Reducing Waste at Kemps Ice Cream Plant

Anne Hunter

MnTAP Advisor: Jane Paulson

Company Supervisor: Jay Strommen

UNIVERSITY OF MINNESOTA

Driven to Discover℠

MnTAP

UNIVERSITY OF MINNESOTA

Company Background

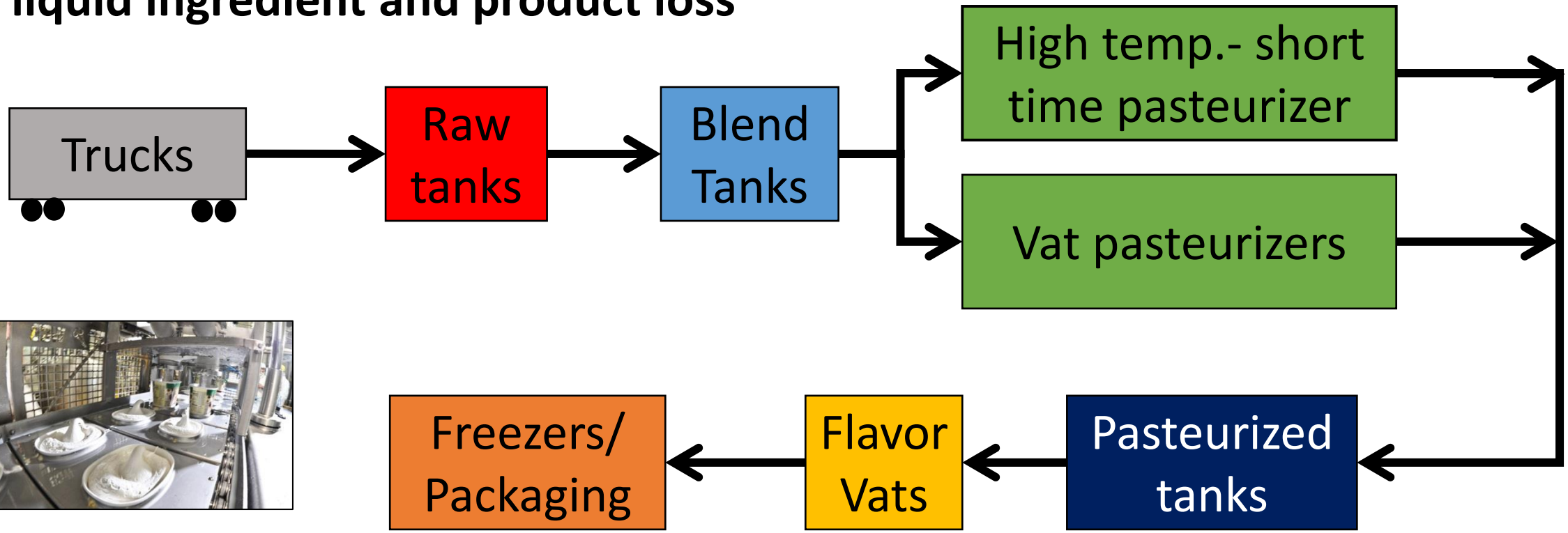
- Name: Kemps Ice Cream
- Location: Rochester, MN
- 200 employees
- 700,000 gallons of ice cream per week

Reasons for MnTAP Assistance

- High biochemical oxygen demand (BOD) levels in wastewater
- Daily reports show losses
- Gather information about ingredient loss in established processes
- Gain a better understanding of where waste occurs in the process

