Lean Principles

Training Guide

10-Second Test

Learning to see value

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What is Waste?

WASTE (lean definition): anything other than the minimum amount of equipment, materials, parts, space, and worker's time, which are absolutely essential to add value to the product.

"If it doesn't add value - - it's waste."

Waste in Japanese is Muda

MUDA (lean definition): any human activity which absorbs resources but creates no value: mistakes which require rectification, production of items no one wants, a build up of excess inventories, processing steps which aren't needed, movement of employees to transport goods without purpose, people waiting idle in downstream processes waiting for a delivery, and goods which don't meet the needs of the customer.

Taiichi Ohno (1912 - 1990)

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8 Kinds of Waste

Overproduction

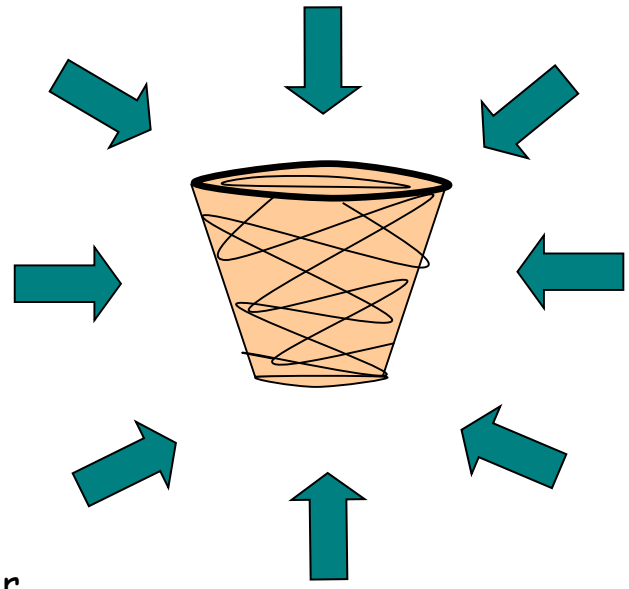
Producing too much, or producing too soon

Intellect

Any failure to fully utilize the time and talents of people

Conveyance

Any nonessential transport is waste



Motion

Any motion that does not add value

Inventory

Any more than the minimum to get the job done

Correction

Any rework or repair

Waiting

Waiting on parts, waiting for a machine to finish a cycle

Over Processing

Any unneeded or inefficient steps

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Sorting out Waste

Waste -- Overproduction

Preparing Reports Which Are Not Acted Upon

- Producing too much
- Producing too soon
- Designing but Not Making
- Multiple Copies
- Multiple Data Storage
- Excess Inventories
- Excess Work in Process

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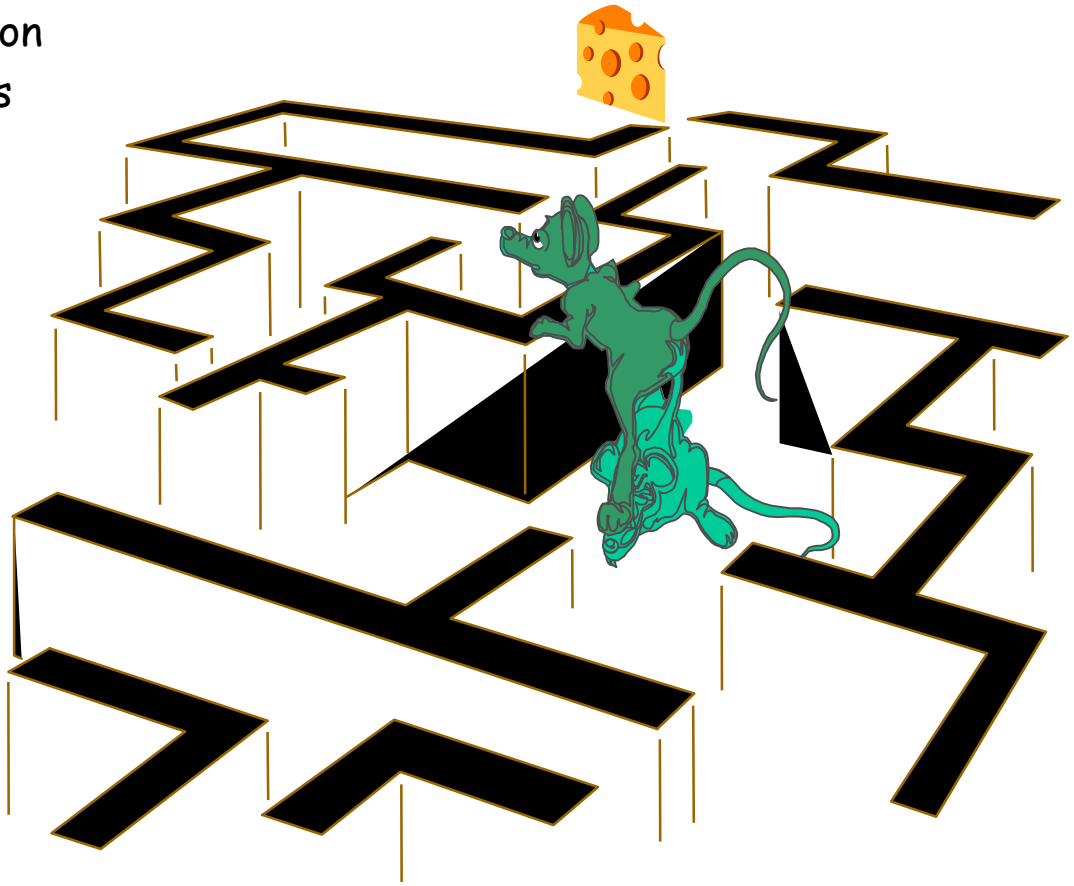
Sorting out Waste

