LEAN MANUFACTURING

By Derek Adamczyk, CPA

What is Lean Manufacturing? Simply stated, it is a course of action focused on eliminating all waste in the manufacturing process. The goal is to minimize all activities that are non-value added. If it does not add value to the customer, get rid of it!

The demands of the global market have changed. Lean manufacturing applies not only to a highly repetitive production environment, but also to job shop operations with a highly mixed model of production. In either case, customers demand quality, speed, low price, and a quick responsiveness to change. Lean Manufacturing is an initiative that allows manufactures to be highly responsive to customer demand, while producing top quality products in the most efficient and economical manner possible. Manufacturers that make no attempt to implement some principles of Lean Manufacturing may find it very hard to compete in the competitive manufacturing environment at hand.

The first and foremost fundamental of Lean Manufacturing is to eliminate waste. Waste most often occurs in the form of overproduction and excess inventory. Waiting and excess motion are activities that increase lead time and also produce a significant amount of waste. Defects are the ultimate waste. They add zero value to everyone involved.

In Lean Manufacturing, to overproduce is a grave sin. This leads to excess inventory and more important, can lead to obsolescence. Even if the product is manufactured perfectly, it can become worthless if a new product or new customer demand takes its place. Too many struggling manufacturers have old, worthless product laying all over the plant or warehouse that will never be sold and is taking up valuable space. Inventory is very expensive, due to the costs of storing, counting, tracking, dusting, damage, and insurance. It also slows response time, hides quality problems, gets lost, degrades and becomes obsolete. Lean Manufacturing aims to minimize inventory as much as possible. Pull processing is the ideal way to operate. Products are pulled from the customer end and not pushed from the production end. This relies heavily on properly managing your suppliers. The goal here is to limit the number of suppliers you deal with. They must deliver on time, the right quantity, with little or no inspection necessary. They must also be able to deliver in small lot sizes.

In the manufacturing environment, one process waiting for the next is highly inefficient. This creates work in process inventory and is the key reason lead times are much longer than they should be. Manufacturers must think of making products in hours, instead of days or weeks. In a traditional environment, the plant floor is set by function centers. Parts and materials are moved from one end of the plant to another. This entails waiting for the forklift, loading and reloading material, setup time, and incurred backups. These are all non-value added activities that consume resources and waste time.

Cell manufacturing is one of the big keys to Lean Manufacturing. Cell manufacturing is a state where the plant is arranged by product family. One type of product is worked in one cell and another type of product is worked in another. The materials necessary are delivered to a particular cell directly. Then the materials are transformed through one continuous process. All the machines and processes a product goes through are in one continuous line. The result is extremely short lead time, high quality, and increased flexibility. Manufacturers need to shift their thinking from conventional mass production to product-aligned one-piece flow pull production. Mass production involves a production of large lots of products in advance, based on potential or predicted customer demands. In pull production, the process begins only when there is customer demand. The one-piece flow process is then triggered. The results are absolutely dynamic. Lead times are often shortened from weeks to hours, and production times are cut from hours to minutes. A one-piece flow cell manufacturing environment also enables defects to be identified at the source in a short amount of time. Employees are empowered and see the entire process from start to finish. There is no wasted movement of materials or employees. There is minimal work-in-process inventory and the flexibility to customer demand is high. Products are produced quickly, economically, and with the highest quality.

Convincing employees and management of the benefits of Lean Manufacturing can be difficult. One of the ways to introduce the fundamental concepts is to have what is termed a Kaizen event. A particular product is chosen for the exercise. A group of employees then engage in the making of this product, from start to finish. A cell is set-up and employees go through all the processes it takes to complete the product. What shocks most participants is how much actual value-added time goes into making a particular product. It may take less than an hour for a product to go through every process through its completion. It then begs the question, why is the lead time several weeks? Wasteful activities are the culprit! These include inefficient plant layouts leading to excess movement, transportation, and waiting. Too much buildup of work-in-process inventory is also wasteful. Defective items along the way waste time as well. Inefficient processes that require non-value work can add days, if not weeks, to lead times. Kaizen events can lead to employee empowerment and vision to transform operations.

Value stream mapping is the process by which a Lean transformation begins to occur. This entails outlining all activities that it takes from the sales order, through the production process, to the shipment of goods. Plant layout is also included in this analysis. Once the present state is mapped out, improvements can be planned and addressed. Manufactures can quickly see how much waste truly occurs in their business, hindering them from thriving in the manufacturing sector.

Lean Manufacturing is a continuous improvement journey. It does not occur overnight. It is an ongoing commitment to eliminate waste and activities that do not add value. One piece flow cell manufacturing, efficient plant layout, strong supplier relationships, customer demand driven production, and empowered employees can propel domestic manufacturers to world class status.