



CASE STUDY

HERCULES SHUTOUT MANHOLE LUBRICANT AND SEALANT



OATEY PARTNERS WITH CALIFORNIA SANITARY DISTRICT TO DEVELOP UNIQUE MANHOLE SEALANT/ LUBRICANT TO CUT INFLOW WHILE REDUCING WORKER INJURIES

Truckee Sanitary District (California) identifies leaking manholes during heavy-rain events as the cause of serious system Inflow spikes; then leverages the Oatey Idea Portal to recommend an innovative manhole sealant that has helped solve the problem.

TRUCKEE SANITARY DISTRICT

PROBLEM

TRUCKEE, CALIFORNIA — The Truckee Sanitary District (TSD) is the public agency responsible for collecting and conveying wastewater in the greater Truckee area, located outside of Lake Tahoe, California. Serving a population of approximately 25,000 people in a 39-square-mile service area, the TSD collection system contains about 200 miles of sewer mains, 16,000 laterals and 43 lift stations.

A major challenge sanitary districts everywhere face is Inflow & Infiltration (I&I); i.e., when unusually large amounts of groundwater and stormwater enter the sewer during periods of heavy rain, causing pump stations and treatment plants to become strained and less efficient. I&I, when severe enough, can also result in sanitary sewer overflows and backups into homes subjecting sewer agencies to costly claims and/or fines from regulators.

TSD General Manager and Chief Engineer Blake Tresan explains that, although the TSD sanitary sewer system is designed to convey a large amount of wastewater, it still saw significant and problematic spikes in flows during rain events — despite their best efforts and use of all available technology.

“The spikes in flows happened almost concurrently with rain events,” says Tresan. “It would rain, and data from our real-time flow meters would almost immediately indicate a spike in flows. As soon as the rainstorm ended, the flows would quickly go back to normal levels.”



According to Tresan, the water was not infiltrating through the system’s pipes for the simple reason that they are buried six feet underground. If that were the main route, he notes, “it would take much longer for that rainwater to get there.”

Also, were the I&I flow coming through the buried portion of the pipe and manhole network, the flow increase would have been delayed until groundwater levels had increased. In addition, I&I would have continued after the rain event until groundwater levels subsided.

The conclusion? The I&I flow appeared to be coming through parts of the collection system exposed to surface run-off. “The only place where the sewer system meets the ground surface is at the top of manholes and lateral cleanouts,” says Tresan, “so we decided to zero in on the manholes as a likely source of I&I.”

TSD field supervisors Matt Ruge and Ryan Clifton and their crews conducted smoke testing of the sewer basins that experienced the highest rate of I&I during the rain events. The smoke testing showed that the largest and most common openings in the collection system appeared to be through the manhole frame and cover interface. Of the 200 manholes included in the initial smoke testing basin, approximately 90% of them leaked between the frame and cover.



“It was surprising, because we have always specified manhole covers with integrated o-rings, which we assumed created a watertight seal,” explains Tresan.

Further testing showed that small deviations in the casting sizes or the presence of debris created openings in the frame and cover, allowing surface water to enter.

At that point, a simple idea occurred to Ruge: “Wouldn’t it be nice if we could apply some type of sealant or lubricant to the manhole frame to completely fill that inner void.”

SOLUTION

The TSD team knew it was on to something when they applied a pipe joint lubricant to the manhole frame — and it actually worked. Then came another problem.

“The pipe joint lubricant dried out and washed away over time,” Tresan recalls, “and it didn’t really have a long-lasting effect, so we decided we should try another product.”

After additional research, the Truckee team ended up trying Hercules Pro Dope, a petroleum-based thread sealant manufactured by the Oatey Co. “Not only did it work as well as the pipe joint lubricant,” says Tresan, “but it had much longer-lasting effects.”

THE NEXT STEP

TSD briefly contemplated doing their own product development, “I looked at all of the literature to see if anybody was selling anything like this product,” says Tresan. “Nobody was, so we discussed trying to go down this road by ourselves. But, in the end, we all have full-time jobs here. The best bet was to reach out to Oatey and tell them they had a product that we thought they could repurpose for another sewer-related application.”

TSD submitted their I&I product solution on Oatey’s dedicated [Idea Portal](#). Oatey had created the latter as part of its ongoing effort to remain on the cutting edge by developing superior, safer products.

“OATEY HAS BEEN EXTREMELY GENEROUS, ALLOWING US TO ENTER INTO A PARTNERSHIP TO DEVELOP THIS PRODUCT.”



Through the online portal, Oatey encourages new ideas, as well as new inventions and patents from both customers and the inventor community.

Tresan reports that “Oatey has been extremely generous, allowing us to enter into a partnership to develop this product. After submitting the idea, Oatey responded in less than 24 hours, indicating they were interested.”

Ultimately, Pro Dope served as the stepping stone to a new product: a nontoxic sealant/lubricant that could be applied to manhole frames: Hercules Shutout Manhole Lubricant and Sealant.

RESULTS

“After we applied a bead of this product to the frame, a perfect seal was created when the manhole cover was installed,” explains Ruge. Smoke testing confirmed that the sealant/lubricant application resulted in a completed air and watertight manhole frame and cover interface, delivering three major benefits:

1. Inflow reduction: According to Ruge, his crew applied the product to all the manhole frames and covers in several sewer drainage basins and left other drainage basins untreated. “After a large rain event,” he says, “those basins that had been treated showed a significantly lower increase in flows due to inflow than the untreated sewer basins.”

2. Collection system worker injury reduction: “Manhole covers get corroded and rusted, which can make it extremely difficult to open,” explains Ruge. “To open a stuck manhole cover, we have to pull harder on the manhole pick while simultaneously hitting the cover with a steel mallet.” This approach can result in two types of collection system worker injuries. The first is acute lower back or shoulder injuries from applying excessive force on the manhole pick. The second is chronic hearing loss from the noise generated when striking a manhole cover with a steel mallet at close proximity. Application of the manhole sealant product

lubricates the two metal surfaces; thus, decreasing the force required to open the cover.

3. Easy application: According to Tresan, it is very easy to apply the product: “It takes a couple of minutes at most per manhole, including preparation.

“And it doesn’t require any training,” he adds. “We apply the sealant/lubricant with a caulking tube, and we perform the application as part of TSD’s regular operations and maintenance activities.”

Once applied, a manhole frame and cover remain watertight until opened. “Because the product is nontoxic, we don’t have to deal with any hazards/waste issues. Meanwhile, it works better than anything else, because it fills the voids.”

Inflow is a significant problem in collection systems. It results in oversized conveyance, pumping, treatment infrastructure and higher capital and operating costs. In addition, it inevitably increases the incidence and severity of sewer overflows and backups.

“Hercules Shutout Manhole Lubricant and Sealant helps avoid significant capital and operating costs and reduces the likelihood of sanitary sewer overflows,” says Tresan. “But, most important of all, this one-of-a-kind manhole sealant provides these benefits while improving worker safety. In the end, that is our number one concern.”



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