Rotary Press Revolutionizes Sludge Compaction

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Abstract

Optimization, cost reduction and mill sludge discharge are seldom combined as a topic of discussion, but evolution in technology has changed that. Dewatering sludge to form cake material with this design is proving to be an outstanding alternative to existing systems. With feed sludge or flow streams that can be as low as 0.7% total suspended solids, this upgrade to belt presses and screw presses produces a consistent extrusion of cake from all types of mill sludge. That includes recycled fiber sludge, combinations of fiber, filler and fines from primary capture sources and sludge from secondary biological treatment.

When compared to equipment and operations currently in use, the rotary press reduces energy cost, decreases polymer cost, significantly cuts maintenance requirements and eliminates the need for operator attention during operation. Other benefits include a system that is free from the need for constant cleaning and is totally automated, from push button start to complete system monitoring and alarming.

This paper discusses the technology, the successes and the benefits of a revolutionary rotary press technology for producing cake from sludge.

Introduction

Sludge dewatering has very low priority when it comes to topics for discussion on the evolution of technology that impacts pulp and paper mill performance. It is, however, an important part of any discussion associated with mill sustainability and environmental impact. The processes required to discharge unwanted solids from mill operations can be streamlined and simplified with the use of well-conceived and capable equipment that overcomes many of the problematic issues with current solutions. The Rotary Press CV by Fournier Industries dewater sludge to produce higher cake solids at lower cost, with reduced support requirements and long term benefits.

Sludge is produced by every mill as a result of normal papermaking operations. It is made up of various components but mainly fiber fines that are of little or no value to the finished product. Where operations add fillers or use recycled paper, the mill discharge also includes mineral content and non-fiber substances. Mill effluent is discharged to various receptors, including onsite treatment plants, municipal wastewater systems, lagoons and directly into rivers or other bodies of water. Government clean water initiatives increasingly demand improved environmental stewardship and that requires improved wastewater management. All of the issues lead to the need to remove solids from wastewater and to concentrate those solids.
Sludge Management Issues

There are a number of issues that affect sludge management and mill sustainability. The following factors need to be understood and considered when selecting the appropriate equipment for sludge dewatering and cake production.

**Final % solids:** The objective of sludge dewatering is to produce a material with solids that are as high as possible. Some equipment will only dewater to a point where the sludge will appear more solid than liquid but it will still slump when piled and actually flow outwards from the pile. The ideal is to produce a cake-like material that will pile for storage and handling. If too wet, the sludge will lose water as it is being transported on public roads and this often results in unwanted attention by the public and state authorities. As well, transporting and disposing of water is costly and can be avoided. For a mill that is producing 50 tons per day of bone dry sludge, an increase of 10% in solids through better dewatering means there will be about 10,000 pounds less water transported each day. The impact of handling excess water includes costs for the weight of material to be transported, the number of truckloads and, in most cases, additional tippage fees.

**Solids capture rate and filtrate clarity:** The solids retained by dewatering is affected by a number of equipment parameters, operating modes and polymer addition rates. If the filtering medium, whether it is cloth, screening, belt, perforated plates or any other material, is too open then the initial capture rate of the solids will be very low. In most cases this means the filtrate will return solids to the process and that material will come around again. This dead-load impacts the capability of the entire operation to function efficiently, either by limiting the use of the filtrate or by simply reducing throughput capability. The opposite is true if the filtering medium is too closed. This can provide a very high retention of solids but at the cost of greatly reduced throughput. Capture rates in excess of 98% for the entire sludge dewatering process are readily achievable with good throughput and should be considered as a low end target.

**Operator action and attention:** Sludge dewatering is not a revenue generating operation and thus should have the lowest possible manpower assigned to it. Some dewatering equipment requires constant operator attention in order to keep the solids and throughput at optimal levels. Most paper operations have variable sludge production due to factors such as the amount and quality of recycled fiber used, the number of sheet breaks, the amount of fillers used, the amount of refining or how open or closed the process is operated. Changes that result from these will impact the equipment that is used to dewater sludge and that may require close operator attention. The operator must also monitor and refine the addition of expensive polymers that are used to flocculate the solids in the sludge feed. Finally, it is a waste of valuable operator attention if time is required to keep the dewatering operation and its surroundings clean. Greater operator attention to revenue producing activities is required for sustainability.

