Clean and tidy workspaces reduce waste resulting from time spent searching (motion) and enable visual management. This makes it easier to detect and prevent deviations from standards.

**The 5S Method is also referred to as the 5A Method:**

- Assessment
- Awareness
- Association
- Adherence
- Ascendency

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**5A method** > See 5S method

**5S method**

The 5S method is the foundation of continuous improvement. 5S stands for the five steps followed to maintain standards and discipline within an organization:

1. **Sort** (Japanese seiri): Sort and separate what is not needed
2. **Straighten** (Japanese seiton): Arrange items so they are easy to find
3. **Shine** (Japanese seiso): Clean the workplace
4. **Standardize** (Japanese seiketsu): Revisit first three steps and maintain standards
5. **Sustain** (Japanese shitsuke): Discipline
8D process

An 8D report is generated as a result of the 8D process, which is carried out as a part of quality management if there is an issue between a supplier and a customer. 8D stands for the eight mandatory process steps carried out when processing a claim, in order to get to the root cause. The report includes the type of claim, responsibilities and measures taken to prevent the problem from recurring:

D1 Establish the team
D2 Describe the problem
D3 Define interim containment action
D4 Determine the root cause(s)
D5 Choose permanent corrective action
D6 Implement permanent corrective action
D7 Prevent recurrence
D8 Recognize the team

5 Whys

The root cause for a problem is identified using the 5 Whys. However, there are other ways of determining the causes of problems.
A3-report

The term A3 report comes from the name of the paper size used to prepare the report (close in size to the U.S. 11 x 17-inch sheet). Its structure is influenced by the > PDCA-method.

The best-known A3 report is the problem-solving report. It explains how the A3 report will support the problem-solving process. In this case, the user takes the standards through a systematic process that makes it possible to describe the symptoms that have emerged. It is assumed that the cause is not known, but that the effect is evident. The next (interim) target condition is to be verbalized by the processor – and should not just include the desired development of parameters. As compared to other techniques, the goal is to train the processor to describe the interim steps needed to achieve the objective. The knowledge and the description are as important as the objective to be reached. A > mentor should encourage the processing and develop the > mentee through targeted questions. This ensures that the A3 report is not just used to “put out fires”.

Andon | Japanese for „lamp“

Andon is a visual signal that indicates when there is a problem.

Audit

An audit is done to verify whether processes, requirements or guidelines meet the required standards. This verification process finds its roots in quality management, but has recently been applied to many other fields of management (e.g. environmental management value creation systems, etc.). Audits are carried out by an auditor who has been trained in this field.
**Auto unloading** | jap. Hanedashi

The term auto unloading indicates that each machine automatically unloads the part, so all the operator has to do is to load the machine.

> Chaku-Chaku line

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**BIM**

**Building Information Modeling**

Building Information Modeling (BIM) is a method to optimally plan, develop and manage buildings using software. All relevant building data is captured digitally, combined, and then networked. The result is a geometrically represented, virtual building model (computer model). BIM is used in the building sector (planning and development) and also in facility management.

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**Autonomation** | Japanese Jidoka

Autonomation is a combination of the words automation and autonomous and refers to automation with a human touch. It is less a method or a tool and more an operating principle.

Every machine in the work process should be able to operate without being constantly watched by an operator, and, if there is an abnormality, i.e. if a component breaks, it should shut off automatically, so that no defective parts are introduced further down the line.

Autonomation is one of the two pillars of the Toyota production system and is also referred to as “intelligent” automation, as it, in contrast to total automation, places quality and the ability to self-operate in the foreground, rather than focusing on output.
Blue Sky

In a so-called blue sky workshop, a team elaborates on the ideal picture as it applies to their value streams. Figuratively speaking, the team “gazes into the blue, cloud-free sky” to come up with an ideal, waste-free value stream. This is used to develop the next possible target state and the project road map.

Bottleneck

A bottleneck describes a work station in which the cycle time is greater than the customer takt time.

