Glossary of Lean Terms & Concepts

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A3 – This is a one-page report prepared on a single sheet of paper that adheres to the discipline of PDCA thinking as applied to collaborative problem solving, strategy development, or reporting. The A3 is based on the Toyota 8-Step Problem Solving Method, and includes the background, problem statement, analysis, proposed countermeasures and actions, and the expected results.

Activity – An identifiable chunk of work with recognised prerequisite requirements to begin, plus a recognised state of completion or condition of satisfaction. Another way to look at an activity is to establish the hand-offs for each chunk of work, thus defining the activity.

Agile – Originating in software development, "Agile" is the method of project management characterised by the division of tasks into short phases of work and frequent reassessment and adaptation of plans. It is an iterative approach to project management and software development that helps teams deliver value to their customers faster and with fewer headaches. Instead of betting everything on a "big bang" launch, an agile team delivers work in small, but consumable, increments. Requirements, plans, and results are evaluated continuously so teams have a natural mechanism for responding to change quickly.

Agility – This refers to supply chains and their management, and essentially means "readiness to change". From a business perspective, agility is defined as a strategy that is more responsive in a volatile marketplace, where this strategy is totally demand driven and the whole supply chain management changes as consumer buying patterns change at a very rapid pace. The fundamental drivers of agile supply chain are Speed, Cost, and Efficiency, and agile supply chains are based on the sensitivity to consumer demand, with sensitivity referring to the ultimate consumer demand in terms of the volatility of that demand. Agile supply chain framework is based on four major constituents: (i) Virtual Integration; (ii) Process Alignment; (iii) Network-Based; and (iv) Market Sensitive.

Assignment – A request or offer that has resulted in a reliable promise and is ready to be placed on the weekly work plan for performance. An assignment must meet the characteristics for a quality assignment prior to inclusion on the weekly work plan.

Buffer – A mechanism for deadening the force of reality unfolding in a manner that is contrary to what was anticipated in the plan. For example, a capacity buffer is created by committing to complete less work than what would be achieved according to the planned capacity of the resource. If production falls behind schedule, there is capacity available for catching up. Lean production/construction generally prefers capacity buffers to inventory buffers.

Building Information Modelling (BIM) – The process of generating and managing building data during the life cycle of a building. BIM uses three-dimensional (3D), real-time, dynamic building modelling software. BIM includes building geometry, spatial relationships, geographic information, and quantities and properties of building components. BIM can include four-dimensional (4D) simulations to see how part or all of the facility is intended to be built and 5D capability for model-based estimating. BIM provides the platform for simultaneous conversations related to the design of the "product" and its delivery process.

Capacity – The amount of work that can be produced by an individual, specialist, or work group in a given period of time.

Choosing By Advantages (CBA) – This is a tested, effective, and sound decision-making system developed by Jim Suhr (1999) for determining the best decision by looking at the advantages of each option. CBA has five phases of decision-making: (1) Stage-setting: establish the purpose and context for the decision; (2) Innovation: formulate an adequate set of alternatives; (3) Decision-making: choose the alternative with the greatest total importance of advantages; (4) Reconsideration: change the decision if it should be changed or improved on; (5) Implementation: make the decision happen, adjust as needed, and evaluate the process and results.

Commitment-Based Planning – A planning system that is based on making and securing reliable promises in a team setting.

Conditions of Satisfaction (CoS) – An explicit description by a customer of all the actual requirements that must be satisfied by the performer in order for the customer to feel that they received exactly what was wanted.

Constraint – An item or requirement that will prevent an activity from starting, advancing, or completing as planned. Typical constraints on design tasks are inputs from others, clarity of requirements criteria for what is to be produced or provided, approvals or releases, and labour or equipment resources. Typical constraints on construction tasks are the completion of design or prerequisite work, or availability of materials, information, and directives. Screening tasks for readiness is assessing the status of their constraints. Removing constraints is making a task ready to be assigned.

Constraints Log – A list of constraints with identification of an individual promising to resolve the item by an agreed date. Typically developed during a review of the 6-week look-ahead plan when it is discovered that activities are not constraint free.

Continuous Improvement (CI) – This is "Kaizen" in Japanese, and it refers to the never-ending cycle of incremental efforts to improve products, services, and processes. Lean is a CI methodology and Lean's 5th Principle of "Seek Perfection" and "PDCA" speak to CI.

