Lean Process Improvement

How to Positively Impact your Projects and Business

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Agenda

- What is Lean?
- Why is it important?
- How does it apply to ICT?
- Case Studies
- Core Tools
- Group Activity 1 – Value Stream Mapping
- Group Activity 2 – Mini kaizen

Lean

What is it?

What is Lean?

Getting the right things,
to the right place,
at the right time,
in the right quantity,
with minimal wasted
resources

ICT Value Stream
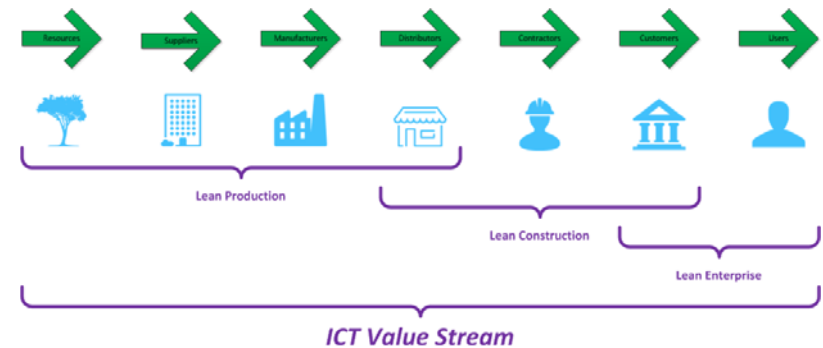
Avoid workers waiting for work,
and work waiting for workers

History of Lean

- It is a philosophy that is based around minimization of waste based on:
  - Frederick Winslow Taylor "Principles of Scientific Management" (1911)
  - Henry Ford; First US mass assembly manufacturing system focusing on the elimination of waste (1913)
  - Taiichi Ohno; the Toyota Production System (1948)
  - Growing beyond manufacturing to sales process, specific verticals (e.g. healthcare) and other types of business processes (e.g. construction)
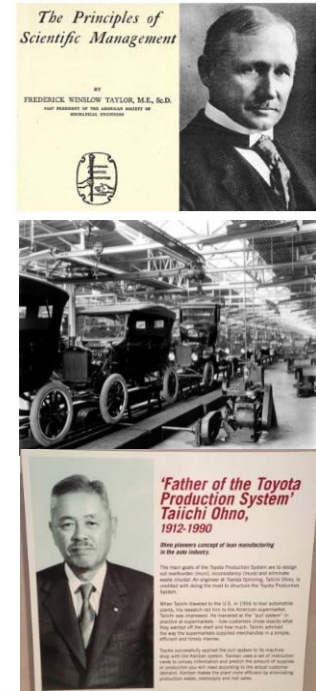
Eliminating The Eight Wastes

Defects

Transportation

Motion

Waiting

Inventory

Over production

Over processing

Talent*

Value, Muda, Mura and Muri

- Value must always be defined from the customers view point;
  - Are they willing to pay for it?
  - Does it transform the product and/or service some how?
  - Is the product and/or service correct the first time?
- Muda; futility, uselessness, wastefulness
  - By definition non-value added (NVA) components to the process
  - Type 1 muda (NNVA); 'considered' necessary, and are typically secondary in priority for elimination
  - Type 2 muda (NVA); non-value added and not necessary, they should be the first priority targets for elimination
- Mura; unevenness, irregularity, lack of uniformity
  - Variation in operation(s); when things don't go smoothly and/or do so inconsistently
- Muri; unreasonableness, impossible, beyond one's power
  - Unnecessary and/or unreasonable burdening of people, equipment and/or other systems
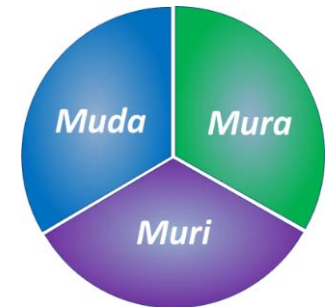
Lean

Why is it important?

Increased Value/Less Waste – More Effective

- Traditional process improvements focus on value added components

- However, focusing on non-value added components (NVA) has the largest opportunity for improvement!

