The Right Recipe

A PULSED-AIR MIXING SYSTEM HELPS AN OHIO CITY RESOLVE A SOLIDS PUMPING ISSUE AT A NEWLY UPGRADED WASTEWATER TREATMENT PLANT
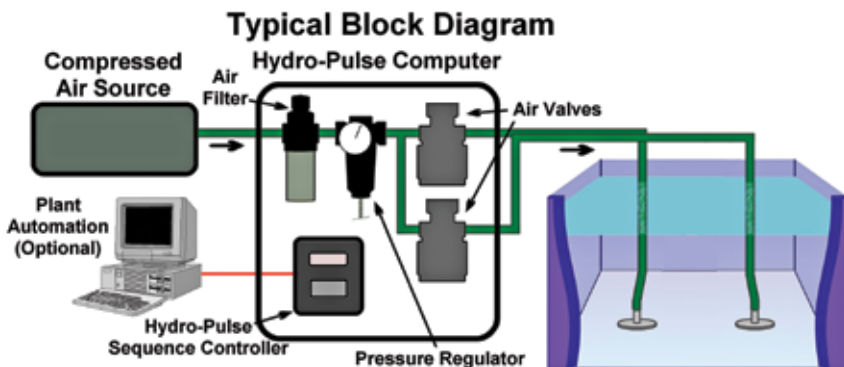
By John Sparks

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The PHi Model 300 hydro-pulse mixing system from Pulsed Hydraulics.

The Ohio city of London brought its new activated sludge wastewater treatment plant online in 2009 and soon encountered issues with solids pumping. Waste activated sludge (WAS) is pumped to a gravity belt thickener where it is concentrated to about 2.5 percent solids before being pumped to anaerobic digesters from a holding tank.

Wasting to the thickener is not continuous, so the thickening process operates only when sludge needs to be wasted. As a result, thickened sludge is kept in the holding tank until 15,000 to 20,000 gallons accumulate. Any septic tank waste or grease delivered by contractors is emptied directly into the thickener so that it goes to the holding tank and eventually to the anaerobic digesters.

When held in a tank for a length of time, WAS will denitrify. At London, the solids floated to the tank surface, resulting in a layer of water at the bottom. Grease also floated. When the batch was pumped to the digesters, the water layer low in solids was pumped first and caused operational problems in the digesters. Because the water and sludge separated, sludge in the holding tank became thicker than the sludge pumps could handle, causing pumping problems.

Dan Leavitt, Wastewater Department superintendent, found a solution in a PHi Model 300 hydro-pulse mixing system from Pulsed Hydraulics.

Typical Block Diagram

FAIR TRIAL

Leavitt first looked into pump-based mixing systems, found a unit costing about $70,000 plus installation, and considered purchasing it. He then met with Pulsed Hydraulics representatives Benjamin and Larry Bell at the treatment facility. As Leavitt explained his problem, the visitors suggested a demonstration of the pulse mixer.

They found an on-site compressor that had been out of service and quickly configured a demonstration unit. They explained that the system would introduce a burst of compressed air at the base of the tank. The resulting bubble would create the necessary mixing. Pulsing the burst every 30 seconds would keep the material in suspension so it could be moved easily to the next process stage.

Leavitt saw the logic of the application. He also learned that it would cost just over $5,000 and that his staff could install the package themselves. "All that was needed was a 5 hp compressor, a controller to regulate the frequency of the burst, a valve to regulate the volume of the burst, a flexible pipe, and a bubble-forming plate," Leavitt says.

QUICK RESULTS

When the plate was dropped into the tank, the sludge became thoroughly mixed within a short time. "There are no moving parts in the tank," says Leavitt. "The bubble-forming plates are inert and never require servicing. If there were a problem, it would be a simple task to pull the pipe up and replace the failed part. As far as the compressor, it has a life cycle, but it doesn't pose any maintenance issue. The controller and valve are not high-maintenance items, either."

Since the bubble-forming plates are positioned on the bottom of the tank, no tank real estate is lost to pumps and their collectors. The compressor used for the system had been in the plant for years as part of another treatment process, since abandoned.

"We installed the PHi 300 system without using outside contractors," says Leavitt. "It is a very low-maintenance application, consumes a small amount of energy, is reliable and costs a fraction of the other solutions we reviewed."

Pulsed Hydraulics has installed its solution in wet wells to eliminate FOG mats and has had similar results. "The London Wastewater Department will consider that application, should the need arise," Leavitt concludes. **tpo**