



Eleanor Schonell Bridge (Green Bridge)



The Eleanor Schonell Bridge is Australia's second-longest cable stayed bridge and provides bus, pedestrian and bicycle access via its two bus lanes, dedicated cycle way and footway.

The cable stayed deck is 20m wide, 520m long (main span of 185 m + two back spans of 73 m), with two 70m-high H-shaped reinforced concrete towers in the river and a tie-down pier at end of each back-span.

The 64 state of the art BBR CONA cable stays vary from 21 to 96 m long, are in a harped configuration, arranged in pairs both sides of the two river piers, at an elevation of about 24° to the horizontal.

Each stay has 31 or 37 parallel seven-wire 15.7 mm strands enclosed in a UV-resistant HDPE stay pipe in a selected architectural dark grey colour. The strands are galvanized, waxed and individually sheathed with a continuous and wear-resistant coating, providing each strand with a triple protection system. In the anchorage zone, the strand bundle passes through a deviator and spreads out towards the high fatigue resistant anchorages, where each strand is individually guided and locked with high fatigue resistant grips. Ring nuts screwed on to the anchor heads transfer the cable loads by contact pressure to the supporting bearing plates. The individual strands inside the anchorage are protected by a corrosion-inhibiting compound. Finally, the anchor head is covered by a protection cap injected with corrosion-inhibiting compound. With this system, the anchorage is fully encapsulated with a multi-barrier protection system. All stressing was done from tower to allow a more elegant deck detail.



Each individual strand installed in the cable system can be re-stressed at any time during or after the installation, allowing not only for re-stressing including for future light rail, but also for the selective removal, inspection, or replacement of individual strands.

The composite deck consists of steel grillages with precast reinforced concrete planks and in-situ concrete stitch joints, and in-situ concrete barriers to protect the stays against vehicle impact. The bus lanes have a bitumen overlay and the entire bridge is designed to accommodate the possible future addition of light rail, including a substantial concrete overlay to accommodate the rails.

The deck was built using the balanced cantilever technique from both river towers simultaneously. At both towers, deck grillages were erected alternately on each side of the tower, with cable stays reeved and stressed progressively to provide the appropriate support to the deck during construction and permanently. After each deck steel grillage was bolted in place, the initial stay installation took place and the stays stressed to the minimal load to support the grillage. Next stage was installation of the precast and stitch concrete; after the stitch reached the required strength, the second stage stressing was carried out to support the steel + concrete, and achieve the required deck levels. After installation of barriers and bitumen the third stage stressing took place, to achieve required final deck levels.

Structural Systems were awarded the design, fabrication, installation, stressing, finishing and post-construction periodic inspection of the stay cables.

Installation used the state of the art strand-by-strand installation method, only the second time this method has been used in Australia. Anchorages were first installed in the tower and the deck. The HDPE stay pipe was then hung between the two anchorages using two master strands, and used as a guide for subsequent strand installation. The strand was positioned at deck level and pulled up through the stay pipe to the upper anchorage, using a stay cable strand puller, positioned behind the upper anchorage. Each strand is tensioned immediately after installation, using the BBR isostress tensioning method, ensuring an equal force distribution among the strands of an individual cable. Compact multi-strand jacks were used for the final adjustment.



Project Data Sheet

Year:
2006

Location:
Brisbane, Queensland

Client:
John Holland

Division:
Structural Systems
(Northern) Pty Ltd

Scope:
Supply, Installation &
Stressing of Strand
Cables

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