Corrective Action Preventive Action (CAPA) – This is a process that investigates and solves problems, identifies causes, takes corrective action, and prevents recurrence of the root causes. The ultimate purpose of CAPA is to ensure that the problem can never be experienced again.

Cost Modelling – Developing a model of the cost components and systems specific to a project and structuring it in a manner that the components and system costs can be continually updated either via benchmarks, metrics, or detailed estimates to provide the team with a constantly up to date cost model for the project. In the TVD environment, the cost model should allow for projecting "what-if" scenarios based on value decisions that have yet to be made.

Critical Path Method (CPM) – The critical path method is a step-by-step project management technique to identify activities on the critical path. It is an approach to project scheduling that breaks the project into several work tasks, displays them in a flow chart, and then calculates the project duration based on estimated durations for each task. It identifies tasks that are critical, time-wise, in completing the project.

Critical To Quality (CTQ) – These are the key measurable characteristics of a product or process whose performance standards or specification limits must be met in order to satisfy the customer. CTQs represent the product or service characteristics as defined by the customer/user.

Current State Map – This is a snapshot of how a process is currently done, showing the current methodology of how you produce products or perform services for your customers. It is a visual method of succinctly recording the key aspects of the current structure and processes in the whole, or any part, of a supply chain.

Customer – The individual engaged in a conversation for action who will receive the results of performance either requested from, or offered by, the performer. That is, the person receiving goods/information from a performer. Customers can be internal (for example, a foreman receiving answers to an RFI; or an architect receiving mechanical loads from an engineer), and external (for example, end users or client organisations).

Cycle Time – The time it takes a product or unit of work (for example, a room, building, quadrant) to go from beginning to completion of a production process. That is, the time it is work-in-process.

Defined Task – A quality task must be "defined". It must have a beginning and end, and it should be clear to all when it has been completed.

Dependence – This refers to where two or more tasks are sufficiently related that one cannot be started (or finished) without a certain measure of progress or completion having been achieved by the other. Waiting on release of work.

Direct Observation – Also known as "Observational **S**tudy", this is a method of collecting evaluative information in which the evaluator watches the subject in their usual work environment without altering that environment.

DMAIC – **D**efine, **M**easure, **A**nalyse, **I**mprove, and **C**ontrol. DMAIC is a data-driven improvement cycle used for improving, optimising, and stabilising business processes and designs. The DMAIC improvement cycle is the core tool used to drive "Six Sigma" projects.

Earned Value (EV) – This is an approach involving monitoring the project plan, actual work, and work completed value, to see if a project is on track. Earned Value shows how much of the budget and time should have been spent, considering the amount of work done so far.

Eight Wastes – A framework of eight types of activity that do not add value – thus they are "Waste". They can be summarised as "DOWNTIME" (**D**efects, **O**ver-Production, **W**aiting, **N**on-utilised resources/talent, **T**ransportation, **I**nventory, **M**otion, **E**xcess-Processing); or as "TIMWOODS" (**T**ransportation**, I**nventory**, M**otion**, W**aiting, **O**ver-Production, **O**ver-Processing, **D**efects, **S**kills).

Enterprise Resource Planning (ERP) – This is the integrated management of core business processes, often in real-time, mediated by software and technology, and providing an integrated and continuously updated view of core business processes using common databases.

Expected Cost – An expression of the team's best estimate at the conclusion of the Validation Phase of what current best practice would produce as a price for the facility reflected in the accompanying basis of design documents. Typically, the Expected Cost will also be supported by benchmarking or other market data to calibrate the Expected Cost in light of the market context.

Fishbone Diagram – This was developed by Ishikawa – and is often referred to as an "Ishikawa Diagram" – and is a cause-and-effect diagram used in root cause analysis to better understand the factors contributing to a problem.

Five Big Ideas – A set of organising concepts that support Lean Project Delivery. They were developed to explain and organise the Sutter Health Lean Construction Initiative: Optimise the project not the piece, Collaborate, Really Collaborate (originally implied "specialty contractors involved at schematic design"), Projects as Networks of Commitment, Increase Relatedness, and Tightly Couple Action and Learning.

