacturing PR where parts are rated based on the financial risk, they might pose to the organization due to not being available. As shown in Figure 1, there are four levels in which spare parts could be cataloged in the RM Manufacturing Network. Levels are established based on tolerance to mitigate unavailability and the possibilities of losses with a monetary threshold. Once the risk level is established, the inventory staff can begin following the appropriate path.

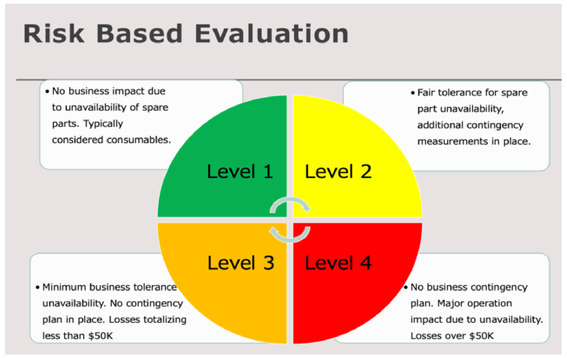

Figure 1
Risk-Based Evaluation Matrix

The current notification structures follow a complex flow in which every decision must pass through the subject matter expert for approval before ordering. Typical notifications are conducted via email in which a staff member from inventory gathers the required data for a decision to be made and sends the information to the applicable subject matter expert. As stated above, owners will provide feedback on Superseded and Pending Alternate parts. No notification is currently conducted for Zero Hand Balance parts.

As shown in Figure 2, previously all transactions required a subject matter expert intervention for order forward processing. After implementing the risk level classification only levels 3 and 4 will require a subject matter expert intervention. It is important to mention that their intervention would be made in the following scenarios: when a part is on Zero Hand Balance, when a part requires a decision for Pending Alternate or Superseded. Now in Zero Hand Balance, the notification will be made via email to notify of the instance to take the appropriate measurements in case the part is needed at a nearby time before its delivery.

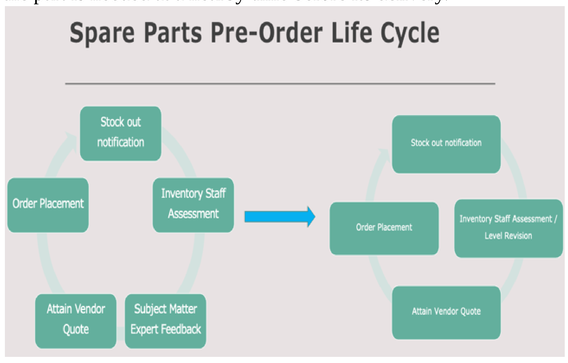

Figure 2
Spare Parts Pre-Order Life Cycle

In terms of improvement areas, it can be mentioned that the spare parts creation process was restructured in order to include key information about each item. In addition, the actual process flow of inventory staff while evaluating and placing orders was also improved. This is with the help of the risk category given to a part. This means that less additional interaction is required from functional areas prior to placing an order. As for monitoring, some guidance performance indicators were established in order to show how effective the staff is managing the process.

Results and Discussion

After implementing the spare parts management strategy, an increase in efficiency has been observed. A decrease in inventory staff personnel overtime has been experienced, as shown in Figure 3. The overtime decrease possesses two benefits for the organization: cost reduction and work-life balance for staff.

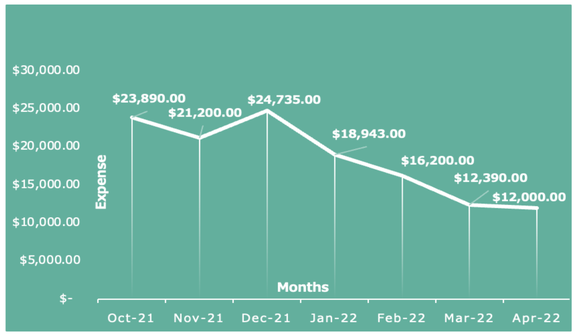

Figure 3
Global Inventory Staff Over Time Expense Tracker

In addition, order cycle time has also decreased, as shown in Figure 4. This shows that the new evaluation flowchart based on categories is indeed more effective and leaner than the previous strategy.

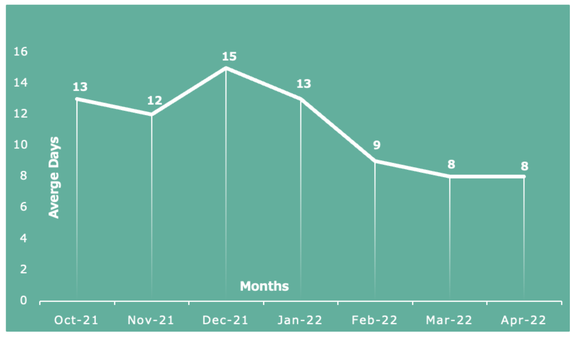

Figure 4
Order Processing Cycle Time

Additional findings noted during this evaluation were: Subject Matter Experts (SME) have also reported that since they are not involved in each order, they can refocus their efforts on additional tasks. Monitoring platforms are live under their first version and will be updated as deemed necessary in order to show the applicable data to spare parts and plant staff.

Conclusions

The project results suggest that an effective implementation was conducted. Furthermore, an increase in savings was observed due to overtime reduction on a network basis. As for parts availability, the reduction of order processing time shows that the team can place an order faster, which results in quicker delivery of the new part. Hence, minimum disruption of plant operations is to be expected related to parts unavailability. This only applies to parts that are already part of the inventory system.

Investing resources in understanding the system and establishing a strategy that fits the organization is considered a value-added activity. Furthermore, tailored strategies are suggested to change during their life cycle since they must adapt to current business needs.

Future Work

Development of an intelligent database capable of self-processing orders based on current inventory balance and spare part priority classification. No human interaction in the purchase order generation. Inventory staff will refocus on negotiating with the supplier price revisions based on volume consumption. Hence, reducing overall spare parts cost.

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