

w4.1- Purpose of Lean

w4.1- Purpose of Lean.mp4

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Purpose of Lean

- Better serve customers
 - Reduce Cycle Time
 - Eliminate Waste

In the previous module,
we defined cycle time as the time

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Removing Wastes

- 8 Wastes
 - Transportation
 - Inventory
 - Motion (operations)
 - Waiting
 - Over production
 - **Over processing(including rework)**
 - Defects / Quality
 - Skills / People (unused creativity and skill)

There are eight major categories of waste.



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Lean Principles

- Involve everyone
 - Organizational knowledge
 - Technical expertise
 - **Process expertise**
 - Commitment to new process

Involve everyone is sort of an unwritten principle in lean.



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Waste Elimination

Effect on Cycle time

Category	Percentage
Non-Value Added	95%
Value added	5%

a manufacturing facility is due to non-value added activity.

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Removing Wastes

- Process Analysis
 - Start with the process map and analyze each step
 - Does the customer care if we do this?
 - Will the process fail if we don't do this?



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Removing Wastes

- Does the customer care if we do this?
- Will the process fail if we don't do this?

There may be legal, regulatory or



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Removing Wastes

- What is non-value added?
 - Look for:
 - Redundant steps
 - Multiple approvals
 - Unnecessary inspections
 - 8 wastes

redundant steps like multiple approvals and unnecessary inspections.

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Culture

– Culture change

	Traditional	Lean
Structure	Functional silos	Product focused teams
Worker role	Do as you are told	Solve problems
Responsibilities	Individual	Team
Decision making	Ego Opinion Emotion	Facts
Interaction	Competition	Collaboration
Goals	Good enough	Best in Class

When we involve everyone
in our improvement efforts,

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Purpose of Lean

The **fundamental purpose of Lean** is to improve **organizational performance** by better serving customers. This is achieved by:

- Reducing and eliminating **waste**.
- Reducing **cycle time** (the time from the beginning to the end of a process, including delays).
- Reducing errors and responding more quickly to customer needs.



The Eight Major Categories of Waste

Waste is fundamentally defined as **anything that does not add value** to the product or service.

The eight wastes (**often remembered** by the acronym **DOWNTIME**, though the order in the transcript is different) are:

1. **Transportation:** Moving products or components further than necessary without changing them. (Example: Moving inventory to a warehouse and back.)
2. **Inventory:** Any inventory beyond what is necessary. It often hides underlying problems.
3. **Motion:** **Unnecessary movement of people.** (A focus of traditional industrial engineering.)
4. **Waiting:** People, machines, or, more importantly, **product waiting** to be processed. (Often a result of large batch size production.)
5. **Overproduction:** Producing more than is needed or running product for inventory when there are no orders.
6. **Over-processing:** Any additional processing beyond what is needed to meet customer requirements. (Includes rework or working to a standard higher than customers will pay for.)
7. **Defects:** Errors or mistakes that require rework. (The goal is "do it right the first time.")
8. **Unused Creativity/Skill of People:** The waste added by Americans; a result of not involving all employees.



Involving Everyone and Non-Value Added Time

- **Involving everyone** is an unwritten principle of Lean, directly eliminating the eighth waste.
- This involvement helps change organizational culture, taps into existing expertise, and builds **commitment and ownership** of changes.
- It is estimated that **95%** of the time a product is in a manufacturing facility is due to **non-value added activity**—only about 5% is actively changing inputs to outputs.



Determining Value-Added Steps

When analyzing a process map, ask two key questions to determine if a step is value-added:

1. **Does the customer care if we perform this step?** (Is it critical to quality? Is the customer willing to pay for it?)
2. **Will the process fail if we don't do this?**
 - If the customer doesn't care, the step is **non-value-added**.
 - Look for other non-value-added steps like **redundant approvals** and **unnecessary inspections** (often due to lack of trust between internal/external suppliers).

The ultimate goal of involving everyone is to change the mindset from trying to reach **compliance** to trying to **be the best**.

w4.2- Value Stream Mapping

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Four Steps

- Define and Pick the Product or Product Family
- Create the Current State Map
- Create a Future State Map
- Develop an action plan to make it happen.

There are four major steps in the process.

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Four Steps

- Define and Pick the Product or Product Family

You may select a product family that's your biggest seller or

The logo for Kennesaw State University, featuring a stylized yellow mountain range graphic above the text "KENNESAW STATE UNIVERSITY".

