



# DYNACIV PTY LTD

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## STRENGTHENING PIER 10 OF THE BURNETT RIVER BRIDGE

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### TEAM VALUES

Safety | Integrity | Collaboration | Determination | Passion for improvement | Responsibility and accountability

## Company profile

Dynaciv is the culmination of many years of experience in the application of various epoxy resins to strengthen structures. We have learnt how to adapt epoxy compounds to specifically suit the purpose to improve quality and increase value.

We pride ourselves on our technical expertise and how it knits well with the practical experience we have gained working on large underground infrastructure projects to the smallest repair project.

## The Burnett River Bridge

The Burnett River Bridge was constructed about 130 years ago. The bridge is approximately 535 m long and consists of a mix of structural elements made from both steel and cast iron. The steel truss and plate girder bridge is supported by 1 – 2 metre cast iron piles at 33 m centres.

It is an integrate bridge that provides a means for trains to pass over the river to travel along the east coast rail line. The Burnett River Bridge carries heritage value and is situated in a sensitive, highly valued ecosystem.

A few years ago, Queensland Rail (QR) initiated a process to verify the structural integrity of the bridge. The study revealed that the cast iron piers suffered from corrosion and strengthening was required to extend the usable life of the asset.

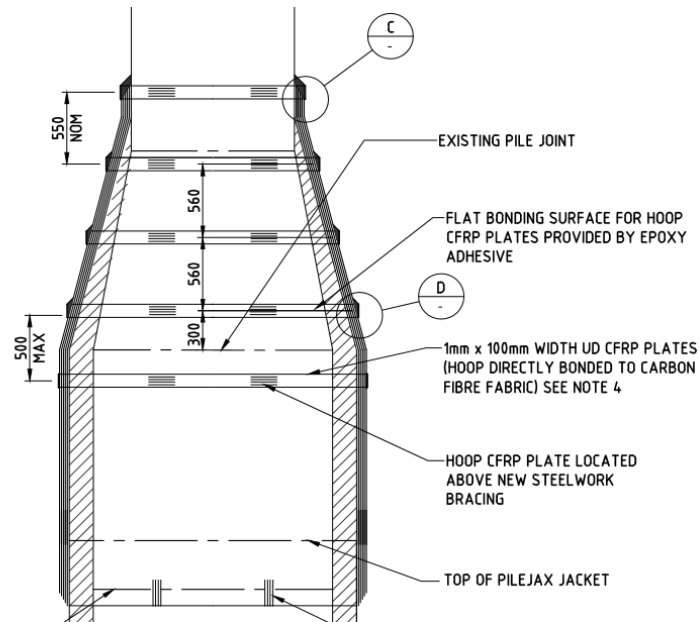
A design was completed and distributed to the market for tender. Dynaciv received a tender invite and was asked to submit a cost based on the tender design. The design is described below.

## The Tender Design

The tender design comprised of the re-coating of the cast iron section above water, supply an installation of new bracing, as well as the strengthening of the conical and underwater sections. The section above water required abrasive blasting and epoxy coat. The underwater section needed to be strengthened using GRFP jackets stiffened with carbon fibre strips. The jacket was to be fitted around the pile and the annulus filled with an epoxy grout.

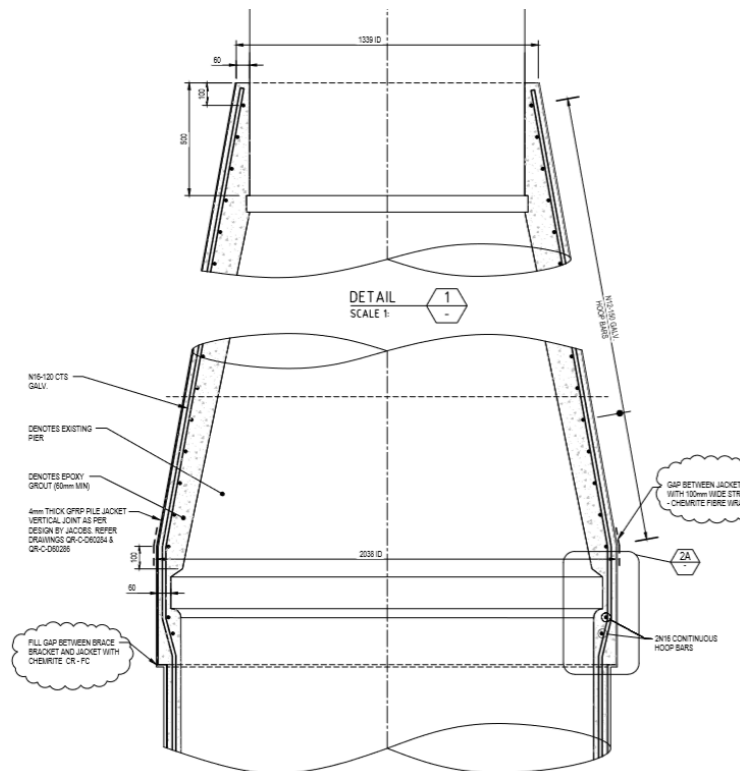
The conical section was to be strengthened using carbon fibre fabric, wrapped around the base of the cone. The design called for five layers of fabric to extend from approximately 2 metres below the base of the cone to the top of the cone. This was further strengthened by carbon fibre hoop plates adhered at 560 mm centres along the cone.

