Leveraging Lean Six Sigma Tools in LMS Implementations
Maximize Cost Savings During the Implementation of Labor Management Systems

Direct labor accounts for the largest percentage of total cost within a distribution center. Operations teams are constantly being asked to do more with less, that is, increase the throughput and reduce the number of labor hours required to do it. As a result, more and more organizations are turning to the implementation of Labor Management Systems (LMS) in order to improve processes and reduce labor costs. LMS is an important piece to the puzzle, but leveraging Lean Six Sigma tools during the implementation can further reduce labor costs, while improving quality and creating additional value for the customer.

Several Lean Six Sigma tools can be utilized in an LMS implementation. These tools can identify root causes and barriers to productivity, and coupled with an LMS implementation, can increase throughput and reduce overall labor costs. The below sections outline three Lean Six Sigma tools that can be used to achieve these goals.

Standard Work

Standard work involves determining and implementing best practices for a process to ensure it is done right the first time and ultimately delivering value to the customer. When implementing an LMS, standard work takes on the form of a preferred work method (PWM). PWMs outline the best way to perform a task under normal operating conditions. It is not always the easiest or fastest way to conduct a task, but it becomes the established way to perform a task within your organization. PWMs must take into account safety and quality and must be consistent. The methods become the baseline for the process but should always be continuously improved.

PWMs are oftentimes overlooked and viewed as unimportant to the organization. However, they act as a training document for new and existing employees and become the basis for engineered standards. PWMs are typically established for direct tasks that require engineered standards as part of the LMS implementation. However, PWMs can be developed for indirect tasks or tasks that are not typically measured as well. PWMs differ from conventional standard work in that task time and cycle time are not included. Time elements

1. **Obtain the required number of cases from the location.**
   a. Determine if the current pick should be reverse picked based upon the number of cases in the location and the number of cases required.
   b. Pick all items in layers from the pick location.
   c. Do not stack heavy product on top of light product.
   d. Obtain multiple cases at a time when it is safe to do so.
   e. Place cases to the pallet in even layers.
   f. Follow proper bending and lifting techniques.
2. **Place the cases to the pallet.**
   a. Build stable pallets by forming layers whenever possible.
   b. Minimize the number of times walking around the pallet to place cases required.
   c. Avoid re-handling cases whenever possible.

Figure 1: Example Preferred Work Method

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related to each process are separate from these documents and developed as part of additional steps in the LMS implementation.

Cause and Effect

Cause and Effect diagrams, oftentimes referred to as Fishbone or Ishikawa diagrams, can be an effective tool in uncovering potential root causes of issues encountered during LMS implementations. In the initial phases of an LMS implementation, process observations are carried out, and during these observations, productivity barriers are identified. Productivity barriers are anything that prevents employees from being as productive as possible in their working environment. It is important to note that some barriers can be related to improper method usage or inadequate training. Barriers need to be eliminated, and utilizing Cause and Effect diagrams for analyzing barriers is an important first step.

There are five steps to constructing and leveraging a Cause and Effect diagram.

1. Identify the problem or effect of interest, which, in this case, is the specific productivity barrier. This becomes the head of the fishbone skeleton.

2. Determine the major categories for the causes of each productivity barrier. Categories that are oftentimes used for classification include the 6Ms: Manpower (Personnel), Machines, Material, Methods, Measurements, and Mother Nature (Environment). However, these categories

can be customized to fit the desired scenario. The categories become the main bones in the fishbone.

3. Once the effect of interest and categories have been identified and recorded, the third step is to brainstorm for potential causes of the productivity barrier. The potential causes become the smaller bones leading into the main bones. It is important to include resources at all levels of the operations team (directors, managers, supervisors, group leaders, experienced employees, etc.) in the brainstorming session.

4. Once the potential causes have been identified, the fourth step is to ask, "Why is this cause occurring?" The answer to this question becomes an even smaller bone leading into the potential causes on the fishbone skeleton. As a result of this exercise, you may find multiple factors that are causing the productivity barrier to occur.

5. The fifth and final step is to eliminate any causes that do not apply and identify the most critical causes, as these should be further investigated.

