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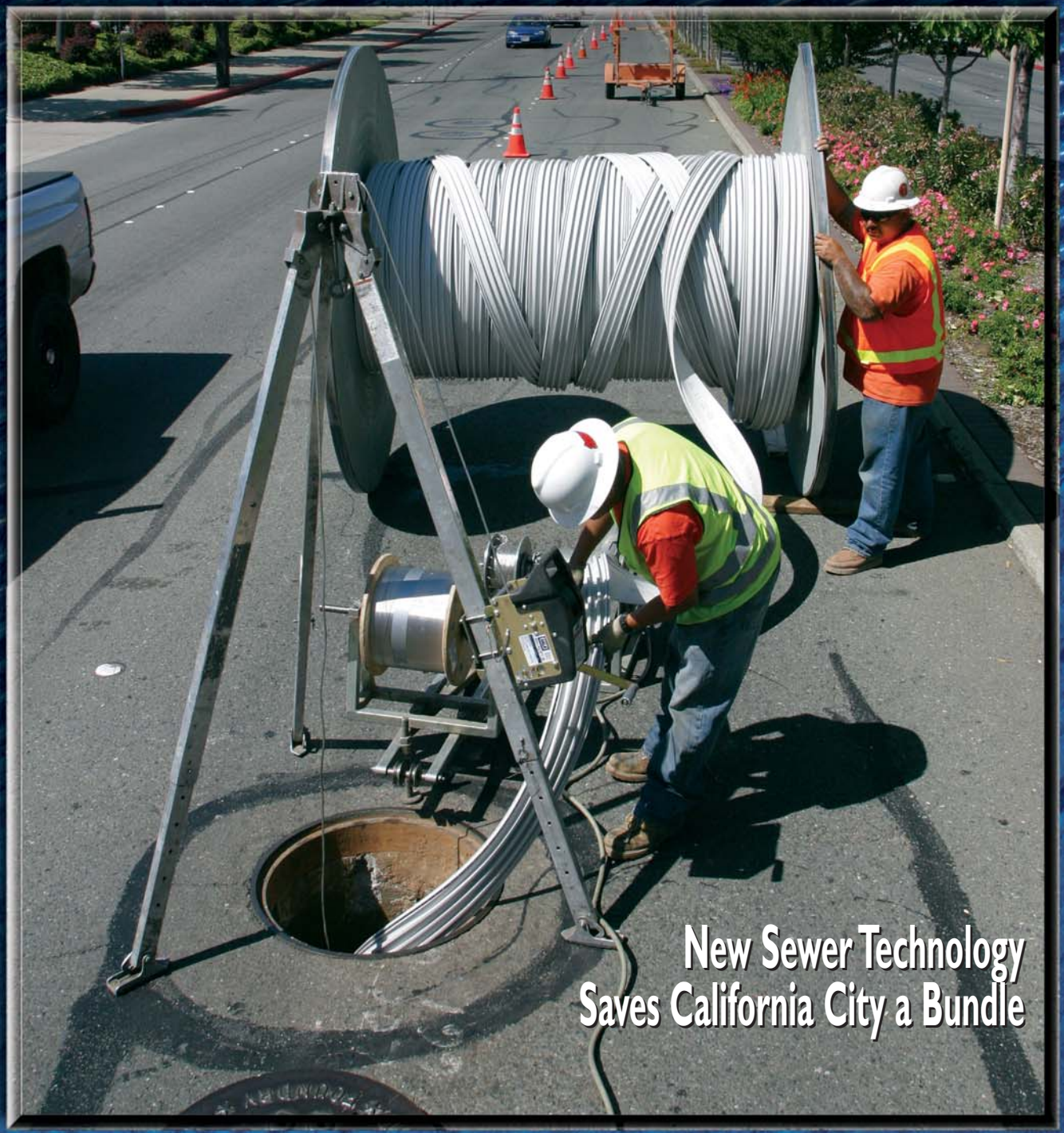

New Sewer Technology Saves California City a Bundle

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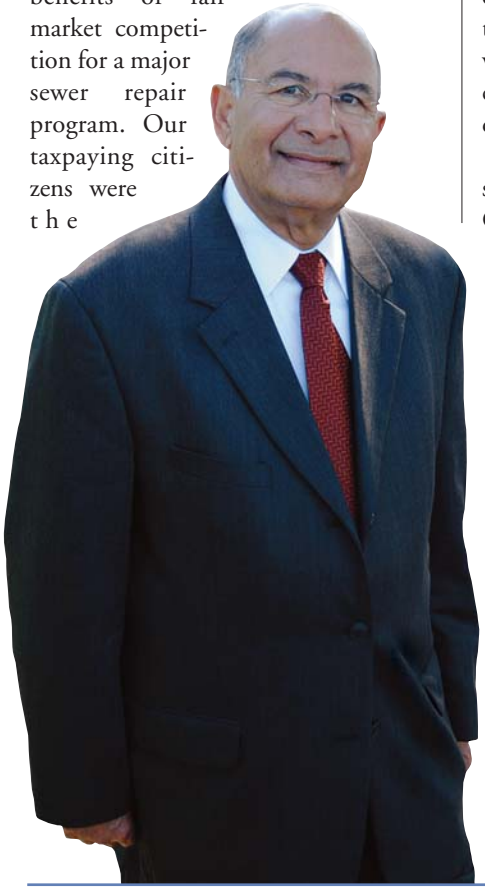
By Qamar Z. Khan

All the way from the Land Down Under, this new approach to sewer rehabilitation saved over $26 million.

