Creating a Lean Culture of Continuous Improvement and Engagement

Jared Evans, November 2017
The House of Lean

Customer Focus:
- Hoshin planning
- Takt time
- Heijunka
- Involvement
- Lean design
- A3 thinking

<table>
<thead>
<tr>
<th>Just In Time</th>
<th>Involvement</th>
<th>Jidoka</th>
</tr>
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<tbody>
<tr>
<td>• Flow</td>
<td>• Standardized work</td>
<td>• Poka-yoke</td>
</tr>
<tr>
<td>• Heijunka</td>
<td>• 5-S</td>
<td>• Zone control</td>
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<tr>
<td>• Takt time</td>
<td>• Kaizen circles</td>
<td>• Visual order (5-S)</td>
</tr>
<tr>
<td>• Pull system</td>
<td>• Suggestions</td>
<td>• Problem solving</td>
</tr>
<tr>
<td>• Kanban</td>
<td>• Safety activities</td>
<td>• Abnormality control</td>
</tr>
<tr>
<td>• Visual order (5-S)</td>
<td>• Hosin planning</td>
<td>• Separate human &amp; machine work</td>
</tr>
<tr>
<td>• Robust process</td>
<td></td>
<td>• Involvement</td>
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<tr>
<td>• Involvement</td>
<td></td>
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</table>

Standardized work
- Kanban, A3-thinking

Stabilization
- Standardized work
- 5-S

Stability
- TPM
- Heijunka
- Kanban

Visual order (5-S)
- Hoshin planning

Level Incrementally
- Standardize
- Stabilize
- Create Flow

Continuous Improvement
- Standardize
- Level Incrementally
- Create Flow

Create Flow
- Stabilize
- Level Incrementally
- Standardize
The Six S Program

A system of workplace standardization and organization.

It’s purpose it to create a clean and well-ordered workplace.
The Six S’s:

• Sort
• Set in order
• Shine (and inspect)
• Standardize
• Sustain
• Safety
“Fix it up, wear it out, make it do, or do without.”

– Mormon pioneer adage
1S - Sort

If in doubt, throw it out

- What is needed and what is not needed
- Red Tag System
- Disposal procedures
Developing a Red Tag System

1. Set up a red tag removal location
2. Schedule a red tag pause
3. Explore recycle options
4. Set up a capital assets disposal procedure
5. Measure red-tag volume
6. Commit to regular red tagging
“Organizing gives workers the power to lift themselves out of poverty and build a better future.”

– Eric Schneiderman
2S – Set In Order

A place for everything, and everything in its place

• Organize what’s left to minimize wasted motion
• Shadow Boarding
• Tape out / Floor Tape
• Visual Pictures / Visual Systems – 4 Types
• Information at a glance
• Beginning of Poka-yoke – error prevention
Developing Visual Systems

Four types of visual systems:

1. **Visual Indicator** – Tells only
   - Street signs
2. **Visual Signal** – Grabs attention
   - Traffic lights
3. **Visual Control** – Limits behavior
   - Parking lot lines
4. **Guarantee** - Allows for a correct response only
   - Automatic pump shut off at a gas station
“The objective of cleaning is not just to clean, but to feel happiness living within that environment.”

– Marie Kondo
3S – Shine (and Inspect)

Cleaning up your new found shelf space

Cleaning
• Targets
• Methods
• Responsibilities
• Schedules

Inspect and check the condition of equipment

Solving to the root cause of cleanliness problems
Benefits of Being Clean

• Enhances **ownership**

• Generates mutual **respect** among employees

• Improved ability to **recognize issues quickly** by becoming more aware of minor changes in the sound, smell, vibration, or temperature of their equipment

• Enhanced perceptive skills from learning to **solve to the root cause** of cleanliness problems
“What Gets Measured Gets Managed”

– Peter Drucker
4S – Standardize

Developing and applying standards for how to do work.

- Inventing procedures to maintain the first 3 of the 6S’s
- Creating standardized work or ‘playbook’ to be clear, simple, and visual
- Measuring the condition of 6S
- Generating a standard checking schedule
- Making a tailored scorecard
There are three primary documents used for developing standardized work.

