Plastic culvert liners cheaper, easier

You can rehabilitate deteriorating metal culverts by installing plastic liners. When culverts are still round, but rust or bacterial action has weakened them, plastic slip-lining can be cheaper, faster, and easier than excavation and replacement, according to a WisDOT report, *Culvert Pipe Rehabilitation Using Slip-Liners.*

Slip-lining has been around for many years. In a 1994 project, WisDOT rehabilitated a number of culverts, including corroded aluminum culverts, under high volume roads. Three types of HDPE and PVC pipes were installed in Juneau and Marathon Counties. When the culverts were inspected three years later, all but one of the liner types were performing adequately and showed no deterioration.

Plastic liners are an economical alternative to culvert replacement.

Slip-lining was 52% less expensive than conventional metal culvert replacement which involves excavating, replacement, backfilling and paving. During road reconstruction slip-lining is about 4% less. This does not calculate any costs for detouring traffic or for traffic delays or potential crashes associated with traditional excavation and replacement.

Plastic liners have higher flow rates than corrugated metal. Grout fills the cavity between liner and culvert.

Hydraulically, reducing culvert diameter with a liner can be offset by the plastic's higher flow rate. It is smoother, so a smaller culvert can often carry as much water as the larger corrugated metal culvert it is replacing. Inlet control can be a problem and should be evaluated.

While the plastic liners are relatively simple to insert using common highway department equipment, grouting between the liner and the old culvert generally has been done with a concrete pump. It can be expensive because there are not many alternatives available.

For a copy of the report, ***Culvert Pipe Rehabilitation Using Slip-Liners,*** *#WI-01-97, contact the WisDOT, Pavements Section, 3502 Kinsman Blvd., Madison, WI 53704.*

Inspect culverts regularly

It is easy to ignore culverts until the road surface sinks over them and there is an emergency. Rust and bacteria (in north central counties) take a toll on galvanized steel culverts, and road salt can seriously damage aluminum culverts under higher volume roads. Routine culvert inspection allows you to plan and budget for their replacement. WisDOT corrosion specialist Bob Patenaude developed the following rating scale. Concrete and aluminum culvert scales are available.

To get corrosion rating sheets for concrete, aluminum, and steel culverts, call, fax or write the T.I.C.; see page 7.

Corrosion ratings for zinc galvanized steel pipe

Rating	Condition of pipe
0	No corrosion. Galvanizing or cladding intact.
1	Staining or surficial oxidation. No pitting.
2	Moderate rusting. Rust flakes tight. Possible nodules. Minor pitting.
3	Fairly heavy rusting. Some scale. Nodules. Some pitting.
4	Heavy rusting. Rust scale easily removed. Deep pitting but metal is sound.
5	Heavy scale. Deep pitting. Unsound areas easily penetrated with pick end of geology hammer.
6	Small perforations in pipe.
7	Large perforations in pipe.
8	Invert gone from pipe.

These ratings attempt to reflect both scale and nodules, Wisconsin's two principal corrosion modes. They can be used as a gross estimate of remaining service life. For example, if a pipe has a C.R. of 4 and has been in service for 20 years, the rate of corrosion is 5 years per C.R.; with 2 C.R. ratings to perforation, the remaining service life would be estimated as 10 years.