

Lean Terminology

There are hundreds of terms used by practitioners of lean, many of which are carried forward from traditional industrial engineering lingo and more recently the adoption in North America of terminology used by the Japanese adds more colourful language to the practice.

What follows is a sample of those terms and their definitions but it's important to lead with the "Five Principles of Lean" as it's the foundation for success in lean implementation and sustainability.

- 1.) Specify value from the perspective of the customer.
- 2.) Identify the value stream for each product and manage by removing steps that do not add value for the customer.
- 3.) Create a system in the value stream that creates flow.
- 4.) When flow is created develop the system so that pull system is achieved.
- 5.) Pursue perfection through continuous improvement of the value stream.

Terminology:

5S – Adopted from 5 Japanese terms beginning with 'S' the 5 S's represent a method for cleaning and controlling the order in the workplace.

Sort – begin by eliminating all items in the work area that are not needed.

Set in Order – organize remaining material and tools that are visible and accessible.

Shine – clean everything and organize work so that daily cleaning occurs.

Standardize – develop rules and procedures to ensure the first 3 S's are maintained.

Sustain – continue with 5S activities to ensure order is maintained

Current State Map – a visual representation of what is occurring in the value stream using icons to depict processes, material flow, cycle and lead times, equipment, suppliers, customers, transportation of material, machine efficiency, inventory, etc. Current state maps are used to identify waste and assist in developing the future state.

Cycle Time – how often a product is completed (transformed) by a process in the production sequence. Usually measured in seconds, cycle time is calculated by determining the process time (how long it takes an operator or a machine to complete a process) and dividing it by the number of people or machines doing the work.

Future State Map – like the current state map, the future state map visually represents how the value stream will perform in the future. The improvements identified by answering a series of questions designed to remove waste and create flow and pull, are documented on the future state map. An implementation plan follows and when implementation occurs, the future state becomes the new current state.

Hoshin Kanri – the Japanese word *Hoshin* means *plan* and *Kanri* means *management or control*. The Hoshin Kanri strategic approach to business planning ensures all levels of the organization are striving toward the same objectives.

Kaizen – translated from Japanese the term means improvement. Kaizen events involve employees who are employed in the value stream focusing on a particular area of the operation to attain rapid improvement.

Kanban – *Kan* means *visual* and *ban* means *board or card*; this is a system for signaling that triggers replenishment of material or to begin producing. It can signal when, how much, and what to produce.

Lean Diagnostics – a system that measures company wide performance in lean deployment. Measures are taken in 14 lean categories and scoring is used to pull improvement plans ensuring overall lean progress.

Operational Balance – when many production processes are necessary to achieve an final product output it is likely that these processes do not operate at the same cycle times causing waste types such as inventory, waiting, and overproduction. In order to control production and achieve one-piece flow, processes need to be balanced to equal cycle times (slightly under takt time). Processes can be documented and improved using value stream maps, work element analysis, and operational balance charts.

Process Map – this is a tool used to document and clarify the order of repeatable steps of a process and to identify what has to occur when certain conditions exist. They create a common understanding of what needs to occur, minimizes problems, and are very helpful for training and quality control purposes.

Pull – a system that signals the need of the customer or downstream process for more product or parts. It ensures that only what is needed is produced. Sometimes referred to as a supermarket pull system it operates on the basis of a supermarket ordering system where replenishment product is ordered as the consumer takes away from the shelf.

SIPOC – one of the first steps in analyzing a problem the acronym means Supplier – Inputs – Processes - Outputs – Customers. It is used to identify all of the components of the business to assist in identifying product families that make up the value streams.

Standard Operating Procedures (SOP's) – these procedures are developed to standardize the sequence in which operations are performed. They are usually accompanied by process maps, which pictorially represent the steps that need to occur. In addition to outlining steps that need to occur, SOP's address quality issues, process ownership, responsibilities, terminology, and process scope.

Standard Work – a detailed description of the work elements necessary to achieve the work in a process. They include work element times, cycle time, takt time, machine cycle

time, workstation layout, safety precautions. Standard work is the basis for achieving operational balance and operating at takt time.

Takt Time – *takt* is derived from a German word which means *clock cycle*. It is calculated by determining the available operating time and dividing by the customer demand. For example if there are 480 minutes of operating time in a work day and the customer demand is 480 units then the system needs to produce 1 unit every minute in order to meet takt time. Truly lean systems are focused around building the operation to meet the takt time. In fact, the first question in creating the future state map is, “What is the takt time?”

Value Stream – all of the actions required to bring a product from order to delivery. It includes actions related to processes that transform a product as well as information exchanges. These actions are categorized in two main groups; Value added and non-value added. It is the objective of lean to remove the non-value added steps and improve the value added steps.

Waste – activities that are non-value added are considered waste and can be categorized as follows; defects, overproduction, waiting, transportation, extra processing, inventory, motion.

Work element – defined as the smallest increment of work that can be transferred from one person to another. Work elements are documented for the creation of standard work and used to improved the system to one that is balanced and operates to takt time.

Work in Process (WIP) – product that is being processed in the value stream and includes pieces that are being worked on as well as pieces waiting to be worked on in inventory between processes. WIP between processes is a form of waste that needs to be eliminated or controlled with pull systems or kanbans.

For a more detailed listing of lean terms go to:

<http://www.leanadvisors.com/Lean/glossary/>