Alberta Transportation

Product ID: 8090-2-4-4
Initiation Date: August 28, 2000
Revision Date: December 4, 2008

Product Evaluation

RE: Review of "Bridge Plate" Structural Plate Culvert

PRODUCT
Bridge Plate is a galvanized Standard Plate Corrugated Steel Pipe that is fabricated by Armtec Construction Products.

VENDOR CLAIMS AND INFORMATION

CLAIMS
Bridge Plate was developed in Canada by Armtec Construction Products. The Bridge Plate culvert structure was first used in Alberta in August, 2000.

Armtec Construction Products has been in business since 1908. Their products are manufactured to CSA and AASHTO standards. Product web link: http://www.armtec.com/

DESCRIPTION
Bridge Plate is a deep corrugation profile developed for use in arch and box culvert applications.

Bridge Plate is 3.5 times stronger and more than 10 times stiffer than the conventional 152mm X 51mm multi-plate culverts.

POTENTIAL USAGE
Bridge Plate's intended purpose is for corrugated metal arch and box culverts.

Bridge Plate structures have approval for use in Newfoundland. Public Works and Government Services Canada have approved the use of Bridge Plate for a creek crossing on the Alaska Highway.

Bridge Plate is currently being installed in Alberta on Hwy. 43 at Two Creeks.

STANDARDS
CSA G401 Corrugated Steel Pipe Products (with the exception of deep corrugation)

Armtec is in the process of obtaining approval from CSA in incorporating a specification for deep corrugation products.

ALBERTA TRANSPORTATION COMMENTS

ADDITIONAL TECHNICAL REQUIREMENTS
Culverts with a diameter equal to or greater than 1.5 meters are classified as bridge size structures, and as such must be designed, fabricated and constructed in accordance with all the requirements of the "Engineering Consultant Guidelines for Highway and Bridges – Volumes 1 & 2", and the codes and documents references contained within the manuals.

Suppliers of new culvert materials should be familiar with the design and fabrication processes contained within the manuals that are applicable to their product. They should also ensure that all technical information, design parameters, materials data etc for their product that are necessary to meet the design requirements of the manuals are available to the hydrotechnical, structural, fabrication, and construction engineers upon request.

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Armtec shall ensure that the Bridge Plate product meets the requirements of Section 18 of the Bridge Construction Specification of CSP and SPCSP Structures (i.e. fabrication, inspection, sampling and testing, handling and shipping requirements). Armtec state that they are in the process of obtaining CSA approval for the Bridge Plate product.

Bolting configuration: A joint research project between Alberta Transportation (AT), and the University of Alberta (U of A) carried out in 1987 proved conclusively that the ductile performance of the longitudinal seams of SPCSP's could be significantly improved depending on how they were lapped. Based on the findings of the U of A report AT's current standard is to only allow two-bolt configurations for longitudinal seams, and that the seams be lapped in accordance with the recommendations of the report i.e. that the bolts in the valleys are closest to the visible edge.

If a supplier wishes to deviate from AT's current two-bolt standard, then it is their responsibility to provide satisfactory proof to AT that the system of bolting proposed will provide equal or superior performance to the current standard in terms of ductility and strength. (Copies of the 1987 U of A report are available upon request).

EXPERIENCE

The Bridge Plate structure on Highway 43 at Two Creeks was installed using a 6-bolt configuration for bolting the longitudinal seams. Since this is contrary to Alberta Transportation practice to only allow a two-bolt configuration, Armtec need to assure Alberta Transportation that the 6 bolt configuration will not develop tears underneath the bolt heads in the critical locations as demonstrated in the 1987 joint research study for 3 and 4 bolt configurations. Perhaps the best course of action would be to conduct a research study with the U of A on the behavior of the Bridge Plate with 6 bolt configuration (A copy of the paper detailing the research work can be provided if required).

RECOMMENDATIONS

Bridge Plate structural plate culvert will be accepted as a Proven Product on the Alberta Transportation Products List.

TRIAL PROJECTS

Bridge File:

73920, Two Creeks (Installation date: August, 2000)Contact Name: Ranjit Tharmalingam
13695, Claresholm (Installation date: 2001) Contact Name: Nino DeLaurentiis

Joe Filice

cc New Product Evaluation Standing Committee – Terry Willis
Clive Clarke
Abdul Waheed

JF/nv