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1. KAIZEN BASIC

Kaizen (Ky 'zen) is a Japanese term which means continuous improvement as the words 'Kai', means continuous and 'zen' means improvement. Sometimes Kaizen also translates to 'Kai' to mean change and 'zen' to mean good, or for the better.

Kaizen is a daily process, the purpose of which goes beyond simple productivity improvement. It is also a process that, when done correctly, humanizes the workplace, eliminates overly hard work ("muri"), and teaches people how to perform experiments on their work using the scientific method and how to learn to spot and eliminate waste in business processes.

In all, the process suggests a humanized approach to workers and to increasing productivity: "The idea is to nurture the company's people as much as it is to praise and encourage participation in kaizen activities."

While kaizen (at Toyota) usually delivers small improvements, the culture of continual aligned small improvements and standardization yields large results in terms of overall improvement in productivity. This philosophy differs from the "command and control" improvement programs (e g Business Process Improvement) of the mid-twentieth century. Kaizen methodology includes making changes and monitoring results, then adjusting. Large-scale pre-planning and extensive project scheduling are replaced by smaller experiments, which can be rapidly adapted as new improvements are suggested.

In modern usage, it is designed to address a particular issue over the course of a week and is referred to as a "kaizen blitz" or "kaizen event". These are limited in scope, and issues that arise from them are typically used in later blitzes. Kaizen Events are an extremely efficient way to quickly improve a process with a low Sigma score. A person who makes a large contribution in the successful implementation of kaizen during kaizen events is awarded the title of "Zenkai".

There are several types of kaizen activities, ranging from those that focus on developing solutions to problems on the factory floor, to implementing a predetermined plan for change, to streamlining the flow of paperwork. The most familiar and common type, the factory kaizen, provides a good example of the technique. In a typical Kaizen Blitz project, a cross-functional multilevel team of 6 to 12 members work intensely, 12 to 14 hours a day, to rapidly develop, test, and refine solutions to problems and leave a new process in place in just a few days. They don't plan, they don't propose, they do. This focus on doing is what sets kaizen apart from other improvement tools, but in order for it to work effectively; we need to recognize that it has other similarly unique characteristics.

The kaizen process must begin with the process owner, the individual with real ownership and responsibility who has the authority to change the process and be answerable for the consequences. He or she may be the general manager, president, or in some cases plant manager, but always the person in charge. Kaizen cannot be successful without strong support and direction from the top.

1.1. Lean and Kaizen

The Kaizen mindset uses employee's personal creativity and ingenuity to identify problems and then develop and implement ideas to solve those problems. The key piece of the Kaizen mindset is acknowledging that everything can be improved and everything can perform better or more efficiently.

Kaizen-type improvements can be as small as a single employee identifying and fixing a problem, or it could be many employees working together to solve a problem that affects each of them in a different manner. A Kaizen event is a collection of resources (dedicated people, money, and time resources) that are pulled together to collectively build on the Kaizen mindset, typically with a targeted problem project in mind.

Lean manufacturing, as a management philosophy, is focused on improving process speed and quality of manufacturing through reduction of process wastes. The Lean lists various wastes or mudas which consume unnecessary energy, money, and time thus, adds no value to the customer. By reducing activities that drive up cycle times or cost money unnecessarily, processes can become more efficient and more predictable. While Lean is identified as a problem solving tool, it is itself a series of tools that help to reduce the process wastes.

The main premise of Kaizen is about all employees performing task and being knowledgeable about that task, by involving them and giving ownership of the process. The responsibility and team effort encourages innovation and change by involving all levels of employees for productive improvements. Hence, Kaizen is the right approach for achieving a higher manufacturing competitiveness. Kaizen emphasizes making jobs easier by taking them apart, studying them, and making improvements.

Kaizen encompasses different continuous improvement activities to address improvements at every processing step if applicable thus, creating a corporate attitude for continuous improvement. Improvements by Kaizen have a process focus as Kaizen generates process-oriented thinking, is people-oriented and is directed at people's efforts. Instead of identifying employees as the problem, Kaizen targets the process and involves employees who provide improvements by understanding how their jobs fit into the process and changing it.

Kaizen aims for improvements in productivity, effectiveness, safety, and waste reduction, and those who follow the approach often find a whole lot more in return:

✓ Less waste – inventory is used more efficiently as are employee skills.
✓ People are more satisfied – they have a direct impact on the way things are done.
✓ Improved commitment – team members have more of a stake in their job and are more inclined to commit to doing a good job.
✓ Improved retention – satisfied and engaged people are more likely to stay.
✓ Improved competitiveness – increases in efficiency tend to contribute to lower costs and higher quality products.
✓ Improved consumer satisfaction – coming from higher quality products with fewer faults.
✓ Improved problem solving – looking at processes from a solutions perspective allows employees to solve problems continuously.

✓ Improved teams – working together to solve problems helps build and strengthen existing teams.

Kaizen Principles

The kaizen process is based on several rules that may vary in detail from company to company. But the underlying concepts are the same: Be open minded, Maintain a positive attitude, Reject excuses, seek solutions, Ask Why? Why? Why? There are no stupid questions, Take action. Implement ideas immediately, don't seek perfection, That is, do what can be done now, with the resources at hand, Use all of the team's knowledge. The experts are frequently found on the factory floor, Disregard rank. All team members are equal and everyone has something to contribute, Just do it!!

Kaizen fundamentally differs from traditional continuous improvement processes because it is almost entirely action-based. Teams are charged with both developing and implementing their solutions; they create processes or change existing processes, leaving a new process in place. Kaizen is very much a hands-on process. Team participants not only plan, they clean equipment, sort tools, move machinery (within the bounds of safety), assemble, build, and run the process. They get tired, they get frustrated, and they get dirty together. Rank is not recognized—factory managers and company officers work side by side with machine operators to find and implement the best of their ideas. The team's job is to make change happen. To create and leave in place a new way of doing things.

Kaizen doesn't just mean a business should keep trying new things. Rather, it refers to a disciplined process of systematic exploration, controlled experimentation and then painstaking adoption of the new procedures. In the original formulation, kaizen was applied to manufacturing, where experimentation could determine whether a new process resulted in quality improvements or cost savings in a matter of months.

It is much more difficult to apply kaizen to product design, since it can easily take years to design and market a new product. To take a recent example, the iPhone has been two and a half years in the making.

Product development can cost hundreds of millions of dollars, making it almost impossible to run a controlled experiment with a product introduction. But it is simple to run a controlled experiment with a Web page. Amazon can show a different page layout to every hundredth visitor and determine in a few days whether the new design increases sales.

Similarly, a search engine can run a controlled experiment to try out a new tweak to its search algorithm and discover in a few hours whether users find it an improvement on the old algorithm. On the Web, continuous improvement really is continuous.

The cycle of exploration, experimentation and adoption is drastically shortened for Web-based applications. This isn't just the old atoms and bits distinction. Vista, Microsoft's new operating system, has also taken years to develop and only time will tell how successful it will be.

1.2. 5S

5S are the principles of work environment improvement. Companies usually initiate with 5S, for their lean manufacturing program. Five S is a manageable process which people easily grasp and adapt to it. This technique focuses on standardized cleanup of the workplace but, involves much more than that.

Five S is a method to organize and manage the workspace and work flow for improving efficiency by eliminating waste, improving work flow and reducing process inefficiencies. Five S is a reference to five Japanese words that have been translated into English. The 5S's are, Sort (Seiri), Straighten (Seiton), Sweep (Seiso), Standardize (Seiketsu) and Sustain (Shitsuke).

5S Stages

Cleanliness and order are important issues in a manufacturing or processing environment. The core idea is to increase productivity, improve the level of quality and raise work ethic which is reached when the working environment is clean and in good order. 5S is a practical tool for maintaining these as, it helps to find and eliminate issues in time. The 5S-model is flexible as it can be applied in to an office as well as in the production environment of a company for developing systematic and disciplined operations.

