Waste Reduction
Uponor Corporation

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Minnesota Technical Assistance Program

University of Minnesota
Company Overview (OO-Pa-Nor)

- Plastic Piping and Component Manufacturer
  - Plumbing
  - Radiant Heating
  - Fire Sprinkler Systems
- PEX-a Extrusion
  - Polyethylene crosslink
  - “Engel Method”
Reasons for MnTAP assistance

• Decrease Product Contamination
• Establish Baseline
• Facilitate project to increase production yield
  – Research
  – Plan
  – Recommend
  – Implement
Motivations For Change

• Continuous Improvement Oriented Culture
• “Wildly Important Goals” (WIGs)
  – 15% reduction in weighed scrap
  – 15% increase in production yield
• Increase revenues
• Decrease waste-streams
Approach

• Improve product yield, decrease process waste
• DMAIC methodology
  – Determine Root Cause
  – Develop Improvements to reduce, eliminate
• Establish Baselines
• Next Steps
Approach

• Improve product yield, decrease process waste
• DMAIC methodology
  – Determine Root Cause
  – Develop Improvements to reduce, eliminate
• Establish Baselines
• Next Steps
Define // Measure
Baselines // Benchmarks

• Expose and quantify unknown scrap streams
  – Maintenance scrap
  – Mixing scrap
  – Improperly reported scrap

• Convert into consistent figures
  – Weight
  – Cost
Determine Focus of Project

- “Black Contamination” - BC
- “Foreign Contamination - FC
- “Proprietary Additive Contamination” – PAC
Determine Focus of Project

• “Black Contamination” - BC

• “Foreign Contamination - FC

• “Proprietary Additive Contamination” – PAC
Define “Black Contamination”

- Black specks or streaks on / in pipe
- Different ‘types’
  - Major: burnt resin
  - Minor: tool coating, component residue
- Doesn’t meet customer standards
Analyze
- 91% of WOs on BC involve work on moving parts
- Info from maintenance scrap tracking pilot (06/12-06/28)
- ‘Band-Aids’ → recurring problems on same machines
- Does not address root causes

Piston: 65%
Cylinder: 10%
Feeder Tube: 11%
Tool: 7%
Shuttle: 5%
Ran on floor: 2%
FACT: Black contamination in/on pipe

- Carbon burnt somewhere within machine
- Resin burnt from friction / trapped in hot spot
- Material getting stuck in grooves
- Grooves are being created in the machine
- Machine creates grooves within components
- Machine becomes out of spec
FACT: Black contamination in/on pipe

• Machine components are not tightened to a standard specification

• *There is no torque gun in-house with capability to reach specified torques*
Other Causes

- New parts from supplier(s) received in unacceptable condition for use
Improve
Identify Opportunities

• Opportunities for improvement in quantifying and tracking waste for continuous improvement
  – Better understand past, current, future states for feedback

• Opportunities for waste reduction
  – Reduce / eliminate scrap due to contamination
Opportunities for improvement in quantifying and tracking scrap

• Continue maintenance scrap tracking program
  – Largest stream of previously uncategorized scrap
  – Better shows current state of BC issue
Opportunities for improvement in quantifying and tracking scrap

• Introduce new scrap code for “HV – Contamination”
  – High Voltage fault is a test to check for a problem
  – Historically, ~80% associated with foreign contamination
  – Could be a multitude of things
    • Cracks
    • Voids
    • Holes
    • Thin walls
Opportunities for improvement in quantifying and tracking scrap

- Include reason for scrapping mix batches when transferring data from daily logs to high-level spreadsheet
  - Reason given on daily logs
  - Not given on high-level spreadsheet
  - Already spreadsheet rows for reason
Waste Reduction Opportunities

• Standardized procedures for:
  – Assembly / Maintenance of central units (CUs)
  – Inspecting / Cleaning of newly received components prior to installation
Assembly/Maintenance of CUs

- Purchase torque gun capable of ~5000 lb-ft
- Torque specs
  - CU Housing (Cage)
  - Hydraulic Cylinders
  - Feed blocks
  - Shuttle housings
Inspecting/Cleaning of New Parts

- Formalize inspection of new parts
- Utilize parts washer when needed
### Economic/Environmental Benefits

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Annual Waste reduced (kg)</th>
<th>Implementation Cost</th>
<th>Net Annual Savings</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardize Procedures for Central Unit Maintenance</td>
<td>18,000</td>
<td>$10,000</td>
<td>$85,000 annually</td>
<td>&lt; 3 months</td>
<td>In Progress</td>
</tr>
<tr>
<td>Standardize Procedures for Inspecting / Cleaning parts</td>
<td>200</td>
<td>$140</td>
<td>$950 annually</td>
<td>&lt; 2 months</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
Personal Benefits

- Six Sigma Experience
- Experience facilitating cross-functional team
- Problem Solving Approaches
- Project Management Experience
Special Thanks to…