Waste -- Conveyance

- Nonessential Transportation
- Extra Steps in the Process
- Distances Traveled
  - Worker
  - Product
- Hand Off of Data
- Paper Copies
- Products Lost or Damaged



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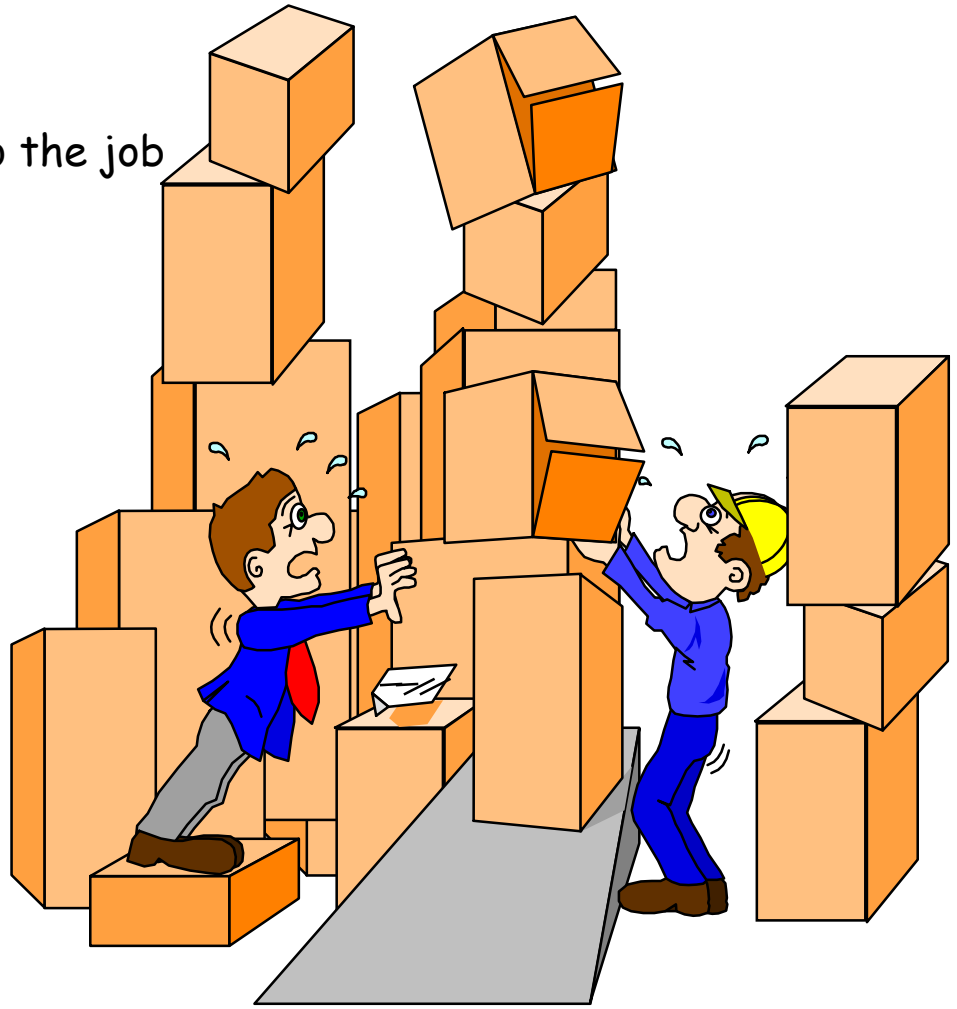
Sorting out Waste

