

Eliminate Non-Value Added Effort through Lean Manufacturing

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Changing customer requirements are shifting many manufacturing companies from mass production of standard products to small-lot production of customized products, with even greater focus on quality.

Many companies continue to produce large lots based on a forecast, with batches pushed from department to department and with people trained in limited, repetitive tasks. But it's becoming clear that this approach causes excessive inventory, too much movement and waiting and wasted resources in people; plant and equipment, all of which result in highly inflated costs.

Lean manufacturing is a systematic approach to identifying and eliminating waste (non-value added activities) through continuous improvement to allow product flow at the pull of the customer in pursuit of perfection. It focuses on eliminating non-value added activities from your company's processes while streamlining value-added activities. A people-oriented approach that empowers a team to take action to achieve improvements, lean is the best way to effectively use a company's most valuable resource — its people.

Any activity that doesn't add to the market form or function of the product (things for which the customer is willing to pay) is a non-value added activity, or the "wastes" that lean seeks to eliminate. Interestingly, many manufacturers don't even recognize some of these as "wastes," but simply necessary evils of doing business.

Lean manufacturing focuses on eight specific major wastes:

1. Overproduction

This is probably the most deceptive waste. It simply is making more products earlier and faster than the next process requires. In all cases, overproduction leads to unneeded inventory. Overproduction usually is deliberate to cover up quality deficiencies, equipment breakdowns, and inadequate employee training, long process set-up and unbalanced workload.

2. Inventory This waste is any supply in excess of a one-piece flow through the process, including work in process and finished goods. Holding inventory costs money — roughly 25 percent of the value of the inventory if held for a year.

3. Defects This is a major waste that includes material, labor, machine hours, inspecting, sorting or rework. Its causes can be inadequate training, weak process control, deficient maintenance and/or incomplete engineering specifications.

4. Processing This waste is effort that adds no value from the customer's viewpoint. It can include extra or incorrect inspections, extra copies of paperwork and over or redundant processing "just-in-case." Expediting processing because of failing to meet schedule also is a waste.

5. Transportation Moving materials in the manufacturing process can add costs, but no value. Not only does the act of transporting add to costs, it also typically involves using expensive equipment. Further costs are space, racking and the people and systems needed to track the material.

This includes all idle time, such as waiting for parts from up-stream operations and waiting for tooling, set-ups and instructions. Waiting for workers generally is of greater concern than machine use.

7. Motion

Any people and/or machine activity that doesn't add value to the product is considered waste. Its symptoms include time looking for tools, extra product handling, walking and product arrangement, stacking, etc. Causes include poor plant layout and workplace design, inadequate training, weak processing and constant schedule changes to reduce on-time delivery problems.

8. People

Factors such as company culture, hiring practices, management styles, turnover rates and morale all contribute to this waste — not using your employees' abilities to their fullest potential.

Do A Self-Assessment

The best way to get started down the road to becoming lean is doing a simple "self-assessment" walk. Go to the shop floor, the engineering area, the production control and order management department and pick a product family from the customer end of the value stream. Consider these as opportunities — long lead times, frequent set-ups, long set-ups, significant work-in-progress dollars, critical work centers, flow bottlenecks, capacity constraints, key customers, large inventories and competitive products.

Look for products that pass through similar processing steps, and over common equipment, in your downstream processes. Selecting the product family based on upstream fabrication steps that serve many product lines in a batch mode won't give you what you need.

Once you've picked a product family, put yourself in your customers' position and trace the design, order and physical product from launch back to original concept, from delivery back to the sale and from finished product back to raw materials. Include distances, stops and their duration, and the number of functions handling the product or its components.

Ask yourself these questions:

- ◆ Does this product provide the precise value sought by the customer?
- ◆ Do the design, order and product flow continuously through the necessary activities to reach your customers?
- ◆ Can your customers pull the product from the value stream, i.e., can they get just what they want, when they want it and without your company holding a mountain of finished goods "just in case?"
- ◆ Is the value stream's performance steadily improving?
- ◆ Can your plant's overall lead-time be measured in hours instead of days or weeks?

If your answer to each of these questions is yes, then you do not need to think further about lean enterprise — you are lean already. If you still aren't getting an adequate return on assets or sales, the problem must lie elsewhere, such as structural problems in your industry, slipping customer need for your category of products, etc.

But if your answer to most of these questions was no, it's time to think about getting lean.

Lean manufacturing as a form of continuous improvement isn't a destination, but rather a journey; an ongoing process. So the first step to getting lean is to learn as much as you can about lean manufacturing through examples of other companies and existing literature.

By identifying various types of waste in your operation, determine each waste's root causes and lead your team in a systematic lean manufacturing approach to removing the wastes. Typical improvement projects supporting lean might include:

- ◆ Value stream mapping
- ◆ Flow/cellular manufacturing
- ◆ Visual controls and work place organization (5S concepts)
- ◆ Standardized operations
- ◆ Pull/Kanban production methods
- ◆ Set-up reduction
- ◆ Total preventive maintenance
- ◆ Mistake-proofing
- ◆ Plant layout
- ◆ Kaizen event facilitation

Effective implementation of lean manufacturing techniques can generate significant benefits:

- ◆ Reduce work in process up to 90%
- ◆ Reduce lead time up to 95%
- ◆ Improve productivity 10-40%
- ◆ Improve quality 25-75%
- ◆ Enhance teamwork and communication
- ◆ Multiple other benefits related to improved product flow

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