# putting a wrap on PIPE DEFECTS

By Mike Fox

WWTP repairs piping systems for the long term with reinforced composite system

The North Tonowanda Wastewater Treatment Plant (WWTP) is often faced with the challenge of making repairs to the array of sizes and configurations that comprise its carbon filtration service piping system. The original piping located in the carbon filtration facility is constructed of spiral-welded carbon steel. Over the years of service, external corrosion has provided the WWTP's maintenance department with the ongoing challenge of making reliable repairs to leaking pipes in a timely manner. Past repairs have involved temporary bands or clamps comprised of gasket materials and strap steel or banding steel until schedules permitted the pipe sections or fittings to be replaced.

HydraTech Engineered Products LLC presented the North Tonowanda facility with its HydraWrap reinforced composite system as an alternative means to permanently repair leaks and arrest corrosion. The system utilizes high-strength carbon fiber saturated with a proprietary epoxy resin to reinforce piping and restore pressure rating to piping that has experienced significant wall loss. For anomalies, high-compressive-strength epoxy filler is incorporated before the carbon fiber is applied.

HydraWrap is a wet lay-up system, which involves the saturation of the carbon fiber material on site and provides an advantage in repairing a wide variety of pipe diameters and configurations. It is able to be contoured to various shapes and pipe fittings and gives the end-user or installer the convenience of one type of repair system to address various piping applications.

The system is engineered and tested in accordance with ASME PCC-2 guidelines and regulations regarding nonmetallic repairs and is supported through third-party testing. HydraTech Engineered Products provides it in various kits to accommodate the specific pipe size and fitting, or the company can custom design the repair system for applications that exceed kit performance and coverage.

The design of the carbon-fiber reinforcing system takes into account operating and design pressures, operating temperatures, the remaining pipe wall thickness and pipe material, as well as other design considerations such as cyclic loading or external forces that may be involved. HydraWrap can be applied to a variety of pipe substrates and is compatible with many common chemical reagents. It is available as a standard system as well as an acid system and high-temperature system.




**The reinforced composite system presented to the North Tonowanda facility is an alternative means to permanently repair leaks and arrest corrosion.**

## BEYOND BANDAGING

Although nonmetallic repairs have been used successfully for pipe repairs, the awareness and knowledge of such methods is often lagging behind those of conventional repairs such as mechanical clamps, welded overlays and the replace-in-kind approach. The HydraWrap system provides an economical means

to permanently repair piping over the conventional methods and provides the client with a reliable engineered system to prevent shutdowns caused by the sudden occurrence of pipe leaks and failures. Installation of the system is completed with common hand tools and inexpensive consumables; it can eliminate hot-work associated with welding and grinding and the need for rigging equipment and specialized tools that may be required with conventional repair methods. HydraTech can provide clients with turn-key installations through its network of certified installers or can provide owners and maintenance crews with the proper installation training and certification to perform their own repair projects.

## NORTH TONOWANDA INSTALLATION

John Maurer, maintenance supervisor of the North Tonowanda WWTP, was interested in utilizing and evaluating the HydraWrap system as a long-term repair method for the carbon filtration process piping. In November 2009, certified installer Corrosion Technologies Inc. installed the system on a 12-by-24-in. gored reducing elbow located on the discharge side of a carbon filter supply pump. The elbow had active leaks, and temporary repairs had included the use of banded clamps. During a four-hour window, the line was depressurized, the anomalies filled and the elbow surface prepped and wrapped with the HydraWrap system.

"The repair went very well. It was done ahead of schedule and the Cortech [Corrosion Technologies] team performed in a professional manner," Maurer said. "By using the HydraWrap system, we were able to save a considerable amount of money and time. The repair not only looks great, but it stopped several leaks in that pipe section."

As often is the case with piping systems that have widespread corrosion, point repairs made to pipe leaks and defects can result in anomalies occurring in other areas of the piping system. HydraWrap enables clients to be proactive in the maintenance of piping systems, as the carbon fiber-reinforced system can be installed online on pressurized pipe—provided active leaks have yet to occur. This allows clients that are aware their existing piping is deteriorating due to corrosion, abrasion, chemical attack and other causes a means to repair and rehabilitate piping systems while in operation and eliminate costly unplanned shutdowns and downtime. WWD

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