Low-cost, scalable treatment for Haitian hospital

Partners in Health and Engineers Without Borders team up to install a low-cost wastewater treatment facility for a new hospital in Haiti. Daniel P. Saulnier, P.E., and Cecilia Carrion-Carmona explain how the scalable treatment system can be replicated for use worldwide in areas with little or no infrastructure.

In Mirebalais, Haiti, an innovative wastewater treatment system sets a new standard for low-cost, scalable treatment for a region with little or no infrastructure and high rates of waterborne diseases such as cholera. The newly opened Hôpital Universitaire de Mirebalais (HUM) incorporates an innovative package treatment solution provided by Butler Manufacturing Services (BMS) of Longford, Ireland, which began operation in April 2013. Its effluent quality above Caribbean standards, the facility has great potential in influencing the future of water and sanitation development throughout Haiti and the Caribbean region.

The nonprofit organization Partners In Health (PIH) built the 30-meter by 45-meter wastewater treatment facility for a new hospital in Haiti. The hospital well and backup, an off-site well for water purification, waste treatment or surface disinfection is required, STS Product Manager Jean-Paul Monali explained.

The 300-bed teaching hospital will provide primary care services to about 185,000 people and secondary and tertiary care to all of central Haiti and areas in and around Port-au-Prince.

STS donates sodium hypochlorite generation disinfection system

The US company Severn Trent Services (STS) partnered with the humanitarian organization Operation Blessing International (OBI) to install and commission a ClorTec® T-6 Series sodium hypochlorite generation disinfection system for the Hôpital Universitaire de Mirebalais (HUM) in Haiti.

The system is capable of producing six pounds of sodium hypochlorite per day, which can disinfect up to 625 cubic meters (165,000 gallons) of water daily for the hospital. ClorTec electrolytic technology is applicable for use in isolated locations where water purification, waste treatment or surface disinfection is required, STS Product Manager Jean-Paul Monali explained.

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Breaking ground

“We knew the system, if constructed properly, could exceed the expected effluent quality,” recalls Polaneczky. “We also knew that construction would be the biggest hurdle, because trained labor and construction materials are very limited in the region.”

One of the challenges that came about during construction was how to lift the blivets into place. Each blivet weighs approximately 6,000 kilograms. Polaneczky says, “Cranes are extremely rare in Haiti, and luckily one was available to take the blivets out of their shipping containers. However, we were not able to use a crane to place the Blivets in their final location.” Instead, PIH borrowed an excavator from the HUM construction site to put the blivets on their concrete pads. Construction activities occurred over a series of months.
PIH educated crews about system operation during construction. “The hands-on education during construction was beneficial to everyone involved as it gave the staff an intimate understanding of the system and the opportunity to ask questions,” Polaneczky adds. PIH continues to provide training as needed.

**Global applicability**

Since the wastewater system went online, other Haitian organizations have shown interest in replicating the system’s design in other cities. Polaneczky was not surprised. “The simple design really fits in with the broader Haitian goals. It is inexpensive, easy to construct and maintain, and doesn’t require much energy. It is a great system for areas with little to no infrastructure,” she explains.

PIH contends that the design could be replicated for projects worldwide in regions without clean water and sanitation. Other hospital owners and project teams in Haiti have contacted PIH to discuss the design.

Polaneczky concludes, “This project proves that a wastewater system doesn’t have to be complex or extremely costly to bring high water quality standards to areas with little or no supporting infrastructure. The Mirebalais project is certainly proof that with a little creative thinking, we can bring safe, clean water to everyone who needs it – in Haiti and beyond.”

**Authors’ Note**

Daniel P. Saulnier, P.E., is the coordinator of the Civil & Environmental Engineering Co-op Program and faculty advisor for Engineers Without Borders, both positions located at Northeastern University, near Boston, Massachusetts, USA. He can be reached by email at d.saulnier@neu.edu. Cecilia Carrion-Carmona is a project professional for Kleinfelder, a global science, engineering and architecture consulting firm. She can be reached by email at ccarmona@kleinfelder.com. Dan and Cecilia volunteered their time and expertise to complete the design of the Mirebalais wastewater treatment system.

Above left: PIH Project Manager Ann Polaneczky examines the blivet-based wastewater treatment system located at the Mirebalais hospital.

Above right: Mirebalais hospital wastewater treatment system relies on three prefabricated blivets to process sewage.

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