

Continuous Improvement Toolkit

Waste Analysis



The Continuous Improvement Map



- Waste Analysis

- ❑ **Waste** is anything that doesn't add value from the customer's perspective.
- ❑ It includes activities and resources beyond what is needed to meet customer requirements.



- Waste Analysis

- ❑ **Waste Analysis** involves identifying, quantifying, eliminating and preventing waste.
- ❑ It involve manufacturing, service and office environments.
- ❑ Many Lean tools focus on continually identifying and eliminating these wastes.
- ❑ This is one of the core principles of Lean thinking.



- Waste Analysis

- ❑ Waste takes many forms.
- ❑ It can be found at any time and in any place.
- ❑ There are many classifications of waste.
- ❑ One of the most basic and widely used is the **Seven Wastes**.

Unnecessary Transportation

Overproduction

Excess of Inventory

Over Processing

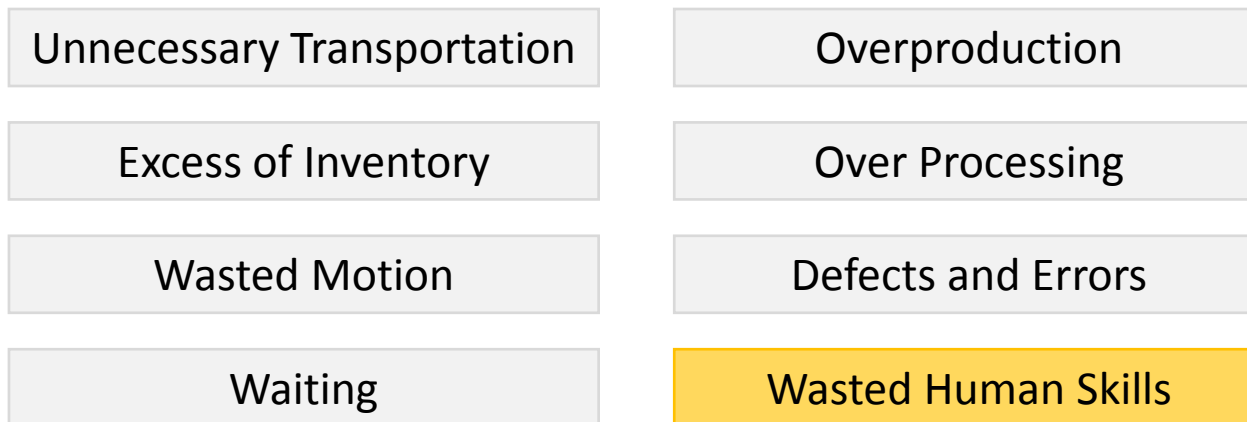
Wasted Motion

Defects and Errors

Waiting

- Waste Analysis

- Many lean practitioners have added an extra waste to the original seven wastes, which is the waste of human skills.



The Eight Wastes

- Waste Analysis

Transport
Inventory
Motion
Waiting
Overproducing
Over Processing
Defects
Skills



If there are too many wastes, your process will be
DOWNTIME

- Waste Analysis

- ❑ One of the main principles of Lean.
- ❑ One of the easiest ways an organization can improve its operations.

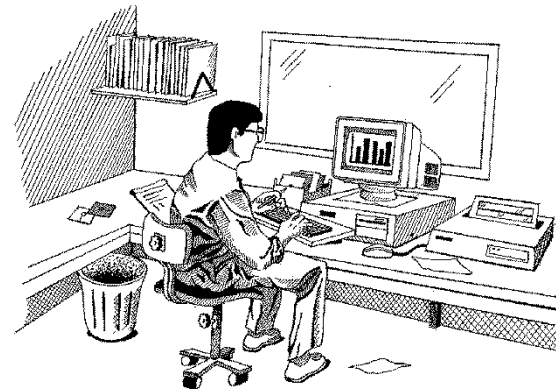
- ❑ **Benefits:**
 - Improved productivity.
 - Increased flexibility.
 - Reduced costs and lead times.
 - Improved quality and safety.
 - Improved morale and pride in workplace.
 - A products and services that meet customer expectations.



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Remember:

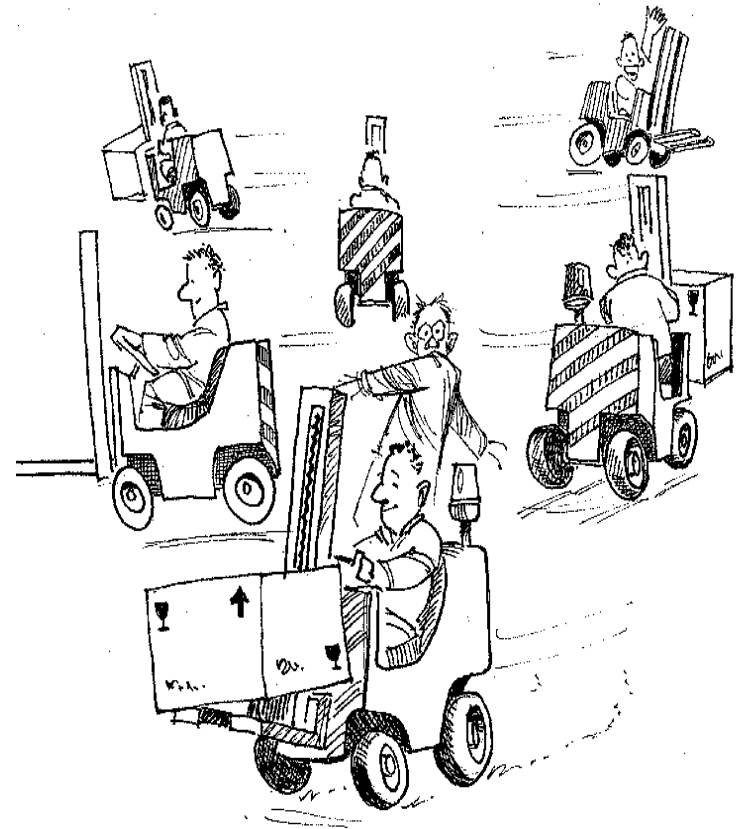
- ❑ Wastes are **non-value add activities** as they do not help transform the product into the customer requirement.
- ❑ All forms of waste can be present in **service environments** and **offices** as well as in production areas.