1. **Standardized Work Chart**
   - The main elements are: **work sequence** and a **diagram of the work** movement.
   - Employees get an overhead view of a process, describe their impression on where waste can be reduced, and develop better methods.

2. **Standardized Work Combination Table**
   - **Analyzes** jobs that have **two or more simultaneous activities** that occur.
   - This can also be a combination of **manual operations** and **automatic equipment**.

3. **Production Capacity Sheet**
   - Indicates the **capacity of machinery** in a process.
   - Purpose is to determine if machinery has capacity for production requirements.
   - Also useful for identifying bottleneck operations.
Standardized Work Chart
# Standardized Work Combo Table

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Part Name/Part#</th>
<th>Group#</th>
<th>Date:</th>
<th>Standardized Work Combination Table</th>
<th>Talk Time</th>
<th>Manual</th>
<th>Automatic</th>
<th>Walking</th>
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<tr>
<td>#</td>
<td>Work Elements</td>
<td>Time Elements</td>
<td>Operation Time (Seconds)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td>Auto</td>
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<td>30</td>
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<td>2</td>
<td></td>
<td></td>
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<td>2</td>
<td>Load in fixture</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Pick up Bracket B</td>
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<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td>Load in fixture</td>
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<td>3</td>
<td></td>
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<tr>
<td>5</td>
<td>Pick up Side Support</td>
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<td>6</td>
<td>Load in fixture</td>
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<td>7</td>
<td>Pick up Stiffer</td>
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<td>9</td>
<td>Pick up Brace</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Load in fixture</td>
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<td>Start Robot cycle</td>
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## Process Capacity Sheet

<table>
<thead>
<tr>
<th>Step</th>
<th>Step name</th>
<th>Machine #</th>
<th>Machine #</th>
<th>Part # 25-59001</th>
<th>Application JN-01</th>
<th>Entered by: Wayne Xi</th>
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<td>2</td>
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<td>GR100</td>
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<td></td>
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</tr>
<tr>
<td>3</td>
<td>Fine Grind</td>
<td>GR200</td>
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<td></td>
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</tr>
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<td>4</td>
<td>Measure Diameter</td>
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</table>

### Basic Time

<table>
<thead>
<tr>
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<th>Machine #</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Manual</td>
</tr>
<tr>
<td>1</td>
<td>Cut</td>
<td>C100</td>
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</tr>
<tr>
<td>2</td>
<td>Rough Grind</td>
<td>GR100</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Fine Grind</td>
<td>GR200</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>Measure Diameter</td>
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<td>8</td>
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</table>

### Tool Change

<table>
<thead>
<tr>
<th>Step</th>
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<th>Machine #</th>
<th>Tool Change</th>
</tr>
</thead>
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<td></td>
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</tr>
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<tr>
<td>3</td>
<td>Fine Grind</td>
<td>GR200</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>Measure Diameter</td>
<td>TS100</td>
<td>—</td>
</tr>
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</table>

### Processing Capacity/Shift

<table>
<thead>
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<th>Step</th>
<th>Step name</th>
<th>Machine #</th>
<th>Processing Capacity/Shift</th>
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<tr>
<td></td>
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<td>720 p</td>
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<td>Fine Grind</td>
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<td>2,325 p</td>
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<tr>
<td>4</td>
<td>Measure Diameter</td>
<td>TS100</td>
<td>—</td>
</tr>
</tbody>
</table>

Total: 28
“Even if people just change two or three things that they are able to sustain over time, it makes quite a difference eventually.”

– Peter Drucker
5S – Sustain

Creating a 6S culture which isn’t just the ‘flavor of the month’

- Promoting, communicating, and training to promote the ideas of 6S
- Report Boards
- Catch of the Month
- Slogan or logo contests
- Core group of plant champions from many different areas
- Internal Audits
5S - Sustain

Complete sustainability of a 6S program is dependent on three things:

1. Focus on the **understanding** of lean concepts and philosophies
   - Do not mindlessly apply lean tools
2. An **acceptance** of all aspects of the lean process.
   - No ‘cherry picking’ only the elements that don’t push employees in a company past their comfort zones
3. Taking care when conceiving an **implementation** plan
   - A plan needs to be systematic, cyclical, and continuously eliminate waste
“An incident is just the tip of the iceberg, a sign of a much larger problem below the surface.”

