Sludge Screw Press Operation

Steve Macomber
Ed Fritz, P.E.
Huber Technology
Outline

• Dewatering Unit Process
• Dewatering Equipment
• Screw Press Equipment
  • Screw Press Mechanical Operation
  • Screw Press Process Operation
• Case Studies
Where is Dewatering?

- Headworks (Screening/ Grit Removal)
- Primary Clarifiers
- Biological Process
- Secondary Clarifiers
- Filtration/ Disinfection
- Thickening
- Digestion
- Dewatering
- Drying

RAS

WAS
What is Dewatering?

“Dewatering is the removal of water from wastewater treatment plant (WWTP) solids to achieve a volume reduction and to produce a material for further processing or disposal.” – WEF/WERF/EPA Solids Process Design and Management text

<table>
<thead>
<tr>
<th>Property</th>
<th>Dewatering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>Sludge cake (nonfluid, semisolid material)</td>
</tr>
<tr>
<td>Inlet Concentration</td>
<td>0.5-6% solids</td>
</tr>
<tr>
<td>Outlet Concentration</td>
<td>15-40% solids</td>
</tr>
<tr>
<td>Primary Forces Used</td>
<td>Mechanical (Exc: drying beds)</td>
</tr>
</tbody>
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Why Dewater Sludge?

Volume Reduction
No dewatering (0.5%)  With Dewatering (20%)

Precursor to downstream processes:
• Easier to incinerate (higher heat value)
• More efficient drying
Uses for Dewatered Sludge

- Fertilizer for agricultural land (typically Class A or Class B)
- Soil Amendment
- Composting
- Incinerator
- Dryer
Dewatering Process

Upstream Process

Sludge Conditioning

Feed Sludge

Dewatering Equipment

Cake

Pressate

Use/Disposal
Feed Sludge Characteristics

General characteristics which affect dewatering performance:
- Solids concentration
- Loading rates

Biological characteristics which affect dewatering performance:
- Type of sludge (primary, waste activated, blend)
- Sludge processing (digestion, thermal, chemical)
- Fibrous material or filamentous bacteria
- Volatile Suspended Solids

Chemical characteristics which affect dewatering performance
- Nature of water in sludge (free, interstitial, bound)
- Ortho-phosphorus (PO$_4$-P)
- Monovalent/divalent ions ratio
- pH
- Temperature
Promotes Flocculation:

- Polymer
- Metal salts
Dewatering Equipment

- Sludge Drying Beds
- Belt filter press
- Centrifuge
- Screw press

Andritz Belt Filter Press
Centrisys Centrifuge
Huber Screw Press
1 sludge feed
2 filtrate discharge
3 auger
4 filter basket
5 spray basket for independent washing of feed and press zone
6 wash water connection
7 pneumatic pressure cone
8 sludge cake discharge
9 spray drive
10 auger drive
Wiper:

- Seals to convey sludge
- Cleans inside of basket
Wash System:

- Cleans outside of basket & inside of press housing
- Rotates 180°
- Four wash zones
Screw Press – Process Operation

Automation:
- Sludge Feed
- Inlet Pressure
- Motor Speed
- Wash Cycle
Screw Press – Maintenance
Screw Press – Maintenance
Screw Press – Maintenance
Case Study – Contentnea MSD, NC

Simplicity:
- Small footprint
- Low operator attention
- Low maintenance

Simplicity:
- Clean
- Startup
Case Study – Dover, NH

Operation:

• Highest Cake Solids
• Unattended Operation
• Lowest Electrical Consumption
• Ease of Maintenance
• Expanded to have both unit types
Excellence

- Replaced BFP with Centrifuge, then Centrifuge malfunctioned
- Maintenance Reductions
- Energy Savings
- Superior Cake Solids
- Lower Labor Costs
- Fit into Footprint
Questions?

Huber Technology, Inc.
9735 NorthCross Center, Suite A
Huntersville, NC 28078
www.huber-technology.com