

## *Lean Thinking in the Warehouse*

*Editor's Note: The next book to be produced by our company will be called Lean Warehousing. This article is taken from the introductory chapter of that book. Two earlier publications, Lean Thinking by James P. Womack and Daniel T. Jones, ©2003 and The Toyota Way by Jeffrey K. Liker, ©2004 by McGraw Hill served as inspiration. KBA*

The concept of “lean” has roots in mass production, originally in the automotive industry, and most famously, at Toyota, where Ford Motor’s original Rouge manufacturing complex was used as its benchmark. Toyota’s managers studied the text of *Today and Tomorrow*, a book written during 1926 by Henry Ford. Ford conceived the idea of a moving assembly line, after observing the meat packing plants in the Chicago stockyards. He recognized that the process of disassembling a hog or steer could be reversed to construct the automobile.

The original lean techniques were limited to mass production of a highly standardized product as noted in Henry Ford’s famous proclamation “You can have the Model T in any color, as long as it is black.” In contrast, warehousing is not mass production -- it is a service industry. With a few exceptions, warehousing volumes are not massive, and they very seldom are standardized. Not only can the customer have any color, but he also may choose from thousands, or even tens of thousands, of items that are available from storage. Given these significant differences between warehousing and production, how can lean thinking be applied to a distribution center environment?

The airline industry is one example of a contemporary service industry that has applied lean thinking to its work. Waiting time can account for more than half the total time on shorter trips. Although the typical airline consumes thirty minutes in the process of turning an aircraft at the airport gate, Southwest Airline has cut that time in half. Southwest flight attendants do double duty as the cleaning crew, and the passengers are asked to expedite the process by disposing of trash before the aircraft reaches the terminal. In recent years, most of the airlines have reduced check-in time by offering customers the ability to print a boarding pass on a home computer, or at kiosks in the terminal. Personnel requirements are reduced by the “do it yourself” opportunity for customers.

Banking is another service industry that successfully has applied “do it yourself” devices in the form of automatic teller machines (ATMs). Gasoline stations and grocery stores have reduced staffing through the use of automatic checkout devices that allow the customers to pay for the purchases without human intervention. At least one hotel chain allows guests to check in, and receive a room key by inserting a credit card into a machine. While many hotels encourage their customers to check out by using a device that is connected to the guest room television set. Decades ago, the telephone industry management discovered that operators could be replaced by dialing systems.

## **Eliminating Waste**

The Japanese word muda is worth remembering because it has an uglier sound than waste. Muda is any activity that absorbs resources without creating any additional value. The telephone operator did not create value, nor did the bank teller, or the checkout clerk at a supermarket. All could be, and have been, partially replaced by machines that provide “do-it-yourself” ability for the customer.

As you study your warehousing operations, you should identify every activity that absorbs resources without creating additional value. Shipping and receiving errors may be the most obvious example. How much more profitable could the warehouse be if we eliminated the errors accepted as normal today?

Waste also is found in poor utilization of space. Space is money, and it is paid for every month. If extra space is acquired when the existing warehouses are not completely full, the waste is obvious.

Although staging of product at the shipping and receiving docks is accepted as a necessity today, could it be eliminated? Both warehouse operators and truckers accept a condition that requires the typical truck driver to devote more than 30 hours per week to “dwell time,” or waiting at shipping or receiving docks. What if truckers and warehouse operators emphasized the turnaround time of trucks the way that Southwest Airlines focuses on the turnaround of aircraft at the terminal gate?

Since warehousing is nothing more than the management of space and time, reducing waste starts with identifying the poor use of both.

## **Eight Varieties Of Waste**

Consultant Taiichi Ohno identified eight varieties of waste commonly found in manufacturing. All have application in the warehouse.

1. Overproduction in manufacturing results in wasted materials. In warehousing, an excess of inventory has the same result.
2. Waiting is a waste of time. This is as true in warehouse operations as it is in production.
3. Unnecessary movement of cargo is a major source of waste in materials handling.
4. Over processing is a waste in production - in warehousing it is over checking.
5. Poor inventory control represents waste , particularly when stock-outs are frequent.
6. Movement is a waste when it involves hunting for tools, or stored items, that cannot be located.
7. Defective parts waste production; in warehousing, errors result in waste.
8. Unused employee creativity represents a waste of human resources.