The employee's workstation is an important part in the employees' daily life which should be clean, in good order and safe. 5S also focuses on making it an efficient and comfortable as well. Employees must be at ease to simplify processes resulting in fewer accidents, low rejection or discards, waste running, stoppages and mistakes. The various stages are discussed as

Phase 1 - Sort (Seiri)

The first phase is called Sort and it focuses on to sort everything. Every tool, object and instrument is noted and their demands are evaluated. This phase also includes a task of criteria creation which, differentiate amongst useful and useless products. Removable products are sorted and disposed later on. Useful products are sorted and places are created for them after sorting.

Most used method in sorting is the "Red-tag"-program in which the removable products are marked with a red tag as in the figure below. The tag has information on name of the inspector, date, demand, reason of the tag, storage place and disposition date. Jigs, moulds, junk and work-in process items are used stored all over the workplace and this phase gets rid of all these by moving the tagged products into red tag-area and after that, either positioned again or disposed off.

Removing useless items clears working environment and adds more space to act. This phase also helps to keep places clean and in good order. Moving and safety at work gets better by saving and increasing space and clarifying processes. The sorting should be conducted on a daily, weekly and monthly manner depending upon the requirement. The idea is to ensure that everything left in the workplace is related to work and even necessary items are absolute minimum.

Phase 2 - Set in Order (Seiton)

This phase finds storage space for every needed tool or instrument and the spaces are properly marked. The organization of the storage space is in a way so that those can be found easily when needed. Setting in order also ensures finding the item by anyone else also easy and placing back at marked space. This marking remove useless searching, improves safety at work and make working environment better. Tools and wires are also marked or color coded for easy access and usage. Marking off the floor and dividing it into stations is also undertaken to make passages and simplify movements in the production areas. When pulling the lines, it is useful to mark places for pallets, pallet jacks and garbage cans at the same time. Color-codes and signs are used to prevent equipments getting mixed-up.

Time used into taking something to its own place or getting it, is pointless when thinking from works point of view. Because of that, pointing places is critical. Belongings needed rarely are moved beyond and equipments needed daily are staying near the stations. If everyone has quick access to an item or materials, work flow becomes efficient, and the worker becomes productive. The correct place, position, or holder for every tool, item, or material must be chosen carefully in relation to how the work will be performed and who will use them.

Phase 3 - Shine (Seiso)

The first and second phase address issues related to space but dirt which is present everywhere, is addressed by the third phase. Dirt wear down machines and makes quality worse. Seiso focuses on cleaning up everything. Floors, tools, tool racks, devices and especially machines are cleaned of dirt. Machinery life increases and everything is ready in top condition for use when needed. This results in user maintenance and making it easier to identify possible errors and deviations. Seiso consists of cleaning up the workplace and giving it a 'shine'. Everyone should see the 'workplace' through the eyes of a visitor - always thinking if it is clean enough to make a good impression.

Clean environment creates optimal working environment as, everybody watches out mistakes and from the other hand, even the smallest mistakes are easier to register. Oily and dirty floors can

cause slips and objects in wrong places can be fatal which are addressed in this phase. Cleanliness manual or instructions should be created for maintaining it.

Phase 4 - Standardize (Seiketsu)

Without daily discipline and clear follow-up and operation routines it is too easy to return into old habits and fall back to inefficiencies. This phase centers on standardization by emphasizing creation of procedures and routines. The purpose of this phase is to use and maintain what was achieved in earlier three phases (sorting, stabilizing and shining) into continuous and developing course of actions. By creating the methods into standards, employees are expected to obey them. Mundane tasks are established and are followed precisely. Instructions should be clear and easy to understand so that anyone could check the workstation with the help of those.

It consists of defining the standards by which personnel must measure and maintain 'cleanliness'. Seiketsu encompasses both personal and environmental cleanliness and starts with personal tidiness. Visual management is an important ingredient of seiketsu. Color-coding and standardized coloration of surroundings are used for easier visual identification of anomalies in the surroundings. Check lists are created in standardization phase which also helps in monitoring of the level of operation model.

Phase 5 - Sustain (Shitsuke)

Shitsuke, means 'Discipline' and denotes commitment to maintain orderliness and to practice the first 4S as a way of life. The emphasis of shitsuke is elimination of bad habits and constant practice of good ones. Once true shitsuke is achieved, personnel voluntarily observe cleanliness and orderliness at all times, without having to be reminded. Sustaining the progress as in this phase, enables method becoming a part of daily actions and development. Creating competition amongst departments can also motivate the employees and as well as help in sustenance.

Internal audit lists are created in this phase and conducted at regular intervals. The results of audits are gathered and put on to bulletin boards so that everyone can see and follow up the development of 5S-actions. Evaluation should include implemented changes and comparison to earlier months. Audit is essential tool in progress of pushing cleanliness and sustaining a creditable level of order.
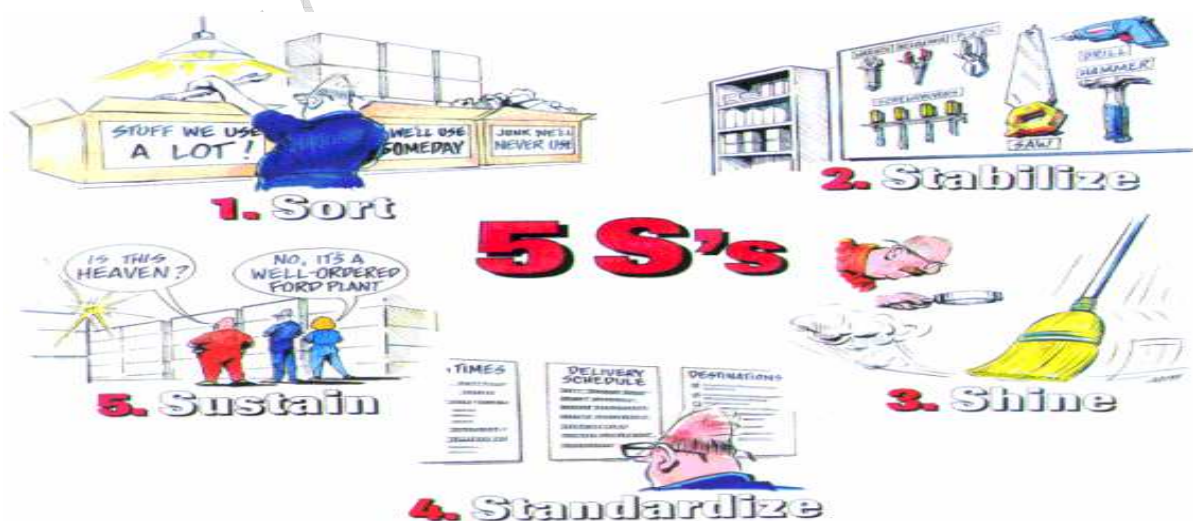
5S for Waste Elimination

5S-operation model brings many benefits which are economical and improvement of human resource. The main benefits are summarized as

- ✓ Upgrade of productivity and the quality of actions
- ✓ Reduce of work in-processes and shorten lead-times
- ✓ Better working circumstances and rising comfort
- ✓ Decreasing searching times and costs
- ✓ Rising company image

5S results in better identification of problems and deviations before major complication appear. If audits points to error or deviation in the same machine or station, it highlights the problem before anything major occurs due to it. Even the smallest blips be acted upon by reaching to the roots of the problem and eliminated.

5S Impediments

Every new method or process has challenges and difficulties attached to it. Stabilizing and implementing new requires hard work and variable amount of resources. Even if a new method manages to push through, the old habits do not vanish and are even bigger and tougher to remove. Proper usage and implementation of 5S can not be done until and unless the basic idea of 5S is understood. Targets need to be understandable to everyone so that everyone is involved and not delegated to selected few. Employees should also be properly counseled so that they do not consider it a waste of time.

Attitudes are a major hindrance in implementing such projects. Negative atmosphere assists creating mistrust and anxiety and those factors are unwanted. Employee skills and creativity are the most important resources what a work group can get for implementing 5S.

This kind of big and demanding operation model needs time from senior management as things do not change overnight. Long-term results as well as forgetting old habits are achieved with patience and hard work.