Waste -- Inventory

- Any more than the minimum to do the job
- Design Data
- Transaction Not Processed
- Hold Box
- Stacks of Stuff
- Money Tied up
- Storage Costs
  - Handling
  - Auditing
  - Finding



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Sorting out Waste

Waste -- Waiting

- For Other
  - Elements
  - Functions
  - Disciplines
- For Enough to Build
- Watching Machines
- For Parts to Arrive
- For Computer Time

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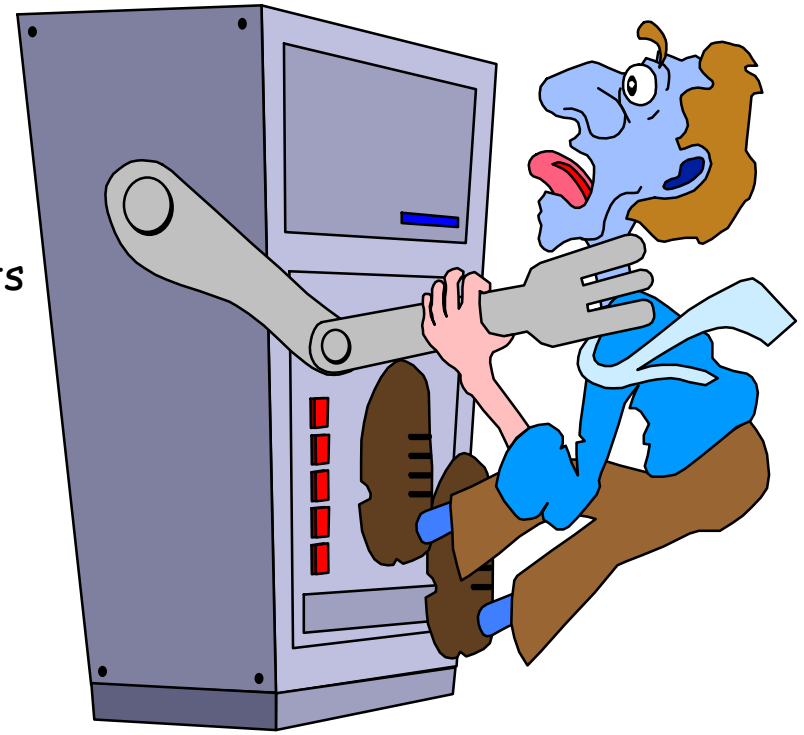
Sorting out Waste

Waste -- Over Processing

- Redesign
- Not Organized
- Not Fully Utilized
- Signoffs
- Reports Etc. Which Are Not Read / Used
- Unneeded or Inefficient Steps
- Delivering More Than the Customer Wants



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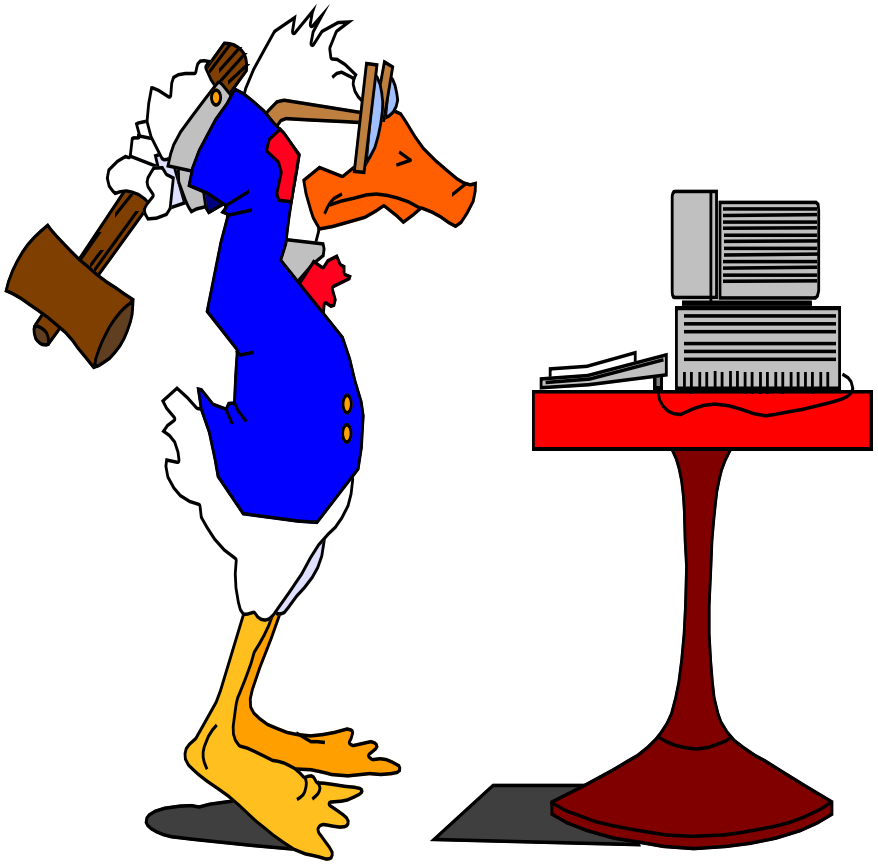
Sorting out Waste

