

Plastics News

Life-cycle study backs PVC pipe

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PVC pipe has the environmental and economical attributes needed for long-lasting water and sewer systems, according to a 128-page report that is said to be the first comprehensive environmental review of underground piping systems in North America.

The report was released April 19 by Sustainable Solutions Corp. (SSC), a Royersford, Pa.-based firm that is urging cities to consider the findings when they look at the life-cycle cost of water infrastructure and make piping decisions.

SSC, an environmental consulting firm, was hired to conduct an independent study of PVC pipe for buried infrastructure by the Uni-Bell PVC Pipe Association, which represents North American manufacturers of PVC pipe.

SSC's engineers and scientists used life cycle assessment (LCA) methodology from the International Organization for Standardization (ISO). The peer-reviewed report also includes a comparison of alternative pipe products based on durability, performance and statistics, as well as environmental data when available.

"The PVC pipe industry is the only pipe material that has transparently reported their sustainability and environmental impacts," SSC President Tad Radzinski said in a news release. "This is welcome information for both policy makers and utility professionals to make fully informed decisions in their efforts to improve underground infrastructure with sustainable products."

Radzinski served 10 years as a national expert on waste minimization programs for the U.S. Environmental Protection Agency before starting SSC in 2011. He's a mechanical engineer with a master's degree in water resources and environmental engineering as well as an adjunct professor at Villanova University and an active member of the U.S. Green Building Council.

SSC's report is out as aging infrastructure, pipe corrosion and water quality issues are stirring debate about the best ways to address \$1 trillion of drinking water system upgrades identified by the American Water Works Association. The firm says its study evaluates pipe infrastructure in the context of providing sustainable water and sewer service over a 100-year period with minimal risk of degrading water quality while reducing operation costs.

Bruce Hollands, executive director of the Dallas-based Uni-Bell PVC Pipe Association, said one of the main points he hopes decision makers will consider is that the energy required to pump water through PVC pipes over a 100-year design remains constant because the pipe walls remain smooth.

"This generates overall life-cycle cost savings and a lower carbon footprint compared to ductile iron and concrete pipes that require more pumping energy over time due to corrosion, leaks and internal degradation," Hollands said in an email.

Hollands said that over its lifespan, PVC pipe is less expensive "while maintaining performance and reliable service levels, protecting water quality and minimizing water main breaks, water loss, infiltration and pavement repairs."

The report also says PVC pipe does not emit or leach toxic substances when it is manufactured or when it conveys water. And, it says PVC pipe does not corrode internally or externally or require chemical additives to inhibit corrosion.

Hollands said that's important because corrosive soils affect about 75 percent of water utilities.

"Ductile iron pipe may last as little as 11 to 14 years in moderately corrosive soils, requiring numerous replacements over a 100-year period," Hollands said. "This increases the embodied environmental energy impacts of iron pipe by up to nine times compared to PVC."

The report also gives a little history about the pipe material. PVC was discovered in the 1830s and introduced as a pipe material in North America in 1951. The American Society for Testing and Materials (ASTM) began developing plastic pipe standards in 1955 and the National

Sanitation Foundation, which became NSF International, began certifying tin-stabilized PVC pipe for drinking water in 1956.

An EPA study found some gasketed (cemented with a solvent) PVC pipes less than 2 inches in diameter made in the United States prior to 1977 experienced vinyl chloride leaching.

"However, no instances of vinyl chloride leaching from any North American PVC pipe manufacturer post-1977 have ever been cited," the report says.

Even though it was funded by a trade group, Hollands said the pipe study is a transparent review by independent experts.

"Do people pay for university degrees?" he asked. "Yes, but they are objective because they are obtained in a transparent and independent fashion because the institutions that issue them follow certain rules, regulations and protocols. Same thing for LCAs, which are governed by the ISO, peer reviewed and then certified by the global health organization NSF International, which is the case for this report."

The report is officially called "Life Cycle Assessment of PVC Water and Sewer Pipe and Comparative Sustainability Analysis of Pipe Materials."

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