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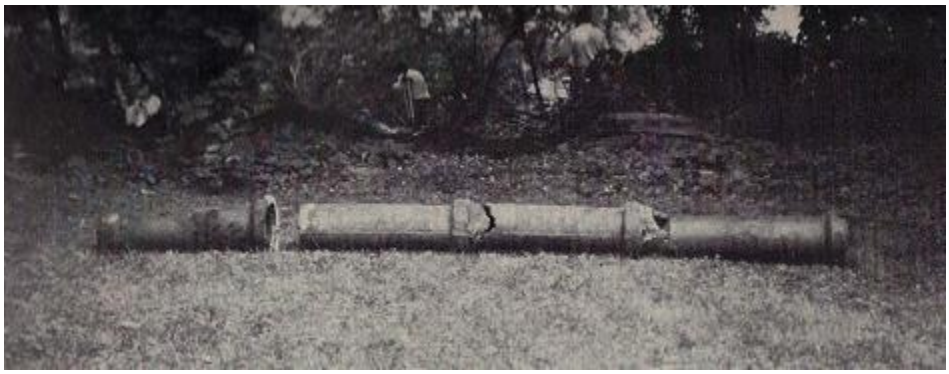
Century Concrete Pipe Does Exist

By Grant Lee, Manager, MCIP, RPP
Canadian Concrete Pipe Association

It is widely accepted that a 6-inch diameter concrete pipeline, constructed between 1840 and 1842 at the Mohawk New York home of General Francis Elias Spinner to convey domestic sewage to the Erie Canal, is the oldest recorded sanitary sewer in the USA. In 1982 (140 years after installation), the pipeline was exhumed and found to be in excellent condition, and still functioning. Details about America's earliest sewers are rare, but it is known that concrete pipe was used for sanitary sewers to control outbreaks of Yellow Fever in the mid 1800s. Julius W. Adams, who designed the concrete sewers of Brooklyn in the mid 1800s, is recognized as the first to introduce engineered sewer systems in America. A concrete pipe sewer installed in 1869 in Chelsea, Massachusetts was functioning satisfactorily in 1980, 111 years later. In addition, there were numerous concrete pipelines installed in New England during the latter half of the 19th Century that were still in use during the 1980s.



6-inch diameter century concrete pipeline constructed between 1840 and 1842 in Mohawk New York

There are claims by flexible conduit manufacturers[1] that their products will last 100 years, based on theory, linear regression analysis to determine probability, and limited materials testing. These claims have yet to be proven, because there are no documented gravity steel or thermoplastic pipelines that have reached the 100-year mark in the U.S.A. It is important for designers and specifiers to understand that when considering concrete pipe[2], they are working with a well-known material and product that has a proven service life of 100 years[3] and more. It is important for many reasons, and it can be argued that in a time of great national debt and scarce resources for building and maintaining infrastructure, designers and specifiers should be

thinking long-term to build public assets that hold value, or increase in value throughout the design life of a project[4]. Concrete pipelines and culverts can be considered buried bridge structures supporting the weight of surface uses while conveying fluids and other elements. Thermoplastic products, on the other hand, are tubes that require the construction of a soil structure to facilitate the conveyance of fluids through the void created by the tube. The soil structure must be constructed carefully, because the tube alone cannot support surface loads.

When developing a confidence level to specify concrete pipe, young designers and specifiers may well ask; where are the century concrete pipes and those approaching the century milestone? The concrete pipe industry has records of where the sewers and culverts are, but there are detailed public inventories because of the implementation of GASB 34[5] and decades of record-keeping by State DOTs. The records of the American Concrete Pipe Association cover 113 consecutive years, with many references to early concrete pipeline and culvert installations – and where they may be found.

Between 1875 and 1888, St. Paul Minnesota installed over 94,000 feet of concrete pipe for combined sewers (sanitary and storm water effluent). These pipelines varied in size from 9-inch diameter circular pipe to 21-inch by 28-inch oval pipe. These pipelines provided more than 100 years of service.

One of the earliest railroad culverts was near Salem, IL. Constructed in 1854, the culvert was still in use a century later. The Memphis Division of the Louisville and Nashville Railroad constructed three nonreinforced concrete pipe culverts in 1855 and 1857. Approximately 40 concrete pipe culverts, ranging in diameter from 10 to 20 inches in diameter were installed in 1877 on the Cambridge Junction line of the Central Vermont Railway.