  - Benefits (increased) quality, responsiveness, OTD, satisfaction, productivity, profit, capacity, cash flow
  - Benefits (decreased) defects, lead times, costs, inventory, resources, waste
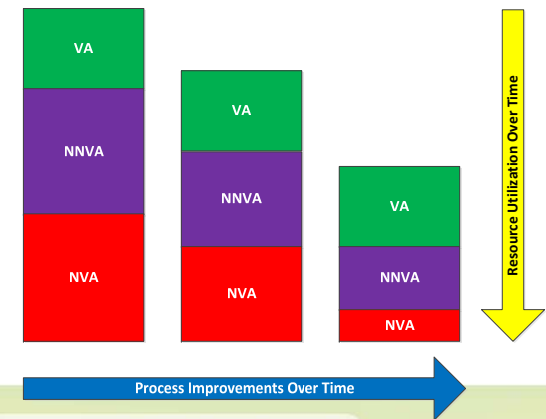
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How does it apply to ICT?

Defects & Transportation

- Defects (also scrap, rework and reconciliations)
  - Misunderstanding requirements
  - Incomplete or incorrect information, data or materials
  - Incomplete or incorrect installations
- Transportation (material and/or information handling)
  - Jobsite material movement, uncoordinated deliveries and site layout issues
  - Identification and sorting issues

Motion & Waiting

- Motion
  - Searching for tools, test equipment, information, drawings etc.
  - Moving from area to area before completing work (or to recover forgotten/overlooked/lost materials)
  - Poor jobsite organization
- Waiting and delays
  - Waiting for instructions, tools, RFIs, materials, labour etc.
  - Waiting for other work to be completed

Inventory & Over Production

- Inventory
  - Lack of preplanning materials
  - Fabricating to early, or over purchasing "just-in-case"
  - Not returning excess materials
- Over Production
  - Out of sequence work (trying to get ahead)
  - Creating extras (paper, materials, staging etc. that ends up not being used)
  - Anything that ends up in the dumpster (materials and/or packaging)

Over Processing and Talent

- Over Processing
  - Anything that the owner/customer doesn't recognize as value
  - Over providing (giving more than the owner/customer doesn't want/need)

- Talent
  - Not making use of the resources, talents and experience of the entire organization/team
  - Not utilizing healthy consensus or recognizing that a 'team' decision is usually the best one

Case Studies

Healthcare, Construction, &
You don't know what you can do
unless you try!

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Example: Healthcare

- St. Mary's General Hospital – focusing on the value chain … 'the patient'
  - Percentage of patients readmitted to hospital from 7.2% to 4.1% (national average 8.7%)
  - Reduced Hospital Acquired Infections; 35% reduction in C.difficile
  - Better than national average of Hospital Standardized Mortality Ration (HSMR) score of 83 vs 89 for national average
  - Emergency wait times reduced from 5.4 hours to 3.1 hours a 45% improvement (2012/13)

"Over the past few years, St. Mary's has seen positive results when it comes to patient readmission, Hospital Standardized Mortality Ratio, and fiscal responsibility as a result of using Lean tools and methodologies to support staff-led continuous improvement initiatives in patient care," said Sandra Hett, [former] Vice President of Patient Services and Chief Nursing Executive.

The Value of Thinking Differently

- Empire State Building
  - Single largest install for NY Telephone Company
    - 6k house pairs, 4k pairs to the CO, >5k phones, and >3k switchboards
  - Excavation began January 22nd, 1930
  - Ribbon cutting May 1st, 1931
  - More than 3400 workers
  - 103 Stories, 67 Elevators
  - Cost of Construction & Land $41M
  - Master builder concept
  - Used a construction supermarket
    for daily deliveries
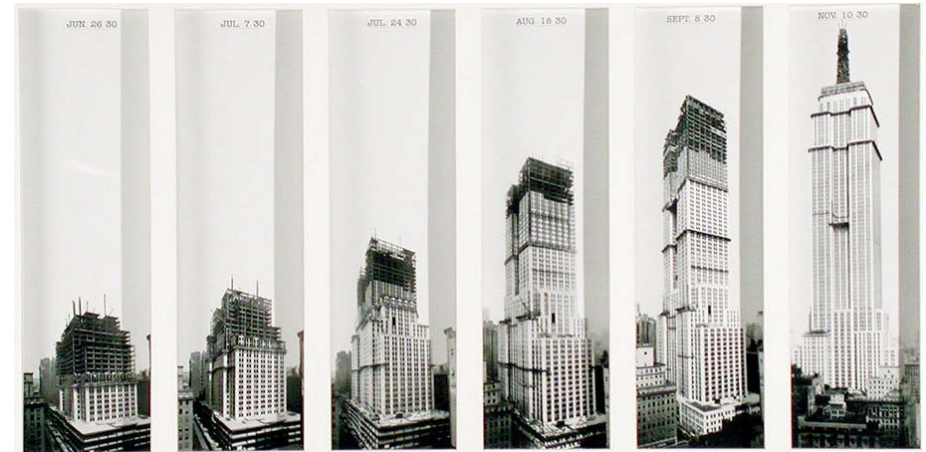
How Long Does it Take to …