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Four Steps

Create the Current State Map

Process Leg Frame

Improvement Opportunity

Information Flow

Product Movement

Ground Transportation

External Source

Inventory

Time or Value Line

Process

Input

Output

i

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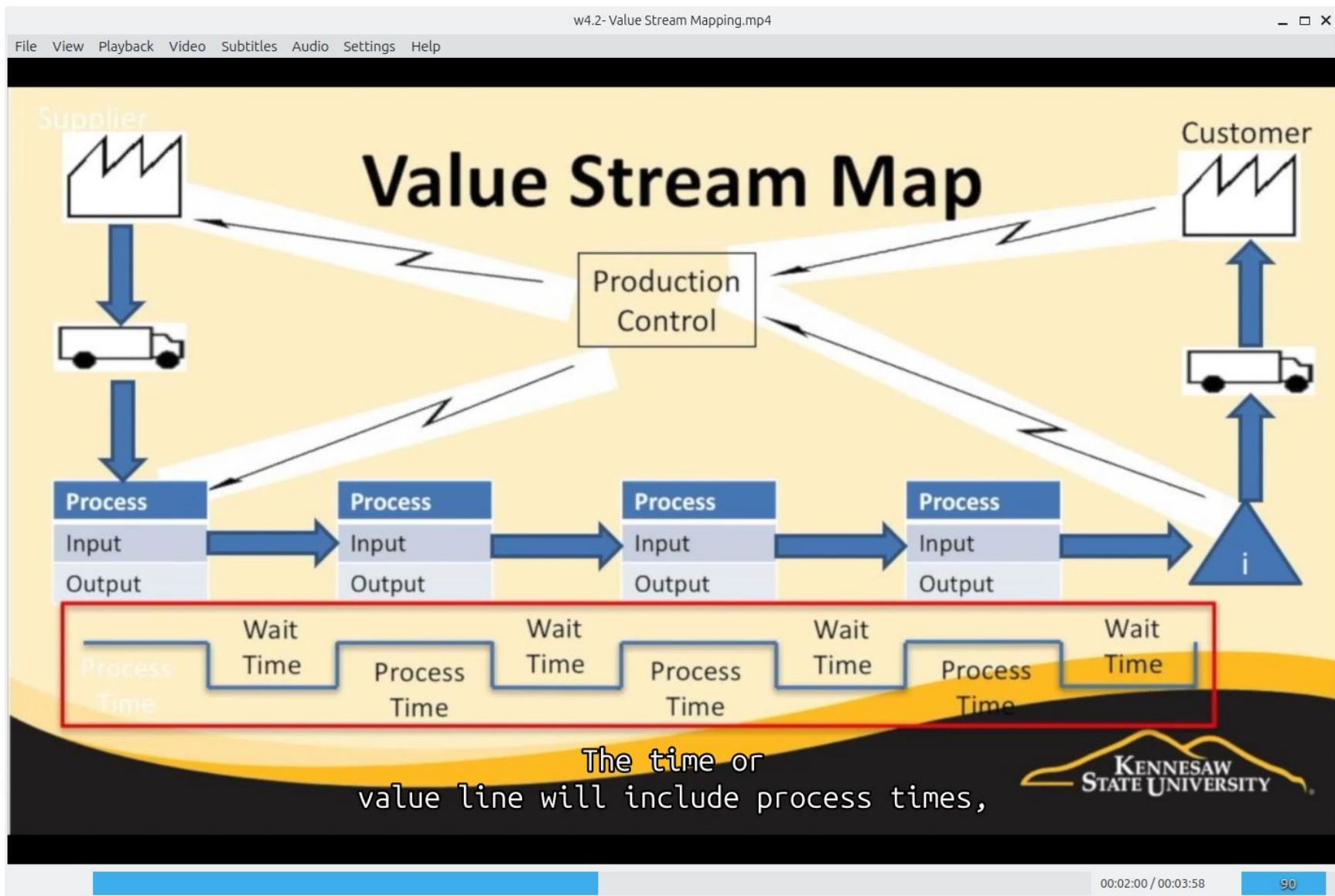
Value Stream Map

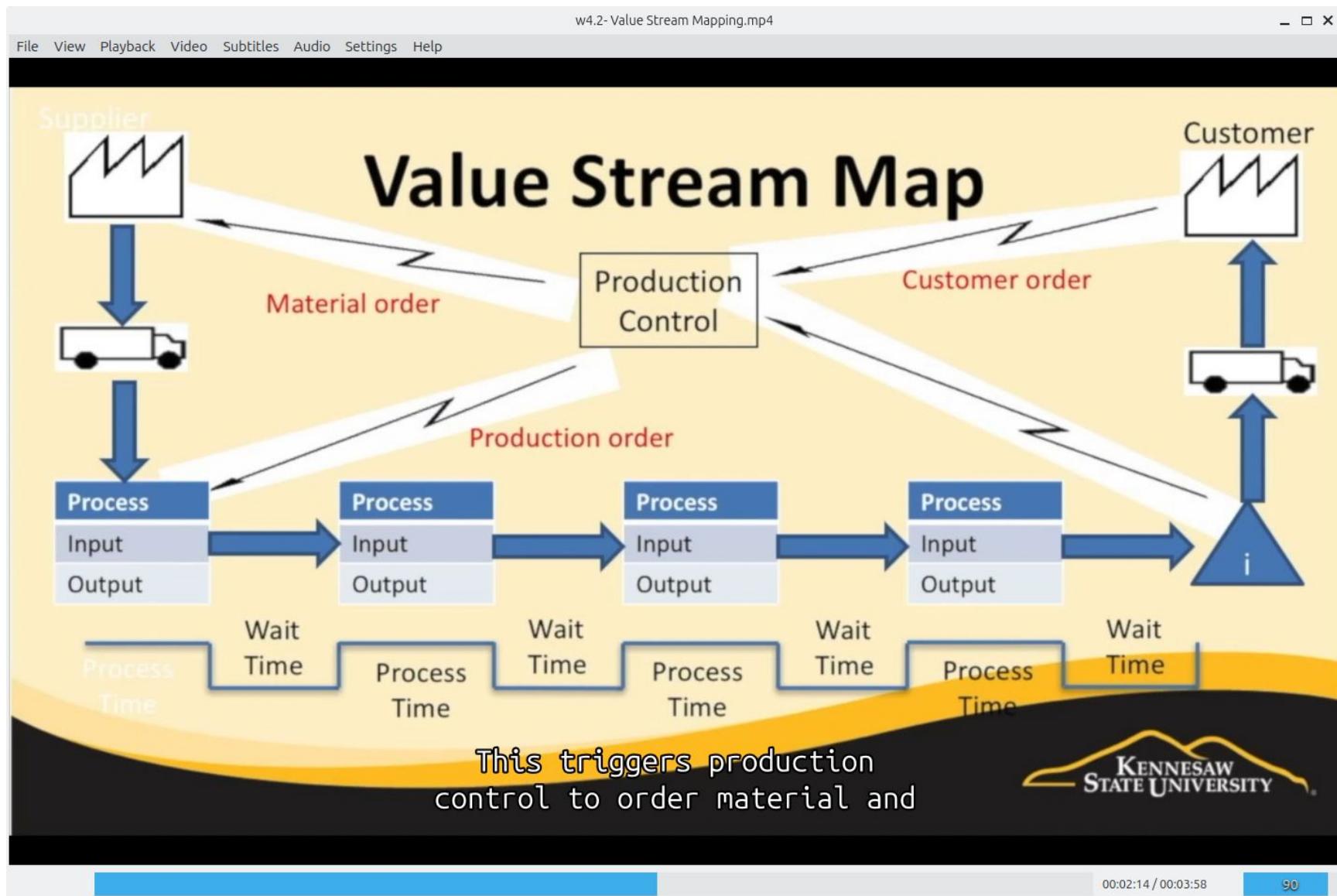
The diagram illustrates a Value Stream Map. At the top left is a factory icon labeled "Supplier". A blue arrow points down to a truck icon, which then points down to a blue box labeled "Process". This process box contains three sections: "Input" (light blue), "Process" (dark blue), and "Output" (light blue). A blue arrow points right from this process to the next in a sequence of four identical process boxes. Each process box has "Input" and "Output" sections. After the fourth process, a blue arrow points up to a blue triangle labeled "i". From the "i" triangle, a blue arrow points up to a truck icon, which then points up to a factory icon labeled "Customer". On the far left, there are five small blue L-shaped brackets. On the far right, the Kennesaw State University logo is displayed.