## **Focus on Flow**

When Ford developed the moving assembly line, the labor required to assemble a car was reduced by 90%; however, the process worked best with high volumes of a standardized product. Creating continuous flow in small lot production is more complicated than Ford's process, but it was achieved by Taiichi Ohno and his associates at Toyota. Continuous flow involves more than materials. It includes the flow of information and paper as well.

In warehousing, the monitoring and reduction of order cycle time also is involved. In your warehouse, what is the time lapse between receipt of an order and delivery to the customer? If it is less than it was a year ago, you are reducing the order cycle time. Improvement of the flow of materials and information is one way to accomplish this. In materials handling, flow is facilitated by reducing the number of times that product is moved during the process of receiving, storing, picking and shipping. Flow of information is controlled in similar ways, by eliminating opportunities for error in the transmission of data.

### **The Five Ss**

Lean thinking starts with the creation of a lean workplace which, for us, is the warehouse. Five S's noted here, are involved in the process:

- **Sortation** is the process of separating needed tools or merchandise from those that are not needed, and removing the unneeded materials.
- **Straightening** means that items are arranged in an order making them easiest to use.
- **Shining** is the cleanup campaign. Lean warehouses have excellent housekeeping.
- **Standardization** is the development of systems and procedures used to monitor the first three S's.
- **Sustaining** is the maintenance of a stabilized workplace, through continuous improvement.

Each of the S's readily can be adapted to most warehouse operations.

### **Pull Replaces Push**

With traditional manufacturing, factories produce in economical quantities and then push the product through the market to the retailer. When products are not purchased as expected, unsold product is pushed out in a "clearance sale." Improved logistics capabilities have enabled manufacturers to replace the "push" system with "pull." The best example is in automotive replacement parts. The traditional car dealer carried a three month supply of replacement parts. The repair technician went to the parts window, requested the needed part, and waited for the counter person to find the item in a maze of storage bins. Today, rather than stocking all parts, the car dealer is likely to contact a nearby distributor who will have the needed part delivered within two or three hours.

The pull system relies on a very high degree of reliability in parts storage and delivery. Some specialists in the warehousing industry are highly skilled in storage and

delivery of replacement parts. As an ever larger percentage of finished products are imported from overseas, effective distribution of replacement parts has become more critical than ever before.

### **Transparency or Visibility**

The best lean manufacturers use an ample number of status boards to provide a clear sense of progress. In the logistics industries, the process usually is referred to as visibility. On shipments made through one of the major parcel carriers, the location of your shipment can be determined by entering the tracing number on the carrier's web site. Warehouse operators can use similar technology to trace the status of every order that is received at the warehouse, from time of receipt through final delivery.

### **Perfection**

Lean manufacturing professionals define perfection as the complete elimination of waste, so that every activity in the process creates value.

In warehousing, perfection is identified with "the perfect order" meaning that it is delivered precisely on time (neither early nor late), that it is free of any damage or defect, and that it contains the correct materials in the order. Imperfect orders result in unhappy customers. In extreme cases, the imperfect order can cause a disaster involving assembly-line shutdown, or a health risk.

Perfect inventories are nearly as important as perfect orders, and neither can be accomplished without the other. In earlier times, shipping and receiving errors were considered to be inevitable. Current information technology enables the best warehouse operators to achieve a shipping accuracy rate above 99.9%.

### **Lean Thinking**

Achieving lean warehousing requires a certain mind set. A can-do attitude is the starting point. If you and your staff don't believe that "the perfect order" is attainable, normal error rates will persist. Lean thinking will require a conversion from top-down leadership to bottom-up initiatives. In a lean operation, every worker is an inspector, and everyone is expected to help the company achieve continuous improvement. Lean thinking will not occur in a hierarchical environment. Managers must become coaches rather than tyrants. Employees must be rewarded for being proactive.

A perfection mindset in your warehouse can be developed with active leadership. The leader in lean warehousing must be a change agent.