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Unnecessary Transportation:

- ❑ The unnecessary movement of products, materials or supplies from one place to another.
- ❑ While product is being transported, it is not being worked on and no value is being added to it.
- ❑ It normally results from poor system design or layout.

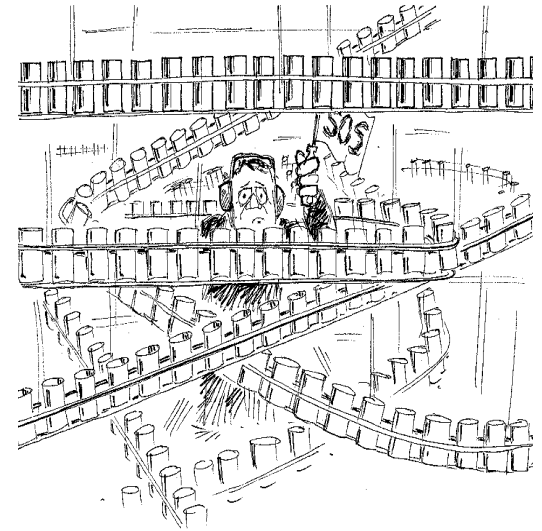


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Unnecessary Transportation:

❑ Moving things:

- Costs money and time.
- Causes production delays.
- May include the risk of loss or damage.



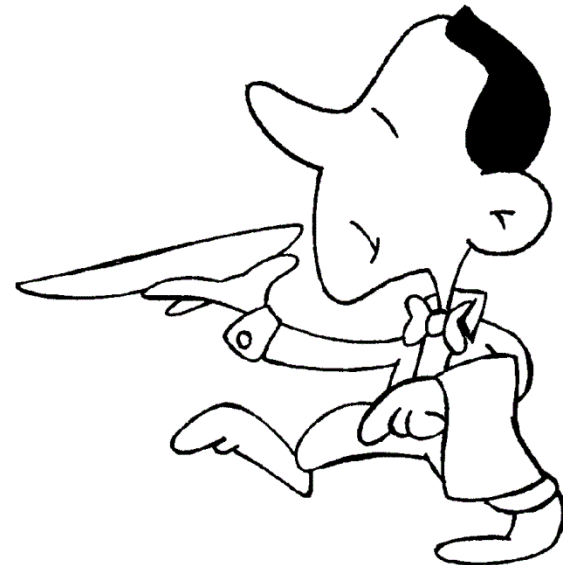
- ❑ Unnecessary transportation is clearly visible in old-fashioned production lines, where **work-in-process** parts are pushed from one area of a factory to another.

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Unnecessary Transportation:

❑ Examples:

- Storing raw materials far away from production lines.
- Building a storage area and a loading area at opposite ends.
- Building a dining room and a kitchen at opposite ends in a restaurant.
- Delivery of supplies in an office.

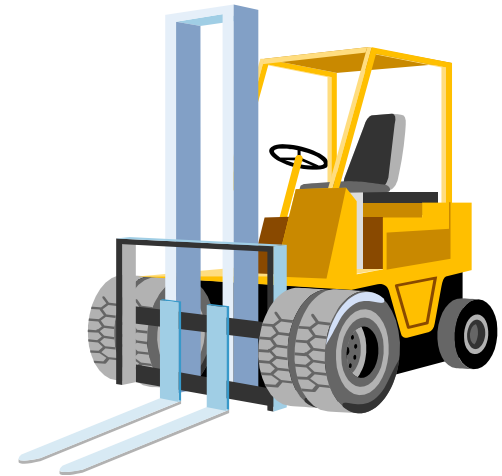


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Unnecessary Transportation:

❑ Simple ideas to reduce or eliminate unnecessary transportation:

- Find ways to reduce the distance between work areas.
- Relocate items to be closer to where the work is performed.
- Introduce standard sequences for transportation.



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Excess of Inventory:

❑ **Inventory** can be:

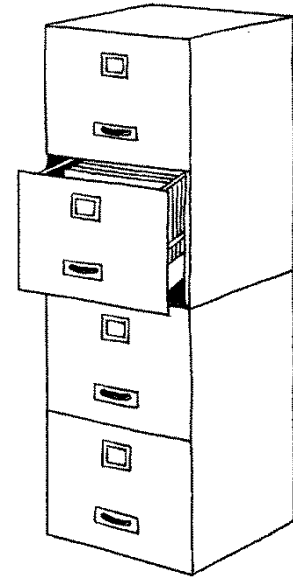
- Raw materials and work-in-process.
- Finished goods awaiting sales.
- Merchandise inventory in stores.
- Office supplies.
- Physical reports and manuals that are not immediately required.



