

OVERVIEW LEAN TOOLS

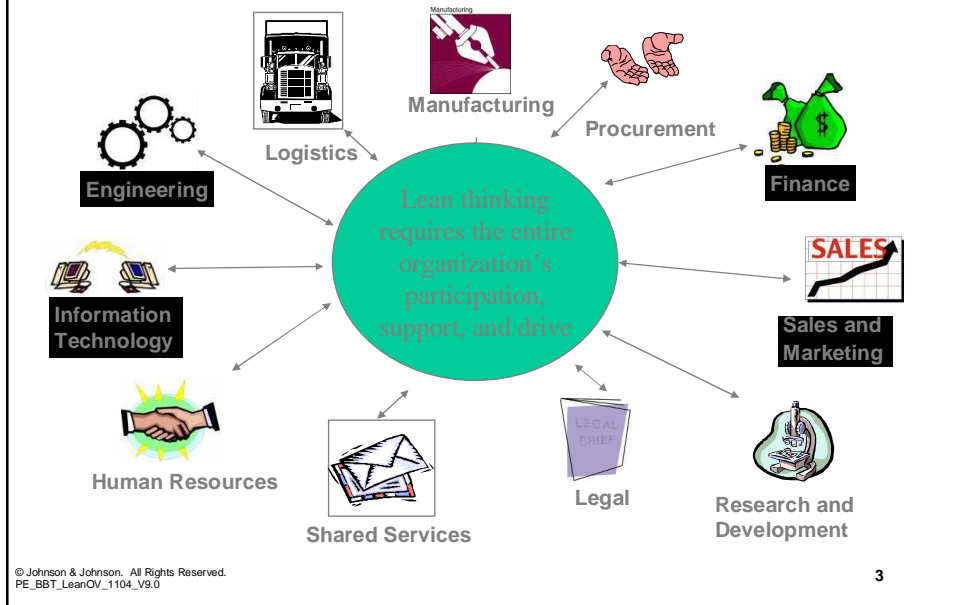
ASQ Biomedical Discussion Group
 San Fernando Valley
 Larry Bartkus
 January 2008

The 8 Wastes

❖ The heart of lean is eliminating waste. Waste can be defined as anything that does not add direct value to the end service or product from the customer's perspective.

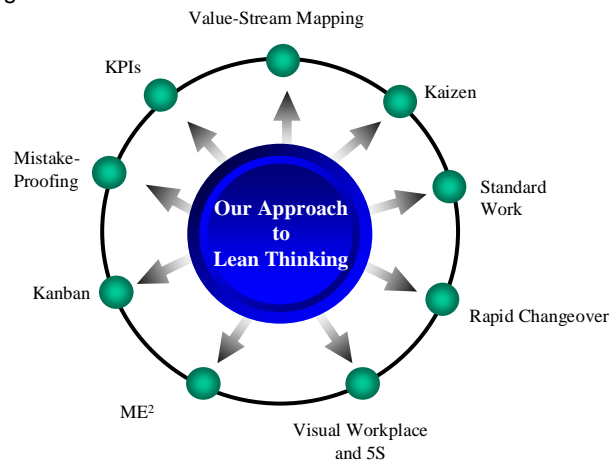


Lean Involves the Entire Corporation

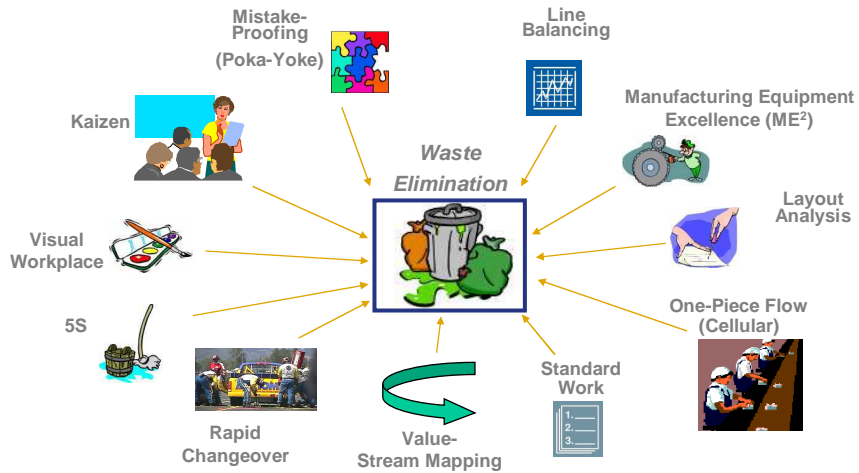


Lean Thinking

Lean has a variety of tools used to *enable* the culture. They are **designed to reduce waste and increase customer value**. Below are some tools used in lean thinking.



