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Strand Associates, Inc.®

Biosolids Dewatering Equipment Comparisons

WWOA Annual Operators' Meeting

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Common Dewatering Equipment
Belt Filter Press

- Advantages
  - Low power consumption
  - Low polymer consumption
  - Low speed equipment
    - Fewer specialized maintenance requirements
  - High wash water requirements

- Disadvantages
  - Humid and odorous atmosphere
    - Operator Exposure
    - Corrosion Potential
  - Lower cake solids
  - Higher operator attention required

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Common Dewatering Equipment
Centrifuge

- Advantages
  - Contained equipment, improved atmosphere
  - High cake solids
  - Low wash water requirements
  - Reduced operator attention required
  - Small footprint

- Disadvantages
  - High power consumption
  - High polymer consumption
  - High speed equipment
    - Potential specialized maintenance requirements
  - Potential for higher centrate solids

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Common Dewatering Equipment

Screw Press

- Advantages
  - Low power consumption
  - Low speed equipment

- Disadvantages
  - Humid and odorous atmosphere
    - Operator Exposure
    - Corrosion
  - Lower Cake Solids
  - High polymer consumption

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Common Dewatering Equipment
Rotary Fan Press

- Advantages
  - Low power consumption
  - Low speed equipment
  - Low capital cost
  - Low operator attention required
  - High cake solids
  - Low wash water requirement

- Disadvantages
  - High polymer consumption
  - Limited throughput
    - Suitable for smaller installations

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Alternative Dewatering Approach
Sludge Drying Beds

- Advantages
  - No power consumption
  - Very low maintenance requirements (facility dependent)
  - Very high cake solids achievable (40%)

- Disadvantages
  - Sometimes labor intensive
  - Weather-dependent operation
  - Space requirement
  - Odor potential
  - Appearance

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Illinois WWTP Dewatering Evaluation

- 3.5 mgd design average flow
- Extensive Renovations
  - Remove Primary Clarifiers
  - Expand Aeration Tanks
    - Use Adjacent Aerobic Digester Tanks
  - Convert Anaerobic Digesters to Aerobic Digesters
  - Demolish Sludge Drying Beds
  - Implement Mechanical Dewatering
  - Screw Press Pilot

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Screw Press Pilot

- Trailer Mounted Unit
- 12 gpm sludge flow rate
- Aerobically digested sludge
- 3.0% TS feed sludge
- Achieved 22.4% dry solids (average)
- 28 lbs active polymer per dry ton

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Centrifuge vs. Screw Press Comparison

	Screw Press	Centrifuge
Number of Units	2	1
Flow Rate (gpm)	50	157
Operating hours/wk	56	18
Polymer (lb active/ton)	28	15
Power (each)	2.5	75
Annual O&M	$112,000	$81,000
Capital Cost (including equipment, building, storage)	$2,934,000	$3,142,000
Total Present Worth	$4,079,000	$3,845,000

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Wisconsin WWTP Dewatering Evaluation

- 2.3 mgd design average flow
- Heavy Industrial Loads
  - 4,400 lb/day BOD
  - 3,500 lb/day TSS
- Anaerobic Digestion
- Currently Use Belt Filter Press
  - In need of replacement or reconditioning
- Limited Cake Storage Capacity
- Evaluate Replacement Options
  - Recondition Belt Filter Press
  - Centrifuge
  - Rotary Fan Press

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Alternatives Comparison

	Recond. Belt Press	Fan Press	Centrifuge
Polymer (lb active/ton)	22	22	22
Power (each)	5	2.5	75
Cake Solids	17.5%	20%	24%
Additional Storage Required?	Yes	No	No
Annual O&M	$173,000	$121,000	$121,000
Capital Cost	$551,000	$1,099,000	$1,057,000
Total Present Worth	$3,204,000	$2,940,000	$2,900,000

Owner Selected Centrifuge

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Illinois WWTP Dewatering Evaluation

- 25 mgd design average flow
- Anaerobic Digestion
- 98,000 gpd digested sludge
- Currently Use Belt Filter Presses (3)
  - In need of replacement or reconditioning
- Limited Cake Storage Capacity
- Evaluate Replacement Options
  - Replace Belt Filter Press
  - Centrifuge
  - Screw Press

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Alternatives Comparison

	Belt Press	Centrifuge	Screw Press
Number of Units	3	2	3
Flow Rate (gpm)	130	300	225
Operating hours/wk	88	38	51
Polymer (lb active/ton)	24	30	35
Connected Power (hp)	29	182	43
Cake Solids	16%	23%	21%
Annual O&M	$1,277,000	$1,126,000	$1,169,000
Capital Cost	$6,638,000	$5,592,000	$5,347,000
Total Present Worth	$18,191,000	$15,575,000	$17,033,000

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