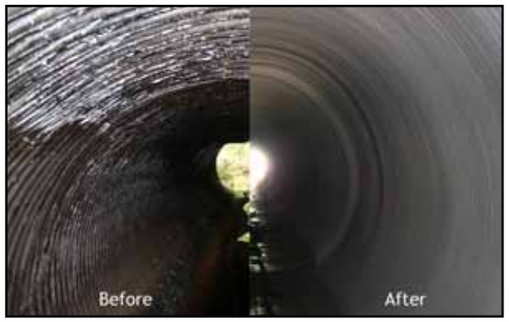
TECH TIPS FROM NASSCO

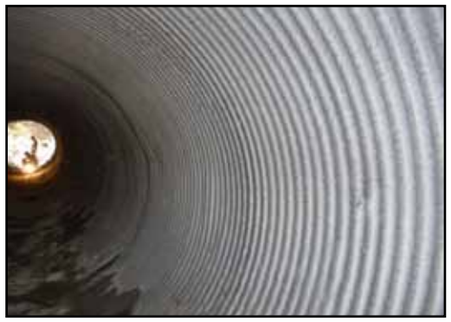
Tech Tips by NASSCO is a bi-monthly article on trends, best practices and industry advice from NASSCO's trenchless technology membership professionals.

4 EASY WAYS TO BOOST YOUR INFRASTRUCTURE BUDGET

By NASSCO Member John Hepfinger, Global Market Manager, Milliken Infrastructure Solutions

As the construction season starts to wind down in many places across the country, it's time to consider options for stretching budgets as you head into 2017. In addition to keeping abreast of the latest trends and minimizing travel expenses, take a look at the viability of new technologies and repair methods such as trenchless technology and geopolymers.





1. Assessment:
Decide whether your infrastructure needs to be repaired or replaced. There are several studies available to help you make that determination. Researchers at Queens University in Ontario, for example, have performed 2-D and 3-D finite element analyses to determine the remaining service life of corrugated metal culverts. The 2013 study ("Assessment of Deteriorated Corrugated Steel Culverts," Van Thien Mai, Queens University, January 2013) examines the magnitude of compressive thrust changes in the wall of the culvert (especially at the springlines) and how its resistance to yield and buckling is affected.

Led by Dr. Ian Moore, a professor at Queens and executive director of its GeoEngineering Centre, the researchers have developed a quantitative procedure for culvert assessment. Rather than relying on an individual inspector, one can use a rigorous methodology to characterize the remaining steel plate thickness using ultrasonic thickness measurements. This allows you to calculate the deteriorated culvert stability using an analysis package such as CANDE or other finite element programs.

According to Moore, qualitative assessment had been the norm until the introduction of these technologies. "In the past, people have said, 'Oh, that looks terrible,' or 'I think that looks OK,' but they have not done an actual calculation. Now they can."

2. Maximize resources:
Often, the capability to tackle multiple aspects of a project can be shifted from external servicers to existing in-house assets. Areas such as project management, implementation, inspection, labor and even project engineering are becoming internal strengths for some local agencies. Of course, there are still many instances where specific outside expertise should be employed.

3. Explore New Technologies:
Many departments may not have the budget to attend conferences and tradeshows, but you can review websites to keep abreast of technology trends. Two worth noting: the American Association of State Highway and Transportation Officials (AASHTO), whose members test products; and ASTM International, which works to write standards.

Also consider lunch-and-learn sessions and webinars with different technical consultants. You'll see if new products can offer superior benefits at a competitive price. In addition, some states may count this toward continuing education credits.

Developments in Trenchless Technologies over the past 20 years have provided a way to replace or renew underground utilities with minimal excavation and surface disturbance. Primary candidates for repair include electrical and fiber optics conduits, water mains, storm and sanitary sewers, gas mains, and more. Trenchless technology dramatically reduces restoration of roads and property, disruption to businesses and homeowners, and impacts to areas that are environmentally sensitive. A great place to start is nassco.org.

4. Remain open-minded, but cautious:
Relatively new technologies to the industry that may not have a long track record should have the third-party analysis that allows you to objectively evaluate the appropriate use and limitations. Moore's team, for example, has conducted several studies to examine technologies in the attempt to understand their capabilities:

- One study evaluated two 1,200 millimeter (47 inch) diameter corrugated steel pipes repaired with a Milliken Infrastructure geopolymer spray-on cementitious liner. The work, which appeared in Tunnelling and Underground Space Technology (Vol. 47, 2015), established the liner's strength and how it reacted to the loads applied since the original flexible system would now be semi-rigid.
- In another study, a 1.8 meter (5.9 feet) diameter corroded metal culvert, as well as 1.2 meter (3.9 feet) diameter reinforced concrete pipes with significant overload fractures, were sliplined and grouted. After burial, the pipes were tested before and after repair using full Canadian Highway Bridge Design Code (CHBDC) and ASHTO service loads at two burial depths. The work clearly showed how loads are shared between the old pipe, the liner and the grout. The grout significantly stiffened both pipes. In the repaired metal culvert, the grout carried much of the load; on the other hand the concrete pipe continued to provide most of that system's structural support.

"It's not just a calculation on a piece of paper," Moore says. "We actually have real, physical measurements, and we know how these systems behave."