Notes From The Director

Years ago, the only way to deal with stormwater run-off, it seems, was to simply collect it and route it to the nearest convenient disposal site; whether that be a stream, river or other waterway, or perhaps to a municipal treatment plant as many combined sewers still exist today. Precast concrete has long been a part of that effort with concrete pipe, manholes, inlets, junction boxes, etc.

Technology today is providing engineers and municipalities with a much broader tool kit of options (or what are now referred to as BMPs) for dealing with the negative affects of stormwater as well as compliance with state and national pollution control permitting standards. Hydrodynamic separators, filtration, systems, and irrigation are just a few of the innovative solutions that have emerged in recent years. However, as technology in this area improves, there is one thing that remains constant. You still have to collect, store and move water and precast concrete remains the most effective means of doing so.

For more information about stormwater and other precast products, please contact me or one of our member companies.

Warmest Regards,

Ronald E. Thornton, P.E.
Chestnut Ridge Elementary School—Stormwater Treatment System

A capital improvement project at the Chestnut Ridge Elementary School in the Churchville-Chili Central School District, Churchville, NY included access drive improvements with a wider entrance driveway, a new bus loop, and an island area for student drop-off and pick up. The site BPM called for a water quality system to separate unwanted pollutants from stormwater run-off.

A CrystalClean Separator from CrystalStream Technologies was provided by Lakelands Concrete Products of Lima, NY. The unit was housed in a 5'-0" wide x 8'-0" long x 9'-8" deep precast vault and arrived from the precast yard complete with internal piping, baffles, reservoirs, and filters already installed saving the contractor precious time at the job-site. The precaster also supplied the cast iron frame & cover and aluminum hatch for a truly turn-key system.

Water quality units such as this separate pollutants either by gravity, filtration, or some combination of both. A by-pass system is typically employed to handle run-off during peak storm events. Such units being neatly packaged with precast vaults are cost-effective and take up much less space than settling ponds or other BPMs. Also, precast products provide the ideal solution for many types of school projects, which have notoriously difficult construction schedules.

Thanks to Gina Latham of Lakelands Concrete Products for submitting this project.

Project Credits:
Owner: Churchville-Chili Central School District
Contractor: DiFiore Construction
Precast Manufacturer: Lakelands Concrete Products
Water Quality System: ClearStream Technologies

Watertight Joints for Precast Structures

Here’s a revelation; Underground precast water, wastewater and utility structures that are supposed to be watertight are made with discontinuous joints that can potentially leak. Our concern, as engineers, is actually two-fold. First is the infiltration of groundwater into the structure and second is the exfiltration of contaminated wastewater or other pollutants into the groundwater system. Both are potentially detrimental and need to be alleviated.

This could be a major concern were it not for preformed flexible joint sealants meeting the requirements of ASTM C990. These sealants are made of butyl rubber and come in rope form in a variety of sizes. To meet ASTM standards, sealants must be tested for watertightness under at least 10psi (1440psf) of hydrostatic pressure. Install per the manufacturer’s recommendations and there will be no worries of leakage.
What is buoyancy, and how does it affect concrete septic tanks?

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www.ohioprecast.org

Concrete is a very heavy material weighing around 150 pounds per cubic foot. The specific weight makes concrete 2.4 times the weight of water. In a pool of water, a solid concrete block would sink. So if concrete cannot float in water, then why is it such a problem to water test a septic tank by filling the vessel well into the riser? The answer requires a lesson in buoyancy.

Water has a specific weight of 62.4 pounds per cubic foot. Consider that a cube of water filled an area of exactly 12” x 12” x 12”. The area at the base would be 144 in². The force exerted by the cube of water on its base is 0.433 psi. A second cube of the same size and volume stacked on the first would double the force applied on the base. In addition, a lateral force, a force exerted sideways, would also exist. The lateral force is equal to the force in psi at the base, and is reduced to 0 at the top of the base.

The Archimedes Principle states: The buoyant force is equal to the weight of the displaced water.

To illustrate this, if a concrete test cylinder measuring 4” in diameter x 8” in height were dropped into the one cubic foot of water, the amount of water displaced would be 100.5 in³. The weight of the water displaced would be about 3.6 pounds. Since the weight of the concrete cylinder is about 8.7 pounds, the cylinder would not float, but it now has a weight of about 5.1 pound (8.7 - 3.6). If the test cylinder form was “pushed” into the water, the same amount of displacement of water would occur. The only difference is that the test mold is significantly lighter than the water that would be displaced, so it will float.

Another principle that is important to know is that water in a pipe exerts the same force per square inch at the base regardless of the diameter of the pipe. In a septic tank with a riser, the riser becomes the pipe. If water is filled into the riser to a level that is 1” above the bottom of the concrete tank lid, the lid will “displace” a volume of water equal to the contact surface area of the bottom of the lid multiplied by the height of the water in the pipe above the bottom of the lid. Assume that a concrete lid has an inside area of 40 ft² without subtracting the area of the riser. The riser is 18” in diameter (1.77 ft²). The net surface area displacing the water is 38.23 ft². The volume of water displaced per foot of water in the riser is (38.23 x 1 = 38.23 ft³). The weight of the water displaced is (38.23 x 62.4 = 2,385.5 pounds). The buoyant force “lifting” the lid is almost 2,400 pounds. A 4” thick concrete lid of this size weighs less than 2,000 pounds. The buoyant force is greater than the mass of the concrete lid, therefore the concrete lid would float.
Welcome New PCANY Members
Auburn Crane and Rigging, Inc. of Auburn, NY has joined as an Associate member. The company provides crane services and specializes in the erection of precast concrete products. Contact Todd Macintosh todd@auburncraneandrigging.com for information.

Press-Seal Gasket Corp of Fort Wayne, IN has also joined as an Associate member. Press-Seal provides pipe gaskets, pipe-to-manhole connectors, butyl sealant, coring machines, lifting devices, and hold forms. Contact Territory Manager, Christopher Barr CBarr@press-seal.com for more information.

NPCA Stormwater Seminar
NPCA will be conducting a stormwater seminar at NC State University in Raleigh, NC on November 14. PCANY Director, Ronald Thornton, PE will be one of the presenters.

PCANY/NYSDOT Fall Meeting Scheduled
Please mark your calendars for the fall 2014 PCANY meeting and joint NYSDOT meeting on Wednesday November 5. The morning session will be held at the AGC Conference Room, 10 Airline Dr., Albany. The afternoon joint meeting with NYSDOT will be held in the first floor conference room at 50 Wolf Road, Albany.

Contact Us
Give us a call for more information about our services and products

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Visit us and find a complete listing of our member companies on the web at: www.pcany.org

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