Waste -- Correction

- Defects
- Incorrect Data Entry
- Drawing Errors
- Miscommunication
- Rework
- Repair
- Inspections
- Warranty Costs
- Customer Dissatisfaction



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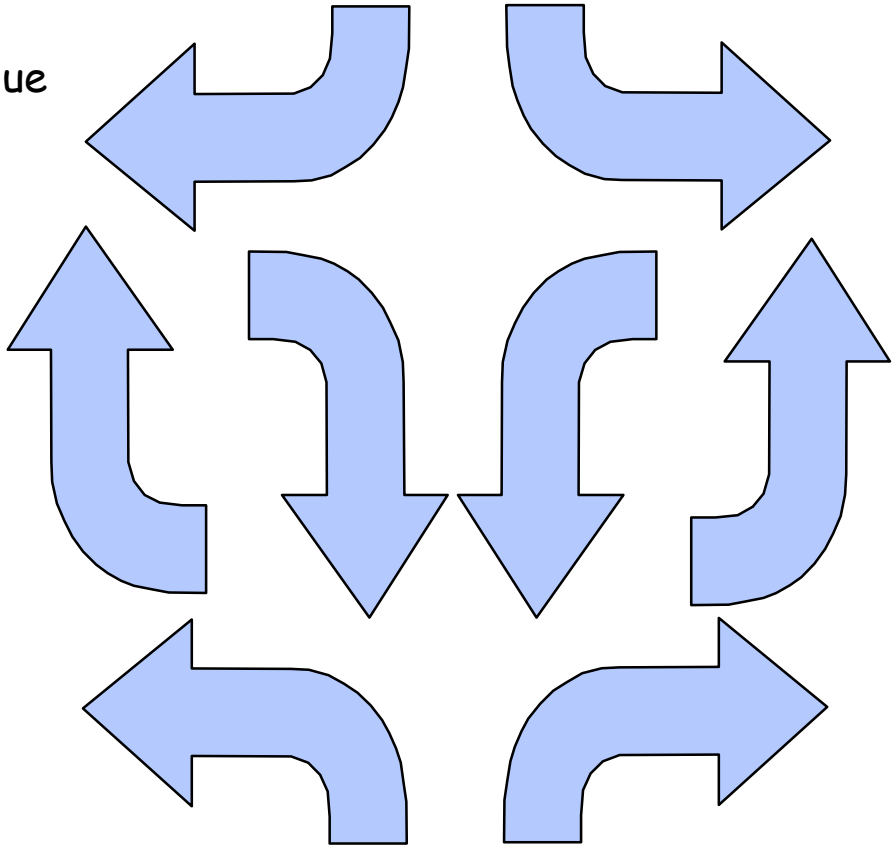
Sorting out Waste

Waste -- Motion

- Any motion that does not add value
- Unnecessary Analysis
- Unneeded
  - Testing
  - Steps
  - Data Entry
- Looking for
  - Tools
  - Plans
- Stacking
- Unstacking



