shielding **septic tanks**

Chemical treatment helps delivers more sustainable, durable systems

By Les Faure

Some things are better off left buried, and the longer the better: Septic tanks top this list. That is one of the reasons ABC Precast & Ready Mix of Nanaimo, BC, Canada, has turned to advanced sewage treatment systems—to make sure concrete tanks remain the product of choice for residents of British Columbia.

The biggest problem with septic tanks is leaching that causes degradation.

ABC tested Xypex in a variety of conditions, including compressive strength and resistance.

The Xypex mix also protects concrete structures against sulfate attack.

"We've been in the tank business for almost 40 years, and the biggest problem with septic tanks is leaching causing degradation to concrete," said A.J. Hustins, general manager of ABC Precast & Ready Mix (ABC). "To minimize these problems, we take special care to form our septic tanks with newer molds and high-quality concrete that exceed industry standards for thickness and strength. We also look to new industry advancements for further improvements to our final product."

ABC did not have to look far. The company had been testing an additive called Xypex Admix C500, a chemical treatment for waterproofing, protection and the improvement of concrete strength, in some of its other product lines.

"The product was performing so well in terms of waterproofing and durability that we decided to put the product to the test in our septic tanks—with some impressive results," Hustins said.

Tangible Results

ABC tested Xypex in a variety of conditions, including compressive strength and sulfate resistance.

Added to the concrete during the batching process, Xypex Admix reacts with calcium hydroxide and other byproducts of cement hydration in the concrete, causing a catalytic reaction that generates a nonsoluble crystalline formation throughout the pores and capillary tracts of the concrete. Mixed with Xypex Admix, the concrete becomes permanently sealed against the penetration of water or liquids from any direction and deterioration due to harsh environmental conditions. Version C-500 is highly resistant to chemicals and can seal a hairline crack up to 0.4 mm. Unlike a coating system applied to the concrete after it has formed, this solution never has to be reapplied.

Typically, ABC looks to achieve a minimum 32 MPa (concrete strength is typically expressed as MPa) in the tank mix design at a 28-day break. With Xypex, the average is 45 MPa.

"The Xypex crystalline reaction helped the concrete hold more moisture over a longer period of time, so we get a longer, slower, moister cure, which ultimately yields a higher strength," Hustins said.

Some of the benefits were visible to the naked eye. "We knew our tanks were working in terms of

Onsite Wastewater Treatment Systems

When properly designed, installed and maintained, onsite wastewater treatment systems (OWTS) are a reliable choice for wastewater treatment from public health, environmental and economic standpoints. OWTS allow water used in homes and businesses to be treated and recycled to replenish local groundwater supplies.

According to the U.S. Census Bureau, approximately 23% of homes in the U.S. are served by OWTS. This number has not changed significantly since 1970. More than 60 million people depend on decentralized systems, including the residents of about one-third of new homes and more than half of all mobile homes nationwide.

About half of the occupied homes with OWTS are more than 30 years old, and a significant number of homeowners report system problems. In 2000, U.S. Environmental Protection Agency studies cited onsite treatment systems failure rates range from 10% to 20%.

Comprehensive data to measure the true extent of septic system failure are not currently collected by any single organization. In addition to failures due to age and hydraulic overloading, OWTS can fail because of design, installation and maintenance problems.

While typical failure of OWTS can be prevented with ongoing or periodic monitoring and maintenance, most authority management programs do not oversee routine operation and maintenance. In many cases, OWTS planning is not linked to larger groundwater and watershed protection programs.

The challenge for onsite treatment regulators in the future will be to improve traditional health based programs for groundwater and surface water protection, while embracing a vigorous role in protecting and restoring the nation's watersheds.

Source: U.S. Environmental Protection Agency

waterproofing," Hustins added. "We'd look at a tank that was full of water and see if the color of the concrete was getting darker and showing signs of dampness. Had we seen a color change, it would have been a clear sign that water was leaching through the concrete."

Not so easily detected is the protection that Xypex provides to concrete structures against sulfate attack. Acid-resistance testing shows that by blocking the penetration of acids into the concrete, it prevents the formation of sulfoaluminate hydrate, an expansive compound that literally causes the concrete to self-destruct.

In the Field

Today, ABC uses Xypex in all of its septic tanks, which are available in volumes of 275, 400, 750, 1,000, 1,200, 2,000 and 4,000 imperial gal. The Xypex Admix C500 is added at a dosage rate of 3% by weight of the Portland Cement for precast tanks.

Many septic tank installers and contractors in British Columbia now recognize the difference. Recently, ABC was awarded a contract to supply a local registered installation company with a multiple-tank system for one of the Gulf Islands, located off the east coast of Vancouver.

Currently, a large portion of sewage in North America is treated with septic tanks. The need for septic tanks in British Columbia and other parts of the world is expected to grow dramatically in the next decade, and owners will want the most durable, sustainable solutions. WWD

Les Faure is advertising and promotion director for Xypex Chemical Corp. Faure can be reached at 800.961.4477 or by e-mail at les@xypex.com.

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