Cardboard Engineering

Cardboard engineering is used to optimize and simulate working systems within a team. Cardboard engineering is used to redesign working systems as a cardboard model, by simulating the work processes, and to verify them as a whole. Over the course of a 3 to 5-day intensive workshop, the creativity of all participants is used to significantly improve workspace design, ergonomics and best-point preparations with respect to material and tool readiness.

Chaku-Chaku line

| Japanese for „load load“ |

Chaku-Chaku is a standard term that applies to a lean production cell that has several features. The most significant of these features is multi-machine operation and highly standardized body and hand-movements, to achieve consistent and safe operation. Each machine in the cell has an > LCIA-type ejector, so that all the operator has to do is load the part.
Change agent

Change agents are those people who initiate change within an organization.

CIP
Continuous Improvement Process

Continuous improvement within an organization can occur on different levels and therefore requires different platforms.

We differentiate between:
Employee CIP for smaller, daily problems and ideas

12-week projects for medium-sized improvements (achievable within 12 weeks at most) that are defined and executed in one or several workshops

Large projects, for bigger changes within an organization that require more than 6 months and require corresponding cost, deadline and resource management.

Coaching

The learning and performance ability of the coachee is improved when the coachee is motivated by the coach to develop solutions to the problems encountered. This is called coaching. The coach is not an expert, but, under certain conditions, is often seen as a technical point of contact and is asked for advice or a personal opinion.

Cycle time

Cycle time is the actual time needed to carry out a work process. For an optimum production cycle time, the operator's cycle time matches the customer cycle time.
Deviation management

Deviation management is the ability to identify when there is a deviation from a standard work process (= disruption) in a timely manner and to eliminate it.

Doctor nurse principle

The operator creating the value (doctor) receives the materials and tools from the logistics provider (nurse), so that his/her primary activity is not interrupted by secondary activities.

Drain

The drain is where materials are used. The opposite is source.

EMIPS method

EMIPS stands for eliminate, minimize, integrate, parallelize, synchronize. The EMIPS method is a process improvement principle. It is implemented to undergo a structured assessment of processes or individual process steps with the goal of optimizing the approach used.

EPEI

Every part every interval

The EPEI represents the frequency at which a so-called production goes through its full cycle and the same component is produced again. All components are produced once on one resource.
**Ergonomic work place**

A work system that takes into consideration ergonomic aspects such as the operator’s size, reach and range (without turning or bending, if possible).

**External setup**

External setup denotes the steps and procedures during setup while the machine is still operating (preparation and follow-up).

**FIFO**
**First In First Out**

FIFO is a warehousing-related principle. The parts that were stored first are picked first.

**Fishbone principle**

The fishbone principle is when several synchronized process chains are tied to the main process and supply it synchronously.
**FMEA**
**Failure Mode & Effects Analysis**

FMEA is an analytical dependability tool used to find potential weak spots. Used as a part of quality or safety management, FMEA is used preventively to avoid errors and increase technical dependability. It is primarily applied in the development phase of new products or processes and is requested by suppliers of serial parts for the industry.

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**Gemba**  |  **Japanese for actual place**

Gemba refers to the actual place in the workstation / production facility.

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**Hancho**  |  **Japanese for group leader**

A Hancho is the first management level in a lean organization. A hancho is the technical manager (Japanese chô) in one part of the process chain (Japanese han) and typically consists of 5 to 7 employees. A hancho masters all processes in his /her area, receives a slightly higher wage (5-10 %) than normal production employees and is selected and appointed by the company. The hancho’s responsibilities include reacting to abnormalities and promoting standardized work and continuous process improvement.

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**Hanedashi**  |  **Japanese for auto-unload**

> Auto unloading
Heijunka | Japanese for smoothing and leveling

A leveled and smoothed dispatching of production demand guarantees regular processes and therefore, less waste. Leveling transforms ununiform order inputs into uniform production quantities.

Based on leveled production quantities, a production pattern in an unvarying sequence and with the smallest possible lot sizes is the determinant (smoothing). The Heijunka board depicts the specified production pattern for the production process. Heijunka enables a steady and synchronous production with little control effort.

