TEAMTHINK

LEAN GLOSSARY

The key terms of Lean Management from A to Z



116 terms

English · German

Edition 2026

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are shown with their meaning in the second line, e.g. Kaizen, Muda, Heijunka.

TEAMTHINK

A – C

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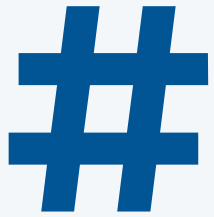
5 WHYS

GERMAN: 5-W-METHODE

The 5 Whys is a problem-solving technique.

The root cause of a problem is narrowed down by asking “Why?” five times.

Other question words are also allowed.



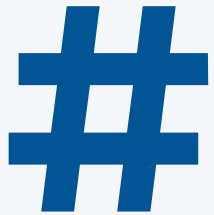
German

5-W-Methode

5A METHOD

GERMAN: 5-A-METHODE

see **→ 5S method**



German

5-A-Methode

See also

→ 5S Method

5S METHOD

GERMAN: 5-S-METHODE

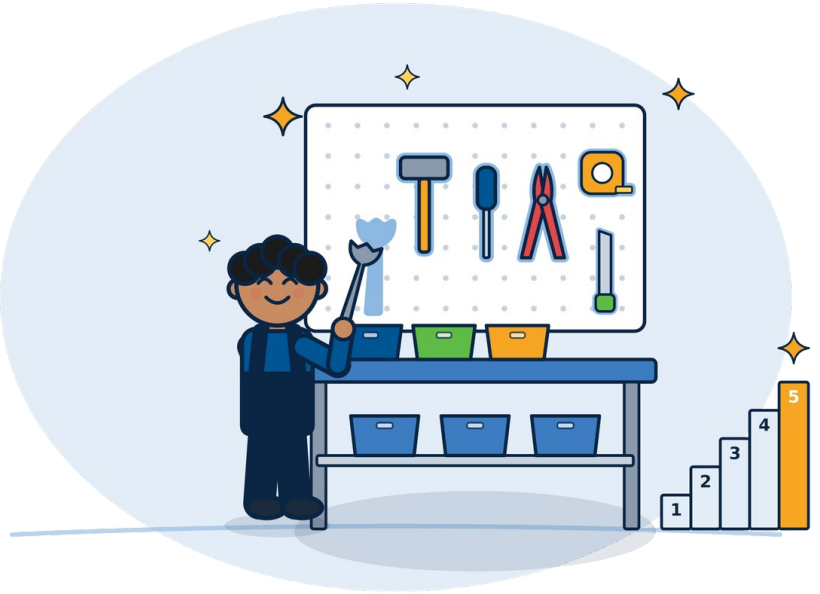
The 5S method is the foundation of continuous improvement. “5S” stands for the five steps that establish order and cleanliness in the workplace:

1. **Sort**, Jap. Seiri (create order)
2. **Set in order**, Jap. Seiton (orderliness)
3. **Shine**, Jap. Seiso (cleanliness)
4. **Standardize**, Jap. Seiketsu (personal sense of order)
5. **Sustain**, Jap. Shitsuke (discipline: follow and improve standards)

Clean and orderly workplaces reduce the **→ waste** of “searching” (motion) and enable visual management. Deviations from standards are easier to detect and eliminate.

In German-speaking countries, the 5S are sometimes called the 5A:

› **A**ussortieren (sort out)
› **A**rbeitsplatz säubern (clean the workplace)
› **A**rbeitsplatz aufräumen (tidy up the workplace)
› **A**nordnung zur Regel machen (make the arrangement the rule)
› **A**udits durchführen (conduct audits)



→ Waste

TEAMTHINK

8D REPORT

EIGHT DISCIPLINES · GERMAN: 8-D-REPORT

The 8D report is a quality management document exchanged between supplier and customer in the event of a complaint.

“8D” stands for the eight mandatory process steps required in complaint handling to solve the underlying problem.

The report covers the nature of the complaint, responsibilities, and the actions taken to correct the defect:

D1 Form the team
D2 Describe the problem
D3 Implement containment actions
D4 Identify root cause(s)
D5 Plan corrective actions
D6 Implement corrective actions
D7 Prevent recurrence
D8 Recognize the team

A3 REPORT

A

The A3 report takes its name from the paper size on which it is prepared. Its structure was influenced by the PDCA method (**→ PDCA cycle**).

The best-known A3 report is the problem-solving report. It guides the user through a systematic approach, starting with a description of the observed symptom. Its text fields lead the user from describing the symptom through identifying the cause to planning and implementing the countermeasures that solve the problem.

The individual text fields are:

- Title
- Background of the problem
- Problem description
- Target condition
- Immediate action
- Cause-and-effect relationship
- Root cause analysis
- Countermeasures
- Communication to adjacent areas
- Follow-up activities

A **→ mentor** should support the work and develop the **→ mentee** through targeted questions. The A3 report is therefore not suited to “firefighting.”

ANDON

JAPANESE FOR "LANTERN"

A

Andon is a visual signal that draws attention to problems.

The signal can be triggered by pulling a cord.

see also **→ stop-the-line authority**



→ Stop-the-line Authority

AUDIT

A

An audit examines whether processes, requirements, and guidelines meet the required standards. The procedure originated in quality management but in recent years has been extended to many other management areas (e.g., environmental management, value creation systems). Audits are carried out by a specially trained auditor.



German

Audit

AUTO UNLOADING

JAPANESE: HANEDASHI · GERMAN: AUTO-ENTLADEN

A

Auto unloading means that every machine ejects the workpiece automatically, so the operator only has to load it.

see also **→ Chaku-Chaku line**

A

German

Auto-Entladen

See also

→ Chaku-chaku Line

AUTONOMATION

JAPANESE: JIDOKA

A

Autonomation is a coined word combining “automation” and “autonomous” and stands for “automation with a human touch.”

Every machine in the process should run without constant monitoring by an operator and stop automatically in the event of an abnormality, such as a broken tool, so that no defective parts are passed on to the next process.

Autonomation is one of the two pillars of the Toyota Production System. It is also called “intelligent,” simple, or partial automation because, unlike full automation, employees are involved in introducing it. The goal is broad qualification beyond machine operation: employees who operate, repair, inspect, and improve. Autonomation supports this qualification process.

BIM

BUILDING INFORMATION MODELING

B

Building Information Modeling (BIM) is a software-based method for optimized planning, construction, and operation of buildings. All relevant building data is captured, combined, and linked digitally. The result is a geometrically visualized virtual building model (computer model). BIM is used both in construction (planning and execution) and in facility management.

B

German

BIM

BLUE SKY

B

In a so-called Blue Sky workshop, a team develops the ideal state for its value streams. Figuratively, the team “looks into the clear blue sky” and dreams of the ideal, waste-free value stream.

From this, the realistically achievable next target state is derived and the project map is created.

B

German

Blue Sky

BOTTLENECK

GERMAN: ENGPASS

B

A bottleneck is a workstation whose **→ cycle time** is longer than the **→ takt time**.

The time actually required exceeds the time available.

B

German

Engpass

See also

→ Cycle Time

→ Takt Time

CARDBOARD ENGINEERING

C

Cardboard engineering is used to optimize and simulate work systems as a team.

Using cardboard engineering, teams redesign work systems as cardboard mock-ups, then simulate and jointly review the workflows.

In an intensive 3- to 5-day workshop, the creativity of everyone involved is used to achieve a quantum leap in workplace design, ergonomics, and point-of-use presentation of materials and tools.



German

Cardboard Engineering

CHAKU-CHAKU LINE

JAPANESE FOR “LOAD-LOAD” · GERMAN: CHAKU-CHAKU-LINIE

C

Chaku-Chaku literally means “load-load” and is an established term for a lean manufacturing cell with several characteristics. The most important are multi-machine handling and highly standardized body and hand movements for steady, safe work. Every machine in the cell has an ejector (Hanedashi) in the style of **→ LCIA**, so the operator can load the workpiece directly while standing at or walking past the machine.

C

German

Chaku-Chaku-Linie

See also

→ LCIA

CHANGE AGENT

C

A change agent is the person who leads the cultural change in a company.