This is a very simple representation of what a value stream map might look like.

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Four Steps

- Create a Future State Map
 - Creativity
 - Improvement Opportunities
 - Flow
 - Cycle Time
 - Etc.



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Four Steps

- Develop an action plan to make it happen.

When the future state map has been completed,



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Four Steps

- Define and Pick the Product or Product Family
- Create the Current State Map
- Create a Future State Map
- Develop an action plan to make it happen.



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The Purpose of **Value Stream Mapping**

The main goal of VSM is to **identify all activities** involved in creating a product or service so that **improvement opportunities** can be identified.

The Four Major Steps in Value Stream Mapping

1. Identify a Product or Product Family:

- You won't map everything; you must select a specific product or **product family**.
- A **product family** is a group of products that **share common processing steps** and common equipment.
- Selection criteria might be your biggest seller, a product with chronic problems, or other strategic factors.

2. Create a Current State Map:

- This maps the process **as it is currently being done**.
- It includes the steps in the process, performance measures, inputs and outputs, and, critically, the **information flow** (e.g., customer order triggers production control, which orders material and issues production orders).
- The map uses various symbols, **and the time or value line** at the bottom includes process times, wait times, and other important value information.

3. Create a Future State Map:

- This is a map of **what you would like the process to be**, incorporating as many improvement ideas as possible.
- The team uses their skills and creativity to analyze the current state and simplify the process, focusing on eliminating **the eight wastes** (covered in the previous topic).

4. Develop an Action Plan:

- A detailed plan is created to implement the changes outlined in the future state map.
- The actual implementation of this plan can be complex and may **take months to accomplish**.

In essence, VSM is a strategic visual tool used to see both the **material flow** and **information flow** necessary to deliver a product, providing a roadmap for Lean transformation.

w4.3- 5S

w4.3- 5S.mp4

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5S

1 Sort

2 Set in order

3 Shine

4 Standardize

5 Sustain

5S is a method for organizing a workplace,

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w4.3- 5S.mp4

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Purpose of 5S

- Keep the workplace **neat and orderly**
- Improve working environment
- Increase Productivity
- Reduce cost
- Eliminate wasted time looking for things
- Improves Safety

5S is a method for organizing



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- 1) Sort (Seiri): Clearing the work area and discarding unnecessary items. Leads to less clutter and greater efficiency.
- 2) Set in Order (Seiton): Designating locations and orderly arranging. Tools and work should be arranged so that most often used items are most easily accessible.
- 3) Shine (Seiso) **Cleanliness and workplace appearance**. Maintaining cleanliness should be a part of the normal routine.
- 4) Standardize (Seiketsu): Everyone doing things the same way and knowing their responsibility.
- 5) Sustain (Shitsuke): Do not decline and lose improvements. Ingrain the Five S's into the culture.

Definition
including their
Japanese names: sort,

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w4.3- 5S.mp4

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5S Examples

items which aren't used every

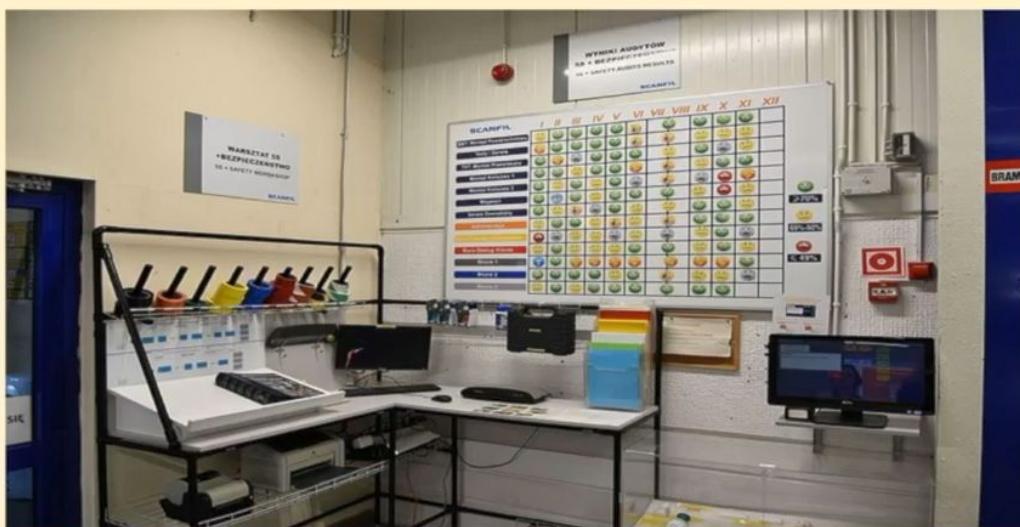
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5S Examples

This is an example of
a 5S office space.

