



Term	Definition
Batch-and-Queue Processing	Producing more than one piece of an item and then moving those items forward to the next operation before they are all actually needed there. Thus these items need to wait in a queue. Also called “batch-and-push.” Contrast with continuous flow.
Buffer Stock	Finished goods available to meet Takt time when variations in customer demand exist.
Catchball	The handing back and forth of information between workers and management and the subsequent feedback.
Cell	Operating a true continuous flow on machines and workstations placed close together in the order of processing, sometimes called a “U” shape. Cell operators may handle multiple processes, and the number of operators is changed when the customer demand rate changes. The “U” shaped equipment layout is used to allow more alternatives for distributing the work elements among operators, and to permit the leadoff and final operations to be performed by the same operator.
Cellular Manufacturing	Linking of manual and machine operations into the most efficient combination to maximize value-added content while minimizing waste.
Changeover	When a piece of equipment has to stop producing in order to be fitted for producing a different item; for example, the installation of a different processing tool in a metal working machine, a different color paint in a painting system, a new plastic resin and mold in an injection molding machine, loading different software, and so on.
Charter	A document that clearly defines the focused kaizen team mission, scope of activities, risks, and deliverables (if required by management to provide additional details).



Term	Definition
Continuous Flow Processing	The process by which items are produced and moved from one processing step to the next one piece at a time. Each process makes only the one piece that the next process needs, and the transfer batch size is one. Also called “single-piece flow” or “one-piece flow.” Contrast with batch-and-queue processing.
CONWIP	Constant Work In Process. This is another way of defining FIFO (see FIFO).
Core Team	The designated group of people primarily responsible for completing the details of the plan.
Cycle Time	How frequently a process, as timed by direct observation, actually completes an item or product. Also, the time it takes an operator to go through all of his or her work elements before repeating them.
Defects Waste	Inspection and repair of material in inventory.
Demand / Customer Demand	Also commonly referred to as Takt time (see Takt time).
8 Wastes	Wastes addressed by Lean manufacturing that include: overproduction, waiting, transportation, non-value added processing, excess inventory, defects, excess motion, and underutilized people
8–D or 8–Discipline	The eight-step Ford methodology for problem solving.
EPEI	Refers to the “every-product-every interval,” which is a measure of production batch size. For example, if a machine is able to change over and produce the required quantity of all the high-running part types dedicated to it within three days, then the production batch size for each individual part type is about three day's worth of parts. Thus this machine is making every part every (EPE) three days.
Excess Inventory Waste	Any supply in excess of a one-piece flow through your manufacturing process.



Term	Definition
Extended team member	An individual who provides expertise to the project team, but will not have the responsibility of implementation.
Fabrication Process	Segments of the value stream that respond to requirements from internal customers. Fabrication processes are often characterized by general-purpose equipment that changes over to make a variety of components for different downstream processes. Compare to “pacemaker process.”
FIFO	Stands for “first-in, first-out,” which means that material produced by one process is used up in the same order by the next process. A FIFO queue is filled by the supplying process and emptied by the customer process. When a FIFO queue gets full, the supplying process must stop producing until the customer process has used up some of the inventory. FIFO is sometimes called “CONWIP,” or “Constant Work In Process.”
5S System	A system designed to organize and standardize a workplace and consisting of five component parts: Sort, Set in Order, Shine, Standardize, and Sustain (see five component parts definitions).
Flow	A main objective of the entire Lean production effort, and one of the key concepts that passed directly from Henry Ford to Taiichi Ohno (Toyota’s production manager after WWII). Ford recognized that, ideally, production should flow continuously all the way from raw material to the customer and envisioned realizing that ideal through a production system that acted as one long conveyor.
Heijunka	The act of leveling the variety and/or volume of items produced at a process over a period of time. Used to avoid excessive batching of product types and/or volume fluctuations, especially at a pacemaker process.
Heijunka Box	A physical device that visually displays the product family. Pitch and work orders for meeting daily demand are represented by kanbans.
Just-In-Time	Producing or conveying only the items that are needed by the next process when they are needed and in the quantity needed.