Common Lean Tools



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What Is a Value-Stream Map?

A visual representation, a “map,” that follows a product’s production path from beginning to end and contains all of the process’ material and information flows.

Is equally effective in both production and administrative environments.

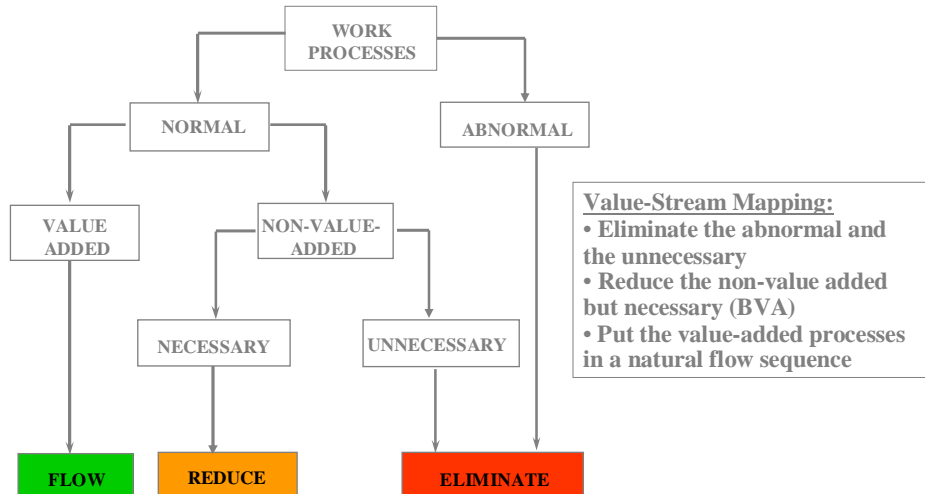
It is advised to do a current state map and future state map and update at least monthly.

You can hand-draw it on sticky notes or do it on the computer, either one will work depending on your needs.

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Identifying Value in a Process



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Draw the Future-State Map

Use current VSM data

Reduce as many NVA steps as you can

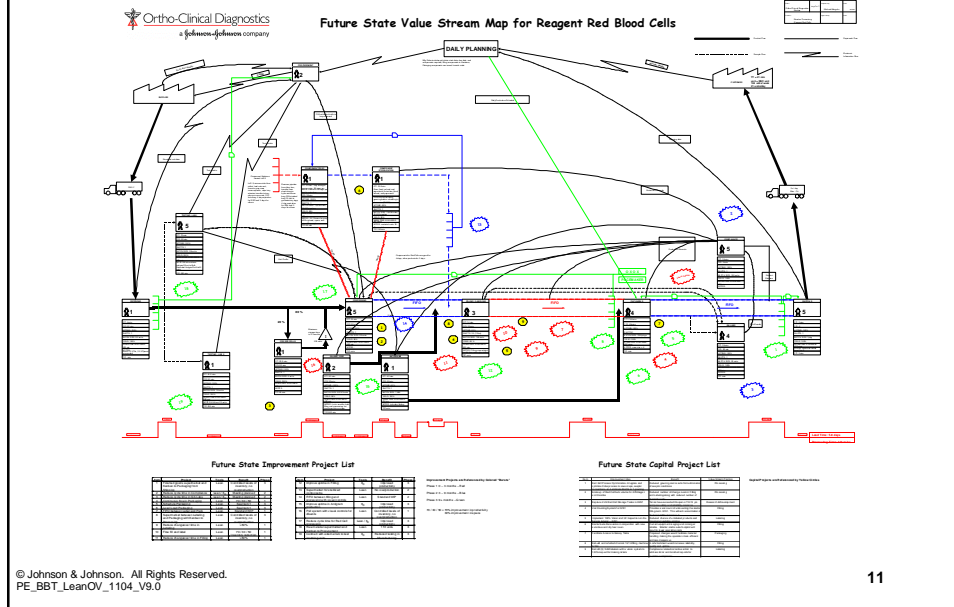
Include projects list (Lean, Six Sigma, DEx, etc.)

Include capital projects (What, Who and When)

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Future-State Value Stream Map for Reagent Red Blood Cells



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Key to a Lean Culture: Kaizen (Continuous Improvement)

What Is Kaizen?

Kaizen means "change for the better" in Japanese. The best English equivalent is "positive improvement."

What Is Kaizen 'Blitz'?

Kaizen Blitz is a concentrated, highly intensive activity designed to make rapid improvements quickly and efficiently.

