



## Swan Street Bridge Upgrade – Widening a 70-year old bridge

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### Abstract

The Swan Street Bridge is a reinforced concrete five-span arch bridge crossing the Yarra River in Melbourne, Australia. Constructed circa 1950, it provided four lanes of traffic and narrow pedestrian footpaths on both sides. The bridge forms part of a key route for vehicular access into the Central Business District, as well as pedestrian thoroughfare to the sporting and events precinct.

Substantial increases in traffic volumes meant the bridge had become a significant bottleneck and was hazardous for pedestrians. In response to this, a scheme was developed to widen the bridge – providing an additional lane of traffic and four-metre-wide Shared User Paths on both sides – all guided by an overlaying architectural vision created by the winner of a design competition.

This paper presents the structural technical solutions adopted for the strengthening and widening, which considered the original structural design, as well as the architectural intent for the widening.

**Keywords:** Bridge, Widening, Rehabilitation, Strengthening, Mechanical Bearings, Reinforced Concrete, Abutment

### 1 Introduction

The Swan Street Bridge was constructed in the lead-up to the 1956 Olympic Games in Melbourne, Victoria, Australia. It was a four-lane bridge with narrow footpaths on both sides, spanning over the Yarra River.

Due to the bridge's location, it is a key route for vehicular access to the Melbourne Central Business District and pedestrian access to the Melbourne and Olympic Parks sporting and events precinct. Increased traffic volumes over the 70 years since it was constructed, meant the bridge was creating bottle-necks during peak events. Pedestrian safety was also compromised before and after local events due to the narrow footpaths, these often necessitated the closure of one lane of traffic to deal with the volume of pedestrians – further exacerbating the problems with vehicular traffic.

A scheme to widen the bridge providing an additional lane of traffic and four-metre-wide cantilevered Shared User Paths (SUPs) on both sides, as well as widening to the abutments and strengthening as required to account for the increased loads was developed [1].

Due to the high-profile nature of the area and bridge, an architectural design competition was held to determine the appearance of the widened structure. The winner of this competition was Melbourne-based practice BKK Architects, with the cantilevered fin concept as shown in Figure 1 (overleaf).

Arup was the Engineering consultant to the successful Design and Construct tenderer, Seymour Whyte.