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Milk & Aseptic Cartons
A Processing Experiment

Background, Data & Analysis

Background

- 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.**

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Container Line Priorities

- On container line sort priorities are:

Item	Priority	Why
ALU	HIGH	Very High Value
TIN	HIGH	High volume, High Value, Cheap & Easy to Remove with Mag Belt
PET	HIGH	High Volume & High Value
HDPE	HIGH	High Volume & High Value

Container Line Priorities

- Both Milk Cartons & PP Dairy Tubs are a lower priority because:

Item	Priority	Why
Milk Cartons	Lower	Very Low volume, Very low value
PP #5 Tubs	Lower	Good value but low volume

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

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Background

- With either People or Robots,
  - Picks are a finite & scarce resource
- Thus
  - Each pick comes with an opportunity cost

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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 choice

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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

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Data Background

- We have high confidence that volume data represents 95% or more the 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.

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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**

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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

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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

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Bale Quality

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Bale Quality

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Quality Feedback

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

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Analysis- Space Issue

- It takes 4+ months to accumulate just one load
- This equals an inventory turn of 139 Days

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Space Prospective

- 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

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Opportunity Cost to Pick Milk Cartons

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

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Opportunity Cost Calculation

- Opportunity Cost equals
  - $286.51 Plastic & Metal Avg Value
  - $ 21.00 Extra Rent
  - -$ 41.00 Milk Carton Value

  - **$266.51/Ton = Net Opportunity Cost**

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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.

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