5S Implementation

Implementation of 5S in an organization usually involves the following steps

- ✓ 5S implementation team formation
- ✓ Waste identification
- ✓ 5S manual and process details are developed
- ✓ Training and orientation of employees
- ✓ Implement 5S
- ✓ Measure the progress and feedback on implemented sub-processes
- ✓ Continuously improve and refine

The 5S implementation process usually initiates with taking pictures of the present setup to photograph, the faults and shortages for easy observation of the points to take notice.

Next, arranging meetings with the workers on listed faults and targets to achieve are conducted. Discussions focus on identifying the necessary and useful and what was useless. Employees themselves list tools and equipments frequently needed by them and what are not needed which is also examined to prevent any exaggeration like tools needed more than once a week might be missing as the company had only a few of them. Workers shared their knowledge which is very difficult to observe.

Implementing the 5S phases can be summarized as

The first phase, starts by gathering everything unnecessary, rarely used and disposable equipments or materials from the workstations. Tools, accessories and other, which should not be there was gathered on specific locations nearby. The "red tag"-materials should be sorted in groups immediately so it is easier to move those forward.

Second phase of the 5S is usually the hardest as many parts and tools are in wrong and bad locations and tools are often mixed up between workstations due to borrowing-culture amongst them. Measuring devices which are mostly used should be placed on place where everyone can find them when needed. Mark drawers with name stickers to easily identify the materials, tools and other things. New storage spaces should be planned for better organization, if needed. Marking and placing tools, tool racks and tool cabinets with colorful cable ties helps in prevention of them getting lost or mixed up.

Cleaning and sorting up the places is not a huge task and cleaning of metallic dust, oil or cutting fluids is to be undertaken to begin with. Benches, work surfaces and closets should be cleaned and floor should also be washed along with passages and the areas for the pallets drawn with yellow and black-and-yellow marking tapes on the floor. Rooms for the storing cylinders should be cleaned carefully with specified chemicals to remove rust and dirt. Different kind of signs and plates, like place for the truck and incoming and outgoing goods should also be installed.

Next phase involved creation of a standard work instruction to be followed by the employees which lists tasks to be done and when. The tasks should be divided as per frequency like daily, weekly and monthly actions to highlight important tasks. This phase aims for specifying the segmentation of responsibilities and work assignments. Standard work instruction gives needed directives so that cleanliness and order are going to be maintained continuously.

With standardization it was also possible to make 5S-results visible and by that way to give more motivation for the employees. A problem was that it is really easy to accomplish this system once, but without standardization it is a lot easier to get back to earlier types of actions. With shop floor the tools in each post, dustbins empting intervals, cleaning schedule and the places for the passages were standardized. Audits are also conducted for keeping the achieved goals.

Sustain is going to be success only if everyone acquires the operational principles and methods. It means that every person should commit themselves for sustenance and development and also know their responsibilities. Workers took this immediately for themselves and concerned if someone was breaking the standards or agreed working methods.

1.3. Visual Management

It is the practice of communicating messages visually, to manage work, understand systems or follow directions. Most of us have some visual clues in our workplaces. They may include notices with instructions, signs pointing to other places, or pictures of products or services. Visual management is a clear and simple way to organize and present information like

Visual Management is the concept of making a workplace more effective by making the current condition of a workplace obvious at a glance. Since the dawn of history, people have used visual signs and signals to simplify and speed up communication. Simple signals let us know something needs attention, support identification and elimination of waste and ensures no problems are hidden. When user can quickly see what is going on, then user don't waste time and energy trying to find out what's happening. Visual Management is the concept of making a workplace more effective

Benefits

✓ It makes work standards quicker and easier to understand by all employees so they can follow them.
✓ It allow us to insert time saving.
✓ It helps to eliminate the wasteful motion involved in searching for information and objects.
✓ It helps to directly observe the work flow.
✓ It allows identifying waste and problems as they occur and fix they become an issue.
✓ It helps to motivate the team members by clearly clarifying key performance targets.
✓ It builds participation through shared information.
✓ Improving communication of key information
✓ Providing everyone in the team with the same picture
✓ Fostering collaboration, promoting teamwork and improving morale
✓ Providing a forum where all staff are able to raise any issues
✓ Helping the team identify and solve problems
✓ Measuring progress, identifying trends and analyzing performance
✓ Focusing on and establishing goals for continuous improvement

Visual Management Tools

Visual management evolved in factories, but its principles apply equally in any setting, from offices to call centers. Ask yourself this, with a basic idea of what organisation does, could someone walk into building/office and understand what the process is? Would they be able to see how work passes through the process, or people pass through the service? Do we make it easier for staff to perform by creating a visual workplace?

From signs, to painted aisles, to dial indicators on equipment, these basic applications of visual management exist in most operating or administrative environment. The key is to find creative ways to apply visual management to reduce waste in activities, connections, and flows. Some common visual management tools includes color coding, pictures/graphics, kanban cards, colored lines, signage, labeling, control boards, area information boards, gages, dials, etc.

The most popular techniques for visual management are

- ✓ Using Primary Visual Displays
- ✓ Having Stand-up Meetings
- ✓ Seeking continuous performance improvement by measuring, monitoring and reviewing team performance

Together, these three actions provide a foundation upon which teams can begin to continuously improve.

Visual Displays

Visual displays are large central communication points focused around up to date team-specific information and continuous improvement activities. Typically, wall-mounted pin boards are used in combination with magnetic or dry wipe boards. This allows regularly reported information, normally updated on a weekly or monthly basis, to be displayed alongside more dynamic information, which is updated daily.

Examples of dynamic reported information are safety issues, weather forecasts, site attendance, contact details, activity schedules or key milestones, traffic management arrangements, shift handover notes or news or reminders. Examples of regularly reported information are health and safety information, programme / cost information, tool box talk schedule, non conformance reports, contractor performance indicators and continuous improvement activity
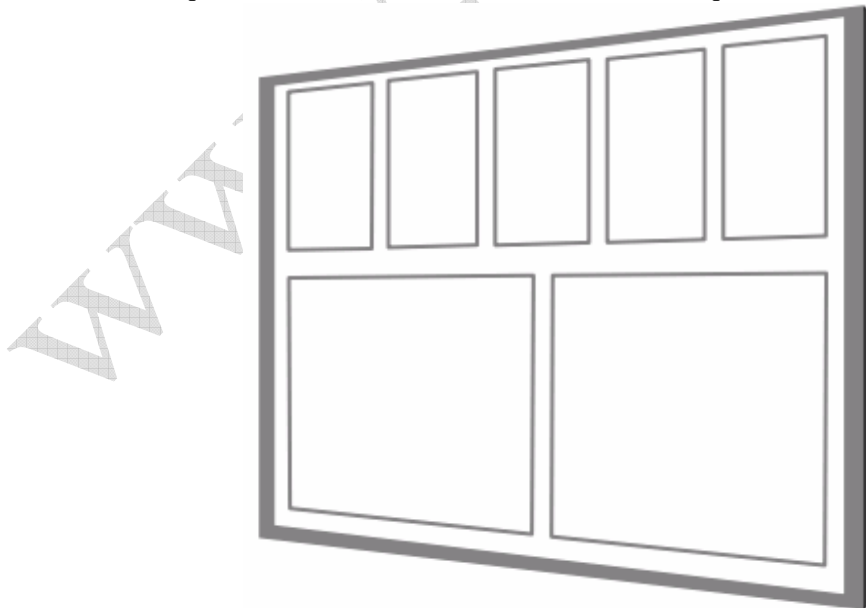
Visual displays should be located as close as possible to the team's working area. This is important for a number of reasons as

✓ It helps to create a sense of ownership within the team
✓ The visual display can be easily and regularly updated
✓ The close proximity to the team ensures that new information is communicated in the most efficient way

In a construction environment visual displays should be located in an area where teams regularly convene before they go to their point of work. This may be an existing meeting point, the site canteen, or another specifically designated area within the site. visual display should contain team-specific information related to people, performance and continuous improvement

Stand-up Meetings

Stand-up Meetings are regular, mandatory meetings held in front of a team's visual display . The purpose of a Stand-up meeting is two-fold

✓ They provide a forum where teams discuss their progress on a regular basis and make work commitments.
✓ They provide a forum where teams review performance measures and the progress of improvement actions.