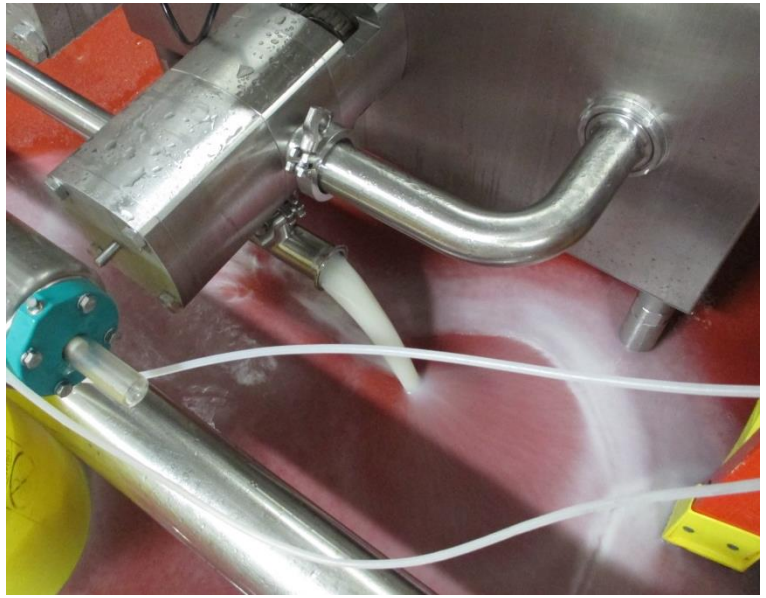
Overview

Goal: To make process change recommendations that will reduce liquid ingredient and product loss



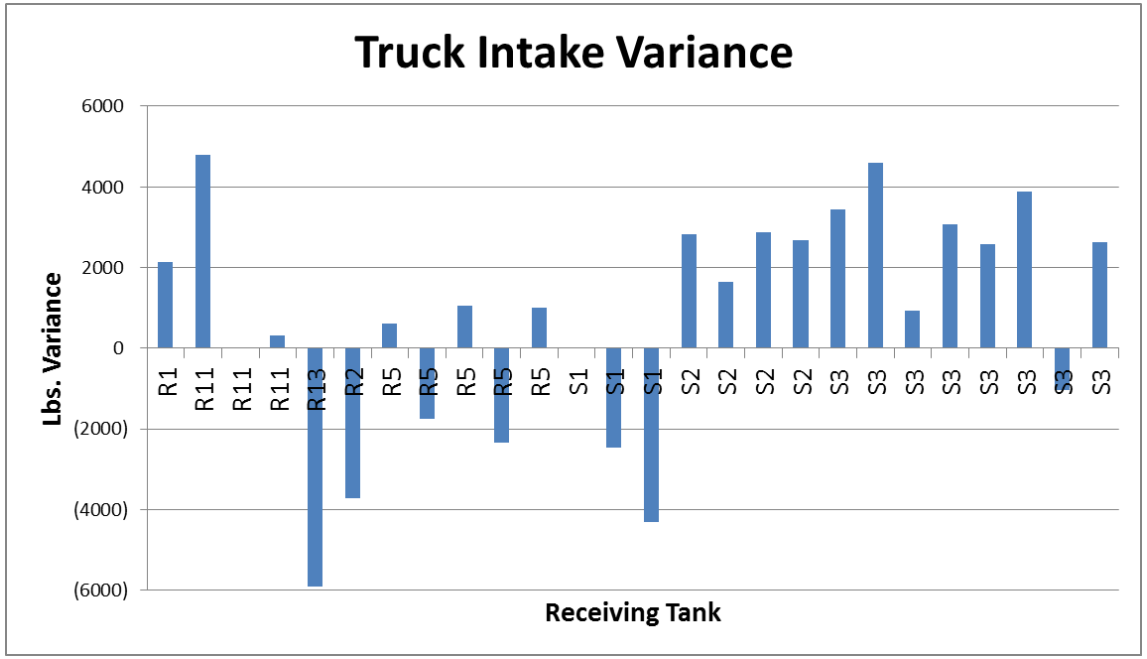
Approach

- Collected data using tank inventory differences
- Collected rinse samples from dairy trucks



- Observed cleaning processes on post-pasteurization side of plant
- Collected samples of Clean In Place (CIP) pre-rinses for many types of processes

Tank Calibration



- *Variance = Raw tank weight difference - Scale Ticket Weight*
- Correction needed for dairy ingredients for water used to rinse trucks

<u>Recommendation</u>: Calibrate tank gauges

- Loss reports will be more accurate
  - Resources can be spent more efficiently
- Can double-check amounts brought in by truck

Dairy Truck Intake

- Water used to rinse dairy trucks may still be cloudy after diverted to drain
- Negligible product loss occurs EXCEPT when:
  - Cream comes from more than 2 hours away
  - Whey settles in truck and clogs filter

<u>Recommendation</u>:

- Standardize unloading procedures
- Continue minimizing high loss situations

Sugar Truck Intake

- Liquid sugars are brought in by a pump provided by individual trucks
- Connecting hose is full of sugar when pumping is complete and goes to waste
- System is more prone to leakage

<u>Recommendation</u>: Add existing sugar pump to the truck bay

<u>Savings</u>: 10 gallons per load, 112,000 lbs or $23,000 of sugar per year

Compressed Air System

- Compressed air system has several drains to prevent buildup of water
  - Two float drains
  - Two timed drains
  - Five open drains
  - One manually opened drain
- When drains are open long enough to leak air, electricity is being wasted

Recommendation: Replace timed, open, and manually opened air compressor drains with zero-loss air drains

Savings: 256,000 kWh, or $24,300 in electricity costs

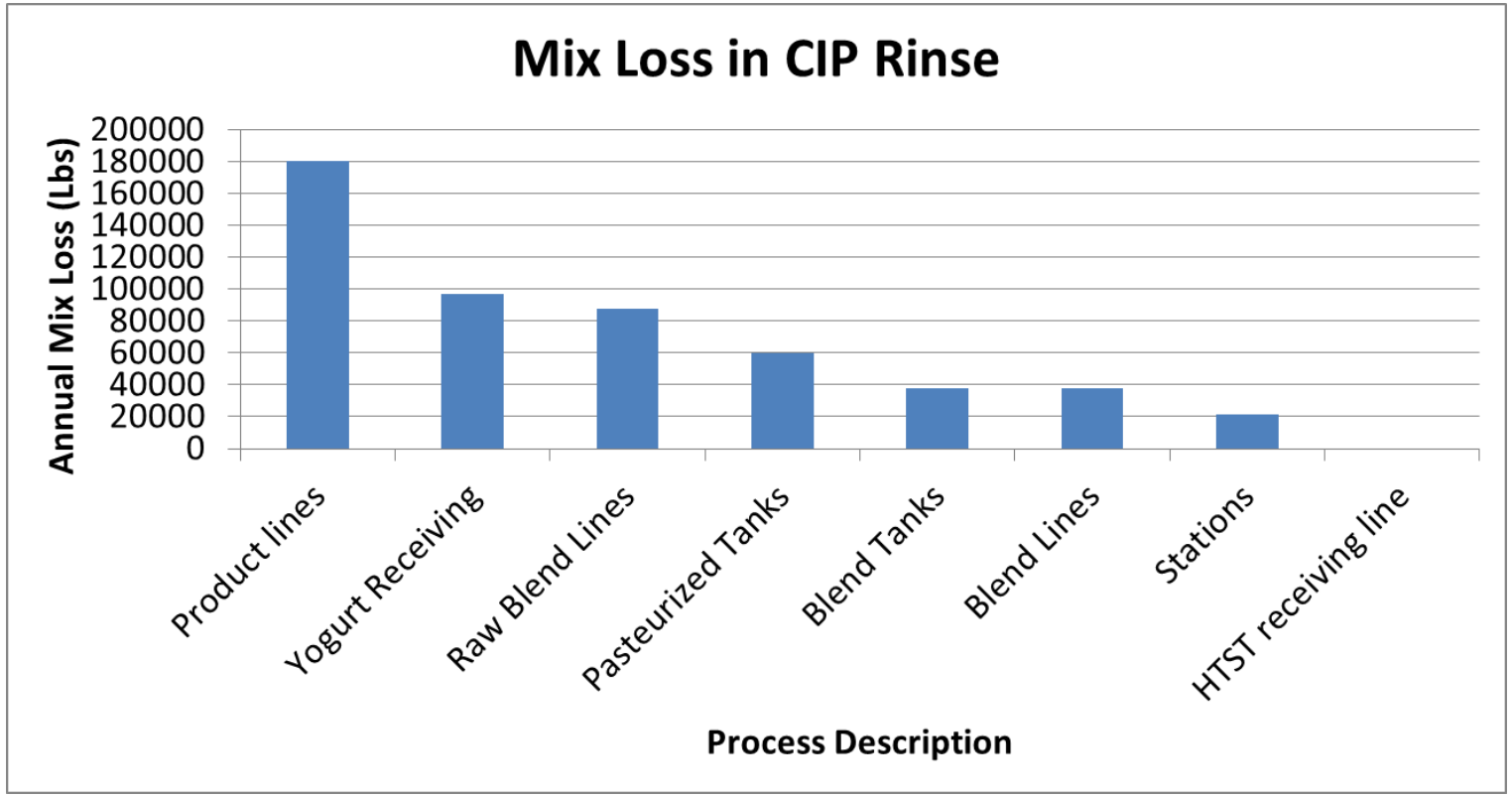
Recommendations

Recommendation	Product Savings	Energy Savings	Adjust Annual Savings*	Implementation Costs	Payback Period	Status
Sugar pump	112,000 lbs of sugar	N/A	$22,620	$54,260	2.4 years	Recommended