C

German

Change Agent

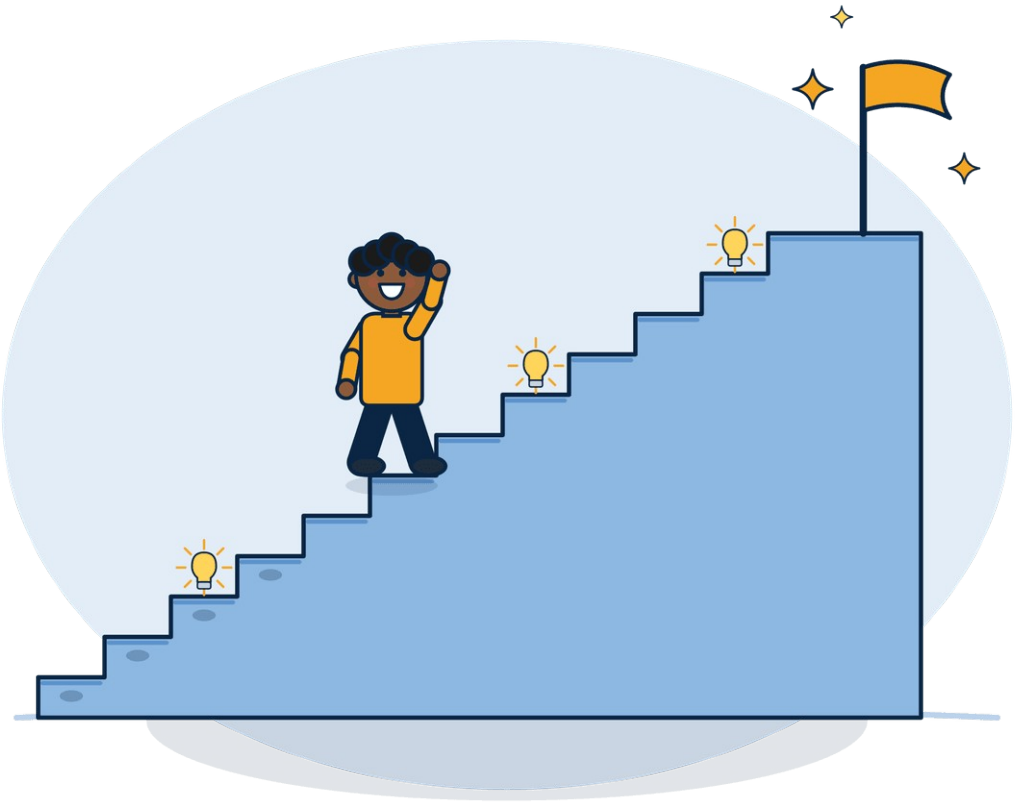
CIP | CONTINUOUS IMPROVEMENT PROCESS

GERMAN: KVP – KONTINUIERLICHER VERBESSERUNGSPROZESS

Continuous improvement in a company can take place at different levels and therefore requires different platforms.

We distinguish between:

- **employee CIP** for small, everyday problems and ideas,
- **the 12-week project** for “medium-sized” improvements (achievable in no more than 12 weeks), developed and implemented in one or more workshops, and
- **major projects** for “large” changes in the company that take more than 6 months and require appropriate cost, schedule, and resource management.



COACHING

C

Coaching improves the coachee’s learning ability and performance by encouraging the coachee to develop their own solutions to their problems.

The coach is not a subject-matter consultant, but is often seen as a technical point of contact for certain issues and asked for advice or a personal opinion.



German

Coaching

CYCLE TIME

GERMAN: ZYKLUSZEIT

C

Cycle time is the time actually needed to perform a work process. With optimal line balancing, the operator’s cycle time equals the **→ takt time**.

C

German

Zykluszeit

See also

→ Takt Time

D – H

DEVIATION MANAGEMENT
ECRS METHOD
EMIPS METHOD
EPEI
ERGONOMIC WORKPLACE
EXTENDED SIGNAL KANBAN
EXTERNAL SETUP
FIFO
FISHBONE PRINCIPLE
FMEA
GEMBA
HANCHO
HANEDASHI
HEIJUNKA
HOSHIN KANRI

Index

DEVIATION MANAGEMENT

GERMAN: ABWEICHUNGSMANAGEMENT

D

Deviation management is the ability to detect and correct a deviation (= disruption) from a standard work process in good time.

D

German

Abweichungsmanagement

ECRS METHOD

GERMAN: EKUV-METHODE

E

The ECRS method systematically examines the setup process, as well as work processes in general, with the aim to

- **e**liminate,
- **c**ombine,
- **r**earrange,
- and / or **s**implify work steps.

E

German

EKUV-Methode

EMIPS METHOD

GERMAN: EMIPS-METHODE

E

EMIPS = “**E**liminate, **M**inimize, **I**ntegrate, **P**arallelize, **S**ynchronize”

The EMIPS method is used for process improvement. It provides a structured way to examine processes or individual process steps for improvement opportunities.

E

German

EMIPS-Methode

EPEI

EVERY PART EVERY INTERVAL

E

EPEI is the period in which a production pattern is run through once. Every item is produced once on a resource.



German

EPEI

ERGONOMIC WORKPLACE

GERMAN: ERGONOMISCHER ARBEITSPLATZ

E

An ergonomic workplace is a work system that takes ergonomic aspects into account, such as the worker's height, reach, and sequence of movements (ideally no twisting or bending).

E

German

Ergonomischer Arbeitsplatz

EXTENDED SIGNAL KANBAN

GERMAN: ERWEITERTES SIGNALKANBAN

E

Every container has a kanban card. When material is withdrawn, the **→ kanban** is sent to the **→ source** and placed on the kanban board.

The kanban board shows the exact work-in-process inventory and thus visualizes the level of **→ overproduction** at the **→ source** and the **→ sink**. The distribution of cards across the color zones shows directly when the next setup is required.

E

German

Erweitertes Signalkanban

See also

→ Kanban
→ Source
→ Overproduction
→ Sink

EXTERNAL SETUP

GERMAN: EXTERNES RÜSTEN

E

External setup is the part of a tool change that can be prepared or completed safely while the machine is running.

E

German

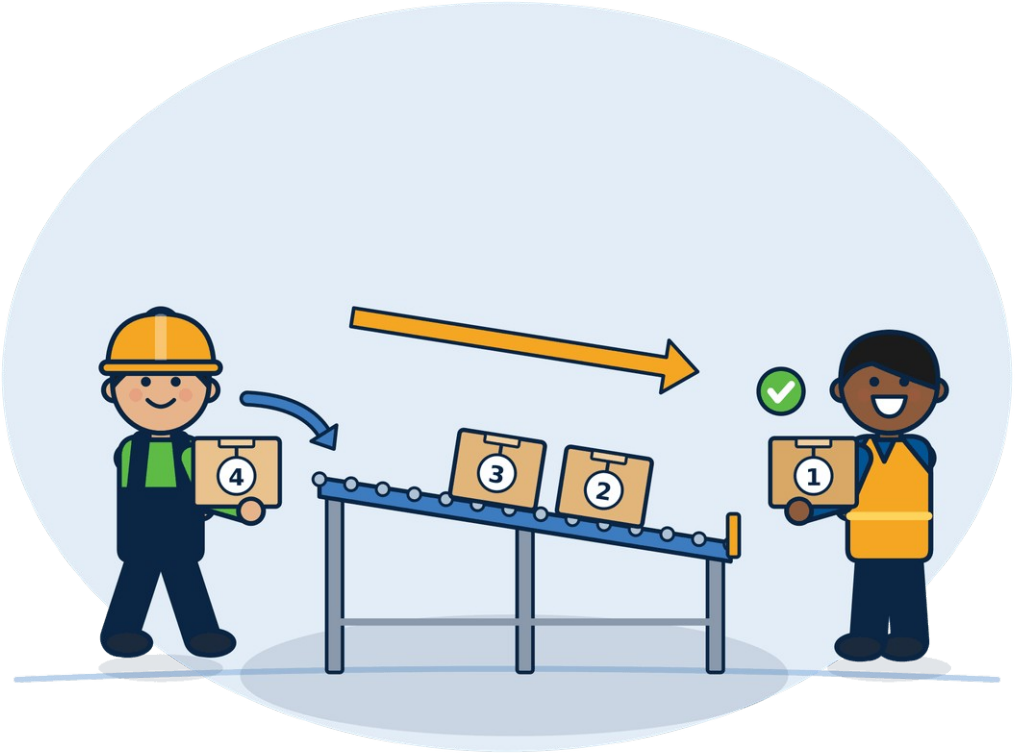
Externes Rüsten

FIFO

FIRST IN, FIRST OUT

F

FIFO is a storage and withdrawal principle: the parts stored first are the first to be withdrawn.



