

## For less disturbance, lower cost, think trenchless



*“We use liners whenever we can. They are more expensive, but we don’t have to tear up the road, and traffic can keep going through.”*

### FIXING A FAILING CULVERT

without excavation is a growing trend. It minimizes disruption, preserves the pavement surface, and can be less expensive. In some situations it may be the only viable method, or the best one, even at a higher direct cost. Sliplining with smaller diameter plastic or metal pipe is the most common approach.

Interstate highways saw some of the state’s earliest plastic sliplining projects. In St. Croix County, for example, former Highway Commissioner Dan Fedderley managed projects on six, 24”-36” diameter culverts. “They were 250-300 feet long and under very high fills, but we could do it without the traffic knowing there was anything going on below,” says Fedderley. In addition, the cost of sliplining was significantly less than excavation.

“I wouldn’t say you should slipline every pipe,” Fedderley says, “but as dollars get tight and full-fledged reconstruction is less possible, it’s a good economical option in some applications.”

For Chairman Paul Swart, Town of Koshkonong, it was the only option to fix a failing culvert under a dead end road. “We had 75 homes down there; only one way in and out; and no way of making a temporary road,” says Swart. “And utilities were in the way — power, phone, cable tv, and gas.”

Swart’s crews were able to thread two 30’ sections of new 4’ metal pipe through the old 6’ culvert, even though it was starting to deform. Calculations showed the smaller diameter was adequate because upstream changes had reduced the flow volumes. They were finished in a day and a half.

### Worth the cost

George Koval was worried. He had a 60-year-old culvert under deep fill and it was starting to sag. From experience the long-time Chairman of the Town of Keystone in Bayfield County knew he didn’t want to disturb that clay fill. Back in 1986 it took nearly 800

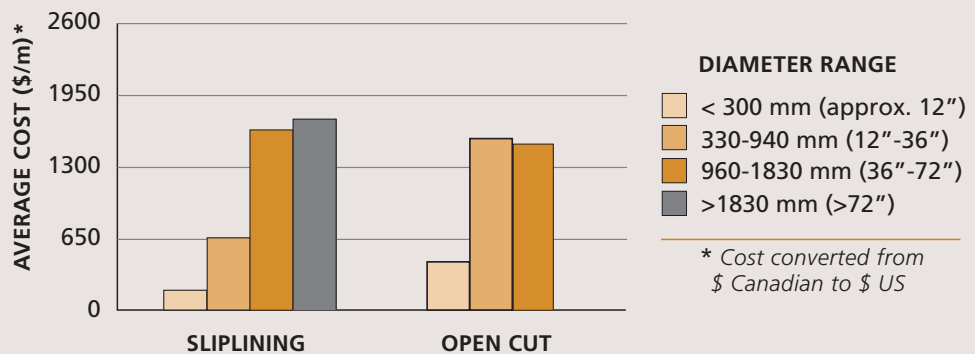
cubic yards of fill to fix it after a flood. A plastic liner could be the answer, but would cost almost twice as much as cutting a trench.

“My side board couldn’t see the extra \$10,000,” Koval says. After a couple meetings where they talked about other costs — for fill, pavement repair, and moving the buried telephone cable — along with the disruption from a long excavation project, and the relatively short service life of new metal culverts, they decided to go ahead.

In one day, the job was done. Town and county crews pulled plastic sections through the 165’ culvert, filled in between with grout, and finished the ends with rock riprap. “I’m really satisfied with it, and I can sleep nights again,” he says.

Bayfield County has installed more than 100 slipliners so far. “We use liners whenever we can,” says Keith Larson, Patrol Superintendent for the Bayfield County Highway Department.

### Relative Cost of Construction and Rehabilitation Methods



Source: Construction and Rehabilitation Costs for Buried Pipe with a Focus on Trenchless Technologies, Research Report No. 101, June 2002. Jack Q. Zhao; Balvant Rajani, published by Institute for Research in Construction National Research Council Canada Ottawa, Canada.



*Sliplining with plastic pipe left deep fill in place, and the crew finished in one day.*

“They are more expensive, but we don’t have to tear up the road, and traffic can keep going through.” He also expects a significantly longer service life. “Plastic probably will go for 75 to 100 years where 20 to 30 is the average for steel.”

The plastic pipe he uses comes in 19 or 21 foot sections. Crews push them through the old culvert with an excavator or “come-along,” snapping together the built-in couplers as a new section is needed. When the liner is in place, they pump slurry in between the two to fill the void and support the plastic culvert’s sides. Then they seal the ends with concrete and add a metal apron or other end treatment.

A slurry made with fly ash works best, Larson says. Sand tends to settle out. In situations with relatively little pitch to the pipe, they add silicon beads to the slurry to improve flow. “The silicon makes it so slippery it will flow through the old culvert where it’s rusted out and fill a void outside it,” says Larson.

### **Consider indirect costs**

While the installation cost for slipliners is generally higher, other direct costs are lower than open cuts, or are avoided all together. Traffic control, excavation, and backfilling are less; landscape restoration is the same, and pavement removal and restoration are avoided. Another cost to consider is safety: the risk associated with excavation and the expense of shoring up or stepping back trench walls.

The indirect costs of a project, though hard to put a number on, can also be significant. In addition to longer travel times for drivers, these may include loss of productivity; loss of business or revenue; and impacts to health and safety, public image, and esthetics. The minimal disruption of trenchless techniques may help satisfy these concerns.



*Traffic, utilities, and pavement are undisturbed with sliplining*

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