

Southern Link Upgrade – Burnley and Morshead viaduct strengthening

Australia, Victoria

Work / Activity 1
Structural reinforcement /
Additional prestressing



Companie(s) : Abigroup
Owner : Southern Link Upgrade Alliance
Engineering consultant : Aecom

Subsidiary(ies) : Freyssinet Australia

Beginning of works : 07/2010
End of works : 04/2011



Description of the work :

The project consists of strengthening the Burnley and Morshead viaducts, made of simply supported prestressed concrete I girders. The structural strengthening is made of additional external post tensioning strands installed along the concrete girders according to a trapezoidal profile. The strands are deviated at contraflexure points by steel deviators and anchored at concrete girder supports by mono strand anchors. The pier headstock supporting the concrete girders required some local strengthening as well, provided by carbon fiber vertical strips for shear strengthening and by external horizontal stress bars for bending strengthening.

Freyssinet mission :

Freyssinet came up with an alternative design based on 15.7mm diameter greased and sheathed strands to 279 kN breaking load and use of proprietary monostrand anchorages called 1R15. This particular monostrand anchorage is made of steel casting protected by Rilsan coating (Fusion Bonded Nylon). Freyssinet achieved acceptance of this alternative design on the basis that it was offering a better corrosion protection than the conforming design made of stress bars coated with epoxy painting, but also based on lower material cost and simplified installation on site. Freyssinet designed the steel deviators made of steel tubes welded to fabricated steel I girder. Strands are individually deviated using a multitube saddle principle. Steel deviators are hot dip galvanised and prefabricated off-site such as to minimize the works to be done in situ. The 1R15 anchorages are clamped to the existing concrete surface with transverse stress bars 26.5mm diameter stressed to 45% of the breaking load. Epoxy resin is placed in between the back of the anchorage and the concrete surface which needs to be scabbled to increase surface roughening for friction transfer purpose. From 1 to 3 strands per side are installed in each prestressed concrete girder. Strands are stressed from one side using a curved nose and a 30 tons double acting jack. Southern Link Upgrade is the first project using the 1R15 anchorages within the Freyssinet group. It represents more than 2000 anchorages to be installed on 300 prestressed concrete I girders.