Competition is a wonderful thing. In a free market economy, companies are always competing to be the best, the fastest, the least expensive. Competition is a market force that helps drive down prices while simultaneously improving product quality or company service.

This is certainly true in the public works arena where a variety of trenchless pipe rehabilitation methods fight for municipal projects. Our city, Concord, CA, recently reaped the benefits of fair market competition for a major sewer repair program. Our taxpaying citizens were the winners as we completed a significant pipe rehab job for less than half the projected price.



Qamar Khan, Director of Public Works, Concord, CA.

For many years Concord had problems with a leaking, deteriorated sewer infrastructure. A thorough inspection and capacity study of the city's sewers between 1999 and 2002 revealed that many of our 12-in. and larger concrete pipes were severely damaged by hydrogen sulfide attack. Our smaller clay pipes, while not themselves damaged, were nonetheless leaking due to the corrosion of the joints between the pipes. Many of these small clay pipes were in a high-water-table area, so groundwater inflow created a significant and expensive burden on our wastewater treatment costs.

After gathering all the data, we considered various rehabilitation options. Cured-in-place pipes (CIPP) and dig-and-replace were the obvious alternatives, but both were expensive. When we calculated the cost of the materials, installation, by-pass pumping, traffic issues, and street repairs, the cost estimates came in at nearly $50 million. For Concord, a city of about 128,000, a $50-million phased implementation sewer reconstruction project would have taken 20 years.

Having lived and worked in Australia, I was familiar with a trenchless technology called Expanda™ by Rib Loc Pty Ltd (www.ribloc.com.au). The successful track record of this system "Down Under" has provided numerous cities in Australia with a proven alternative to pipe replacement at a fraction of the cost. I had never specified Expanda myself, but I knew it would be less expensive and faster to install because by-pass pumping and expensive mobilization is not required. With Expanda, lines can be rehabilitated with some flow in the line.

Workmen insert the Expanda profile into a manhole.

When it came time for bidding, the contractors compared Expanda against a CIPP technology and dig-and-replace methods. Because of the manpower and disruption factors associated with dig-and-replace, it was quickly eliminated from consideration.

That left the trenchless options. Having Expanda in the mix was fortunate for Concord because to be cost competitive, the CIPP providers had to

A spiral-winding machine located in an existing manhole creates a new Expanda pipe.

significantly lower their prices to remain competitive. The end result was a combination bid where the successful low bidder used Expanda when and where it was appropriate to do so, and used CIPP for the remaining pipelines. In our view this was a result of the city and contractor applying a "best-fit" solution to the project. It was a win-win result that saved Concord over $26 million.

But saving money was only one aspect of this successful project. Rebuilding our pipes solved several important problems and we did it with almost zero inconvenience to our community. The list of plusses from this project is impressive.

Elimination of I&I

Our leaky sewers were an enormous economic burden at the water treatment plant. Having to treat millions of gallons of ordinary groundwater at cost of $1,427/MG was a significant waste of financial resources. We knew that fixing the sewers would solve the problem and help pay for the project in cost savings at the treatment plant.

Like any PVC pipe, Expanda is watertight. Once the new liners were in place we saw an immediate and drastic reduction of water at the treatment plant. Now only wastewater is being treated. We estimate the annual savings at our treatment plant this year at approximately $100,000.

H2S Attack

Before we installed the PVC pipe, our concrete pipes were in shambles. Hydrogen sulfide gasses had eaten away much of the cement concrete. The crown of many of the pipes at places was virtually gone and exposed rebar was the only thing preventing street collapse in some cases.

Because the new pipe is made of PVC, we no longer have to worry about hydrogen sulfide damage because PVC is virtually impervious to H2S attack and has excellent structural strength. It is designed to handle live and dead loads and be a free-standing structure, so sink holes or cave-ins due to soil voids caused by leaking pipes are now extremely unlikely. And the long life expectancy of the PVC pipe (50 year design life) means we won't have to worry about this issue for decades, another plus for our taxpayers.

Rehab Hassle

Sewer reconstruction can be among the most costly and inconvenient of all public works projects. Street disruption, excavation, lots of heavy equipment, and liability issues are just a few of the concerns. Sewer work can take months and disrupt service for days at a time. Thankfully, we avoided all those problems.