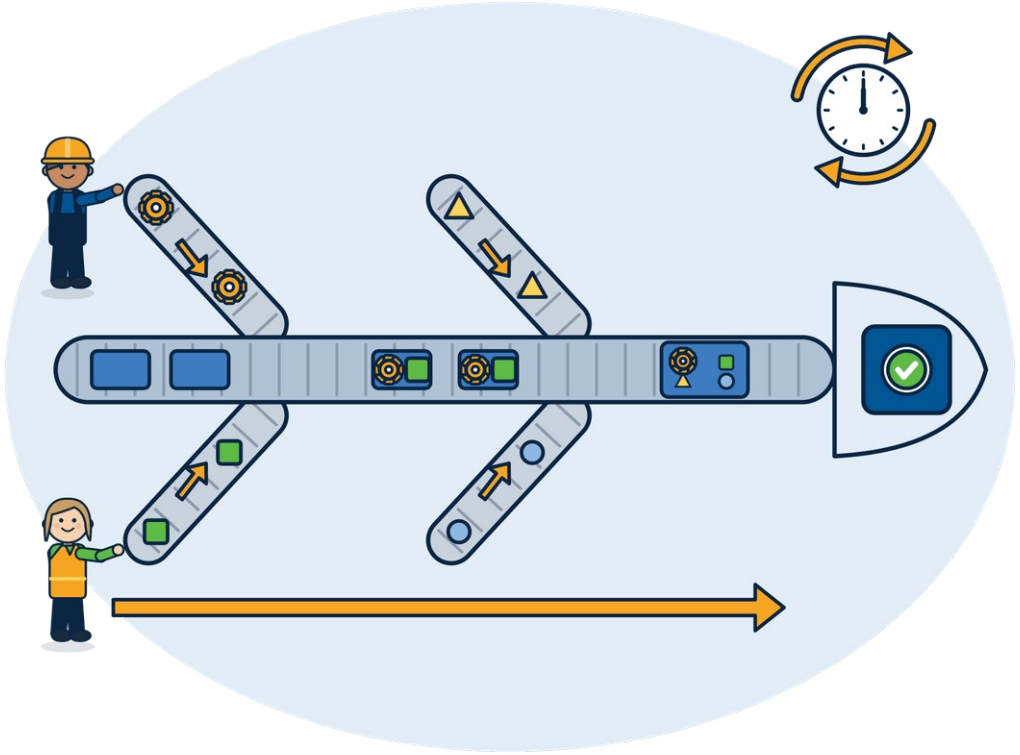
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FISHBONE PRINCIPLE

GERMAN: FISCHGRÄTPRINZIP

F

The fishbone principle means that several process chains are connected to the main flow and supply it in sync.



FMEA

FAILURE MODE AND EFFECTS ANALYSIS

F

FMEA is an analytical reliability engineering method for identifying potential weaknesses. In quality and safety management, FMEA is used preventively to avoid defects and increase technical reliability.

It is used especially when developing new products or processes and is required of suppliers of series production parts.

F

German

FMEA

GEMBA

JAPANESE FOR "THE ACTUAL PLACE"

G

Gemba refers to the "actual place" where things happen in the workshop / production.

G

German

Gemba

HANCHO

JAPANESE FOR "GROUP LEADER"

H

The hancho is the first level of leadership in a Lean organization. He is the technical leader (Jap. chô) of a section of the process chain (Jap. han), which typically consists of five to seven employees. He masters all processes in his area, receives slightly higher pay (5–10%) than regular production employees, and is selected and appointed by the company. His responsibilities include responding to abnormalities, ensuring production capability, promoting standardized work, and continuous process improvement.



German

Hancho

HANEDASHI

JAPANESE FOR "AUTO-UNLOADING"

H

see → **auto-unloading**



German

Hanedashi

See also

→ **Auto Unloading**

HEIJUNKA

JAPANESE FOR "LEVELING AND SMOOTHING"

Leveled and smoothed loading of production demand creates regular workflows and therefore less **→ waste**. Leveling transforms uneven incoming orders into even production quantities.

Based on the leveled production quantities, a production pattern with a constant sequence and the smallest possible lot sizes is determined (smoothing). The heijunka board visualizes the production pattern defined for the production process. Heijunka enables calm, synchronized production with little control effort.



German

Heijunka

See also

→ Waste

HOSHIN KANRI

JAPANESE FOR "COMPASS MANAGEMENT"

H

Hoshin Kanri focuses the leadership and development of employees on the vision. Using tools and forms, it links vision, objectives, projects, and success factors. The X-matrix is the tool for connecting breakthrough objectives, annual objectives, improvement projects, and success factors. Involving all management levels across all company functions serves to align the company and is a core element of Hoshin Kanri.

Management agrees on the goal and the shared path (horizontal alignment) and speaks to the organization with "one voice." Only with strategic messages free of conflicting goals does Hoshin Kanri unfold its full effect in the organization (vertical alignment).



German

Hoshin Kanri

I – K

IDEAL STATE
INTERNAL SETUP
INVENTORY
JIDOKA
JIS
JIT
KAIKAKU
KAIZEN
KANBAN
KATA
KPI

Index

IDEAL STATE

GERMAN: IDEALBILD

I

In the Lean world, the ideal state stands for processes completely free of waste. When neither obvious nor hidden **→ waste** remains, the process consists of 100% value creation.

When developing an ideal state for a value stream or process, the team is forced to look beyond currently existing limits. This often leads to ideas that go further in reducing waste than if the team only dealt with the next target state.

The realistic state is the achievable state that comes closest to the ideal state.



German

Idealbild

See also

→ Waste

INTERNAL SETUP

GERMAN: INTERNES RÜSTEN

I

Internal setup comprises the tasks of a tool change that are performed while the machine is stopped.



INVENTORY

GERMAN: BESTÄNDE

I

Inventory is a type of **→ waste**. It refers to all quantities of raw materials and purchased parts that are not needed to fulfill current customer orders.



→ Waste

JIDOKA

JAPANESE FOR "AUTONOMATION"

J

see **→ autonomation**

J

German

Jidoka

See also

→ Autonomation

JIS

JUST-IN-SEQUENCE

J

In the **→ fishbone principle**, a side branch (subassembly) produces in the same sequence (= order) as the main stream.

J

German

JIS

See also

→ Fishbone Principle

JIT

JUST-IN-TIME

J

- The **r**ight part,
- in the **r**ight quality,
- at the **r**ight time,
- in the **r**ight quantity
- and at the **r**ight place (5 Rs).



KAIKAKU

JAPANESE FOR "REFORM"

K

Kaikaku refers to the radical improvement of an operation or business process – usually in one large step. The scope of investigation is larger than with **→ kaizen**.

K

German

Kaikaku

See also

→ Kaizen

KAIZEN

JAPANESE FOR "CHANGE" (KAI) AND "GOOD" (ZEN)

K

Kaizen generally stands for continuous improvement (→ **CIP**) in small steps.

K

German

Kaizen

See also

→ CIP

KANBAN

JAPANESE FOR "SIGN, SIGNBOARD, ORDER BOARD, ORDER CARD"

K

Material replenishment can be organized based on consumption using cards (kanbans), in line with the **→ pull principle**. A kanban carries the information on the part, the quantity, and the **→ source**/**→ sink** and, following the motto "When something is taken, something must be replaced!", signals when the critical inventory level has been reached and new material must be delivered.

The kanban card replaces the traditional production or transport order. The kanban system ensures a smooth work process with minimal overproduction / minimal inventory. The kanban method can be used in all areas of a company, from administration to manufacturing.



→ Pull Principle | → Source | → Sink

KATA

JAPANESE FOR "ROUTINE" OR "WAY OF THINKING AND ACTING"

K

The term kata comes from Japanese martial arts and refers to a kind of dry exercise. The standardized form and predefined sequence of movements are used to practice the course of a fight. In a real fight, the fighter can then instinctively call up the corresponding movements.

Through guided, routine work on improvements in their own work area, employees are invited to drive **→ CIP** intrinsically.

The **→ mentor** supports the **→ mentee** – the improvement routine and the mentoring routine work together.

The improvement routine (kata) consists of four steps:

1. **Understand the direction**
2. **Grasp the current condition**
3. **Establish the target condition**
4. **Conduct PDCA experiments** (**→ PDCA cycle**)

KPI

KEY PERFORMANCE INDICATOR

K

A key performance indicator is a key metric used to measure progress or degree of achievement toward important objectives within an organization (e.g., increasing EBIT by 15%). It should not be confused with the success factors which, in the second metrics cycle of **→ Hoshin Kanri**, make transparent the cause-and-effect relationship between one's own actions and the metric at the next-higher employee level.

