An Introduction to Lean and Process Improvement
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Topics

• Introduction to Lean
• Waste
• 5S
• Kaizen/Visual Management Controls
• Lean Process Improvement/Process Mapping
• Error Proofing (Poka Yoke)
Objectives

• To gain a basic understanding of Lean Concepts
• To be able to apply some of the Lean tools into work
• Understand basic process improvement
What is Lean?

• Helps identify the value-added vs. non-value added processes
• Identifying and eliminating waste within processes to:
  – Improve work flows
  – Minimize inventories and redundancy
  – Create value-added work
  – Speed up processes (increase efficiency)
  – Improve quality
  – Create error-proof processes
It all started with Henry Ford?
Lean Attributes

• Simply stated: “Lean is about moving the mean.” It focuses on efficiency and waste elimination
  – Lean reduces average cycle/processing time
  – Lean reduces excess inventory, hiring time, or injuries
  – Lean improves average response time
Waste: The Enemy of Lean
What is Waste?
<table>
<thead>
<tr>
<th>Waste</th>
<th>Definition</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-production</td>
<td>Generating more than needed just in case</td>
<td>• Creating reports no one reads&lt;br&gt;• Unnecessary meetings</td>
</tr>
<tr>
<td>Transportation</td>
<td>Movement of products and information that does not add value</td>
<td>• Multiple handoffs or approvals&lt;br&gt;• Moving things in and out of storage</td>
</tr>
<tr>
<td>Motion</td>
<td>Movement of people or equipment that does not add value</td>
<td>• Searching for files&lt;br&gt;• Clearing or Gathering</td>
</tr>
<tr>
<td>Waiting</td>
<td>Idle time created when material, information, people, or equipment is not ready</td>
<td>• Waiting for Computer to re-boot&lt;br&gt;• Waiting for toast</td>
</tr>
<tr>
<td>Over-Processing</td>
<td>Efforts that create no value from the end-user viewpoint</td>
<td>• Multiple signatures&lt;br&gt;• Re-entering data&lt;br&gt;• Different software for same doc.&lt;br&gt;• Excessive Reports</td>
</tr>
<tr>
<td>Inventory</td>
<td>More material than end-user needs</td>
<td>• Emails waiting to be read&lt;br&gt;• Open projects and files piled up</td>
</tr>
<tr>
<td>Defects</td>
<td>Work that has errors, rework, mistakes</td>
<td>• Invoice errors&lt;br&gt;• Lost Records or files&lt;br&gt;• Missing Information</td>
</tr>
<tr>
<td>Underutilized Creativity</td>
<td>Ideas not listed to or skills that are not utilized</td>
<td>• Lack of diversity&lt;br&gt;• Failing to seek input</td>
</tr>
</tbody>
</table>
Key LEAN Process Measures

• Most important are:
  – Calendar /Lead Time
  – Work Process Time
  – Complete and Accurate
  – Value Add

Analysis of these measures will red flag primary areas for improvement
Lean Measures in Reality

• 80% of process resource cost due to non-value add and waste
• 20% of activities cause 80% of the problems
• 30-50% of cost caused by slow speed or rework
• Make invisible problems visible

*Lean Six Sigma for Service, Michael L. George, McGraw Hill, 2003*
Key Lean Tool – 5S

• Method for creating a clean, safe, orderly, high performance work environment
• Requires resources are provided in the appropriate location and as needed to support work activities
• Housekeeping system
Advantages of 5S

- Time Saving
- Work is easier to manage
- Things are easier to find
- No obstructions, deviations, or problems
- Everyone knows where things are
- Accidents and mistakes are minimized
- Increased space
- Creates workplace ownership
The First S - Sort

Separating the Needed from the Not-Needed

- Eliminate not-needed items and perform an initial cleaning
  - Establish criteria/handling of items
  - Identify not-needed items
  - Putting like things together
  - Move not-needed items to holding area
  - Conduct a white-elephant sale
  - Conduct an initial cleaning
The Second S - Straighten

A place for everything and everything in its place, clean and ready to use

• Arrange workplace for safety and efficiency
  – Identify key equipment and supplies
  – Decide where things go
  – Reorganize work stations and process flow
  – Determine who has missing items or if they are lost
  – Use labels and markings
  – Outline locations and zones
  – Develop shadow boards, label items
"Now! ... That should clear up a few things around here!"
The Third S - Scrub

Cleaning for Inspection

• Perform daily cleaning and inspection to understand work conditions and keep it clean
  – Identify points to check for performance
  – Be responsible for all working conditions
  – Inspection checklists
  – Divide responsibilities into zones
  – Determine acceptable performance
  – Conduct daily cleaning/inspections
The Fourth S - Standardize

Developing Common Methods for Consistency

– Make 5S routine to minimize abnormalities
– Determine important points to manage
– Set standards, determine necessary tools
– Determine inspection methods
– Establish/document standard methods across similar work areas
– Determine countermeasures and remedies
– Use visual tools (color coding, maps, charts)
The Fifth S - Sustain