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Excess of Inventory:

- ❑ Inventory is harder to see in an office or transactional environment, but it is there.
- ❑ Some inventory is necessary, but most processes can be managed differently to minimize inventory.



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Excess of Inventory:

- ❑ Creates the need for more manpower and equipment.
- ❑ Takes up valuable working space.
- ❑ Ties up money that could be used for other things
- ❑ Have a significant impact on working capital and operational costs.
- ❑ Slows down the speed of production.
- ❑ May hide problems such as line imbalance and quality defects.

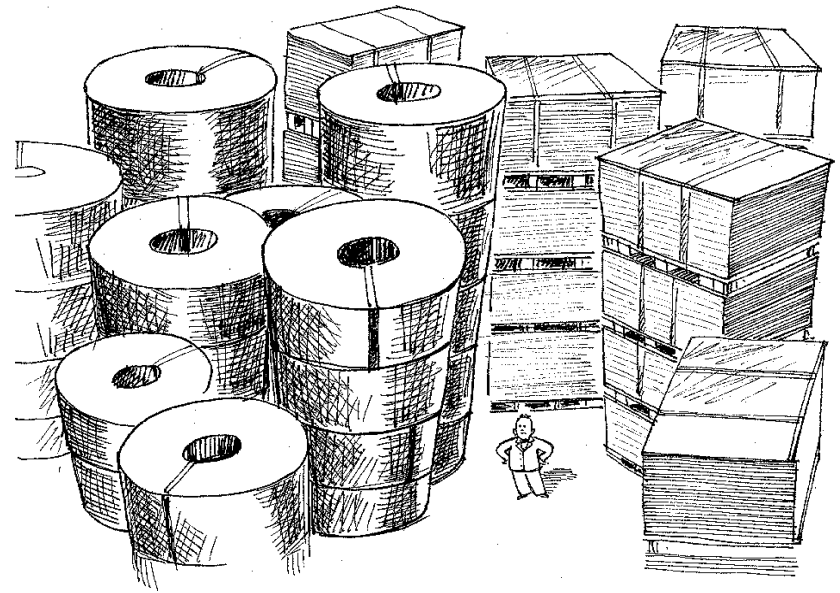


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Excess of Inventory:

□ Examples:

- Storing raw materials ahead of requirements.
- Archiving documents that are not required or will never be used in the future.
- Computer programs stored on hard drives which will never be used in the future.
- Clothes brought back at the end of vacation not worn.



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Excess of Inventory:

❑ Simple ideas to reduce or eliminate inventory:

- Keep track of your inventory levels.
- Reduce unnecessary comfort stocks.
- Don't buy in bulk unless you are sure you will use all of it.
- Apply **line balancing** and **Kanban**.



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Wasted Motion:

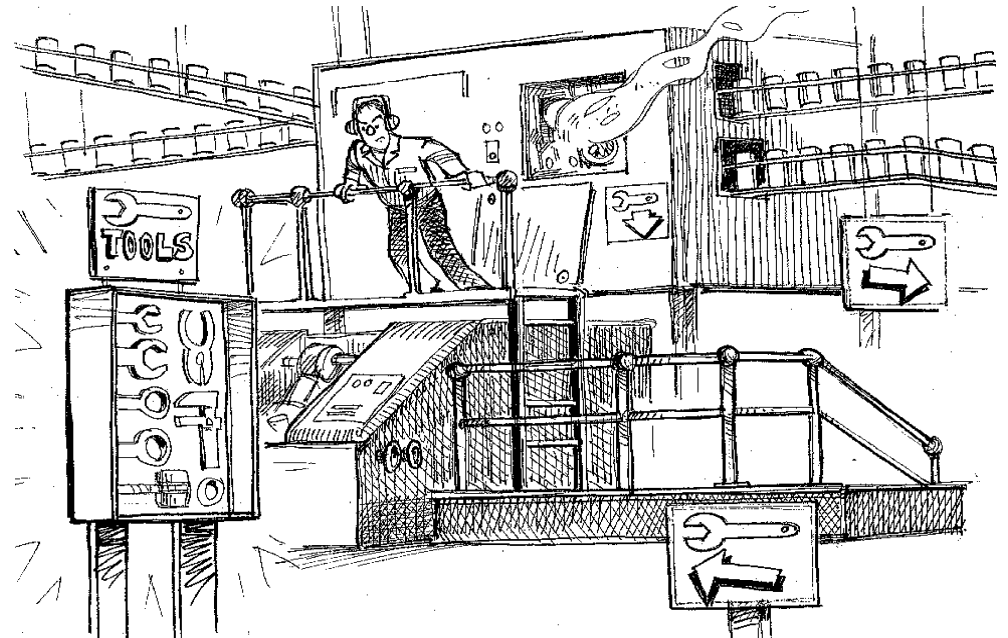
- ❑ It refers to the movement performed by people that is not required and will not add value to the product or service.
- ❑ It describes the situation when we have to physically move more to perform our jobs.
- ❑ Or when we are not efficient in using our hands to do our jobs.