Hoshin Kanri | Japanese for compass management

Hoshin Kanri aligns the management and development of employees with the vision. Hoshin Kanri creates a connection between the vision, objectives, projects and success factors using tools and forms, e.g. the x matrix is a tool used to link leveraged targets, annual targets, improvement projects and success factors. Involving all levels of management across all organizational functions helps align the organization and is a key component of Hoshin Kanri. Traditional top-down communication becomes value-stream driven CIP (continuous improvement process) communication.
Ideal state

The ideal state in the lean world is represented by processes that are fully waste-free. Once there is no more obvious or hidden waste, the process is one that consists of 100% value creation.

When defining the ideal state for a value stream or a process, the team has to see beyond current limits. Often, the team will come up with ideas to further reduce waste in order to reach the next target state. The target state is the achievable state that comes closest to the ideal state.

Internal setup

Internal setup is the term used to encompass setup activities done when the machine is at a standstill.

Inventory

Inventory is a type of > waste. Inventory includes all components, from raw materials toprocured parts that are not immediately needed to meet customer orders.

Jidoka | Japanese for autonoma\m

> Autonoma\m
**Just-in-sequence**

This inventory strategy is used to achieve just-in-time (JIT). Components reach the production line just in time and in the sequence that they are assembled in. This strategy is also applied to transportation to and from the production area.

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**Just-in-time**

The right component, the right quality, the right time, and in the right quantity at the right location (5R).

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**Kaikaku | Japanese for reform**

Kaikaku denotes fundamental and radical changes to improve a work or business process.

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**Kaizen | Japanese for change for the better**

Kaizen is a combination of the Japanese words kai, meaning change, and Zen, meaning good, and denotes continuous, incremental improvement.
**Kanban** | Japanese for visual signal or card

Colored cards (Kanban) can be used to visually indicate when a material needs to be replenished, in accordance with the pull principle. A Kanban carries information and indicates when inventory levels have reached the minimum level and new inventory has to be delivered, in keeping with the motto: “If something’s gone, it has to be replaced!” Kanban cards replace the traditional production or transportation orders. The Kanban system guarantees a seamless work process without high inventory levels. The Kanban principle can be used in all areas of an organization, from administration to production. 

> Signal Kanban

**Kata** | Japanese for routine, or a way to think and act

The term Kata is borrowed from Japanese martial arts and denotes a choreographed series of predefined movements that determines the sequence of a fight. In an actual fight, the opponents engage in an instinctive series of movements. In the lean world, this term is promoted by Mike Rother. Customer satisfaction and personal development are improved using two key elements: improvement routines and mentoring routines. The improvement routine (Kata) consists of four steps:

1. Determine a vision or direction
2. Grasp the current condition
3. Define the next target condition
4. Move toward the plan through iterative > PDCA cycles
**KPI**
**Key Performance Indicator**

A key performance indicator is a measurement used to indicate progress or the degree of performance with respect to important objectives or critical success factors within an organization.

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**LCIA**
**Low Cost Intelligent Autonomination**

LCIA is the automation of manual activities using the easiest methods available in the facility. In a multi-step process, existing manual activities are first made easier and then standardized. LCIA is set up so that it will stop when there is an error, to prevent the defective component from continuing down the line. When implementing LCIA, automated and manual work is to be kept separate. Low Cost Intelligent Autonomination is primarily used in assembly, mechanical processing and internal transport.

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**Lead time**
**(also throughput time)**

In lean philosophy, lead time is seen as the key indicator. Lead time is proportional to the level of > excess production and > inventory in the value stream. It is based on the time that a component needs to get from the raw material stage to the customer.

To calculate lead time in ...

... **Batch production:**
  processing time + transport time + idle time

... **Single-piece production:**
  Time from order input to operation
**Leveling**

Leveling is a component of > Heijunka. Customer demands are leveled, kept the same or introduced into the production line based on the average amount needed: the same amount is to be produced every time unit, e.g. shift or day. If the actual customer requirements differ from the leveled amount, these differences are balanced through a finished goods supermarket. A balanced dispatching of demand (leveling) is required to smooth production quantities.