K

German

KPI

See also

→ Hoshin Kanri

L – N

LCIA
LEVELING
LIGHTHOUSE PROJECT
LINE PRODUCTION
MACHINE CYCLE TIME
MENTEE
MENTOR
MILK RUN
MINIMARKET PRINCIPLE
MIZUSUMASHI
MODEL MIX
MTM
MUDA
MURA
MURI

Index

LCIA

LOW COST INTELLIGENT AUTOMATION

L

LCIA means automating manual tasks with the simplest of means through in-house construction. Manual tasks are first made easier, sometimes in several steps, and then standardized. The LCIA device must be designed so that it stops in the event of a defect and prevents further processing of the defective workpiece. When implementing LCIA, machine work and manual work must be separated.

LCIA is mainly used in assembly, machining, and in-plant transport.

L

German

LCIA

TEAMTHINK

LEVELING

GERMAN: NIVELLIERUNG

L

Leveling is part of **→ heijunka**. Customer demand is divided into equal quantities for each time unit (e.g., a shift or a day), so that the same quantity is produced and released into production according to average demand. Differences between actual customer demand and the leveled quantity are buffered by a finished goods supermarket.

An even distribution of demand (leveling) is the prerequisite for smoothing production volumes. The ideal is synchronization of supplier and customer.

L

German

Nivellierung

See also

→ Heijunka

LIGHTHOUSE PROJECT

GERMAN: LEUCHTTURM-PROJEKT

L

The so-called lighthouse is the part of a company in which processes and structures have come as close as possible to the ideal. As a highly visible pioneer, this area serves as a role model for company-wide implementation. It sets the direction, shows what is possible, and thus forms the basis for a successful rollout.

L

German

Leuchtturm-Projekt

LINE PRODUCTION

GERMAN: LINIENFERTIGUNG

L

In line production, the manufacturing equipment / machines are arranged according to the value stream and connected by simple means of transport. Another characteristic of lean line production is that the machines are specialized in a few operations (usually just one). Each individual work step should be possible with the lowest possible investment – right-sized equipment.

L

German

Linienfertigung

MACHINE CYCLE TIME

GERMAN: MASCHINENZYKLUSZEIT

M

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

M

German

Maschinenzykluszeit

MENTEE

M

The mentee is the **→ mentor's** student.

M

German

Mentee

See also

→ Mentor

MENTOR

M

The term “mentor” goes back to Homer’s epic from Greek mythology. Mentor was a friend of Odysseus and, during his absence, was responsible for guiding and supporting Odysseus’ son Telemachus. He was like an uncle to Telemachus, an older person with life experience and wisdom. In this role, he encouraged and supported his protégé and taught him to take responsibility.

In the Lean world, the mentor aims to increase the competencies of his protégé, the **→ mentee**, and thereby raise problem-solving skills and the level of improvement in the organization as a whole.

Unlike a coach, the mentor has expert knowledge, which he passes on to the mentee after the mentee has carried out his (learning) experiment.

MILK RUN

GERMAN: MILKRUN

M

The term milk run comes from the US, where the traditional milkman only left a bottle of milk at the door if he could take an empty bottle with him. This ensured that there was never too much milk in the house that could go bad.

In the Lean world, milk run refers to a specific logistics concept. The trick is to increase delivery frequency without increasing freight costs. Instead of each supplier making individual trips to the customer in a star pattern, deliveries are made on a closed loop that connects several suppliers with the customer.



German

Milkrun

MINIMARKET PRINCIPLE

GERMAN: MINIMARKT-PRINZIP

A minimarket is a small storage area from which the employee takes his parts, often directly at his work station.

The minimarket is supplied from the **→ supermarket**

.

M

German

Minimarkt-Prinzip

See also

→ Supermarket

TEAMTHINK

MIZUSUMASHI

JAPANESE FOR "WHIRLIGIG BEETLE"

M

The mizusumashi is the employee responsible for supplying material to the lines.

M

German

Mizusumashi

MODEL MIX

GERMAN: MODELLMIX

A defined sequence that ensures even balancing of the (assembly) line.

M

German

Modellmix

TEAMTHINK

MTM

METHODS-TIME MEASUREMENT

MTM is a method for analyzing work sequences and determining planned and standard times. With MTM, every movement performed by a person is broken down into specific basic motions whose required time is known. The standard time for an entire work process is determined from these individual time elements.



German

MTM

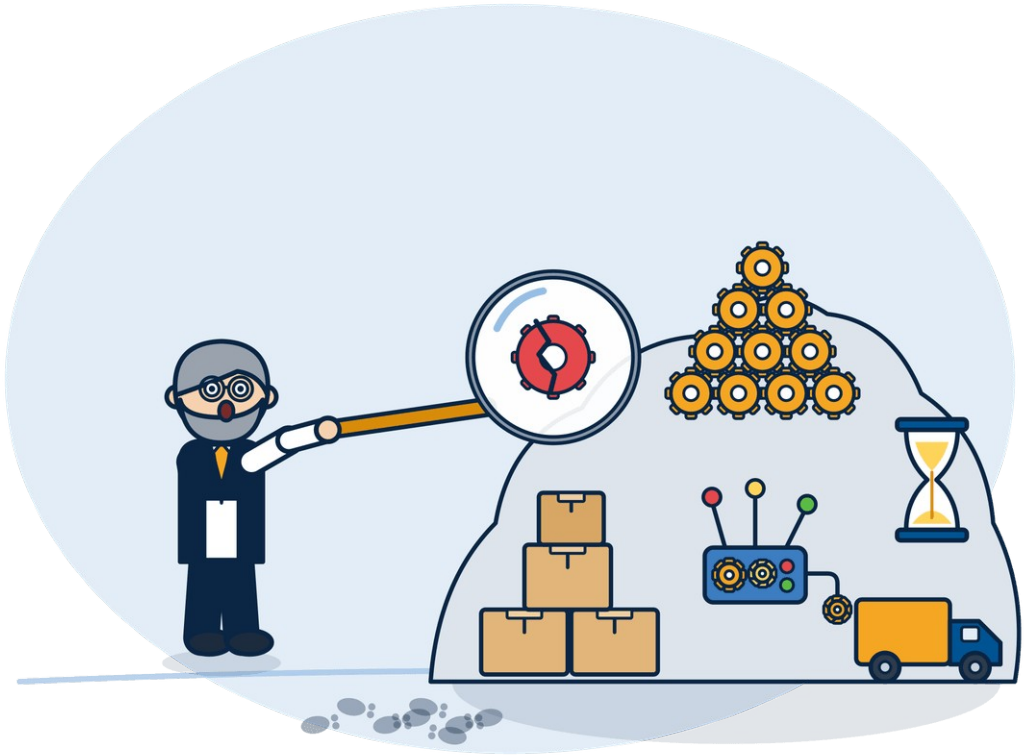
MUDA

JAPANESE FOR "WASTE"

M

All processes in product creation that do not add value to the product. By definition, there are 7 types of waste:

- **→ overproduction**,
- **→ inventory**,
- defects (scrap),
- overprocessing,
- transportation,
- motion
- and waiting.



→ Overproduction → Inventory

MURA

JAPANESE FOR “UNEVENNESS”

Lack of consistency in process quality, cost, and delivery dates.

see also **→ waste** (**→ muda**)

M

German

Mura

See also

→ Waste

→ Muda

MURI

JAPANESE FOR "EXCESS" AND "OVERBURDEN"

Muri is the overburdening of resources of any kind; it causes wear and breakdowns.



German

Muri

O – R

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ONE-PIECE FLOW
ONE-POINT LESSON
OPERATOR CYCLE TIME
ORDERLINESS AND CLEANLINESS
OTED
OVERPRODUCTION
PACEMAKER
PARETO CART
PARETO PRINCIPLE
PDCA CYCLE
POINT KAIZEN
POKA YOKE
PPM
PROCESS CHAIN
PRODUCT / MACHINE MATRIX
PRODUCTION DIARY
PRODUCTION SMOOTHING
PROJECT MANAGEMENT
PULL PRINCIPLE
PUSH PRINCIPLE
RAW MATERIAL
REGULAR COMMUNICATION

ONE-PIECE FLOW

Reduction of **→ throughput time** through flow-optimized production. In a process chain designed for one-piece flow (flow-optimized production), parts are passed from machine to machine without intermediate storage.

Throughput time is minimal when only one part at a time is passed on. This is only possible in tightly linked work systems.

Converting work systems to one-piece flow requires disruption-free processes and is therefore only possible with high availability of existing capacity.



