Treatment Shaft Technology

Automated capture and treatment of large combined sewer overflows (CSOs) in a compact structure. Minimal head loss, primary settling, skimming, fine screening, and disinfection—all in one unit.
**PROCESS DESCRIPTION**

Process Wastewater Technologies and Applied Engineering Technologies (AET) have partnered to develop a fully-automated, patented* vertical treatment shaft process for CSO control systems. The technology provides disinfection contact time, vessel flushing, air venting, odor control, surge control, skimming, settling, and fine screening in a compact structure suited for urban sites.

The system provides a cost effective alternative to basins, tunnels, and sewer separation.

CSO treatment shafts can be built using a variety of construction methods, including: slurry wall, diaphragm wall, sinking caisson, tangential pile, secant pile, and sheet pile.

**ADVANTAGES**

- Small footprint occupies less than 15% of the area of traditional surface storage systems
- Lower capital cost: 20% to 40% less than tunnels or basins
- Simple shaft geometry minimizes head loss, allowing gravity operation and eliminating the need for booster pump stations
- Eliminates tunnel and associated drop shafts, riser shafts, construction shafts, and ventilation structures, as well as surge control tanks and screening buildings
- Eliminates water infiltration and associated treatment costs
- Eliminates manual disposal of screenings
- Automated operation and lower O&M requirements than basins or tunnels
- Lower construction risk

**HOW IT WORKS**

1. During wet weather conditions, water flow rises over an upstream interceptor weir and begins to fall into the treatment shaft. Most storms are completely captured. For storms that exceed the shaft capacity, chlorine is automatically injected prior to the upstream weir via chemical mixers.

2. The shaft fills and floatables are trapped on the upstream side of the shaft’s baffle wall. Solids settle in the shaft due to the low upward velocity within the shaft.

3. After the shaft fills, PWTech Raked Bar Screens activate and trap screenings of mostly neutrally buoyant materials while allowing treated water to overflow to the river.

4. As the storm event subsides, dewatering pumps activate and screenings and floatables are drawn down to around the 10 foot level. A flushing mode begins with a high-pressure nozzle system to keep settled materials in suspension. The dewatering chopper pumps continue until the shaft is emptied.

5. The shaft can then be injected with an odor neutralizing solution (optional feature).

**DESIGN SUPPORT**

AET (www.ae-technologies.net) and PW Tech (www.PW Tech.us) can provide support to designers to incorporate the Vertical Treatment Shaft Technology and Raked Bar Screens into your project.

PW Tech manufactures the Raked Bar Screens in the United States. AET licenses the use of the patented Treatment Shaft Technology.

**MINIMAL HEADLOSS + LOW UPWARD VELOCITY = No Booster Pumping and Primary Settling**

A one-nineteenth scale physical model constructed by the University of Michigan confirmed the superior hydraulic characteristics of the AET Treatment Shaft design compared to traditional alternatives. (See chart below.) Head loss at the peak hourly flow rate was demonstrated to be only 0.41 feet (0.13 meters) and the upward velocity within the shaft was less than 0.1 foot per second (0.03 meters per second). The horizontal raked bar screens introduce only 2 inches of additional head loss. During the second and subsequent hours of the same storm, head loss and upward velocity are reduced dramatically (90% or more).


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**Head Loss Characteristics of CSO Vertical Treatment Shaft Process**

Treatment Shaft Components

EPA PISCES AWARD
Performance and Innovation in the SRF Creating Environmental Success
2006 Award Winner

1. Shaft Structure
2. Upstream Disinfection
3. Influent Channel
4. Baffle Wall
5. Dewatering Pumps
6. Horizontal Bar Screens
7. Effluent Channel
8. Backwater Gate
9. Control Building

View the Video:
The complete Treatment Shaft process can be viewed at:
www.ae-technologies.net
Click on "Process Video."
6.8 million gallon shaft under construction.

Completed Treatment Shaft: 6.8 million gallon capture capacity. 1,200MGD flow-through treatment capability.

7.7 million gallon shaft under construction.

To learn how AET Vertical Treatment Shaft Technology can substantially cut your project costs and simplify operations, contact:

PWTech: 410-238-7977 • rakedbar@PWTech.us • www.PWTech.us

AET: 734-922-5066 • www.ae-technologies.net