An illustration of this design is shown on the following page.



### Dynaciv approach

Dynaciv then worked through the design to identify other possible solutions that could achieve the same or better at a lower cost. Working closely with a RPEQ external designer, we proposed the following design to QR.



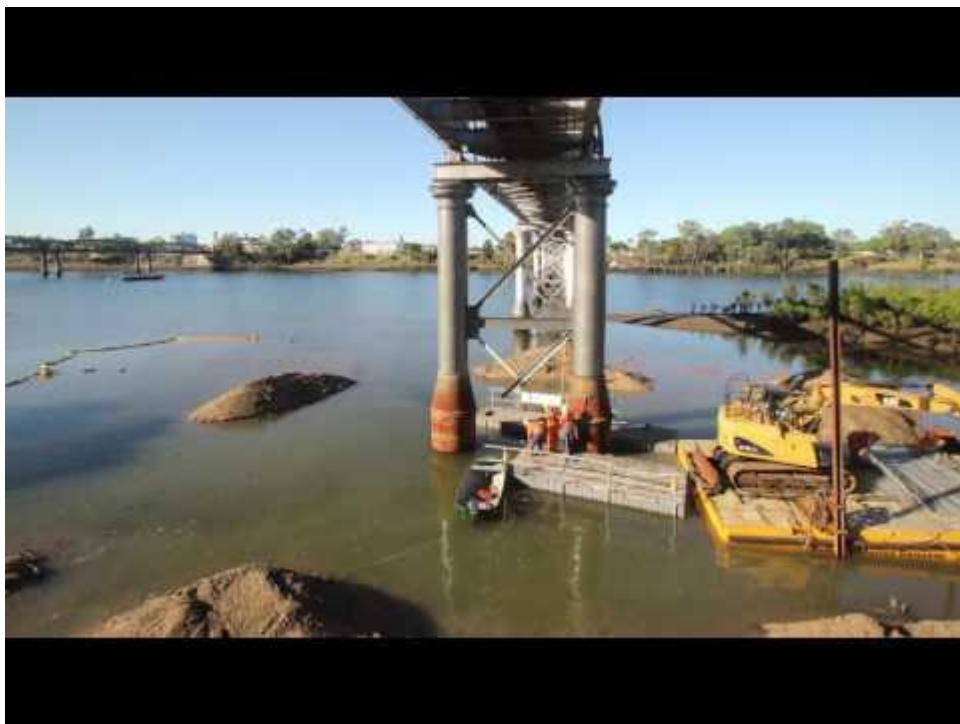
Our design replaced the carbon fibre with an equivalent amount of high tensile steel encased in epoxy grout and a GFRP jacket. With stiffness and strength taken into consideration we carefully selected steel bars that provided equivalent strength to the carbon fibre. These were fixed at the required spacing and grouted in place using a high strength, water displacing marine epoxy grout.

The new Dynaciv design provided the following advantages:

- ✓ Cheaper
- ✓ Faster to install
- ✓ Less risks
- ✓ Finished product appeared similar to original cast iron piles

A great win for Queensland Rail and the local community!

Time Lapse Photography was taken during the install. The photography started just after a section of the blasting and epoxy coating was completed. [Click](#) on the video below to view the install.



Dynaciv used the following products:

- ✓ CHEMRITE HSMC GROUT (High strength underwater epoxy grout)
- ✓ Galvanised high tensile bars
- ✓ Joinlox jackets
- ✓ Carboline epoxy coating