Teams are deliberately required to stand to ensure that meetings are kept short. In addition Stand-up Meetings should be -

✓ Attended by all members of the team
✓ Kept brief (ideally between 10 and 15 minutes long)
✓ Held at a regular time
✓ Follow a set agenda

Stand-up Meetings should be held daily. Where this is not feasible, or where work is intermittent (for example, where only weekend working is involved), less frequent (possibly longer) meetings can be held.

For example, a team that only works weekends would have a meeting on a Thursday or Friday in which they plan the entire weekends work. This will be followed by Stand-up Meetings on the Saturday and Sunday, which are followed up by another meeting on the Monday to review the entire weekend performance.

Where shift changes occur, handover notes on a team's visual display are an ideal way of updating t he incoming shift in the absence of daily Stand-up Meetings. Notes may include progress made, any changes to the situation on site, or any potential safety issues.

Benefits of Stand-up Meetings includes

✓ The benefits associated with Stand-up Meetings include
✓ Bringing the team together and facilitating teamwork

✓ Providing every member of the team with the opportunity to contribute
✓ Providing every member of the team with same clear picture of what is happening
✓ Highlighting potential issues
✓ Focusing each member of the team on productivity and performance measures

Stand-up Meetings require teams to do the following four things

✓ Review the previous days performance
✓ Plan the current day's workload (assign and distribute work assignments)
✓ Identify obstacles to progress
✓ Discuss areas of underperformance, and any subsequent improvement actions

One way of doing this is to allow each team member to take turns in providing a progress update to the rest of the team. Updates should be kept brief.

It is important that Stand-up Meetings focus on the main issues of the day. More detailed discussions, which may be required to resolve a particular issue, should take place outside the Stand-up Meeting so as not to interrupt flow. For this reason it is important that there is an agenda and that the team adhere to that agenda.

Performance Improvement

Visual displays play a key role in communicating up to date performance information to the team. Displaying this information focuses team members on their immediate targets and helps them to understand how their individual performance can contribute to overall success.

Performance measures help to answer the question: "How are we doing?". Without performance measures user can't fully understand how well user are doing because there nothing to tell user if performance is good or if performance is bad. Subsequently, user has no way of measuring whether or not performance has improved over time because user has nothing to compare performance against - user will have no baseline for improvement.

Visual displays provide information and tools that facilitate continuous performance improvement at a team-level. Continuous improvement activity is a key part of Lean Visual Management and team performance is unlikely to improve without it. Information and tools include Current performance measures

Improvement Suggestion Systems

Improvement Suggestion Systems are continuous improvement tools that support visual displays and Stand-up Meetings by providing teams with a structured approach to realizing performance improvements.

It is recommended that suggestions are focused on simple, low-tech solutions that can be implemented by the team without the intervention of senior management.

Suggestions that are implemented by the team can be considered as 'banked', providing a platform for the next improvement. By continuing to capture and 'bank' on small incremental gains teams will begin to see that it is possible to realize significant improvements in performance.

There are various methods teams can employ to capture improvement suggestions and teams are encouraged to try various methods in order to ascertain those that work best for them. However, two of the most common approaches are

Concern, Cause & Countermeasure (3C) - It is a simple, table-based approach to capturing improvement suggestions generated by the team. Initial suggestions submitted under Concern, Cause & Countermeasure are normally aimed at addressing concerns raised by senior management or off-target Contractor Performance Indicators. Issues raised at this level are more likely to reflect what matters to customer, and delivering maximum value to the customer is a fundamental part of lean.

The Four Folder Approach (4FA) - It is also aimed at capturing improvement suggestions generated by the team. Using the Four Folder Approach allows teams to

- ✓ Capture ideas that fall 'below the radar' of other organisation-wide initiatives
- ✓ Provide team members with an opportunity to influence the way that they work
- ✓ Provide a means of identifying and capturing small changes that help eliminate waste at its source

As its name suggests this approach is bas ed around the use of four folders that form part of a team's visual display. These are

- ✓ A folder containing blank suggestion forms
- ✓ A folder for submitted suggestions
- ✓ A folder for instigated suggestions
- ✓ A folder for completed suggestions

Implementation

The first step in implementing Lean Visual Management is the determination and measurement of appropriate team-specific performance measures so that the team can determine their baseline for improvement.

Once suitable performance measures have been determined, teams can begin to develop their individual Visual Displays. This development will focus on the agreement of the information that best informs the team and which will enable performance improvement activity.

When teams have their Visual Displays in place, they can begin to hold regular Stand-up Meetings. Teams will soon become familiar with Stand-up Meetings and their use will start to become second nature.

As the use of Stand-up Meetings matures, teams will find that they are spending less and less time reporting individual progress updates and more time focusing on performance measures and improvement activity - due to the increased efficiency of meetings over time.

When teams reach a position where performance measures and improvement activity are a part of their daily routine they need to ensure Stand-Meetings and Visual Displays are maintained and that performance improvement continues - teams should periodically review team performance against the original baseline for improvement to see what has been achieved to date.

Gemba and Visual Management

In the gemba, management must manage the five Ms (5M): manpower, machines, materials, methods, and measurements. Any abnormality related to the 5M conditions must be displayed visually. What follows is a more detailed look at visual management in these five areas.

✓ Manpower (Operators) - How is worker morale? This can be measured by the number of suggestions made, the extent of participation in quality circles, and figures on absenteeism. How do you know who is absent from the line today and who is taking their place? These items should be made visible at the gemba. How do you know people's skill level? A display board in the gemba can show who is trained to do what tasks and who needs additional training. How do you know that the operator is doing the job right? Standards that show the right way to do the job—for example, the one-point standard and the standard worksheet—must be displayed.

✓ Machines - How do you know that the machine is producing good-quality products? If jidoka and pokayoke (mistake-proofing) devices are attached, the machine stops immediately after something goes wrong. When we see a machine that is stopped, we have to know why. Is it stopped because of scheduled downtime? Changeover and setup? Quality problems? Machine breakdown? Preventive repair? Lubrication levels, the frequency of exchange, and the type of lubricant must be indicated.

✓ Materials - How do you know the materials are flowing smoothly? How do you know whether you have more materials than you can handle and whether you are producing more products than you should? When a minimum inventory level is specified and kanban—attaching a card or tag to a batch of work-in-process as a means of communicating orders between processes—is used, such anomalies become visible. The address where materials are stored must be shown,

together with the stock level and parts numbers. Different colors should be used to prevent mistakes. Use signal lamps and audio signs to highlight abnormalities such as supply shortages.

✓ Methods - How does a supervisor know if people are doing their jobs right? This is made clear by standard worksheets posted at each workstation. The worksheets should show sequence of work, cycle time, safety items, quality checkpoints, and what to do when variability occurs.

✓ Methods - How does a supervisor know if people are doing their jobs right? This is made clear by standard worksheets posted at each workstation. The worksheets should show sequence of work, cycle time, safety items, quality checkpoints, and what to do when variability occurs.

1.4. VSM

Value Stream Mapping also called as VSM is a diagrammatic tool used in lean manufacturing to represent and streamline present as well as future work processes. Value refers to an activity for which customer will pay for or which is valued by the customer. Value stream refers to the sequence of activities involved from customer's request ion to fulfillment and VSM records these activities as icons or symbols.

VSM Basics

Value Stream Mapping (VSM) is a visualization tool oriented to understand and streamline work processes using icons and symbols to depict various elements and improve the flow of material and information. It helps in identifying and decreasing waste or non-value addition, in the process. It can also be used as a strategic planning tool and a change management tool other than a communication tool.

Metrics - VSM visually maps processes, end to end from receipt as raw material to steps involved in manufacturing process and delivery as finished product thus, mapping of process from an external supplier to external customer. It maps various metrics which include

✓ Cycle Time
✓ Down Time
✓ Lead Time
✓ % Complete and Accurate
✓ In-process inventory
✓ Information flow paths, etc.

It visualizes the current state of the process activities and guides towards the future desired state by making a present state and future state value stream.