Kai



Zen



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Change/Improvement Good/Continuous

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Kaizen Definition

Formal, planned activities to achieve a stated objective within a short period of time OR quick meetings that occur to review data and make a decision if there is an issue with the process

Kaizen assembles dedicated cross-functional teams aimed at improving a process or problem identified within a specific area

The team may work together once in a quick event or they may work together over a long period of time. Find what works for you at your facility or in your function.

Kaizen Definition (cont.)

Kaizen is a vehicle for driving quick-hit value by implementing “do-now” solutions through waste elimination and making on-the-spot decisions when an issue is presented

A great project launching tool

Kaizen is a vehicle to increase process speed and efficiency through employee involvement (remember the Talent waste!)

Change is IMMEDIATE (few to-do lists or action items)

**Kaizen events and kaizen teams are about *action and change*,
not just talk and lists.**

How Long Will It Take?

Short period of time

- Kaizens can be as short as 15 minutes or as long as 5 days

Complex kaizen workshops can take up to 2 months to complete

- Two weeks planning
- Workshop lasts 3 to 5 days
- Follow-up tasks completed 3 to 4 weeks

How Do You Make Kaizen Part of the Culture?

Leadership must lead kaizens as part of their goals and objectives.

Leadership must support innovation and empowerment of the team (do not second guess, let the team work).

Change must be *expected*.

If the change does not work, do not reprimand. Learn the lessons and do another kaizen. That's part of the process of innovation!

Identify a dedicated 'kaizen room' with computers and all needed supplies for uninterrupted success

GE has kaizen t-shirts so when you are doing a kaizen you know that person cannot be bothered for other reasons. You also know that if you get asked for data or ideas that you must stop and help. T-shirts are a number one priority!

Reward and recognize kaizen team success.

Visually track progress.

Summary

A kaizen event:

- Is fast
- Has clear and radical goals
- Has clear boundaries and allocated resources
- Is initiated and fully supported by management
- Involves cross-functional team
- Is thoroughly planned in advance
- Is structured
- Includes training in appropriate tools
- Achieves results quickly; the spirit is “do it” by removing waste from the process

The 5 Ss

Step 1 SEIRI

Segregate and Eliminate - SORT

- Segregate necessary items from unnecessary items and eliminate what is not needed.

Step 2 SEITON

Arrange and Identify - SET IN ORDER

- Arrange items so that they can be found quickly by anybody.

Step 3 SEISO

Daily Cleanup Process - SHINE

- Create a spotless workplace...swept and clean.

The 5Ss (cont.)

Step 4 SEIKETSU

*Constant Adherence to the First Three Steps & Safety -
STANDARDIZE*

- Standardize cleanup activities so that these actions are specific and easy to perform. Create and maintain a safe work environment. Ensure compliance to procedures.
- This is the condition we support when we maintain the first three steps.

Step 5 SHITSUKI

Motivate to Achieve Habitual Compliance - SUSTAIN

- Promote adherence to maintaining a high performance, high quality and safe work environment. Use visual performance measurement tools.
- Make a habit of maintaining established procedures and ensuring they are followed.

