Waste Reduction
Uponor Corporation

Calen Papke

MnTAP Advisor: Jane Paulson
Uponor Supervisor: Scott Bates

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

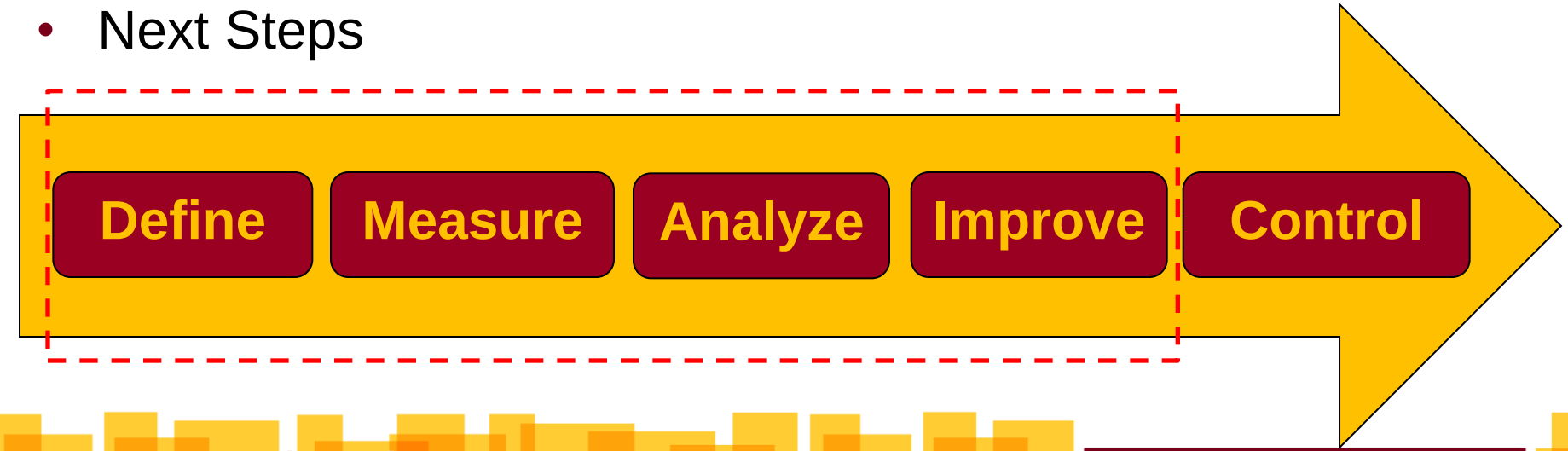
- Continuous Improvement Oriented Culture
- “Wildly Important Goals” (WIGs)
  - 15% reduction in weighed scrap
  - 15% increase in production yield
- Increase revenues
- Decrease waste-streams

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

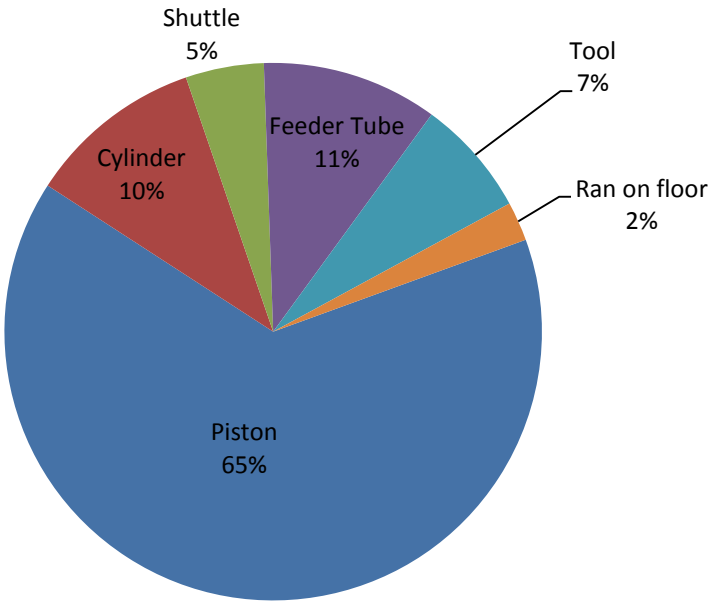
- ***"Black Contamination" - BC***
- "Foreign Contamination - FC
- "Proprietary Additive Contamination" – PAC

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

Maintenance Work Orders (WOs)



- **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

Root Cause Analysis (5 Why's)

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

Root Cause Analysis (5 Why's)

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

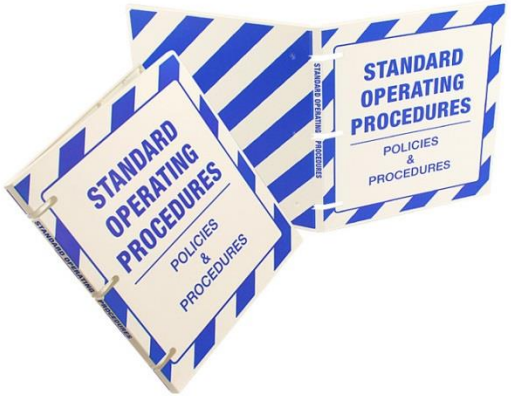
- Introduce new scrap code for “HV – Contamination”
  - High Voltage fault is a test to check for a problem
  - Historically, ~80% associated with foreign contamination
  - Could be a multitude of things
    - Cracks
    - Voids
    - Holes
    - Thin walls

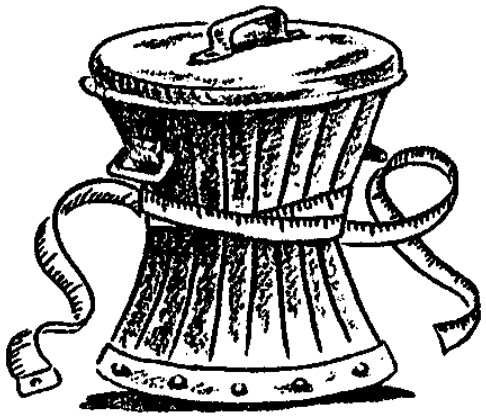
Opportunities for improvement in quantifying and tracking scrap

- 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

Recommendation	Annual Waste reduced (kg)	Implementation Cost	Net Annual Savings	Payback Period	Status
Standardize Procedures for Central Unit Maintenance	18,000	$10,000	$85,000 annually	< 3 months	In Progress
Standardize Procedures for Inspecting / Cleaning parts	200	$140	$950 annually	< 2 months	Recommended

Personal Benefits

- Six Sigma Experience
- Experience facilitating cross-functional team
- Problem Solving Approaches
- Project Management Experience

Special Thanks to…