Lean Principles in Facility Management

Presented to GAPP 2013

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What is Lean?

- The term “Lean” was coined by Jim Womack of MIT to describe Toyota’s business philosophy.
- Lean focuses on flow, the value stream and eliminating *muda*, the Japanese word for waste.
- Lean manufacturing is the production of goods using *less* of everything compared to traditional mass production: less waste, human effort, manufacturing space, investment in tools, inventory, and engineering time to develop a new product.
What is Lean?

• Lean Principles rely heavily on employee involvement and a team structured organization
• Lean consists of a set of tools used to identify value and eliminate waste
• Lean is a way of thinking and acting for an entire organization and it applies to all industries including Facilities Management
Timeline
What is Waste?

- Waste is anything that happens to a product or process that does not add value from the customer’s perspective.
- Materials being stored, transported, inspected or delayed, material waiting in queues, and defective products do not add value.
Seven Wastes

- Overproduction – producing more than the customer orders or producing early. Inventory of any kind is usually waste.
- Queues – idle time, storage, and waiting are wastes
- Transportation – moving material between plants, between work centers, and handling more than once is waste
- Inventory – unnecessary raw material, work-in-process (WIP), finished goods, and excess operating supplies
- Motion – movement of equipment or people
- Overprocessing – work performed on product that adds no value
- Defective product – returns, warranty claims, rework and scrap
Lean Principles & Tools

• 5S
• Setup Time Reduction – SMED
• Point-of-Use Storage & Kanban
• Kaizen Events
• Lean Maintenance
5S
Strategy for creating a well organized, smoothly flowing process

1. Sort
2. Stabilize
3. Shine
4. Standardize
5. Sustain
Benefits of 5S

• Increases organization and efficiency
• Avoids wasted motion
• Increases safety
• Eliminates unnecessary inventory
• Offers improvements at an inexpensive cost
Setup Reduction - SMED Examples

1) Reduce # of screws
   10 → 4 fixed screw sights
   Give thorough consideration to the magnitude and direction of forces undergone

2) C-washer method
   Don’t remove the C-washer

3) Pear-shaped hole method
   Tighten here
   Attach and remove here

4) U-slot method
   Clamp
   Fixture

5) Variation of pear-shaped hole method
   Bushing cap

6) Wing nut method
Kanban

- A system that uses replenishment signals to simplify inventory management
  - Signals (usually cards) hold product details
    - What to make, when to make it, how much to make, and where to send it
  - Cards stay attached to a bin that holds the product
  - When bin is empty, it is returned to the start of the assembly line for replenishment
  - Full bins are returned to the customer, and the cycle continues
Benefits of Kanban

• Highly visible systems
• Simple, effective, and inexpensive
• Reduces inventory and eliminates stock-outs
• Improves the quality of service
• Improves lead times
People

- Transition to Lean is difficult since a company must build a culture where learning and continuous improvement are the norm.
- Success of lean requires the full commitment and involvement of all employees and of the company’s suppliers.
## How People Benefit from Lean

<table>
<thead>
<tr>
<th>Element</th>
<th>Traditional</th>
<th>Lean</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Slow &amp; Uncertain</td>
<td>Fast &amp; Positive</td>
<td>Quality &amp; Coordination</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Inhibited</td>
<td>Enhanced</td>
<td>Effective Teams</td>
</tr>
<tr>
<td>Motivation</td>
<td>Negative, Extrinsic</td>
<td>Positive, Intrinsic</td>
<td>Strong Motivation</td>
</tr>
<tr>
<td>Skill Range</td>
<td>Narrow</td>
<td>Broad</td>
<td>Job Enrichment</td>
</tr>
<tr>
<td>Supervision</td>
<td>Difficult and Fragmented</td>
<td>Easy &amp; Localized</td>
<td>Fewer Supervisors</td>
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Lean Journey at UGA

• UGA began implementing Lean in the Facilities Management Division in 2009
• Partnered with Georgia Tech’s Enterprise Innovation Institute
• Started with a one day Lean overview with the senior staff to learn the basics of Lean
• First Kaizen “Rapid Process Improvement” events were conducted in the Welding Shop & Structural Shop
• Developed In-house Lean experts
Lean Projects at UGA

• Pump Rebuild
• Classroom/Lab Remodel
• Preventive Maintenance Material
Introduction to the Team

Pump Rebuild Shop
Chris Bennett
KC Chester
Kurt Reifeis

Classroom/Lab Remodel
Lynn Hix
Terry McCollum
Frankie Smith

Lean Champions:
Tyler Chapman
Doug Dauler
Rapid Process Improvement (RPI)
Agenda for the week

