



SPECIAL WEFTEC 2006 PRE-SHOW ISSUE

Closed-loop water-jet system cleans sewer main odorlessly

Oakland, Calif. project completed in record time

OAKLAND, Calif. — When you're trying to inspect a thousand or so feet of an ancient five-and-a-half-foot diameter sewer main and you find it's more than half filled with rock-like sediments and debris, it tends to slow things down.

That's what corrosion expert Jose L. Villalobos faced last winter when his Oakland, California-based company, V & A Consulting Engineers, Inc. (www.vaengineering.com), was trying to complete a condition assessment for that city's Public Works Agency (PWA).

The assessment was part of a program to make sure the sewer facilities around Broadway and 20th Street, mostly dating from around 1920-30, would be in shape to meet the future needs of the city's rapidly redeveloping central downtown district.

"Our main mission at that point was to get the pipe as clean as we could, inspect it with closed-circuit TV, and identify any problems and necessary fixes so the city could move ahead with its rehab program," Villalobos explained.

But like many old large-diameter sewers, the one under 20th Street probably hadn't been cleaned since sometime early in the Cold War, if ever, and the assessment project stalled when the line proved too clogged to admit the CCTV camera.

"Getting all that sediment out with a conventional bucket machine could have taken months, if it could be done at all," Villalobos notes. "Meanwhile, you'd have a thousand feet of bypass piping obstructing traffic, and the transfer of solids to the disposal truck would be generating sewage odors for the public and complaints for PWA. It was a big problem."

That's when Villalobos learned about the Sewer Hog.

Not a pink animal, but a large red machine, the Sewer Hog is a patented high-power water-jetting system, specifically designed to do large-scale sewer cleanouts and similar tasks without taking the line out of operation and without the rank odors that usually accompany such jobs. Villalobos was interested enough to visit Colorado Springs, where Texas-based Garner West (www.garnerwest.com), the system's designer and manufacturer, had been contracted to clear out some 1900 ft of a badly clogged 66-inch interceptor sewer — the same size, conveniently, as the one in Oakland.

The city had tried cleaning the pipe with a kite — a windsock-shaped device for hydraulically cleaning sewer



Jet setters. Workers in Oakland, Calif. are operating the Sewer Hog™, a patented, high-power water-jetting system specifically designed to clean out large-diameter sewers without taking the line out of operation and without releasing offensive odors to the surrounding area.

lines — but the device hung up on something and was badly damaged during retrieval. Furthermore, the debris had not been removed, merely relocated.

"There had been concern over possible spills and seepage of raw sewage, because the pipe ran under a creek and directly to a lift station," Villalobos said. "But they managed to remove all the debris while the sewer was online and without any leaks or spills."

Impressed, Villalobos arranged for Garner to send a unit to Oakland in early April. "We could see these guys had done it right," he says. "They didn't skimp around and they made the equipment beefy enough to withstand the rigors of a wastewater system. If it worked the way we hoped, we would be able to get the data PWA needed, and also see a good demonstration of the technology."

The system's power and flow volume are the key, according to Kent Ford, Operations Manager at Garner West, who handled the Oakland assignment. "Most off-the-shelf jetters supply about 80 to 120 gpm. Then you

allow for the line loss, and that's just not enough flow to move some of that material."

The Sewer Hog addresses the problem with a 600-hp engine that generates a water flow of 350 gallons per minute (gpm) at a pressure of 2000 pounds per square inch (psi) to a 200-pound nozzle

parked at curbside, but most hardly seemed to notice there was anything going on at all. The cleanout was finished in a record-setting four days, without interrupting service and, as promised, essentially odor-free. "They operated for a week," says PWA project manager Gunawan Santoso, P.E., "and

"Many are so obstructed that they only function at a fraction of their nominal capacity. The sewer under 20th Street is over five feet wide, so it should be able to handle 32 million gallons a day, but before we cleaned it the actual capacity was down to 12 mgd. Regaining the designed capacity helps reduce sewage overflows."

The Sewer Hog addresses the problem with a 600-hp engine that generates a water flow of 350 gallons per minute at a pressure of 2000 pounds per square inch to a 200-pound nozzle via twin 1¼" hoses.

via twin 1¼" hoses. The nozzle is inserted into a manhole and maneuvered upstream under its own power. As it's drawn back, the intense downward spray generated by the nozzle blasts the embedded materials loose and the 350-gpm flow forces them down the sewer pipe to the manhole.

A powerful 6-inch downhole grinder-pump — picture a kitchen garbage disposal on steroids — then chews up everything, including plastic, metal, bricks and rocks, and shoots the resulting slurry through an 8-inch-diameter hose, at up to 2500 gpm, up to the Grit Gator, a sealed, pressurized dewatering box at street level.

The patented Grit Gator is what makes the cleanout odor-free. "It's a closed-loop, odor-containing system," Ford explains, "pumping up via an 8-inch hole to a totally sealed 30-cubic-yard container. The positive pressure removes 99 percent of the sand and grit and whatever else is in the water, while the filtered water, 99-percent particle-free, is simultaneously decanted back to the sewer line."

The equipment was set up near the Oakland BART station at 20th Street and Broadway on Tuesday, April 4, and cleaning started immediately. "We were sweating bullets," Villalobos recalls. "Anything can happen when construction work is going on, and here was probably the most massive sewer cleaning project ever done in this city, in the heart of the downtown business district, and right next to one of its busiest rapid transit stations."

He needn't have worried. A few passers-by seemed curious about the 60-foot array of bright red machinery

we didn't have a single complaint."

Work continued over the weekend, switching mid-assignment to a connecting 24-inch pipe that was found to be almost totally blocked with rags and other debris. The change of plan meant the cleanout of the main sewer line had to be less complete than planned, but enough material was removed to allow V&A's inspection to be completed, essentially as planned.

Meanwhile, 46 tons of sediment had been removed, and since the material was dry enough after dewatering in the patented Grit Gator debris box to pass the EPA's Paint Filter Liquids Test, it could be sent to a nearby landfill with no further solidification treatment.

"Due to available funds we only had a limited time to work," Garner's Kent Ford explains, "but it was enough to demonstrate that the technology can clean a difficult large-diameter pipe without bypass pumping and without putting odors up in the air."

By eliminating the need for bypass pumping, Villalobos believes, the closed-loop may offer a very cost-effective solution to a problem that affects sanitary districts across the country. "A lot of the older cities have large sewer lines like the ones in Oakland," he says.

The problem, he believes, is simple neglect—"deferred maintenance," in agency jargon. "There's always a huge backlog of things that need fixing, and the wastewater infrastructure is largely underground, out of sight and easy to overlook." The good news, he says, is the advent several years back of GASB +34, the rule change that requires state and local governments to report the value of their infrastructure assets in detail on an accrual accounting basis.

"Thanks to GASB 34, a lot of major public-works assets, in a lot of jurisdictions, are going to be getting the overdue attention they deserve," Villalobos says. "I think we may find the Garner



Job completed. Once the Oakland sewer main was cleaned, product collected by the patented closed-loop Sewer Hog™-Grit Gator "Paint Filter-dry" process was disposed in a landfill without further treatment.

West Sewer Hog technology has turned up just when it's most needed."

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