Five Core Principles – These are the core principles underpinning Lean that were developed by Womack and Jones (1996), and include:

i. Value – It is defined by your customers who buy results not products (clean clothes vs. washing machines). We should give the customer what they want rather than what is convenient for us to give them.

ii. Value Stream – The sequence of all processes from raw material to customer.

iii. Flow – Keep value moving; avoid batches and queues; there should be few non-value-adding steps.

iv. Pull – Short-term response to customer's rate of demand and no over-production.

v. Perfection – Delivering exactly what a customer wants, when they want it, at a fair price, and defect-free, with minimum waste.

5S – (1) Sort; (2) Set in order; (3) Shine; (4) Standardise; (5) Sustain. This five-step process for workplace efficiency uses visual controls to eliminate waste, and helps us organise what we need and to eliminate what we don't need, thus allowing us to identify problems quickly.

5 Whys – An iterative questioning technique, using cause-and-effect analysis, to get to the root cause of a problem by asking "why" successively whenever a problem exists in order to get beyond the apparent symptoms. As each answer to the "why" question is documented, an additional enquiry is made concerning that response.

Flow – Movement that is smooth and uninterrupted, as in the flow of work from one crew to the next or the flow of value at the pull of the customer.

Future State Map – A vision of the desired future Lean system that is used as the guide for the change process.

Gemba – This is the Japanese term for the place where the actual work is done and where actual value is added. Lean experts encourage "going to the gemba" to see how things are really done and where there is opportunity to eliminate

or reduce waste. Gemba is the practice of leaders going to the place where work is done to observe, ask questions, and show respect. Gemba walks should be done with purpose and focus on understanding and improving processes, not evaluating employee performance. After a walk is complete and the leader has the chance to reflect, action is taken regarding any opportunities for improvement that were discovered.

Hand-Off – The act of releasing an item or activity to the person or group performing the next step or operation on that item or activity, for example, a structural steel design is handed-off to the steel detailer to complete shop drawings; a room (or portion) that has been framed is handed-off to the drywall installer; or all construction on a floor of a hospital is completed and handed-off to the hospital personnel to begin staff-and-stock activities.

Hoshin Kanri – This is the Japanese term for direction management or strategy deployment – *Ho* means direction; *Shin* means Focus; *Kan* means Alignment; *Ri* means reason. Hoshin Kanri is the practice of identifying the organisation's long-term breakthrough objectives and aligning the goals and decisions of every person in the organisation. Strategy deployment is not an annual event, and success requires that it become operationalised at every level and incorporating strategy deployment into leader standard work to set a schedule for reviewing progress toward the objectives and managing KPIs on a daily basis. At any point, a leader should be able to say where their team is on the path toward its stated monthly, quarterly, and annual objectives.

Huddle Meetings – Huddle meetings give employees the opportunity to identify challenges and work on problem solving skills. They should be part of leader standard work because they give managers and supervisors early insight into potential problems and the opportunity to coach the team on how to implement positive change.

Integrated Form of Agreement (IFoA) – A multi-party agreement that includes the owner, design professional, and constructor as signatories to the same construction contract.

Integrated Project Delivery (IPD) – A project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to reduce waste and optimise efficiency through all phases of the project, from early design through project handover. The three contractual components of IPD include: Organisation Structure, Lean Operating Systems, and Commercial Terms.

Just In Time (JIT) – A system for producing or delivering the right amount of parts or product at the time it is needed for production.

Kaizen – The Japanese term for incremental continuous improvement. Kaizen is a structured process to engage those closest to the process to improve both the effectiveness and efficiency of the process. Its goals are to remove waste and add standardisation. Kaizen has come to mean the philosophy of continuous improvement.

Kanban – The Japanese term for a signposting mechanism associated with the demand pull principle. The signal tells workers to pull parts or refill materials to a certain quantity used in production, and is a signal that a downstream or customer process can use to request a specific amount of a specific part from the upstream or supply process. It is a visual system for managing work as it moves through a process, and it visualises both the process (the workflow) and the actual work passing through that process. The goal of Kanban is to identify potential bottlenecks in your process and fix them so work can flow through it cost-effectively at an optimal speed or throughput.

Key Performance Indicators (KPIs) – These are a set of measures designed to benchmark a business's most important characteristics against a set of strategic targets.

Last Planner – Integral to the LPS, this is the person or group that makes assignments to direct workers. Project Architect and Discipline Lead are common names for last planners in design processes; and Superintendent or Foremen are common names for last planners in construction processes.