– Don Brown
The 6th S is Safety

Physically Safe

Mentally Safe
Physical Safety

1 Fatality
30 Lost Workday Cases
300 Recordable Injuries
3,000 Estimated Near Misses
300,000 Estimated At-Risk Behaviors

Visible
Reactive
Proactive
Less Visible
Mental Safety

1. Separation
   - Reactive
   - Visible

30. Attendance Issues
   - Reactive
   - Proactive
   - Visible

300. Performance Issues
   - Proactive
   - Less Visible

3,000. Aggressiveness, frustration, disengagement, reduced productivity

300,000. Lack of: morale, motivation, fulfillment, creativity, friendships, confidence
Preparing Your People

Maslow’s Hierarchy of Needs

1. Physiological
2. Safety
3. Belongingness and Love
4. Esteem
5. Self-Actualization

Basic needs
- Physiological needs
- Safety needs
- Love and belonging needs
- Esteem needs
- Self-fulfillment needs

Preparing Your People

1. Fatality
2. 30 Lost Workday Cases
3. 300 Recordable Injuries
4. 3,000 Estimated Near Misses
5. 300,000 Estimated At-Risk Behaviors

1. Separation
2. 30 Attendance Issues
3. 300 Performance Issues
4. 3,000 Aggressiveness, frustration, disengagement, reduced productivity
5. 300,000 Lack of: morale, motivation, fulfillment, creativity, friendships, confidence
The secret to sustaining 6S is Safety! This sixth S will bring you to success.

- Leaders set the tone, they drive safety
- Anyone in any position can be a leader
- Just being an authority in your business will not get you followed
- When people feel safe they work together to face outside dangers and they make remarkable things happen
- The natural reaction of people who feel safe is to trust and cooperate

Safety is generated by a leader when they exercise the skills of Sacrifice, Selflessness, and Service

5S + Safety = 6S = sustainable culture = Success
Implementing a 6S Culture

- Define
- Generate
- Decide
- Implement
- Evaluate

Approval
Planning
Carry Through
Follow Up
Producing Approval

**Selling Your Ideas**

Prepare a document or presentation describing the following:

1. What you want to do
2. Why you want to do it
3. How you are going to do it
4. How your project will greatly benefit your organization and/or others

**Making the Case for Change**

The six step process to use when managing change:

1. Articulate the case for the change
2. Prepare a **vision** what it will be like after the change
3. Identify **skills** needed to make the change
4. Define **incentives** for change
5. Identify the **resources** to implement the change
6. Have an **action plan**
Managing Complex Change

Vision + Skills + Incentives + Resources + Action Plan = Change

Vision + Skills + Incentives + Resources + Action Plan = Confusion

Vision + Skills + Incentives + Resources + Action Plan = Anxiety

Vision + Skills + Incentives + Resources + Action Plan = Resistance

Vision + Skills + Incentives + Resources + Action Plan = Frustration

Vision + Skills + Incentives + Resources + Action Plan = Treadmill
How
Quality Circles

A voluntary tool to improve productivity and quality. They promote teamwork and improve the capability of each member.

Teams are allotted one hour per week to address a meaningful issue.

At the completion of an activity the group prepares a short presentation for management explaining the activity and the results.
Mentorship
Stream Methodology

• In 1996 authors Daniel T. Jones and James P. Womack published the book Lean Thinking.
• The two formulated the phrase – ‘macro value stream’
• Their new terminology highlighted the connection between a company, customer, and supplier.
Stream

Some elements of a natural stream:

1. **Flow** – upstream and downstream

2. **Connection** – Water connecting two pieces of land

3. **Water** - Works over and around obstacles, finds the fastest path

4. **Work being accomplished** – movement of liquid and sediment, breakdown of rocks, erosion
Stream Physics

Water contains two kinds of energy:

1. **Kinetic Energy** – Energy used during the execution of processes of movement like flow and waves.