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Wasted Motion:

- ❑ Consumes time and uses up energy.
- ❑ Increase health and safety issues.
- ❑ Affects the reliability of operations.

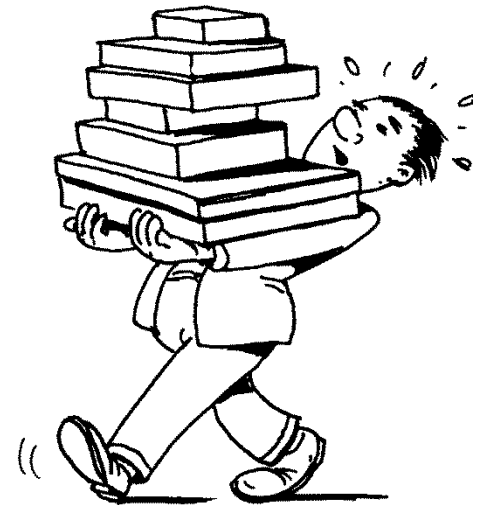


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Wasted Motion:

❑ Examples:

- Moving too much or travelling farther than necessary to accomplish tasks.
- Walking between work stations to get tools (especially when they are heavy).
- Having to bend or twist because of poor ergonomic design.
- Placing the refrigerator outside the kitchen.



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Wasted Motion:

❑ Simple ideas to reduce or eliminate wasted motion:

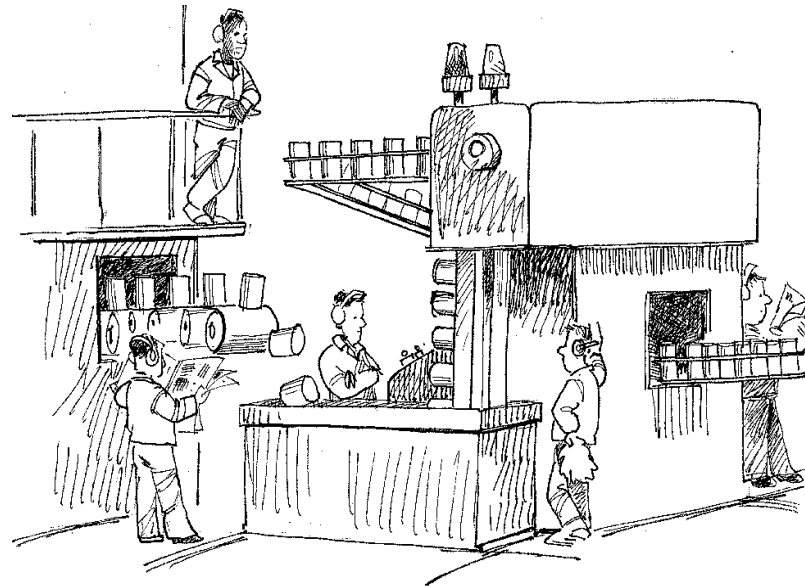
- Evaluate the flow and layout to identify chances to streamline the processes.
- Relocate the required tools at the point of use.
- Implement time and motion principles.



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Waiting:

- ❑ Refers to the idle time that occurs when there are unnecessary delays within the process.
- ❑ Occurs when a product is not in transport or being processed.
- ❑ Or when a person is waiting for a work to get completed.



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Waiting:

- ❑ Waiting costs time and money.
- ❑ **Any time a person or a product is waiting:**
 - There is no value being added.
 - Lead times are increased.
 - Wasted time is transferred to the customer through increased costs.



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Waiting:

□ Examples:

- Waiting for the maintenance department to repair a line breakdown.
- Waiting for the size changeover to be completed.
- Experiencing poor computer system performance.
- Waiting for a meeting to start.
- Arriving an hour early for a meeting.
- Waiting in line at the grocery store.
- Waiting in the doctor's waiting room.
- Waiting for lab results.



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Waiting:

❑ Simple ideas to reduce or eliminate waiting:

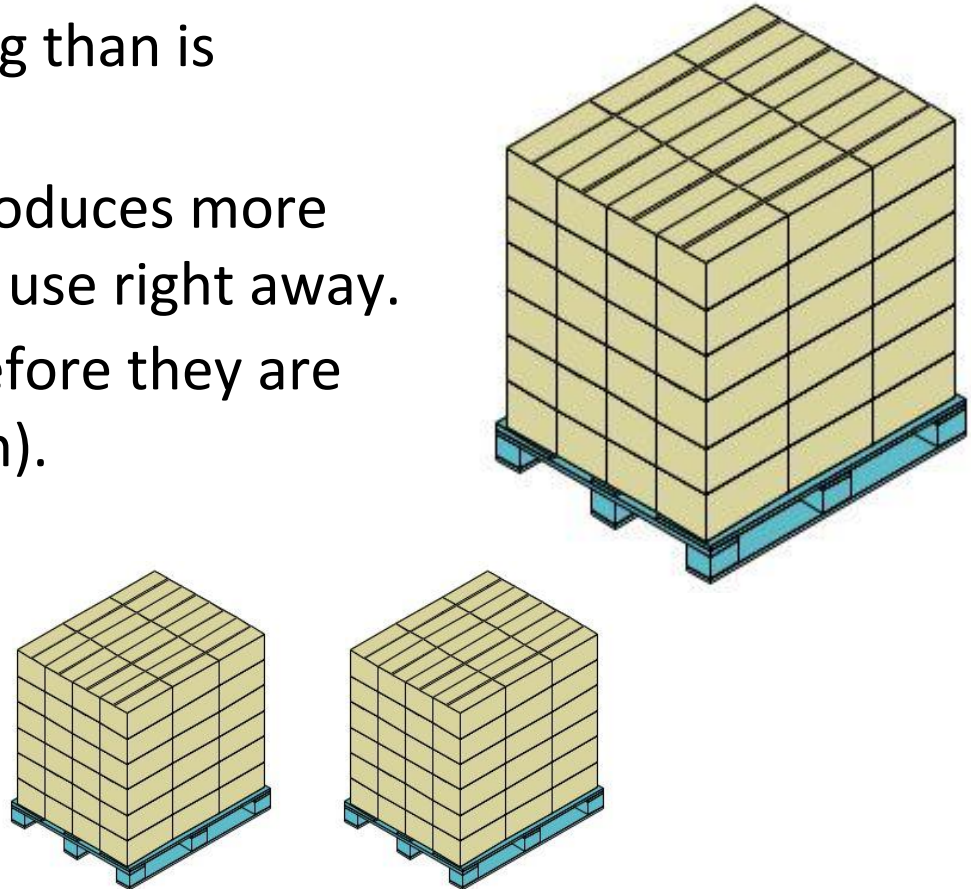
- Observe what keeps your people waiting.
- Measure waiting and make it visible.
- Allocate more resources at the bottleneck areas to increase their capacities.
- Rebalance activities so that time can be filled productively.



