

Lean Management: A Productivity Tool

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Lean principles have their origin in the Japanese manufacturing industry. The concept was first brought by John Krafcik in his 1988 article, "Triumph of the Lean Production System." The Lean concept is based on finding more efficiency and removing wastes in the process. Lean Manufacturing is a business strategy that aims to increase market potential at the same time attempts to minimize the operating cost. In this global environment organizations are running for Moreflexibility, Market knowledge & Productivity. Lean manufacturing is one of the key factors for achieving above benchmarks.

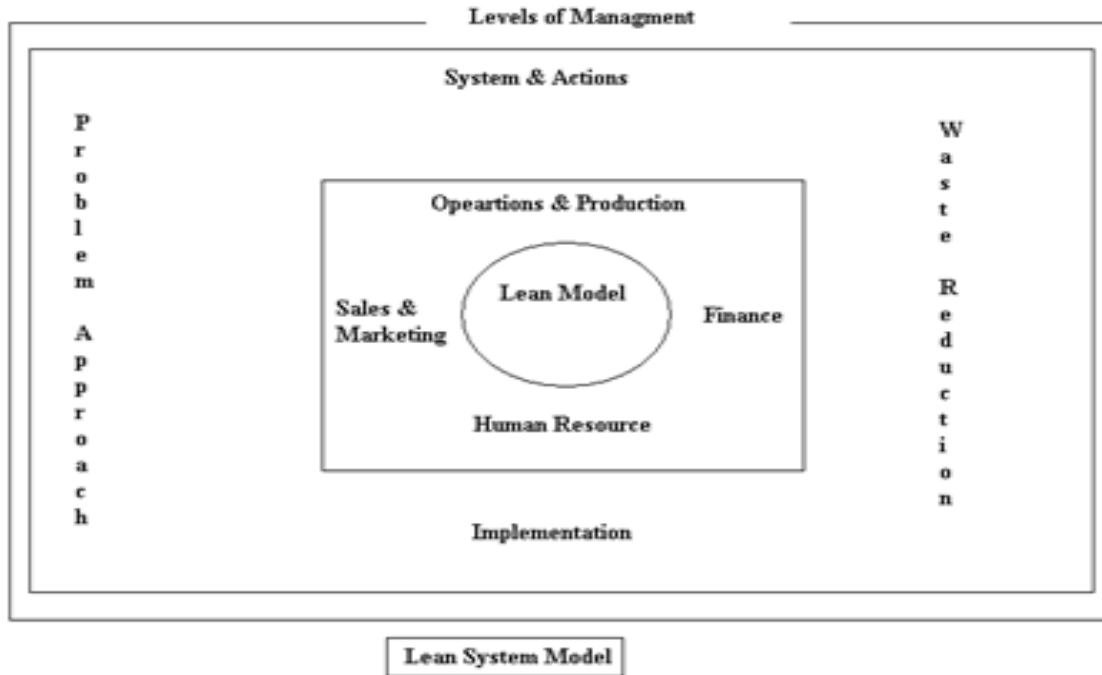
Lean management is not a concept of best practices from which manufacturers can select. It is an operational philosophy, focusing on the manufacturing system from raw material to finished goods and from customer survey to customer satisfaction. Lean is a philosophy of thinking about manufacturing.”

Lean Management may be defined as

- This is an operational strategy oriented towards achieving the shortest possible cycle time by elimination of waste : By “Rockford Consulting “
- The philosophy of continually reducing waste in all areas & all forms

Lean Management is fast growing manufacturing .The basic rule of Lean is to simplify the process i.e. more output with less input & right quality

Lean System Model



Lean Management concept primarily focus on elimination Ofwastes from whole production system.

Basically three types of wastes exist in the process.

- Muda :Any activity in your process that does not add any value In short: Waste
- Mura :Any variation leading to unbalanced situations. In short: Unevenness
- Muri :Any activity asking unreasonable stress . In short :Overburdened

Lean Management System is also known as Toyota Production System. In every organizations various system / departments are exists. Like Accounts, Finance, Human Resource, Sales & Marketing, Production. Etc By combining all these sub systems , activities & different processes the model formed called as Lean system. This model explains how different system & processes together form a system. By coordinating all these activities & processes wastes can be removed from the system & output will be increased.

To increase the efficiencies, lean management focus on a customer-value , asking "What is the customer expectations" Customers want value, and they'll pay only if you can meet their needs. They shouldn't pay for defects, or for the extra cost of having large inventories. In other words, they shouldn't pay for your waste.