2. **Potential Energy** – This is the energy that is stored in water but isn’t used. This becomes useful when water starts to flow. It will be transferred to Kinetic Energy and will cause movement.
The House of Lean

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- Involvement, Lean design, A3 thinking

Just In Time
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Involvement:
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Standardized work
- Kanban, A3-thinking

Standardization
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- Hosin planning

Standardized work, 5-S
- Jidoka

Stability
- TPM, Heijuka, Kanban
Making Some Toast

Surprisingly the process of making toast is often used to teach Lean concepts. From the many toast making videos on the Internet there are two that impress me.

- **Kaizen Toast**, by Bruce Hamilton, President of GBMP (Greater Boston Manufacturing Partnership) from the University of Massachusetts
- **Process Mapping**: How to Make Toast, by Tom Wujec, TED Talk given at Edinburgh, Scotland, in June of 2013
Learnings from Kaizen Toast

This video is helpful to understand Lean elements.

1. **Parts of a Process**
   - Machine, tool, conveyance, customer, and worker

2. **Eight wastes of Lean**
   - Motion, waiting, transportation, storage, defects, processing, overproduction, and inventory

3. **Kaizen**
   - Continuous improvement; small simple changes used to improve a process by eliminating waste

4. **Knowledge Nugget**
   - Because of our familiarity with a process we can become blind to the inefficiencies within a process. By analyzing a process and evaluating what changes could be made to improve, frustration and waste can be eliminated.
Learnings – Tell me how you Make Toast

This video is helpful to understand diagraming elements

1. Diagram Elements
   - Nodes – Represent *tangible objects* like a toaster
   - Links – Represent the *connection* between the nodes

2. Diagraming
   - Model created by putting down how we think things work in written form. This shows a person’s point of view.
   - Breaking down complex things into simple things and then bringing them back together again.

3. Knowledge Nuggets
   - Initial paper drawings by individuals = good for identifying links and nodes
   - Individuals with movable cards = different iterations and improved models
   - Collaborative groups with movable cards = most successful comprehensive models because several points of view are synthesized
Value Stream (VS)

• The series of steps required to bring a product or service to the customer

Value Stream Map (VSM)

• A diagram that shows the series of steps required to bring a product of service to a customer

Value Stream Thinking (VST)

• Using VSM concepts and methodologies to show opportunities which exist within a value stream. These opportunities include; knowledge, ideas, and creativity
Communication
1. Pass down meeting between shifts
2. Shift Leadership Priority Setting Meeting
3. Shift Game Plan and Priority Meeting
4. Constraint and Bottleneck recovery and resolution meeting
5. Priority Follow-up instant messages
6. Instant Messages on Priority and Near Constraint Down Tools
7. Pass down meeting between shifts

Start of Day
End of Day
1. Pass Down Between Shifts

<table>
<thead>
<tr>
<th>Method of Communication:</th>
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<tbody>
<tr>
<td>Average # of People Involved:</td>
</tr>
<tr>
<td>Stakeholder Roles of People Involved:</td>
</tr>
<tr>
<td>Location:</td>
</tr>
<tr>
<td>Deliverables:</td>
</tr>
<tr>
<td>Frequency / Time:</td>
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</table>

<table>
<thead>
<tr>
<th>Multi – Saw</th>
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</thead>
<tbody>
<tr>
<td>Operator Cycle Time:</td>
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<tr>
<td>Machine Cycle Time:</td>
</tr>
<tr>
<td>Change Over Time:</td>
</tr>
<tr>
<td>Availability / Up time:</td>
</tr>
<tr>
<td>Shift:</td>
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<td>Minutes Available:</td>
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<tr>
<td>Modeled Utilization:</td>
</tr>
<tr>
<td>Actual Utilization:</td>
</tr>
</tbody>
</table>
1. Pass Down Between Shifts
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

2. Shift Leadership Priority Setting Meeting
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

3. Shift Game Plan and Priority Meeting
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

4. Constraint and Bottleneck recovery and resolution meeting
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

5. Priority Follow-up Instant messages
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

6. Instant Messages on Priority and Near Constraint Down Tools
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:

7. Pass down meeting between shifts
   - Method of Communication:
   - Average # of People Involved:
   - Stakeholder Roles of People Involved:
   - Location:
   - Deliverables:
   - Frequency:
1. Pass Down Between Shifts

Method of Communication: Face to Face

Average # of People Involved: 16
Total Involved electronically: 32

Stakeholder Roles of People Involved:
Shift Supervisors, Logistics, Operators, Area Leaders, Site Leadership

Location: Conference room

Deliverables: Face to Face meeting, written report with issues, email with written report sent to area leadership and site department executives

Frequency / Time: Daily / 6 AM
Data is gathered about issues, near constraint, and hot issues by the outgoing **shift supervisor**.