Process - VSM involves creation of a mapping team which has representation from all the different functions and specialties, so as to gain a common understanding of the process and not only develop but also implement good solutions.
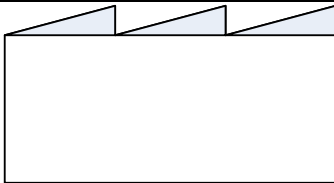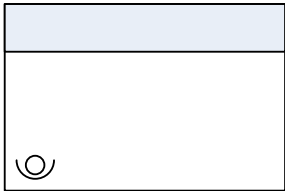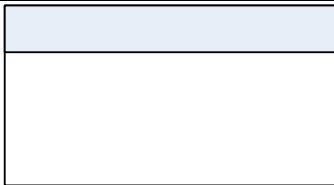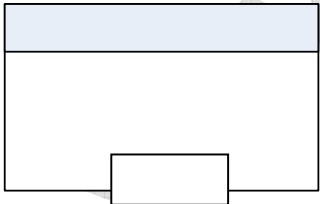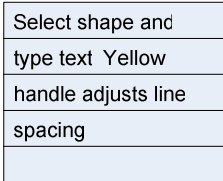
Application – VSM is more suitable to companies having high-production, low-variety product mixes with few components and subassemblies and dedicated equipment.
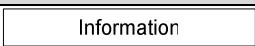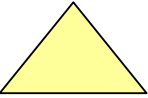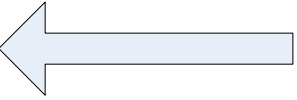
Present State Mapping – It is the process to create a Present State Map, which shows work processes as they currently are. It is needed to pinpoint change and know where opportunities for improvements are present.

Future State Mapping – It is the process of creating a Future State Map which is the desired state with removal of non-value processes and is quality conscious along with being flexible. It is needed to not only create a blueprint for improvements but also put forward an objective for the organization to achieve for better work flow and discarding non-value processes.

VSM Primary Icons
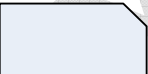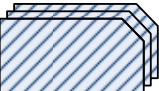
These icons are essential for mapping and development of VSM. They include
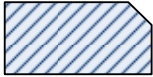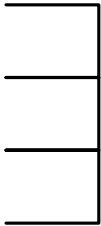
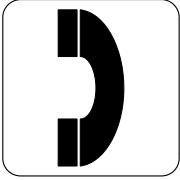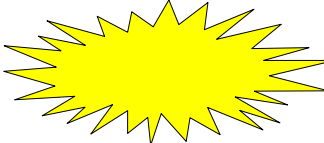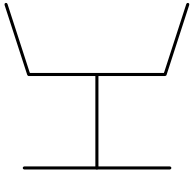| Icon	Name	Description
	Customer/Supplier	It represents outside sources. It represents the supplier when placed in the upper-left, and the customer when placed in the upper-right.
	Process	It is a process box with operator. The process or activity name is listed in the top bar, and the department or function name in the center area. It may represent a process, operation, department, or other activity involved in material flows.
	Production Control	It is a process box; an area where value can be added to a product. The process or activity name is listed in the top bar, and the department or function name in the center area. It is a shared process operation or department. It includes estimates for the number of operators required, for the value stream.
	Process Box with Information Technology	Process or activity name in the top bar, Department or function name in the center area. Note the information technology used to assist in the processing of information in the lower-left corner. If largely or completely manual, may indicate "manual" or "manual" plus the information technology used.
Select shape and type text Yellow handle adjusts line spacing	Data Table	This data box is placed under other icons that have information required for analyzing the system. It typically includes Cycle Time (Process Time, Lead Time), Changeover Time, and other processing information.
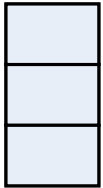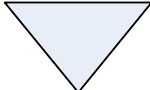
Icon	Name	Description
Information	Information Box	Text box for including relevant information only as needed.
	Physical Pull	This is a withdrawal of materials from a supermarket.
	Shipment Truck	This represents shipments using external transport from a supplier. It may be labeled with the frequency of shipment.
	Inventory	This is a material Queue of products that are not being processed. It represents storage of raw materials as well as finished goods. The time period may be listed below the icon.
	Push Arrow	It represents a push of information or material from one process to another. A process produces something regardless of the downstream needs.
	Manual Information	This arrow indicates manual flow of information.
	Electronic Information	This shape represents electronic flow of information.
	Pull Arrow	This indicates that a customer or process pulls from a previous process.
	Shipment or Materials Movement Arrow	This represents material or product flow from supplier to process or from process to customer. Supplier to process flow top to bottom; process to customer flows bottom to top.

VSM Secondary Icons

These are icons and symbols which are optional for mapping and development of present and future state VSM. They include

| Icon	Name	Description
	Production Kanban	This is a visual signal representing a trigger of production of a specific number of parts.
	Batch Kanban	This indicates batch processing.
	Batch Withdrawal Kanban	This is a card or device that instructs a handler or operator to withdraw items via batch processing from a supermarket.

Icon	Name	Description
	Withdrawal Kanban	This is a card or device that instructs a handler or operator to withdraw items from a supermarket.
	Database	A database.
	Supermarket	This is an inventory "supermarket" that contains some inventory available to downstream customers enabling them to select what they need. The next process or customer would pull from this inventory.
FIFO	FIFO Lane	This represents a First In, First Out Sequence Flow.
IN	Inventory/In-box	An in-box is an information queue. It indicates inventory. Inventory is usually paperwork or electronic files. If there is a cost ($ value) listed below the symbol, it represents the scheduling priority. Inventory examples Forms in people's in-boxes Work stored in e-mails (message, requests for information, files) Design projects in queue
	Operator	This is the symbol for a worker. It is added to a process box to indicate a worker completes some or all of the process tasks.
X5	Multiple Operators	This symbol and number represents the number of workers involved. Percentage of time to perform the specific process may be noted in parentheses to the right of the number of workers.
OXOX	Load Leveling	It batches kanbans to level mix or volume.
	Phone	This represents collecting information via telephone.

| Icon	Name	Description
	Kaizen Burst	This highlights improvement needs at a specific process that is critical to achieving the future state map.
	Go See Scheduling	Glasses represent collecting information visually. It can also indicate informal Scheduling.
	Kanban Post	This represents a location for kanban signal pickup.
	Pull Arrow	This indicates that a customer or process pulls from a previous process.
	Safety/Buffer Stock	This is an inventory stock reserved for specific circumstances.
	Sequenced Pull Ball	It represents a pull system that gives instruction to other processes to produce a predetermined type and quantity of product without using a supermarket.
	Signal Kanban	It is used to alert when the inventory levels in the supermarket between two processes drops to a trigger or minimum point.
	Timeline Segment	A timeline segment shows value-added times and non-value-added times. Value-added times are cycle processing times, and non-value-added times are wait times.
	Clock	A clock icon indicates a delay or timing constraints.
	Rework	This indicates multiple iterations or a need for rework.