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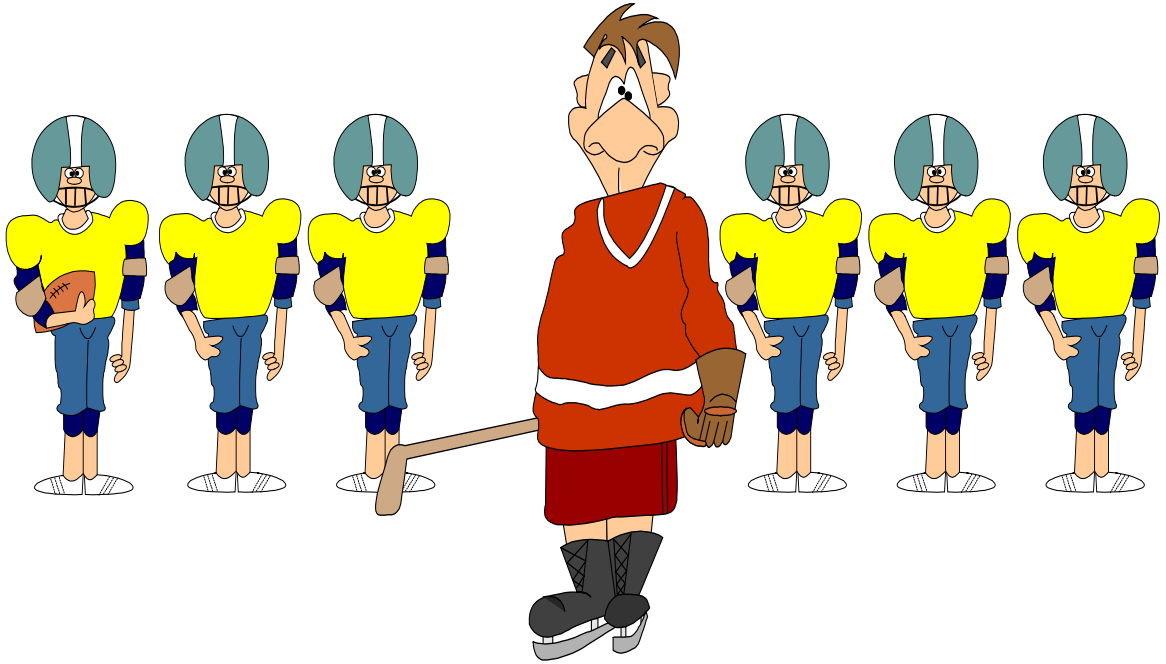
Sorting out Waste

Waste -- Intellect

Failure to fully utilize time or talent of people
Underdeveloped Talent
Poor Quality
Unplanned Absence
Turnover
Independent Actions
Under Utilization
Focus on Status Quo
Ambiguous Standards
Unresolved Problems
Accidents



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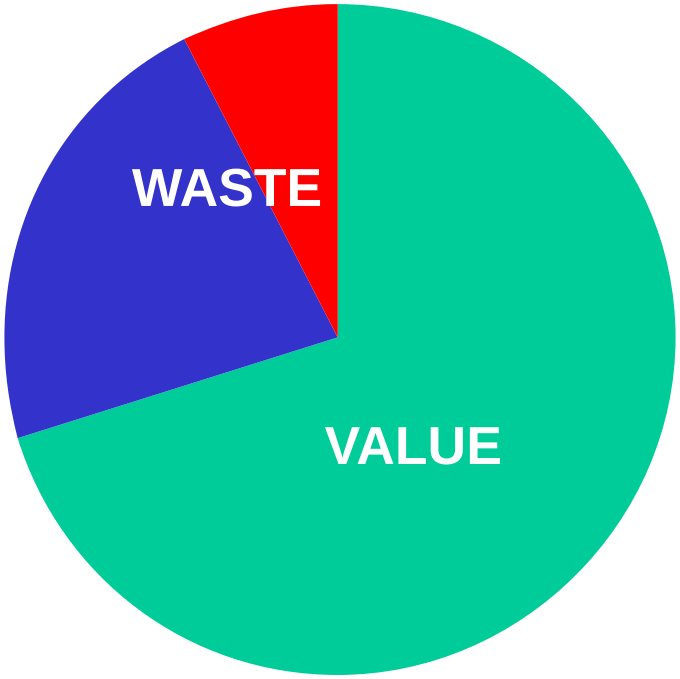
Waste - Where is it?



WASTE: waiting for materials, watching machines run, producing defects, looking for tools, fixing broken fixtures or cables, producing unnecessary items, etc…

WASTE: transportation, storage, redundant inspection and rework, etc…

WASTE: unnecessary movement of anything, set up activities, searching for documents, etc…

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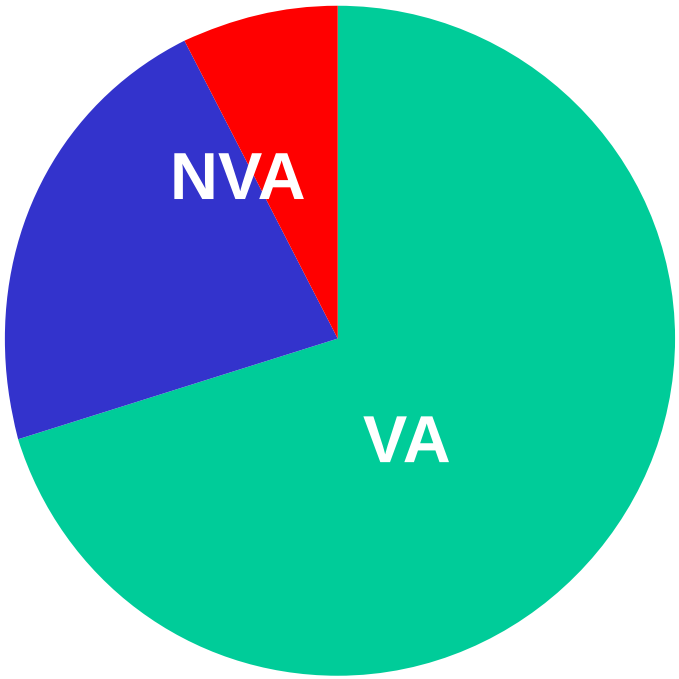
Waste - Non-Value Adding