- https://youtu.be/rwvmru5JmXk
  - In 2011 a 30 story was built in China
  - In 2015 the same company built a 57 story building with an even larger floor plate …
- How long does it take to build a building if you're in a rush?

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Lean

Core Tools

The Core Lean Tools

- 5 Ss
- Kaizen Events
- Standard Work
- Value Stream Maps
- A3 Problem Solving
- Error Proofing
- Office / Process Cells
- Kanbans

The 5 Ss

- Used to create a safe, clean and organized business environment. They provide a foundation to becoming a world class organization;
    1. Sort
    2. Straighten / Set In Order
    3. Sweep / Shine
    4. Schedule / Standardize
    5. Sustain

Before   **After**

- Reduce (ideally eliminate) organizational waste related to;
    - Injury and/or lost time accidents (the 'unofficial' 6th S for Safety)
    - Searching for anything at the jobsite, office, shop, service trucks, remote devices ... anything anywhere

Kaizen (Change for the Good)

- Specifically refers to continuous incremental improvement,

- Related to kaikaku (radical improvement, as a part of the kaizen process, or conversely as part of the overall organizational goal)

- It is key to remember slow and continuous improvement is the goal – not necessarily;
  - Giant steps, dramatic improvements and home runs

- Kaizen 'events' typically can last days or even weeks, and are usually staffed with a reasonably sized team (5-12 people)
  - Gathers key people (operators, managers, and owners of the process)
  - Maps the existing process (current state)
  - Suggests improvements on the process (future state)
  - Gets consensus from all on the changes and reports back to the organization

改善 **KAI=Change**

善 **ZEN=Good**

改善 **KAIZEN** (Continual Improvement)

Kaizen

Kaikaku
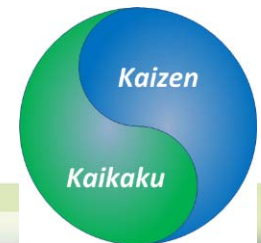
Steps of a Kaizen Event (example)

0 – Event preparation

1 – Define the scope and goals

2 – Train the team, and review tools

3 – Observe the process

4 – Collect data on the process

5 – Brainstorm ideas (no holds barred)

6 – Prioritize the ideas

7 – Implement prioritized ideas

8 – Verify results of change

9 – Document, disseminate and train successful changes

10 – Develop action plan

11 – Report on results

12 – Recognize the team

13 – Follow up on open action items

14 – Measure improvements

15 – Disband on completion of all action items

Example Timeline of a Kaizen Event

Day One – Document the Current State

Day Two – Current State Evaluation

Day Three – Describe Future State

Day Four – Implement Future State

Day Five - Make Operational and Report

Standard Work

- Safest, best and easiest way to complete a task
  - Fastest / most efficient will be a natural outcome
- Focuses on the procedure/process
  - Not on the person or the outcome
- Establishes structure (patterns, routines, habits) for the process including:
  - Documented procedures, sequence of work, tools/supplies/equipment, storage of equipment/materials
- Creates a baseline that can be improved upon
- Is a living concept that changes as improvements are made
- Examples include:

|		
Estimating	Purchasing	Fabrication
Project Management	Budgeting	Reporting & Communications
Scheduling	Documentation	Field work (ICT e.g. patching)

