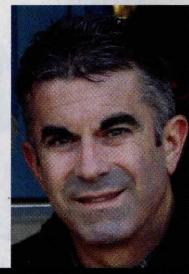


LAST WORD

THE REDISCOVERY OF VITRIFIED CLAY PIPE

BY JEFF BOSCHERT



MUNICIPALITIES across the country are rediscovering the value of the material properties of Vitrified Clay Pipe (VCP).

After 6,000 years as the worldwide sewer material of choice and 200 years' experience in U.S. sanitary sewers, municipalities are discovering clay pipe again. When municipalities inspect their sewers, they find clay pipe that is over 100-years old that is still functioning as designed and still has many years of service life remaining. Other pipe materials, installed in the last 30 to 50 years are failing. Plans built on an assumption of continuing service life based solely on the age of the pipe have been revised. The newer pipe is prioritized for replacement and the older pipe will continue in service for the foreseeable future. Evaluation of the projected continuing service life of those pipelines is leading engineers, maintenance professionals and municipalities to the clay pipe that is manufactured today.

We're proud of our history and glad to see public works professionals rediscovering the material properties of VCP. But everyone should be aware of just how different today's VCP is from what might, more correctly, be called Terra Cotta pipe.

Differences between Terra Cotta & VCP

Raw materials: For centuries, the clays used to make pipes were primarily fire clays, which were salt glazed during the firing process. The glazing was needed to keep absorption rates to a minimum. Pipe manufactured today consists of a blend of several types of both clay and shale resulting in a tight, dense, non-porous pipe body without the need for glazing.

Extrusion: For the first century of manufacturing in the U.S., clay pipes were extruded using steam driven presses resulting in a product contain-

ing laminations within the pipe wall. Pipe extrusion today utilizes hydraulic and electric presses with vacuum chambers that produce a solid pipe body.

Kiln Firing: Before computer-controlled kiln firing, which enable precise control of temperature and burner cycles, many factories made a clay pipe that was not actually vitrified. It could more accurately be described as a terra cotta material. Terra cotta is a dried clay, fired to 1,200 degrees while vitrified clay is a ceramic, fired to over 2,000 degrees. Vitrification occurs at approximately 2,000 degrees, when the mineral particles become fused into an inert, integrally bonded ceramic.

Joints: In the 19th century, system designers intentionally planned for infiltration to "clean" the pipelines. Joints allowed both infiltration and exfiltration and had zero flexibility the day it was installed (a flexible joint is needed for a buried rigid pipe). It was not until after the passage of the Clean Water Act in 1972 that the use of factory-applied, leak-free, flexible, compression joints became commonplace for VCP. Today's compression joints maintain a leak-free seal even when the joint is deflected due to minor differential settlement of the pipeline.

ASTM Standards & Testing: The first ASTM standard for pipe (of any kind) wasn't adopted until 1912, over 90-years after clay pipe was first manufactured and installed in the U.S. The first ASTM standard only required a three-edge bearing strength of 1,200 lbs./FT for a 12-inch pipe, today that same pipe must withstand a load of 2,600 lbs./FT.

The Benefits

Longevity & Sustainability: The natural properties of VCP make it uniquely suited to the high-sulfur, highly-abrasive and highly-demanding environment of a sanitary sewer. As a kiln-fired

ceramic, VCP is naturally inert. It does not change over time, so VCP offers the longest life of any pipe material.

Maintenance: Aggressive cleaning has been proven to reduce sanitary sewer overflows (SSO's). No other sanitary sewer pipe material can withstand the aggressive cleaning techniques commonly used in VCP. Unmatched abrasion resistance, a Mohs hardness of 9, average compressive strength of 18,000 lbs., all result in a pipe that can withstand jetting pressures of 5,000+ psi, flow rates of 80 GPM all while using any desired jetting angle. Maintenance departments around the country have become proponents of VCP.

All common methods of cleaning sewer lines can safely be used in VCP sewer pipe including hydro-mechanical tooling, hydro-flush nozzles, mechanical rodding, bucketing, as well as chain/cable type cutters.

Trenchless Applications: Vitrified Clay Jacking Pipe was introduced to the North American trenchless market in 1992. The inherent strength of VCP makes it uniquely suited to pilot tube guided boring projects, but it is also used for slurry microtunneling, static pipe bursting and as a carrier pipe inside a cased bore. VCP Jacking Pipe is the predominant direct jacked product pipe material used in 8-inch thru 24-inch sizes.

The Bottom Line

Municipalities consistently prioritize long-term value over short-term cost. That is why public buildings and schools are generally built with brick and it is why more and more public works professionals are discovering clay pipe as the right choice to serve the long-term interests of their communities.

Jeff Boschert is a civil engineer with the National Clay Pipe Institute.