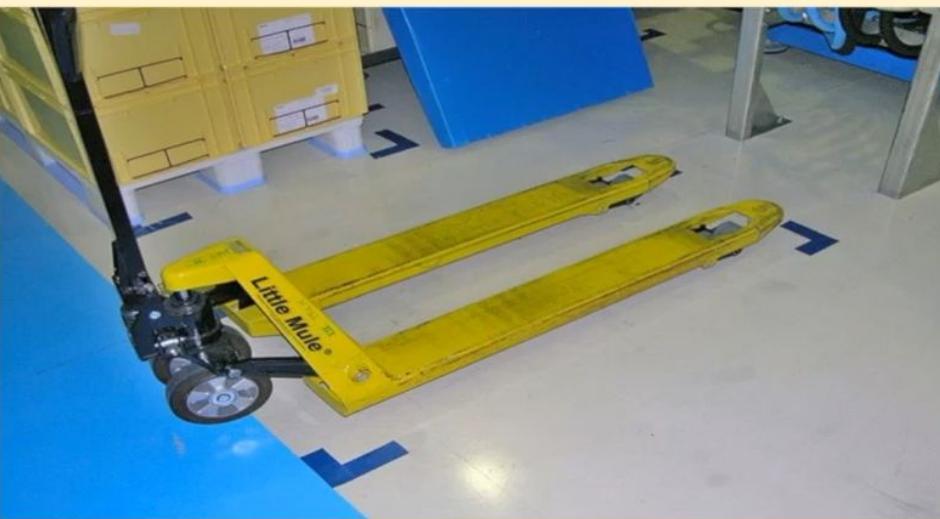


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5S Examples

Here, the pallet jack and

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5S Examples

Tool boards are a
good 5S example.



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5S Examples

This cleaning station is clearly labeled and color-coded.

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Benefits

- Reduced waste
- Improved efficiency
- Employee involvement

improved efficiency
and productivity



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★ What is 5S?

- 5S is a method for **organizing a workplace** (shop floor, office, etc.) and, crucially, **keeping it organized**.
- It is often implemented as a concentrated effort, sometimes called a **Kaizen event**.
- Some American companies **use 6S**, with the sixth 'S' being **Safety**.



Benefits of 5S

- Creates a **more pleasant** work environment.
- Increases **employee productivity** and **reduces cost** (by cutting down on time spent looking for things).
- Makes the workspace **safer**.
- It is an excellent way to **begin employee involvement**, giving workers ownership and control over their environment.

The 5s Steps

Japanese Name	English Name	Description	Key Practices
Seiri	Sort	Prioritize everything in the work area and remove unnecessary items.	Items used every day are prioritized and located visibly. Items not used are disposed of. Red Tagging is an approach where non-daily items are moved to a specific area, tagged, and disposed of if unused after a set period (e.g., six months).
Seiton	Set in Order	"A place for everything and everything in its place."	Locations are marked out and labeled so it is obvious where things belong and immediately obvious when they are missing. (Example: Marked spaces for brooms, trash cans, or tools on a board).
Seiso	Shine	Cleaning the area and equipment.	More critical in industrial settings. Keeping machinery clean helps in the early identification of problems (like oil leaks). Fresh paint is also beneficial.
Seiketsu	Standardize	Establish rules and best practices for the workspace.	Rules should be developed by the people using the workspace and must be documented. Everyone must follow the same rules.
Shitsuke	Sustain	The hardest step—maintaining the improvements long-term.	Requires a systematic approach, typically involving periodic audits of the workplace. It takes discipline to maintain the organization.

w4.4- Interview: Real World Value Stream Mapping

w4.4- Interview: Real World Value Stream Mapping.mp4

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Dale Suffridge
Kennesaw State University

By reducing and eliminating waste,
and reducing cycle time we can reduce

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w4.4- Interview: Real World Value Stream Mapping.mp4

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John Pak
Quality Manager, Shaw Industries, Inc.

Shaw

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What that is is a continuous improvement event where you'll gather all levels,

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Key Takeaways on VSM and Kaizen

1. VSM is Used in a Kaizen Event

- John's organization uses VSM during **an event called a Kaizen** (a continuous improvement event).
- The event gathers individuals from **all levels** of the organization: floor workers, experts, engineers, managers, and executives.

2. The Goal and Process of VSM

- The primary goal is to **address and reduce waste** in a process.
- The team maps out the **entire process from start to finish**, including:
 - The first process step to the last process step.
 - All the little details in between.
 - The **resources** involved in each process.
- The focus is on waste in the broader Lean sense—not just trash, **but waste of time, energy, and movements** that can be optimized.

3. The Importance of Employee Involvement

- It is **critical** to bring workers off the floor because they have years of experience and deep, practical understanding of the process (e.g., "I can avoid maneuvering around this person or whatnot").
- Using VSM **exposes** these small, hidden wastes.
- Involving employees gives them a sense of **importance and self-worth** because they realize their small ideas (e.g., eliminating two steps) can save the company significant minutes/dollars.
- It's essential to get **buy-in from the operator** and make them feel **included** so they bring their ideas to the table.

4. Benefits of VSM as a Visual Tool

- VSM is a **great visual** tool.
- It helps to **narrow down the scope**, allowing the team to focus their improvement efforts on a specific area rather than getting distracted by every possibility.

w4.5- JIT & KanBan

w4.5- JIT & KanBan.mp4

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JIT

- Definition
- Misconceptions
 - Stand alone approach

JIT stands for just-in-time.

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JIT

- Just in Time
 - Critical part of a Lean system
 - Requires
 - SMED (Single Minute Exchange of Dies)
 - **TPM (Total Productive Maintenance)**
 - Enhanced by
 - Kan Ban
 - POUS (Point of Use Storage)

**JIT is properly a part
of a Lean system.**



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w4.5- JIT & KanBan.mp4

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What is Kan Ban

- Kan Ban is not an inventory control system
- Kan Ban is a **visual scheduling system** that tells you:
 - What
 - When
 - How much

What is Kanban?



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Kan Ban Benefits

- Eliminate the waste of overproduction
- Increase flexibility
- Simplify procurement
- Integrate processes and tie to the customer

None of these tools works well alone.

