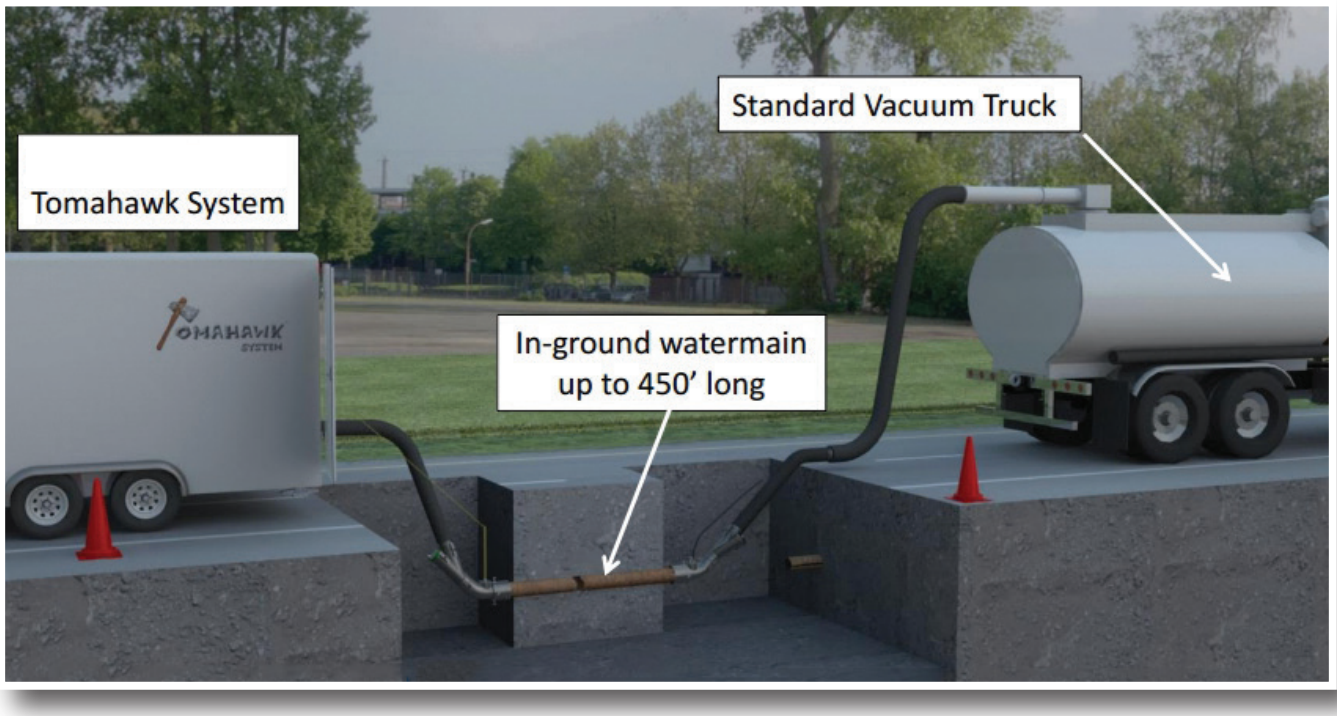
Waterless pipeline cleaning process saves time, money and resources

By Kyle Verwey



By using abrasives in a high-volume, low-pressure airstream, pipes can be cleaned and dried, in preparation for lining, without using water.

Although many solutions are needed to cope with drought, new trenchless technologies exist that can help prevent the massive amount of water losses common in aging underground water mains.

Old metallic water mains become congested with tuberculation and corrosion that restricts flow and can produce poor water quality. The corrosion process also reduces the pipe's structural properties, which may lead to leaks or breaks. Many leaks can remain undetected for years, wasting thousands of litres of clean water. To compensate for reduced flows through old congested pipes, utilities are forced to increase network pressures, causing a pipe failure at its weakest section. The result is a significant water release event, common in many cities today.