**Maintenance Support Requirements:** The Total Cost of Ownership (TCO) needs to be determined for any piece of equipment or process, and that includes the cost to maintain as well as operate. Maintenance can be a big factor when added to the TCO. That cost includes the manpower cost to maintain, the cost of replacement parts, the frequency of maintenance and the cost to have the operation down for
servicing or because of breakdowns. As a rule, the more moving parts there are, the greater the frequency and cost of maintenance. This has been proven to be a key component of the support required for belt presses and many screw presses. High speed equipment also tends to have higher maintenance requirements. That and noise are reasons that centrifuges have low appeal in pulp and paper.

**Energy consumption:** Wherever there are moving parts there are motors that drive the equipment. The number and size of motors contributes to the overall energy usage. Electrical energy is required for sludge feed pumping, drive motors, polymer mixing and addition system, and sludge cake conveyance. The higher the speed of the equipment, the greater the amount of energy required to drive it.

**Raw water usage:** Raw water or clarified water is required to clean or flush each piece of equipment on a regular basis. The quantities and pressure required vary with the design and type of equipment. The amounts for belt presses are high because of their open system design and the need to continuously clean the belts. This adds considerable additional water that must be treated.

**Pulp and Paper Mill Sludge**

The current approaches and technologies to deal with mill sludge are as varied as the types of operation and feed materials. Typically, where virgin fiber is the product or raw material, mills produce much less sludge than operations that use recycled fiber, especially where deinking is involved. The characteristics of sludge vary not only according to the source of the sludge but also by how it is processed in wastewater treatment plants (WWTP). According to a 2008 study\(^1\) by Bird and Talberth for the Center for Sustainable Economy, the pulp and paper industry discharges four types of WWTP residuals:

1. **Primary sludge**, which represents 40% of WWTP residuals
   Primary sludge is the unused, spilled, or rejected solids that is discharged from mill process streams. It is often in the range of 0.5%-1.5% solids and often must be further thickened before it is further processed for removal. Primary solids includes deinking residuals, as well as fines, fillers and other contaminants.

2. **Secondary sludge** or waste activated sludge, which is 1%
   Secondary sludge comes from the bottom of a clarifier or lagoon where the solids are digested aerobically, and sometimes anaerobically. Most of the fiber and other organic solids in secondary sludge are consumed or reduced to “pudding” by microorganisms.

3. **Combined primary and secondary sludge**, which is 54%
   It is common for mills to mix their primary and secondary solids before further processing the material for removal from the mill. The fiber in primary sludge acts as an excellent filter medium that captures much of the finer solids, including the secondary “pudding” sludge. Proportions of each are dependent on the secondary treatment capabilities at each site. It is very common to have mixtures of 90% primary and 10% secondary and rare to have sludge mixtures with 50% primary and 50% secondary.
4. Dredged sludge, which is 5% of WWTP residuals

Some mills use lagoons or ditches for the discharge of mill waste streams. These systems are basic reservoirs where the solids settle and are anaerobically digested. When the pond or ditch fills and the discharge stream no longer has time to allow solids to settle then it is dredged and the solids are carted away. There are fewer and fewer of these operations because of the dredging cost and the requirement for duplicate system capacity or system down-time to accommodate the dredging process.

**Mechanical Dewatering**

Mechanical dewatering is used to concentrate sludge so it can be transported to a final destination or other end use. The common technologies in use are: Belt Press; Belt Press followed by Screw Press; modern design Screw Press that accept lower solids sludge, and Centrifuges. In all cases any of this equipment works better if higher solids sludge is introduced to it. The lowest practical solids feed would be 1% Total Suspended Solids (TSS) into the belt presses and screw presses and 1.5% into a centrifuge. All equipment requires the use of polymers to coagulate/flocculate the solids in order to promote dewatering and good retention.

*Belt Press:* There are many designs of belt presses and they typically have multiple stages to them. Before sludge is fed to a belt press it is usually thickened on a gravity thickener so that the solids are raised to the 1-1.5% range. This is necessary to improve the capture rate. On the belt press the sludge goes through a gravity filtration zone then it enters a medium pressure zone where a top belt presses down against the bottom belt to squeeze water out of the sludge. This zone can be followed by the belts going through one or more nips where pressure is applied to produce the final sludge cake. The performance of belt presses is affected by variations in the sludge makeup and flow.

![Figure 1 - Representative Belt Press Design](image)

*Screw Press:* There are also many different design concepts for a screw press but the key features include a scroll shaft (screw) to move sludge forward through a
filtration area and then into a compression zone where progressively more water is removed through a perforated shell or screen and sludge cake is produced. There are numerous variations to the design with some unique features to mitigate fouling and plugging of the equipment.

