York-Rizzani De Eccher JV - Matagarup Bridge Lifting Beams

Overview

McDowall Affleck assisted York-Rizzani De Eccher Joint Venture during the construction of the Matagarup Bridge. In the construction of a large span bridge the temporary works and the erection process are critical design aspects and often the key factors for the success of the project. Rizzani De Eccher are world leaders in the construction of large span bridges and together with their subcontractor, ALE, have designed a very efficient erection system which has allowed a quick erection of the main arch of the bridge. McDowall Affleck were appointed for the detailed design of the two spreader beams which were used to lift in place the two wishbones now connected to form the main arch of the Matagarup Bridge.

Type of Engineering Work

Structural Engineering

Work Timeframe

July 2016 - July 2018

Contract Value

Commercial in Confidence

McDowall Affleck Contact

Albert Puccini & Ben Galvin

Scope of Work

- Detailed design of main arches lifting beams
- Detailed design of shear keys on main arches
- Detailed design of lifting beams lowering system
- Shop drawings review
- Pre-lift inspection of installed lifting beams

Project Challenges

- Complex spatial geometry not allowing direct connection of lifting beams to bottom chords
- No bolted connection allowed to wishbones
- Balancing complexity vs accuracy of the structural model
- Load test not possible due to magnitude of loads

How we managed this

- Skewed connecting arms introduced forming a portal frame
- Clamped connections and shear keys adopted
- Linear static analysis using a Solidworks 3D model with static load conditions at critical steps of lifting
- Validation of structural model by independent verifier

Value Engineering

Lifting beams were a key element for the success of the erection process. Hiring of lifting towers was extremely expensive, McDowall Affleck's designed lifting beams performed as expected minimising the erection time.

RESPONSIVE. RELIABLE. RESULTS.