**Machine cycle time**

Machine cycle time is the time that a machine needs to produce a unit, including loading and unloading.

**Mentee**

The mentee is the so-called student of the > mentor.

**Mentor**

The term mentor goes back to Homer's saga, The Odyssey: Mentor was the advisor to Odysseus and the friend of Telemachus. Telemachus saw him as an uncle, a wise and experienced older person who took him under his wing, providing him with encouragement and support and allowing him to grow into his responsibilities.

In the world of lean, the mentor strives to improve the competencies of his / her charge and thereby improve the level of...
Minimarket principle

A minimarket is a small storage area from which the user can take parts, often located directly in the workstation, and which is supplied by the supermarket.

Milk run

The term milk run comes from the U.S., where a bottle of milk was only delivered to a home if an empty bottle was awaiting pickup on the doorstep. This ensured that the home never had too much milk and that it wouldn't go bad.

The term milk run is used to describe a certain logistics concept. The key is to speed up delivery flow and increase delivery frequency without increasing freight costs. Deliveries are no longer made one-by-one by each supplier in a star shape, but rather are done as a closed loop where several suppliers are connected to the recipient.

Mizusumashi | Japanese for water bug

Mizusumashi is the employee responsible for supplying a workstation and keeping production going without interruption.

Model mix

A defined order that ensures smooth production.
MTM
Methods Time Measurement

MTM is a process used to analyze work processes and determine planning and target times. When applying MTM, all movements carried out by people are broken up into the basic movements, to determine the standard required time. The individual times are then used to determine the time required for an entire work process.

Mura | Japanese for lack of uniformity

Waste (> muda) can lead to imbalance that affects process quality, costs and delivery dates.

Muri | Japanese for unreasonable, impossible, overburdened

Muri is the overburdening of all types of resources (equipment, operators), and results in wear and production downtime.

Muda | Japanese for waste

All processes that relate to the product and do not increase the value of it.
7 types of waste:
> overproduction, > inventory, defects, motion, transport over-processing, waiting.
Orderliness and cleanliness

Clean and orderly workstations reduce > waste resulting from searching (motion) and make > visual management possible. Deviations from standards can be more easily recognized and shut down. A lack of order and particularly, a lack of cleanliness are also the cause for defective processes. The > 5S method can be used to achieve order and cleanliness.

One-piece-flow

This term is used to describe a reduction in > lead time through flow-optimized production. One-piece-flow is a method used to drastically reduce production lead time.

In a one-piece flow production process (flow-optimized production), parts are moved from one machine to the next without interim storage (the most extreme form of lead time reduction). The quantity moved only consists of one part. This is only possible in closely connected work systems. Changing a work system to one-piece flow can only occur if there is a high availability of existing capacities.
One-point-lesson

A one-point lesson is a communication on a single topic, written and illustrated on one piece of paper.

Operator cycle time

Operator cycle time is the time it takes for an operator to complete a given process, including the time needed to load and unload parts, but excluding wait times.

OTED

One-touch exchange of die

Changeovers are reduced so that they can be carried out in a single step (one touch).

Overproduction

Overproduction is the worst of the seven > wastes as it leads to excessive > inventory, so that capital is tied up in finished goods. It involves all other types of waste. Lean uses the term inventory to refer to purchased parts and raw materials.
Pacemaker

This a process within a value stream that has a cycle time that is as close as possible to the > customer takt and that defines the rhythm (process step) of a process chain.

Pareto cart

A pareto cart is used to help determine the waste characteristics of a product. They are sorted onto a cart so that the most frequent defects can be visualized.

> Pareto principle

Pareto principle

According to the Pareto principle, named after Vilfredo Pareto (1848–1923), the effects of a problem (80 %) are most often due to a small number of causes (20 %).

PDCA cycle

Targeted troubleshooting when problems arise is the key to success when solving these problems. A series of structured problem-solving techniques make it easier for employees to systematically and deliberately expedite and implement problem solving.

The PDCA cycle consists of four steps:

Plan – Planning phase
Do – Implementation phase
Check – Check effectiveness
Act – Standardize

To align with continuous improvement, the PDCA cycle is carried out repeatedly.
**Point Kaizen**

Point Kaizen is an improvement that is limited to a given work station (= punctual).

