

PROJECT PROFILE



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AlL's innovations in manufacturing and assembly techniques save five days on Alberta Super•Cor project

Alberta's Highway 725 passes through rolling hills with deep ravines northeast of Spirit River. At Josephine Creek, a 4.3 m diameter culvert was to be replaced by a new 6.1 m diameter structure designed by WSP, the Engineer of Record for the project. Bridge installed in two days.

Structure used two different thicknesses of steel

With an 11.5 m cover depth, a deep-corrugated structural plate was required to provide a much stronger and stiffer structure than the existing culvert. The new structure had heavier 7.1 mm (1 gauge) steel in the centre sections below the road, while the end sections were 5.5 mm (5 gauge).

WSP to OK improved test assembly before shipping

On previous projects of similar diameter, plate assembly was found to be challenging, with lots of barring the plates to pull and draw the bolt holes into position — a trait common to all plate

Project at a glance:

Project Name: Josephine Creek Stream Crossing

Location: Highway 725, 47 km NW of Spirit River, Alberta

Owner: Alberta Ministry of Transportation and Economic Corridors

Consultant: WSP

General Contractor: Greenfield Construction

Plate Assembly Subcontractor: RB Multi-Steel Construction Ltd.

Sector: Transportation

Application: Stream Crossing

Product: Super-Cor Round

Dimensions: Diameter 6.1 m, Length 106.8 m

Assembly Time: 25 days



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assembly. To proactively address these issues, the tender required the manufacturer to fabricate the structure with a minimum of six plates per ring for easier assembly and to pre-assemble a minimum 3.5 m length of the structure for inspection by WSP, prior to shipping.

AIL develops two critical innovations to improve assembly

Greenfield Construction was awarded the project and retained AIL to manufacture the 106.8 m long structure with bevelled ends. To further improve plate assembly fit-up, we developed two critical innovations:

1. Eliminate the flat spots on the plate ends

This allowed a consistent curvature for the entire circumferential length of each plate, allowing superior fit-up and nesting on both the longitudinal and circumferential seams.

2. Fabricate the structure with inner and outer rings This enabled the circumferential seams to slip over each other to allow better alignment on the circumferential bolt holes with minimal effort.

To prove these innovations would work in the field, the new plate manufacturing and assembly methods were developed, tested and documented at our facility in Ayr, Ontario. A dedicated AIL site representative for the project participated in the test assembly, helped detail it in our shop drawings and then provided "lessons learned" to the contractor months later on-site in Alberta.

At the start of construction, AIL attended a pre-construction meeting and provided two days of site assistance to the plate assembly subcontractor, RB Multi-Steel Construction Ltd. We also visited at subsequent construction milestones to ensure everything was going smoothly.

Contractor saved 17% on time for plate assembly

The assembly went smoother than RB Multi-Steel expected. Originally, they thought it would take 30 days to assemble the

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structure, but it took only 25 days — a time savings of 17%. Their daily average was 5.5 rings (or 4.5 lineal metres) per day. Saving this time allowed them to take advantage of installing the engineered backfill zone in more favourable weather as the colder "shoulder" construction season approached in late October.

AIL's upfront investment in fabrication innovation, post manufacturing testing and having a dedicated experienced site representative to pull it all together in the field made for a successful project.

"We were very happy with how the assembly went much faster with the flat areas eliminated from the plate ends and the new inner/outer assembly technique. We installed eight rings on our best day. Five and a half rings was our daily average. We figure we saved five days on the assembly time with these advances from the AIL team."

— Ron Babish, President, RB Multi-Steel Construction Ltd.

