



Site-ready bridge eases installation

Bridge 3, Darlington Upgrade Project, Adelaide

South Australian steel fabricator Bowhill Engineering has successfully delivered the first stage of the superstructure for two bridges that are being constructed adjacent to the road and lifted into position.

In what is believed to be an Australian first and part of the \$620 million North-South Corridor Darlington Upgrade Project, the two 3000-tonne 180-metre-long bridges will be moved into place via Self-Propelled Modular Trailers known as SPMTs.

A total of eight bridges are being built and installed for the Darlington Upgrade Project, which is expected to be completed in 2019.

Bowhill's original scope was to undertake shop detailing, material procurement, fabrication, welding, surface treatment and delivery to site of the 20 open top box girders, each up to 48 metres long, four metres high and weighing around 85 tonnes.

Bowhill Engineering Managing Director, **Jeremy Hawkes** said that with some quick and innovative thinking between the Darlington Upgrade Project team, their engineer and Bowhill Engineering staff, the cost to complete the temporary steelworks was reduced by \$350,000.

He said credit must be given to engineer, **James Deane-Butcher** from Robert Bird Group for the cooperative and flexible approach he had to repeated requests to tweak the original design to unlock significant time and cost efficiencies whilst maintaining structural integrity.

The National Structural Steelwork Compliance Scheme (NSSCS) certified fabricator was able to help even before the project was underway to maximise efficiencies.

"Bowhill was chosen early enough in the project to be invited to contribute to the design optimisation process," Mr Hawkes said.

"During the main contractor tendering phase, we helped the Department of Planning, Transport and Infrastructure flesh out some critical constructability feasibility checks.

"This was a fantastic opportunity to refine some of the connection, welding, rigging and splice location details together as a team before the bridge design was finalised, ultimately resulting in a better engineered outcome as these trade-specific considerations are not just checked in after the design process, but rather built into and fully considered as the original design."

As the first fabricator in South Australia to be independently certified to Construction Category 3 of the NSSCS, the family-owned business has already forged a good working relationship with the SA Government through the State's Office of the Industry Advocate (OIA) which has been very supportive of the third-party certification scheme since its recent inception.

"We would not have not been considered for this ground-breaking project if it wasn't for the work of the OIA and particularly **Ian Nightingale** in his role," Mr Hawkes said.

"Giving our small regional business a crack at this project was a real show of faith through the Industry Participation Policy (IPP) and we feel that we have stepped up to the challenge, especially with the timing and quantity of the critical temporary works.

"We have successfully demonstrated that South Australia has the capacity and capabilities and there are probably many smaller businesses that just need consideration to step up to the next level of project work."

Bowhill outsourced some of the temporary steelwork which helped greatly in unlocking its own fabrication shop capacity.

"We calculated module sizes around our current overhead crane capacities and negotiated weld details with the designers to suit our preference around our methodology and capability to handle each assembly," Mr Hawkes said.



"Moving the finished girders around our site has been made possible and efficient through the adaptation of some steerable 'jinker' trailers we bought, hydraulic lifters installed under the deck as well as steering both ends and slew rings to enable turning under the girder.

"They have been an outstanding success and allowed us to move up to 140-tonne assemblies around our plant."

He said Bowhill also provided a 'rough-out' detail of the first bridge plate requirements within a very short timeline which allowed its steel supplier to optimise plate sizes to minimise splicing and waste through mill running custom plate sizes.

"The fact that our supplier also cuts plate commercially for the industry allowed it to utilise substantial offcuts for smaller parts or even other customers' requirements to further lift efficiencies."

Transportation of the massive girders to the interchange set-down location also tested Bowhill's mettle.

"To reduce the disruption to traffic and increase efficiency, girder beams were transported to site in pairs as convoys," Hawkes said.

"Engineered bolsters were designed, detailed and fabricated to suit both the specific jinker trailers and the girders that were being moved that ensured a safe and efficient loading process at Bowhill and transport on the road during the moves.

"All parties signed off on the support and restraint proposal well before the moves actually took place."

He said the logistical technicalities of this project were demanding and necessitated a detailed route survey to not only ensure that the physical size could get to site, but also to minimise delays and inconvenience on other parts of the busy road.

"The Bowhill staff need credit for their hard work, long stints of overtime and attention to detail. This is a massive challenge for our humble family business and they have stood up to the rigours and excelled, and I am immensely proud of all of them," he said.

PROJECT TEAM

Proponent: Department of Planning, Transport and Infrastructure South Australia (DPTI)

Client: Gateway South (Fulton Hogan/Laing O'Rourke JV)

Engineering: KBR, Jacobs and SMEC

ASI Steel Fabricator: Bowhill Engineering

Steel Processing: Adelaide Profile Services, Liberty OneSteel

ASI Steel Distributor: Liberty OneSteel Metalcentre

ASI Steel Manufacturers: BlueScope, Liberty OneSteel