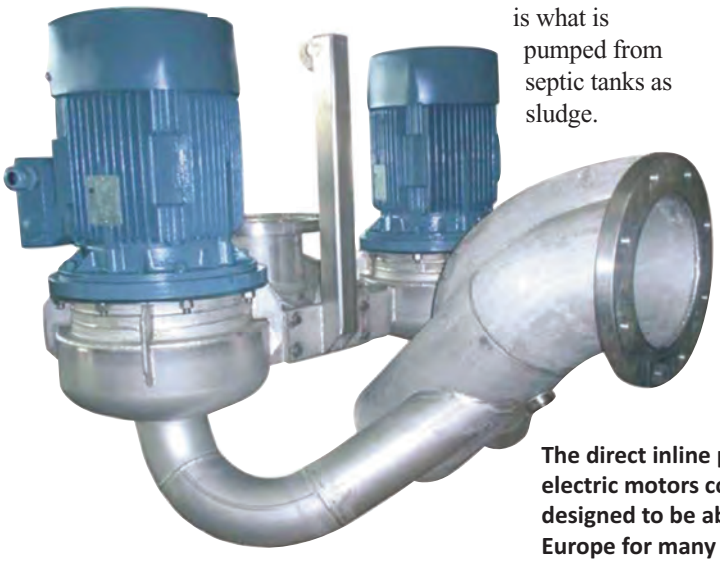
By Jon Dunham, Steel Toe Group

After 2,000 Years ... New Wastewater Technology ... And It's Not Gravity!

It is estimated that the first sewers of ancient Rome were built between 800 and 735 BC. Drainage systems evolved slowly, and began primarily as a means to drain marshes and storm runoff. The sewers were mainly for the removal of surface drainage and underground water. The sewage system as a whole did not really take off until the arrival of the Cloaca Maxima, an open channel that was later covered, and one of the best-known sanitation artifacts of the ancient world. Most sources believe it was built during the reign of the three Etruscan kings in the sixth century B.C. The early Romans used aqueducts to bring water into the cities and built wastewater handling sewers to complete the circuit. They used bricks, stones, and terracotta tiles to form their waste lines.

Around AD 100, direct connections of homes to sewers began, and the Romans completed most of the sewer system infrastructure. Sewers were installed throughout the city, serving public and some private latrines, and also served as dumping grounds for homes not directly connected to a sewer. It was mostly the wealthy whose homes were connected to the sewers, through outlets that ran under an extension of the latrine.

In 2,000 years, not much has changed in the management of wastewater! We are still using terra-cotta tile, and pipes (and still some old brick tunnels in some older cities) now replace the stone covered waterways. Gravity still works! Sewage still flows to some lower point to be collected. The collection points are now called wet wells and in rural areas, septic tanks. The odors are still the same as then. The septic systems use tiles to disperse the "grey water" into the surrounding landscape. The "solids" settle out and this is what is pumped from septic tanks as sludge.



The direct inline pumping technology featured in this article consists of two electric motors connected by a hydraulic body, the shape of which is specifically designed to be able to receive effluent directly. The technology has been used in Europe for many years and is advertised to eliminate clogs on its own.

The wet wells, now called "lift stations," are usually associated with high density neighborhoods as they collect and retain higher volumes of raw sewage. They are designed to turn on a pump when a certain level is collected. The pump transfers the sewage to a treatment plant or to another lift station to be collected and transferred again, ending at a treatment plant.

Now, rather than emptying the raw sewage into a river, the Clean Water Act requires sewage be treated and meet high standards before being discharged. As wet wells are filled by anything that flushes or is forced into the sewer line, they are notorious for collecting all sorts of trash and debris. Rags, diapers, plastic bottles, cans, grease, oil, dead animals, and if nearby, prison uniforms – all of which need to be physically removed and hauled away. These things also clog the pumps and cause maintenance personnel the smelly job of removing the clogged pump, cleaning it and then replacing it. (Time and time again!)