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**Poka Yoke** | Japanese for avoiding unplanned mistakes

Poka Yoke is any mechanism that helps avoid unplanned mistakes. Poka Yoke is the application of simple, error-proof mechanisms to consistently avoid incorrect assembly, mix-ups or the downstream movement of defective parts. Because stable and high-quality processes begin long before the production phase, simple Poka Yoke measures can be implemented preventively in the construction and planning phase to ensure quality.

**Poka Yoke is implemented to avoid:**
Leaving out or forgetting process steps, process or operational-related mistakes, incorrect or missing parts, setup or installation errors.

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**PPM**

**Parts per million**

An error rate indicates that a pre-defined, relatively small number of components can be defective out of one million components produced. The ppm unit of measure is prevalent in the automobile sector: auto manufacturers demand that suppliers strictly adhere to the ppm rate (e.g. for the electronic components of built-in control devices).

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**Production diary**

A production diary defines the weekly plan for the management team, including support functions, and is posted on the > Shop Floor Management board. It sets the daily shop floor discussions regarding daily activities and defines the daily activities to be carried out by management. This includes problem solving and process confirmation. It also defines who takes part in which meeting and when. Additional meetings must be scheduled around the times set out in the production diary.
Production smoothing

Leveling production is part of > Heijunka. A prerequisite for smoothing is the uniform dispatching of the customer demand to production (leveling). When smoothing, customer demand is broken into the smallest uniform production demand. By sequencing the demand for all components produced by one resource, a production pattern is created. This is the guideline for a recurring production order that remains the same. Smoothing is a prerequisite for synchronous production.

Product / machine matrix

The product / machine matrix represents which component families are produced on which machines. This matrix forms the basis of developing assembly lines and process chains.

Process chain

Process chains are directly aligned with a flow, or chain. The materials can only flow to the next process step.

Project management

Project management is a structured method used to work through complex tasks or projects based on a:
» Clearly defined organizational structure, with defined tasks, competencies and responsibilities
» Clearly defined organizational structure, with defined tools, methods and tools
The objective of project management is to provide a clear overview of “big” changes within an organization. Projects are plans with a defined goal, as well as constraints with respect to time, finances and personnel. These projects are clearly differentiated from other projects and have a project-specific organizational structure.
Pull principle

The pull principle is one of the four building blocks of lean production (pull production). The downstream process or concrete customer demand determine which component is delivered or produced when and in what quantity. Minimum / maximum inventory levels are defined between customers and suppliers. This thereby limits > overproduction quantities.

Push principle

“Push production”: The downstream process or a prognosis are what determines the quantity delivered or processed, and when. This results in > overproduction between process steps, the lead time is long and usually not plannable.

Regular communication

Regular communication is characterized by efficient and effective communication of information. So that all processes in an organization are implemented efficiently, all relevant information must be in the right place at the right time and in the required quality. One tool to ensure this is standardized, regular communication. Communication can, for example, be between management and employees, project teams, or employees working together across the value stream. Those involved can regularly exchange target-oriented, situational information on short-cycle projects. This standardized information flow creates clear channels of communication, ensures that information flows, and frees up time by, e.g., reducing the number of e-mails.
**Sequencing stability**

The sequencing of components to be manufactured / assembled should correspond to the planned sequence; this ensures uniform production, transparent and manageable production control, and logistics that align with production.

> Just-in-sequence

**Sequential manufacturing**

In sequential manufacturing, the sequencing of production materials is value stream-driven and production materials are connected using simple transportation devices.

**Sensei | Japanese for master or teacher**

A sensei is a lean production expert. The sensei passes on his / her knowledge as the mentor.

**Set-up reduction**

To reduce set-up time, the set-up process is observed and analyzed (e.g. using the ECRS – eliminate, combine, rearrange, simplify – method), > waste is reduced, and the developed concept is tested and standardized. The defined process standard is the basis for training employees who carry out the setup process.

