

## CHAPTER 8

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# Lean Warehouse: Low-Hanging Fruit

Lean is still in its early stages in supply chain and logistics, so it is sometimes difficult finding a place to start it. A place that many companies have found as a good place to start is the warehouse, which was discussed briefly earlier in the book.

In the 21st century, the warehouse is becoming a strategic tool to be used for a competitive advantage. Warehouses today are distribution centers supporting a JIT supply chain that is low cost, flexible, and efficient, especially in the rapidly growing world of e-commerce. E-commerce growth affects both the warehouse and the inbound and outbound logistics that support the facility.

### Lean Thinking in the Warehouse

In “The Skinny on Lean,” Peter Bradley cites the following five-step process as a guide to implementing Lean principles, which can be applied to the distribution environment as well as manufacturing:

- ▲ Identify what your customers expect and determine what value you add to the process. For distribution and logistics, that usually means greater velocity. What it doesn’t mean is a lot of handling. Distribution people assume all the handling they do adds value, but customers don’t see it that way. “No customer asks if a product has been touched a lot,” Womack says. “Most people just want their product. All those touches from a customer standpoint are irrelevant. From an end customer standpoint, less logistics is better.”

- ▲ Plot the value stream. Identify all the steps involved in moving goods through the system. Womack and Jones encourage the use of value-stream mapping—literally diagramming all the steps in the distribution process, from order to delivery. That diagram may help you spot activities that add no value so that you can eliminate them.
- ▲ Make the process flow. Dismantle any roadblocks that prevent the free flow of materials through the facility.
- ▲ Pull from the customer. The lean system is a pull system, drawing materials and merchandise into the distribution network based on what customers want (not on hazy forecasts).
- ▲ Pursue perfection. Root out any remaining waste. Then do it again, and again, and again.”[Bradley, 2006]

The fact is that most Lean concepts can work well in the warehouse, especially 5S (usually the first activity to do as a good foundation for a Lean program), value stream mapping (VSM), team building, *kaizen*, problem solving and error proofing, *kanbans*/pull systems, line balancing, and cellular applications and general waste reduction.

At first glance, many warehouses are very neat and organized, at least in the case of “pure” distribution companies, and perhaps less so at manufacturers (not their area of expertise!). However, once you “get under the hood,” there are plenty of opportunities to be found.

### *“Assembling” Orders*

Warehouse operations seem to be very active, with people and equipment in constant motion. However, this does not mean they are productive. Orders do not necessarily keep moving. They tend to pile up and sit, waiting between processing steps, causing clutter and taking up space (all forms of waste!). An analysis done around 2006 of a distribution operation, as described in *Are Your Warehouse Operations Lean?* by Ken Gaunt showed that a typical order was only being worked on 38 percent of its cycle time; 56 percent of the time orders were idle while the remaining 6 percent involved employees dealing with problems such as waiting for equipment, computer issues, interruptions, and blocked aisles.

To radically improve this type of performance, warehouse orders should be looked at as being “assembled” in the most efficient manner, minimizing non-value activities including delays in receiving, putting away, picking, packing, and loading, as well poor picking paths, wasted motion, congestion, and poor equipment condition and availability.

For example, the orders could be assigned based on the amount of time or “batches” that it takes to pick line items (established in time motion studies), instead of just giving an entire order to a picker. Pickers would be assigned zones. They would then feed workstations in regular intervals to keep products flowing and so that packers and loaders are not kept waiting.

In general, you want to look at aisle and rack layout to improve space utilization, make sure products are arranged so that the most frequently used items are closest to shipping to reduce travel distance; heavily use visual systems for aisles, racks, products, and workflow; avoid cluttered and blocked aisles; and create housekeeping systems to improve efficiency by ensuring tools and equipment are available when and where they’re needed. [Gaunt, 2006]

### *Value Stream Mapping in the Warehouse*

A good way to attain better flow is to start with VSM. The value stream map will give employees an overall view of all warehouse activities, which allows them to suggest improvements in other areas, as well as their own. It is a good way for everyone to understand and agree on how the facility works and to come up with ideas for improvement. Display the current and future state maps in the warehouse so that employees are able to see previous improvements and take part in the ongoing effort.

