

Western Bridge Engineer's Seminar

Peppermill Hotel – Reno, Nevada

September 9-11, 2015

Title: *I Didn't Know They Could Do That!*
Capabilities and Design Considerations for Flexible Buried Bridges
September 11, 2015 – 8:30 a.m. – 10:00 a.m.

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Abstract:

Structural plate buried structures have been in use for over 80 years. These types of structures started out as a more robust alternative to traditional culverts for use in hydraulic and minor crossings where culverts could not meet flow and size requirements and/or where bottomless structures were needed. Over the past 40 years, there has been a significant increase in the use of structural plate as buried bridges in hydraulic crossing and grade separation applications where low- to medium-span traditional bridges have typically been used – particularly in the western states. This has been made possible by industry advancements in design and analysis tools, manufacturing capabilities, materials, and development of deeper corrugation profiles to allow for longer spans, heavier loads, and higher cover. Benefits to the transportation industry have been in terms of lower installed costs compared to traditional bridges, ability to carry heavier loads than traditional bridges, increased security through redundant systems, improved aesthetics through the use of a wide variety of end treatments, environmental advantages, ABC benefits, and lower maintenance and inspection costs compared to traditional bridges. Flexible buried bridges are an attractive alternative to many low- to medium-span traditional bridges.

Design of structural plate buried bridges is covered in Sections 12.8 and 12.9 of the current AASHTO LRFD Bridge Design Specifications. Although structural plate buried bridges have been in use for a long time and provisions for their use as flexible buried bridges have been fully incorporated into the AASHTO LRFD design and construction specifications, many engineers are not familiar with the range of capabilities, key design inputs, and project considerations, as well as the concept of soil-structure interaction. As a result, many engineers are not sure where to begin, and buried bridges are often not considered for bridge applications where they may be the best crossing option. While there are some design similarities with culverts and traditional bridges, the level of analysis and inputs involved with design of buried bridges is often more detailed depending on the structural plate corrugation profile and project requirements. In many cases, the design process can be more rigorous than design of traditional bridges, but will

also allow more economy by customizing the structure design to site conditions and construction practices.

The goals of this presentation are to outline the design process for buried bridges, highlight key design inputs, and show design advantages of using flexible buried bridges as an alternative to traditional bridges. This will include an introduction to the AASHTO LRFD design requirements for buried bridges and include case studies. Among the specific topics to be discussed are design, materials, foundations, fabrication, load rating, construction, and maintenance.