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Overproduction:

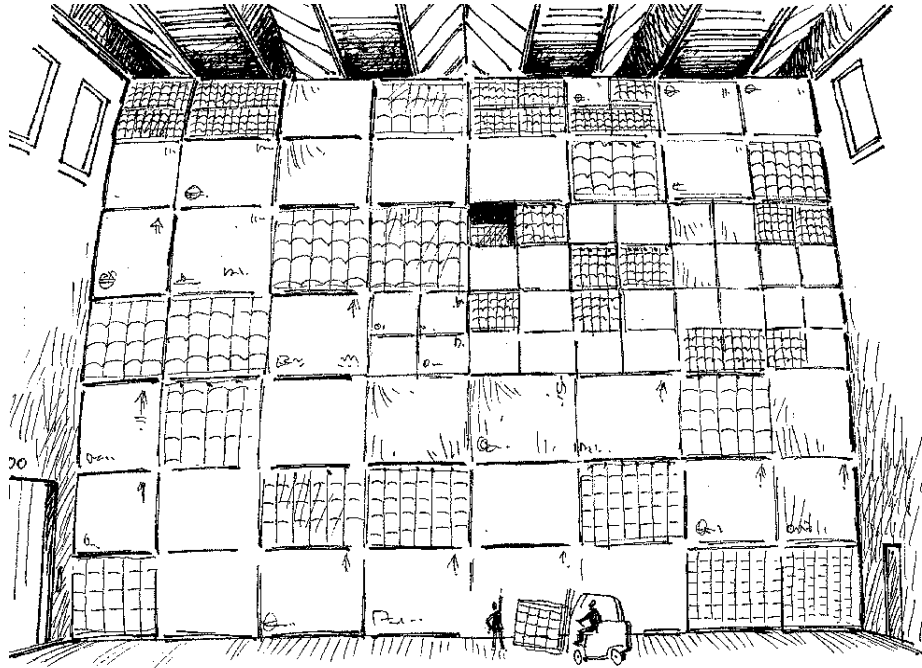
- ❑ Making more of something than is required by the customer.
- ❑ Occurs when a process produces more than the next process can use right away.
- ❑ Or when making things before they are required (early production).



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Overproduction:

- ❑ Increases lead times.
- ❑ Consumes more materials.
- ❑ Promotes a **batch and queue** system.
- ❑ Hides quality problems.
- ❑ May prevents other activities from taking place.



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Overproduction:

❑ Examples:

- Producing faster than customer demand.
- Printing multiple versions of the same publication hoping that you will distribute all.
- Buying vegetables for one month on your weekly shopping trip.



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Overproduction:

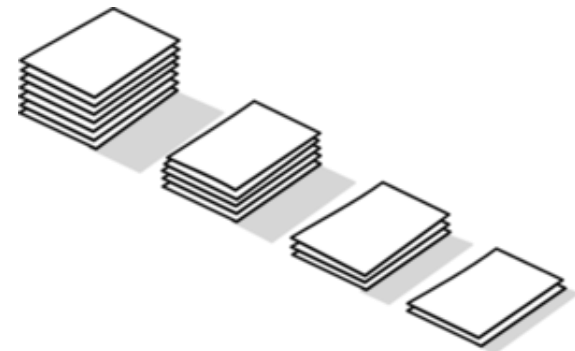
- ❑ **Simple ideas to reduce or eliminate overproduction:**
 - Produce only what customers want and when they want it.
 - Produce as close to the schedule as possible.
 - Implement **Pull** and **Kanban**.



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Over Processing:

- ❑ Processing beyond what the customer specifies.
- ❑ Providing more value than what he is paying for.
- ❑ It is generally unnecessary steps that do not add value to the end product or service.
- ❑ Often a result of poor product or service design.
- ❑ May result from internal standards that do not reflect true customer requirements.

