

Pipe Cleaning in Delaware

New Castle County Reduces Its SSOs Through Aggressive Approach

By Sharon M. Bueno

New Castle County, Del.,

has taken a proactive approach to its sewer maintenance needs over the last 30 years in order to provide better service to its 400,000 population and reduce the frequency and severity of its sanitary sewer overflows (SSOs).

The sewer maintenance section of the New Castle County (NCC) Department of Special Services is charged with this task, aggressively integrating the latest technologies and programs to combat the blockages and other problems encountered below the surface that result in SSOs and costly and repeated repairs.

Since 2008, NCC — at the behest of state and federal regulators — has established an aggressive preventative maintenance program to address its SSOs and sewer cleaning needs. Efforts over the last five years have resulted in a drastic reduction in SSOs caused by roots and fats, oils and grease (FOGs) by more than 70 percent. More than 500 miles of gravity sewer is cleaned each year. NCC's preventative maintenance program combines several specific points, including chemical root control, root cause analysis, enhanced FOG program and trunk line cleaning.

"All of these things working together have contributed to the success that we have seen in New Castle County for mainline blockage reductions, SSO reductions and basement backups," says Robert Roff, operations service manager of the sewer maintenance section. "Without chemical root control, we couldn't re-deploy crews to do the amount of cleaning that we need and increase the amount we are able to do. Without analyzing each and every problem we've had, we couldn't eliminate repeat problems and really attack our FOG hot spots, which has contributed greatly to grease stoppages. We have prevented trunk line SSOs."

NCC spends \$1.7 million (roughly about 23 percent of its operating budget) annually on the preventative maintenance program — a figure that Roff would like to see increased but understands the realities of budgeting during tight economic times. He has made the amount work but knows to keep on top of things that the county will have to spend more in the coming years.

"What we've done the last five years is learn new techniques and have become more efficient, allowing us to work within the framework of our budget," Roff said. "We have been able to re-deploy crews to other areas of the county and increase the amount of pipe we can clean in-house [due to these maintenance programs]."

Background

New Castle County covers 494 sq miles and is Delaware's most northern county, situated between Pennsylvania, Maryland and New Jersey. Home to City of Wilmington, NCC is the most populous county in the state, with a 400,000 population and 120,000 sewer customer accounts. NCC shares the wastewater treatment plant owned by the City of Wilmington, with 70 percent of the



New Castle County, Del., has seen a vast improvement in the number of SSOs since 2008, with its preventative maintenance program.

plant's flow coming from NCC's customers. The average daily flow from NCC to the treatment plant is approximately 62 million gals.

Roff's purview entails maintaining NCC's 1,700 miles of collector sewer, ranging 6 to 84 in. in diameter and 45,000 manholes. The two dominant pipe types of the sewer lines are clay (in the older sections of the county) and PVC (in the new sections of the county). The earliest clay pipe was installed around 1907, with most of the system being constructed post-World War II and updated during the 1970s.

"The general condition of our system is no different than any of our age and size in the country," Roff said. "We have the same problems, especially with the older clay pipe, which have a lot of root problems because of the joints. A lot of the infrastructure was built years and years ago in hard-to-access places and we have many trunk lines and interceptors that are a challenge to even access and clean."

NCC has 12 Vector jet trucks in its cleaning fleet, with three combination jet/vacuum trucks. On occasion, its power buckets

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are used to clean its trunk line, interceptors and siphons, located in remote and hard-to-access areas. Since 2003, NCC has used Duke's Root Control Inc. as part of its chemical root control program.

In 2003, NCC was approached by its environmental regulator, the Department of Natural Resources and Environmental Control (DNREC), which put the county under an order to rehab its oldest section — Brandywine Hundred — due to chronic issues, as well as addressing SSOs countywide, which at that point averaged in excess of five SSOs per 100 miles of sewer per year. The order contained detailed milestones NCC had to meet — including cleaning 500 miles of collector sewer — which were the basis for the more comprehensive preventative maintenance program created in 2008.

"In 2003, we had milestones to meet. The meat of what drove these programs didn't come until the amended order in 2008. That was really the driver in creating all of [today's] programs," said Roff, who has worked for the county for 11 years, with six years in his current position.