→ Throughput Time

ONE-POINT LESSON

A one-point lesson is a work instruction presented briefly and precisely on a single page.



German

One-Point-Lesson

OPERATOR CYCLE TIME

GERMAN: MITARBEITERZYKLUSZEIT

Operator cycle time is the time it takes a person to perform a given work sequence, including the time for loading and unloading parts, excluding waiting times.



German

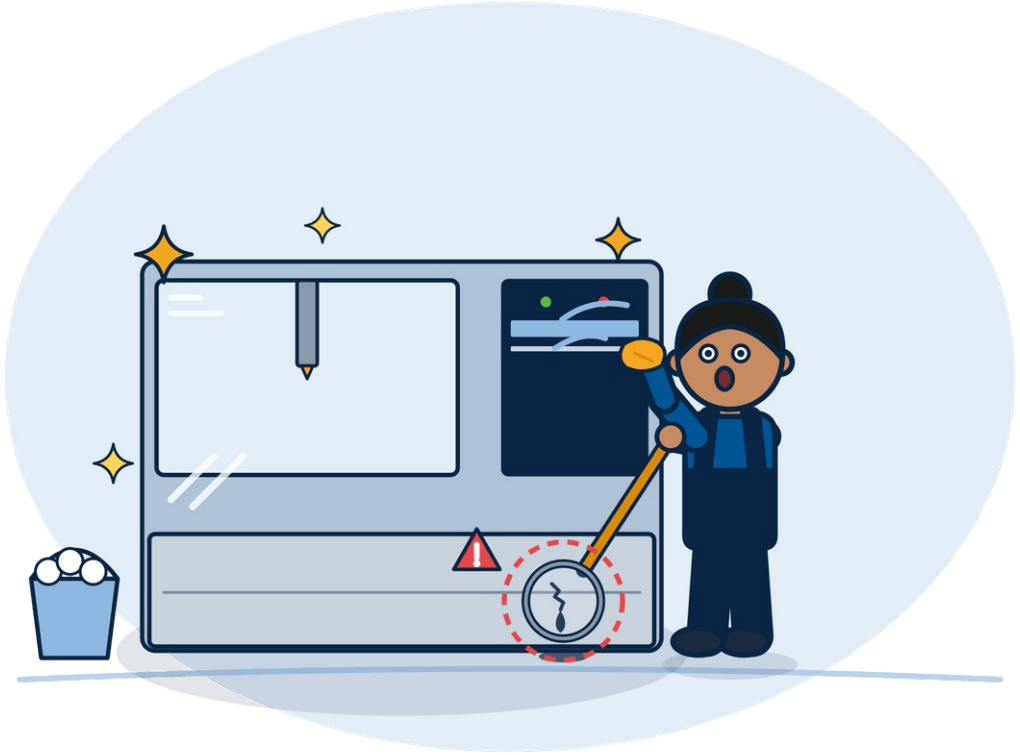
Mitarbeiterzykluszeit

ORDERLINESS AND CLEANLINESS

GERMAN: O & S – ORDNUNG UND SAUBERKEIT

Clean and orderly workplaces reduce **→ waste** caused by searching (motion) and enable **→ visual management**. Deviations from standards can thus be detected and eliminated more easily.

Poor orderliness and, above all, poor cleanliness are also causes of faulty processes. The **→ 5S method** is used to improve orderliness and cleanliness.



→ Waste → Visual Management → 5S Method

OTED

ONE-TOUCH EXCHANGE OF DIE

The setup process is improved to the point where it can be carried out in a single step (one touch).



German

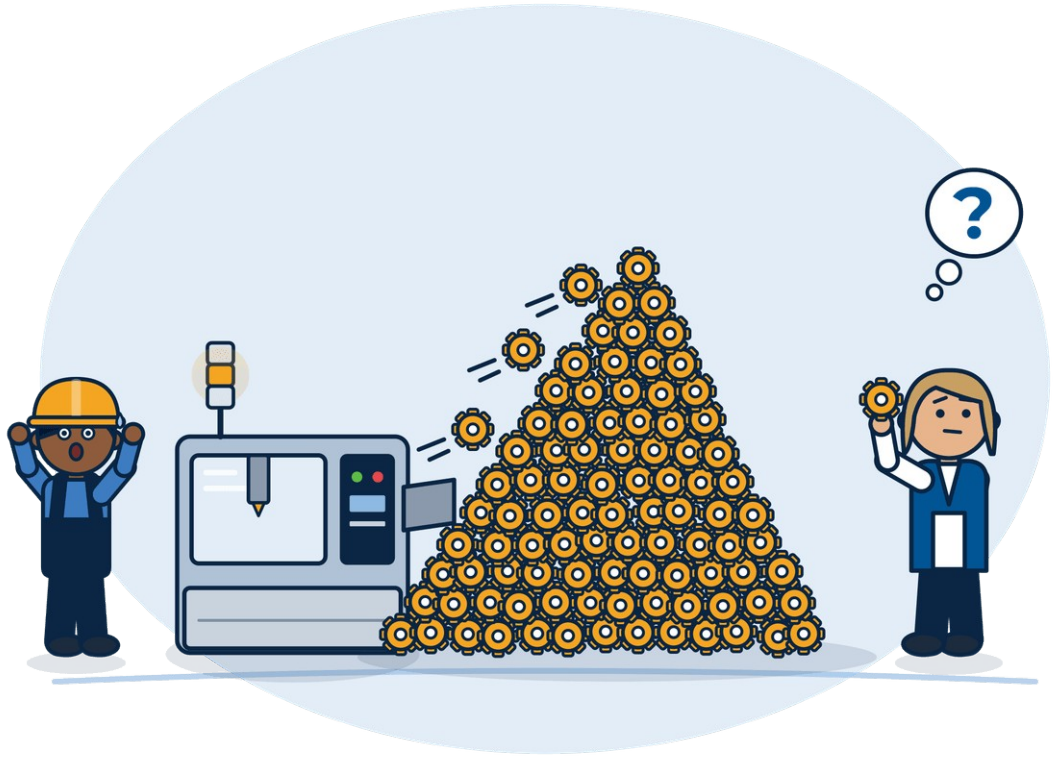
OTED

OVERPRODUCTION

GERMAN: ÜBERPRODUKTION

Overproduction is the worst of the seven types of waste: it shows up as unnecessary in-house manufactured parts and causes all other types of waste.

For purchased parts and raw materials, the lean world uses the term **→ inventory**.



→ Inventory

TEAMTHINK

PACEMAKER

GERMAN: SCHRITTMACHER

P

The process within a value stream whose **→ cycle time** is closest to the **→ takt time** sets the pace for the entire process chain.

P

German

Schrittmacher

See also

→ Cycle Time

→ Takt Time

PARETO CART

GERMAN: PARETO-WAGEN

P

The Pareto cart helps identify defect characteristics on the product. Scrapped products are sorted and collected on a cart to visualize the most frequent defects.

see also **→ Pareto principle**

P

German

Pareto-Wagen

See also

→ Pareto Principle

PARETO PRINCIPLE

GERMAN: PARETO-PRINZIP

P

The Pareto principle, named after Vilfredo Pareto (1848–1923), states that most of the effects of a problem (80%) can often be traced back to a small number of causes (20%).

P

German

Pareto-Prinzip

PDCA CYCLE

PLAN – DO – CHECK – ACT · GERMAN: PDCA-ZYKLUS

P

The PDCA cycle was first proposed by Walter Shewhart and later developed further by William Edwards Deming. It consists of four phases:

- **Plan** – planning phase
- **Do** – implementation phase
- **Check** – effectiveness review
- **Act** – standardization

The PDCA cycle is usually run through repeatedly in the spirit of continuous improvement.

P

German

PDCA-Zyklus

POINT KAIZEN

P

Point kaizen is an improvement limited to a specific workstation (i.e., at one point).

P

German

Point Kaizen

POKA YOKE

JAPANESE FOR "MISTAKE-PROOFING"

P

Poka yoke serves to prevent inadvertent errors. It involves introducing simple, error-preventing mechanisms to consistently prevent incorrect assembly, mix-ups, or passing on defective parts. Since stable, high-quality processes begin long before the production phase, quality can be safeguarded preventively through simple poka yoke measures as early as the design and planning phase.

Poka yoke is used to prevent:

- skipped / forgotten work steps,
- processing / operating errors,
- wrong / missing parts, and
- setup / adjustment errors.

P

German

Poka Yoke

PPM

PARTS PER MILLION

P

The defect rate states that out of one million parts produced, no more than a predefined number may be defective.