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Other Lean Benefits

- Reduce cycle time
- Reduce WIP
- Improve Quality
- Free up floor space

Additional benefits from this Lean system



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Lean System

```
graph LR; TPM[TPM] --> KanBan[Kan Ban]; TPM --> SMED[SMED]; POUS[POUS] --> KanBan; POUS --> VM[Visual Management]; SMED --> KanBan; KanBan --> Pull[Pull]; KanBan --> JIT[JIT]; Pull --> JIT; JIT --> FTQ[First Time Quality]; VM <--> 5S[5S]; VM <--> JIT
```

We've referred here to a Lean system,

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Parts of the system

- Kan Bans
- Dedicated Space (POUS)
- Scheduling Board



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Sample Kan Ban Cards



A Kanban is simply a card with



w4.5- JIT & KanBan.mp4

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Kan Ban Rules

- Downstream processes withdraw items from upstream processes
- Upstream processes produce only what has been withdrawn
- Only 100% defect free products are sent to the next process
- Establish level production
- KanBans always accompany the parts
- The number of KanBans is reduced over time



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Kan Ban Rules

- Downstream processes withdraw items from upstream processes
- This describes the pull system
- In practice, sometimes the upstream process delivers the **items to POUS.**

Downstream processes withdraw items from



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Kan Ban Rules

- Upstream processes produce only what has been withdrawn
- This is the control against overproduction.
- You do not produce more than **you have kan bans** for.
- If you have no kan bans, you do not produce.

never produce more than
you have Kanbans for.

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Kan Ban Rules

- Establish level production
- This is not as hard as it sounds
- If your customer wants 10,000 parts in a month –
 - Produce 2500 each week
 - Or 500 each day
- Work with customers to level their orders

your customers to level their orders.



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Kan Ban Rules

- KanBans always accompany the parts
- The KanBan (card or tote) stays with the parts until they are used, then returned upstream to be replenished.

Whether the Kanban is a card or a tote,



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Kan Ban Rules

- The number of Kan Bans is reduced over time.
- A Kan Ban System must be actively managed.

inventory is to actively manage Kanban levels.

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Just-in-Time (JIT)

JIT is the idea of getting supplies and materials **just when you need them** and **in the quantities you need** (not before, not more).

Goal and Misconceptions

- **Goal:** To shorten **cycle times** and **eliminate errors** to better serve customers. Inventory reduction is a **benefit**, not the goal.
- **Purpose:** JIT is intended to **drive improvement** by exposing problems.
- **Misconception:** JIT cannot be implemented successfully without a full **Lean system**. Simply imposing **JIT on suppliers** without process improvement only **shifts the inventory burden** to them, threatening the supply chain.

Elements that Enable JIT

JIT facilitates **flow** and **pull** by eliminating the waste of **overproduction**. Key elements that make JIT work include:

- **SMED (Single Minute Exchange of Dies)**: Also called **quick changeover**. The faster you can change a process from one product to another, the shorter the cycle time and the more responsive the organization is.
- **TPM (Total Productive Maintenance)**: A system of careful **preventive maintenance** to make processes more predictable and reliable.
- **Point-of-Use Storage**: Storing all work-in-process inventory right where it will be used, eliminating the waste of transportation.

Kanban

Kanban is a **visual production signaling system** that tells the upstream process: **what to produce, when to produce it, and how much to produce.**

Kanban's Role in Lean

- It is **not** an inventory control system, but a visual **scheduling system**.
- It helps eliminate the waste of **overproduction** by ensuring you produce *just what's needed and no more*.
- It increases customer flexibility and simplifies procurement, tying production directly to the customer's needs (**pull system**).
- For Kanban to work, quick and reliable changeovers **(via SMED and TPM)** are necessary.

TPM= Total Productive
Maintenance

Elements of the Kanban Signaling System

There are three main elements:

1. **The Kanbans:** A **card** or a **visual signal** like an empty tote or standardized container, containing necessary information for **a fixed unit of production**.
2. **Dedicated Space for Storage:** Ensures organization and quick visibility.
3. **A Scheduling Board:** If cards are used, they are collected here. When a predetermined number of cards is collected, it signals the start of production; when they are used up, it signals a stop.

Rules for Managing a Kanban System

The system relies on strict adherence to key rules:

1. **Pull System:** Downstream processes (**internal customers**) *withdraw* items from upstream processes (**internal suppliers**). The supplier **never delivers before being asked**.
2. **Strict Adherence to Signals:** Never produce more than you have Kanbans for.
3. **100% Quality:** The supplier is responsible for quality; only **defect-free products** are delivered. Production stops until a quality problem is resolved.
4. **Level Production:** It helps to work with customers to **level their orders** (avoiding large, infrequent volume orders) to make the Kanban system smooth.
5. **Kanban Stays with the Part:** The card or **tote stays with the parts until they are used**, then **it is returned upstream as a signal for replenishment**.
6. **Active Management:** Kanban levels can be actively managed and **reduced over time** to decrease work-in-process inventory (pursuing perfection).

Kanban Card

A *kanban* card is small card containing information about a specific part used in **production**. It is a signal that tells someone **upstream** to move, purchase, or build more of a component for production.

These cards must contain the number of units (items, pounds, kits, etc.) that need action. They also likely contain a variety of other information that clearly conveys what must be done.

A *kanban* card often has a place to write the date it was turned in, or “dropped”, and when it is due, calculated by adding the **lead time** to the turn-in date.

Part Description				Part Number	
Smoke-shifter, left handed.				14613	
Qty	20	Lead Time	1 week	Order Date	9/3
Supplier	Acme Smoke-Shifter, LLC			Due Date	9/10
Planner	John R.		Card 1 of 2		
			Location	Rack 1B3	

w4.6- Visual Management

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Visual Management Tools

- Visual management tools might include:
 - Color Coding
 - Pictures/Graphics
 - Kanban Cards or bins
 - Colored Lines
 - Signage
 - Labeling
 - Control Boards
 - Area Information Boards
 - Gages, Dials, etc.
 - Checklists

but it's also demonstrated through Manufacturing.net

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- Visual Management is used in every part of a lean system
 - Lean improvement
 - Lean management



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Visual management can take a number of shapes or forms.