Term	Definition
Kaizen	Continuously improving in incremental steps.
Kanban	A signaling device that gives instruction for production or conveyance of items in a pull system. Can also be used to perform Kaizen by reducing the number of kanban in circulation, which highlights line problems.
Lead Time	The time required for one piece to move all the way through a process or value stream, from start to finish. Envision timing a marked item as it moves from beginning to end.
Lean	A systematic approach to identifying and eliminating waste (non-value added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection.
Lean Enterprise	The organization that fully understands, communicates, implements, and sustains Lean concepts seamlessly throughout all operational and functional areas.
Leveling	The process or method used to distribute work within the value stream to maximize material and information flow efficiency.
Line Balancing	A process in which work elements are evenly distributed within the value stream to meet Takt.
Location Indicator	A type of red tag that shows where an item belongs. These include lines, arrows, labels, and signboards.
Material Handlers	Production-support persons who travel repeatedly along scheduled routes within a facility to transfer materials, supplies, and parts in response to pull signals, and to make paced withdrawal of finished goods at pacemaker processes.



Term	Definition
Material Requirements Planning (MRP)	<p>A computerized system typically used to determine the quantity and timing requirements for delivery and production of items. Using MRP specifically to schedule production at processes in a value stream results in push production, because any predetermined schedule is only an estimate of what the next process will actually need.</p> <p>Manufacturing Resource Planning (often called MRPII) expands MRP to include capacity planning, a finance interface to translate operations planning into financial terms, and a simulation tool to assess alternative production plans.</p>
Milk Run	<p>Routing a delivery vehicle in a way that allows it to make pickups or drop-offs at multiple locations on a single travel loop, as opposed to making separate trips to each location.</p>
Motion Waste	<p>Any movement of people or machines that does not add value to the product or service.</p>
Muda	<p>See Waste.</p>
Non-Value Added	<p>Any activity that does not add market form or function or is not necessary. (These activities should be eliminated, simplified, reduced, or integrated.)</p>
Operator Balance Chart	<p>A seven-step process used to meet customer demand or Takt through optimal human and equipment efficiencies.</p>
Overproduction	<p>Making more than is required by the next process. Making earlier than is required by the next process, or making faster than is required by the next process.</p>
Paced Withdrawal	<p>A timed sequence of withdrawal of finished product from the pacemaker process. Paced withdrawal is a tool for pacing an assembly process and becoming aware of production problems within a pitch increment.</p>



Term	Definition
Pacemaker Process	A series of production steps, frequently at the downstream (customer) end of the value stream in a facility, that are dedicated to a particular product family and respond to orders from external customers. The pacemaker is the most important process in a facility because how you operate here determines how well you can serve the customer, and what the demand pattern is like for upstream fabrication processes.
Pack-Out Quantity	The number of units/parts that can be moved throughout the value stream to ensure flow efficiency. Pack-out quantity may or may not be customer driven.
Pitch	When Takt time is too short for a reasonable paced withdrawal, it can be adjusted upward to a consistent increment of work called pitch, which becomes the basic unit of your production schedule for a product family. Pitch represents the frequency at which you withdraw finished goods from a pacemaker process as well as the corresponding amount of schedule you release to that process. Pitch is often calculated based on the customer's ship container quantity.
Point of Use Storage (POUS)	Raw material stored at the workstation where it is used.
Process Cycle Time	The amount of time taken to produce one good part before it continues to the next process in the value stream.
Process Kaizen	Improvements made at an individual process or in a specific area. Sometimes called "point Kaizen."
Processing Time	The time a product is actually being worked on in a machine or work area.
Processing Waste	Effort that adds no value to the product or service from the customers' viewpoint.
Product Family	A group of products that goes through the same or similar downstream or "assembly" steps and equipment.



Term	Definition
Production Kanban	A printed card indicating the number of parts that must be produced to replenish what has been consumed from the supermarket.
Production Smoothing	See Heijunka.
Pull System	A method of controlling the flow of resources by replacing only what has been consumed. See Kanban.
Push System	A system where resources are provided to the consumer based on forecasts or schedules.
Quality at the Source	When operators are given the means to perform inspection at the source, before they pass it along. A final inspection station is not required when quality at the source is used.
Queue Time	The time a product spends waiting in line for the next processing step.
Quick Changeover	Changing over a process to produce a different product in the most efficient manner.
Red Tag (for 5S)	A visible way to identify items that are not needed or in the wrong place.
Runner	A person on the production floor that paces the entire value stream through the pick-up and delivery of materials through kanban utilization.
Safety Stock	Finished goods available to meet Takt time when internal constraints or inefficiencies exist.
Set in Order (for 5S)	Step 2 of the 5S System. To identify the best location for remaining items, relocate out of place items, set inventory limits, and install temporary location indicators.