With the urbanization of America and the need for mechanized agriculture to feed a quickly-growing urban populous, concrete drain tile was introduced in the 1840s to carry access water from low-lying areas to improve crop production. In subsequent years, small diameter concrete pipe drain tile became increasingly important in the agricultural development of New England and the rolling prairies of the Midwest. Available farm acreage, quality and quantity of farm

products, and the value of farmland were increased by draining wetlands with tile. The widespread need for tile was recorded in Ohio, where 11 million acres of land were improved with 20,000 miles of drain tile by 1884.

The Bureau of Reclamation was instrumental in the expansion of the concrete pipe industry throughout the 1930s with extensive irrigation installations in Washington, Oregon, California, and Texas. These installations were started and completed between 1925 and 1940. One of the major irrigation programs was the Central Valley Project in California. Another was the program for the irrigation district of the Lower Rio Grande Valley of Texas.

In 1935, construction started on the massive combined sewerage system of Chicago. By 1940, 109 miles of concrete sewer pipe had been installed in diameters ranging from 6 to 102 inches. Seventy-one miles of 109-mile sewer were small diameter pipe ranging from 6 to 24 inches. Evidence of long-term performance was exposed in San Francisco when a section of concrete sanitary sewer pipe that had been in continuous service from 1876 until 1946, was in good condition when examined.

During installation of a storm sewer near an existing combined sanitary and storm sewer in Appleton WI in 1964, a cave-in exposed a section of the combined sewer installed in 1891. The old pipe was nonreinforced horse-collar shaped with tongue and groove joints. The pipe measured 27 inches tall by 21 inches wide and was prebedded. Made with the hand tamp method, the pipe, had serviced Appleton for 72 years. The damaged sections were removed and the old line returned to service as a sanitary sewer only. Appleton continued to show the performance of concrete pipe when a section of 72-year-old pipe was excavated in February 1965, followed by a 78-year-old pipe that was in excellent condition. The nine-inch diameter pre-bedded concrete sanitary sewer was removed to make way for a manhole installation. The remainder of the line, installed in 1887, remained in service.

In Lansing MI, a run of forty-three year concrete old pipe was unearthed in 1965 to make room for a new parking area. The 78-inch diameter pipe, laid in 1922, was found to be in such good condition that it was reused by the city for the Haze Drain Area Storm Sewer. The salvaged pipe

was subjected to rigorous testing and exceeded requirements.

Canada has its claim of "old concrete pipe" as well. In 1982, a 30-inch diameter concrete pipe sewer installed in 1923 was uncovered near Oshawa, Ontario. It contained an expanded metal grid for reinforcement and D-load tested to Class III pipe. After testing, the sample pipe was repaired and the pipeline restored to use as a sewer under Oshawa Boulevard (formerly St. Julien Street).

American concrete pipe companies that have remained in continuous service in their communities since the early 1900s also have records of decades-old local projects. The concrete pipe industry and its national and state associations know where century pipe exists. If there is any doubt about the long-term performance and value of concrete pipe sewers and culverts, you may not need go any further than the records of your own city or town. It can be easily argued that concrete pipe is among the top reasons for the success of your home.

INFO LINKS

1. http://www.concrete-pipe.org/ysk_pdfs/ysk116.pdf
   http://www.concrete-pipe.org/ysk_pdfs/YSK-142-HDPE-Pipe-Service-Life.pdf
2. http://www.concrete-pipe.org/why.htm
3. http://www.concrete-pipe.org/cp_vs_hdpe.htm
4. http://www.concrete-pipe.org/articles/2006%20Fall%20R%20&%20B%20Stormwater%20supp%20by%20Galloway%20pipesreprint.pdf
5. http://www.concrete-pipe.org/news/cpnewsspring06.pdf

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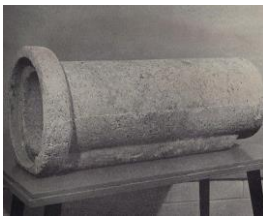
Keyword Search on American Concrete Pipe Association Website
(service, design, flexible, rigid, history, performance, GASB, reuse, sanitary, storm, culvert)
www.concrete-pipe.org
Concrete Pipe Design Manual
http://www.concrete-pipe.org/designmanual.htm

Section of 70-year concrete pipe from San Francisco

Oshawa concrete pipe remained in service after examination at 60-year mark.



78-year concrete pipe sanitary sewer still in use in Appleton after examination in 1965.