The goal is to do only **Value Adding** activities that actually go directly into producing the product

The opportunity is to eliminate the **Non Value Adding** activities that are associated with producing the product.

The NVA time can be broken into two parts: About 75% is **INCIDENTAL** time that is non-value adding but necessary, and 25% is **PURE WASTE** and therefore presents an opportunity for elimination.

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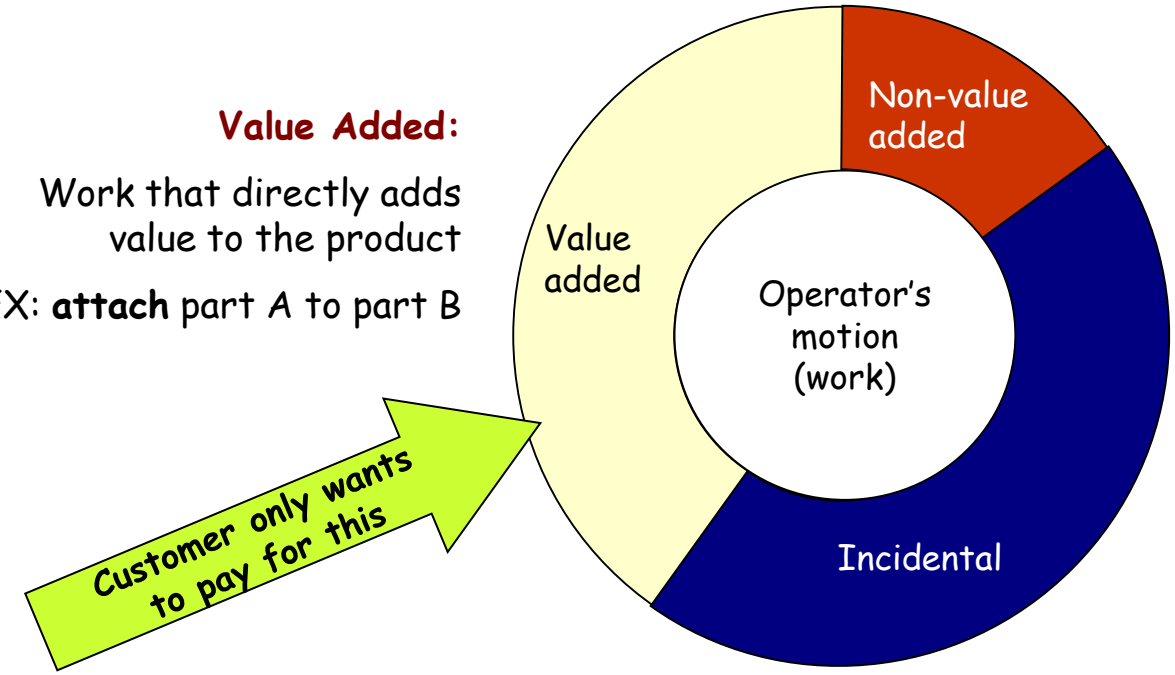
VA / NVA -- Managing Productivity

Value Added:

Work that directly adds value to the product

EX: **attach** part A to part B



Non Value Added:

Work that does **not** add value to the product

EX: **walking** to get Part A that could have been located at point of use

About 25% of all NVA is pure Muda!

Incidental NVA:

Work that **does not add value** but must be done to accomplish value added work

EX: **picking up** Part A to be installed

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Waste – you will find it everywhere a process exists

Manufacturing

- Machine a Part
- Assemble Parts
- Package
- Heat Treat
- Identify Parts
- Move Part to Next Unit
- Walk to Tool Crib
- Deliver Paperwork
- Walk to Parts Crib
- Inspect the Part /Assembly
- Check Paperwork
- Verify Stamps
- Check Tooling

Business Process

- Fill Out a Form
- Post to a Record
- Look up a Customer
- Make Entry in File
- Sort Orders
- Take to a Person's In- Basket
- Walk to Copier
- Deliver a Package
- Walk to File Cabinet
- Check Form for Completeness
- Verify Figures on Report
- Check Design Drawing
- Proofread Memos

All of these are opportunities for observation and improvement. The tools presented in Learning to See the Waste aren't just for the manufacturing shop, they also apply to the office or anywhere else a process exists.