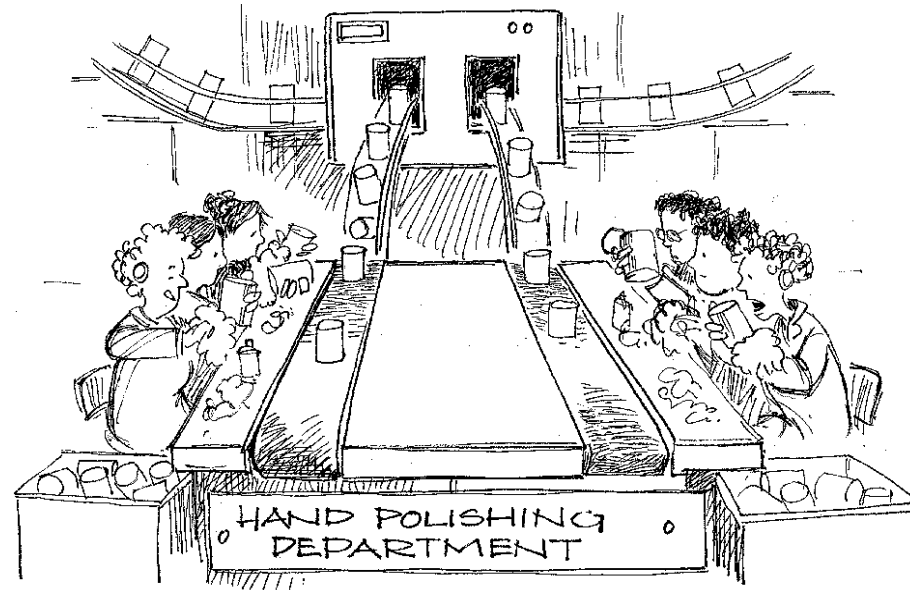


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Over Processing:

❑ Examples:

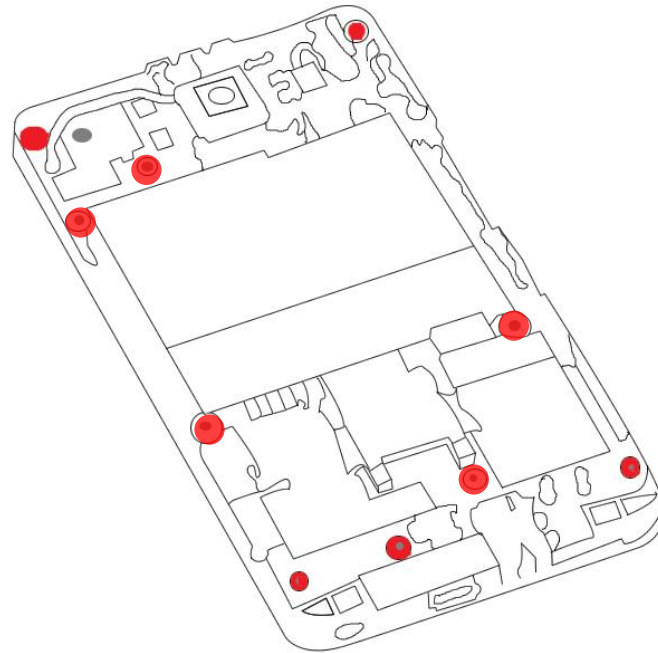
- Duplication of work.
- Using tools that are more precise.
- Completing reports in a level of detail not required.
- Painting areas that will never be seen.
- Stirring a mixed cup of coffee.



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Over Processing:

- How many bolts are there?



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Over Processing:

❑ Simple ideas to reduce or eliminate over processing:

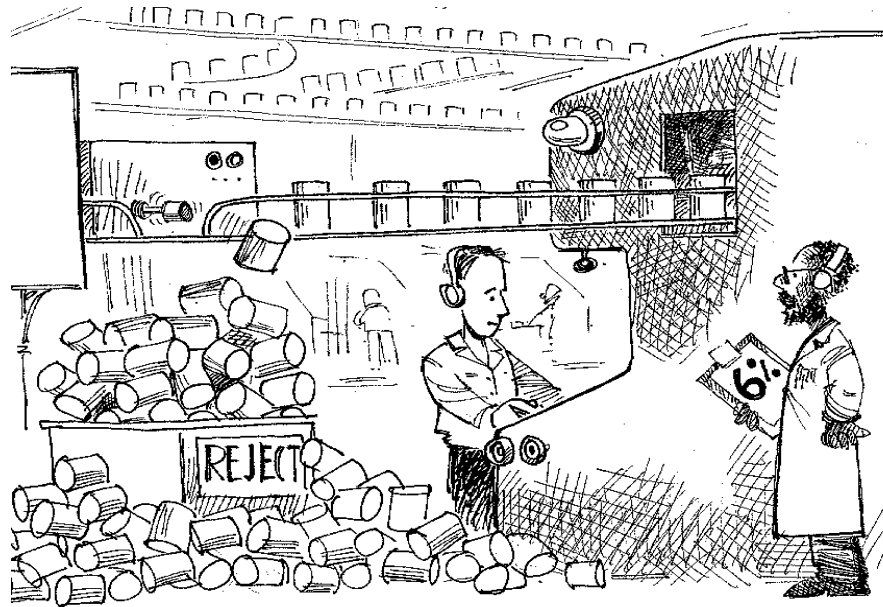
- Challenge yourself to find ways to do less and to use less.
- With every task try to just "**do it once**".
- With every document try to just "**touch it once**".
- Provide clear standards for every process.