Value Stream Maps

- The Value Stream includes all of the process steps required to complete a task, and VSM helps points out the waste in the value stream. It provides the roadmap for a Kaizen event;

Step 0 – Pick the process to be improved and an improvement goal

1. Document Current State
2. Identify Improvement Opportunities
3. Document Future State
4. Create a Transformation Roadmap
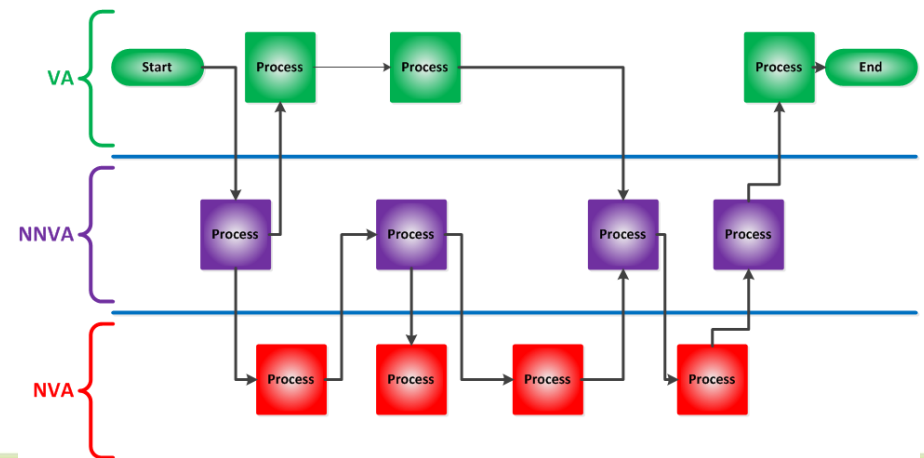
A3 Problem Solving

- Designed to quickly, concisely and clearly report on;
  - Proposals, Status, Problems
- Form is actually less important than function it's similar to other systems;
  - Ford Problem Solving Template called the "8D"
  - Johnson Controls Problem Solving Document (PSD)
- When used as a problem solving tool it should be expressed very specifically, and remember to view the issue through the eyes of the client/customer
- Finding the root of the problem is often key to solving the issue, remember tools like the 5 Why's

THE 5 WHY WHY WHY WHY WHY's

Title: What you are talking about

initials | | | Owner

Background

Why you are talking about it.
- What is the business reason for choosing this issue?

Current Conditions

Where things stand today.
- What's the problem with that, with where we stand?
- What is the actual symptom that the business feels that requires action?
Show visually – pareto charts, graphs, drawings, maps, etc.

Target/Goal(s)

The specific outcome required for the business.
- What is the specific change you want to accomplish now.?
- How will you measure success?

Analysis

The root cause(s) of the problem.
- Why are we experiencing the symptom?
- What constraints prevent us from the goal?
Choose the simplest problem-solving tool for this issue:
- Five whys
- Fishbone
- QC Tools
- SPC, Six Sigma, Shainen, Kepner Traego, others…

Proposed Countermeasure(s)

Your proposal to reach the future state, the target condition.
- What alternatives could be considered?
- How will you choose among the options? What decision criteria?
How your recommended countermeasures will impact the root cause to change the current situation and achieve the target.

Plan

A Gantt chart or facsimile that shows actions/outcomes, timeline and responsibilities. May include details on the specific means of implementation.
- Who will do what, when and how?
Indicators of performance, of progress.
- How will we know if the actions have the impact needed?
- What are the critical few, visual, most natural measures?

Follow-up

Remaining issues that can be anticipated.
- Any failure modes to watch out for? Any unintended consequences?
Ensure ongoing P-D-C-A. Yokoten as needed.

A3 Problem Solving

- Background

- Current Conditions
  - What is the issue? Where do we Stand?

- Targets & Goals
  - What is the specific change we want to see and how do we measure it?

- Analysis
  - What is the root cause?

- Proposed Countermeasures
  - What are the alternatives? How should we chose between them?

- Plan
  - Who, when, what and how? What are the measures? How will we ensure it met the goals?

- Follow Up (PDCA)
  - Any other issues that can be anticipated? Any unexpected consequences?