![Diagram of a screw press](image)

**Figure 2 - Representative Screw Press**

**Centrifuge:** This equipment uses high speed rotation (1000 to 6000 rpm) of a bowl that is either cone-shaped, cylindrical or a combination. The sludge is fed into the centrifuge and moved across the length by a scroll that is also rotating, but usually at a different speed than the bowl. Centrifuges have large drive motors, require close attention during the start-up and shutdown, and they are susceptible to variations in the feed sludge.

**Evolution or Revolution?**

The Fournier Rotary Press CV is a game changer for making cake from mill sludge. It was created for the pulp and paper industry but found rapid acceptance with municipal sludge applications. Perhaps that was a result of the companies that did the selling and who their customers were. Tecumseth recognized the advantages this product would have in pulp and paper and is now introducing it across North America. There are five key factors that give this rotary press advantages over other technologies.

1. High solids cake
2. Low maintenance cost
3. Low operator attention
4. Low energy usage
5. Clean and quiet operation

Sludge is pumped into a chamber where it is mixed with the appropriate polymer to form flocs that are necessary for good dewatering. The flocculator has a motor driven mixer to ensure the sludge and polymer mix effectively. The efficacy of this chamber is the first key component in the design of the system. Following the flocculator there is a site glass diversion that allows operators to inspect the mixture for proper flocculation and settling characteristics.
The sludge then enters the rotary press channel which has three zones that result in the end cake product. These zones transition through drainage, pressing and restriction to deliver the compacted sludge. The discharged cake either drops freely or is moved away with a conveying system.

Sludge with total suspended solids as low as 0.7% is fed into the rotary press channel at between 2 and 7 psi (10 to 50 kPa). It flows into the gap between two drilled plates that are designed for low wear and high rigidity. The drainage zone is where most of the water is removed. The filter plates rotate at slow speed, somewhere between 0.5 and 1.5 rpm. As the sludge dewater’s the friction between the sludge and filter plates increases – this is what drives the sludge through compaction and out. There is a pneumatically controlled restrictor arm that is set to provide back pressure for constant cake solids. The outlet pressure is as high as 70 psi (500 kPa) and is controlled by a bellows that regulates pressure on the restrictor arm. On start-up the restrictor arm is pushed up between the plates to form a small opening. As the solids build the arm is forced down by the dewater sludge and the opening extends to where the backpressure allows. There is a deflector bar above the cake outlet and below the sludge inlet to separate the incoming sludge from the outlet cake.

During operation there are three plastic scrapers that clean the surface of each filter plate in the drainage zone. Once a day the rotary press receives an automated five minute flush to back-clean the filter plate. This requires about 250 gallons of suitably clean water per day. No other clean-up or attendant action is required to operate the equipment. Automation also includes monitoring of flows...

Figure 3 - Diagram and Picture of Flocculator System
and operation with alarm and shutdown sequences. To shut a unit down the pump is stopped and the rotary press is run until no more cake is produced, then a prod is used to push the last of the cake out of the discharge area. No further cleaning is required. Start-up is as simple as pushing the start button and ensuring there is flow of sludge and polymer.

The really great thing about pulp and paper sludge is the high degree of friction that exists between the fiber laden sludge and the filter plate. That allows the filter plates to be driven at a higher speed which means higher throughput. Friction is one factor that affects throughput, others are the feed pressure, discharge pressure and the speed of filter plate rotation.

A rotary press unit can have between one and six channels. The feed to any of the channels can be independently shut off if the capacity is not required, but the single drive for the unit means the filter plates continue to rotate. The high gear ratio of the variable frequency drive requires relatively small motors, a 5 HP motor for a single channel unit up to a 20 HP motor for the six channel configuration. The footprint for the largest unit is about eight feet by twelve feet.
Figure 5 – Various Rotary Press Configurations

Performance Results

Cake Dryness – Pulp and paper sludge from primary treatment dewater exceptionally well compared to most other industrial sources of sludge. The natural dewatering matrix that is formed by fiber promotes water removal. Cake as high as 55% solids is not unusual from these sources of sludge. This allows the addition of secondary treatment sludge without huge reductions in dryness for lower percentage additions. Figure 6 shows the results for tests performed on sludge from a deink pulp mill, Cascades Breakey Fibres in Breakeyville Quebec, for various proportions of primary through secondary sludge mixtures.

