Milk & Aseptic Cartons
A Processing Experiment
Background, Data & Analysis
Milk & Aseptic Cartons flow to the container line for sorting

- They are a 3D shape

  - Mechanical sort systems send 3D shapes with plastic & metal containers by design.
## Container Line Priorities

- On container line sort priorities are:

<table>
<thead>
<tr>
<th>Item</th>
<th>Priority</th>
<th>Why</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALU</td>
<td>HIGH</td>
<td>Very High Value</td>
</tr>
<tr>
<td>TIN</td>
<td>HIGH</td>
<td>High volume, High Value, Cheap &amp; Easy to Remove with Mag Belt</td>
</tr>
<tr>
<td>PET</td>
<td>HIGH</td>
<td>High Volume &amp; High Value</td>
</tr>
<tr>
<td>HDPE</td>
<td>HIGH</td>
<td>High Volume &amp; High Value</td>
</tr>
</tbody>
</table>
Both Milk Cartons & PP Dairy Tubs are a lower priority because:

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<thead>
<tr>
<th>Item</th>
<th>Priority</th>
<th>Why</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Cartons</td>
<td>Lower</td>
<td>Very Low volume, Very low value</td>
</tr>
<tr>
<td>PP #5 Tubs</td>
<td>Lower</td>
<td>Good value but low volume</td>
</tr>
</tbody>
</table>
Container Line Priorities

- Because Milk Cartons are both low volume and low value:
  - They are sorted at the end of the line
  - They are sorted by people or robots
    • (Volume * Value) does not justify optical sorters
With either People or Robots,
- Picks are a finite & scarce resource

Thus
- Each pick comes with an opportunity cost
Opportunity Cost

- Example: If I pick a milk carton, I can’t pick an a PET bottle at the same time.

- Picks are an either or or choice.
Data Background

- Pioneer began sorting & baling milk cartons separately May 10, 2018

- 74% of total volume that Pioneer processes is sourced from areas that include milk cartons as a program item
Data Background

- We have high confidence that volume data represents 95% or more of milk cartons available on the container line.
- Why?
  - Milk Cartons were picked (positive sort) from container stream while making a negative sort of #3–7 Plastics. (Until Aug 2018)
    - This means our sorters HAD to get the milk cartons out as their presence in #3–7 plastics would be a prohibitive.
Data Results

- Avg Monthly Volume = 5.05 Tons

- Volume requires 4.6 Months to make a full load
  - Annual volume estimate = 61 Tons

- Loads per year = 2.6 loads
Data Results

- Broke two bales to determine extent of mold contamination
  - Four month old bale—very little mold
  - Two month old bale—very little mold
Inspecting for Mold
Inspecting for Mold
Data Results

- Sold load to Omnisphere who is a broker recommended by the Carton Council
- Price was $41/ton FOB Clackamas
- Destination was Mexico
- We contacted three different brokers recommended by the Carton Council
  - Two of the three brokers told us that they could not move the material
Bale Quality
Bale Quality
Quality Feedback

- As of Nov 8th, we have not received any quality feedback from consuming mill
  - (We are not expecting a claim)
Analysis—Space Issue

- It takes 4+ months to accumulate just one load
- This equals an inventory turn of 139 Days
If the average inv turn for all grades at Pioneer Clackamas were 139 Days---

Pioneer would need a building of approximately 423,000 square feet to operate

The additional rental expense would add at least $21/ton to our processing cost
Opportunity Cost to Pick Milk Cartons

- Weighted Avg Value of Alu, Tin, PET, HDPE & PP equals $286.51/Ton for Oct 2018
Opportunity Cost equals

- $286.51 Plastic & Metal Avg Value
- $ 21.00 Extra Rent
- –$ 41.00 Milk Carton Value

- $266.51/Ton = Net Opportunity Cost
Summary

- It is possible to sort & market milk cartons without much mold, although it appears that the markets for cartons are very limited.

- The sorting, storing & shipping costs of milk cartons are at least $266.51/Ton more than the benefit of doing so.