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Visual Management Tools

- Jidoku
- Andon



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But first, I want to

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Visual Management Tools

- Jidoku



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<https://www.shutterstock.com/image-photo/clipboard-checklist-stethoscope-1137900146>



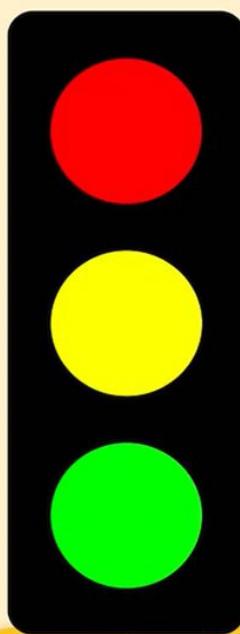
00:02:37 / 00:08:35 100

w4.6- Visual Management.mp4

File View Playback Video Subtitles Audio Settings Help

Visual Management Tools

- Andon



Redrobsche, CC0, via Wikimedia Commons
https://upload.wikimedia.org/wikipedia/commons/d/db/Traffic_light_all_lights_on.svg

Andon is a visual management tool



00:03:36 / 00:08:35 100

w4.6- Visual Management.mp4

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- Visual management tools are used to:
 - Provide status at a glance, enabling quick and simple detection of abnormal operating conditions
 - Provide visual aids to help employees complete tasks more quickly and in a more standardized approach

A visual management system makes it easy

Manufacturing.net

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00:04:39 / 00:08:35

100

w4.6- Visual Management.mp4

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<https://www.shutterstock.com/image-photo/warehouse-components-electronics-industry-white-metal-793873726>



Visual Management

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w4.6- Visual Management.mp4

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<https://www.shutterstock.com/image-photo/water-vapor-steam-plant-air-nitrogen-1644729442>



<https://www.shutterstock.com/image-photo/pressure-gauge-fire-extinguisher-197292638>



Visual Management

The center image are cylinders of hydraulic fluid.

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w4.6- Visual Management.mp4

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Visual Management

Easy way to keep them in

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00:06:24 / 00:08:35 100%

The image shows a screenshot of a video player window titled "w4.6- Visual Management.mp4". The menu bar includes "File", "View", "Playback", "Video", "Subtitles", "Audio", "Settings", and "Help". The video frame displays a stack of white binders with blue and green diagonal stripes on a dark shelf. Below the video frame, the title "Visual Management" is displayed in large blue letters, followed by the subtitle "Easy way to keep them in". To the right is the Kennesaw State University logo, which features a yellow mountain range graphic above the text "KENNESAW STATE UNIVERSITY". At the bottom of the screen is a blue progress bar showing the time "00:06:24 / 00:08:35" and a volume indicator "100%".

w4.6- Visual Management.mp4

File View Playback Video Subtitles Audio Settings Help



Visual Management

I know this is a little
more difficult to see,

00:06:34 / 00:08:35 100%

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w4.6- Visual Management.mp4

File View Playback Video Subtitles Audio Settings Help



<https://www.shutterstock.com/image-photo/businessman-pointing-flip-board-chart-office-334211591>

Visual Management

This is a performance board.

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00:06:55 / 00:08:35 100

w4.6- Visual Management.mp4

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<https://www.shutterstock.com/image-photo/assorted-tools-carpenter-on-wood-background-556648714>



<https://www.shutterstock.com/image-photo/organized-tools-wall-maintenance-298685108>



Visual Management

These are just a couple of

00:07:44 / 00:08:35 100

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w4.6- Visual Management.mp4

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The image shows a Scrum task board on a dark wall. It is divided into three columns: 'TO DO', 'WORK', and 'DONE'. The 'TO DO' column contains tasks like 'Create items via email', 'IP addresses for tracking', 'Do download app', 'Developing diskies', 'Coding keen update', 'Do download site', 'Update videos', 'Rework UI/UX', 'Redesign home page', 'Functional test', 'Rework design icons', and 'Release V2.0'. The 'WORK' column contains tasks like 'Test new UI', 'Import tasks from CSV', 'CSV file adds if necessary', 'Delete old tasks', 'Create new stories', 'Demo stories', 'Create backlog', 'Demo app for review', 'Create user stories', 'Add search at publications', 'Affiliate mode', 'Send button', 'Getaways membership menu error', 'Make home page', 'In app that iteration', 'Delete old stories', 'Demo site for review', 'In app that iteration', 'Delete old stories', 'After 5000', 'Fuel tank error', 'Error in L100', and 'VISUALS'. The 'DONE' column contains tasks like 'Design wireframes', 'Create user stories', 'Add search at publications', 'Delete old stories', 'Demo app for review', 'Create user stories', 'Create backlog', 'Demo app for review', 'Create user stories', 'Delete old stories', 'Demo site for review', 'In app that iteration', 'Delete old stories', 'After 5000', 'Fuel tank error', 'Error in L100', and 'VISUALS'.

[https://www.shutterstock.com/
image-photo/scrum-task-board-
on-dark-wall-1337303492](https://www.shutterstock.com/image-photo/scrum-task-board-on-dark-wall-1337303492)

Visual Management

This is a project management board.

00:08:20 / 00:08:35

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Visual Management: The Central Idea

Visual Management uses various tools to give an update on the **current status of a process**. The goal is for a complete system to allow you to see the process status **with just a glance**.

Tools and Forms

Visual management includes, but is not limited to:

- **Color Coding** (e.g., green/yellow/red gauges, color-coded tabs)
- **Kanban cards**
- **Signage and Labeling**
- **Control Boards and Performance Boards**
- **Gages, Dials, and Checklists**
- **Graphics and Pictures** (e.g., visual references for inspection)
- **5S** (workplace organization) and **Poka-Yoke** (error-proofing) tools.