Last Planner® System (LPS) – The complete term is "Last Planner System for Production Control". This is a system for project production planning and control that is aimed at creating a workflow that achieves reliable execution. It was developed by Glenn Ballard and Greg Howell, with documentation by Ballard in 2000. LPS is the collaborative, commitment-based planning system that integrates should-can-will-did planning: pull planning, make-ready look-ahead

planning with constraint analysis, weekly work planning based upon reliable promises, and learning based upon analysis of PPC and Reasons for Variance.

Last Responsible Moment (LRM) – The instant in which the cost of the delay of a decision surpasses the benefit of delay; or the moment when failing to take a decision eliminates an important alternative.

Leader Standard Work – This applies the concept of standard work to the task of driving Lean thinking and behaviour throughout the organisation. Leader standard work is a set of actions, tools, and behaviours that are incorporated into the daily activities of leaders at all levels. Like the standard work for any process, leader standard work must be documented, practiced consistently, and changed only with reflection and experimentation.

Lean – The concept that all processes contain waste. Lean is a value-driven and integrated approach to designing and improving work towards a customer-focused ideal state through the engagement of all people aligned to common principles and practices. It is associated with the ability to accomplish more with less – Lean Enterprises use less human effort to perform their work, less material to create their products and services, less time to develop them, and less energy and space to produce them. It is underpinned and sustained by a culture of respect and continual improvement aimed at creating more value for the customer while identifying and eliminating waste.

Lean Construction – This is a respect-oriented and relationship-oriented production management-based approach to capital project delivery. It is an alternative and transformational way to design and build capital facilities versus traditional construction design and project management.

Lean Project Delivery System (LPDS) – An organised implementation of Lean principles and tools combined to allow a team to operate in unison to create flow.

Lean Thinking – The philosophical foundation, leadership mindset, and management orientation that enables all individuals in an organisation to understand "Real Lean", and to design, develop, implement, manage, and sustain a Lean Enterprise and culture of proactive problem solving and continuous improvement.

Load – The amount of output expected from a production unit or individual worker within a given time.

Look Ahead Plan – A short interval plan, based on the pull/phase plan, that identifies all the activities to be performed in the next 6 (or other) weeks. The 6-week look-ahead is updated each week – always identifying new activities coming 6 weeks out so that the project management team can make appropriate arrangements to assure that the work will be ready to be performed in the week indicated.

Look Ahead Planning – The portion of the LPS that focuses on making work ready – assuring that work that should be done, can be done, by identifying and removing constraints in advance of need.

Look Ahead Window – The duration associated with look ahead planning. Typically look ahead windows extend from 3 to 12 weeks into the future, with 6 weeks preferred on most projects.

Make Ready Process – To make ready is to take actions needed to remove constraints from assignments to ensure the work can be done as planned.

Master Schedule – A schedule that identifies major events or milestones in a project (for example, start- up, turn-over to client, order long delivery components, mobilise in field, complete design, government reviews) and their timing. It is often the basis for contractual agreements between the owner and other team members. It is seen as a way to identify long lead items, the feasibility of completing the project as currently required, the basis for defining milestones and phases – but not always as a way to control the project.

Milestone – An item on the master schedule that defines the end or beginning of a phase or a contractually required event.

Muda – This is the Japanese word for "Non-Value-Adding" or "Waste" and refers to any activity that consumes resources but adds no value. They are a target for reduction or elimination. All Muda is caused by Mura and/or Muri.

Mura – This is the Japanese word for "Unevenness", namely any activity that has not been levelled out creating consequential complexity and cost. They are a target for reduction or elimination.

Muri – This is the Japanese word for "Overburdening", namely any activity that causes excessive demand on a system that causes the system to produce beyond its reasonable capacity. Pushing a machine or person beyond natural limits. Overburdening people results in stress, safety, and quality problems. Overburdening equipment causes breakdowns and defects. They are a target for reduction or elimination.

Necessary Non-Value-Adding (NNVA) – Those support activities/processes that are necessary under the present operating system or equipment but which do not, per se, add value. One should seek to optimise these.

Network of Commitments – The web of promises necessary to deliver any project. The role of management is to articulate and activate the unique network of commitments required to deliver each project.

Non-Value-Adding (NVA) – Those activities/processes that do not directly add/contribute value to customers – namely those activities the customer would not be happy to pay for. One should seek to reduce or remove these.

