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Inspection camera aids tricky pipe rehab project

BY: MARY SHAFER



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The pipejack

Tiburon, Calif., is named for the sharks that cruise just offshore this hilly peninsula in San Francisco Bay. Contractor Gary Miksis, president of Miksis Services Inc. of Healdsburg, Calif., may have been thinking of their destructive jaws when he saw gaping rot voids in a 500-ft run of pipe with his **TrakSTAR mainline inspection camera system** during a troubleshooting inspection he was called out to perform in conjunction with a repair for a desperate local homeowner.

The homeowner feared her home might collapse into the steep hillside rapidly eroding beneath it as water gushed from the 50-year-old corroding storm drain. One hundred feet of residential line off a Y-connection from the main line about 400 yd uphill was rotting out beneath her, threatening her foundation, retaining walls and driveway.

Tough Scenario

A local contractor had tried to televise the line, but kept losing the camera in the large voids, so they called Miksis and his crew to rehabilitate the bottom rot. With a restored floor, they could create a host shell for pipe rehabilitation and televise the whole line using Miksis' **R.S.Technical TrakSTAR camera** on a TranSTAR tractor to determine the best method for rehabilitation.

They pushed a 1-in. PVC pipe through the line underneath and ahead of the camera and tractor. At the first void encountered, they began feeding a slurry of Quadex Restore grout through this PVC with a pump. This cementitious grout, normally used for rehabbing manholes, was chosen for its fiber mesh-enhanced strength and favorable flow characteristics.

"We're familiar with it and know how to tweak our mixtures for great control," Miksis said. The grout also sets up to withstand camera workability in just two hours, with full cure in four hours.

They pumped in 10- to 15-ft sections, squeezed the grout level, went off to work on other jobs while it set up, then returned to do the next section. Directly beneath the driveway and retaining wall, they ran into the largest void—about 25 ft—on a rather steep incline, thickening the grout consistency there to avoid creep during setup. They completed the host pipe rehabilitation in two to three days.

Limited Options

It was clear to Miksis there would be just one no-dig repair option. CIPP would not have fit tightly enough and slip-lining would not have been possible with the three major bends in the line. Miksis decided on a PVC fold-and-form solution and ordered a reel of 12-in. flattened PVC pipe, which would be steamed to 220°F to make it pliable. His team would winch it through the host pipe, still flattened, then heat the ends enough to insert a pig (plug) in each end. Finally, it would be heated and inflated to its full diameter.

The problem with the fold-and-form method is that the steamed, pliable pipe is delicate and vulnerable to punctures from any snags in the pipe. After grouting cured to allow the full **video inspection**, the Miksis team discovered just such a hazard, which they would have to fix before moving forward with the pipe-within-a-pipe repair.

Near a joint about 40 ft into the pipe, the original tube had been punctured by a backhoe tooth on its ceiling, which was now protruding about 2 in. into the pipe. This was almost directly under the driveway near the retaining wall, likely a main cause of the massive erosion.

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Miksis decided that a Porta-Power hydraulic jack would do the trick, but how to get it into place? They built a football-shaped skid and pushed it into place with 41/40 rigid steel sewer rods connected and extended as needed.

It took several hours to create the carrier on a shop workbench—designing, cutting and welding the 10-in.-tall carrier on a roughly 2-by-3-ft base with a push shoe. The jack head was about 1.5 in. in diameter on a 4-in. diameter base about 9 in. tall. It was mounted sturdily to the carrier and its 10-ft hydraulic fluid hose connected using regular couplers to a .25-in. jetting hose for power. Once onsite, it only took about 10 minutes to move it into position and force the deformed corrugated host pipe back into place.


Total project duration for approximately 500 ft of rehabilitation was about three weeks, including installation of a manhole behind the house to access the cul de sac inlet connection. Grouting and fold-and-form took about a week.

Miksis enjoyed the challenges, especially engineering the jack carrier. “You’re always making it up as you go,” he said. “You have to be okay with taking each step at a time. Inspection technology helps tremendously on tough projects like this. A trenchless rehabilitation might not have even been attempted, let alone accomplished without the aid of our **R.S. Technical inspection systems**. This technology has opened up a whole new area of opportunities for us in the world of pipeline assessment and renewal.”

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The pipejack



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