Transparency

A key result of visual management **s transparency**, where performance data (productivity, cost, quality) is shared openly on boards in prominent places (like the manufacturing floor). This ensures everyone knows how the organization is performing so improvements can be made.

Transparency

A key result of visual management is **transparency**, where performance data (productivity, cost, quality) is shared openly on boards in prominent places (like the manufacturing floor). This ensures everyone knows how the organization is performing so improvements can be made.

Jidoka and Andon: Linked Visual Tools

The transcript introduces two closely linked concepts that are integral to the visual management system: **Jidoka** and **Andon**.

1. Jidoka (Autonomation)

- **Definition:** Jidoka is a philosophy, sometimes called **autonomation** (automation with a human touch) or intelligent automation.
- **Principle:** It is based on **stopping immediately when abnormalities are detected** to prevent defective products from being produced. It eliminates the need for people to simply watch over machines.
- **Four Basic Elements:** **Detection**, **Stoppage**, **Response**, and **Prevention**.
- **Example:** A printer that shuts itself down when a **paper jam is detected**. In manufacturing, this is often accomplished with **sensors**.

2. Andon

- **Definition:** Andon is a **visual management tool** that highlights the status of operations and **signals whenever an abnormality occurs**.
- **Function:** It indicates production status (e.g., which machines are operating, typically with lights) and is used by workers to **alert supervisors, call maintenance, or shut down the line** to address an error.
- **Purpose:** To standardize and **speed up the flow of information** from the source of the problem **to the person who can fix it**, allowing for immediate corrective action.



Practical Examples of Visual Management

- **Workplace Organization (5S):**
 - **Shadow Boards/Tool Boards:** Each tool has a dedicated space (often an outline/shadow) making it easy to see **what is missing** at a glance.
- **Standards and Status:**
 - **Gauges and Dials:** Color-coded markings (e.g., Green = Fine, Yellow = Attention, Red = Problem) on fluid cylinders or fire extinguishers.
 - **Piping Systems:** Clearly labeled to determine function.
- **Error Proofing:**
 - **Diagonal Stripe on Binders:** If any binder is out of order, the stripe is broken and the anomaly is quickly recognized.
 - **Visual Reference Books:** Used at inspection stations with pictures and descriptions of defects to look for, ensuring consistency.
- **Project Management Boards:** Color-coded boards (like Kanban boards with sticky notes) that identify which projects are in various stages.

w4.7- Poka Yoke

w4.7- Poka Yoke.mp4

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Volume: 100

Poka Yoke

Mistake Proofing



00:00:13 / 00:06:33 100

w4.7- Poka Yoke.mp4

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Poka Yoke

- Mistake Proofing – prevent errors from moving to the next step in a process
 - A behavior shaping constraint
 - Occurs at very low levels
 - May either warn of, or prevent errors
 - Typically applied to errors of execution
If it's not possible to prevent a mistake,



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w4.7- Poka Yoke.mp4

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Poka Yoke Examples

- You cannot remove the key from your car unless the **automatic transmission** is in park.
 - Microwave oven will not operate if the door is open
 - Rumble strips on the highway
 - Speed bumps

The ones that you see on this slide are safety related.

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w4.7- Poka Yoke.mp4

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Poka Yoke Examples

- Coffee maker automatic shut-off
- Pink Ceiling Paint
- Round manhole covers



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w4.7- Poka Yoke.mp4

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Poka Yoke Examples

- Sink overflows
- Motion sensitive lights and commodes
- Machine guard interlocks



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w4.7- Poka Yoke.mp4

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Poka Yoke Example

Online forms

- 1) Verify all required fields have been filled out.
- 2) Validate data types
- 3) Validate data values

There are lots of examples of



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w4.7- Poka Yoke.mp4

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Mistake Proofing a Phone Number

Phone [REDACTED]

Phone [REDACTED]

XXX – XXX - XXXX

Phone [REDACTED] [REDACTED] [REDACTED]

There are many different ways to reduce or eliminate

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w4.7- Poka Yoke.mp4

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Poka Yoke Example

- Tooling - Symmetrical outside
 - Could be reversed
- Tooling - Asymmetrical outside
 - Cannot be reversed

the piece could be put in backwards,

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w4.7- Poka Yoke.mp4

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Poka Yoke Example

Before

big gap

flat washer

Put the DTI under the bolt head...

After

small gap or no gap

turn, turn

plastic on it that goes under the head of the bolt.

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w4.7- Poka Yoke.mp4

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Poka Yoke Example



A bridge inspector would previously have had to use



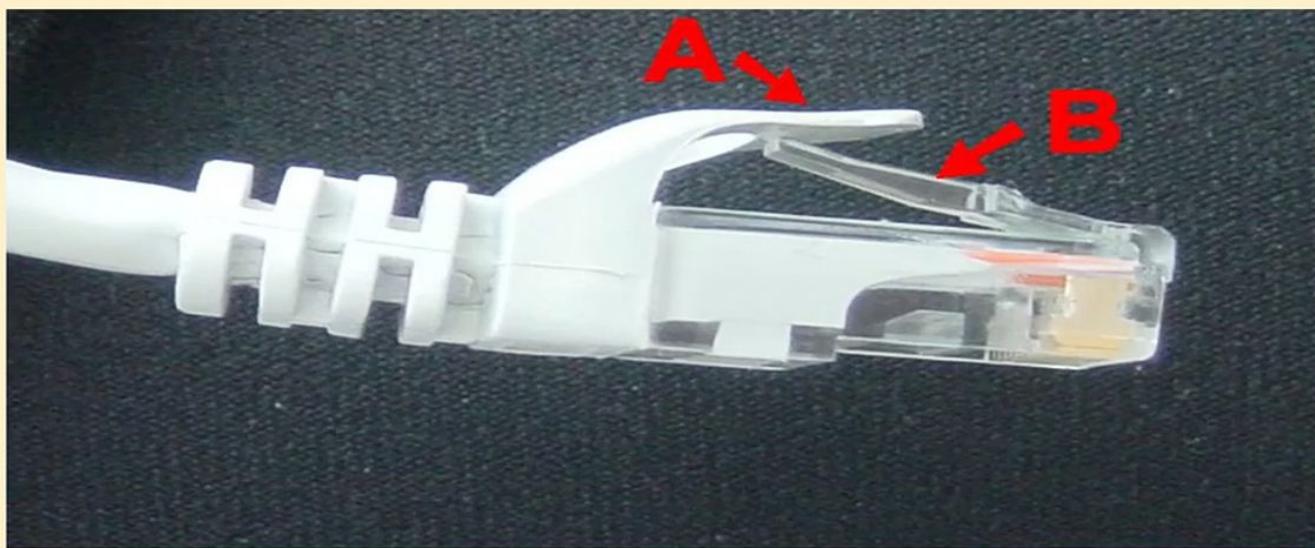
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w4.7- Poka Yoke.mp4

