Minworth STW

S:Max installation to increase sludge screening efficiency

by Peter Craven

Minworth is Severn Trent Water's largest sewage treatment works serving a population equivalent (PE) of 1.75 million from Birmingham. The plant also treats sludge arising from a PE of 2.5 million due to a high volume of imported sludge tankered from industrial sources and smaller treatment works throughout south Staffordshire and north Warwickshire. A new sludge screening system introduced by Severn Trent has resulted in significant operational efficiencies due to increased screenings removal, elimination of blockages and reduced power and water requirements.

S:Max screenings plant and tanker connection point *Courtesy of CDE Global Ltd*

The removal of screenings from raw sludge is crucial to ensuring maximum efficiency at the AD stage, and since the introduction of the S:Max sludge screen, a product developed by CDEnviro, there has been a 300% improvement in this regard from the S:Max when compared to the previous system that was in operation at Minworth. A major success of the S:Max system is the increased performance in relation to the removal of screenings.

By ensuring screenings are effectively removed before material reaches the anaerobic digestion phase Severn Trent are maximising the potential for the generation of energy from biosolids by reducing the level of biosolids contamination within the digesters. The benefits of effective screenings removal also include reduced operation and maintenance costs at the anaerobic digestion phase.

Eliminating blockages during sludge screening

The S:Max installed for Severn Trent has been in operation since June 2010 and in addition to the benefits for the AD process there have also been significant reductions in the cost of operation and maintenance when compared to the sludge screening plant that the S:Max has replaced.

The elimination of blockages during screening is undoubtedly one of the most significant reasons for these cost reductions. As well as the costs of plant downtime, Severn Trent also had the problem that when blockages occurred, they caused damage to the screening plant, which led to an extension in the period of downtime and additional costs by way of the replacement parts required to get the plant operational again.

The costs incurred during this period of downtime were not restricted to the costs of maintenance itself, but were further increased by the fact that tankers containing the raw sludge for screening needed to be diverted to alternative sites to be processed. An increase in transport movements is unwelcome at any time, but in recent years where high fuel costs have ensured an even greater focus on this, the ability of the S:Max system to address this issue has been welcomed by Severn Trent Water.

Dealing with variable dry solids content in raw sludge

The screening of imported sludge is a complicated process due to the nature of the material being processed and one of the key variables effecting plant performance is the level of dry solids contained in the sludge. The S:Max has demonstrated a development of the capability offered in this area when compared to previously existing systems thanks to its ability to handle both a higher level of dry solids and cope with larger variations in the volume of screenings.

The previous system installed at Minworth was sized to cope with a dry solids content of 3% within the raw sludge. An analysis of the material processed by the S:Max in the first 16 weeks of operation shows an average dry solids content of 4.1% with the highest level being 10.5%. While the vast majority of material will fall within the 3% to 5% range, the proven capability of the S:Max to handle 10% dry solids within the raw sludge gives operators a great sense of comfort when it comes to specifying a new sludge screening plant.

Based on the previous plant in operation at Minworth, an increase in dry solids content above 3% required that the feed rate to the screening plant be slowed down to ensure the material was effectively processed. It can be seen from the average dry solids content of material processed through the S:Max that this involved a high degree of variation in feed levels with the previous plant.

As a result of this the old system could not accept feed directly from the tankers containing the raw sludge but instead required the installation of a separate reception tank in order that the flow rate could be modified as required. The S:Max eliminates the requirement for this reception tank as material is discharged directly to the screening unit which has a series of benefits for Severn Trent.

The S:Max has the capability to accept feed from two tankers simultaneously through two independent connection points at the rear of the unit. This has the effect of minimising the standing time for tankers on site, further enhancing operational efficiencies. This ensures that the tanker fleet is operational for as close to 100% of the time as is possible improving productivity levels in a number of different areas independent of the actual sludge screening process.

Reducing installation requirements

The additional cost of the civils work required to allow for the introduction of both a sludge screening plant and reception tank not only greatly increases the overall investment required in a new plant but also the project delivery time. The total installation time for the S:Max system at Minworth was one and a half days. This ensures operators can be up and running in the quickest time possible with minimal on site preparation work required.

The S:Max operates at less than half the water pressure of the previous system installed at Minworth while also requiring less wash water. This allows for the system to be easily retrofitted to existing sites as the S:Max does not require a high pressure water pump to feed the system. Further benefit is gained from the reduced power requirement of the plant, which has the dual benefit of reducing costs of operation while ensuring a minimal carbon footprint.

A unique back wash system is also designed to ensure that the screens do not block with material. Blockages within existing sludge screening plants are the single biggest cause of increased operational costs and long periods of plant downtime. The S:Max has addressed every point at which this is a problem, and come up with a solution that offers a sludge screening system which eliminates blockages from the process.

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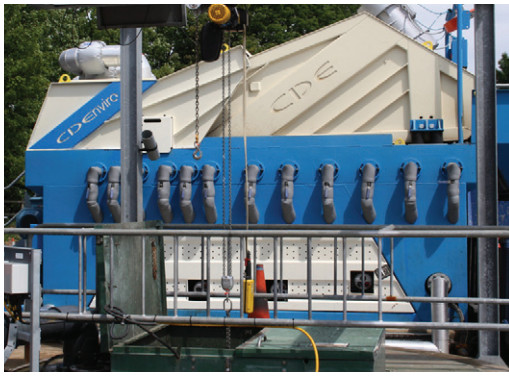
S:Max screenings plant at Minworth STW *Courtesy of CDE Global Ltd*



S:MAX

- Maximum screenings removal
- Discharge directly from tankers without buffering
- Fully automatic operation
- Eliminates blockages by effective rag removal

CDEnviro

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