

JEPCO NEWS

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CAN VENTING HELP WITH MIC?

Microbe Induced Corrosion (MIC) is a serious problem in sewers, septic tanks, and other concrete structures. Within a few years, way before expected service life, the concrete inside manholes, pump tanks, and distribution boxes (D-boxes) can be corroded. In West Goshen Township, near West Chester, PA several manholes were corroded past the wire reinforcement, in only 5 years. They had to be repaired by pouring new concrete with a plastic liner at a great expense.



Corrosion of the concrete surface near the invert of a sewer manhole

What happened? A family of microbes (Thiobacillus bacteria) that live on a sewer gas called Hydrogen Sulfide (H_2S) colonized on the concrete surface and their waste, excreted as a nasty form of Sulfuric Acid (H_2SO_4), corroded the surface of the concrete.

These bacteria need sulfur, which is in the H_2S , oxygen and water to survive. They die without fresh air.

If you remove the sulfur, they die.

Or, if you remove the microbes, there is no corrosion. All of the links in the chain are required for MIC.

If they need oxygen to survive, how could venting, which will supply plenty of fresh air, help? Yet, the National Precast Concrete Association (NPCA) has research that shows that venting seems to help a lot.

Their study involves venting septic tank components to fresh air. Sniffers (sensors) are mounted in the vents to detect the H_2S . Normally, H_2S remains dissolved and contained within sewage, but with turbulence, the H_2S gas can leave the liquid and float freely in the air. It is heavier than air. You would expect it to settle to the lowest point. Somehow the gas is pushed up and out through the vents.

Perhaps it is the movement of the air in the system that carries the H_2S up and out through the vents. Every time the toilet is flushed, or the dishwasher cycles, or people shower, a gush of water flows down the pipes, pushing a wave of air ahead of it.

It is like cars passing on the road, stirring up leaves and paper as they speed by. Movement of the air, caused by the rushing water, stirs up the sewer gas, pushing it out through the vents. This eliminates one link and the chain is broken

By the way, H_2S is just one of many sewer gases. But it is the one that is involved with the corrosion. In combination with those hungry Thiobacillus microbes, it causes a serious problem: Microbe Induced Corrosion.

To reduce turbulence, another link in the chain, sanitary tees should extend below the liquid level in septic tanks. This includes inlets and outlets. Too often in pump tanks, the inlet has no tee. Effluent is allowed to free-fall. That splashing and turbulence is just begging for MIC.

If it is not possible to reduce turbulence, as in force mains, where sewage is pumped into the system, then the concrete has to be protected from MIC. One way, is to install liners to cover the surface with acid resistant plastic. This is best done at the time of manufacture. It CAN be done later, but it is tricky and expensive. Plastic liners add \$15.00 or more per square foot of surface. Done correctly they will protect the concrete from MIC. They have been known to peel off, which cancels their effectiveness.(Below)

There is a better way to prevent MIC. Concrete Sealants Inc. makes a liquid, ConBlock MIC, which prevents the microbes from establishing themselves on the concrete. Best Practice is to add a gallon per yard as the concrete is batched. Then, after installation, a spray of ConBlock MIC all over the exposed surfaces makes sure that those nasty Thiobacillus microbes cannot live there.

It is easy to do and very effective. No microbes, the chain is broken... No MIC.

Currently, Loudoun County in northern Virginia, is running a study where the D-boxes are topically sprayed with a tinted ConBlock MIC. Every D-box is coded and tracked, so that in the future, we expect no MIC.



PVC liner in a manhole. This was not installed correctly. Already, the joint is exposed due to a poor weld. In the worst case, the liner will fall into the base and block the sewer line.



Left-Concrete Riser with MIC. The attack causes concrete to change to soft white Gypsum, which looks and feels like mashed potatoes.



Right- Extreme MIC at the outlet of a septic tank. The concrete is eaten all the way through