Optimal Equipment Effectiveness (OEE) – This is a hierarchy of metrics to evaluate how effectively a manufacturing operation is utilised with results stated in a generic form which allows comparison between manufacturing units in differing industries. It is not an absolute measure and is best used to identify scope for process performance improvement. It is a composite measure of the ability of a machine or process to carry out value adding activity. OEE = % time machine available * % of maximum output achieved * % perfect output. It measures the degree to which machines are adding value by not being wastefully employed due to planned or unplanned downtime or in producing defects.

Pareto Analysis – Sometimes referred to as the "80:20 rule", this is the tendency in many business situations for a small number of factors to account for a large proportion of events. For example, 80% of total sales volume might be attributable to 20% of customers and 20% of the product range. In terms of quality, 80% of defects might be attributable to 20% of causes. The 20% is sometimes referred to as "the vital few".

PDCA – **P**lan, **D**o, **C**heck, **A**ct/**A**djust. This is the cycle introduced by Walter A. Shewhart and popularised by Dr W.E. Deming as a method for continuous improvement.

Percent Plan Complete/Planned Percent Complete (PPC) – A basic measure of how well the planning system is working – calculated as the number of promises/activities completed on the day stated divided by the total number of promises/activities made/planned for the week. It measures the percentage of assignments that are 100% complete as planned.

Performer – The individual engaged in a conversation for action who agrees to undertake performance either requested from or offered to a customer.

Phase – A period of the project where a specific group of activities is scheduled to be accomplished such as building design, completion of foundations, erection of exterior walls, building dry-in. A phase can be either a time period or a group of activities leading to the accomplishment of a defined goal/milestone.

Phase Plan – A plan for executing a specific phase of a project using a pull technique to determine hand-offs. It is prepared by the team actually responsible for doing the work through conversation. Work is planned at the request/demand of a downstream customer.

Plan Reliability – The extent to which a plan is an accurate forecast of future events – it is measured by PPC.

Planning – The act of conversation that leads to well-coordinated action.

Plus/Delta Review – A continuous improvement discussion performed at the end of a meeting, project or event used to evaluate the session or activity. Two questions are asked and discussed. Plus: What produced value during the session? Delta: What could we change to improve the process or outcome?

Poka-Yoke – A Japanese term for mistake-proofing method or device developed by Shigeo Shingo that is used to prevent an error or defect from happening or being passed on to the next operation.

Personal Protective Equipment (PPE) – Integral to health and safety, this is the equipment worn to minimise exposure to serious workplace injuries and illnesses.

Process Mapping – A flowchart identifying all the activities, operations, steps, and work times for a process.

Promise – The action taken by a performer to commit to a customer to take some action to produce a mutually understood result, for example CoS, by a definite time in the future.

Pull – A method of advancing work when the next-in-line customer is ready to use it. A request/demand from the customer signals that the work is needed and it is pulled from the performer. Pull releases work when the system is ready to use it.

Push – Push an order from a central authority based on a schedule; advancing work based on central schedule. Releasing materials, information, or directives possibly according to a plan but irrespective of whether or not the downstream process is ready to process them.

Quality – Quality denotes an excellence in goods and services, especially to the degree they conform to requirements and satisfy customers.

Quality Assignment – Assignment that meets quality criteria for release to the customer process. The quality criteria are: (1) definition; (2) soundness; (3) sequence; (4) size; and (5) learning.

Reason for Variance – Factors that prevented an assignment from being completed as promised, used by the team to promote learning concerning the failure of the planning system to produce predictable workflow. By assigning a category of variance to each uncompleted task, a team is able to identify those areas of recurring failure that require additional reflection and analysis.

Reliable Promise – A promise made by a performer only after self-assuring that the promisor: (1) is competent or has access to the competence (both skill and wherewithal); (2) has estimated the amount of time the task will take; (3) has blocked all time needed to perform; (4) is freely committing and is not privately doubting ability to achieve the outcome; and (5) is prepared to accept any upset that may result from failure to deliver as promised.

Request – The action taken by a customer to ask a performer to take some action to produce a mutually understood result (CoS) by a definite time in the future.

Right First Time (RFT) – This concept involves ensuring that all activities/processes are carried out in the right manner the first time and every time. A quality management concept that defect prevention is more advantageous and cost effective than defect detection and associated rework.