Failure rates are expressed in PPM especially in the automotive industry. Car manufacturers require low PPM rates from suppliers (e.g., for the electronics in installed control units).

P

German

PPM

TEAMTHINK

PROCESS CHAIN

GERMAN: PROZESSKETTE

P

The process steps are arranged directly in flow, in a “chain.” Material can necessarily only be passed on to the next work step.

P

German

Prozesskette

PRODUCT / MACHINE MATRIX

GERMAN: PRODUKT- / MASCHINEN-MATRIX

P

The product / machine matrix shows which part families are produced on which machines. The matrix is the basis for forming flow lines / process chains.

P

German

Produkt- / Maschinen-Matrix

PRODUCTION DIARY

GERMAN: PRODUKTIONSTAGEBUCH

P

The production diary is a fixed weekly schedule for the management team, including support functions, and is posted on the **→ shop floor management** board.

It governs the daily shop floor meetings and the topics to be covered, and structures the managers' daily activities. These include supporting problem solving and process confirmation.

It also defines who attends which meeting, when, and where. Additional meetings must fit into the time structure of the production diary.

P

German

Produktionstagebuch

See also

→ SFM

PRODUCTION SMOOTHING

GERMAN: GLÄTTUNG DER PRODUKTION

P

Production smoothing is a part of **→ Heijunka**.

The prerequisite for smoothing is an even loading of demand into production (leveling). In smoothing, the leveled quantities are further broken down into the smallest possible equal production lots.

Sequencing the lots of all items produced on a resource creates a production pattern. This pattern defines the constant, recurring production sequence. Smoothing is a prerequisite for synchronized production.

P

German

Glättung der Produktion

See also

→ Heijunka

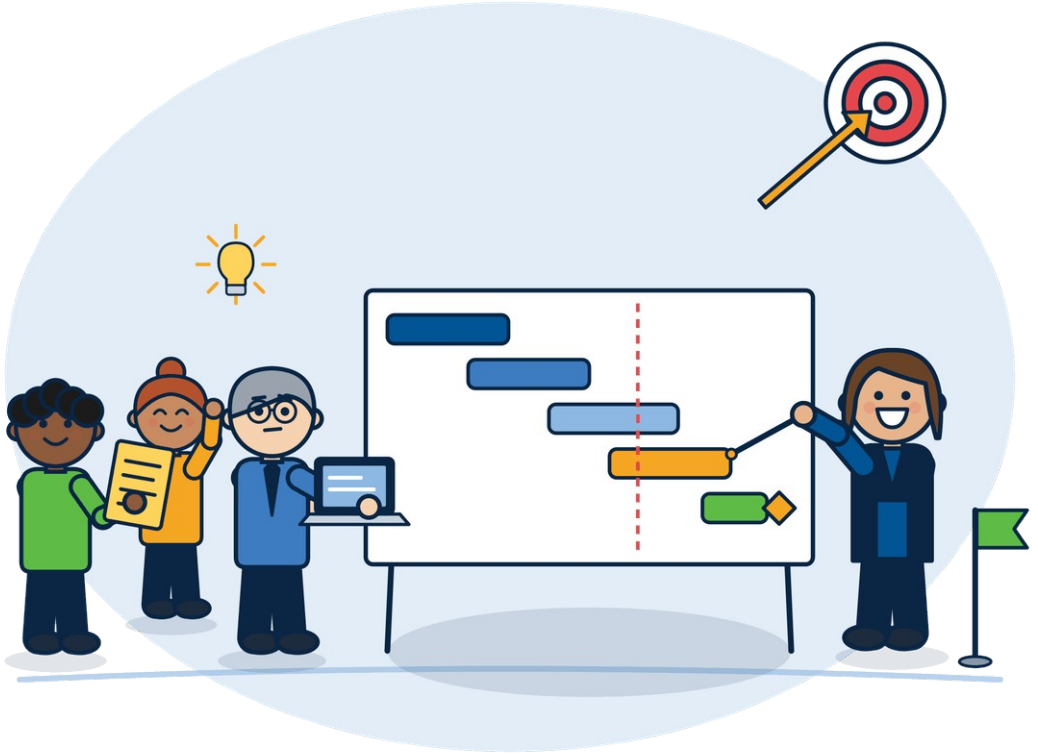
PROJECT MANAGEMENT

GERMAN: PROJEKTMANAGEMENT

P

Project management is a method for working through complex tasks / projects in a structured way, using a clear organizational structure with defined tasks, authorities, and responsibilities, and a process organization with defined tools, methods, and aids.

The goal of project management is to manage the “big” changes in a company in a transparent way. Projects are undertakings with a defined objective and limited time, budget, and staff. They are clearly separated from other undertakings and have a project-specific organization.



PULL PRINCIPLE

GERMAN: PULL-PRINZIP

P

The pull principle (also called “pull production”) is one of the four building blocks of lean production. The downstream process or customer demand determines which item is to be produced or delivered, in what quantity, and when.

Min / max inventory limits are defined between customers and suppliers. This limits the level of **→ overproduction**.

P

German

Pull-Prinzip

See also

→ Overproduction

PUSH PRINCIPLE

GERMAN: PUSH-PRINZIP

P

“Push production”: the upstream process or a forecast determines what quantity is to be produced or delivered, and when.

This creates **→ overproduction** between work steps; the **→ throughput time** increases and is usually unpredictable.

P

German

Push-Prinzip

See also

→ Overproduction

→ Throughput Time

RAW MATERIAL

GERMAN: ROHSTOFF

R

Raw materials are substances in an unprocessed state that are incorporated into finished products as components.

R

German

Rohstoff

REGULAR COMMUNICATION

GERMAN: REGELKOMMUNIKATION

R

Regular communication refers to the routine, efficient, and effective way of passing on information. For processes in a company to run efficiently, all relevant information must be in the right place at the right time and in the required quality.

One tool for this is standardized regular communication. It can take place, for example, between managers and employees, between project teams, or between employees who work together across value streams.

The participants meet at regular, short intervals for a goal-oriented, situation-specific exchange of information. This standardized communication flow creates clear reporting lines, ensures the flow of information, and frees up time, e.g., through a significantly reduced number of emails.



S

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SENSEI

JAPANESE FOR "MASTER" OR "TEACHER"

S

A sensei is an expert in lean production who passes on his or her knowledge as a **→ mentor**.

S

German

Sensei

See also

→ Mentor

SEQUENCE STABILITY

GERMAN: REIHENFOLGESTABILITÄT

S

This KPI compares the planned sequence (of the products to be manufactured / assembled) with the actual sequence. The better the sequence stability, the more even the production and the more transparent and manageable the production control (**→ just-in-sequence**).

S

German

Reihenfolgestabilität

See also

→ JIS

SETUP TIME REDUCTION

GERMAN: RÜSTZEITREDUZIERUNG

S

To reduce setup time, the setup process is observed and analyzed (e.g., using the **→ ECRS method**), **→ waste** is reduced, and the resulting concept is tested and standardized. The defined process standard is the basis for training the employees who perform the setup.

The goal of setup time reduction is to reduce **→ overproduction**. This is achieved by producing small batches. To produce these batches without major time losses, setup times must be kept as short as possible.



→ ECRS Method | → Waste | → Overproduction

SFM | SHOP FLOOR MANAGEMENT

S

SFM stands for improved management on the way to a learning organization and applies to all areas of a company. It achieves more because it offers methods aimed at optimizing the interaction between

- a) managers and
- b) managers and employees.

Managers are supported in improving their leadership skills, and employees in the problem-solving and improvement process. The conversation on site, i.e., where the problem occurred, is characterized by an exchange of open questions from the manager and answers from the employee, each revealing leadership and problem-solving competence.

The manager's tasks in shop floor management are clearly defined and require specific behaviors. Managers are supported by the use of specific tools.

The manager performs the five leadership tasks of shop floor management on site:

1. **Conduct regular communication**
2. **Confirm processes**
3. **Enable employees**
4. **Drive continuous improvement of processes**
5. **Solve problems in a structured way**

In SFM, the manager keeps it brief, makes only binding commitments, gives and seeks feedback, gets a first-hand picture of the situation, allows mistakes in learning situations, refrains from assigning blame, and uses questioning techniques.

SFM tools support the manager's effectiveness: e.g., the production log, KPI charts, the problem-solving sheet, and the T-card board.

SINK

GERMAN: SENKE

S

The point where materials are used is called the sink. The point of origin / place of manufacture is called the **→ source**.

