ME 410 Lean Terminology

Lean Manufacturing Terms

- **5S System** – An ordered set of techniques to improve workspace practices: Seiri (Separate), Seiton (Set in Order), Seiso (Shine), Seiketsu (Standardize), and Shitsuke (Sustain).
- **Andon** – System of flashing lights used to indicate production status in one or more work centers; the number of lights and their possible colors can vary, even by work center within a plant; however, the traditional colors and their meanings are:
- **Autonomation** – In Toyota parlance, automation with a human touch; English translation of **jidoka**. Workers do not stand around and watch while machines do their work.
- **Batch Reduction** – The effort to reduce the size of a batch through a process in order to reduce lead times.
- **Cellular manufacturing** – an approach in which manufacturing work centers [cells] have the total capabilities needed to produce an item or group of similar items; contrasts to setting up work centers on the basis of similar equipment or capabilities, in which case items must move among multiple work centers before they are completed; the term group technology is sometimes used to distinguish cells that produce a relatively large family [group] of similar items.
- **Cycle time** – the normal time to complete an operation on a product. This in NOT the same as **takt** time, which is the allowable time to produce one product at the rate customers are demanding it.
- **Error-proofing (Poke-Yoke)** – a manufacturing technique of preventing mistakes by designing the manufacturing process, equipment, and tools so that an operation literally cannot be performed incorrectly; an attempt to perform incorrectly, as well as being prevented.
- **Flexible manufacturing system** – an integrated manufacturing capability to produce small numbers of a great variety of items at low unit cost; an FMS is also characterized by low changeover time and rapid response time.
  - green - no problems
  - yellow - situation requires attention
  - red - production stopped; attention urgently needed
- **Heijunka** – A production scheduling/leveling tool, essentially to distribute **kanban** cards in an efficient manner.
- **Jidoka** - a Japanese word which translates as **autonomation**; a form of automation in which machinery automatically inspects each item after producing it, ceasing production and notifying humans if a defect is detected; Toyota expands the meaning of **jidoka** to include the responsibility of all workers to function similarly, i.e. to check every item produced and to make no more if a defect is detected, until the cause of the defect has been identified and corrected.
- **Jishu kanri** - self-management, or voluntary participation.
- **Jutsu** - to talk, or ‘the art of’ (i.e., 'leanjutsu: the art of lean production').
- **Kaikaku** - A rapid and radical change process, sometimes used as a precursor to kaizen activities.
- **Kaizen** - the philosophy of continual improvement, that every process can and should be continually evaluated and improved in terms of time required, resources used, resultant quality, and other aspects relevant to the process.

- **Kanban** – a card or sheet used to authorize production or movement of an item; when fully implemented, **Kanban** (the plural is the same as the singular) operates according to the following rules:
  - All production and movement of parts and material take place only as required by a downstream operation, i.e. all manufacturing and procurement are ultimately driven by the requirements of final assembly or the equivalent.
  - The specific tool which authorizes production or movement is called a kanban. The word literally means card or sign, but it can legitimately refer to a container or other authorizing device. Kanban have various formats and content as appropriate for their usage; for example, a kanban for a vendor is different than a kanban for an internal machining operation.
  - The quantity authorized per individual kanban is minimal, ideally one. The number of circulating or available kanban for an item is determined by the demand rate for the item and the time required to produce or acquire more. This number generally is established and remains unchanged unless demand or other circumstances are altered dramatically; in this way inventory is kept under control while production is forced to keep pace with shipment volume. A routine exception to this rule is that managers and workers are continually exhorted to improve their processes and thereby reduce the number of kanban required.
- **Karosh** – Death from overwork.
- **Lean manufacturing** or **lean production** - the philosophy of continually reducing waste in all areas and in all forms; an English phrase coined to summarize Japanese manufacturing techniques (specifically, the Toyota Production System).
- **Line balancing** – equalizing cycle times [productive capacity, assuming 100% capacity utilization] for relatively small units of the manufacturing process, through proper assignment of workers and machines; ensures smooth production flow.
- **Muda** – Japanese for "waste". Specifically any human activity which absorbs resources but creates no value: Mistakes, excess production, unnecessary processing steps, machine and human idle time, etc.
- **Nagara** – Flow without waste.
- **Point of use Storage (POUS)** – The practice of storing raw materials and sub-assemblies next to the production process that consumes them.
- **Poke-Yoke** – "Mistake-proofing" of production processes.
- **Quality at the Source** – A conceptual shift from inspecting quality at the end of a manufacturing process (or multiple processes) to continually improving the manufacturing process until it produces the quality metrics desired by the customer.
- **Quick Changeover** – The goal for switching the tooling at a workstation between different production runs.
- **Standardized Work** – The specified components of a production task, including: cycle time, work sequence, and standard inventory. Typically this is a visual control used to audit production (not to guide work).
- **Total Productive Maintenance (TPM)** – A maintenance system whose goal is 100% availability of production machinery and equipment. TPM consists of activities that are designed to prevent breakdowns, minimize equipment adjustments, improve machinery safety, and make machinery easier to operate.
- **Visual Controls** – Lights, signs, and other visual material designed to communicate production status and/or standard work and/or quality standards etc.