

How To Build A Better Mousetrap Or Manhole Chimney

by Richard L. Kronick



With several decades experience in the precast concrete business, Dwight Wiedrich was very familiar with solving problems as they arose. So when a salesman pointed out some problems customers were having with the concrete rings used to build manhole chimneys, he took a swing – and hit a home run.

A manhole chimney serves a crucial function by making sure the manhole cover is flush with the street. The chimney is a connecting link, usually about one foot high, between the massive concrete or brick cylinder at the bottom and the cast iron frame and cover at the top of a manhole. For decades, workers have built manhole chimneys the same way – by stacking numerous thin concrete rings on top of each other to bring the manhole up to the level of the pavement.

Problems with concrete ring chimneys are legion. The rings weigh about 85 pounds each, requiring a skid-steer loader to move and place them. However, because they are so thin and fragile, they tend to break when moved. Furthermore, it takes some skill to build the chimney. After

it's built, crews have to wait for the mortar to cure before back-filling the area around the chimney, frame and cover.

After construction, concrete chimneys fall prey to three unavoidable enemies: traffic loading, water and sulfuric acid. Traffic volume and weight have steadily increased over the years. The water finds its way inside the chimney either by flowing through the hole(s) in the cover or by infiltrating through the ground. The acid is a product of bacteria that metabolizes the hydrogen sulfide in sewage. Under the pressure of this triple attack, eventually the concrete and the mortar fail.

Wiedrich explains that “the chimney is the weakest part of the system. Under attack by water, sulfuric acid and vibration from traffic, the concrete turns into a fine powder. The powder gets between the rings and whatever adhesive was used to seal them up – so the adhesive releases its grip.”

Ultimately the manhole caves in, creating an instant road hazard. Considering that there are 20 million manholes in the U.S., and about 60 percent of them were built before 1960, this is a major problem.

Looking for a better way

Wiedrich knew there had to be a better way to build a manhole chimney. In 1995, Wiedrich received a patent for the manhole chimney and founded Ladtech In. to market his invention. He serves as chief executive officer and Lana Wiedrich serves as president.

“I figured plastic was the way to go, so I began visiting manufacturers,” explains

Wiedrich. “I asked for a type of plastic that would withstand high and low temperatures, constant loading by heavy trucks, and the attack of water and sulfuric acid. PVC wouldn't work because it cracks at low temperatures. Rubber and composite materials were too expensive. And foamed plastics wouldn't stand up to the load. Then one guy mentioned high-density polyethylene (HDPE). We [Ladtech] looked at its characteristics and it seemed to be a fit. That was in 1992.”

After crunching some numbers, Wiedrich concluded that HDPE chimney rings were feasible. He spent the next two years working through the design process.

“Ladtech's computer expert gave us modeling information on impact and dead load, and we discovered that HDPE easily meets those requirements,” says Wiedrich. “A tougher question was: ‘How are we going to seal the rings together?’ The bottom ring has to bond to the concrete or brick manhole below; each ring has to bond to the next ring; and the top ring has to bond to the cover frame. Well, we tried every type of sealant we could find. We ended up with butyl rubber. It's the only thing that sticks to everything. Then we went through 82 versions of the ring profile that didn't quite do the trick. Version 83 was the one that worked!”

In 1995, Wiedrich received a patent for his invention called Ladtech Adjusting Rings.

Wiedrich says, “We suggest to agencies that they should always replace their chimneys when they open up manholes for any type of work. About 60 to 70 percent of sewer inflow enters either through the manhole casting or a broken chimney section. So that's the best place to put your money – it's the cheapest way to decrease inflow. We also point to our five-year warranty. Can they get that from the contractor who builds a concrete chimney? No! And yet people resist; they think it's going to be cheaper and easier to use some kind of spray or hydraulic cement to seal up the existing concrete chimney. But those products won't do any good if the concrete rings have deteriorated, and sooner or later they all do.”

Ladtech is enjoying fast growth, partly due to the influence of the federal government. The EPA has proposed a program called cMOM (Capacity Management Operation & Maintenance) as an addition to the Clean Water Act. If enacted, cMOM will require all sanitary sewer system operators to develop programs to monitor and control sewer system overflows. This will involve the rehabilitation of millions of failed manholes.

Wiedrich also owes his success to satisfied customers. More than 30 states and thousands of municipalities have officially approved Ladtech Adjusting Rings for use. Hundreds of thousands of the rings have been installed nationwide with zero failures reported to date.

NOTE: Richard L. Kronick is a freelance writer.

For More Information

Ladtech Adjusting Rings, 877-235-7464, ladtech.com