The fact that the Expanda technology, in most cases, does not require by-pass pumping makes the process faster and less expensive. There are no by-pass lines on the ground, no ramps for cars to drive over, and no extensive public information campaign to prepare the citizens for massive inconvenience. Installation is typically done in existing manholes with minimal equipment and manpower. It's also fast. Crews can install lengths of 300 to 500 ft in a few hours.

We also appreciated the fact that there are no chemicals, fumes, or hot water needed for an Expanda installation. That means no odor and no disposal of contaminated hot water. And unlike CIPP technologies, if there is a problem with an Expanda installation, you can easily back out the pipe and start over.

Solving our underground pipe problem was a tremendous relief for our city. The project taught us some important lessons. The most important lesson: competition is good. When technologies compete against each other, the taxpayer wins. GE

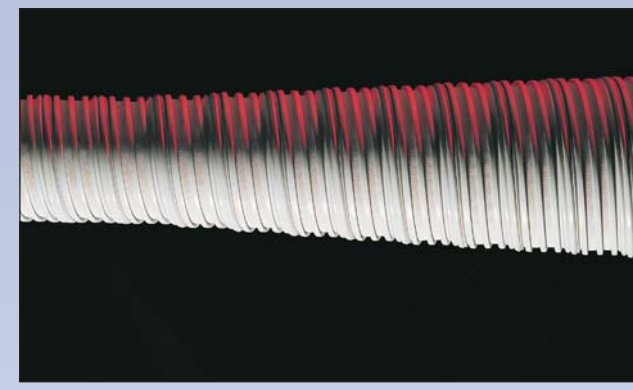
Mr. Khan is the Director of Public Works, Concord, CA.

The new Expanda pipe is made of hydrogen sulfide-resistant PVC.

How Expanda Rehabilitation Works

Expanda is a trenchless pipe rehabilitation technology, developed in Australia in 1983, as a revolutionary process by which the efficiency, reliability, and integrity of aging sewers, storm drains, and culverts can be quickly improved with minimal disruption and expense. To date it has been used to structurally rehabilitate more than three million linear feet of buried pipe in 30 countries around the world.

Expanda provides a "close-fit" structural liner and is suitable for non-pressure applications. It is commonly used for drainage, sewer, and road culvert applications from diameters of six in. to 30 in.



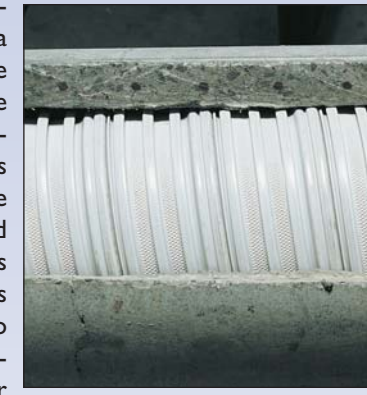
Rib Loc extrudes the pipe-grade PVC profiles in a factory environment where the quality of the process can be closely controlled and monitored. All seals required for the performance of the profile are also applied in the same environment. This ensures that Rib Loc is able to produce a product of high quality and consistency. Several different sizes and configurations of plastic profile are available to provide a structural liner that meets the size and load carrying requirements of the design.

Installation is fast and easy. Multiple lines can be rehabilitated in a single day in lengths exceeding 500 ft. The mechanical installation process also allows the existing sewer to continue to function during the installation process. This eliminates the need for bypass pumping and the risks associated with sewerage spills during construction. Minimal on-site equipment, operating at noise levels less than 75 decibels, and the fact that no chemicals, hot water, or steam are used during the installation enables the Expanda process to be used in residential neighborhoods with little or no disruption to the people in the project area.

The process uses a single truck set-up that can either be positioned at the manhole access point, or as far away as 300 ft should the manhole be in an inaccessible location.

The spiral-winding machine, specially designed to fit through standard manhole openings, is lowered within the access chamber and is used to wind a liner at a constant diameter within the existing host pipe. This diameter is set to be smaller than the host pipe.

After the liner is wound from one manhole to the next, the end of the liner is held in position and the radial expansion process commences. Through a patented process, the edges of the profile are then freed to slide relative to each other as the winding machine continues to wind more profile. It is this mechanical process that causes the liner to expand. Expansion continues until the liner contacts the wall of the host pipe. The lock contains a slow setting lubricating sealant that, until it sets, aids the expansion process by performing the function of a lubricant.



This process means that Expanda provides a maximized internal diameter liner, with a circular cross section and constant wall thickness irrespective of the size and shape of the deteriorated host pipe.

A combination of expanding urethane chemical grout and sulfide resistant cement is used to create a watertight end seal at each end of the liner pipe. Lateral connections to the mains can be remotely cut, then, if required, sealed with polyurethane or other approved types of sealant.

The end result is a seamless, watertight, full-bore structural liner, resistant to chemical attack and with a 50-year service life.