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### Stormwater Management

By Ronald Thornton, PE

The Environmental Protection Agency unveiled the first phase of its National Pollution Discharge Elimination System (NPDES) stormwater program in 1990. Phase I, which applied to medium and large municipalities and construction sites over 5 acres, opened the door for a number of new applications for precast products. Several companies were engaged in the development of treatment technologies, mostly in the area of hydrodynamic systems such as gravity and vortex separators for the removal of coarse particles.

While Phase I opened some doors for the precast industry, Phase II, which incorporates small municipalities and sites as small as one (1) acre, seems to have opened the proverbial flood gates. Not only have more products been introduced into the marketplace, but the products are becoming more complex in order to meet requirements for the removal of total suspended solids (TSS) and total phosphorus (TP).

As the technology of these systems becomes more complex, so too does the level of confusion among specifiers, regulators and producers. NPDES permits are typically issued either by the Feds or the state, depending on the jurisdiction, and are based on the implementation of a set of Best Management Practices or BMPs. BMPs consist of "structural" and "non-structural". Non-structural BMPs include such measures as education and public awareness. Structural BMPs are those physical systems used to control run-off and remove pollutants.

The requirement for a BMP under the EPA rule is to reduce the discharge of pollutants to the "maximum extent practicable". It becomes incumbent upon the specifier to determine what is "practicable". As better products come to the marketplace, the bar of practicality continues to rise. The result is that proprietary stormwater management systems have become an essential part of most BMPs.

The most common types of proprietary systems include:

- Hydrodynamic – Devices that move water in a circular, centrifugal manner to promote the separation and deposit of sediment.
- Wet Vaults – Large watertight boxes that allow settlement of particulates through detention. Most use a series of internal baffles and other modifications to facilitate the process.
- Media Filters – Flow through systems containing absorptive filtering media for the removal of finer particles and other pollutants
- Underground Filtration – Prefabricated system of pipes and vaults designed to capture and infiltrate runoff.

The above systems are primarily installed below grade and, therefore must be housed in a structurally sound and durable vault of sufficient size and shape as specified by the supplier of the system components. Precast is the container of choice for strength, durability, quality, availability and ease of installation.

This is a rapidly growing industry that offers tremendous opportunities for precast producers. However, the technology seems to be outpacing the development of clear standards and definitions for various products. ASTM has recently formed a new subcommittee (C27.70) to address these issues.

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In honor of our 10<sup>th</sup> year of providing specialty engineering services to the precast industry, the Delta Precast Team will be well represented at MCPX 2007. Stop by our booth #1505 for a demonstration of our popular DP\_Vault software. We also invite your comments on what we can do to be of better service to you, our client, and meet our goal of being a seamless extension of your organization.

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## Featured Project

Septic Tank Proof of Design Test  
Produced by: Milan Vault, Inc. of Milan, MI  
Structural evaluation by Delta Engineers



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Milan Vault opted for the Design by Performance alternative of ASTM C1227 for their standard septic tank models. Calculations were prepared by Delta based on the results of vacuum test to determine the allowable live load and maximum depth of fill under various groundwater conditions.