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Lean Thoughts

5 Steps to Implementing a Lean Material Handling System

In a traditional material handling system, large quantities of purchased parts arrive at the receiving dock, typically on pallets or in boxes, and are delivered directly to the production floor by fork truck in an unorganized manner. Therefore, the shop floor becomes a mini-warehouse with multiple storage locations and that is when material control is jeopardized.

The result for companies trying to implement lean production is confusion, stock-outs, and difficulty sustaining continuous flow cells. Common problems that we see with such traditional systems include difficulty knowing how many purchased parts are on the floor, cells running out of parts, and operators unable to sustain takt time because they have to go searching for parts. The solution is to replace traditional material-handling systems for purchased parts with lean systems based on five key implementation steps:

1. Develop a plan for every part (PFEP). This spreadsheet or database fosters accurate and controlled inventory reduction and is the foundation for the continuous improvement of the material-handling system. This is the first step because you will use this data in other steps, such as setting up the purchased parts market and establishing pull signals. To create the PFEP, you'll need to gather essential information on every part number entering the plant, such as the part's specifications, supplier, location of supplier, rate of usage, storage locations, point of use, container size, as well as other key data.

2. Build the purchased-parts market. The market maintains controlled levels of purchased parts in a central location instead of storing them in scattered locations throughout the facility. Key pieces of information needed for creating the market include determining the maximum level of inventory to hold, the minimum inventory level, and how much space to provide in the market for racks or pallets, depending on the volume and size of parts. You should also establish rules for operating the market, such as an address system, procedures for reacting to overshipments from suppliers, procedures for reacting when the minimum inventory level is reached, and a method for loading and picking parts to maintain a first-in, first-out sequence.

3. Design delivery routes. A lean material-handling system should deliver materials from the purchased parts market to the operators' fingertips. This step involves identifying delivery aisles, selecting a conveyance method, such as tuggers, determining the stops and delivery points for the route, and creating correctly sized point-of-use gravity racks at delivery points. Gravity racks allow material handlers to slide new containers of parts to the fingertips of operators inside the cells. Handlers fill the racks from the outside, so they don't interrupt operators. Each part used in the cell has its own shelf. When a container is empty, the operator slides it down a return shelf for retrieval outside the cell.

A good way to prepare people for the change to lean delivery is to compare them to the operation of an efficient bus route. The lean system will drop off passengers (purchased parts) and pick up passengers (empty parts containers, pull signals, and ultimately, finished goods), at regular intervals. In contrast, the traditional system makes material handlers rush around the facility delivering parts based on urgent need, much like a taxi driver driving around looking for fares and moving only one passenger at a time.

Where Lean Thoughts can become Reality

"Unless you try to do something beyond what you have already mastered, you will never grow."

Ronald. E. Osborn

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4. Implement pull signals. Signals, such as the familiar kanban card, control the precise times and quantities of parts delivered to cells. You must precisely control the number of kanban circulating in the system. The first step is to determine how frequently to deliver material to cells, and whether the route is "coupled" or "decoupled." In a coupled route, the tugger driver loads carts in the market and drives them to the cells, and delivers them to the point of use. In a decoupled route, the work is divided between a market attendant who loads parts and the driver who delivers them. Decoupled routes require two sets of carts but they improve labor utilization, so routes can be longer and have more carts. The type of route affects the number of kanban needed for each part. Coupled routes require kanban equal to three times the delivery frequency. Decoupled routes need signals equal to four times the delivery frequency. The formula for figuring the total number of kanban for a decoupled route looks like this:
(Hourly usage x 4 x route frequency)
Standard container quantity

Example: For Part #12345, the usage is 90 per hour, there is one cycle of the route, and a container holds 30 parts. (Always round up to the next whole number.)
(90 x 4 x 1)/30 = 12 kanban

5. Continuously improve the system. Experience has taught us that the best way to sustain and improve the system is to have daily monitoring of the system and periodic auditing. For instance, the production control supervisor should spend about an hour a day observing various elements of the routes and purchased-parts market. The material-handling team should meet daily to communicate problems and seek solutions. Key performance metrics focused on such factors as delivery, productivity, and safety should be established for the team. The daily monitoring must be supported by periodic audits done by overlapping levels of management to make sure that the new tools -- the PFEP, the purchased-parts market, the delivery routes, and the pull signals -- are being maintained and that standard work is being followed. Emphasize to people that processes, not individual employees, are being audited. Post results for everyone to see.

The best way to start the implementation is usually at one work cell. You can do one cell in a short period and really learn to understand the system, then scale up to the entire facility. Trying to implement the system in a whole facility at once can get bogged down.

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