Developing the VSM

Even though the VSMs are complex on observation but, their construction is easy when taken in logical steps. VSM mapping involves step by step development of the VSM state map whether a present or of future state map. In this section, preparation of a present state VSM is detailed
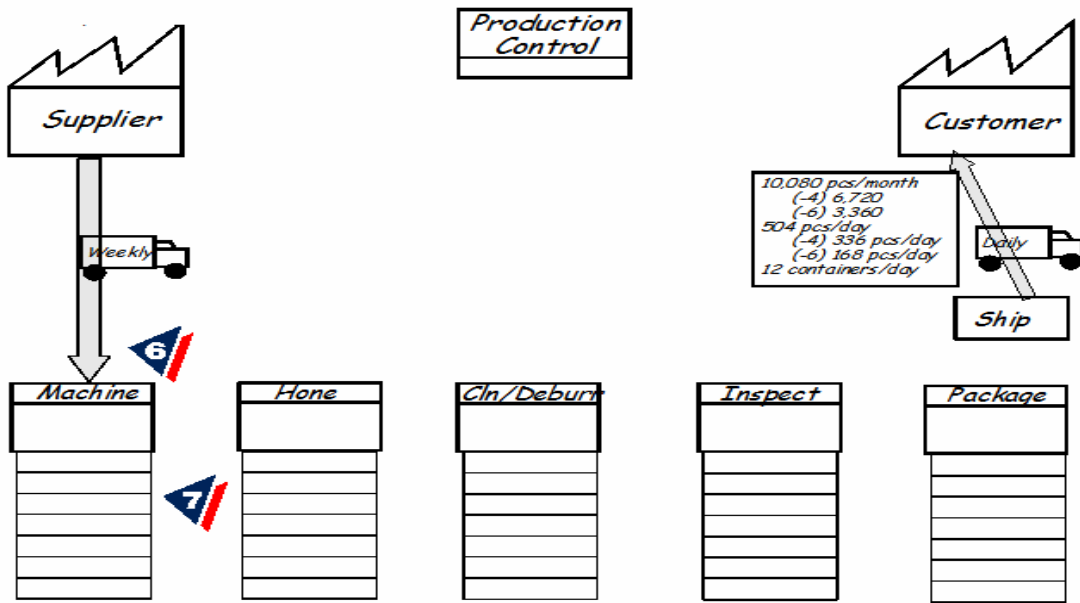
Step 1 - Draw customer, supplier and production control icons.
Step 2 - Enter customer requirements.
Step 3 - Calculate daily production required.
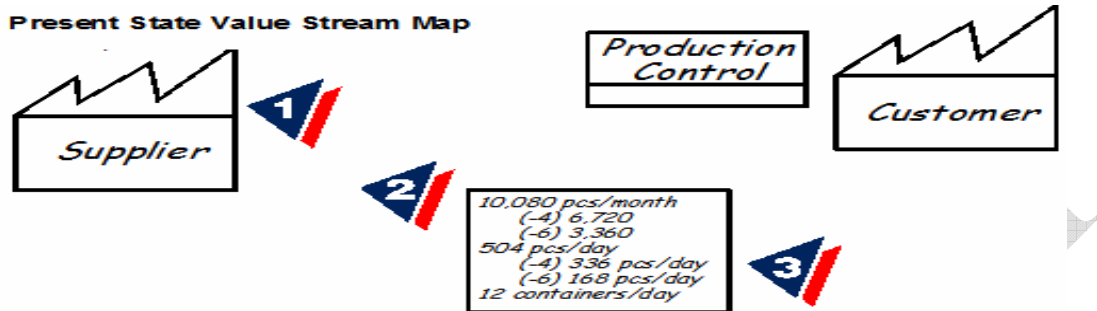
Step 4 - Draw outbound shipping icon and truck with delivery frequency.
Step 5 - Draw inbound shipping icon, truck and delivery frequency.
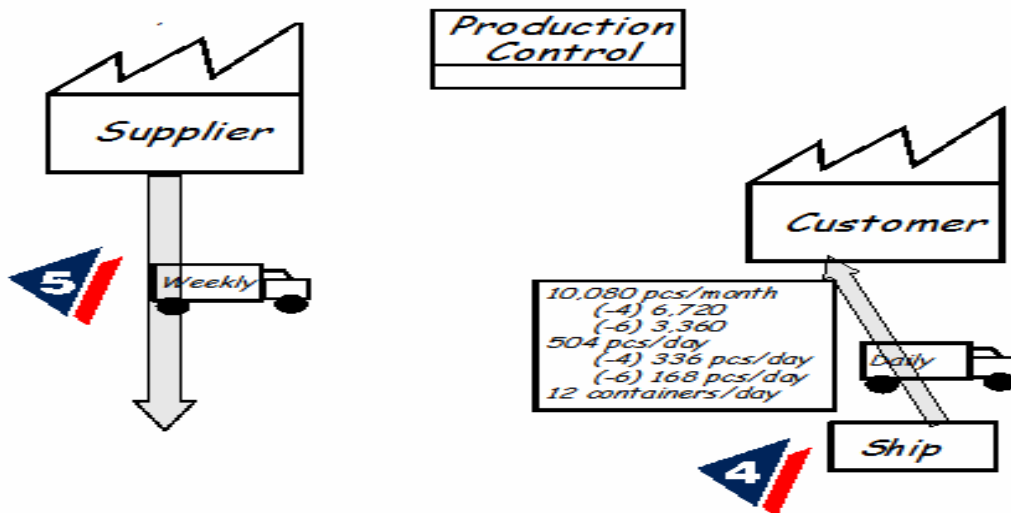
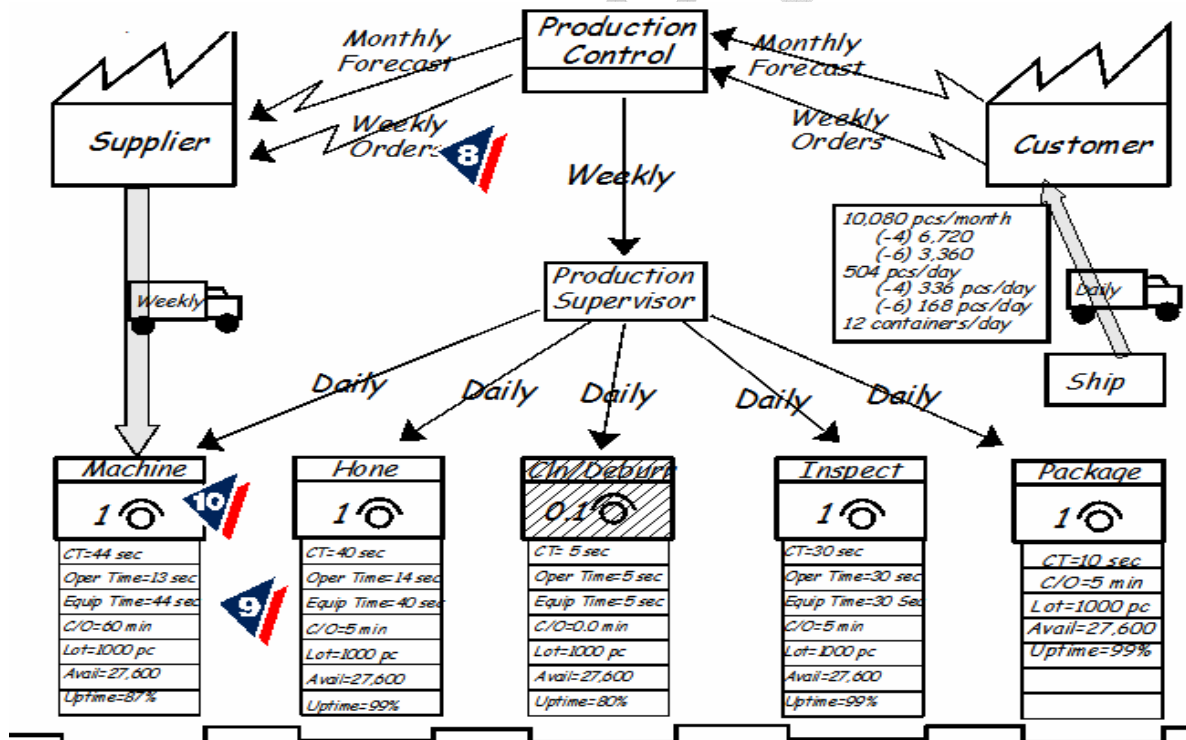Step 6 - Add process boxes, in sequence, left to right.
Step 7 - Add data boxes below.

Step 8 - Add communication arrows with methods and frequencies.
Step 9 - Obtain process attributes. Add to data boxes.
Step 10 - Add operator symbols.