Air compressor drains	N/A	256,000 kWh	$24,300	$1,000**	0.5 months	Recommended
Total	**112,000 lbs**	**256,000 kWh**	**$46,920**	**$55,260****	**1.2 years**	**Recommended**

*Adjusted Annual Savings includes annual operating costs for a new sugar pump

** Estimated cost

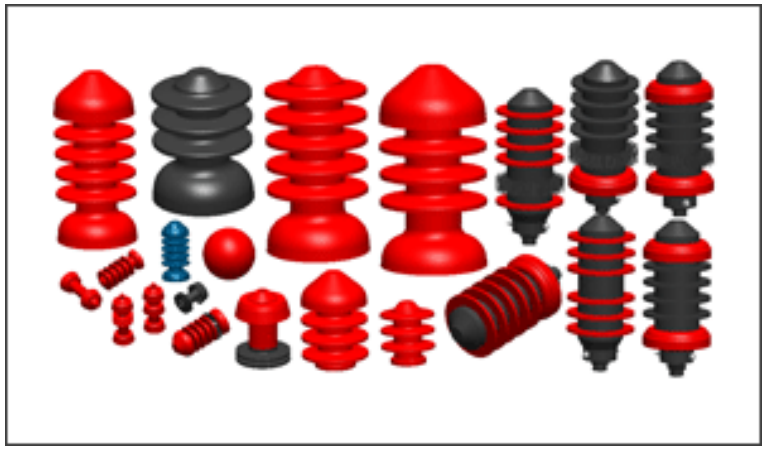
CIP Pre-Rinse Data

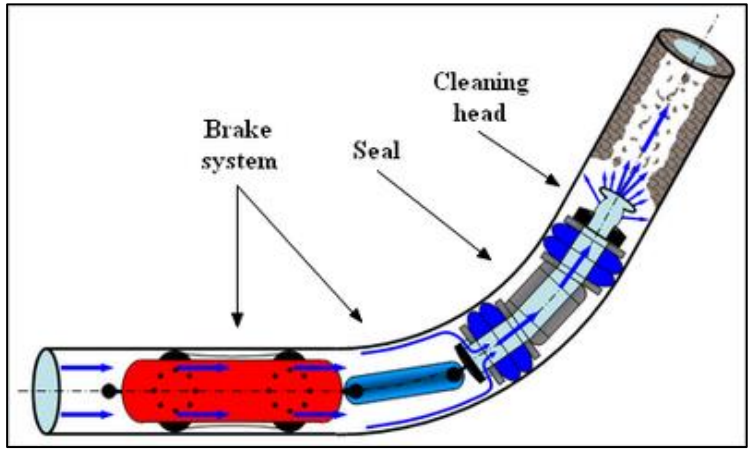


- Product lines show biggest potential for savings
- Yogurt receiving lines and raw blend lines could be water-flushed better
- Stations have more mix loss on the cleaning floor
- More testing needs to be done in order to draw conclusions

Future Opportunities

- Install a PIG system to clean 120 ft. of piping between pasteurized tanks and the flavor vats
  - Potential Savings: 16,500 gallons of mix will go to finished product instead of rework per year





Personal Benefits

- First time in a manufacturing plant setting
- Created and conducted experiments independently
- Had to be flexible, patient, and creative in problem solving
- Met new people with different backgrounds

Thank you for your time!

UNIVERSITY OF MINNESOTA

Driven to Discover℠

MnTAP

UNIVERSITY OF MINNESOTA