

Improving Work Order Visibility and Trackability in the Materials Lab

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Abstract—Our capstone project was sponsored by SKF Tool. SKF is in Elgin, IL and they produce products, solutions, and services for rolling bearings, seals, services, and lubrication systems. The project’s scope is in their material labs where they receive work orders to test compounds. Currently, the material lab has no tracking or real visibility of the work orders. Some data is collected in each lab, but they are redundant and at times, inaccurate. This is due to the multiple tools used throughout the labs, but the information is not shared across the labs or tools. Continuously doing this will increase lead time, overwhelm workers, overuse the tools, and limit the departments from making continuous process improvement systems integration. In addition, they have no reliable data to fully understand their workload and the progress of the work orders through the labs. We created a Value Stream Map ("VSM") of their current state and propose a new VSM with recommendations for an improved method of data collection and work order tracking. Our goal is to document the current process, reduce redundancies, and provide a data collection process that will allow them to better understand their labs’ performances.

Keywords-Heat Map, Spaghetti Diagram, Value Stream Map

I. INTRODUCTION

Our team was responsible for observing the workflow and processes in the materials lab at SKF. The materials lab receives work orders to test compounds. There are five different labs that involve the material process: the Sirvene Lab, Mixing Lab, Analytical Lab, Curing Lab, and Oven Room. Within these labs are six different tools in use: Enterprise, SharePoint, Excel, Sirvene Lab Request Form, Sirvene Lab Data Sheet, and Analytical Lab Sheet. Upon inspection, some of the data collected during the workflow is redundant, and at times, inaccurate. This is due to workflow issues, namely improper usage of data software tools throughout the labs. The software and tools used throughout the company have the same functionality as one another, but workers were either not aware or it was simply too much work to move already completed assignments from one program to another. Based on interviews, the employees express that they feel overwhelmed with all the different tools being used, which we believe is the reason for the improper usage of the tools by the department as a whole. With data collected across multiple tools and zero integration between them, the labs are unable to make continuous process improvement or system

integrations. There is little understanding of how each lab performs and how the department performs.

II. PROJECT OBJECTIVE AND SCOPE

Our objective is to improve data collection by minimizing resource usage and increasing visibility of work orders. In addition, our team will create a current and potential value stream map for the workflow process. Finally, we will try to make a visual aid to track the work order flow through digitalization of data and completed assignments.

The scope of the project includes all work order process information collected in the different labs: Sirvene Lab, Mixing Lab, Analytical Lab, Curing Lab, and Oven Room. On the other hand, ingredients that go in the compound, how to conduct the tests, and the time it takes to create the compound are the outside our scope.

III. METHODS

The team applied the Kaizen method to look for areas of waste and develop improvements throughout the workorder process.

A. Observations and Interviews

To understand the process, we followed the life of a workorder being created. At every step of the process, the information recorded and method of collection, electronic or paper, was documented. The data collection tools were studied, and we documented all the uses of them from each department. After that we created an “8 wastes of lean” chart to show different problems throughout the process as shown in figure 1.



FIGURE 1 - DIFFERENT KINDS OF WASTE

B. Spaghetti Diagram

Distances between operations were measured for the entire process. Like the time studies, these distances were mostly

focused around the different labs. Some distances were calculated to be zero because the operation was done in the same central unit. As shown in figure 2, a spaghetti diagram showing the travel done in one workorder cycle.

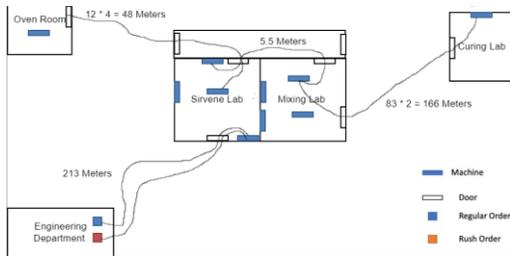


FIGURE 2 - SPAGHETTI DIAGRAM

C. Time Studies

In order to understand to timeline of work orders and how they're distributed, we divided the entire process into individual procedures. After this, the team collected cycle times—times it took the workers to go from one operation to the next. This data was later put in as the third component for stream mapping of the work order process.

D. Value Stream Map

A value stream map is an analysis method for formulating a current and future state of a process, involving the genesis of the product and its process and how it gets to the customer. To improve workflow throughout the company, we created four VSMs (two present and potential) that will target time wasting operations and cut down on time wasted. The current stream map for one of the processes is shown in figure 3.

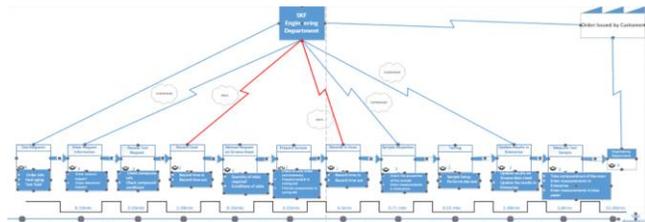


FIGURE 3 - CURRENT STREAM MAP

IV. RESULTS AND CONCLUSION

Due to multiple tools being used, the team looked for different ways the data collection tools could be reduced. The method that stuck out the most was accessing SharePoint across the SKF team; effectively building a dashboard for better transparency of the work orders. Further improvements include having QR codes. The QR codes will link to the information (such as test results) for the work orders, so it is faster for workers to access key information. All the work forms such as ASR, SLR, SLDS, and CSR form will be accessible to all employees as well as any updates that might be made. Future work can be made to streamline workflow via custom software solutions and addons tailored to workflow. Data collected from our preliminary changes can assist in the creation of these bespoke toolsets. Our new potential process is as shown in figure 4.

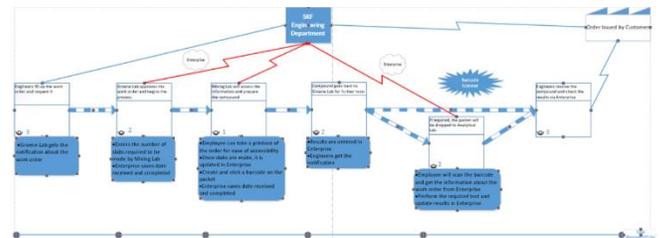


FIGURE 4 - FUTURE STREAM MAP

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