EXPERIENCES WITH A PUTSCH JET WASH ROLLER TABLE

Kevin Bloom
American Crystal Sugar Company,
Box 357, 1020 Business Highway 2,
East Grand Forks, MN 56721
EXPERIENCES
WITH A PUTSCH
JET WASH ROLLER TABLE

Kevin Bloom
Production Superintendent
American Crystal Sugar Company
East Grand Forks, MN
BACKGROUND INFORMATION

• American Crystal Sugar Company
  – Farmer owned Cooperative
  – 6 Factories total: Minnesota (3), North Dakota (2), and Montana (1)
  – Approximately 10,000,000 tons of beets
  – 250 days of operation (September – May)
  – Long term beet storage required
    • Fresh Beets
    • Frozen Beets
BACKGROUND INFORMATION

• Valley Slice ~ 37,000 tpd
  – East Grand Forks, MN – 9000 tpd
  – Hillsboro, ND – 9000 tpd
  – Drayton, ND – 7000 tpd
  – Moorhead, MN – 6000 tpd
  – Crookston, MN – 6000 tpd
OUR PROCESS – WHERE WE BEGAN

- BEET HOPPER
- ROCK CATCHER
- BEET PUMPS
- PADDLE WHEEL WASHER
- GRAB ROLLERS

TOTAL RESIDENCE TIME: 6.6 MINUTES
OUR PROCESS – WHAT WE HAVE NOW

BEET HOPPER

→

ROCK CATCHER

→

ROCK CATCHER

→

BEET PUMPS

→

PUTSCH JET WASH SPRAY TABLE

TOTAL RESIDENCE TIME:
2.1 MINUTES
PUTSCH JET WASH ROLLER
TABLE GENERAL LAYOUT
FLUME LOSS YEARLY COMPARISON

![FLUME LOSS YEARLY COMPARISON Graph](image-url)
FLUME LOSS YEARLY COMPARISON

#COD/ton of beets

January  February  March  April  May

- 2005
- 2007
- 2008
FLUME LOSS YEARLY COMPARISON

14.9#/ton Reduction in Sugar Loss to Flume
BEET WASHING EFFECTIVENESS

Raw Juice Solids Comparison

% Solids in RJ

2005 2006 2007 2008 2009

Valley EGF ↑ High/Low
INFECTION CONTROL

• Comparison before and after spray table
  – Lactic Acid Turndown Ratio (LATR)

\[
LATR = \frac{\text{Flume Lactic Acid}}{\text{Raw Juice Lactic Acid}}
\]

2006 - LATR = 39
2007 - LATR = 75
PROJECT DETAILS - INSTALLATION

• Putsch Jet Wash Roller Table – installation relatively simple

Challenges – Beet distribution and outlet chute
• Beet washer feed – beet distribution
  – From beet pump pipe outlet drop 6” to 16’ long rectangular chute
    – beets naturally distribute entire width of washer
  – Grizzly Bar inlet to washer – removes most of transport water
• Outlet chute
  – 90 degree curve – 8’ drop
  – Beets would plug on chute and “fly out”
PROJECT DETAILS - ENVIRONMENTAL IMPACT

- Project had significant impact on reducing waste water inventory and overall factory odors
- Improved flume water loss accounting
- Better water management practices
  - All water added at clean water sprays offset by other dilution water sources
SPRAY TABLE MAINTENANCE CONCERNS

• Gearboxes - Shaft attachment – problem resolved
• 18 rollers shaft bearings replaced after two years
  – Seals are good
  – Auto-greasing installed
• Rollers – no appreciable wear to date
PUTSCH JET WASH
ROLLER TABLE
CHALLENGES AND NEXT STEPS

• Clarified water supply
  – Protecting nozzles from plugging
  – Wear of nozzles
  – Plugged headers and nozzles
  – Clarifier level control
  – Strainer design

• Pump design and capacity