

# Waste Reduction in Packaging Process

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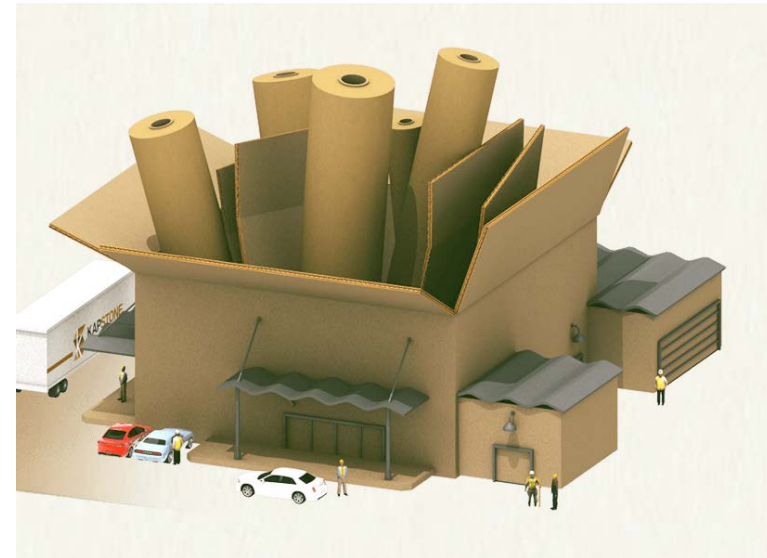
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# Company Background

- Formed in 2005
- Headquartered in Illinois
- Operating businesses: paper, packaging, forest products and related industries
- Fridley site – industrial corrugated packaging
  - Been in operation since 1960
  - 142 employees



# Process Description



Corrugator



Converter



# Project Overview

## Wastewater

- 3<sup>rd</sup> largest water user in Fridley
- 10 million gallons of water consumed per year
- Goal: reduce water consumption

## Paper waste

- 14.5% of total paper consumption
- Goal: reduce the waste to 12.5%



# Approach

- 1) Identified the main sources of waste
  - Reviewed the wastewater and paper waste reports
  - Conducted material balance
- 2) Evaluated the feasible solutions
  - Conducted experiment
  - Talked to operators and vendors
- 3) Performed the cost analysis

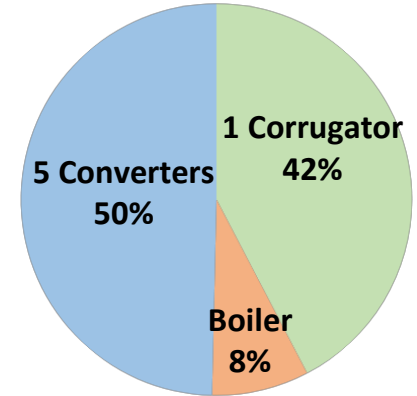


Figure 1: Wastewater Breakdown

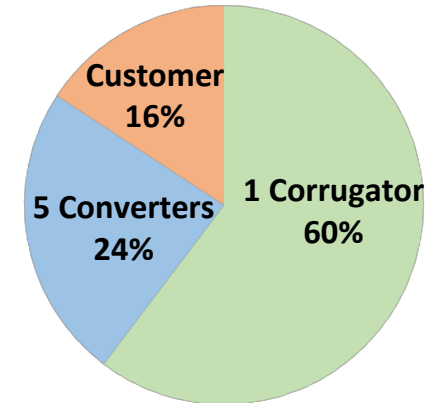


Figure 2: Paper Waste Breakdown

# Water Consumption in Corrugator

## Overview

- Main source (93%): cooling panel
  - Radiant shield to avoid failure in glue distribution
  - 18,000 gallons daily
  - Annual cost of \$39,000