Root Cause Analysis – Integral to Lean tools and techniques, and the essence of problem solving, this is a systematic method of analysing possible causes to determine the root cause of a problem.

SCAMPER – The SCAMPER technique is based very simply on the idea that what is new is actually a modification of existing old things around us. It is a creative thinking and problem solving technique developed to address targeted questions that help solve problems or ignite creativity during brainstorming meetings. The name SCAMPER is acronym for seven techniques: (S) substitute, (C) combine, (A) adapt, (M) modify, (P) put to another use, (E) eliminate, and (R) reverse.

Screening – Determining the status of tasks in the look-ahead window relative to their constraints, and choosing to advance or retard tasks based on their constraint status and the probability of removing constraints.

Scrum – Linked to Agile, and initially utilised in software development, Scrum is a framework for developing, delivering, and sustaining complex products, within which people can address complex adaptive problems while productively and

creatively delivering products of the highest possible value. Scrum meetings encompass the essence of Lean Huddle Meetings and Leader Standard Work.

Sequenced – A sequenced assignment should release work to another performer, and in no case should it hinder another assignment or cause other crews to do additional work. It refers to quality criterion for selecting assignments among those that are sound in priority order and in constructability order.

Set-Based Concurrent Engineering (SBCE) – This emanated from the Toyota Motor Corporation's approach to product development. SBCE begins by broadly considering sets of possible solutions and gradually narrowing the set of possibilities to converge on a final solution. A wide net from the start, and gradual elimination of weaker solutions, makes finding the best or better solutions more likely. As a result, a company/design team may take more time early on to define the solutions, but can then move more quickly toward convergence and, ultimately, production than its point-based counterparts.

Set-Based Design (SBD) – A design method whereby sets of alternative solutions to parts of the problem are kept open until their last responsible moment (LRM) in order to find by means of set intersection the best combination that solves the problem as a whole.

Shielding – Preventing the release of work to production units because it does not meet quality criteria – the work is not a quality assignment. It is akin to stopping the assembly line rather than advancing a defective product. The purpose of shielding is to reduce uncertainty and variation, thereby providing production units with greater opportunity to be reliable.

Should-Can-Will-Did – To be effective, production management systems must tell us what we should do and what we can do, so that we can decide what we will do, then compare with what we did to improve our planning.

SIPOC – **S**uppliers, **I**nputs, **P**rocess, **O**utputs, **C**ustomers. This is a visual tool to assist in documenting a process from beginning-to-end.

6S – This is all of the 5S with the addition of Safety as the 6th S.

Six Sigma – A method and a set of tools to reduce variation in processes, particularly quality, using mostly statistical tools.

Sized – Quality criterion for assignments whereby the amount of work included in an assignment is made to match the capacity of the production unit that will do the work. The performer should have a very reasonable expectation that the assignment can be completed by the number of people available to do the job.

SMED – Stands for **S**ingle **M**inutes **E**xchange of **D**ies. It is a Lean production method to enable improved line changeovers and reduce the waste therein.

Sound – Quality criterion for assignments that tests whether or not assignments have had all constraints removed. The performer of an assignment should know that the materials, tools, staff, and information to complete an assignment are available before accepting it.

Standard Work – Integral to Lean thinking and practice, this aims at creating standardised processes and procedures that are repeatable, reliable, and capable – this being the basis for continuous improvement. It is the documented and current best way to do a particular task, procedure, or process. Workers develop the standard and follow it until an improvement process results in a new standard. Standard work ensures that results are consistent and forms the foundation upon which improvements are made.

Takt – The German word for "beat", Takt time may be thought of as a measurable beat time, rate time or heartbeat. In Lean, Takt time is the rate at which a finished product needs to be completed in order to meet customer demand. If a company has a takt time of 10 minutes, that means every 10 minutes a complete product, assembly, or machine is produced off the line because on average a customer is buying a finished product every 10 minutes.

Target Cost – The cost goal established by the delivery team as the target for its design and delivery efforts. The Target Cost should be set at less than best-in-class past performance. The goal is to create a sense of necessity to drive innovation and waste reduction into the design and construction process.

Target Value Delivery (TVD) – This is a disciplined management practice to be used throughout the project to ensure that the facility meets the operational needs and values of the users, is delivered within the allowable budget, and promotes innovation throughout the process to increase value and eliminate waste (time, money, human effort).