Term	Definition
Shine (for 5S)	Step 3 of the 5S System. To clean everything, inside and out and to continue to inspect items by cleaning them and to prevent dirt, grime, and contamination from occurring.
Signal Kanban	A printed card indicating the number of parts that need to be produced at a batch operation to replenish what has been consumed from the supermarket.
Sort (for 5S)	Step 1 of the 5S System. To perform “Sort through and Sort out,” by placing a red tag on all unneeded items and moving them to a temporary holding area. Within a predetermined time the red tag items are disposed of, sold, moved or given away. “When in doubt, throw it out!”
Standardize (for 5S)	Step 4 of the 5S System. To create the rules for maintaining and controlling the first 3 S’s and to use visual controls.
Standardized Work	Operations safely carried out with all tasks organized in the best-known sequence and using the most effective combination of resources (people, materials, methods, machines).
Storyboard	A visual representation of all the main activities of a Lean project from start to finish.
Supermarket	A controlled inventory of items that is used to schedule production at an upstream process.
Sustain (for 5S)	Step 5 of the 5S System. To ensure adherence to the 5S standards through communication, training, and self-discipline.
System Kaizen	Improvement aimed at an entire value system.
Takt Image	The time frame or window that prevails throughout the value stream acknowledging, identifying, and communicating a certain quantity of parts that should have been produced.



Term	Definition
Takt Time	<p>The rate of customer demand: how often the customer requires one finished item. Takt time is used to design assembly and pacemaker processes, to assess production conditions, to calculate pitch, to develop material handling containerization and routes, to determine problem-response requirements, and so on. Takt is the heartbeat of a Lean system.</p> <p>Takt time is calculated by dividing production time by the quantity the customer requires in that time.</p>
Total Product Cycle Time	<p>The total individual processing time of a particular process or for the product throughout the value stream. Total product cycle time would ideally be equal to total value-added time.</p>
Total Productive Maintenance (TPM)	<p>A systematic approach to the elimination of equipment downtime as a waste factor</p>
Transportation Waste	<p>The waste of unnecessarily transporting parts and materials around the plant.</p>
Underutilized People Waste	<p>The waste of not using people's mental, creative, and physical skills and abilities.</p>
U-Shaped Cells	<p>U-shaped, product-oriented cell layouts that allow an operator(s) to produce and transfer parts one piece, or one small lot, at a time.</p>
Value	<p>A product or service's capability provided to a customer at the right time, at an appropriate price, as defined in each case by the customer.</p>
Value Added	<p>Any activity that increases the market form or function of the product or service. (These are things the customer is willing to pay for.)</p>
Value Added Time	<p>Time for those work elements that transform the product in a way the customer is willing to pay for.</p>



Term	Definition
Value Stream	All activities, both value added and non-value added, required to bring a product from raw material into the hands of the customer, a customer requirement from order to delivery, and a design from concept to launch. Value stream improvement usually begins at the door-to-door level within a facility, and then expands outward to eventually encompass the full value stream.
Value Stream Loops	Segments of a value stream whose boundaries are typically marked by supermarkets. Breaking a value stream into loops is a way to divide future state implementation into manageable pieces.
Value Stream Manager	The person responsible for creating a future state map and leading door-to-door implementation of the future state for a particular product family. This person makes change happen across departmental and functional boundaries.
Value Stream Mapping	A pencil-and-paper tool used in the following two stages: <ol style="list-style-type: none">1. To follow a product's production path from beginning to end and draw a visual representation of every process in the material and information flows.2. To then draw a future state map of how value should flow. The most important map is the future state map.
Value Stream Methodology	A sequential process used to implement Lean concepts and tools derived from the Toyota Production System for the purpose of attaining a waste-less flow of product throughout the value stream.
Visual Controls	Simple signals that provide an immediate understanding of a situation or condition. They are efficient, self-regulating, and worker managed.
Waiting Waste	Idle time created when waiting for anything in a manufacturing process.
Waste	Any activity that consumes resources but creates no value for the customer.



Term	Definition
WIP	Stands for “work in process.” Any inventory between raw material and finished goods.
Withdrawal Kanban	A printed card indicating the number of parts that will be removed from the supermarket.
Work Place Organization	A safe, clean, neat, arrangement of the workplace that provides a specific location for everything, and eliminates anything not required.