



Bearing Replacement Gatwick Tram Viaduct

Client
BAA
Maintenance Contractor
Dyer & Butler
Specialist Contractor
Freyssinet Limited
Works Completed
August 2000
Contract Duration
4 Weeks
Contract Value
£60,000



Gatwick's elevated transit system carries two automated passenger tram cars between the north and south airport terminals on a viaduct. The structure crosses the A23 dual carriageway in the form of an 82 m long, two span, continuous box beam with cantilevered outrigger track supports. The structure is supported on two bearings at each verge abutment and on a central supporting column.

Freyssinet were contracted to replace two large spherical guided sliding bearings on one abutment, replace four smaller pot bearings on the viaduct, and refurbish three others. The main bearings had failed due to excessive movement of the structure caused when trams passed from the viaduct onto the main span. The contract included design and installation of a temporary support system to jack the A23 bridge. All replacement bearings were designed and manufactured in stainless steel by Freyssinet and incorporated anti-vibration components.

Due to the complex torsional and uplift dynamics of the bridge structure under live loadings, the design for the temporary support system was developed in close conjunction with the British Airport Authority, and rigorously checked by their consultants. The support system had to withstand significant live loadings and also accommodate the 'lively' reactions of the structure caused by the trams passing overhead every two minutes. The design also provided the capacity to rotate and re-level the structure thus bringing the abutment and deck tracks back out of misalignment.

The 250 T capacity central jack located between the two bearings on the abutment shelf carried the majority of the deck load. Two further 250 T jacks were located under the outrigger beams either side of the central jack. These rested on a bracket system that was bolted to the concrete cross head of the abutment. Rubber bearing pads on the jack head were used to accommodate rotational deflection under load. The existing outrigger beams needed strengthening directly above the jacking points. This was achieved by welding steel plate stiffeners onto the outrigger beams.

The structure was successfully jacked during a 6 hour night closure of the transit system. The new bearings each weighing 350 kg were then installed in a very restricted work space over the following two weeks.

- 1 Main span across the A23
- 2 Tram car on the viaduct
- 3 Tram car passing over croshead / Outrigger support

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