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10 Second Test - How to

Pick a group of workers in a small section of the shop or office area, and count how many.

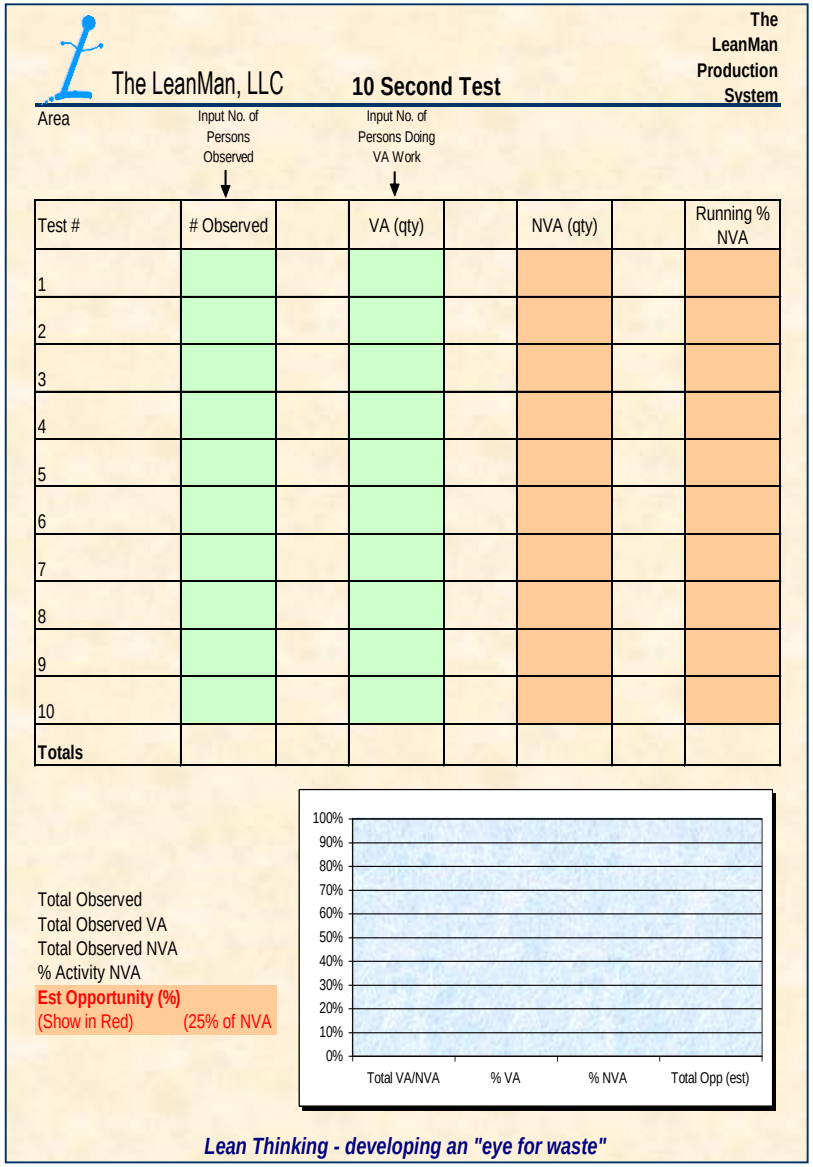
Do NOT disturb the workers, you need true data and asking them what they are doing will defeat the test.

Look at the group for 10 seconds.

Each person is either working the process or not (doing something the customer would pay for). Anyone working on the process is considered to be doing Value Added (VA) work and is added to the VA quantity.

Record the total number observed, and the number doing VA activity.

Sum totals on form provided.



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The 10-Second Test

The results, when graphed, show the total activity, the portion that is Value Added, and the total portion that is Non-value Added.

Of the Non-value Added time, the empirical formula for incidental versus pure waste is 75% to 25%. In the example shown, the pure waste is approximately 8% of the observed time, which is the opportunity for improvement through Kaizen or Continuous Improvement events.