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Defects:

- ❑ Occurs when a process or service does not serve the purpose it was created for.
- ❑ It is failure to meet the “do it right the first time” expectation.



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Defects:

- ❑ Whenever defects occur during a production process, extra costs are incurred reworking or scrapping the parts.
- ❑ And if they passed on to the customer, the poor quality can reduce profit in the form of lost sales and negative reputation.



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Defects:

❑ Examples:

- A manufacturing faulty parts that require rework or need to be scrapped.
- Dealing with guest complaints in hotels.
- Spelling mistakes in an office memo.
- Missing information or incorrectly completing an application.



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Defects:

❑ Simple ideas to reduce or eliminate defects:

- Find where the errors occur.
- Analyze root causes.
- Solve the problem as early as possible (the 1-10-100 rule).
- Avoid multitasking.



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Unused Human Skills:

□ Can be described in several ways:

- Unused creativity.
- Wasted ideas and talent.
- Wasted human potential.



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Unused Human Skills:

- ❑ Not using the potential and creativity of employees is a waste.
- ❑ Many companies now realize that their biggest assets are their employees.
- ❑ It is only by capitalizing on employees' ideas and skills that companies can reduce the other waste forms and improve their performance.

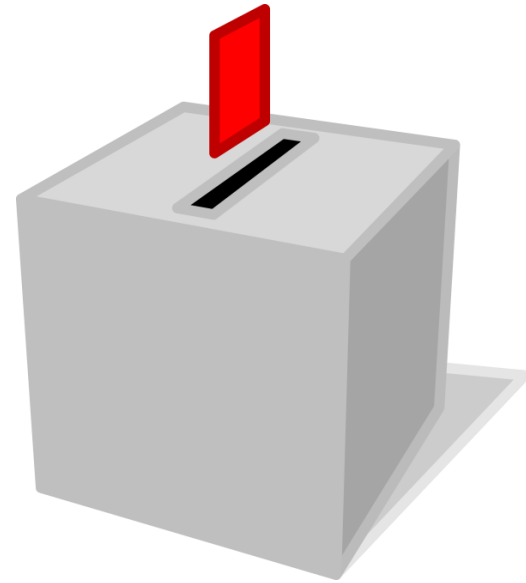


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Unused Human Skills:

❑ Simple ideas to reduce or eliminate defects:

- Be creative.
- Ask questions.
- Challenge the status quo.
- Implement an idea system.
- Encourage employees to make improvement suggestions.
- Ensure that the ideas are well heard.
- Show respect and confidence for everyone by letting them solve their daily problems as process owners



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Other Types of Waste:

- ❑ **Wasted space** – a waste as the customer will not pay for.
- ❑ **Wasted energy** – a hidden shared cost to all of us.
- ❑ **Pollution** – the producer is increasingly being made to pay for it.
- ❑ **Excessive resources** – whether they are people, equipment, materials or facilities, they only increase costs and add no value.

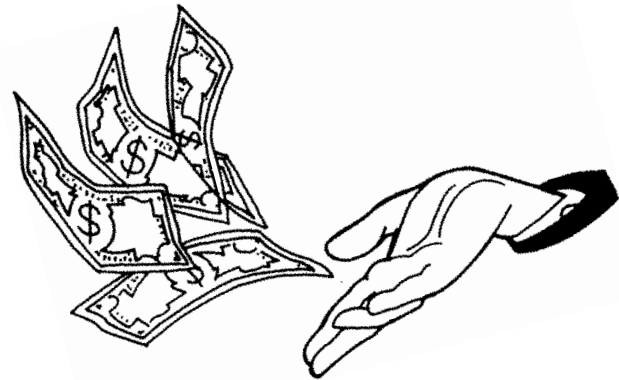


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Other Types of Waste:

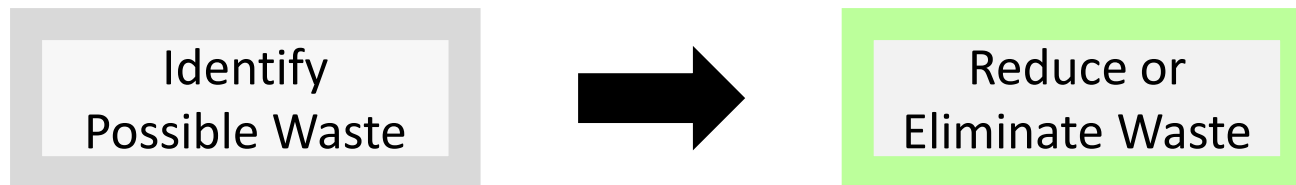
❑ Capital waste (or wasted money):

- Throwing money at problems instead of addressing the real root causes.
- **Example** - building a warehouse to store extra inventory).



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- ❑ It is not enough to just identify the waste.
- ❑ Reducing or eliminating waste is one of the fundamental objectives of Lean.
- ❑ Lean provides the methodology, tools and techniques to identify and reduce waste from processes.



Declare War on Waste!

Lead times and costs reduce as waste is eliminated

- Waste Analysis

❑ To identify waste, you may use:

- Waste walks.
- Waste recording forms and waste logs.
- Opportunity process map.
- Value matrix.