One of the ways > overproduction is decreased is by producing smaller lots. To produce these lots without too much time loss, the setup times must be kept as short as possible.
**SFM
Shop Floor Management**

Shop Floor Management supports the consistent development of on-site processes and procedures. The presence of management in production areas and their focus on deviations from standards dramatically speeds up decision-making and results in the immediate implementation of solutions.

Shop Floor Management clearly defines management tasks and requires special modes of behavior. Management is supported by the application of specific tools.

**Five Shop Floor Management-related tasks are carried out on-site and are as follows:**
1. Carry out regular communication
2. Confirm processes
3. Enable employees
4. Carry out continuous process improvement
5. Solve problems in a structured manner

SFM exemplifies behavior that encourages employees to solve problems within their scope of competencies and initiate improvements. For example, management keeps its comments to a minimum, only makes binding commitments, gives but also accepts feedback, gains its own perspective of a situation, allows mistakes in learning situations, does not lay blame and puts in place questioning techniques.

SFM tools support the effectiveness of management, e.g.: production diary, KPI charts, problem-solving sheet, T-cards.

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**Signal Kanban**

Every container is marked with a Kanban card or signal. When last part is taken, the > Kanban is sent to the source and added to the Kanban board. The Kanban board reflects the exact inventory levels and depicts the level of > overproduction by source and destination. Based on the distribution of the cards in the color-coded areas, the allocation of the workstations as well as the control loop dimensioning can be determined.
SIPOC

SIPOC is a > Six Sigma tool that summarizes, in table form, an entire process at the start of an improvement measure or a project. SIPOC can be used to clearly delimit processes within a process chain. A SIPOC diagram illustrates a moment in time of a process. Each of the letters in SIPOC represent the names of the columns in the table: S – Supplier, I – Inputs, P – Process, O – Output, C – Customer.

Six Sigma

Six Sigma (6σ) is a set of management techniques to manage quality and to improve processes and process output quality. Its key element is to describe, analyze, improve and monitor business processes using statistical methods.

As a rule, every quality characteristic leads to an undesired variation in process results. As a part of a so-called process capability inspection, deviations from the target state in relation to the tolerance level of the characteristics in question are identified. The standard deviation of the characteristic (the Greek letter σ, which is read as sigma) plays an important role. It measures the variance of the characteristic and how much the characteristics’ values deviate from one another. The further the standards deviate from the range of tolerance, the more likely it is that the tolerance levels will be exceeded. Also, the further the mean is from the middle of the tolerance range (the closer it is to one of the tolerance levels), the greater the regression. That is why it is important to measure the distance between the mean and the closest tolerance range using standard deviations. This distance, divided by σ is the process capability index cpk; Cpk = 1 if the mean is 3 σ from the closest tolerance level.

These techniques were named Six Sigma because Six Sigma requires that the closest tolerance level be at least six standard deviations (6σ, Six Sigma) from the mean. When this requirement is met, we can assume that a zero-error production has been met and that the tolerance levels are rarely exceeded.
**SMED**

*Single minute exchange of die*

Shigeo Shingo came up with this series of techniques to set up production equipment in less than 10 minutes.

> Set-up reduction

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**Source**

Source is used to indicate the material’s point of origin / production facility. The opposite is the drain.

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**Standardization**

Standards describe the predefined procedure of processes and workflows. Standardization ensures that optimum performance is continuously achieved, that resources are used efficiently and that quality remains consistent, regardless of the operator.

Standards are visually recognizable, making it easier to immediately identify errors and problems that deviate from the standard. Based on this, e.g. error stoppage measures are determined, or a problem-solving process is started. Standards make it possible to more quickly and easily familiarize employees with the process.

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**Standard layout**

A standard layout diagram illustrates a workstation or cell and indicates how and in what order standardized work is performed.

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**Standard work**

Standard work describes the pre-defined process steps carried out by an employee during > takt time.
**Standard work combination sheet**

A standard work combination sheet is a document that displays the process steps for one or several employees. It is used to display the optimum combination of human and machine work.

**Stop-the-line authority**

The ability of workers to stop the process when there are problems and to pull the >Andon< cord. This prevents defective parts from entering downstream processes.