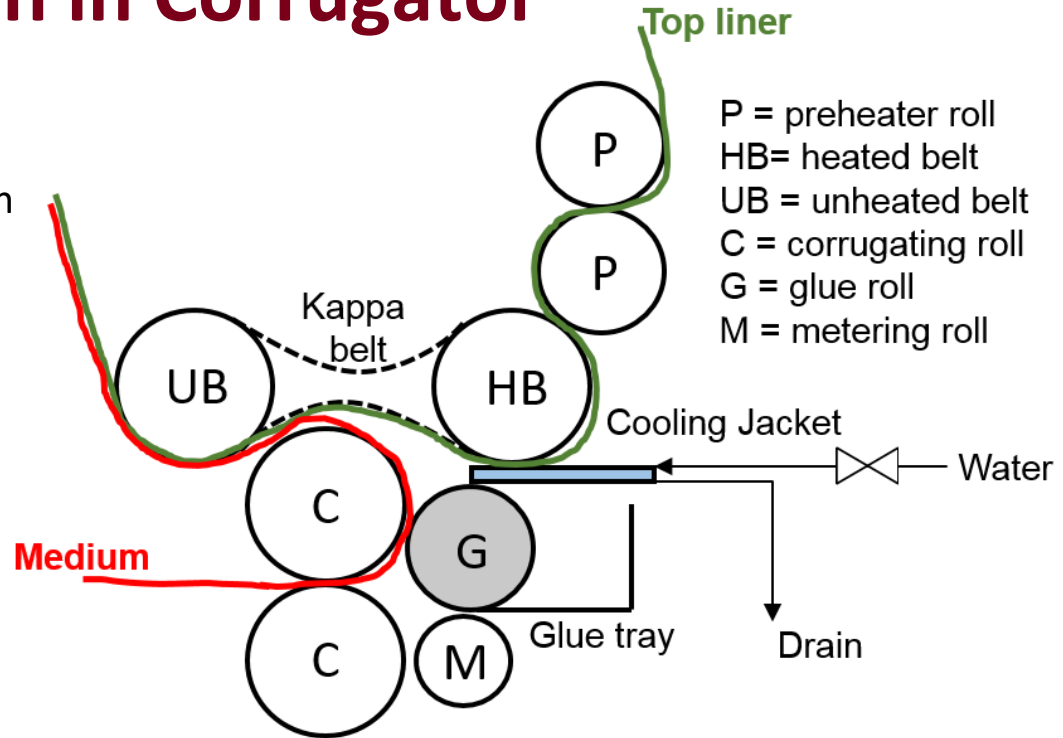


Figure 3: Cross-sectional Area of Single Facer

# Experimental Result

- Conducted the flow reduction experiment
  - Cooling water flow rate varied with city water pressure
  - Glue roll temperature was measured to be  $T = 107.5 \pm 0.6^{\circ}\text{F}$

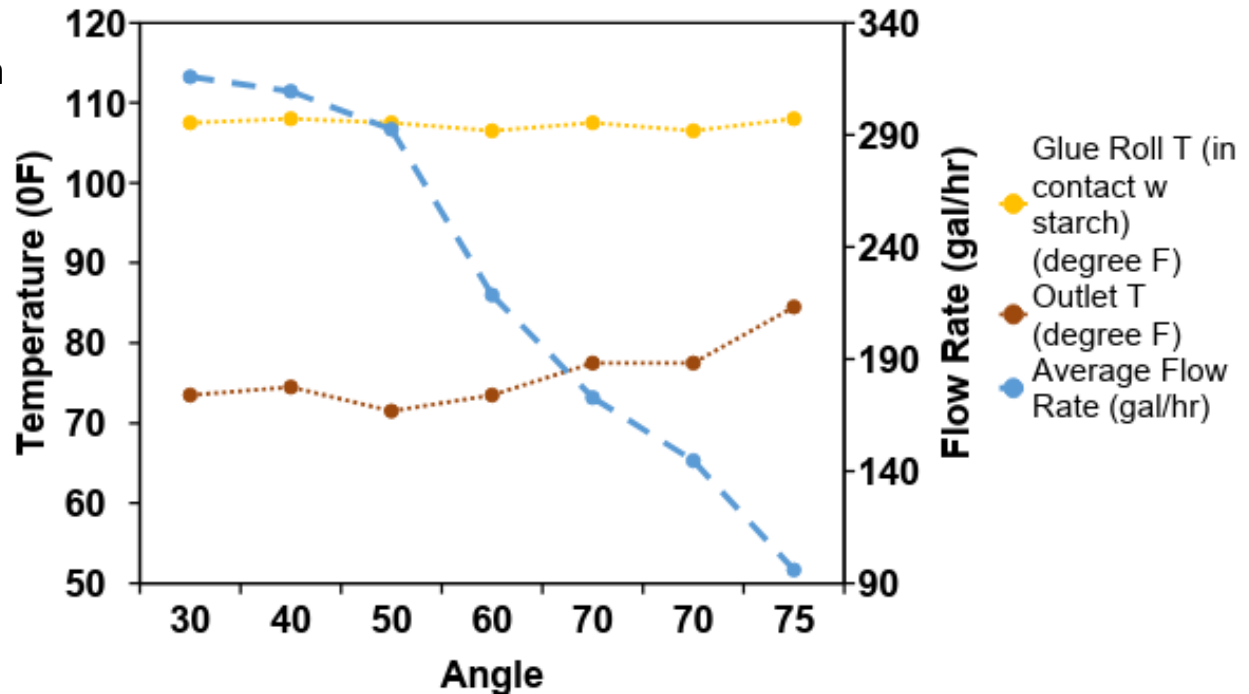


Figure 4: Flow Reduction Result



# Primary Recommendation

Reduction in cooling water flow rate

- 380 gal/hr at fully open (0°) to 150 gal/hr at partially open (70°)
- Total rate of 300 gal/hr for two pasers

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Flow Reduction and Pressure Regulator	2.2 million gallons	\$300	\$18,000	1 Week	Recommended



# Recommendation Table

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Flow Reduction and Pressure Regulator	2.2 million gallons	\$300	\$18,000	1 Week	Recommended
Float Switch	500,000 gallons	\$450	\$4,400	1 Month	Recommended
Valve Repair	250,000 gallons	\$110	\$1,400	1 Month	Implemented

# Anecdote

- Worked in a learning and challenging environment
  - Gained knowledge about corrugated packaging industry and different machinery
  - Applied what learned in school
  - Practiced communication and collaboration
- Gained feedback for personal growth and development