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Build a better mousetrap — or manhole chimney — and then you'll have to prove it!

by Richard Kronick

LINO LAKES, Minn. — With a couple of decades in the precast concrete business, Dwight Wiedrich had solved lots of problems. So when a salesman pointed out problems with the concrete rings used to build manhole "chimneys," he took a swing — and hit a homerun.

A manhole chimney serves a crucial function. It ensures manhole covers are flush with the street. The chimney is a connecting link, usually about a 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 chimneys the same way — by stacking up however many thin concrete rings were needed to bring the manhole up to the level of the pavement.

Problems with these concrete-ring chimneys are legion. First, the rings weigh about 85 pounds each, so you need a Bobcat to move and place them. And when you do move them, they tend to break because they're so thin and fragile. Furthermore, it takes some skill to build the chimney — and, once built, you have to wait for the mortar to cure before you can back-fill 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 to 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 metabolize 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 there are 20 million manholes in the U.S., and that about 60% of them were built before 1960, this is a problem of major dimensions.

Down the chimney. Close-up of a repaired manhole with a chimney composed of several Ladtech ® rings. Ladtech photo

Wiedrich knew there had to be a better way to build a manhole chimney. "I figured plastic was the way to go, so I began visiting manufacturers," Wiedrich said. "I asked for a type of plastic that would withstand

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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 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 then spent about two years working through the design process. "We had a computer expert who gave us modeling information on impact and dead load and we discovered that HDPE easily meets those requirements," Wiedrich said. "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. Number 83 was the one that worked!" In 1995, Wiedrich received a patent for his invention, called Ladtech® Adjusting Rings.

Furthermore, Wiedrich discovered the best source of HDPE is recycled bottles (with recycling code 2). So not only are Ladtech® Adjusting Rings superior in construction, every year their use saves millions of inert plastic bottles from being thrown into landfills.

With the newly designed product, you might think Wiedrich would have it 'made in the shade.' But he says, "Once I can get people to try my product, they immediately see that it's superior. But the biggest challenge is getting them to try it! I'm working with civil engineers and public works people who tend to pride themselves on tradition. So even with all of the obvious benefits and all the testing we've gone through, it can be a tough sell."

"We suggest to agencies that they should always replace their chimneys when they open up manholes for any other work. 60-70% of the inflow in sewers comes through the manhole casting and the chimney section. So that's the best place to put your money — that's the cheapest way to cut down the inflow. We also point to our 5-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 just seal up the existing concrete chimney. But those products won't do any good if the concrete

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rings have deteriorated — and sooner or later they all do."

Wiedrich has stuck to his guns and his company is now growing faster than ever — partly under the influence of the federal government. The EPA has proposed a program called cMOM (capacity management operation and 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 overflows. This will necessarily involve the rebuilding of millions of failing or failed manholes.

But with or without help from the

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federal government, Wiedrich has many allies — his satisfied customers. More than 30 states and thousands of municipalities have already officially approved Ladtech® Adjusting Rings, and hundreds of thousands of the rings have been installed nationwide with zero failures reported to date.

Dwight Wiedrich knows he has a good product. But he also knows he will have to continue convincing public officials, engineers, and contractors the old-fashioned way — one at a time.

For more information, please contact Dwight Wiedrich, CEO, Ladtech, Inc., 6704 Meadowbrook Court, Lino Lakes, MN 55038, (877)235-7464, toll-free fax (866)387-7571, adjring@ladtech.com, www.ladtech.com.

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