Holding the Gains and Improving

• Maintain the gains from other 5S activities and improve
  – Determine 5S level of achievement
  – Perform routine checks
  – Analyze results of routine checks
  – Measure progress and plan for continuous improvement
Whale Exercise – 5 S Example
LET'S BUILD A WHALE!
Let's Build a Whale!
Lean Tool - Kaizen

- “Change for Better”
- Continuous improvement
- Founded in 5S Methodology
- Described as a series of simple changes
Kaizen Activity
Visible Management/Controls

- Integral part of Kaizen and 5S
- Places needed information in plain view of persons who need them
- Enhances pace and flow of work
- Can involve placing information in common view
Introducing the Process Walk ("Gemba")

• You are looking for:
  – Smooth flow
  – Unnecessary travel
  – Unnecessary motion
  – Delay or waste
Lean Process Improvement
Roots of Lean Process Improvement are Deep!

- Standardized work – define best practice
- Simplify
- Remove sources of waste
- Combine steps/ remove steps
- Quicker work can be better work
First steps of Process Improvement - Leveling

- Understand current process
- Understand/document ability to satisfy customer requirements
- ID opportunities to improve
- Teams are critical
Problem Solving Needs to Focus On:

- Gaps
- Pain points
- The “So What” Factor
- Resources
Process steps are value add if:

- The customer recognizes the value
- It changes the “Fit, Form, or Function” of the product
- It is done right the first time

All three rules must be met!
Process Improvement Uses Discretionary Time: This Means …

• It is important not to over-commit
• Ensure that results are achieved
• Ensure that results are documented
• Publicize achievements
Tool - Process Map

- A graphic representation of a process
- Helps to document and analyze each step in a process
- Standard, so anyone who picks it up can understand it.
- Document:
  - What is really done
  - What takes time
  - What uses resources
Spaghetti Process Mapping

- Preprinted documents for mailing
- Generic computer workstation
- Envelope storage: Different types and sizes of envelopes
- Inserts for letters
- Printers
- Stuff envelopes with pamphlets, etc.
- Returned items from mail area—incorrect labeling
- Type up form for FedEx mailing
- Management: 4 supervisors
- First floor
- Labeling for FedEx
- Mail sort for location
- Take mail to post office pickup

Document wasted movement: Miles walked per day
### Tool - SIPOC Example (Hiring Process)

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Inputs</th>
<th>Process</th>
<th>Output</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who supplies each input?</td>
<td>What does this process need in order to produce good output?</td>
<td>What are the steps that are followed to hire someone?</td>
<td>What is the output of the process?</td>
<td>Who are the internal and external customers of this process?</td>
</tr>
<tr>
<td>HR Hiring Mgr.</td>
<td>Job Requirements JDs/Class specs Resumes Interviews Candidates</td>
<td></td>
<td>A new employee</td>
<td>Departments Public</td>
</tr>
</tbody>
</table>

- **S:** Supplier
- **I:** Inputs
- **P:** Process
- **O:** Output
- **C:** Customer
What to Map?

- Series of activities or steps
- Start and end of a process (boundaries) - circles
- Interfaces / transition points / handoffs – squares
- Decision points - diamonds
- Inputs & outputs
- “Ownership”
Benefits of Process Maps

• Objectively describe how activities are done
• Document control points (like intersections)
• Show where variation exists (how many routes are possible)
• Investigate where problems may occur
• Train others on processes
• Develop process thinking
More Benefits of Process Maps

• Logically identify areas that need to be improved (and with proof!)
• Identify best practices
• Monitor and update the process when conditions change
• See Ted Talk by Tom Wujec
  https://www.youtube.com/watch?v=_vS_b7cJn2A
Flowcharts Show:

- Process as a whole
- Sequence of steps
- Relationship between steps
- Beginning and ending steps – the boundaries of the process
Flowcharting Highlights

• The basic steps are the same no matter what type of map you use.

• Strive for a level of detail that is useful to your project – no more, no less.

Example: “sort clothes” isn’t helpful to someone new. You’d get pink laundry.
Example of Process Mapping: Mac and Cheese
Exercise Check

Inputs:
- Pot
- Stove
- Water
- Mac box
- Butter
- Milk
- Spoon
- Strainer
- Plate/bowl
- Measuring cup
- Sink

Outputs:
- Mac ready to eat
- Empty box
- Dirty pan
- Dirty spoon
- Dirty pot
- Dirty strainer
- Dirty measuring cup
- Dirty water
Control Tool – Error Proofing (Poka Yoke)

• What is a Poka Yoke?
  – Japanese for “mistake proofing”

• Takes out human error out of the equation
Examples of Error-Proofing

- Hair dryers and curlers with automatic shut-off
- Cars that will not allow the ignition key to turn unless they are in park, and sometimes until seat belts are fastened
- Online ordering systems that will not allow the order to be placed until all fields are completed, and payment is approved
- Airport security systems that will not allow passengers to arrive at the boarding gate until they have been cleared by the TSA Security Checkpoint
- Identity tags on patients in a hospital
- Anti-tampering seals on pharmaceuticals
Questions
Thank You!

Feel free to contact me with questions

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