

New Dewatering Bel Filter Press System

Author: Juan Torres Rivas

Advisor: Héctor J. Cruzado, Ph.D., P.E.
Polytechnic University of Puerto Rico

Abstract

A new belt filter press has been installed that will help the company not only to reduce labor cost and polymer usage but also improve the dewatering process. Running an old belt filter press does not help to correctly dewater all materials that arrive to the site. Some of this material needs to be processed too many times due to the inefficiency of this belt filter press. After conducting an internal audit and a process study, it was determined that, as a result of a lack of process in addition to high labor costs from the old press, the company lost at least 20% of his dewatering and transferring business because it couldn't handle material exceeding what was expected.

Key Terms – Dewatering Belt Filter Press, Polymer addition

Introduction

Currently the company is running an old belt filter press, were is not able to process more than 35 percent on a daily basis. Also, this equipment is consuming double of the polymer usage in order to coagulate the material as well as is consuming more city water than the inlet flow wet material that is processed.

Objectives

The objectives of this project are

- Replace Old belt filter press
- Improve dewatering process
- Reduce labor cost
- Reduce polymer consumption and automate addition system
- Reduce city water usage

Company Overview

Spectraserv, previously Modern Transportation Company, was incorporated in the state of New Jersey in 1961. It began by transporting waste from facilities to designated transfer stations. In response to the changing needs of our clients, Spectraserv expanded its capabilities to include residuals treatment and construction operations in our line of waste management services. In fact, instead of transporting sludge to other transfer stations, Spectraserv now operates one of the largest residuals transfer stations in New Jersey.



Figure 1: Company Site

Literature Review

•Komline – Sanderson

•Belt filter press is a dewatering equipment that applies mechanical pressure to a mechanically conditioned slurry, which is pressed between two (2) tensioned belts by passing those belts through a serpentine of decreasing diameter rolls.

•The machine can actually be divided into three (3) zones: gravity zone, where free draining water is drained by gravity through a porous belt; wedge zone, where the solids are prepared for pressure application, and pressure zone, where medium, then high pressure is applied to the conditioned solids. Typically, a belt filter press receives a slurry ranging from 1-4% feed solids and produces a final product.

•Sebright Product Inc.

•This company is also one of the best belt filter press designers approved by EPA. It also has its own patented equipment. Sebright Product along with Komline – Sanderson agree that these type of equipment's are designed according to three (3) zones: gravity, wedge and pressure.

•FRC Systems – Wastewater Solutions

•Before sludge enters the press, it is chemically conditioned for dewatering with an emulsion polymer flocculent that helps form stronger flocs. After chemical conditioning, a transfer pump drops the sludge onto a preliminary dewatering belt where free water molecules separate by gravity and fall into a collection trough.

•As sludge is conveyed along the belt, ploughs roll it around to help water drain out. Before dropping down to the next stage, guide plates position the sludge towards the middle of the belt and ensure nothing is squeezed outside of the filter. A second gravity thickener repeats the process before sludge is fed into a pressing zone.

•Upon entering the pressing zone, sludge is sandwiched and squeezed between two belt filters that slowly convey over and under rollers which force excess water out of the sludge and through the filter mesh.

•Finally, the pressed sludge is scraped off the belt and collected in a bin. All filtrate and wash water is captured and transferred back to the front of the wastewater system for re-processing

Methodology

•Evaluate existing process

- Assess complete dewatering process

• Analyze dewatering process assessment

- Design equipment to accommodate company needs
- Find local equipment designer and installation

•Research for equipment alternatives

- Use search tools as google, EPA, and local dewatering belt filter press designers

•Research for regulatory permits

- State and Local permits

•Employees performance

- Train employees for:
 - Onsite OP/PM
 - Equipment Operations

Schedule

In this section will be showing the schedule proposed in order to complete the entire project. Also, there is a comment section where any variation in the project must be recorded

•September,

- Week 1 – Assessment
- Week 3 and 4 – Equipment design review

•October

- Week 1 – equipment delivery
- Week 2 through 4
 - Installation
 - Start up
 - Employees training

	September				October				Comments
	week 1	week 2	week 3	week 4	week 1	week 2	week 3	week 4	
Equipment and Process Assessment	█								
Research for Local equipment designer		█							
Discuss equipment design			█						Original flow parameters were changed
Request Equipment installation regulatory permits				█					Modification permit was issue by State and local agency
Deliver Equipment					█				
Shut Down Press #2						█			
Disassemble Press #2							█		
Install New Press								█	
Connect Electrical wires and mechanical equipments									New three phase panel has to be installed
Equipment Start Up									
Run samples									
Train employees									
Release equipment									

Figure 2: Proposed Schedule

Results

•Equipment installation project ran as expected

- Fours days of project delay
 - Two days of rain
 - Two days to install and re-direct three phase panel

•City water reduction

- Water from clarifier number two was re-directed to the press

•Labor Cost

- Reduce employee equipment operation
 - From two employees to one employee by shift

•Polymer automated system

- Reduce polymer addition by 35%

Discussion

This section outline the dewatering process improvement and advantages to install a new dewatering belt filter press.

- The old belt filter press was operating to process only a 35% or less of the material processed on a daily basis. This old equipment was running with 140 gallons per day with a of 5 to 10 percent efficiency, meaning the cake “dry material” obtained has to be processed twice and consuming more polymer and city water that is expected

- Installing a new belt filter press and automating the polymer addition will help to save some labor cost up to 45 percent in the first 5 years of continues process.
- Also, company has been able to reduce the operational cost adding another 12 hours shift with just only one employee by shift.
- The redirection of the recycle water from clarifier number two has help to improve the city water consumption until to reduce the usage to Zero.

Conclusions

• With this new belt filter press the company is now able to improve their dewatering process as well as and save directly in operational cost.

• Reducing the amount of polymer addition, the usage of city water and training employees will help the company to improve its dewatering process and handle more loads of daily materials.

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