There is an answer to this problem. What if someone could design a lift station that automatically follows any variations in flow, adjusts its head pressure to the variable flows, handles trash and debris with no clogging and is self-cleaning? What if this lift station could accept entrained air up to 10 percent without cavitation, could even handle dry running, and reduce or eliminate H_2S (no gas and no odors)? How about ending sand or grease accumulation, the need for screens, rakes, or regular cleaning of trash or debris accumulated in the wet well? What if this wet well now presents a clean, dry, safe environment for service personnel for minimum routine maintenance? Would you be happy with reduced energy costs and less costs to maintain and install? What if you could eliminate the need for wet wells altogether?

It is now a reality! You can design or convert an existing "wet well" to become an equipment room.

There is a technology that is patented and proven in Europe. In fact, there are more than 1,100 of this new (to the United States) wastewater managing systems operating in France alone.

It is an innovative principle that has its roots with a family owned business that developed a solution for the pumping of "difficult" fluids. In a recent article in Water Online entitled "'Flushables' Turning Sewers Into Nightmares Nationwide"

attention is brought out regarding the costs to maintain pumps and systems that are constantly being clogged with "flushable wipes" and other items that find their way into the sewer. One city has documented the costs for just de-ragging the pumps at $78,000 per year with an additional cost of $30,000 in incremental electrical usage when running clogged pumps.

Everywhere we turn today, there are articles describing an industry roundtable finding – a publication noting deficiencies in our industry, or our government agencies asking questions. All are asking for, and looking for, "innovation" and "sustainability". It is here, now.

Everywhere we turn today, there are articles describing an industry roundtable finding – a publication noting deficiencies in our industry, or our government agencies asking questions. All are asking for, and looking for, "innovation" and "sustainability". It is here, now.

How does this new, to the U.S., system work? It works by lifting gravity effluent flow directly at the point of entry, without water loading or a wet well, the DIP System® (Direct In-line Pumping) overcomes the drawbacks of retained wet well volumes of effluent as there are no dangerous gases (H2S), no odors, no sand and grease accumulation, no equipment corrosion, no structural erosion, no clogged float switches, and no trash or debris collection.

The design includes a special impeller that is perfectly adapted to raw effluent full of air and sand. The special properties of these alternate blade impellers allow most fibrous and solid materials such as wipes, cloths, bandages, clothing, plastic bottles, aluminum cans, etc. to pass through without causing clogging. It prevents these obstructions and helps the system to reprime quickly. This impeller is the best compromise between unclogging, sustainability and efficiency. Conical vortex impellers are not affected when dry, and can run dry without causing damage, for a period of several weeks. There is another new innovation: is called DIPCut® and is a conical vortex impeller that becomes a "Shredder" when it automatically changes direction of rotation when coupled to a smart automated command. This impeller changes its direction of rotation when needed in order to cut snarled long fibrous materials and rags, and then removes them. This is the ideal "Rag Killer!" DIPCut® is the perfect combination between the advantages of the conical vortex impeller pumping sand, air or big solid wastes and the shredding function cutting long fibrous materials into shreds. Cleaning out clogged pumps is ended. DIPCut® allows the savings of pulling, cleaning, and resetting those clogged pumps and uses less power.

Two electric motors are connected by a hydraulic body, the shapes of which are specially designed to be able to receive effluent directly. All parts in contact with fluids are made of stainless steel. The upstream level is measured by a static sensor, fitted in the water stream of the effluent inlet. The bodies' suction profiles are specially designed to take advantage of the flow speed from the gravity-driven inlet. The inlet body also includes a "stone trap" with an inspection port and draining valve. The interior surface of the pumping system body is very smooth to improve efficiency, and has no areas where debris in suspension might be collected. The wide flow section continues through to the internal directional swing check valve. The swing check box is an integral part of the body, eliminating the need for additional pipework between the two pumps. The valve has three working positions: right or left according to which pump is operating, and central if both are operating. It has a stainless steel frame and replaceable wear plates.

For more and detailed information, you may contact the author at JDunham@SteelToeGroup.com or see the book "After the Flush" on Amazon.com http://amzn.to/1lNQVpU

Jon Dunham has sold pumps and pumping systems for the municipal and other market segments for nearly 40 years. Today, he finds himself replacing those old, outdated pumps and controls with newer technologies. Jon works at The Steel Toe Group in Lenexa, KS.