**Supermarket**

The term supermarket is used to identify an instrument that independently controls production. In a supermarket, all components can be found in a pre-defined area; they are organized for optimum reach, their inventory level is limited, and components are replaced as soon as they are used.

**Swim lane diagram**

A swim lane flowchart is used to analyze and model business processes by illustrating the business processes as a flowchart. Various job responsibilities are placed horizontally in a (swim) lane, so that the transfer of responsibility or interfaces is more apparent.
**Takt time** > Cycle time

**Target agreement**

The term target agreement is used to describe a management technique in which management and employees reach an agreement regarding achieving company goals. A target agreement consists of two elements: the goal and the measures used to achieve that goal, i.e. a combination of quantitative goals and action plans.

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**TPM**

**Total Productive Maintenance**

TPM is a standardized method used to obtain interruption-free production. The goals of TPM are as follows:

- To increase machine availability by reducing plant interruptions
- To reduce interruption-related set-up and the related “firefighting efforts” to a minimum
- To recognize and eliminate equipment and material weak points
- To improve the degree to which employees identify with equipment and operating methods and to include employees in maintenance and repair activities
- To increase plant production
- To reduce total maintenance costs through regular and standardized maintenance and inspection
True north

In the world of lean, true north represents the target state: waste-free processes.
The term refers to the North Star, or true north. The North Star is approximately 0.7° from the North Celestial Pole and is visible from the Northern Hemisphere all year-round. Because it is so close to the North Pole, it has long been used as a navigational aid. It can be used to verify compass readings for determine a ship's direction. It is visible to the naked eye and is always seen in the same location. Its height in the sky roughly corresponds to the northern line of latitude in which the observer is located. The world of lean uses this term to denote an ideal state that can never change, a state that never moves.

U-shape layout

The U-shape layout describes the layout of machines and workstations in a > one-piece-flow, where they are laid out in the shape of the letter “U”. The operator works within the U shape, thereby reducing necessary movement to a minimum. Material allocation is done outside of the U layout, making the process interruption-free.
Value creation

As opposed to *waste*, value creation refers to all activities that, from the customer perspective, add value to a product.

Value stream analysis / design

Value stream analysis / design is a method used to record and design value streams. Standardized symbols are used to represent material and information flow on a sheet of paper. The most important indicator derived from value stream analysis is lead time. In value stream design, the target state is modelled as the target value stream, and the implementation projects are based on this.

Visual management

Visual management is the physical representation of all standards, goals and states, so that any deviation can be identified immediately. The visual management concept includes all principles, tools and standards that make it possible to visualize the information, so that management and employees can easily see and understand all related information. This makes it possible to quickly identify all deviations. Good visual management leads to immediate correction measures (e.g. *PDCA*, *5W*) on the shop floor.
Waste

As opposed to value creation, waste denotes all activities that, from a customer standpoint, add no value to a product. Taiichi Ohno categorized waste into obvious waste and hidden waste. Obvious waste can be eliminated, hidden waste can only be minimized. Taiichi Ohno also divided waste into seven types:

1. **Overproduction** (more parts are produced than currently needed)
2. **Inventory** (includes raw materials and purchased components)
3. **Rework**
4. **Over-processing** (processes not adapted, e.g. processes too large, ergonomics lacking)
5. **Transportation**
6. **Motion of employees within the workflow**
7. **Waiting time** (of employees)

It is important to be aware of the order these types are listed in. Overproduction is the worst type of waste and triggers the other types of waste.

Zero defects principle

The zero defects principle is a basic lean management principle. Three basic rules are the basis of the zero defects principle:

1. **Accept no defective parts**
2. **Create no defects**
3. **Do not allow defective parts to move downstream**

The zero defects principle promotes robust processes and is the foundation for the three further lean characteristics: flow, rhythm and pull.
Staufen is a Lean Management consulting service and academy.

We believe that inside every company, there is an even better one. Our passion is helping you discover the better version of your company and working with you to establish a sustainable culture of change. This will make your business lean, clever and able to optimize.