

Implementation of Information Flow

The following is my attempt to explain some of the Lean Manufacturing terminology and identify logical steps in initiating implementation of Lean Manufacturing as it relates to Information Flow, scheduling, production planning, production rate and schedule attainment.

The Pace

The origination point of a Lean Manufacturing intervention is determining the pace at which product must be produced. Contrary to traditional manufacturing, this pace is not determined by sums of machines possible cycle times. Instead, customer demand determines the pace upon work center (Value Stream). This is a radically different concept for many companies.

The Pitch

Once this pace, or Takt, has been determined; the next major step is to design a system that flows product at some rhythm to that Takt. This is often called pitch and becomes the 'heart beat' of manufacturing within the work center. Throughout the value stream, mechanisms must be in place to link all process to that rhythm. This can be achieved through a series of pacing techniques. The key change in thinking is that focus must be on maintaining the pace, not equipment or manpower maximization.

Heijunka – Leveled Schedule

The next major item to determine is how to release that demand to the value stream. Again, there are several techniques that can be employed but the major focus must remain on releasing production instruction in a manner that maintains the customer pace and best possible use of existing resources. From Toyota's perspective, this is the concept of Heijunka, leveling by volume and variety. Their experience has shown that the greater the degree of Heijunka that is employed, the greater the control of resources and waste reduction. There is also the philosophical belief that they are more closely aligned with their true customer consumption of the product.

Heijunka could be daily (weekly), as volume and variety is introduced via a preplanned daily (weekly) pattern schedule based upon supposed demand. Toyota would argue that this is a good start, but would also challenge any company to move to a shift pattern schedule as the next 'future state'.

Pace Maker

With these fundamental elements in place, the next focus must be on designing the system for the entire value stream, called the Pace Maker. Pace Maker is nothing more than the plan for material and information flow for the value stream. It uses the same symbols as VS mapping and requires the implementation of certain Lean givens.

Production instructions from the customer (example: Shipping Schedule) are introduced at **only one point** in the value stream. This will be what is commonly called the 'pace maker'.

Materials from this point upstream will be pulled through by the use of key Lean tools such as supermarkets, Kanban, timed material withdraw and FIFO queues.

Like a set of dominos, each process in the value stream is independent, yet very much linked with the one next to it via the Lean tools. There is a very clear customer/supplier relationship between processes.

The flow of material and information as designed by the Pace Maker is extremely vital to Lean Manufacturing. It is a responsibility of the **Production Control** department to control and monitor performance through out the facilities. It should be the most powerful department within the plant and the Organization.

Waste elimination

With this groundwork finally laid, it becomes much easier to identify opportunities for removing waste and improvement. This is where the real work begins on the floor. The capability of each process, equipment and manual operation must be carefully examined.

Problem Solving

If work cannot be completed within the pace, problem solving must occur and countermeasures enacted. If quality issues, downtime, changeover time etc. are preventing the value stream from meeting the customer-focused rhythm, roll up the sleeves actions are required.

P-D-C-A

It becomes a matter of understanding what is truly needed, what is visually observed and taking a P-D-C-A (Plan-Do-Check-Action) approach to closing all gaps. Since the gaps are so noticeable at this point, it becomes much easier to engage the work force for solutions.

It is the floor management's responsibility to clarify and communicate these opportunities, engage their people and enable them to succeed at these improvements. Though this portion of the improvement activity is appearing as only one bullet point in my comments, it is the activity that consumes the most time and resources. It is also the most crucial in achieving the goals set forth by the Pace Maker. Unlike the others, it never is complete!

Gemba Kaizen – Line Site Observations

Our next step is to understand the importance of detailed work site observation. So far, my comments have been on the macro side of the value stream. However, in order to achieve the results that each company desires and Lean provides this 'micro' activity must be increased, greatly!

Standardized Work

Our job is to demonstrate to all our employees how much waste could be identified, and hopefully eliminated, by just observing using certain tools and techniques. These tools, value stream mapping,

spaghetti charts or 'Arthur Murray' diagrams and time studies for work elements are imperative to elimination of key wastes that the company has overlooked in the past.

Waste has added immense costs to their products over the years. In addition, these observations and tools are necessary for implementing the tool of Standardized Work that will be needed in the near future to guarantee a quality product completed within the desired pace. Standardized Work has many other redeeming aspects that I will not go into here but have been discussed with the site previously.

Value-added work vs. Non-Value added work

Still on the micro side of the improvement, we need to discuss a concept that is foreign to many companies, yet very vital to the success of Lean. This concept is the practice of separating direct and indirect work. It is based on the Lean principle of attempting to keep all the value added work in the hands of those that are transforming product and indirect activities in the hands of those who conduct activities that support the value added operations.

One of the reasons for the separation is to fill up direct workers with value added content. Though probably necessary, non-value added work is considered waste and should be eliminated from the transformation process. This means to remove that work to the next layer of operation, support.

By placing as much non-value added work on a 'support' operator as possible, it becomes much clearer the waste that exist and steps can be taken to eliminate it. There is also the very real probability that by loading all such indirect work on support operators, the indirect work can be much more balanced and the overall resources for indirect operations diminish. With proper site management and Production Control planning, indirect operators essentially develop Standardized Work in support of the direct operators.

Response and Urgency

The final aspect of Lean is that of response and urgency. It is clear to all that a paced, daily scheduled production system would need immediate responses to hiccups in production. From my work with a lot of companies, this has not been the normal practice of the past.

Maintenance, engineering, quality, planners, managers, supervisors and team leaders have to be readily available to react to issues and make decisions. Lean will give them a basis on which to make such decisions, but the urgency and reactivity needed to operate such a paced system is a discipline that must be learned at other levels of the organization.

There are tools to help with this, such as Standardized Work for Supervisors, but the discipline begins with a very simple notion; "If your job doesn't add value to the product then your job is to support the person whose job does!"

Final Thoughts

I believe that in order to be successful we need to understand the reasons behind our actions. Lean Manufacturing is not a cookie cutter. Every piece is not exactly like the last or the next. The tools and techniques differ application by application. However, the implementation methodology that I outlined above seldom changes. It is a fundamental approach in converting traditional value streams to Lean.