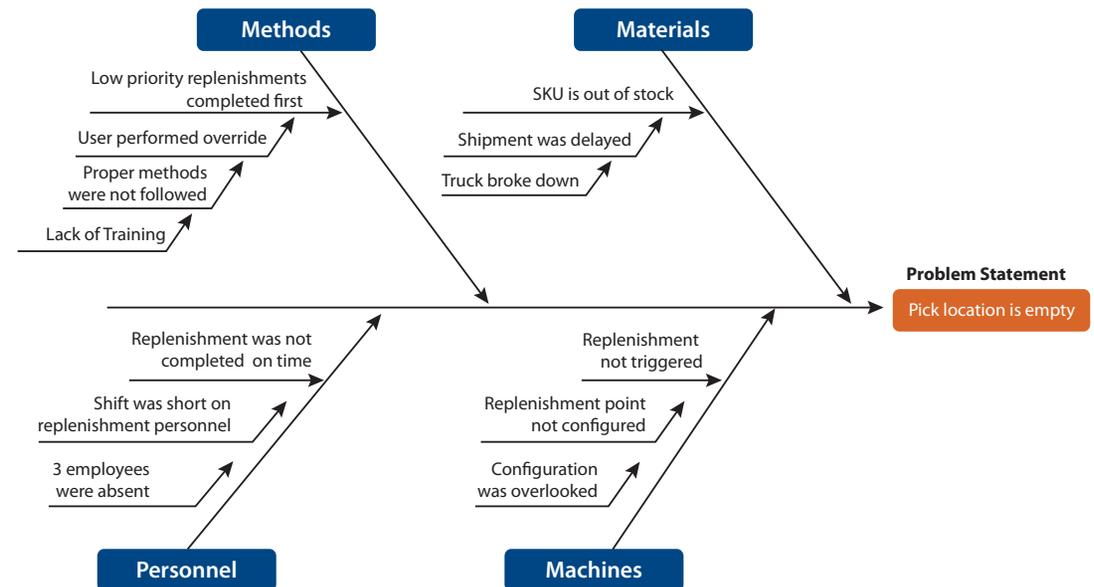Before developing solutions, it is important to gather additional information and collect

Figure 2: Example Cause and Effect Diagram

data to aid in determining which potential causes are actual causes. Once actual causes have been identified, an action plan can be developed for the removal of productivity barriers. This will eliminate waste in the operation and ensure non-value added steps are not included in the engineered standards.

Spaghetti Diagrams

Spaghetti (or Workflow) diagrams are used to depict the physical flow of work or material in the process. They are oftentimes used to improve the physical layout of a warehouse prior to the implementation of an LMS. Major LM systems include functionality for creating the warehouse map within the application in order to leverage discrete travel distances for engineered standards development. However, if the physical layout is not optimized prior to the implementation go-live, inefficiencies will be built into the standards in the form of increased travel distances.

Spaghetti diagrams can aide in identifying non-value added travel and assist in optimizing the physical layout. Analyze the diagram for crisscrossing lines and visits to the same locations or areas multiple times as this is an indicator of backtracking and ultimately non-value added travel. Also, minimizing movement paths and re-slotting items can significantly reduce travel distances as well. Mapping out the flow of work in a spaghetti diagram is a lot easier than trying to visualize that same flow of work and can lead to tremendous cost savings.
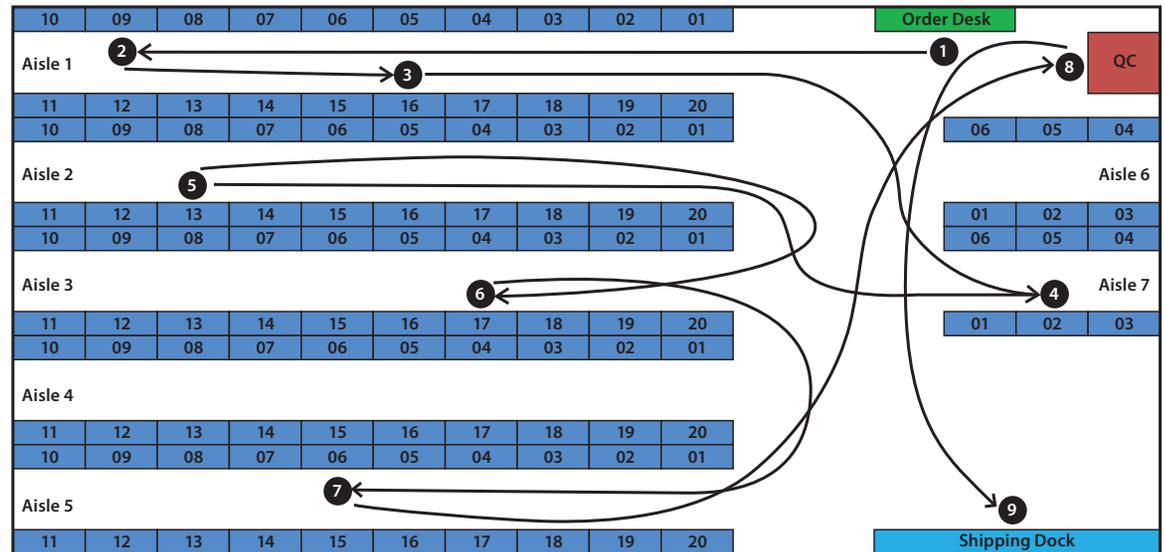

Figure 3: Example Spaghetti Diagram

Conclusion

We have only discussed three of the many Lean Six Sigma tools available that can be leveraged during LMS implementations. When used properly, these tools can improve processes, determine root causes of productivity barriers, and identify opportunities to minimize travel within a distribution center. All of these components, along with a successful LMS implementation, will contribute to increased throughput and a reduction in overall labor costs.

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