S

German

Senke

See also

→ Source

SIPOC

SUPPLIER – INPUT – PROCESS – OUTPUT – CUSTOMER

S

Supplier – **I**nputs – **P**rocess – **O**utputs – **C**ustomer

SIPOC is a **→ Six Sigma** tool for capturing an overall process at the start of an improvement activity or project. SIPOC can be used to clearly delimit processes within process chains. A SIPOC diagram visualizes a snapshot of a process.



German

SIPOC

See also

→ Six Sigma

SIX SIGMA (1/2)

S

Six Sigma (6 σ) is a management system for process improvement, a statistical quality goal, and a quality management method at the same time. Its core element is describing, measuring, analyzing, improving, and controlling business processes using statistical tools.

As a rule, every quality characteristic shows undesired variation in process results. In a process capability study, such deviations from the ideal state are related to the tolerance range of the characteristic concerned.

The standard deviation of the characteristic (symbol: σ; pronounced “sigma”) plays a key role. It measures the spread of the characteristic, i.e., how much its values differ from one another. The larger the standard deviation relative to the width of the tolerance range, the more likely the tolerance limits will be exceeded. Likewise:

The farther the mean moves from the center of the tolerance range (the closer it gets to one of the tolerance limits), the greater the proportion out of tolerance.

SIX SIGMA (2/2)

S

It therefore makes sense to measure the distance between the mean and the nearest tolerance limit in standard deviations. This limit should never be exceeded.

This distance divided by 3 σ is the process capability index Cpk; Cpk = 1 when the mean is 3 σ away from the nearest tolerance limit.

The name “Six Sigma” comes from the Six Sigma requirement that the nearest tolerance limit be at least six standard deviations (6 σ, “six sigma”) away from the mean. If this requirement is met, practically “zero-defect production” can be assumed, and the tolerance limits are almost never exceeded.

SMED

SINGLE-MINUTE EXCHANGE OF DIE

S

SMED means changing dies in the single-digit minute range and refers to a set of techniques developed by Shigeo Shingo for changing over production machines in less than 10 minutes (**→ setup time reduction**).

S

German

SMED

See also

→ Setup Time Reduction

SOURCE

GERMAN: QUELLE

S

The place where materials originate or are manufactured is called the source. The place of consumption is called the **→ sink**.

S

German

Quelle

See also

→ Sink

STANDARD LAYOUT

GERMAN: STANDARDLAYOUT

S

The standard layout is a drawing of a workstation or work cell showing the sequence and paths in which the work standard is to be performed.

S

German

Standardlayout

STANDARD WORK

GERMAN: STANDARDARBEIT

S

Standard work is the defined sequence of work steps that an employee performs within the **→ cycle time**.

S

German

Standardarbeit

See also

→ Cycle Time

STANDARD WORK COMBINATION SHEET

GERMAN: STANDARDARBEITSKOMBINATIONSBLATT

S

The standard work combination sheet is a document showing the sequence of production steps for one or more employees. It is used to show the optimal combination of manual and machine work.

S

German

Standardarbeitskombinationsblatt

TEAMTHINK

STANDARDIZATION

GERMAN: STANDARDISIERUNG

S

Standardization is the method that leads to standardized work, standard work, and standards. Standardization ensures that the optimal work result is achieved continuously, with consistent quality and efficient use of resources, regardless of who performs the work.

Standards describe the defined sequence of processes and operations.

Standards must be made visual, so that errors and problems can be detected early as deviations from the standard.

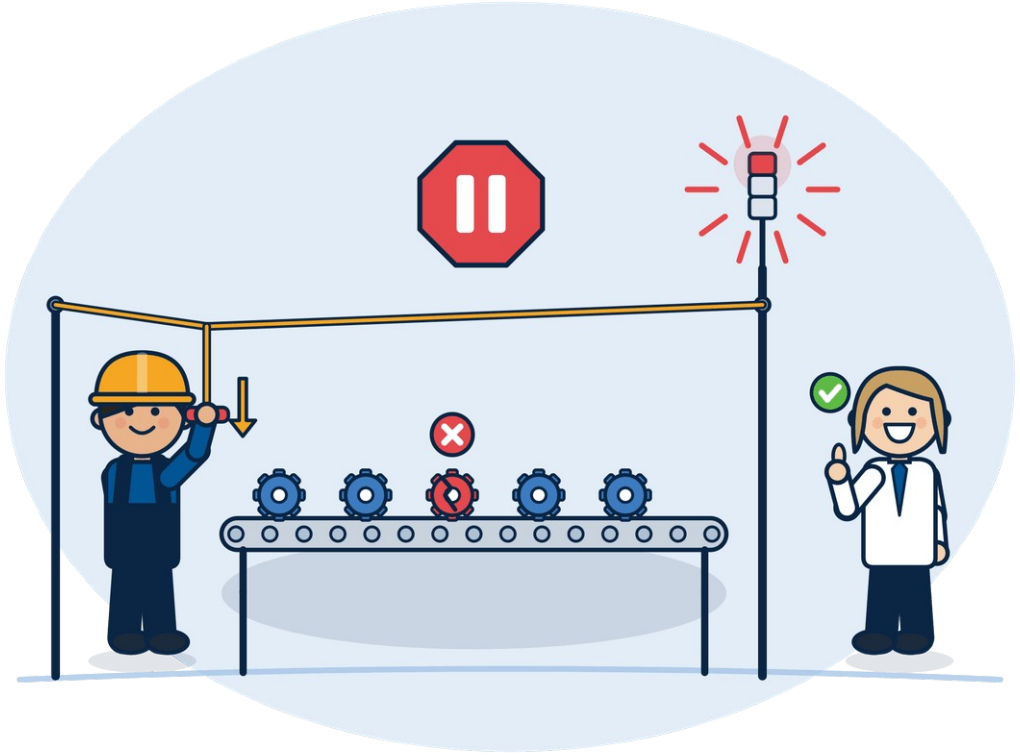
From this, corrective actions are derived, for example, or a problem-solving process is started. Standards make it faster and easier to train new employees.

STOP-THE-LINE AUTHORITY

GERMAN: MASCHINENSTOPP-BERECHTIGUNG

S

Employees are called on to interrupt the process in the event of a disruption and to pull the **→ andon**; this prevents defective workpieces from being passed on to downstream processes.



→ Andon

SUPERMARKET

GERMAN: SUPERMARKT

S

A supermarket is a tool for self-regulating production control.

In a supermarket, all goods are found in a defined location and arranged within easy reach; inventory is limited, and whatever is taken is replenished.



SURGEON–NURSE PRINCIPLE

GERMAN: CHIRURG-KRANKENSCHWESTER-PRINZIP

S

The value-adding worker (surgeon) is supplied by the logistics worker (nurse) with the required materials and tools so that the main work is not interrupted by secondary tasks.

S

German

Chirurg-Krankenschwester-Prinzip

SWIM LANE DIAGRAM

GERMAN: WERTSCHÖPFUNGSKETTENDIAGRAMM

S

The swim lane diagram is a method for depicting an organization's business processes in business process analysis and modeling. Different areas of responsibility are shown one below the other, each in its own horizontal lane ("swim lane"), so that handoffs and interfaces become visible.

S

German

Wertschöpfungskettendiagramm

T – Z

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TAKT TIME

GERMAN: KUNDENTAKT

T

Takt time is the basis for an even production rhythm. The cycle times of all production steps in manufacturing are aligned with takt time.

Takt time is calculated by dividing the available net working time by customer demand in that period. Customer demand is the number of end products required by the customer per unit of time.

T

German

Kundentakt

TAKTZEIT (GERMAN TERM)

T

The German word „Taktzeit“ is easily misunderstood and is best avoided in German.

→ Takt time (German „Kundentakt“) and **→ cycle time** (German „Zykluszeit“) illustrate the time available and the time required.

In German, „Taktzeit“ is often used to mean cycle time. In English, however, “takt time” means the customer takt („Kundentakt“).

T

German

Taktzeit

See also

→ Takt Time

→ Cycle Time

TARGET AGREEMENT

GERMAN: ZIELVEREINBARUNG

T

A target agreement is a management method in which a manager and his or her employees agree on achieving the organization's goals. A target agreement has two elements: the goal and the measures to achieve it, i.e., it consists of quantitative targets and action plans.



THROUGHPUT TIME

GERMAN: DURCHLAUFZEIT (DLZ)

T

In Lean philosophy, throughput time is the most important metric. It is proportional to the level of **→ overproduction** and **→ inventory** in the value stream.