Target Value Design – Encompasses the Target Value Delivery approaches implemented during the design delivery phases of the project.

Target Value Production – Encompasses the Target Value Delivery approaches implemented during the construction delivery phases of the project.

Task – An identifiable chunk of work.

Throughput – This is the output rate of a production process, and refers to the amount of material or items passing through a system or process.

Total Productive Maintenance (TPM) – This is a technique designed to optimise the performance, reliability, and productivity of plant and equipment. Responsibility for maintenance is given to the actual operators.

Under-Loading – Making assignments to a production unit, or a resource within a production unit, that absorbs less than 100% of its capacity. Under-loading is necessary to accommodate variation in processing time or production rate, in order to ensure plan reliability. Under-loading is also done to release time for workers to take part in training or learning, conducting first-run studies, implementing process improvements, or for equipment to be maintained.

Utilisation – The percentage of a resource's capacity that is used in actual production.

Value – This is the start, middle, and end point of Lean. Value refers to what the customer wants from the process – the customer defines value – and is captured through the "Voice Of Customer".

Value-Adding (VA) – Those activities/processes that directly add to or contribute value to customers – those activities the customer is happy to pay for. One should constantly strive to expand these.

Value Stream – The sequence of activities required to design, produce, and deliver a good or service to a customer, and it includes the dual flows of information and material.

Value Stream Mapping (VSM) – The process of mapping out and visually displaying a value stream so that improvement activity can be effectively planned. VSM is the meta tool that guides all other Lean tools. When we utilise VSM we visualise the current state plus desired future state of a process that take a product or service from its beginning through to the customer.

Variance – In statistics, Variance (σ^2) is a measurement of the spread between numbers in a data set. That is, it measures how far each number in the set is from the mean (expected value/average) and therefore from every other number in the set. When an assignment is not completed as stated, it is considered a variance from the daily/weekly/monthly work plan.

Variance Trend Analysis – This refers to the quantitative investigation of the difference between actual and planned behaviour. This technique is used for determining the cause and degree of difference between the baseline and actual performance and to maintain control over a project.

Visual Management – Placing tools, parts, production activities, plans, schedules, measures and performance indicators in plain view. This ensures that the status of the system can be understood at a glance by everyone involved and actions taken locally in support of system objectives.

VUCA – This stands for **V**olatile, **U**ncertain, **C**omplex, **A**mbiguous, and it describes the situation of constant, unpredictable change that is now the norm in certain industries and areas of the business world. **VUCA** demands that we avoid traditional and outdated approaches to management, leadership, and day-to-day working.

Waste – The opposite of value, these are activities/processes that do not directly add/contribute value to customers, and that the customer would not be happy to pay for. The aim of Lean is to reduce and remove waste from processes.

Waste Walks – These are "Gemba Walks" and are a form of direct observation and simply entail a planned visit to where work is being performed to observe what's happening and to note the waste. It differs from go-see activities in that you are specifically looking for waste.

Weekly Work Plan (WWP) – The commitment-level (will) planning step of LPS identifying the promised task completions agreed upon by the performers. The WWP is used to determine the success of the planning effort and to determine what factors limit performance. It is a more detailed level than the look-ahead and is the basis of measuring PPC.

Weekly Work Planning – The process by which the Last Planner establishes the plan for the coming period.

Work Flow – The movement of information and materials through networks of interdependent specialists.

Work Structuring – Designing the production system to determine who does what, when, where and how, usually by breaking work into pieces, where pieces will likely be different from one production unit to the next. The purpose of work structuring is to promote flow and optimise system throughput by focusing on handoffs and opportunities for moving smaller batches of work though the production system.

Workable Backlog – An activity or assignment that is ready to be performed, but is not assigned to be performed during the active week in the WWP. If the team agrees that performance of this activity will not hinder other work, then it can be placed on the list of Workable Backlog as part of the WWP. Completion or non-completion of these activities are not recorded or counted in calculation of PPC.

Work In Process (WIP) – The inventory between the start and end points of a production process.

X-Matrix – Used in Hoshin Planning, the X-Matrix is a template used in organisational improvement that concisely visualises on one page (A3) the alignment of an organisation's True North, its Aspirations, its Strategies, its Tactics, and its Evidence.