Achieving Breakthrough Results - Using Lean as a Competitive Weapon

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Mueller Company

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Operations Leader  
Mueller Company
Outline Chart

• Introduction
• Purpose Driven
  - Company Vision and project business case
• Chattanooga Plant Overview
• Presentation Body
  – Plant Value Stream Steps
  – Obstacles
  – Transformational Leadership
  – Kata Nuts & Bolts with Examples
  – Results
  – Next Steps
  – Questions
• Conclusion
• Next Steps

Thomas (Slides 1-16)

Hans (Slides 17-28)
Purpose-driven Excellence

**Company vision:**
Mueller Co. will double revenues every 3 to 5 years by delivering flow and asset management solutions to diagnose, monitor and control water systems.

**Lean vision:**
To be a principle driven company where making problems obvious and spontaneous continuous improvement by every employee is part of everyday work.
**FY16 Top Level X matrix**

**Strategic Initiative**
- Gain Market Share via Enterprise Performance System

**Key Deliverable**
- Increase Core Water and Canada revenue by $67.4M to $509.3M through market share, orders growth, and service levels

**FY16 Chatt Plant X matrix**

**Key Deliverable**
- Increase revenue by $37.2M through market share, orders growth and service levels
- Increase effective lost foam foundry molds per hour from 31 to 36 (AOP) by 9/30/2016. Breakthrough equals 40 MPH.

Executive Leadership team views the Chattanooga MPH improvement as the most important project in the company.
Chattanooga Plant Overview

- Located on 52 acres
- 500,000 sq. ft.
- Steel/brick buildings
- 438 employees
- 23.3K tons of castings poured FY15
- 362,500 valves for FY15
- 1,300 up to 1,600 valves per day
2” – 16” Lost Foam Process

Foundry

Raw Beads → Foams Patterns → Mold → Cleaned

Machine Shop/Assembly/Shipping

Machine → Painted → Assembled → Shipped
COMPANY STRATEGY

STRATEGY DEPLOYMENT (SD)

VALUE STREAM MAPPING
VSM
- ENTERPRISE WIDE
- VALUE STREAM IMPROVEMENT PLANS (VSIP)
- PROJECT MANAGEMENT

LEAN DEPLOYMENT MODEL
“The How”

RECOGNITION
- TEAM LEADER DEVELOPMENT
- TEAMWORK
- DEVELOPING HOURLY/SALARY
- MENTORING

Enterprise Performance System

KAIZEN EXECUTION
- PLANNING
- TRAINING
- FACILITATION
- REPORT OUT
- MENTORING

SUSTAINING
- VISUAL MANAGEMENT SYSTEM
- Updated STD WORK and LSW
- KPI’S

Recognition
- TEAM LEADER DEVELOPMENT
- TEAMWORK
- DEVELOPING HOURLY/SALARY
- MENTORING

SUSTAINING
- VISUAL MANAGEMENT SYSTEM
- Updated STD WORK and LSW
- KPI’S

KAIZEN EXECUTION
- PLANNING
- TRAINING
- FACILITATION
- REPORT OUT
- MENTORING

Lean Deployment Model
“The How”
Current State Metrics - Instability

<table>
<thead>
<tr>
<th>Metric</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTS</td>
<td>86.3%</td>
</tr>
<tr>
<td>International</td>
<td>55.7%</td>
</tr>
<tr>
<td>Internal LT Days</td>
<td>10 - 14</td>
</tr>
<tr>
<td>(Foundry to LF Supermarket)</td>
<td></td>
</tr>
<tr>
<td>Net Effective Molds</td>
<td>31</td>
</tr>
<tr>
<td>Press 1 Utilization</td>
<td>107.4%</td>
</tr>
<tr>
<td>Press 5 Utilization</td>
<td>110.3%</td>
</tr>
<tr>
<td>Foam Scrap</td>
<td>6.5%</td>
</tr>
<tr>
<td>(Cluster to Cast)</td>
<td></td>
</tr>
</tbody>
</table>

- Unpredictable downtime
- Maintenance and Operations blame each other versus fixing problems
- Team spends more time in conference room – gemba time struggles
Obstacle – Org. Complexity

