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# Benefits for All with Lean Manufacturing



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*Hamish Oag – Business Unit Manager at Matrix International, looks at the introduction of Lean Principles in a manufacturing environment and the benefits to both the business and the customer.*

As global markets become increasingly competitive, companies are looking to improve efficiency, productivity and quality in order to increase profitability and customer satisfaction. In many cases, adopting lean principles can deliver excellent results, provided they are implemented with a systematic approach and with the willingness of all employees to benefit from the process.

There is a common misconception that lean principles are only used as a method of improving manufacturing operations; in fact, they are much more fundamental and can be applied to every process within a business. Using a set of standards and applying them to each business process ensures the company delivers what the customer wants, every time.

Essentially, the philosophy starts with the analysis of a process to understand what issues need to be addressed. This leads to an improvement, which is quantified and, in turn, leads to better customer delivery. As this approach is widened, the company eliminates waste, reduces errors and improves productivity. But this is not a quick-fix. It requires considerable time to adopt new working methods and can demand a change in culture from the employees.

For Matrix International, the initial ideas for lean production were introduced more than 10 years ago, when the company became part of Altra Industrial Motion – a leading global supplier of power transmission products. Over the years, Altra has developed and refined its own approach – the Altra Business System – adapting proven lean principles to the specific needs of the two dozen companies in its portfolio.

As a leading designer and manufacturer of electromagnetic brakes, Matrix predominantly supplies original equipment manufacturers (OEMs) with specific products that are designed to meet the requirements of the client's machinery. One of the most important key performance indicators (KPIs) is on-time delivery so as to avoid any disruption to the client's manufacturing process.

As with the introduction of any new process, it is important to see an initial improvement quickly in order to gain confidence that the principles work and to allow them to be reapplied elsewhere. For Matrix, the starting point was the assembly process of the servo motor brakes with a goal to improve on-time delivery for clients.

The initial examination looked at the assembly line. Taking a value stream approach, they assessed where the components came from, both internal and external sources, and worked with the whole supply chain to make improvements. One of the initial findings was that the supply of hubs was a major factor affecting late delivery. These hubs are manufactured in-house, originating in a number of different areas. As a result, it was difficult to see either the progress of the manufacturing process or to quantify the lead time for the next batch.



Each manufacturing cell contains a number of operatives that should be cross-trained to be able to perform a number of different roles within the cell.

To resolve this, the manufacturing cell was rearranged and standard work developed, creating a new one-piece flow cell. This allowed any delays to be immediately identified and resolved, before they impacted the delivery to the client. The creation of the new cell also improved product quality, which has led to a reduction in costs associated with returned parts.

Addressing the issues at the center of the value stream (i.e., manufacturing in this case) delivers an almost immediate improvement that can be seen by the workforce, illustrating the positive results in terms of productivity and efficiency. This encourages improvements to be made in other manufacturing areas and persuades the workforce to actively participate and contribute toward the process to make it a success.

One example of a simple improvement is the proper documentation (standard work) of the production process. Each manufacturing cell contains a number of operatives that should be cross-trained to be able to perform a number of different roles within the cell. In this way there is no “black art” associated with a particular process, and provides a benchmark in which to improve upon.

Introducing documentation for each process means that a new operator can be trained very quickly and the efficiency of the cell can be maintained. In this way, when certain team members are not available, either through illness, vacation or training, their role in the cell can be easily reassigned, maintaining the high standards of the cell.

As the process develops, attention can be turned toward the supply chain and the end customer, working with them to address other issues. Following the example at Matrix, a major concern was the lengthy component lead times, resulting from poor, or complete lack of, forecasting from clients, which led to unrealistic lead times for orders and consequently late delivery.

Working closely with the clients and explaining the benefits of accurate forecasting, both in terms of timing and quality, Matrix was able to convince even the most skeptical partners that hadn’t previously used forecasting. The improvements achieved with the customers also benefitted the assembly cells, making them more efficient.

The lean process began by looking at just one product line. But over time, the lessons that have been learned by one cell were applied to others and spread throughout the company.

The increased focus has also highlighted opportunities for improvement that would never have been identified in the past. Each manufacturing cell now has basic information boards, including hour by hour charts, ensuring any issues are highlighted and then discussed at the next production meeting. Identifying issues sooner means the effects are very short-lived; this can be especially important when product quality can be affected.



Products are inspected throughout the process.



The one-piece flow cell allows any delays to be immediately identified and resolved, before they impact delivery to the client.



Lean Principles in a manufacturing environment benefit both the manufacturer and the customer.

Aside from the obvious benefits to the customer, each of the small improvements also contributes to the corporate goals that are set by the Altra Group. Each year a number of KPIs are issued, designed to help the Matrix business meet its obligations to the group and, more importantly, to the customer. By reviewing these every month, it is possible to monitor progress and identify issues early enough that they can be resolved without affecting performance.

Using root cause analysis and problem-solving abilities to get to the actual cause of a problem is the single most important aspect of this process. In many cases this requires in-depth investigation of the process under scrutiny and not always taking answers at face value. By being prepared to analyze processes and get to the detail of a particular process, it is possible to make an accurate statement about that process and also implement a successful change.

It is important not to make assumptions that you know where the problem lies – carry out the analysis, study the findings and then re-apply this process to the next area that has been identified for improvement.

Adopting lean principles is not a simple task, it requires the entire workforce – from those on the assembly line to the MD – to trust in the process and to actively participate and contribute to the process in order for it to be a success.

Matrix has taken a pragmatic approach, focusing on areas where the gains will have a direct impact on the final product quality and the customer experience. The end result has been a marked improvement in on-time delivery which now stands at around 95% of customer requests. Having achieved this level of improvement, the aim is to continue to implement the processes across the different product lines and bring further benefits to more customers.



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