5S Training Program Main Menu



Example of Sort



Example of Set in Order _B



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Example of Shine



Floors and equipment in area are painted and clean

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Example of Standardize



Standard Hardware parts are consolidated and identified

5S Audit Form

Work Place Organization Audit Process							
A. Sort							
	0	1	2	3	4	5	Comments
1> Is the floor clean and maintained or is there evidence of spills of material, liquids or parts						x	
2> Is personal protection equipment available and used by all people working in the area. Is it readily accessible			x				
3> Is all machinery/equipment appropriately guarded and kept clean and unsoiled by daily care				x			
4> Is cleaning equipment readily available and identified in the area e.g. brushes, cloths, bins, vacuums					x		
Score	0	0	2	3	3	0	
B. Set in Order							
	0	1	2	3	4	5	Comments
5> In unmarked areas, is the floor free from unnecessary items e.g. tools, WIP, trash cans						x	
6> Are there any unnecessary items of machinery or equipment located within the area			x				
7> Are tools/parts for changeovers identifiable and appropriately located e.g. shelves, cabinets, boards						x	
8> Are there items of inventory/parts that do not relate to what is currently being produced in the area						x	
Score	0	0	2	0	4	10	
C. Shine							
	0	1	2	3	4	5	Comments
9> Are controls for machines properly labeled and are critical points for maintenance clearly marked						x	
10> Are "quality systems on-line" e.g. Work Instructions, Drawings, SPC						x	
11> Are all documents in area associated with task, neatly stored, and are revisions current						x	
12> Is all product appropriately identified in terms of its status e.g. good, scrap, on hold, rework etc						x	
Score	0	0	0	0	0	20	
D. Standardize							
	0	1	2	3	4	5	Comments
13> Is the storage of all containers and material always neat and at right angles					x		
14> Is operational performance information readily available in the area e.g. schedules, production, scrap						x	
15> Are walkways, workstations, product storage and hold locations clearly delineated						x	
16> Are there suitable markings, and labels to identify contents on the floor, shelves, bins, cabinets						x	
Score	0	0	0	3	4	10	
E. Sustain							
	0	1	2	3	4	5	Comments
17> Is there a disciplined system of controls and maintenance to ensure highest possible performance						x	
18> Are all tables, benches and workstations kept in an orderly, clean and tidy condition						x	
19> Is there evidence of a system to keep all machinery/equipment clean by daily care						x	
20> Are controls posted on a bulletin board. Is information on the bulletin board orderly and current	x						
Score	0	0	0	0	4	10	
Area:							
Auditor(s):							
Date:							
Section	A	B	C	D	E		
Sub-total Score	13	16	20	17	10	80	

Before and After 5S



Before: Raw material storage
Montreal SanPro



After: Color coded storage areas

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Before and After 5S



Before: CPC-PPC plant



After: Organized and color coded
space which also acts as a
kanban

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Foundations of Poka-Yoke

Poka-Yoke is Japanese for mistake-proofing. It is the creation of devices that either prevent the special causes that result in defects or to inexpensively inspect each item produced to determine whether it is acceptable or defective.

A Poka-Yoke device is any mechanism that either prevents a mistake from being made or makes the mistake obvious at a glance.

The ability to find mistakes is essential because the cause of defects lies in errors committed due to imperfect processes. Defects result from either being unaware of the errors or neglecting to do anything to correct them.

Any defect or non-conformance to CTQ specifications can be major sources of customer dissatisfaction and create numerous hidden cost for the producer.

Mistake-Proofing Strategies

Make it harder to create the error

Make it possible to reverse the error

Make it obvious that the error has occurred

Detect deviations from procedures or fixed values (e.g., Number of parts)

Design:

- Design process so it tolerates the error and doesn't result in a defect
- Design process to decrease complexity

Poka-Yoke Systems

Two poka-yoke systems can be used...

■ Control approach

- Shuts down the process when an error occurs
- Keeps the suspect part in place when an operation is incomplete
- High capability of achieving zero defects
- Machine stops when irregularity is detected

■ Warning approach

- Signals the operator to stop the process and correct problem
- Sometimes an automatic shutoff is not an option
- Dials, lights, and sounds to bring attention to the problem

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Seven Step Poka-Yoke Process

- (1) Identify and describe the defect
- (2) Identify:
 - Where the defect is made
 - Where the defect is discovered
- (3) Analyze the process/operation where the defect is made
- (4) Determine the deviation from standard
- (5) Determine the *root cause* of the defect
- (6) Identify potential ideas to eliminate or detect earlier
- (7) Create a mistake-proof device or implement other mistake-proof solution

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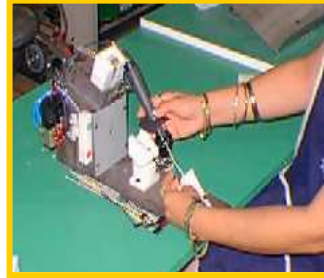
Mistake-Proofing Example - Solder Joints



4 critical wires were hand soldered to a circuit board

An incorrect or missing solder would result in a defect (25 - 30 ppm)

An error may not be detected until a new car drives over a bump in the road



The soldering operation has been error proofed. The new station will ensure:

- All four wires are inserted in the correct positions
- All solder welds are complete
- There are no short circuits
- There are no missing solder welds

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Mistake-Proofing in Film Manufacturing Eliminating Errors During Coating Solution Formulation

Problem:

Raw materials for coating solutions are weighed but not segregated by batch or shift. Creates opportunity for erroneously omitting material or adding material intended for a batch made on a different shift.

Solution:

Operation's team implemented "Shift Carts" to segregate materials. Prevents mix-up of materials between shifts.

No batch waste for this failure mode since implementation in June 2000.



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Discussion Groups

Value Stream Map

Supply Chain
Packaging & Sterilization

Kaizen

Non-conforming Material Reports
ECO Process

5 S

Receiving Inspection
Quarantine & Release Product

Poka-Yoke

Work Station
Computer Report