This facility has had operations where the rate of cake production was as high as 90 dry tons per day with solids in the 52% range. Operators adjust the following four factors to deliver the results:

1. Inlet sludge pressure
2. Rotation speed of the press filters
3. Outlet restriction pressure on the bellows
4. Polymer dosage
Table 1 - Cascades Breakey Fibres Test Results

*Capture Rate* – The retention of solids entering the Rotary Press is affected by three key factors. The makeup of the material is a key. Where there is more fiber the retention of solids will be higher because of the filter mat that is formed. When more secondary sludge is introduced the retention or capture rate will decrease. This effect can also be seen in the data for Cascades Breakey in Table 1. However, the amount of flocculation, inlet pressure and the speed of disk rotation have a major influence on retention. With proper flocculation the solids stick together and are retained by the filter disks. As the inlet pressure is increased, this forces dewatering and solids can be pushed through the filter disks at a faster rate. When the rotation speed is slow the rate of production is lower and the filtration will occur more slowly, thus retaining more solids.

*Energy Usage* – The use of electrical energy is a function of motor size and peak demand. The rotary press has six different configurations – one channel up to six channels – and the drive/motor combinations for these vary with the load that that is to be driven. A single channel unit requires only a 5 HP (3.7 kW) motor, while a six channel unit has a 20 HP (15 kW) motor. In practice, a six channel unit has been measured to consume about 6.65 kWh/dry ton of solids. In addition, the sludge/polymer mixer has a small, 1 HP (0.75 kW) motor.

*Maintenance* – With the focus on sustainability, there is a need to minimize maintenance while the equipment operates at optimal levels of performance. Rotary press design facilitates a low maintenance regime. With no high speed moving parts and few mechanical elements, points of failure and wear are minimized. Wear parts include three plastic scrapers on each disk and a liner on the deflector bar that separates the inlet and outlet sludge. It is notable that the first major service is scheduled to occur after 7 years. The recommended servicing, which includes inspection and replacement if necessary, for 24 hour/7 day operation is as follows:

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Interval (Hours)</th>
<th>Interval (Months)</th>
<th>Time/channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear box oil</td>
<td>4000</td>
<td>5.7</td>
<td>0.5 hours</td>
</tr>
<tr>
<td>Wear parts</td>
<td>7000</td>
<td>10</td>
<td>0.5 hours</td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>----</td>
<td>-----------</td>
</tr>
<tr>
<td>Shroud Seals</td>
<td>15,000</td>
<td>20</td>
<td>0 hours</td>
</tr>
<tr>
<td>Filter disks</td>
<td>65,000</td>
<td>90</td>
<td>3.5 hours</td>
</tr>
</tbody>
</table>

**Environment** – The most noticeable conditions around the rotary press are environmental, including noise, odor and cleanliness. With no high speed equipment and, at most, a 20 HP motor, operators are overtly pleased with the quiet. Next, they see that there is virtually no clean-up required around these units. The totally enclosed equipment means there is no splash or spill clean-up required and it also means there is no odor from typically smelly sludge that could come from secondary treatment or municipal sources. Because the rotary press does a five minute backflush each day or when equipment is shut down for an outage or maintenance, it needs no further internal cleaning. Any cake remaining in the outlet simply requires a quick prod to clear the passage.

**Economic Benefits**

The economy of using a rotary press to make cake from pulp and paper mill sludge becomes evident very quickly. Especially if replacing the now commonly used two phase thickener/ screw press combination of equipment. Briefly, savings can be obtained in the following areas:

- Energy – fewer power using components; less operating consumption
- Maintenance – reduced time and parts; reduced outage time
- Operations – reduced attention while in operation; reduced cleaning
- Solids – higher solids reduces handling and disposal costs
- Chemicals – reduced coagulant/flocculant usage

It is difficult to put values on each of these except on a case by case basis as part of a study or pilot program.

**Sample Testing & Results**

The first step in understanding what level of cake dryness a rotary press can produce from any mill sludge is to have a sample analyzed. This analysis, which is done for no fee, provides a physical as well as a dewatering analysis. The test results allow a dryness value to be projected. Follow-up application experience with an actual rotary press has shown the projected values to be on the conservative side of what will be produced during operation.