To assess the operation using a value stream map, you need to involve the operators and supervisors, identify Lean improvements and *kaizens*, question every activity, treat the warehouse like a large staging area, develop justification as you go along, implement the Lean improvements using the VSM plan, and then start the cycle again.

5S or workplace organization (“a place for everything and everything in its place”), while seemingly simple, is a good place to start, and it is sometimes surprising how much time people waste searching for things.

## Lean Tools in the Warehouse

In order to get any of this done, a team approach is necessary to identify the wastes in areas such as errors (receiving, put away, picking, loading, etc.), inventory inaccuracy, damage, safety, and lost time. Lean tools, such as problem solving (root cause, fishbone, etc.) and error proofing with standardized work (e.g., visual instructions on how to use a strapping machine or how to load/unload a truck) can also be helpful in the warehouse environment.

Pull systems using *kanbans* are a “natural” in a warehouse for everything from packing materials to forms, as well as product assembly and kitting.

If you do any value-added activities such as kitting or assembly, as many 3PLs do, then work cells might be appropriate to minimize labor and maximize the use of equipment and space. Line balancing is a tool that can be used in this type of situation not only in staffing, but also to ensure proper flow in the work cell.

There’s even a place in the warehouse for total productive maintenance (TPM or equipment-related waste) as there’s plenty of equipment (some automated) that might not be running as efficiently as possible (e.g., carousels, forklifts, hand trucks, strappers, etc.).

## Lean Warehouse Examples

Menlo Logistics, a major 3PL provider, has not only implemented Lean at many of its facilities, but also uses it as a competitive weapon as can be seen at their Web site under “Lean Logistics” ([www.con-way.com](http://www.con-way.com)) where they point out the following areas where they look for waste:

- ▲ Mapping material flows— in studying material flows from raw material vendors to customer finished goods, we challenge each point



at which material flow is stopped. Methods to speed up material flows include shipping ocean containers directly from Asia to inland regional warehouses, instead of transferring cargo to trucks at the ports of entry, and bypassing warehouses with large orders that travel directly from factory to customer.

- ▲ Keeping drivers and tractors moving—the interface between warehousing and transportation can often result in waste. We attack this problem by working with our carriers to drop trailers, freeing the driver and tractor to pick up a loaded one and keep moving. Through careful dock scheduling and synchronization of warehouse workflows, we can live-load shipments quickly, minimizing driver dwell time.
- ▲ Using milk runs—milk runs reduce transportation costs and build more consistency into an inbound supply network.
- ▲ Electronic data interchange (EDI)—Menlo Worldwide Logistics makes extensive use of EDI and RosettaNet to pass data among our supply chain partners. Communicating data electronically eliminates errors caused by manual data entry.
- ▲ Warehouse efficiency—Menlo Worldwide Logistics' team of industrial engineers designs warehouse layouts that streamline inbound and outbound flows, maximize labor efficiency, and deliver high space utilization. We employ techniques like dynamic slotting, cluster picking, task management and system-directed putaway to optimize labor and space efficiencies.
- ▲ Optimize transportation routes—Menlo Worldwide Logistics' LMS application optimizes each load to meet delivery dates with low-cost mode and carrier selection.
- ▲ Packaging optimization—We work with customers to explore the use of returnable containers for repetitive shipments to factories. For finished goods, we can study packaging sizes to uncover ways to increase pallet and trailer utilization. Small changes in carton sizes can facilitate better storage utilization and lower transportation costs. [www.con-way.com, 2011] Furthermore, Menlo emphasizes the use of mistake-proofing tools such as:
  - ▼ Making it easy to do things right and making it hard to do things wrong

