Continuous Improvement Toolkit

Waste Analysis

No Muda
- 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 involves 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
- Excess of Inventory
- Wasted Motion
- Waiting
- Overproduction
- Over Processing
- Defects and Errors
- Waste Analysis

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

- Unnecessary Transportation
- Excess of Inventory
- Wasted Motion
- Waiting
- Overproduction
- Over Processing
- Defects and Errors
- Wasted 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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

Unnecessary Transportation:

- **Moving things:**
  - Costs money and time.
  - Causes production delays.
  - Bay 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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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**.
- Waste Analysis

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.
- Waste Analysis

Wasted Motion:

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

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.
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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

**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).
- Waste Analysis

Overproduction:

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

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.
- Waste Analysis

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**.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

Over Processing:

- How many bolts are there?
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

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.
- Waste Analysis

Unused Human Skills:

- Can be described in several ways:
  - Unused creativity.
  - Wasted ideas and talent.
  - Wasted human potential.
- Waste Analysis

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.
- Waste Analysis

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.
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.
- Waste Analysis

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.
- Waste Analysis

- 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.

- To eliminate waste, you may use:
  - Targeted Kaizen events.
  - Team based problem solving.
  - 5S and visual management.
  - Ownership by operational team.
  - Regular improvement meetings.
- Waste Analysis

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
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.
- Waste Analysis

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.

<table>
<thead>
<tr>
<th>Process</th>
<th>Waste Category</th>
<th>Description</th>
<th>Possible Cause</th>
<th>Proposed Action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- Waste Analysis

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
- Waste Analysis

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).
- Waste Analysis

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.
- Waste Analysis

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?