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Poka Yoke Example



This is a common jack
for phone and Internet.



00:03:54 / 00:06:33

100

w4.7- Poka Yoke.mp4

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Poka Yoke Example



Two yellow tabs flip up when
the platform is raised.



w4.7- Poka Yoke.mp4

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Poka Yoke Example



you guessed it,
transmission fluid level.



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w4.7- Poka Yoke.mp4

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Poka Yoke Example



pulled back in order
to start the engine.

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w4.7- Poka Yoke.mp4

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Poka Yoke Example



But how do you know if
it's in the right place?



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w4.7- Poka Yoke.mp4

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Poka Yoke Example



Instructions printed on
the blacktop or curb,

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Poka-Yoke: Mistake-Proofing

Poka-Yoke is meant to **shape behavior at the level of execution** by preventing a human from making a mistake, or by immediately anticipating and warning of a mistake.

Two Approaches to Poka-Yoke

1. **Prevention:** Making it **physically impossible** to create the error.
2. **Detection/Warning:** If prevention isn't possible, the system should **anticipate and warn** of mistakes.

Jidoka vs. Poka-Yoke

Poka-Yoke techniques are often used as the **detection mechanism** that triggers the system to stop, aligning with the Jidoka philosophy of stopping immediately when abnormalities are detected.

Poka-Yoke Examples

Poka-Yoke is highly effective because it makes the correct action easy or mandatory, and the incorrect action difficult or impossible.



Poka-Yoke Examples

Poka-Yoke is highly effective because it makes the correct action easy or mandatory, and the incorrect action difficult or impossible.

Application Area	Example	Mechanism	Poka-Yoke Type
Manufacturing/Assembly	Stamping Die Tooling	Redesigning a piece of tooling so it can only be inserted one way (preventing damage).	Prevention
	Bolt Tightness Washer	A washer that squirts out plastic when the bolt is properly tightened, allowing visual inspection of tightness.	Detection/Warning
Ergonomics/Function	Automotive Dipsticks	The oil dipstick is shaped like an "O" and the transmission fluid dipstick is shaped like a "T" (making it impossible to confuse them).	Prevention
Technology	Online Forms	Forms verify that all required fields are filled and that data types/values are correct.	Detection/Warning

Consumer/Safety	Glidden Ceiling Paint	Paint goes on pink (easy to see coverage) and dries white.	Detection/Warning
	Lawn Mower Safety Bar	Bar must be pulled to start; releasing it stops the blade within three seconds.	Prevention
	Manhole Covers	They are round —the only shape that cannot fall into the hole it covers.	Prevention
	Sink Overflow Slots	Small holes near the top of the sink prevent overflow if the water is left running.	Prevention
Medical	Endotracheal Tube Check	Squeezing a plastic bulb on the tube: if it inflates , it's in the lungs; if it draws liquid, it's not.	Detection/Warning
Traffic/Safety	Offset Crosswalks	Railings force pedestrians to turn and walk towards oncoming traffic.	Prevention
	Crosswalk Instructions	" Look Left " printed on the curb directs pedestrian vision.	Detection/Warning

w4.8- Value to the Organization

w4.8- Value to the Organization.mp4

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Lean Benefits

- How does Lean implementation benefit the organization?
 - Customer Focus
 - Culture Change
 - Capacity
 - Efficiency
 - Effectiveness
 - Flexibility
 - Financial

There are many areas of benefit,
but they're sometimes broad,



00:00:15 / 00:02:39 45

Why Adopt Lean?

The core reason an organization adopts Lean is to improve performance by **better serving customers** and increasing efficiency. As W. Edwards Deming suggested, the focus should be on **creating customers for life**, as satisfying and keeping existing customers is far more cost-effective than finding new ones.



★ Key Benefits of Lean

1. Enhanced Organizational Culture and Employee Engagement

- Lean can lead to a **transformation** by creating an organization of **engaged employees**. 
- Satisfied and engaged employees will, in turn, **satisfy and delight customers.** 

2. Operational Improvement (Capacity and Efficiency)

- **Increased Capacity:** An organization can increase its capacity **without adding new equipment or personnel** by utilizing existing resources more effectively. 
- **Great Improvements in Efficiency:** Lean is a system and a set of tools that allow better utilization of resources, focusing them on **value-added activities** and avoiding non-value-added waste. 
- **Increased Effectiveness:** Better use of resources allows the organization to better satisfy customers (external effectiveness) and be more efficient internally.

3. Responsiveness and Flexibility

- In a Lean environment, it is much easier to **change directions** and **respond quickly** to customer and market needs. 

4. Financial Benefits (Broad and Indirect)

The financial impacts are significant but can be **hard to measure** directly, as they are a result of systemic changes (e.g., measuring the benefit of *not* doing unnecessary things). These impacts are broad and include: 

- **Cost Savings:** Resulting from the better use of resources. 
- **Increased Revenue:** Driven by greater customer satisfaction. 
- **Better Cash Flow:** A result of **reduced cycle time**.
- **Better Utilization of Capital:** Achieved through **inventory reductions** and improved **space utilization**.