Tests utilize samples of mill sludge from any sources that regularly makes up the material that is to be dewatered. This can include exactly what goes into the existing equipment or it could be samples of primary, secondary or representative mixtures. To make the analysis most accurate, a sample of the concentrated polymer currently used by the mill is requested, along with a sample of the dewatered sludge that is produced. This provides the basis for comparison to the existing operation. The lab runs a series of tests to determine what is in the sludge material and then two dewatering tests to determine what can be considered to be lower and upper limits of dewatering that can be achieved. Based on the drainage
characteristics achieved, a projection of the throughput and rate of production is
estimated. Figure 6 is an excerpt from a report that shows the analysis of the
sample. Figure 7 gives the projected results for what a rotary press production unit
is expected to accomplish. Figure 7 provides a picture of the flocculated sludge,
filtrate and cake for a Linerboard mill that used 100% OCC.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Solids</td>
<td>4.23%</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>3.89%</td>
</tr>
<tr>
<td>Solids in Solution</td>
<td>0.34%</td>
</tr>
<tr>
<td>Volatile Solids / Total Solids</td>
<td>63.58%</td>
</tr>
<tr>
<td>Polymer Consumption</td>
<td>1.2Kg / dry ton of solid</td>
</tr>
<tr>
<td>Polymer Type</td>
<td>Provided polymer sample</td>
</tr>
<tr>
<td>Total Fiber + 100 mesh</td>
<td>38.69%</td>
</tr>
<tr>
<td>PH</td>
<td>6.73PH at 20.9 °C</td>
</tr>
</tbody>
</table>

Cloth Wiring Test:

| Cloth Wiring Test with Polymer | 36.65% |

Limit Dryness:

| Limit Dryness with Polymer | 56.57% / 15 minutes |

Notes:
- Excellent dewatering potential; fast drainage
- High friction degree.
- Sludge highly concentrated in solids
- Very Low polymer consumption.
- Provided cake sample was 47.86% TS

Figure 6 - Linerboard Example Test Results

<table>
<thead>
<tr>
<th>Kind of sludge</th>
<th>Mixed sludge Primary and Secondary Clarifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipated performances</td>
<td>240 dry Kg/hr. / channel</td>
</tr>
<tr>
<td></td>
<td>5.6 m³/hr channel (at 4.2%TS)</td>
</tr>
<tr>
<td>Cake dryness</td>
<td>51% (TS)</td>
</tr>
<tr>
<td>Type of channel</td>
<td>(900/1000CVP) 36 Optimum</td>
</tr>
</tbody>
</table>

Note-1: The production in dry Kg/hr/channel is based on a 4.23 %TS sludge. The
production, cake dryness or flow rate could vary depending upon (%TS)
contained in the feed sludge. Provided sludge represents an excellent potential
for the Fournier Rotary Press technology.

Figure 7 - Linerboard Mill Expected Results
The following table summarizes the test from a number of mill samples that have been analyzed in 2014.

<table>
<thead>
<tr>
<th>Mill Type</th>
<th>Type of Sludge</th>
<th>Feed Sludge</th>
<th>Current Cake</th>
<th>Projected Cake</th>
<th>Production Rate</th>
<th>Production Rate</th>
<th>Feed Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mill B - Denk Pulp</td>
<td>100% Primary</td>
<td>5</td>
<td>-</td>
<td>50</td>
<td>715</td>
<td>8.6</td>
<td>27.5</td>
</tr>
<tr>
<td>Mill B - Denk Pulp</td>
<td>80% Primary, 20% Secondary</td>
<td>3.5</td>
<td>-</td>
<td>45</td>
<td>413</td>
<td>4.95</td>
<td>26</td>
</tr>
<tr>
<td>Mill B - Denk Pulp</td>
<td>60% Primary, 40% Secondary</td>
<td>2.6</td>
<td>-</td>
<td>34</td>
<td>41.2</td>
<td>4.95</td>
<td>26</td>
</tr>
<tr>
<td>Mill N - Recycle Tissue</td>
<td>100% Primary Clarifier</td>
<td>3.6</td>
<td>25-38</td>
<td>45</td>
<td>325</td>
<td>3.9</td>
<td>17</td>
</tr>
<tr>
<td>Mill R - Recycle Tissue</td>
<td>80% Primary, 20% Secondary</td>
<td>6.17</td>
<td>36</td>
<td>45</td>
<td>500</td>
<td>6.0</td>
<td>16.2</td>
</tr>
<tr>
<td>Mill S - Recycled Board</td>
<td>80% Primary, 20% Secondary</td>
<td>4.2</td>
<td>48</td>
<td>51</td>
<td>528</td>
<td>6.3</td>
<td>24.6</td>
</tr>
<tr>
<td>Mill T - Recycled Board</td>
<td>100% Primary</td>
<td>1.5</td>
<td>38</td>
<td>46</td>
<td>330</td>
<td>4.0</td>
<td>44</td>
</tr>
<tr>
<td>Mill W - Recycled Board</td>
<td>80% Primary, 20% Secondary</td>
<td>1.7</td>
<td>41</td>
<td>48</td>
<td>385</td>
<td>4.6</td>
<td>44.9</td>
</tr>
<tr>
<td>Mill C - TMP furnish</td>
<td>100% Primary</td>
<td>3.8</td>
<td>-</td>
<td>42</td>
<td>550</td>
<td>6.6</td>
<td>29</td>
</tr>
<tr>
<td>Mill C - TMP furnish</td>
<td>100% Secondary</td>
<td>1.98</td>
<td>-</td>
<td>19</td>
<td>110</td>
<td>1.32</td>
<td>11</td>
</tr>
<tr>
<td>Mill C - TMP furnish</td>
<td>60% Primary, 40% Secondary</td>
<td>2.67</td>
<td>27</td>
<td>32</td>
<td>385</td>
<td>4.62</td>
<td>29</td>
</tr>
<tr>
<td>Mill C - TMP furnish</td>
<td>60%/40%/50% with Sawdust</td>
<td>3.25</td>
<td>30</td>
<td>37</td>
<td>440</td>
<td>5.28</td>
<td>27</td>
</tr>
<tr>
<td>Mill W - Virgin Pulp</td>
<td>100% Primary</td>
<td>6.8</td>
<td>-</td>
<td>50</td>
<td>770</td>
<td>9.2</td>
<td>22.5</td>
</tr>
</tbody>
</table>

