

Technology Profile



Value
to
Wood

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Lean Manufacturing for the Wood Processing Industry



The concept of “*lean manufacturing*” was first developed by the Japanese automotive industry in the 1950s. Lean manufacturing succeeded the “*mass production*” approach introduced by Henry Ford in the early 1920s.

James P. Womack, Daniel T. Jones and Daniel Ross, of the Massachusetts Institute of Technology, carried out a study towards the end of the 1980s on the future of the automotive industry. In their publication, *The Machine that Changed the World*, they named the concept “*lean production*”. Lean production was developed primarily to eliminate waste in every area of production. Any activity that does not add value to a product is considered wasteful. Zero value-added activities can take up 95% of a product’s manufacturing cycle. Some examples of these activities include:

- Excessive production resources
- Overproduction
- Excess inventory
- Waiting

- Defective products
- Shipping and handling
- Superfluous capital expenses.

Excessive waste in the manufacturing process includes overstaffing, an excessive infrastructure and a large work-in-progress inventory (WIP). These three types of waste create demand for capital investments (warehouses, inventory handling equipment, inventory control systems, etc.). A high WIP has a negative impact on waiting time and exacerbates problems in both quality and transportation. These lead to overproduction, or continuous production, even when unjustified by demand. The result is a large inventory of end products.



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Lean manufacturing touches a wide range of factory operations including product development and sales. Its key concepts include:

- Tight production flow
- Work cells
- Just-in-time production tools (*Kanban*)
- Smoothing production
- Reducing machine set-up time (*SMED*)
- Standardisation of operations
- Quality assurance
- Equipment efficiency
- Continuous improvement (*Kaizen*).



Numerous articles explaining these lean manufacturing tools are available for further study. The concepts and principles of lean manufacturing are applicable to any size of manufacturing plant. To implement lean manufacturing successfully, the principles of lean manufacturing must be followed. Often a new concept becomes fashionable on the basis of one company's success with it. Other companies try to copy the system but do not respect its principles and as a result, fail. Lean manufacturing can greatly benefit a company if the tenants of its basic principles are respected.

Businesses that have already implemented lean manufacturing principles have experienced results that include:

- 10% or more improvement in the use of direct labour
- 50% or greater reduction in inventory
- 70% or higher reduction in production cycles
- 50% or more improvement in capacity.

Lean manufacturing is a production philosophy whose implementation requires a change in the traditional way of examining business processes. Implementing its principles is also an ongoing process. Experience has shown that it is of the utmost importance that a framework for introducing lean manufacturing be developed before implementing it in the factory (Standard and Davis, *Running today's factory*, 1999). The framework should:

1. Appoint a person to be in charge of the implementation

It is vitally important that a company manager be put in charge of managing the production systems' changeover (ideally, it should be the production or plant manager). This person must

be familiar with the new production management systems, and must also be familiar with the corporate objectives, company strategy, and understand the need for the changes. This person must not be an outside consultant. An outside consultant can be very useful in implementing certain tools and principles but cannot be a spokesperson for the company's strategy. Implementing lean manufacturing requires a firm commitment on the part of management. This commitment is essential and is the key to a successful implementation.

2. Form a support team

The person in charge of the implementation must form a support team comprised of a few key members who will follow up on the changes and motivate and guide production staff.

3. Analyse the factory's current situation

Before implementing any changes, the current situation must be documented. Mapping the value stream is an excellent method. An analysis of the current situation in the factory helps identify those changes easiest to address. Success in the early stages is essential for gaining employee support.

4. Develop a short- and long-term perspective

After value stream mapping of the current situation, the future value stream flowchart can be drafted. This helps to visualize the need for the changes. The objectives can then be divided into short-term and long-term objectives.

5. Pass the vision on to the employees

Each employee must understand and share in the future vision of the factory. It may be useful to visit factories that are already using lean manufacturing. Such visits will provide a stimulus for the employees to look forward to the new work methods, and will show that lean manufacturing is more than just a theory.

6. Develop a plan of action

The actions that will transform the current situation into a more desirable one must be determined. This is where the actual implementation begins.

7. Manage the company's implementation

Throughout the transition period, the person in charge of the implementation, along with the support team, must closely manage the implementation process. Production staff must be seriously involved in this process because change often meets resistance. The main reasons for resistance are:

- *Loss of control:* Production staff might not have been sufficiently involved in the process. They also have less control over their environment during the implementation period.
- *Uncertainty:* This is caused when management does not clearly show its support.
- *Lack of information:* When the operators face surprise initiatives.
- *Loss of face:* Caused when the employees are embarrassed because they supported the former system.
- *Lack of knowledge:* When employees are worried that they might not have the requisite knowledge to work in the future plant.
- *Loss of employment:* If plant restructuring results in layoffs, an increase in the workload during the transition period may be experienced.

The person in charge of the implementation faces these factors of resistance to change, and must make sure that a climate of trust exists within the factory.

8. Support the new production practices

One of the most difficult tasks after implementation is ensuring that staff do not revert to old habits.

