Product Recovery at Seneca Foods

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On-Site Supervisor: John Sigrist

University of Minnesota
Driven to DiscoverSM
Company Background

• One of the leading producers of packaged produce in North America

• 24 Plants in the East, West, and Midwest

• Rochester plant operates seasonally
Motivations for Change

• Recovery Program
  • Started in 2016
  • Reducing product loss across production process
  • Not only Rochester, but for plants across Minnesota and Wisconsin

• During full-operation, over 2,000 cans per minute are produced!
Reasons for MnTAP Assistance

• Focus on reducing solid waste in Food Manufacturing

• Improving recovery boosts efficiency of:
  • Water usage
  • Chemical usage
  • Electrical demand
  • Labor
  • Silage waste management
Food Recovery Hierarchy

1. **Source Reduction & Reuse**
   Reduce the volume of surplus food generated

2. **Feed Hungry People**
   Donate extra foods to food banks, soup kitchens and shelters

3. **Feed Animals**
   Divert food scraps to animal feed

4. **Industrial uses**
   Provide waste oils for rendering and fuel conversion
   and food scraps for digestion to recover energy

5. **Composting**
   Create a nutrient-rich soil amendment

6. **Landfill / Incineration**
   Last resort to disposal
Process Description – Canned Peas

• Receiving
• Cleaning
• Preparation
• Fill and Close
• Processing
Approach

Primary question:

“Where are we losing peas?”

-Daniel Chang, 2017
CLEANING

Dock Blancher

Color Sorters

West Factory Blancher (Frozen Peas)

PREPARATION

Canned Peas

FILL & CLOSE

PROCESSING
Approach – Pea Waste Checks

- Sample waste streams every hour
- Measure total sample weight and weight of defective (or good) product
- Determine:
  - Efficiency (Weight % Good Peas)
  - Pounds per hour of Good Peas Lost
  - Cost per hour of Good Peas

Scalpers  Air Cleaners  Foam Washers  Air Cleaners  Air Cleaners  Color Sorters
Fill & Close

Peas

Conveyor Belt

Filler
Fill & Close

Empty Cans

Filled Cans (!!!)
Approach – Fill & Close

• How much product is lost from falling out of the filler?
  • Determine hourly loss and cost
Results

Efficiency of Separating Machinery

<table>
<thead>
<tr>
<th>Percentage in Waste Stream</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>70</td>
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<td>60</td>
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<td>50</td>
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<td>40</td>
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<td>30</td>
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<tr>
<td>20</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>0</td>
</tr>
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</table>

- **Scalpers**
- **Receiving Air Cleaners**
- **Foam Washers**
- **Dock Blancher Air Cleaners**
- **West Factory Blancher Air Cleaners**
- **Color Sorters**

- **Bad Peas**
- **Good Peas**
Recommendation – Color Sorters

• [Continue to] use display monitors
• Implemented this year at the start of the season
• Allow daily communication of color sorter performance to mechanics for day-to-day adjustment
• Cost: $10,000
• Results:
  • 33 tons of peas saved this season
  • $33,000 saved
Recommendation – Fill & Close

- Add guide walls to contain product flow and prevent spills
  - Estimated 10% Reduction in Losses
- Replace shake pans with conveyor belts to return product into filler
  - Estimated 25% Reduction in Losses

<table>
<thead>
<tr>
<th>Waste Saved per Year</th>
<th>Implementation Cost</th>
<th>Savings per Year</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5 tons of peas</td>
<td>$200</td>
<td>$4,500</td>
<td>Two Weeks</td>
<td>Recommended</td>
</tr>
<tr>
<td>8 tons of peas</td>
<td>$16,000</td>
<td>$8,000</td>
<td>Two Years</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
Recommendation – Defoamer

• Chemical that is sprayed on top of water tanks to knockdown foam
• Foam buildup results from starchiness of the peas
  • Causes water tanks to overflow

• Challenges:
  • Inefficient use by workers
  • Current dosing system does not effectively control foam
Recommendation – Defoamer

One pumping system services over a dozen tanks through several hundred feet of tubing across the plant.
Recommendation – Defoamer

- Prescribe training for workers
  - Estimated 50% reduction

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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,200 gallons</td>
<td>None</td>
<td>$7,000</td>
<td>Immediate</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

- Upgrade dispensing system with an improved pump and new tubes
  - Estimated 25% reduction in usage

<table>
<thead>
<tr>
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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 gallons</td>
<td>$7,000</td>
<td>$3,500</td>
<td>Two Years</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
## Summary

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Waste Saved per Year</th>
<th>Implementation Cost</th>
<th>Savings per Year</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue Using Display Monitors</td>
<td>33 tons of peas</td>
<td>$10,000</td>
<td>$33,000</td>
<td>Four Months</td>
<td>Implemented</td>
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<tr>
<td>Fill and Close</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase height of guard walls</td>
<td>4.5 tons of peas</td>
<td>$200</td>
<td>$4,500</td>
<td>Two Weeks</td>
<td>Recommended</td>
</tr>
<tr>
<td>Add conveyor belts</td>
<td>8 tons of peas</td>
<td>$16,000</td>
<td>$8,000</td>
<td>Two Years</td>
<td>Recommended</td>
</tr>
<tr>
<td>Defoamer</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Implement worker training</td>
<td>1,200 gallons of chemical</td>
<td>None</td>
<td>$7,000</td>
<td>Immediate</td>
<td>Recommended</td>
</tr>
<tr>
<td>Upgrade dispensing system</td>
<td>600 gallons of chemical</td>
<td>$7,000</td>
<td>$3,500</td>
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</tr>
</tbody>
</table>

Total Savings: 45 tons of peas, 1,800 gallons of defoamer, and $56,000 annually
Personal Takeaways

• Vision
  • Importance of having a driven, improvement-oriented mindset
  • Recognizing problems and seeing solutions
  • Respect for complexity of industrial processes

• Leadership through communication
  • Communication is a building tool
  • Involve others, especially those who will be directly affected by changes you want to make
Questions?