LAYERED PROCESS AUDITS

How to improve quality from the ground up ...
Overview

- Quality history at Brampton Brick
- The challenge
- Layered process audits: background, structure and execution
- Results and conclusions
Quality history at Brampton

- Up to early ‘90’s mainly product compliance based testing
- ISO 9000 accreditation in 1994
- Purchase of Oaks Concrete Products in 2003
- Abandonment of ISO 9000 in 2008 for an internally developed, customer-centric quality system
The challenge:

How do we develop and entrench a “customer-centric” culture?
The approach

Understand what is important to the customer

Establish standards of performance

Monitor performance and improve
Monitoring performance

- Product Specifications
- Process Specifications
- Measure Performance
- Audit
- Corrective Action
Why do we audit?

- 2nd law of thermodynamics
- Offer a different perspective
- Provide measure of improvement
- How do we relate the audit process to culture entrenchment?
Layered process audits
What makes them different

- Focuses on the *most sensitive* processes that impact the customer
- Are done daily
- Most importantly, it is shared by all levels of the company:
  - Senior Management: to show commitment
  - Supervisors: to show involvement
  - Shop Floor Employees: to build appreciation of the entire process
Different from a checklist

- Audit is designed to obtain information, not check “yes or no” to compliance
- Auditor must write down specific information on specifications and test results
# Color room audit

<table>
<thead>
<tr>
<th>Colour Room</th>
<th>Line 1</th>
<th>Line 2</th>
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<tbody>
<tr>
<td>Units</td>
<td>Actual</td>
<td>Specification</td>
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<td>1 Slurry Name #1</td>
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<td>2 Tank # being used</td>
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<td>3 Viscosity #1</td>
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<td>4 Specific Gravity #1</td>
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<td>5 Slurry Name #2</td>
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<td>6 Tank # being used</td>
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<td>7 Viscosity #2</td>
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<td>8 Specific Gravity #2</td>
<td>g/ml</td>
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<tr>
<td>9 Dry Colour Name</td>
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<td>10 Does Dry Colour Match Master</td>
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# Kiln audit

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<th>Kilns</th>
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<tr>
<td>1</td>
<td>Panel Name</td>
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<tr>
<td>2</td>
<td>Brick Size</td>
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<td>Run Number</td>
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<td>Car</td>
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<td>5</td>
<td>Hack</td>
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<tr>
<td>6</td>
<td>Fired Brick Length</td>
<td>mm</td>
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<tr>
<td>7</td>
<td>Fired Brick Bed Depth</td>
<td>mm</td>
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<tr>
<td>8</td>
<td>Fired Brick Height</td>
<td>mm</td>
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<tr>
<td>9</td>
<td>PUNDIT</td>
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<tr>
<td>10</td>
<td>Shell Thickness</td>
<td>mm</td>
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<tr>
<td>11</td>
<td>Kerf Distance from Header</td>
<td>mm</td>
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Corrective action section

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<tr>
<th>#</th>
<th>Item</th>
<th>Action Taken/CAPA Issued</th>
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Audit execution

- Daily: Operators perform audit on a section not under their control. All sections are audited daily.
- Weekly: Supervisor audits a section with Operator.
- Monthly: Plant Manager audits a section with Operator.
- Quarterly: VP Production audits a section with Operator.
Audit results
LPA nonconformance by nature

Nonconformances for 2009
Line 2

- Side Gun Low Alarm
- Top Gun Low Alarm
- Spray Coverage
- Specific Gravity #1
- Green Brick Bed Depth
- Top Sand Weight/Slug
- Dry Colour #1 “Weight/5 Pulses”
- Viscosity #1
- Does Dry Colour Match Master
- Uni-Vibe Test

Graph showing the percentage of nonconformances for different parameters.
2009 LPA completion trends

LPA’s Completed

- Audits Completed (%)

Month

Jan. 80
Feb. 75
Mar. 81
Apr. 90
May 97
Jun. 100
Jul. 71
Aug. 68
Sept. 87
Oct. 97
Nov. 97
Dec. 93

Line 1 vs. Line 2
2009 #1 trends (total 90.2 %)

Percentage of #1 Brick as of December 31, 2009

Month

January: 10.28
February: 11.16
March: 16.96
April: 14.16
May: 18.11
June: 91.98
July: 96.17
August: 83.86
September: 95.43
October: 96.09
November: 92.02
December: 74.01
2010 LPA completion trends
2010 #1 trends (total 97 %)
Normalized Complaint by Nature

- Colour Variation
- Colour Missing
- Chippage
- Face Cracks
- Colour Does Not Match

2009 2010
Summary

- LPA’s are a good tool for cultural change
- Requires management involvement
- Persistence pays off in results!