Progressive cavity pump saves capital costs at dryer facility

Progressive cavity pumps, manufactured by seepex, Inc., helped reduce operational and capital costs at a biosolids dryer facility.

The US city of Winston-Salem, North Carolina, transformed the Elledge wastewater treatment plant into a profit center by adding a biosolids dryer facility, installed by the Austrian company Andritz in 2007. The dryer facility turns dewatered sludge into dry fertilizer pellets that are sold to farmers at a profit. The decision to simultaneously replace conveyors with seepex progressive cavity pumps in the dryer building further reduced overall costs, saving approximately US$1,500 in capital costs per foot of conveyor, according to Bruce Casey, the biosolids drying facility plant supervisor.

The Elledge facility treats wastewater from the Winston-Salem area, which is experiencing significant growth in population and economy. Increasing demands in production and rising disposal costs prompted the decision to expand the treatment facility by installing a biosolids dryer facility. The dryer would turn dewatered sludge into a marketable Class A, Exceptional Quality (EQ) fertilizer pellet.

Casey explained, "Due to higher restrictions on the class B product, reduced landfill space, and higher landfill cost, the city looked for a way to reduce disposal volume and make the product user friendly."

Previously, the facility used conveyors to move dewatered sludge from the centrifuge to a storage building located next to the centrifuge building. The sludge was then loaded onto trucks and transported to privately owned sites chosen for the city's Class B Land Application Program.

The BTI design pump can handle up to 35 percent dry solids contents.

In the new Andritz dryer facility, conveyors deposit sludge into a custom extended hopper seepex BTI 70-24 Progressive Cavity pump with paddle mixers to prevent bridging on top of the feed auger. The pump size 70-24 can handle up to 2,423 liters per minute (640 gpm) of dewatered biosolids. The BTI design pump can handle up to 35 percent dry solids contents. A ribbon-screw auger moves the cake into the compression zone at a rate that is three times greater than the

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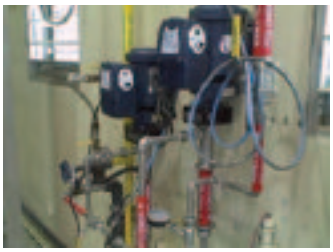
Dewatering pumps vital to rail transport project

Tsurumi high-head dewatering pumps withstand deep-water pressure in a submerged tunnel installation project in Stockholm, Sweden.

physical capacity of the pumping elements. The high shear of the ribbon-auger and circulation of the thixotropic sludge reduces the apparent viscosity making it easier and more efficient to pump.

The pressure side of the pump is fitted with a chemical injection ring, which meters polymer into the annulus of the sludge pipe, using a MD 012-24 seepex metering pump. Polymer injection reduces the friction loss from the cake and the resulting discharge pressures by up to 80 percent. The discharge pipe is fitted with a pressure switch that activates the polymer injection pump when the pressure reaches unsafe levels. The BTI pumps the sludge through 36.6 meters (120 feet) of 30.5-cm (12-in) pipe to the dryer building, located on the right side of the original building.

Upon arrival in the building, sludge is deposited in a 24-hour storage bin. A second seepex BTE 70-24 sits below the storage bin. Here the dewatered sludge is pumped to a mixer and blended with pellets. The auger forces the material into the compression zone where it is moved into the piping by the cavities formed between the rotor and stator (materials are custom selected for every application). The mixture is then run through the Andritz dryer system to produce fertilizer pellets.



The seepex dewatered sludge pump handles up to 35 percent dry solids content. Photo by seepex.

Tsurumi pumps are being used for dewatering during the complicated installation of submerged tunnel sections of the Söderström tunnel project in Stockholm, Sweden. The tunnel will connect two central islands in Stockholm, which will significantly improve rail transport by increasing frequency of trains from the current 10 trains per day to 24 trains every hour.

Six LH series high-head dewatering pumps (LH23.0W) replaced other manufacturer's pumps after the project experienced delays. These pumps are positioned 28 meters underwater in drilled holes that are 200 millimeters wide. The 300-m-long submerged section of the tunnel is being built using immersed tunnel sections. These are supported on four grouped piles that have been drilled into bedrock. This means the tunnel is resting on an underwater bridge.

The submerged tunnel consists of three 100-m-long prefabricated sections. The sections contain two tubes that will each carry a 12-m-wide railway track and a 5-m-wide access tunnel for service and rescue.

Deep channels have been excavated on both sides of the Söderström bay. In these channels the contractor is using the 'cut-and-cover' construction method to connect the underwater and under-bedrock tunnel sections. At a depth of 20 m, these excavated channels – which have retaining walls held in place by 1.5-m-wide piles – are the deepest ever used in northern Europe.

The pumps were chosen for their compact design, reliability, and powerful capabilities, according to Olivier Schmeieder, foreman of the main contractor JV Söderström Tunnel HB. "We needed pumps that can operate effectively with high volumes of water at high heads," he says. "The Tsurumi pumps have been working very well in this challenging application. We are happy to report the project is moving ahead on schedule."

Tsurumi's LH series of pumps are high-head, three-phase dewatering pumps capable of withstanding deep water pressure. The range offers heads of up to 177 m and capacities of up to 6,500 l/min. LH pumps feature an impeller made of high chromium iron casting and a cylindrical drive channel, whose flow-through design maintains motor cooling for improved reliability.

Six Tsurumi LH series high-head dewatering pumps were used in a tunnel project in Stockholm, Sweden.

Tsurumi Europe supplied the pumps. In 2011, the company opened a Swedish subsidiary in partnership with its local distributor Tsurumi-Intec Pump AB.

Schmeieder also commented on the pumps' external casing. "The team experienced problems when lifting the other manufacturer's pumps out of the water. The handles were too weak and would often break. Tsurumi's knowledge of tunnel building has created pumps that exceed requirements. They are highly robust and have much stronger eyelets to attach hoisting gear, which is an important detail in our work."

Scheduled for completion by the end of 2012, the project is being managed by JV the Söderström Tunnel HB, a joint venture between contractors Züblin Scandinavia AB and E. Pihl & Søn A.S.

Tsurumi is a pump manufacturing company based in Kyoto, Japan, that operates using an extensive dealer network (www.tsurumi.eu).