TECH TIPS FROM NASSCO

Tech Tips by NASSCO is a bi-monthly article on trends, best practices and industry advice from NASSCO's Trenchless Technology Membership professionals.

PREVENTING THE "BLOWN TOILET"

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Anyone who has performed either emergency or preventative maintenance using high pressure flushing of their gravity sanitary sewer lines is familiar with the unhappy property owner who has experienced an "upset", or "blown toilet". The phenomenon, also known as "blowback", is rare, but happens with enough frequency that some municipalities neglect much needed preventative flushing programs due to the fear of an upset user or claim.

A blown toilet often results in the "sucking" of the water from a toilet trap or other trap, allowing sewer odor to travel inside of a building. In more severe cases, a toilet or sink can overflow and spray water inside the room. When this occurs, few property owners will understand that sewer cleaning operations are in their best interest. The best practice is to understand why this occurs, and take all steps possible to prevent this from occurring.

PREVENTING DAMAGE

The most important factors in preventing or eliminating the potential for personal property damage or resident complaint is operator awareness of the factors surrounding the task at hand. The three most critical factors that will directly impact the probability and/or severity of the upset that may occur are as follows.

1) The size, condition and grade of the pipe that is being cleaned.
2) The velocity or turbulence that is being created by the nozzle being used.
3) The depth of the sewer in relation to the fixtures inside of the home or business.

Pipe size plays an important role. Smaller pipes have a greater potential for higher velocities of water, which increase the vacuum effect responsible for sucking a lateral dry, or backing flow up the lateral into the home. Small diameter sewer lines ranging from 6"-10" are the most susceptible to a problem. Heavy debris and flat sewers can exacerbate the problem by restricting the nozzle water discharge area, thus decreasing the effective size of the pipe.

PRESSURE AND FLOW

Probably the most important factor is the velocity and turbulence that the cleaning action is creating inside the sewer system. The sewer system includes anything that is connected to the pipe you are cleaning, including the entire plumbing system of the homes and businesses connected to that line. An operator who is well trained in nozzle selection and usage will be far less likely to cause problems as he is aware of the nozzle performance in areas such as nozzle angles, flow, pressure, and speed.

Simply stated, if you're working in an area with known problems, throttle the engine down to reduce flow. Most operators use too much pressure and flow when making a typical cleaning pass. Something in the range of 800-1000 psi @ 30 gpm will do the trick on the majority of pipe sections. When conditions warrant more power, pick out a nozzle which provides an increase in pressure at a lower flow rate, as this will reduce the likelihood of a blown toilet.

There is no perfect configuration, as each pipe type, size, blockage, or many other factors will determine which combination suits the situation best. An experienced operator learns to manage pressure, flow, and speed to find the right combination for the particular situation. An operator with a "one-nozzle-fits-all" approach is not only at a much higher risk of experiencing blowback, but is also extremely inefficient throughout most of the tasks he will perform.

Although backflow preventers will virtually eliminate the potential for issues like this to occur, they are generally only installed when the top of the downstream manhole is lower than the lowest fixture, or when sewers are commonly overloaded by wet weather flows.

ELEVATION

The third factor, and one frequently overlooked, is the elevations of the sewer in relationship to the fixtures in the home and potential sub-grade plumbing. A shallow sewer with lateral connections at three and nine o'clock, on a minimum pitch with a basement bathroom, is the perfect storm for causing a disruption.

It is critical that the operator look at the depths of the sewers in the street and take a quick visual scan around the manhole sections, both upstream and downstream, to see if basements appear to be living spaces. Although basements are common in many areas of the country, they are not in others, so look for very shallow sewers with little pitch to the slab, if homes are built on slabs.

Remembering a few key points can mean the difference between a successful cleaning operation and unhappy property owners. Be aware of your surroundings, the sewer system you are working in, and what your nozzle is doing inside of the pipe. A written plan should be on file of how exactly to respond to, and investigate, a complaint caused by flushing. Then, if it arises, you will have a clear chain of command and can respond consistently with the right authority. Proper training and preparation will minimize the risk of blown toilets, and the results will be well worth the effort. Stay safe and happy flushing!

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