- Individual goals not aligned
- Action plans are “green” but metrics are not improving
- No clearly defined road map
- Team continues to spend more time in conference room – gemba time suffers
Obstacle – Leadership

• Team struggles with making problems obvious
• Measuring outputs with very few input or in process measures
• Priorities change constantly
• HQ help arrives to continue to search for “silver bullet”
Transformation Begins

- Created Future State VSM as roadmap for improvement
- Transformation plan created with date, owners and clear objectives
- Kata teams launched in key individual process inputs
Transformation Meaning

- Lean Thinking then Lean Doing
- TPS – “Thinking Production System”
Leadership

“A United States officer is responsible for everything he or she does or fails to do”

- Presence is everything
- If you care, you show up
Lean Leader Elements

- Sustaining
- Coaching
- Lean Conversion
- Process Analysis

Clear Direction

- Connects to X-Matrix
- Enables VSM Future State
- Timing: Takt & PCT
- Flow & Fluctuation
- Machine Constraints
- Target Manning
- Outcome Metrics

- TWI J-Programs
- TPM
- Standard Work
- Visual Management
- 3 Level Kata
- Daily PDCA
- 1 Obstacle at a time

Level, Flow and Pull
Lean = Hard Work

If you do not plant seeds (process improvement), how can you expect a harvest (transformation)?
Visual Mgmt – Simple yet Powerful

- Most productive H X H board in the company
- Ops – Maintenance – Reliability – Op Ex meet everyday at 8:00am and 4:00 pm
- How do I eliminate this downtime today? – Short and long term countermeasures
# Kata System – Daily Management

<table>
<thead>
<tr>
<th>LF Presses</th>
<th>Cluster</th>
<th>Cast Line</th>
<th>Cleaning Room</th>
<th>Paint</th>
<th>Machine Shop</th>
<th>Assembly</th>
<th>Shipping</th>
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<tr>
<td>Coach</td>
<td>Eric Birdwell</td>
<td>Eric Birdwell</td>
<td>Eric Birdwell</td>
<td>Eric Birdwell</td>
<td>Nick Velk</td>
<td>Nick Velk</td>
<td>Jason Bradley, Matt Sutterfield</td>
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<tr>
<td>Learner</td>
<td>Dewayne Campbell</td>
<td>Joe Burgess</td>
<td>Joe Burgess</td>
<td>Mike Morgan</td>
<td>Frank Greer</td>
<td>Dwight Bolton</td>
<td>James Saldana, Bud Shelton</td>
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<td>Champion</td>
<td>Hans Sowrey</td>
<td>Hans Sowrey</td>
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<tr>
<td>Support</td>
<td>Les Clark</td>
<td>Darian Patterson</td>
<td>Thomas Castillo</td>
<td>Prod Eng - TBD</td>
<td>Alex Uchida</td>
<td>Ian Gilliam</td>
<td>Thomas Castillo, Chris Brackins, Tim Williams</td>
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<td>Prod Eng - TBD</td>
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<td>Horace Knight</td>
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<td>Prod Eng - TBD</td>
<td>Ken Cross</td>
<td>Thomas Castillo</td>
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<tr>
<td>Daily Kata</td>
<td>10:00 - 11:00 AM</td>
<td>10:00 - 11:00 AM</td>
<td>8:00 AM &amp; 2:00 PM</td>
<td>10:00 - 11:00 AM</td>
<td>3:00 PM</td>
<td>10:00 AM</td>
<td>3:15 PM, 9:30 AM</td>
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</tbody>
</table>

Approximate Time:
- 10:00 - 11:00 AM
- 3:00 PM
- 10:00 AM
- 3:15 PM
- 9:30 AM

Utilizing Order line management process to drive daily improvement
Kata Deployment – Nuts & Bolts

- Process Analysis Sheets to establish target and current conditions
- Process Obstacles Log
- Hand Written PDCA cycles log
- Process Metrics
Kata System – LF Presses

Foam Scrap at the presses averaged 6.41% in May thru Dec of 2015. The Jan thru July average is 3.21% with a goal of < 3.5%. Note: The workforce changed in June.