It is the time a part needs to pass through either the entire process chain (from the first machine to final assembly) or individual, clearly defined sections of it.

"Lead time" refers to the throughput time of the order fulfillment process, including all procurement and distribution processes.

Calculating throughput time in …

- **series production:** processing times + transport times + waiting times
- **one-off production:** time from order receipt to commissioning

TOYOTA PRODUCTION SYSTEM (TPS)

GERMAN: TOYOTA-PRODUKTIONSSYSTEM (TPS)

T

TPS is regarded as the “source code” of lean management. In the middle of the last century, Taiichi Ohno and others recognized how to build efficient production with scarce resources.

The goal of TPS is to avoid **→ waste**, reduce lead times, and develop employees’ problem-solving and improvement skills.

T

German

Toyota-Produktionssystem (TPS)

See also

→ Waste

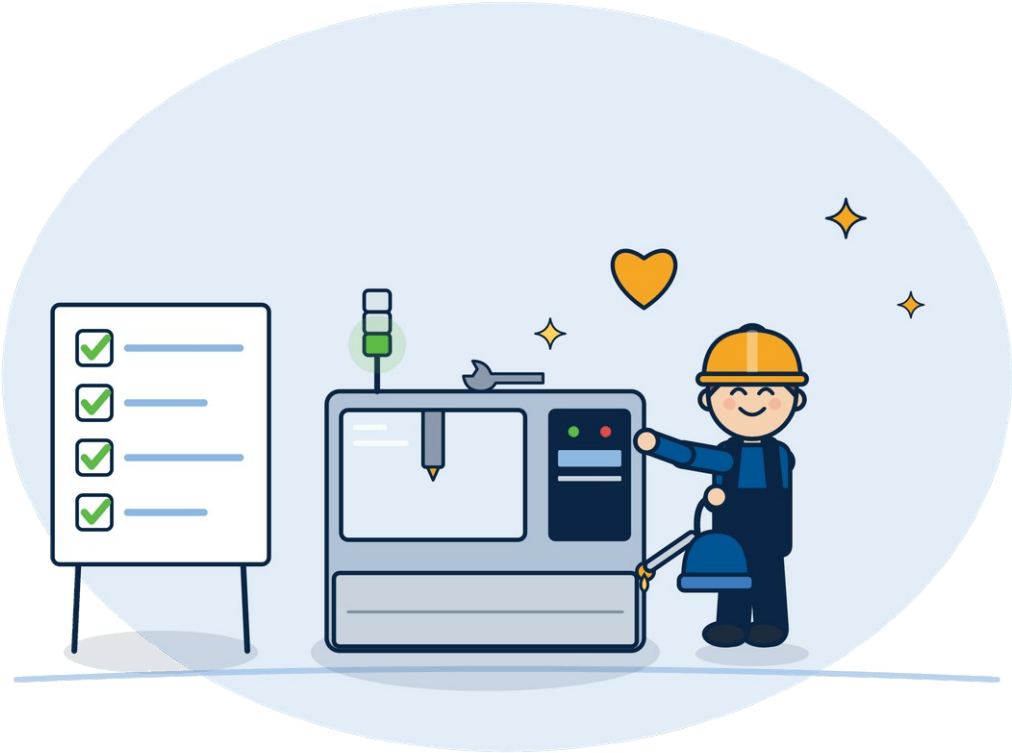
TPM

TOTAL PRODUCTIVE MAINTENANCE

T

TPM is a standardized method for maintaining trouble-free production. TPM pursues the following goals:

- increase equipment availability by reducing breakdowns,
- reduce breakdown repairs and the associated “firefighting” to a minimum,
- identify and eliminate weak points in equipment and tools,
- increase employees’ identification with equipment and tools and involve them in maintenance and repair activities,
- increase equipment productivity,
- reduce total maintenance costs through regular, standardized maintenance and inspection.



TRANSITION TIME

GERMAN: ÜBERGANGSZEIT

T

Transition time is the time a material needs to move from one operation to the next. It consists of waiting and transport times.

Waiting time is the time a material sits in one place, e.g., a warehouse.

T

German

Übergangszeit

TEAMTHINK

TRUE NORTH

GERMAN: NORDSTERN

T

In the Lean world, True North stands for the ideal state: waste-free processes.

The German term “Nordstern” refers to the North Star, or Polaris. It lies about 0.7° from the north celestial pole and is visible year-round in the Northern Hemisphere. Because it is so close to the pole, it has long been used for orientation and navigation: it can be used to check a compass or to determine a ship’s course.

To an observer without a telescope, it appears to stay in the same place all year; its altitude above the horizon roughly equals the observer’s northern latitude.

The Lean world uses the term as a symbol of the ideal state that never changes, which, so to speak, always “stays in the same position.”

U-SHAPED LAYOUT

GERMAN: U-LAYOUT

U

“U-shaped layout” refers to an arrangement of machines and workstations in **→ one-piece flow** that forms the shape of a “U”.

The value-adding operator works inside the “U” and thus travels minimal distances. Materials are supplied from the outside without disruption.



German

U-Layout

See also

→ One-piece Flow

VALUE CREATION

GERMAN: WERTSCHÖPFUNG

V

In contrast to **→ waste**, value creation refers to all activities that add “value” to the product from the customer’s perspective.

V

German

Wertschöpfung

See also

→ Waste

VALUE STREAM ANALYSIS / DESIGN

GERMAN: WERTSTROMANALYSE / -DESIGN

Value stream analysis / design is a method for mapping and designing value streams.

Material flow and information flow are shown on a single sheet using standardized symbols.

The most important KPIs derived from value stream analysis are **→ throughput time** and the degree of leanness (Lean Index).

In value stream design, the target state is modeled as the future-state value stream, and implementation projects are derived from it.

V

German

Wertstromanalyse / -design

See also

→ Throughput Time

VISUAL MANAGEMENT

GERMAN: VISUELLES MANAGEMENT

V

The concept of “visual management” comprises all principles, tools, and standards that make it possible to visualize information so that it is clear, simple, and understandable for employees and managers. Deviations should immediately “catch the eye.”

Good visual management directly triggers corrective actions (e.g., **→ PDCA cycle**, **→ 5 Whys**) at shop floor level.

V

German

Visuelles Management

See also

→ PDCA Cycle

→ 5 Whys

WAITING TIME

GERMAN: LIEGEZEIT

Waiting time is the time a material sits in storage waiting to be used in the process.



German

Liegezeit

WASTE

GERMAN: VERSCHWENDUNG

W

In contrast to “value creation,” waste refers to all activities that add no “value” to the product from the customer’s perspective.

Taiichi Ohno divided waste into obvious and hidden waste. Obvious waste should be eliminated; hidden waste can only be minimized. Taiichi Ohno distinguished seven types of waste:

1. **Overproduction** (producing more parts than currently required)
2. **Inventory** (of raw materials and purchased parts)
3. **Scrap**
4. **Overprocessing** (unsuitable processes, e.g., oversized processes, poor ergonomics)
5. **Transport** of material
6. **Motion** of employees in the workflow
7. **Waiting** times for employees

The ranking matters: **→ overproduction** is the worst type of waste and causes the others.

WORK IN PROCESS (WIP)

GERMAN: WARE IN ARBEIT

This KPI states the number of products in the process chain.

see also **→ overproduction**

W

German

Ware in Arbeit

See also

→ Overproduction

WORK IN PROGRESS (WIP)

GERMAN: WARE (UNFERTIG)

Work in progress is the KPI that represents the value of the material in the process chain.



German

Ware (unfertig)

YOKOTEN

JAPANESE FOR "HORIZONTAL DEPLOYMENT"

Y

Yokoten refers to methods for documenting and spreading knowledge about what works and what doesn't. Yokoten is thus a form of knowledge management.

However, resulting best-practice measures are only required for other applications if the transfer makes sense (adds value), i.e., if the same risk exists in another case / area and it is useful to adopt the measures preventively.

Not: "blindly imposing" solutions / measures.

see also **→ Muda**, **→ overproduction**

Y

German

Yokoten

See also

→ Muda → Overproduction

ZERO DEFECTS PRINCIPLE

GERMAN: NULL-FEHLER-PRINZIP

Z

The zero defects principle is a basic principle of Lean management. It is based on three basic rules:

1. **Do not accept defective parts.**
2. **Do not make defects.**
3. **Do not pass on defective parts.**

The zero defects principle promotes robust processes and is thus a foundation for three further Lean characteristics: flow, rhythm, and pull.

Z

German

Null-Fehler-Prinzip

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