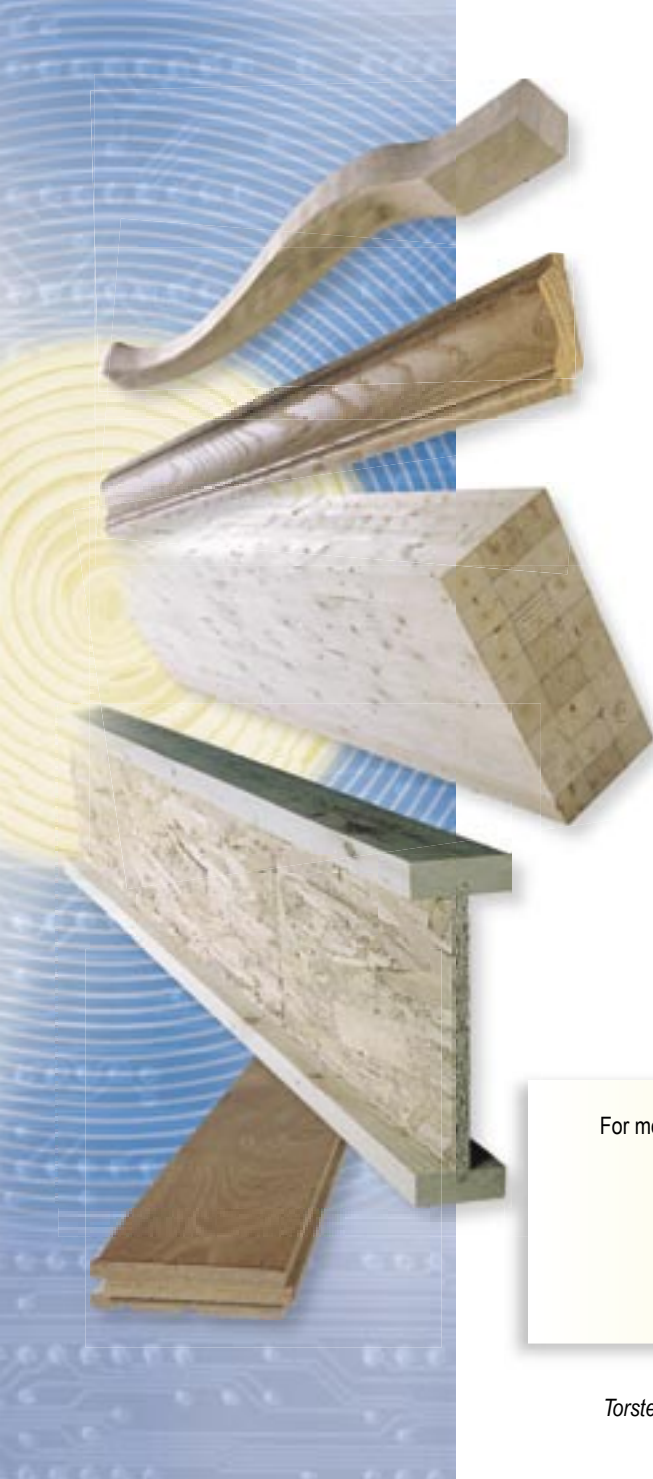
Company that should urgently implement lean production



An organized workstation with gold colour-coded tools

Maximise the benefits from implementing lean manufacturing concepts by avoiding these common mistakes:

1. *Fluctuations are often at the root of failure when implementing lean manufacturing techniques. These variations may result from fluctuating market demand, production in large lots or poor production planning. A **Kanban** system is not suited to an environment subject to significant fluctuations.*
2. *Islands of excellence must be avoided. An over-achieving workstation will choke the following stations and will disrupt the flow within the factory, with a consequent increase in WIP.*
3. *Improving productivity must first address the factory's bottlenecks. Improving non-bottleneck stations will have only a marginal impact on the factory's productivity.*
4. *It is not advised to copy a system that has been successfully implemented by the competition. Each company has its own issues and structure, and the solutions must be adapted to each company's situation.*
5. *Developing the company's vision is not an initiative for consultants. Consulting firms can help implement lean manufacturing tools, but the global vision is the responsibility of company management.*



Lean manufacturing is a production philosophy. In order to compete, Canadian manufacturers must alter the way they design and manage production. Lean manufacturing changes the relationship between suppliers and production and focuses on a continuous, stable flow inside the factory. Its values and performance indicators are different than those of other production systems. In lean manufacturing, economies of scale, production in large lots, and overcapacity are considered potential sources of waste. Lean manufacturing produces only what is necessary in the exact quantity when it is needed. The automotive industry successfully implemented lean manufacturing 40 years ago. Recently, a number of progressive wood products companies in Canada have implemented lean manufacturing techniques with great success. They are now experiencing the financial benefit of their decision. Lean manufacturing is not a difficult concept to implement, and companies of all sizes can benefit from its techniques.

To speak with your nearest Forintek Industry Advisor about this article, or other ways to improve the performance of your business, call Forintek at the numbers below, or visit us at www.valuetowood.ca to find out about upcoming workshops or seminars in your area.

For more information on the 2004-2005 *Value to Wood* research program, visit www.valuetowood.ca (Research and Development). The partners involved are:



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Ce Profil technologique est également disponible en français.



As part of the *Value to Wood* program, funded by Natural Resources Canada, Forintek's Industry Advisors are providing technical services to value-added wood product manufacturers in all regions of Canada. If you need information on any technical issue related to wood product manufacturing, you can:

- Send a request via valuetowood.ca (Help Desk).
- Contact a *Value to Wood* co-ordinator at one of the following locations:

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