DNREC and the U.S. EPA came back to NCC in 2008, amending the 2003 order to reflect expanded requirements, such as trunk line preventative maintenance and the inclusion of developing a Capacity Management Operation Maintenance (CMOM) program. The CMOM Program includes: Trunk line preventative maintenance, chemical root control, CCTV system investigation, fats, oils and grease program and a corrosion control program.



New Castle County, Del., chemically treats more than 75 miles of sewer lines each year. Since 2009, SSOs due to roots have been reduced by 82 percent.

Ridding Roots and FOGs

Roots that infiltrate and intertwine themselves within any sewer pipe are devastating to the condition of the pipe, wreaking havoc on capacity, joints and overflows. Finding the minutest of all holes in a clay pipe, roots feed off the nutrients in them and can spiral out of control — unless they are chemically treated to stop their rampage. They can be mechanically cut but they will just grow back, usually thicker than before. FOG problems can be equally detrimental, reducing capacity and structurally damaging the pipes.

In prior years, NCC had used chemical root control in pilot projects, gauging its effectiveness. Before using chemical treatments, mechanical root cutting was the method of root control but just cutting the roots wasn't eliminating the problem. Crews would have to return to those neighborhoods when the roots grew back and go through the cutting process once again, Roff said.

With the amended 2008 order, NCC implemented a targeted chemical root control program, increasing the number of miles treated per year from 30 to more than 75 miles. Problem areas were identified and addressed. Following the treatment program in which the chemicals are on a two- and three-year schedule, Roff discovered another benefit to treating pipes in this manner — using his employees more effectively, widening the swath of maintenance.

"Because we don't have to keep going back to those same neighborhoods every six months to mechanically cut the roots, I am able to re-deploy the crews to other areas of the county. We have increased the amount of pipe we can clean," he said. "Chemical root control has been very effective in those neighborhoods that have been treated."

In 2008, roots were 32 percent of all SSOs and FOGs were 34 percent — the biggest factors in NCC's dry weather overflows. While they are still the Top 2 reasons behind SSOs, the number of SSOs has gone down exponentially due to the reduction of the roots and FOGs in the system. "Since 2008, we've been able to drop all SSOs of every type by 70 percent and since 2009, SSOs due to roots have dropped by 82 percent," Roff said.

By bringing the roots under control, NCC has also been able to see other underlying problems that were masked by the root intrusion — such as FOGs and sagging pipes. "Through CCTV and analysis, we now find other problems we never knew about" because the roots had been the initial cause of blockage, Roff said.

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When dealing with mainline blockages, NCC uses its CCTV program to televise three sections of the line to identify what caused the problem — was it roots, a structural failure or FOG? “The goal is to reduce repeat occurrences of SSOs in the same spot,” Roff said. “It’s important to really understanding what caused the problems”

Also critical to the program is the trunk line and interceptor cleaning, which focused on the 18- to 36-in. structures in the wooded areas and easements, not easily accessible. This work, which is mostly contracted out, has enabled NCC to inspect, clean and identify significant structural defects and get them repaired. NCC cleans 15 to 20 miles of these structures each year.

“For years, everyone said the trunk lines were self-cleaning but that’s a bunch of bull,” Roff said, laughing. “We have found issues with our trunk lines through cleaning and have regained a lot of capacity in them. Every one we go in, we always find something.”

Program Success

Roff is more than pleased for the progression of the preventative maintenance programs now in place, establishing a sound foundation for the future. It takes the cooperation of the operations and engineering sections of the county working as a team to have a successful preventative maintenance program. He describes the process of implementing such programs as a marathon and not a sprint, noting you will not see overnight results. “You have to be patient. The results don’t always come right away,” Roff said. “It might take a few years but you do see the effects start to build.”



Chemical root control with Duke’s Root Control Inc. has been a critical part of the NCC’s preventative maintenance program.

Advice for other municipalities and utilities starting a comprehensive program? “Remember that everything you do works together,” Roff said. “It’s hard to implement any one of these programs by themselves. You have to look at the big picture and see how they work together.”

Sharon M. Bueno is managing editor of *Trenchless Technology*.

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