Step 11 - Add inventory locations and levels in days of demand graph at bottom.
Step 12 - Add push, pull and FIFO icons.
Step 13 - Add other useful information.
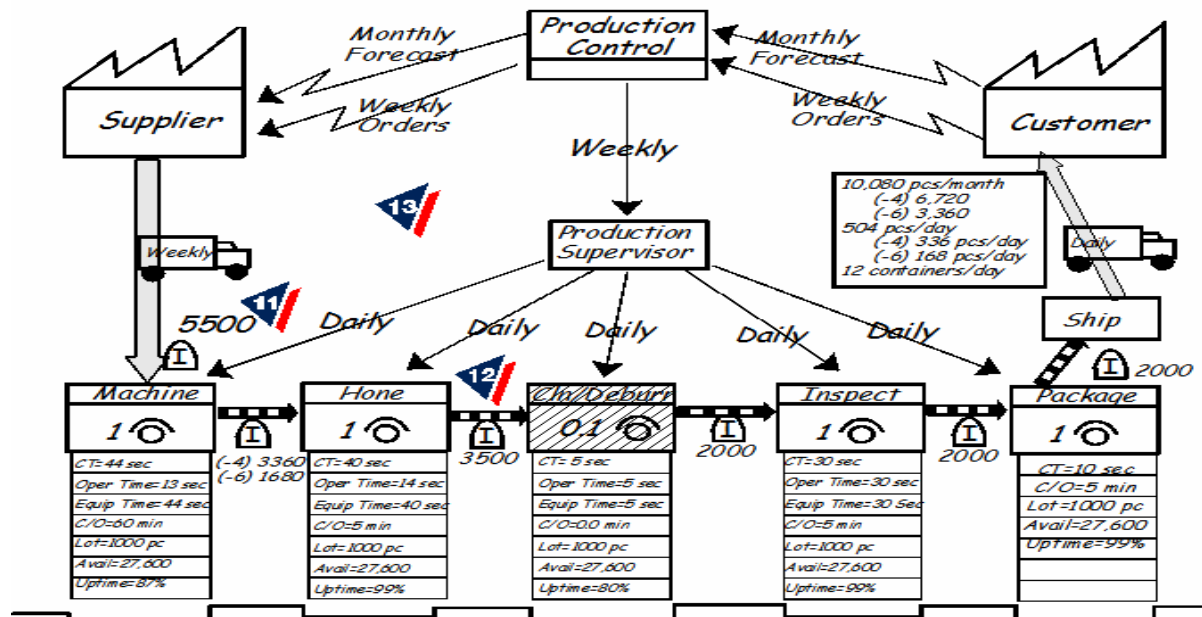
Step 14 - Add working hours.
Step 15 - Add cycle times (CT) and lead times.
Step 16 - Calculate total cycle lead time.
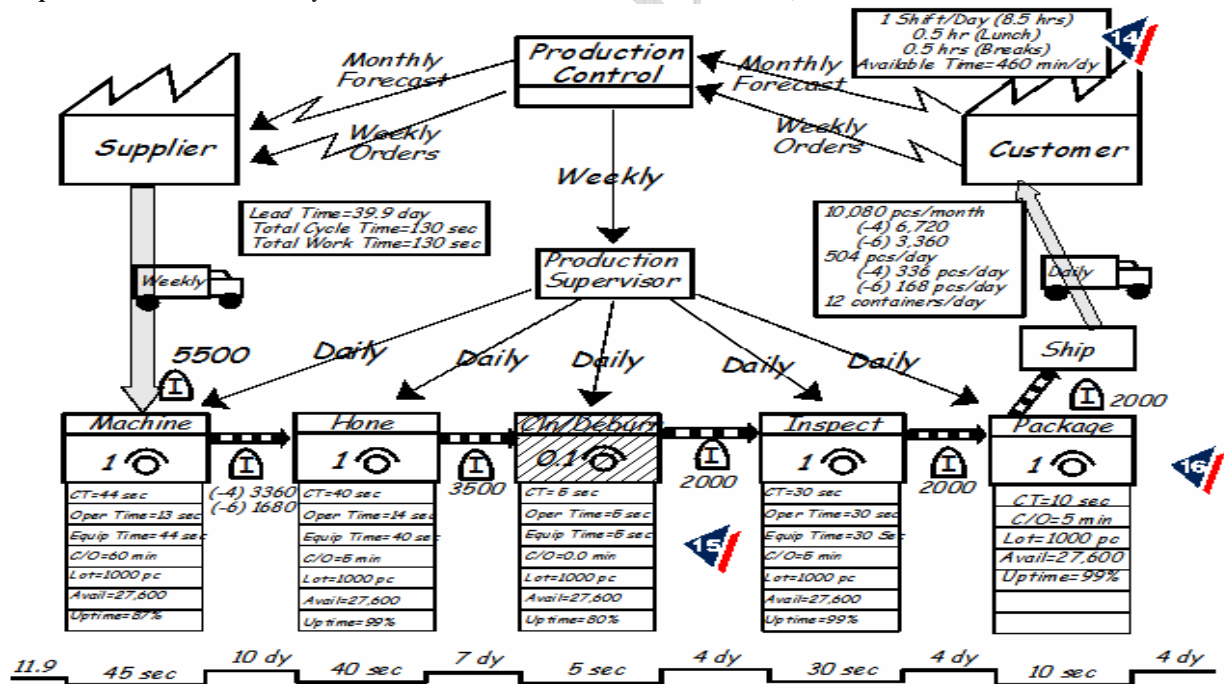
Cycle Time (CT) is the time taken to complete the corresponding process. Changeover Over Time (C/O) is the time involved for changing from one model to another. Uptime (UT) is the actual operating time divided by available time and with changeover time it is calculated as

$$UT = (AT-C/O)/AT$$

Value Stream Mapping Benefits

Various benefits accrued due to VSM are

- ✓ Value Stream Maps are powerful visual tools to help see waste and understand the flow of material and information. VSM is especially powerful for illustrating the wastes of overproduction, idle material & transportation.
- ✓ Value Stream Maps show all actions required to deliver a product regarding the value and non-value added
- ✓ It provides a big picture perspective that helps focus on improving the whole process, not just optimizing bits and pieces
- ✓ It shows the linkage between the information flow and material flow
- ✓ It helps to see across the functional boundaries over which a product's value stream flows
- ✓ It is also a tool for establishing a vision and implementation plan for a new product line
- ✓ It also acts as a visual tool and common language for talking to others about manufacturing process

1.5. PDCA

Where the consequences of getting things wrong are significant, it often makes sense to run a well-crafted pilot project. That way if the pilot doesn't deliver the results you expected, you get the chance to fix and improve things before you fully commit your reputation and resources.

So how do you make sure that you get this right, not just this time but every time? The solution is to have a process that you follow when you need to make a change or solve a problem. A process that will ensure you plan, test and incorporate feedback before you commit to implementation.

A popular tool for doing just this is the Plan-Do-Check-Act Cycle. This is often referred to as the Deming Cycle or the Deming Wheel after its proponent, W Edwards Deming. It is also sometimes called the Shewhart Cycle.

Deming is best known as a pioneer of the quality management approach and for introducing statistical process control techniques for manufacturing to the Japanese, who used them with great success. He believed that a key source of production quality lay in having clearly defined, repeatable processes. And so the PDCA Cycle as an approach to change and problem solving is very much at the heart of Deming's quality-driven philosophy

W. Edwards Deming in the 1950's proposed that business processes should be analyzed and measured to identify sources of variations that cause products to deviate from customer requirements. He recommended that business processes be placed in a continuous feedback loop so that managers can identify and change the parts of the process that need improvements. As a teacher, Deming created a (rather oversimplified) diagram to illustrate this continuous process, commonly known as the PDCA cycle for Plan, Do, Check, Act. Deming's focus was on industrial production processes, and the level of improvements he sought were on the level of production.
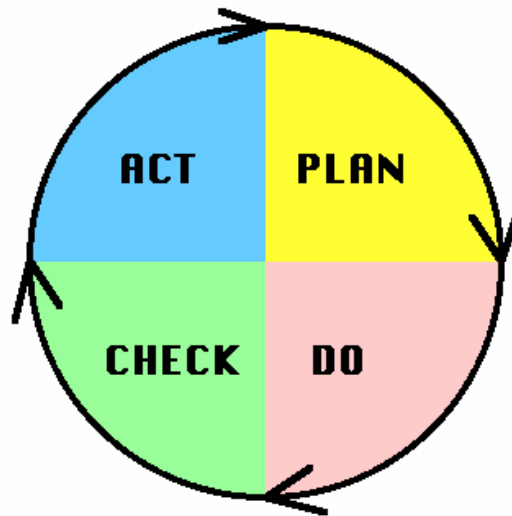
PLAN

Establish the objectives and processes necessary to deliver results in accordance with the expected output (the target or goals). By establishing output expectations, the completeness and accuracy of the spec is also a part of the targeted improvement. When possible start on a small scale to test possible effects.