Waste is anything that doesn't add values to the finish product. Following are the eight types* of wastes

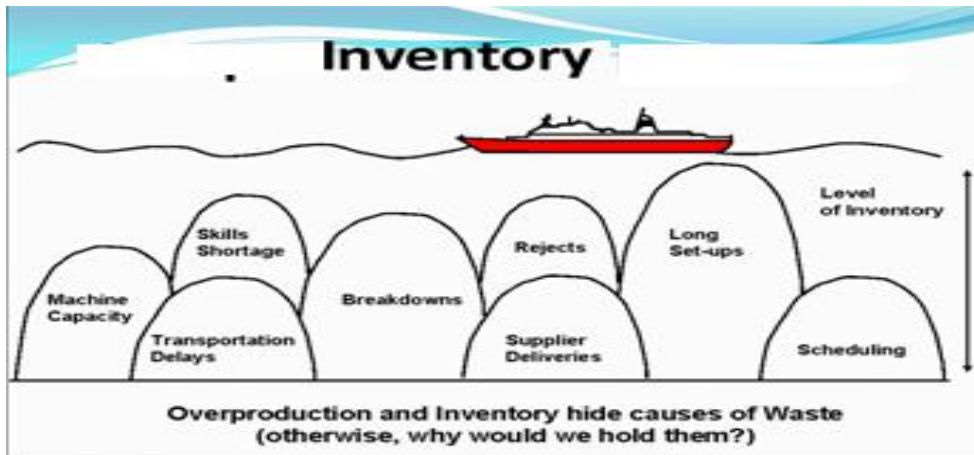
1. Overproduction – Are you producing more than consumers demand?



2. Waiting – How much lag time is there between production steps?



3. Inventory (work in progress) – Are your supply levels and work in progress inventories too high



4. Transportation – Do you move materials efficiently?



5. Over-processing – Do you work on the product too many times, or otherwise work inefficiently?



6. Motion – Do people and equipment move between tasks efficiently?



7. Defects – How much time do you spend finding and fixing production mistakes?



Lean Management Process

Following are the steps :

Step 1 – Identification of Waste

According to the Lean philosophy, waste exists in the process, and no matter how good your system is right now, it can always be better. This can be termed as continuous improvement i.e. Kaizen .

One of the main tool used to find this waste is a Value Stream Mapping (VSM). This tool shows how materials and processes flow through on your shop floor to bring your product or service to the final customer. So that all the actions and departments are connected, and it focuses on the waste.

Step 2 – Analysis of Waste & Root Cause

For each identified waste in the first stage, find out what are the responsible factors by using Root cause analysis. If machines are frequently break down, you might think the problem is in machine and decide to procure a new machine. But Root Cause Analysis could show that the real problem is unskilled operators who don't know how to operate the machine.

Stage 3 – Solution on the Root Cause,

With right problem solving process, decide what you must do to solve the problem & improve more productivity.

Tools to Reduce Waste

Once you have identified wastes using the three key steps above, you can then apply this next set of tools to help you reduce waste further:

Lean Tool	What Is It?	How Does It Help?
5 S	Organize the work area: <ul style="list-style-type: none"> • Sort (eliminate that which is not needed) • Set In Order (organize remaining items) • Shine (clean and inspect work area) • Standardize (write standards for above) • Sustain (regularly apply the standards) 	Eliminates waste that results from a poorly organized work area (e.g. wasting time looking for a tool).
Andon	Visual feedback system for the plant floor that indicates production status, alerts when assistance is needed, and empowers operators to stop the production process.	Acts as a real-time communication tool for the plant floor that brings immediate attention to problems as they occur – so they can be instantly addressed.

Gemba (The Real Place)	A philosophy that reminds us to get out of our offices and spend time on the plant floor – the place where real action occurs.	Promotes a deep and thorough understanding of real-world manufacturing issues – by first-hand observation and by talking with plant floor employees.
Heijunka (Level Scheduling)	A form of production scheduling that purposely manufactures in much smaller batches by sequencing (mixing) product variants within the same process.	Reduces lead times (since each product or variant is manufactured more frequently) and inventory (since batches are smaller).
HoshinKanri (Policy Deployment)	Align the goals of the company (Strategy), with the plans of middle management (Tactics) and the work performed on the plant floor (Action).	Ensures that progress towards strategic goals is consistent and thorough – eliminating the waste that comes from poor communication and inconsistent direction.
Jidoka (Autonomation)	Design equipment to partially automate the manufacturing process (partial automation is typically much less expensive than full automation) and to automatically stop when defects are detected.	After Jidoka, workers can frequently monitor multiple stations (reducing labor costs) and many quality issues can be detected immediately (improving quality).
Just-In-Time (JIT)	Pull parts through production based on customer demand instead of pushing parts through production based on projected demand. Relies on many lean tools, such as Continuous Flow, Heijunka, Kanban, Standardized Work and Takt Time.	Highly effective in reducing inventory levels. Improves cash flow and reduces space requirements.
Kaizen (Continuous Improvement)	A strategy where employees work together proactively to achieve regular, incremental improvements in the manufacturing process.	Combines the collective talents of a company to create an engine for continually eliminating waste from manufacturing processes.
Kanban (Pull System)	A method of regulating the flow of goods both within the factory and with outside suppliers and customers. Based on automatic	Eliminates waste from inventory and overproduction. Can eliminate the need for physical inventories (instead relying on