Identify
Possible Waste

❑ To eliminate waste, you may use:

- Targeted Kaizen events.
- Team based problem solving.
- 5S and visual management.
- Ownership by operational team.
- Regular improvement meetings.

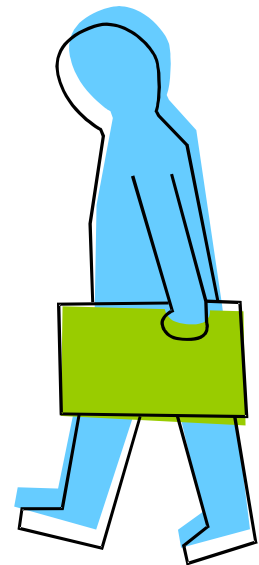
Reduce or
Eliminate Waste

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Waste Walks:

- ❑ Used to quickly identify waste within an area or in a process.
- ❑ Allows walkers to understanding how the process really works.
- ❑ Helps them quickly identify waste and identify continuous improvement opportunities.

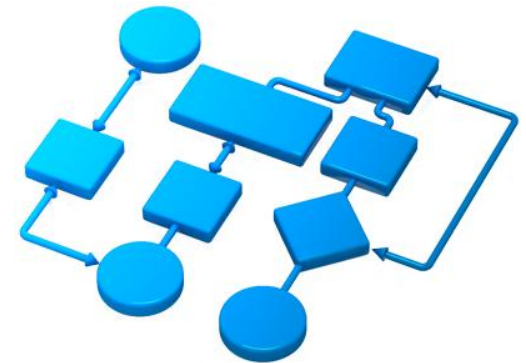
Observe the process with an eye
towards waste



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How to Conduct a Waste Walk:

- ❑ Clearly describe the objective of conducting the waste walk.
- ❑ Select the process or area and define the boundaries.
- ❑ Prepare an observation form to collect the desired information.
- ❑ Get permission from the process owner or supervisor to conduct the walks and talk to the people there.
- ❑ Walk the flow of the process and look for each of the eight types of waste.
- ❑ Collect data, observe actual practices, interview people and ask questions.
- ❑ Identify opportunities to eliminate waste.
- ❑ Prioritize improvement actions as appropriate.



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Waste Recording Form:

- ❑ Helps identify and record wasteful activities.
- ❑ It usually contains a place to classify the waste according to the eight wastes.
- ❑ It may also contain a place that encourages the team to propose priority areas for action.

Process	Waste Category	Description	Possible Cause	Proposed Action

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Exercise:

- List examples of waste from your own work.
- Use the waste recording form.
- Add extra categories if this is helpful.
- Prioritize your wastes based on the impact (or on the expected ease to correct).

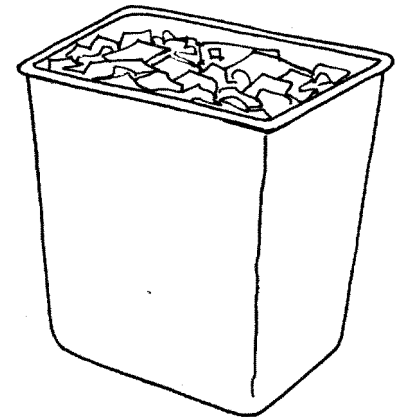


Time allowed: **15 minutes**

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Further Information:

- ❑ The more visual you make a process, the more waste visible.
- ❑ Learn to think in terms of the eight wastes.
- ❑ It doesn't really matter which category you assign it to.
- ❑ Issues associated with information waste include manual checking, reentering data, converting formats, data errors, and data safety issues.
- ❑ **Location of wastes:**
 - Value stream (stagnation).
 - Process (motion).
 - Facility (transportation).



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Further Information:

- ❑ A waste can be described by the Japanese word **Muda**.
- ❑ It means "waste" or “wasteful activity”.
- ❑ It is closely related to the terms:
 - **Mura** - (variation or inconsistency).
 - **Muri** - (excessive stress and strain required to perform a task).
- ❑ From a statistical standpoint, it is recommended to reduce process variation first, and then eliminate Muda and Muri forms of waste.

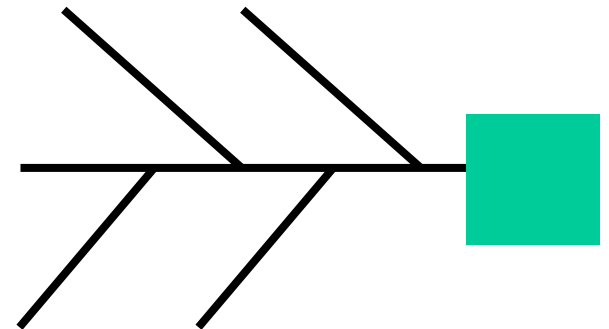


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Further Information:

❑ Common Causes of Waste:

- Misunderstanding of the customer's true requirements.
- Variability in processes or machinery.
- Pressure to maximize production to justify expensive equipment and technology costs.
- Outdated or inappropriate policies.
- Lack of training.
- Poor management work-force relations.



- Waste Analysis

Further Information:

□ Helpful Questions to Identify Waste in Production Areas:

- Are we producing too much or too soon?
- Are operators waiting for parts to arrive or for a machine to finish a cycle?
- Are we over-processing parts?
- Do we keep on the workstation more parts and components than the minimum to get the job done?
- Do we avoid the need for rework or repairs?