The **shift supervisor** reviews reports gathering data on potential upcoming hot spots.

Task follow up is done over IM to **operators** by **shift supervisor** and then added to pass down.

All data is summarized and added to the pass down report by **shift supervisor**.

The pass down report is sent out by email to **area managers**, **site leadership**, **shift supervisors**, and **operators**.

The oncoming shift asks any questions.

Questions are answered by the outgoing shift **operators**.

The **shift supervisor** conducts a meeting with other **shift supervisor** and **operators** from both shifts.

The meeting is completed and closed by the **shift supervisor**.
Start of Day

Use SharePoint instead of a Word Doc or Email

Operators send updates to SharePoint at Noon, 3, and 5 PM

Meeting elimination

Operators view SharePoint for work assignments and shift priorities

5. Priority Follow-up Instant
messages

Method of Communication:

Average # of People Involved:

- Stakeholder Roles of People Involved:
  - Location:
  - Deliverables:
    - Frequency:

6. Instant Messages on
Priority and Near Constraint
Down Tools

Method of Communication:

Average # of People Involved:

- Stakeholder Roles of People Involved:
  - Location:
  - Deliverables:
    - Frequency:

7. Pass down meeting
between shifts

Method of Communication:

Average # of People Involved:

- Stakeholder Roles of People Involved:
  - Location:
  - Deliverables:
    - Frequency:

End of Day
Example – Current state to Ideal State
VALUE STREAM THINKING BUSINESS PROCESS

**Step 1:** Choose a Process
- Identify Tasks Making up the Process
- Talk with Customer; Identify Value

**Step 2:** Create a Current State Map
- Identify Nodes and Links
- Create a Data Box for Each Node
- Enter Metadata for Each Data Box
- Create Sub-Process Maps as Needed

**Step 3:** Bring the Team Together
- Make Edits to Current State Map
- Identify Kaizen Opportunities
- Capture Actions and Assignments
- Set up the Follow-up Meeting

**Step 4:** Create an Ideal State Map
- Make the Ideal State Map Visible
- GOYA – Implement and Work

**Step 5:** Hold the Follow-up Meeting
- Measure the Gaps
- Reward and Recognize
- Encourage and Build-up
- Continue Towards the Ideal State
Where Should I Start?

1. **Philosophy** - Meet with the top leaders of your organization to clearly define your vision for becoming a lean company

2. **Process** - Begin implementing lean correctly

3. **People** - Train employees into the new lean way of thinking, directly effecting culture change, mentorship

4. **Problem Solving** - Train employees in a problem-solving methodology and give them time to meet in groups and solve problems

**Progress Indicators**: Quality, cost, delivery, safety, and morale
Resources

Online Mapping Resources

• **Kaizen Toast**, by Bruce Hamilton, President of GBMP (Greater Boston Manufacturing Partnership) from the University of Massachusetts

• **Process Mapping**: How to Make Toast, by Tom Wujec, TED Talk given at Edinburgh, Scotland, in June of 2013
References

• Achor, S. (n.d.). The happy secret to better work. Retrieved April 26, 2017, from [https://www.ted.com/talks/shawn_achor_the_happy_secret_to_better_work](https://www.ted.com/talks/shawn_achor_the_happy_secret_to_better_work)
References

- Lean Enterprise Institute (https://www.lean.org)
- Tom Wujec- Process Mapping: How to Make Toast, TED Talks, Edinburgh, Scotland, June 2013
- GBMP (http://gbmp.org/)
Thank you for your participation!

Questions?

For questions or comments regarding this presentation please contact info@mastercontrol.com.
Thank you