- ▼ Easy-to-read visual controls
- ▼ Radio-frequency devices coupled with bar-code technology
- ▼ System-directed cycle counting at our warehouses
- ▼ Utilization of Six Sigma and SPC
- ▼ ISO processes
- ▼ Electronic data interchange (EDI)
- ▼ Standardized processes
- ▼ Implement repeatable, standardized processes
- ▼ Establish one best way to perform each task
- ▼ Visual documentation of processes
- ▼ Correct any activity that causes rework, unnecessary adjustments or returns
- ▼ Organized workplace (5S) [www.con-way.com, 2011]

All of this results in benefits to their customers such as better service, lower costs, higher availability, higher customer satisfaction, and more reliable deliveries.

This isn't just "talk" either, as was pointed out by Gary Forger in *Menlo Gets Lean*. It describes how Menlo Logistics operates a 250,000 facility in Michigan that had recently shipped 8,000 orders in a 2 week period with no errors and according to a recent audit has inventory accuracy of 99.99 percent.

This site was the "pilot" site for their Lean program (along with a dozen other Lean warehouses at the time) with a goal to reduce the cycle time and increase productivity of various resources by eliminating waste. Menlo focuses their metrics on service, quality, delivery, cost, and employee morale. Warehouse operators work in 20-minute segments or small "batches" similar to what was mentioned earlier in this chapter. That maximizes flexibility and allows labor to help minimize response time to orders.

Items are slotted according to size and velocity, and workers are assigned certain aisles to keep neat and organized (and must sign off on a checklist).

Team leaders "own" their processes, supervisors and managers remove "road blocks," and bonuses of hourly team members are tied to metrics and improved processes (a real key to success, I believe). Besides weekly departmental meetings to discuss performance and improvement, every month a *kaizen* event is held in which as many as six workers concentrate on improving an operation. [Forger, 2005]

Peter Bradley in “The Skinny on Lean” stated that “Menlo Worldwide reports that warehouse productivity improved 32 percent between January and November last year, measured by gains in lines per hour. Defects, measured as the error rate, dropped by a whopping 44 percent. The on-time percentage for shipments was north of 99 percent in every one of those months, hitting 100 percent in eight of 11 months. And those involved think they can do more.” [Bradley, 2006]

Another major 3PL player, Ryder Logistics, highlights their “Five LEAN Guiding Principles” on their Web site ([www.ryder.com](http://www.ryder.com)), which “provide the foundation for operation excellence, continuous improvement and supply chain efficiency.” The guiding principles are: people involvement, built-in quality, standardization, short lead time, and continuous improvement.

Ryder also mentions using a variety of Lean tools in their business, such as workplace organization, visual management, work cells, standardized work and even a Lean Academy. They not only include Lean applications in the warehouse operations, but start with determining the optimal distribution network design, which can significantly reduce waste in the overall supply chain network. They take this very seriously.

A Ryder case at the site describing how they took over Whirlpool’s service operation shows how continuous improvement activities reduced costs, improved shipment accuracy and order cycle time, and boosted overall efficiency. The first thing they determined was that it was more efficient to consolidate Whirlpool’s various service facilities into one location. After that, they implemented a variety of continuous improvement efforts, including the creation of an inventory profile that identified the best storage location for each part to improve efficiency of order picking, improved workflow processes leading to more efficient use of labor, and collaboratively enhanced the existing WMS system that enabled them to streamline the operation further.

Ryder then keeps track of five key performance indicators (KPIs) on a monthly basis (the first four of which are also measures of waste): shipment accuracy, inventory accuracy, order fill rates, order cycle times, and budget performance. [[www.ryder.com](http://www.ryder.com), 2011]

The point of these examples is to show that not only is the warehouse an ideal place to start a Lean supply chain and logistics journey, but that it can give you real results and a competitive advantage in the marketplace.