THE 5 WHY WHY WHY WHY WHY's

Error Proofing

- Intended to turn 'traditional' QA on it's end
  - Zero defects is an achievable goal, and isn't "too expensive"
- 'Traditional' often relies on client inspection and/or final inspection
  - Rework only, little or no root cause analysis and no error proofing
- Error proofing concepts acknowledge that this is an imperfect world; people and machines make mistakes or break down
  - Prevention in product/process … so it can't be made/completed incorrectly
  - Prevention in workstation … the 'system' prevents or alerts the person to prevent it from being done wrong
  - Detection in workstation … if it's done wrong, it's detected/alerted immediately so corrective action can occur immediately
  - Downstream detection … the (next) downstream station detects the defect for correction

Office / Process Cells

- Departmentalization of people by function can;
  - Create barriers to teamwork
  - Increase waste (motion, transportation, waiting, talent etc.)
  - Divergent goals and measurements
- Office and/or process cells group people by project/process instead providing;
  - Common mission, goals and measurements
  - Shorten process times
  - Improve quality, communications and teamwork
 - Reduce waste, cross-train people

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Kanbans – Inventory Replenishment System

- Simply put they're signals that automate replenishment of materials and supplies (internally or externally)

- From the point of use – 'pull production'

- Reduce material shortages (or outage) and thereby process waste through;
  - Reduced work stoppages due to materials or supplies
  - Reduced raw materials, WIP and finished goods inventories
  - Eliminates overproduction, increases inventory turns
  - Improves workflow, lead times and cash flow

Resource Impact Index
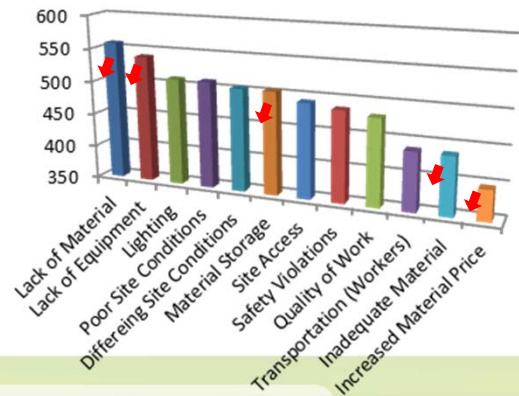
Group Activity 1

Value Stream Mapping

PB&J Sandwich Activity
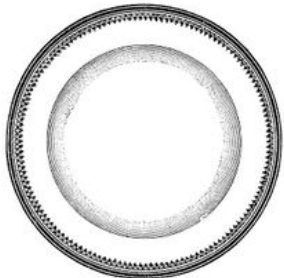
Credit: Patrick Henry's Pub & Grille
www.thephpub.com (4/5 stars on Yelp)

Mapping

- Create a process map

- Map it into a value stream

Group Activity 2

Mini kaizen

Kaizen – Workflow Improvement

- Group activity, workflow improvement
  - Split up into groups of at least 7 (extras can be observers)
    - A time keeper, A coach & 5 'Workers'
  - To complete your 'process' a tennis ball must go from start finish through each of 5 steps (represented by the workers)
    - The ball starts with one worker, has to be passed (without touching the next worker) to another worker then to another until all 5 do their work. The only caveat is it can never go from one worker to the one directly next to them.
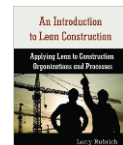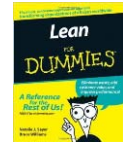
Resources

- Lean For Dummies: Natalie J. Sayer, Bruce Williams: ISBN 9780470099315

- An Introduction to Lean Construction: Applying Lean to Construction Organizations and Processes: Larry Rubrich: ISBN 9780979333132

- Introduction to Sales Process Improvement: Gaining More of The Right Customers at Higher Margins and Lower Costs with Lean and Six Sigma: Michael J Webb: ISBN 0977107205

- Lean Healthcare in Action: A Practical Guide to Streamlining Processes: ISBN 9781601467553

- Lean Healthcare Deployment and Sustainability: Mark L. Dean: ISBN 9780071817707

Resources

- http://www.isixsigma.com/

- http://www.lean.org/

- http://www.aia.org/index.htm

Thank You! Questions?

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