The seven wastes of lean

What is a non-value adding operation?
Types of Work

Value Adding
- Valuable Effort
  - Costs Time
  - Costs Money
  - Adds Value
  VALUABLE

Non-Value Adding
- Valueless Effort
  - Costs Time
  - Costs Money
  - Adds No Value
  WASTE
- Obvious Waste
  - Costs Time
  - Costs Money
  - Adds No Value

Where do we draw the line between Waste & Non-waste elements?
Definition of waste

TOYOTA defines waste as:

"anything other than the minimum amount of equipment, materials, parts, and working time absolutely essential to production."

An American definition of waste is:

"anything other than the absolute minimum resources of materials, machines, and manpower required to add value to the product."

(Hay 1988)

These are subjective "absolute minimum required" they are a weak basis for agreement
Waste

- Every activity should be considered as waste, unless it:
  - Meets an explicit customer requirement
  - Cannot be shown to be performed more economically

If the activity does not meet a known customer requirement or could be performed more economically, why continue in the same manner?
How much of what we do is waste?

- Typically less than 5% of what we do is adding value;
The seven wastes

1. Overproduction
   - To produce sooner, faster, or in greater quantities than customer demand.

2. Inventory
   - Raw material, work in progress or finished goods which is not having value added to it.

3. Waiting
   - People or parts that wait for a work cycle to be completed.

4. Motion
   - Unnecessary movement of people, parts or machines within a process.

5. Transportation
   - Unnecessary movement of people or parts between processes.

6. Rework
   - Non-right first time. Repetition or correction of a process.

7. Overprocessing
   - Processing beyond the standard required by the customer.

MUDA is the Japanese word for WASTE.

An 8th waste is the wasted potential of people.

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Mnemonics to remember

• TIMWOOD
  – Transport
  – Inventory
  – Motion
  – Waiting
  – Overproduction
  – Over processing
  – Defects

• WORMPIT
  – Waiting
  – Overproduction
  – Rejects
  – Motion
  – Processing
  – Inventory
  – Transport

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Transport

- Transport waste is material movement that is not directly associated with a value adding process.
- Processes should be as close together as possible and material flow directly from process to process without any significant delays in between.
- Excess transportation may be caused by:
  - Poor layouts
  - Large distance between operations
  - Lengthy, or complex material handling systems
  - Large batch sizes
  - Working to faster rate than customer demand (overproduction)
  - Multiple storage locations

Poor layout exacerbates transportation wastes
Inventory

- Inventory waste is stock and work in process in excess of the requirements necessary to produce goods or services ‘just in time’
- Unnecessary inventory that accumulates before or after a process is an indication that continuous flow is not being achieved
- Excess inventory can be caused by:
  - Lack of balance in work flow, forcing inventory build-up between processes
  - Large batch sizes
  - Failure to observe first in first out - stagnant materials
  - Incapable processes
  - Long changeover time

Stock wastes space and effort
Motion

- Waste of motion is any motion of man and/or Equipment that does not add value to the product or service.

- Wasteful motion is caused by:
  - Poor workstation layout - excessive walking, bending, reaching.
  - Poor method design - transferring parts from one hand to another.
  - Poor workplace organisation.
  - Large batch sizes.
  - Reorientation of materials.

Work smarter not harder.
Waiting

- Waste of waiting is any idle time produced when two interdependent processes are not completely synchronised.
- Operators are kept waiting, or simply work slowly whilst the machining cycles.
- Waiting results from:
  - Poor man / machine coordination
  - Long changeovers
  - Unreliable processes / quality
  - Batch completion, not single piece transfer between operations
  - Time required to perform rework

Waiting time results from failure to synchronise activities.
Overproduction

- Overproduction is the worst kind of waste because it causes other wastes and obscures the need for improvement.
- Overproduction waste results from producing more (or faster) than required.
- Overproduction is caused by:
  - Large batch sizes
  - Unreliable processes
  - Unstable schedules
  - Unbalanced cells or departments
  - Working to forecast / inaccurate information not actual demand

Avoid overproduction by balancing supply to demand.
Over-Processing

• Over processing is putting more into the product than is valued by the customer,
  • painting of unseen areas
  • unnecessarily tight tolerances
  • cleaning and polishing beyond the level required
• The goal is to do only the level of processing to match that which is useful and necessary
• Over-processing is caused by:
  • No standardisation of best techniques
  • Unclear specification / quality acceptance standards

Clear, standardised instructions avoid over-processing
Defects

- Waste of correction includes additional work performed on a product or service
- Caused by no, or unclear operating procedure / specifications
- Defects are caused by
  - Inadequate training
  - Skills shortage
  - Incapable processes
  - Incapable suppliers
  - Operator error
  - Excessive stock
  - Transportation

Right first time avoids scrap & rework
Additional wastes

- Creativity
- Resources
- By products
The 7 wastes

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