	replenishment through signal cards that indicate when more goods are needed.	signal cards to indicate when more goods need to be ordered).
KPI (Key Performance Indicator)	Metrics designed to track and encourage progress towards critical goals of the organization. Strongly promoted KPIs can be extremely powerful drivers of behavior – so it is important to carefully select KPIs that will drive desired behavior.	The best manufacturing KPIs: <ul style="list-style-type: none"> • Are aligned with top-level strategic goals (thus helping to achieve those goals) • Are effective at exposing and quantifying waste (OEE is a good example) • Are readily influenced by plant floor employees (so they can drive results)
Muda (Waste)	Anything in the manufacturing process that does not add value from the customer’s perspective.	Eliminating muda (waste) is the primary focus of lean manufacturing.
Overall Equipment Effectiveness (OEE)	Framework for measuring productivity loss for a given manufacturing process. Three categories of loss are tracked: <ul style="list-style-type: none"> • Availability (e.g. down time) • Performance (e.g. slow cycles) • Quality (e.g. rejects) 	Provides a benchmark/baseline and a means to track progress in eliminating waste from a manufacturing process. 100% OEE means perfect production (manufacturing only good parts, as fast as possible, with no down time).
PDCA (Plan, Do, Check, Act)	An iterative methodology for implementing improvements: <ul style="list-style-type: none"> • Plan (establish plan and expected results) • Do (implement plan) • Check (verify expected results achieved) • Act (review and assess; do it again) 	Applies a scientific approach to making improvements: <ul style="list-style-type: none"> • Plan (develop a hypothesis) • Do (run experiment) • Check (evaluate results) • Act (refine your experiment; try again)

Poka-Yoke (Error Proofing)	Design error detection and prevention into production processes with the goal of achieving zero defects.	It is difficult (and expensive) to find all defects through inspection, and correcting defects typically gets significantly more expensive at each stage of production.
Root Cause Analysis	A problem solving methodology that focuses on resolving the underlying problem instead of applying quick fixes that only treat immediate symptoms of the problem. A common approach is to ask why five times – each time moving a step closer to discovering the true underlying problem.	Helps to ensure that a problem is truly eliminated by applying corrective action to the “root cause” of the problem.
Single Minute Exchange of Die (SMED)	<p>Reduce setup (changeover) time to less than 10 minutes. Techniques include:</p> <ul style="list-style-type: none"> • Convert setup steps to be external (performed while the process is running) • Simplify internal setup (e.g. replace bolts with knobs and levers) • Eliminate non-essential operations • Create standardized work instructions 	Enables manufacturing in smaller lots, reduces inventory, and improves customer responsiveness.
Standardized Work	Documented procedures for manufacturing that capture best practices (including the time to complete each task). Must be “living” documentation that is easy to change.	Eliminates waste by consistently applying best practices. Forms a baseline for future improvement activities.
Takt Time	The pace of production (e.g. manufacturing one piece every 34 seconds) that aligns production with customer demand. Calculated as Planned	Provides a simple, consistent and intuitive method of pacing production. Is easily extended to provide an efficiency goal for the plant floor (Actual Pieces /

	Production Time / Customer Demand.	Target Pieces).
Total Productive Maintenance (TPM)	A holistic approach to maintenance that focuses on proactive and preventative maintenance to maximize the operational time of equipment. TPM blurs the distinction between maintenance and production by placing a strong emphasis on empowering operators to help maintain their equipment.	Creates a shared responsibility for equipment that encourages greater involvement by plant floor workers. In the right environment this can be very effective in improving productivity (increasing up time, reducing cycle times, and eliminating defects).
Value Stream Mapping	A tool used to visually map the flow of production. Shows the current and future state of processes in a way that highlights opportunities for improvement.	Exposes waste in the current processes and provides a roadmap for improvement through the future state.

Lean Management Principles

Womack and Jones define 5 main principles of Lean Management :

1. Define Value as Perceived by the Customer
2. Identify the Value Stream
3. Make the Value Stream Flow
4. Flow at the Pull of the Customer
5. Strive for Perfection

Above principles are the pillars of Lean Manufacturing and are achieved by respecting and involving employee in every stage of business. Many people understand that Lean is about eliminating waste, while in some ways they are right, but Lean is more about preventing waste. By implementing the above lean principles organizations can identify those actions that add value and make them flow at the pull of the customer, this prevents the waste from occurring. Lean is not a one time activity but it is a journey to add value. Whilst Lean Management has a no of tools and

techniques still we cannot define Lean Management from those tools only. Lean is beyond that sum of all of tools.

Benefits of Implementing Lean Management

- Quality performance, fewer defects and rework (in house and at customer)
- Greater Customer Satisfaction
- Lower levels of Inventory
- Improved Supplier Relations
- Less Space Required
- Higher efficiencies, more output per man hour
- Improved delivery performance
- Faster Development
- Fewer Machine and Process Breakdowns
- Improved employee morale and involvement
- Greater levels of Stock Turnover Higher Profits

References

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