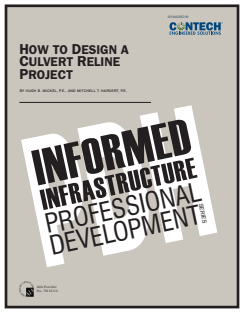
PDH: How to Design a Culvert Reline Project

May/June 2018, *Informed Infrastructure*

Hugh,

One vital question is missing from "Step 1: Assessment of the Existing Culvert." The first question should be, "Is the existing culvert an impediment to migrating species of fish (a fish barrier)?" If the answer is "yes," then forget about a culvert reline and focus on culvert replacement. In the Pacific Northwest, we are mandated by the courts to replace all fish barriers. The engineers who optimized culvert designs based upon hydraulics have created a budgetary and logistic problem for today's planners and engineers. The current philosophy for determining culvert size is to add 2 feet to the bank full width of the stream. All new culverts are partially filled with "streambed gravel" and often have raised areas on the sides for "critter crossings." It is not unusual to replace a 3-foot culvert with a 12-foot or even larger culvert.



Darrell E. Ash, P.E./S.E.
Snohomish County Bridge Engineer

Darrell,

Thank you for your response. You have brought up an excellent point, and I wanted to take a moment to respond. The intention of this article was to determine the best approach to design for a reline project, assuming the reline was a viable option from the onset. Asking the fish-barrier question is certainly an appropriate first step prior to any discussion on the design process for reline. This, along with a host of other project-, permitting- and timing-related questions, should be asked. For example, if a roadway is scheduled to be widened within the remaining expected service life, then a do-nothing approach might be valid. Again, thank you for your comments! It is certainly insightful to gain the perspective of the reader to provide better clarity in future editorial pieces.

Hugh B. Mickel, P.E.
Reline Director
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A+ Infrastructure Begins Below the Surface

January/February 2018, *Informed Infrastructure*

Dear *Informed Infrastructure*,

It seems like an appropriate time to share a fresh perspective on how we can lift America's transportation infrastructure from D- grade to A+ levels as quickly as possible. While we look forward to the resolution of political

debates on transportation infrastructure funding, U.S. highways are still overloaded with traffic that wastes time and fuel, slows commerce, and limits economic growth. Whatever your politics, two things are certain: road construction can't wait, and we must learn to do more with what we have right now. The keys are increased focus on efficiency; the application of existing, proven innovations; and optimizing decisions for total, lifetime cost of ownership.

The global strategic consultancy McKinsey & Company provided this advice repeatedly in recent years, urging the infrastructure industry to embrace efficiency and innovation. "McKinsey studies have shown that delivering infrastructure more efficiently can reduce its whole cost by 15 percent," the firm stated in a July 2015 article, "Megaprojects: The good, the bad, and the better." The article continued, "All told, efficiency gains in approval, engineering, procurement, and construction can generate savings of as much as 25 percent on new projects, without compromising the quality of outcomes."

Years later, though, we have yet to take advantage of these opportunities. McKinsey's February 2017 report, "Reinventing construction through a productivity revolution," stated, "The industry has an intractable productivity problem" and "If construction-sector productivity were to catch up with that of the total economy—and it can—this would boost the sector's value added by an estimated $1.6 trillion … One-third of the opportunity is in the United States."

Some forward-looking DOTs and contractors have seen the short- and long-term advantages of using Geogrids to build roads. However, most remain slow to adopt proven advances that can boost productivity and improve efficiency. For example, independent research consistently demonstrates that the adoption of simple but powerful technologies meaningfully reduces the cost of materials used in constructing highways, while speeding time to completion and extending service life. Still, construction industry research firm FMI estimated that just 3 percent of all U.S. road mileage built or repaired in 2017 incorporated Geogrids, although the technology has been affordably available for decades.

Rather than wait for the infrastructure express to pull up and whisk us to a better place faster, our journey to A+ infrastructure must begin now with greater highway construction innovation and efficiency. We stand ready to join forces with any DOT or road/highway contractor who has not already adopted a full range of efficiency-driving innovations—like those that have arisen from ongoing geosynthetics research—to do more with what we have and improve our country's infrastructure immediately, regardless of the actions of our political institutions.

If we are to remain competitive; if our travelers are to remain safe; if commerce is to continue unimpeded; and if we don't intend to simply kick the crumbling infrastructure can down the road to future generations, now is the time.

Sincerely,
Mike Lawrence
CEO, Tensar Corporation