Gravity Belt Thickener

Problem: Cowlitz County:
2m Belt

• Frequent Cleaning
• Removal and reinstall
• 2 year life
• Feed Rate not at design
• Speed not at design
Visual inspection

- Fabric back covered with hardened product
Existing Fan spray
Existing Wash Spray Approach

- Nozzles recessed in pipe--difficult to clean
- Brushes only temporarily loosen clogged material to nozzles
- Maintenance requires removal of full spray header to clean
Strip brush spray cleaner

VIEW OF THE INTERNAL BRUSH
Washbox design

- Current belt cleaning is static
- Small nozzle openings
- Clogged nozzles difficult to clean
- Washing action vs. cleaning
- Near zero penetration
- Nozzles clogged frequently
Brushes

- Brush “pipe cleaner” design
- Fouls with particulate
- Requires regular dis-assembly to clean
Spray Width vs. cleaning force

- Existing fan sprays
- Wash belt vs. clean
- Little penetration
- Usually washes only one side
- Hi-pressure pump
- Hi-spray distance
Belt/Fabric design parameters

FABRIC SPECIFICATION

Thickness - ?? mm

Tensile Strength – ?? ?? N/cm

Opening – 0-470u???

Air Permeability – ?? ?? l/m2/s ??? Pa

CFM – ??

Safety Factor of Belt – ?? @ ??? pli

Safety Factor of Seam (standard, L) – ?? @ ??? pli

Tensile Strength of Seam (standard, L) – 502.8 pli
Fabric design parameters
Belt/Fabric design parameters

MONOFILAMENT POLYESTER

Process design:          Pattern – 6/2, ????
Surface - Ultra Smooth, ????
Low Modulus-of-Elasticity
Warp material – pes, ????
Weft material – pes, ????
MODIFIED SATIN WEAVE, ????

Process design:
Mesh/Count/Weave – Optimized, ????

CDM – Cross Machine Direction – Large (Diameter), ????
Fabric accelerated deterioration

- Fabric fiber delamination
- Fibers create additional surface area for polymers and material to precipitate
- Fibers accumulate material and lay flat in feed/mixing zone
Home-made spray

- Existing washbox theory insufficient
- Operators forced to design own systems
Gravity Belt Pilot Test

- 2 meter GBT
- 40 existing nozzles
- 80 gpm @ 70psi
- 1/8” of Material on back of fabric
- Belt Blaster pilot 8 gpm @ 70 psi
Belt Blaster- GBT

Notes:
1. rotating spray bars with solid stream nozzles deep
   clean the belt from the backside
2. 0.5 to 1.5 qpm nozzles depending upon field test performance
3. spray system can be set to operate on a periodic basis or continuous

Equipment Frame
Spray shield and frame
clamp, strut
Frame

Possible shield location, reverse mounting possible if desired

Eco-Blaster, BCS

Confidential Information
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Sheet 1 of 1

GTU Trading.com, Inc.
Rotating Spray Advantages

- High impingement forces
- Reduced water volume
- Reduced pressure
- Roll tracking control due to reduced material on rolls
- Higher consistent belt cleanliness actually removes material compressed on rolls
Belt Blaster System

- Optimize washbox system efficiency
- Reduce water volume used with improved weave penetration
- Drive materials out of weave openings
- Reduce nozzle clogging issues
- Consistant weave opening, therefore improved dewatering abilities
- Consistant scfm=improved speed
Belt Filter Press pilot test

- Pilot test available for extreme cases
- Adaptable to most machine configuration
- Bolt in test model
- 2” strip between Rotating spray bars = belt normal state
Strainer filtration

- 60-300 mesh strainer
- Larger diameter due to larger nozzle openings
- Automated cleaning strainer available
Secondary cleaning

- Rolls stay clean due to the belt being cleaner
- Machine tracking /control systems reliability improved
Belt Filter Press Cleaning
Field Pilot Test
# Spray cleaning ability

Cleaning ability is dependent upon many factors:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Belt travel rate</td>
<td>Temperature of the liquid</td>
</tr>
<tr>
<td>Water pressure</td>
<td>Thickness of material</td>
</tr>
<tr>
<td>Water volume material</td>
<td>Density/adhesion of material</td>
</tr>
<tr>
<td>Angle of spray impact</td>
<td>Spray dispersion area</td>
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<tr>
<td>Surface finish surface</td>
<td>Distance to cleaning</td>
</tr>
<tr>
<td>Rotating solid stream spray over a moving</td>
<td></td>
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<tr>
<td>fabric/media allows to cleaning with solid</td>
<td></td>
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<tr>
<td>steam spray</td>
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</tbody>
</table>

Rotating solid stream spray over a moving fabric/media allows to cleaning with solid steam spray.
Typical installation between rollers 3-4 & 6-7
Testing Questionnaire

Operational visual inspection photograph

Please provide the following additional data:
1. Manufacturer & Model #:
2. Machine type: (ie. Gravity belt, Gravity zone plus pressure section, etc..)
3. Product being thickened (please be specific, include concentration, material and grease/polymer content)
4. Width and number of Belts/Fabric:
5. Fabric/belt data: SCFM Thickness
   Opening size Air Permeability
Visual inspection

- Fabric back covered w/ hardened product
Testing Questionnaire

6. Fabric/belt average operational life:

7. Wash box water pressure and flow:

8. Number of nozzles per wash box:

9. Nozzle opening size (can be found by trying various size drill bits to test hole size by inserting bits to match size)

10. Cleaning procedure (Daily/weekly/quarterly) for fabric/belt including chemical/anti-polymer cleaning solutions used and periodicity

11. Primary problem(s) with belt/fabric:
Spray penetration

- Rotating water lance
- Full Penetration
- Spray from fabric back
- Lower pressure
- Concentrated force
- Extreme water reduction