Table 2 - Sample Testing Examples
Site Pilot Testing

When lab testing verifies that there may be an advantage to rotary press technology, the next step is to book a site pilot test so that the actual equipment can be tested and the potential for improvement exactly determined. A tractor trailer (Figure 9) has been mounted with all the equipment needed to duplicate a mill feed scenario. The trailer includes a feed tank into which sludge is loaded and kept mixed. As well, there is polymer mix tank to makedown a flocculant that is to be used. Onboard pumps feed both the sludge and flocculant into the mixing chamber which then feeds the rotary pumps. To establish that flocculation is occurring, there is a sight-glass beside the mixing chamber. The flow is diverted into the sight-glass and the flocculation can be immediately seen, along with its settling characteristics.

Figure 9 - Tractor Trailer Pilot

There are two rotary presses on the trailer, one with a 2 inch (50 mm) gap between the filter plates and the other with a 3 inch (75 mm) gap. Where there is good friction in the sludge and good dewatering characteristics, the wider gap can be used and the production rate can be higher. For sludge that is more pudding-like with low friction, the small gap rotary press is utilized. The rotary press rotation rate is varied through testing to determine what throughput and cake solids can be achieved. As well, the backpressure is established, as is the rate of feed. The entire operation is automated with a PLC that receives status signals from the equipment to ensure safe operation. It provides start and stop functions, performs the routine backflush and keeps operating information for reference and maintenance purposes.

Summary

The Rotary Press CV is an improved technology to continuously dewater mill sludge. It has been shown to provide higher solids cake through sample testing, site pilot testing and installations at pulp and paper mills. The economic benefits of higher solids cake are evident in the reduced requirement to transport this waste material away from the mill site for disposal. An 8% improvement in solids means 8% less water to be hauled away, fewer truckloads and reduced tippage fees.
Additionally, the equipment has been designed to provide:

- Low power usage
- Low maintenance and upkeep
- Low operator attention and support activity
- Minimal polymer usage for flocculation
- Less water usage

This rotary press comes fully automated for ease of use. It is internally self-cleaning; it is self-documenting; and it is ready to communicate with mill systems. The rotary press is also very quiet, very clean to operate and avoids release of sludge odors.

Fournier Industries Inc. analyzes samples of mill sludge for no cost and performs on-site pilots at a fraction of the actual cost. These trials use production equipment that is mounted on a tractor trailer that also includes a complete lab for test analysis. Options include shaftless conveyors that can be designed to move cake as required and various materials of construction for harsh environments.

The rotary press is a revolutionary product that must be considered in the evolution of sludge management for the pulp and paper.

Reference Materials

1. Washington State Department of Ecology Industrial Footprint Project, Waste Stream Reduction and Re-Use in the Pulp and Paper Sector, Project Task 5.1, Michelle Bird and Dr. John Talberth, Center for Sustainable Economy, August 2008