

Strengthening Works to Bridge Deck End Girders

St Marks Road, Bristol

Client

Network Rail

Contractor

Taylor Woodrow

Engineer

Arup

Temporary Work Engineer

Tony Gee & Partners

Works Commenced

July 2017

Works Completed

September 2018

Freyssinet was chosen to work for Taylor Woodrow on St Marks Bridge off the back of successfully completing Muller Road bridge. Both structures had a similar scope – jack the steel deck then cut off and replace the corroded ends of the main girders. However, as the design delivery had been outside of Freyssinet’s control on Muller Road, and there had been delivery and clash problems, Taylor Woodrow awarded an advance contract to Freyssinet to do the temporary works design.

Freyssinet appointed Tony Gee and Partners to conduct the detailed calculations and, together, Freyssinet and Tony Gee developed the jacking and propping design making sure that the design was buildable, with clash detection and sequencing properly investigated. The early contractor involvement allowed Freyssinet to collaborate with all relevant parties and was effective in ensuring the design could be delivered without delays.

The Filton Bank Four-Tracking project involved reinstating the two-line track to a four-line track railway between Dr Day’s Junction (Bristol Temple Meads) and Filton Abbey Wood Station. As well as doubling the capacity of the rail line, enhancement of structures along the 15km route was undertaken.

St Mark’s Bridge was a single span rail-over-road bridge consisting of three main half-through steel riveted girders spanning 12m between brick abutments. Additionally, there was an edge beam, at higher level, and supporting precast concrete planks which formed a station platform, since disused.

The bridge required jacking vertically to allow the removal and replacement of corroded girder ends. Additional repairs to deck plates and cleats were also required. It was only necessary to lift the deck by 1.5mm so as to release the load from the girder ends, allowing them to be removed with hand-held grinders.

Freyssinet’s construction sequence entailed:

- Erection of temporary propping systems beneath the bridge deck founded on 1750 x 1750 crane mats. Placed on sand and timber levelling.
- Installation of shim plates with (100 tonne capacity) hydraulic jacks. Bridge deck lifted 1.5mm.
- Cut and removal of six defective steel end girder sections.
- Holes drilled for new ballast plate cleats.
- Installation of six new I beam end girder sections.
- Installation of new splice plates and new packer plates.
- Bridge deck de-jacked, removal of shims and jacks.
- Temporary propping system dismantled including access platforms.