1. Train on lean principles
2. Observe process, data collection and analysis
3. Brainstorm and prioritize ideas
4. Leadership update meeting
5. Implementation
6. Report out
7. Follow-up / Adjust procedure if necessary, and measure impact of new process

Have Fun!!!
Data Collection & Analysis – Pump Rebuild
Observations – Pump Rebuild

- Lack of housekeeping
- No set location for pumps in process
- Workspace layout is too spread out
Brainstorming – Pump Rebuild

• 21 Ideas
• Collected ideas from each person on post-it notes
• Classified the ideas based on impact and feasibility (cost/time) to implement
  • 5S the shop
  • Work Requests
  • 5S the Trucks
Pump Rebuild Implementation

5S the Shop

- Sort      Clean & Organize
- Set in Order  A place for everything
- Scrub & Shine  Back to original “new” condition
- Standardize  Make it the same for all
- Sustain     Make it continuous
BEFORE

Hey Kurt! Hand me that compressor head...

Hmm... Who knew this was here!
Hey, I could get used to this!
SET IN ORDER
A PLACE FOR EVERYTHING...

...AND EVERYTHING IN ITS PLACE.
Class/Lab Renovation Implementation

5S and Stocking of Trucks

- Stocking trucks with basic materials
- Organizing the materials on the truck
- Reducing number of trips
- Reducing time to acquire materials
BEFORE
AFTER
UGA PHYSICAL PLANT
PM SHOP MATERIALS
TO AND FROM THE WORK SITE

Rapid Process Improvement Report Out O&M, WAREHOUSE AND I.T.

August 17 - 21, 2009
Introduction to the Team

Back Row: Jim Gamble, Al Jeffers, Casey Westbrooks, Doug Dauler, Tyler Chapman, Mike Baxter
Front Row: Tim Savage, Donald Jennings, Harold Beauchamp, Brandon Myers
Brainstorming

• 40+ Observations
• 6 - 8 Ideas per person
• Used 4 Quadrants based on
  • Impact
  • Feasibility
• Quadrant 2 – Future Items:
  • More trash compactors
  • More disposal sites
  • Better filter storage
Action Items:

1. **Standard Size Filter Specification**
2. **Truck**
   1. Better Truck
   2. Quick items on truck
   3. Hallway space and loading space
3. **Pick Ticket**
   1. Usable pick ticket
   2. Cheat sheet/easy reference
4. **Communications**
   1. Radios
   2. Between WH and PM Shop
   3. Suggestion Box
5. **Tools at Job Site**
   1. Tools that don’t walk away
   2. Portable pulley
Vehicle Before
Vehicle After
Quick Items on Truck
Quick Items on Truck
Staging Space, with early access...

RESERVED AREA
PM SHOP-16 MATERIAL
PICK-UP ZONE
DO NOT PLACE ANY OTHER ITEMS
IN THIS ZONE
Loading Space

NO PARKING
WAREHOUSE LOADING ZONE PARKING ONLY
15 MINUTE PARKING MAX.
DO NOT BLOCK
Summary of results

Total Distance/order Before = 1200 ft.
Total Distance/order After = about 200 ft.
Time Before = 29 minutes
Time After = < 10 minutes
Trips reduced from 5 to 6 down to 1
Summary of Improvements:

- Actually eliminated steps:
  - PM Shop filling out ticket at Warehouse
  - Warehouse having to enter the order into system
- Streamlined the process of handling order information
  - Less typos/defects/questions/etc.
- WH staff can fill order when time is free, and also see directly when last stock is pulled
- Harold has more time/week for value-added work
  - Not waiting in WH, not driving as much
- Conservative Estimate Cost Saved = $7,000 to $10,000 per year, just on time alone
# 30-Day Follow Up

<table>
<thead>
<tr>
<th>Action item</th>
<th>Responsible</th>
<th>Due</th>
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</thead>
<tbody>
<tr>
<td>1 Finish parking setup</td>
<td>Don Jennings</td>
<td>8/28</td>
</tr>
<tr>
<td>2 Evaluate current filter inventory</td>
<td>Al Jeffers, Tim Savage</td>
<td>8/31</td>
</tr>
<tr>
<td>3 Evaluate recycling containers for disposal; Pick up by Harold in truck</td>
<td>Rod Platt, Tyler Chapman</td>
<td>8/28</td>
</tr>
<tr>
<td>4 Finalize storage</td>
<td>Champions; D. Fisher</td>
<td>8/31</td>
</tr>
<tr>
<td>5 Portable Pulley</td>
<td>D. Jennings, Mike Baxter, D. Dauler, Welding</td>
<td>8/31</td>
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Questions?
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Thanks for your attendance