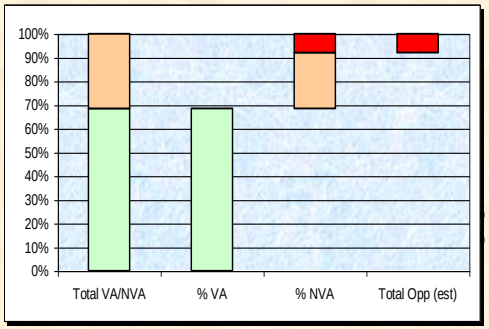
The LeanMan, LLC — **10 Second Test** — The LeanMan Production System

Area

Input No. of Persons Observed ↓ Input No. of Persons Doing VA Work ↓

Test #	# Observed		VA (qty)		NVA (qty)		Running % NVA
1	4		4		0		0%
2	3		2		1		33%
3	4		4		0		0%
4	3		3		0		0%
5	4		3		1		25%
6	2		0		2		100%
7	4		2		2		50%
8	4		1		3		75%
9	4		3		1		25%
10	3		2		1		33%
Totals	**35**		**24**		**11**		**31%**

Total Observed	35
Total Observed VA	24
Total Observed NVA	11
% Activity NVA	31%
Est Opportunity (%) (Shown in Red)	**8%**



Lean Thinking - developing an "eye for waste"

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10 Second Test - Benefits

Discussion Points

- What was observed about the process?
- Common themes observed?

Applications

- This test is only to get a quick top level idea of opportunity that may exist in the process. However, it lacks specificity and cannot by itself direct change.

Summarize key points (based on observations)

- Identifies a few limited forms of obvious waste
- Lumps incidental and pure waste into NVA
- Great for large areas to highlight specific areas of interest to zoom in on.

To get specific detail on a small areas, use the 15 Minute Observation

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The 15 Minute Observation

A 15-Minute Observation Team is formed to collect specific detail.

The team usually consists of

a shop operator familiar with shop transactions,

a salaried materials support person familiar with material movement and transactions, and

a process engineer familiar with the process.

The observation team and the work cell team are brought together and given a review of the 10-second test method and results, the ideas behind learning to see waste, and instructions on how the 15-minute observation works.

Using the 15-Minute Observation Form, record a brief description of the process being observed, just enough detail support later discussion. Indicate the process and queue (wait) times and distance traveled. Indicate how much time is value adding, and how much time is required (incidental) and pure waste.

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The 15 Minute Observation - How To

The work cell is instructed to perform as trained, and not to be interrupted by the observers. They are asked to handle the daily situations, make the usual decisions, and do whatever they normally do as they perform their work.

The observers are to pull up stools and sit and watch the work cell function over a period of time, taking particular note of any non-value adding activities. They are asked not to disturb the work cell with questions, but simply make notes of any questionable activity for later discussion.

After the observation period, the observation team and work cell members are to discuss the observations, clarify activities, and look for opportunities for improvement.

15-Minute Observation Sheet

Step No	Process Description	Process Time	Queue Time	Distance Traveled	Value Added	Required Waste	Pure Waste

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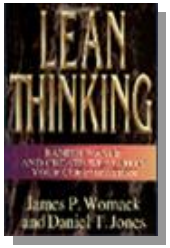
Lean Thinking

Author: Daniel Jones, James Womack
Publisher: Simon & Schuster
Publication Date: 9/9/1996

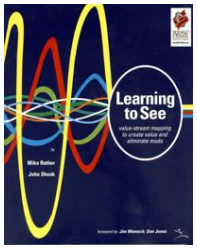


New Manufacturing Challenge: Techniques for Continuous Improvement

Author: Kiyoshi Suzaki
Publisher: The Free Press, a division of Simon & Schuster
Publication Date: 1987

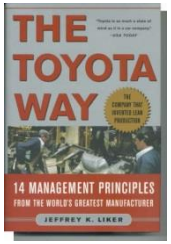
Learning to See: Value-Stream Mapping to Create Value and Eliminate Muda

Author: Mike Rother, John Shook
Publisher: The Lean Enterprise Institute, Brookline, MA
Publication Date: 2003 Version 1.3



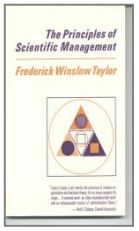
The Toyota Way

Author: Jeffrey K. Liker
Publisher: McGraw-Hill
Publication Date: 2004



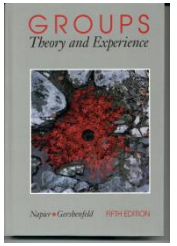
The Principles of Scientific Management,

Author: Frederick Winslow Taylor,
Publisher: New York: Harper & Brothers,
Publication Date: 1911



Groups Theory and Experience,

Author: Napier, Rodney W., Gershenfeld, Matti K., 5th ed.,
Publisher: Houghton Mifflin Company,
Publication Date: 1993.



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