76 PDCA Cycles completed in 2016
Implemented slow speed cluster dip into coating for fragile clusters
- Slowed mixer speed to prevent breakage on fragile clusters
- Replaced and cleaned oven racks
- Plastic wrapped foam storage carts
- Changed stacking method of NGV bodies
- Improved gate tab strength and locations
- Clarified dip setup instructions
- Repaired dip fixtures for bonnets
Kata System – LF Cast line

- 8 am and 3 pm daily meeting
- Hour by hour board management
- OBC and Reliability improvement
- Developed and implemented new coating to pour faster
- Implemented finer grain sand to reduce burned on sand to reduce cleaning room stops
- Installed LVDT sensors to monitor raingate motion
- Implemented raingate cleaning standards
- Implemented new Clean Up Procedures
Kata System – LF Cleaning Room

• Sustain goal of 0 casting in shed
Reliability – Downtime Reduction

Visual Operator Reliability Board (2nd version)

On the right side are the card holders, tags and instructions. The left is the map that corresponds to each numbered check.
## Value Stream Focus and Results

### Core Objectives
- Improve On Time Shipments to 92% by 02/01/2016
- Improve Assembly Supermarket health to at least 85% by 02/01/2016
  - Press 1 & 5 OEE \( \geq \)
  - Effective Molds/Hr \( \geq \)36 (40 molds/hr & 10% scrap)

### July Actuals

<table>
<thead>
<tr>
<th>Metric</th>
<th>Metric Type</th>
<th>FY 2016</th>
<th>FY 2015</th>
<th>% PY</th>
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<tbody>
<tr>
<td>OTS</td>
<td>Output</td>
<td>97.2%</td>
<td>86.3%</td>
<td>12.7%</td>
</tr>
<tr>
<td>International</td>
<td>Output</td>
<td>82.9%</td>
<td>55.7%</td>
<td>49.0%</td>
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<tr>
<td>Internal LT Days (Foundry to LF Supermarket)</td>
<td>Output</td>
<td>5 - 7</td>
<td>10 - 14</td>
<td>50%</td>
</tr>
<tr>
<td>Net Effective Molds</td>
<td>Process</td>
<td>39.5</td>
<td>31</td>
<td>27.4%</td>
</tr>
<tr>
<td>Press 1 Utilization</td>
<td>Input</td>
<td>84.6%</td>
<td>107.4%</td>
<td>- 24.5%</td>
</tr>
<tr>
<td>Press 5 Utilization</td>
<td>Input</td>
<td>71.1%</td>
<td>110.3%</td>
<td>- 41.7%</td>
</tr>
<tr>
<td>Foam Scrap (Cluster to Cast)</td>
<td>Input</td>
<td>1.5%</td>
<td>6.5%</td>
<td>433%</td>
</tr>
</tbody>
</table>
YOY Manufacturing Performance

The Lost Foam Foundry has produced 13,770 (1,200 molds) more castings with 1% less pounds of iron YOY.
Next Steps – MIF Improvement
Next Steps - Takeaway

Levels of lean transformation – kaizen perspective

- **Shingo Model levels of lean transformation**
  - **Tool driven.**
    - Management planned kaizen for selected portions of a process without explicit linkage to strategic direction.
  - **System driven.**
    - Management and engineering planned kaizen is linked to company strategies and value stream imperatives. Kaizen employs the systemic elimination of waste, unevenness and overburden.
  - **Principle driven.**
    - "Spontaneous continuous improvement via project, event, or 'just-do-it' approach; sponsored by management, work team, or worker. Kaizen activity is part of everyday work.” (Shingo Prize model 2009)

- **Performance**
  - Some kaizen events sub-optimize value stream performance. Occasional backsliding.
  - Events are high leverage and integrated. Lean management systems prevent backsliding.
  - Predominate improvement activity is daily kaizen (kaizen circle activities, 5S improvements, mini-events, employee suggestions, etc.).

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Time
Thank You!

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Please take a moment to complete the survey using the conference mobile app.

Session: WP/36
Achieving Business Results
Using Lean as a Competitive Weapon

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