

# Miksis Services Gets Creative With Corrugated Steel

By Mary Shafer

**T**iburon, California is named for the sharks that cruise just offshore of this hilly peninsula in San Francisco Bay. Contractor Gary Miksis, President of Miksis Services Inc. of Healdsburg, CA, may have been thinking of their destructive jaws when he saw gaping rot voids in a 500-foot run of 12-inch corrugated metal pipe with his TrakSTAR mainline inspection camera system from R.S. Technical Services, Inc. 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 fifty-year-old corroding storm drain. One hundred feet of residential line off a Y-connection from the main line about 400 yards uphill was rotting out beneath her, threatening her foundation, retaining walls, and driveway.

## UGLY SCENARIO

A local contractor had tried to televise the line, but kept losing the camera into 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 one-inch 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," says Miksis. 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-foot 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 of about 25 feet, on a rather steep incline, thickening the grout consistency there to avoid creep during setup. They completed the host pipe rehabilitation over two to three days.

The problem with this 'fold and form' method is that the steamed, pliable pipe is very delicate, 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 they'd have to fix before moving forward with the pipe-within-a-pipe repair.

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

#### SEAT OF THE PANTS

Miksis decided that a Porta-Power hydraulic jack would do the trick, but

position and force the deformed corrugated host pipe back into place.

Total project duration for approximately 500 feet 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 says. "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 RST 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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#### LIMITED OPTIONS

It was clear to Miksis there would be just one no-dig repair option. CIPP wouldn't have fit tightly enough, pipe-bursting doesn't work on corrugated steel pipe, and slip-lining wouldn't have been possible with the three major bends in the line. Miksis decided on a PVC fold and form solution, ordering a reel of 12" 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.

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-inch tall carrier on a roughly 2x3-foot base with a push shoe. The jack head was about 1.5-inch dia. on a 4" dia. base about 9 inches tall. It was mounted sturdily to the carrier and its 10-foot hydraulic fluid hose connected using regular couplers to a 1/4-inch jetting hose for power. Once onsite, it only took about ten minutes to move it into

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