DO

Implement the plan, execute the process, make the product. Collect data for charting and analysis in the following "CHECK" and "ACT" steps.

CHECK

Study the actual results (measured and collected in "DO" above) and compare against the expected results (targets or goals from the "PLAN") to ascertain any differences. Look for deviation in implementation from the plan and also look for the appropriateness and completeness of the plan to enable the execution, i.e., "Do". Charting data can make this much easier to see trends over several PDCA cycles and in order to convert the collected data into information. Information is what you need for the next step "ACT".

ACT

If the CHECK shows that the PLAN that was implemented in DO is an improvement to the prior standard (baseline), then that becomes the new standard (baseline) for how the organization should ACT going forward (new standards are enACTed). If the CHECK shows that the PLAN that was implemented in DO is not an improvement, then the existing standard (baseline) will remain in place. In either case, if the CHECK showed something different than expected (whether better or worse), then there is some more learning to be done... and that will suggest potential future PDCA cycles. Note that some who teach PDCA assert that the ACT involves making adjustments or corrective actions... but generally it would be counter to PDCA thinking to propose and decide upon alternative changes without using a proper PLAN phase, or to make them the new standard (baseline) without going through DO and CHECK steps.
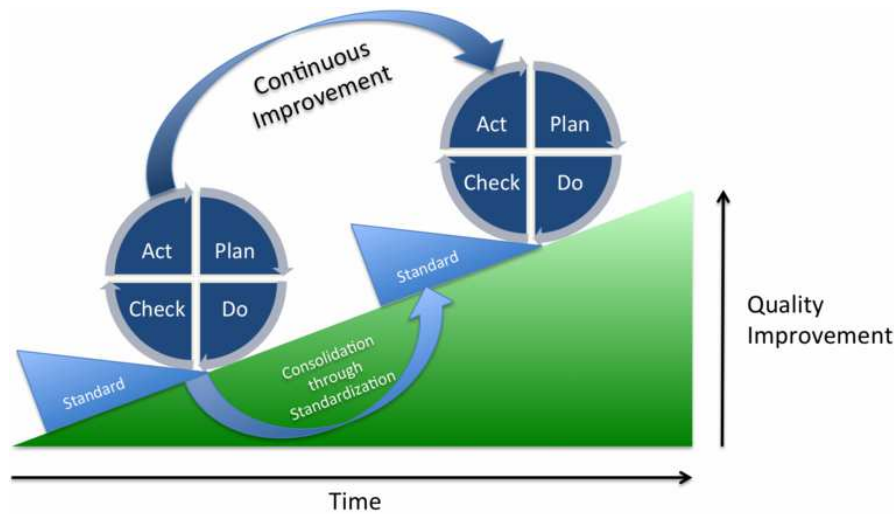
PDCA Usage

- ✓ As a model for continuous improvement.
- ✓ When starting a new improvement project.
- ✓ When developing a new or improved design of a process, product or service.
- ✓ When defining a repetitive work process.
- ✓ When planning data collection and analysis in order to verify and prioritize problems or root causes.
- ✓ When implementing any change.

Plan–Do–Check–Act Procedure

- ✓ Plan. Recognize an opportunity and plan a change.
- ✓ Do. Test the change. Carry out a small-scale study.
- ✓ Check. Review the test, analyze the results and identify what you've learned.
- ✓ Act. Take action based on what you learned in the study step: If the change did not work, go through the cycle again with a different plan. If you were successful, incorporate what you learned from the test into wider changes. Use what you learned to plan new improvements, beginning the cycle again.

A fundamental principle of the scientific method and PDCA is iteration—once a hypothesis is confirmed (or negated), executing the cycle again will extend the knowledge further. Repeating the PDCA cycle can bring us closer to the goal, usually a perfect operation and output.

Another fundamental function of PDCA is the "hygienic" separation of each phase, for if not properly separated measurements of effects due to various simultaneous actions (causes) risk becoming confounded.

In Six Sigma programs, the PDCA cycle is called "define, measure, analyze, improve, control" (DMAIC). The iterative nature of the cycle must be explicitly added to the DMAIC procedure.

Deming continually emphasized iterating towards an improved system, hence PDCA should be repeatedly implemented in spirals of increasing knowledge of the system that converge on the

ultimate goal, each cycle closer than the previous. One can envision an open coil spring, with each loop being one cycle of the scientific method - PDCA, and each complete cycle indicating an increase in our knowledge of the system under study. This approach is based on the belief that our knowledge and skills are limited, but improving. Especially at the start of a project, key information may not be known; the PDCA—scientific method—provides feedback to justify our guesses (hypotheses) and increase our knowledge. Rather than enter "analysis paralysis" to get it perfect the first time, it is better to be approximately right than exactly wrong. With the improved knowledge, we may choose to refine or alter the goal (ideal state). Certainly, the PDCA approach can bring us closer to whatever goal we choose.

Rate of change, that is, rate of improvement, is a key competitive factor in today's world. PDCA allows for major "jumps" in performance ("breakthroughs" often desired in a Western approach), as well as Kaizen (frequent small improvements). In the United States a PDCA approach is usually associated with a sizable project involving numerous people's time, and thus managers want to see large "breakthrough" improvements to justify the effort expended. However, the scientific method and PDCA apply to all sorts of projects and improvement activities.

Certifications

Accounting, Banking and Finance
– Certified AML-KYC Compliance Officer
– Certified Business Accountant
– Certified Commercial Banker
– Certified Foreign Exchange Professional
– Certified GAAP Accounting Standards Professional
– Certified Financial Risk Management Professional
– Certified Merger and Acquisition Analyst
– Certified Tally 9.0 Professional
– Certified Treasury Market Professional
– Certified Wealth Manager

Big Data
– Certified Hadoop and Mapreduce Professional

Cloud Computing
– Certified Cloud Computing Professional

Design
– Certified Interior Designer

Digital Media
– Certified Social Media Marketing Professional
– Certified Inbound Marketing Professional
– Certified Digital Marketing Master

Foreign Trade
– Certified Export Import (Foreign Trade) Professional

Health, Nutrition and Well Being
– Certified Fitness Instructor

Hospitality
– Certified Restaurant Team Member (Hospitality)

Human Resources
– Certified HR Compensation Manager
– Certified HR Stafffing Manager
– Certified Human Resources Manager
– Certified Performance Appraisal Manager

Office Skills
– Certified Data Entry Operator
– Certified Office Administrator

Project Management
– Certified Project Management Professional

Real Estate
– Certified Real Estate Consultant

Marketing
– Certified Marketing Manager

Quality
– Certified Six Sigma Green Belt Professional
– Certified Six Sigma Black Belt Professional
– Certified TQM Professional

Logistics & Supply Chain Management
– Certified International Logistics Professional
– Certified Logistics & SCM Professional
– Certified Purchase Manager
– Certified Supply Chain Management Professional

Legal
– Certified IPR & Legal Manager
– Certified Labour Law Analyst
– Certified Business Law Analyst
– Certified Corporate Law Analyst

Information Technology
– Certified ASP.NET Programmer
– Certified Basic Network Support Professional
– Certified Business Intelligence Professional
– Certified Core Java Developer
– Certified E-commerce Professional
– Certified IT Support Professional
– Certified PHP Professional
– Certified Selenium Professional
– Certified SEO Professional
– Certified Software Quality Assurance Professional

Mobile Application Development
– Certified Android Apps Developer
– Certified iPhone Apps Developer

Security
– Certified Ethical Hacking and Security Professional
– Certified Network Security Professional

Management
– Certified Corporate Goverance Professional
– Certified Corporate Social Responsibility Professional

Life Skills
– Certified Business Communication Specialist
– Certified Public Relations Officer

Media
– Certified Advertising Manager
– Certified Advertising Sales Professional

Sales, BPO
– Certified Sales Manager
– Certified Telesales Executive

& many more job related certifications

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