Too few municipalities have annual programs in place to carry out maintenance or renewal of their aging, leaky water infrastructure. The majority of drinking water pipe failures are from piping that was installed pre-1950 and has operated beyond its 50-year design life span. Jim Lary, a NACE certified corrosion engineer, estimates there are over 250,000 water main breaks per year in the U.S. alone. The amount of piping installed post-1950 is dramatically more than that installed before 1950. Now, pipes that were installed in the 1960s and 1970s are reaching the end of their design life.

Some estimates predict that rehabilitating North American water distribution networks to an acceptable level will require more than a trillion dollars over the next twenty years.

Approximately 70% of buried pipes are in good structural condition, according to PICA, a pipeline assessment company in Edmonton, Alberta. Even at the end of their design life, pipes can continue to function with regular maintenance. It is during this "extra life" that municipalities are faced with the decision to replace or rehabilitate.

Replacement is most common and comes with a heavy price. However, rehabilitation approaches offer advantages over replacement. Today's trenchless renewal options are among the least costly, lowest impact, and quickest to restore pipes back to full service. They can extend life by up to 50 years. Trenchless water main rehabilitation can be a significant contributor to reducing the number of leaks, breaks and unnecessary water releases in a water distribution network.

Furthermore, areas under drought conditions are more susceptible to fires. Older, tuberculated water mains restrict the flow of water which can make the difference between saving a structure from fire or not. The more the distribution system has been cleaned and rehabilitated, the better assurance of adequate water supply to all areas where, and when, it is needed most.

Most trenchless water pipe solutions require a clean and prepared pipe to host one of a variety of renewal or life extension methods. While most trenchless options limit the amount of envi-

ronmental impact from greenhouse gas emissions and ground displacement, they generally consume a large amount of clean water.

As experts predict the shortage of water is only going to get worse, these wet cleaning methods are not ideal. Every aspect of water usage will be under increasing scrutiny as water conservation efforts take effect. This will be especially true when alternative waterless options are available, as is the case with water main cleaning.

Common methods for cleaning buried pipe use power boring and flushing, high pressure water flushing, or scraping and flushing. Each of these options requires a large amount of water to either dislodge internal corrosion and tuberculation, or flush it from the pipe. Then, water is displaced into an access pit where it needs to be taken to a processing plant, or pumped into a nearby sanitary sewer. Tens of thousands of litres of clean water can be wasted in the process of cleaning the pipe.

In most situations, trenchless rehabilitation projects will install a structural class 4 liner to fully replace the pipe. Based on the break history, age and condition of the pipe, it may be possible to coat the pipe with a class 1 barrier coating. This option can be significantly less than the cost of a class 4 liner. It can return the host pipe to full flow capacity while protecting it from further internal corrosion.

Using a standard vacuum truck, Tomahawk injects dry abrasive materials in a high-volume, low-pressure air stream to clean corrosion and tuberculation from the interior of the pipe. The process also removes old tar or bitumen liners that may be present and which contribute to poor water quality. The pipe is left clean and dry, in compliance with SSPC-SP/NACE No. 3, commercial blast standard. Using the Tomahawk Scout™, a CCTV camera with integrated abrasive deflector, service connections in the pipe can be "target" cleaned to a SSPC-SP/NACE No. 2 standard.

This degree of cleaning is crucial for maximum liner bond around any service connection to ensure leak-free liner performance. The dry process also reduces waste generated by up to 98% and virtually eliminates downtime required for disposal. The process is completely enclosed, so there will be nothing for curious residents to see during operation.

Watermain before cleaning. Corrosion and tuberculation restrict the flow of water.

Watermain after dry Tomahawk cleaning. Pipe is restored to full capacity.

The fully cleaned and prepared pipe may be analyzed with a pull through Ferroscope to determine the remaining wall thickness along the entire pipe. The on-site engineer can then determine which class of liner should be installed into the main.

With specific liner installation options available on site at the time of inspection, the cost and time savings to municipalities can be substantial and more infrastructure can be renewed.

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