THE DESIGN AND CONSTRUCTION OF THE NEW 7TH AVENUE PEDESTRIAN BRIDGE

Sarah SKORPEN
Bridge Engineer
SSI Engineers and Environmental Consultants
Pietermaritzburg, South Africa
sarahs@ssi.co.za

Gerrit VISSER
Bridge Engineer
SSI Engineers and Environmental Consultants
Pietermaritzburg, South Africa
gerritv@ssi.co.za

Edwin KRUGER
Bridge Network Manager
The South African National Roads Agency Ltd
Pretoria, South Africa
KrugerE@nra.co.za

Summary

The highway infrastructure improvements in and around the cities of Johannesburg and Pretoria, which together form the largest metropolitan area in South Africa, was initiated by the South African National Roads Agency Ltd. (SANRAL). This large open road tolling scheme is known as the Gauteng Freeway Infrastructure Project (GFIP) and is one of the largest road infrastructure projects yet undertaken in South Africa. This project, although not directly linked to the FIFA 2010 Soccer World Cup, coincided with other large construction projects that were part of the construction boom that was the result of South Africa being the host nation. To say the least, 2010 was a great year for structural and civil engineering in South Africa.

The new 7th Avenue Pedestrian Bridge was a project which formed part of GFIP. Because the bridge is a landmark structure showcasing the engineering and architectural expertise of South Africans it was required to be completed before the FIFA 2010 World Cup which took place in June 2010. This bridge utilises both concrete and structural steel in the way they work best. The striking double curvature concrete pylon was constructed with post-tensioned concrete and the composite deck consists of a triangulated steel truss fabricated from circular hollow sections with a reinforced concrete walkway surface. The new bridge forms an elegant landmark on the N1 route to Soccer City Stadium, the venue used for the opening and closing matches of the FIFA 2010 Soccer World Cup.

This paper describes how conventional construction techniques were used in an unconventional way to design a workable solution to a challenging architectural design concept.

Keywords: aesthetics; footbridge; cable stay; vertical post-tensioning; triangulated steel truss; South Africa.

1. Introduction

The upgrading of the Gauteng freeway system started in 2008 and the original 7th Avenue Pedestrian Bridge over the National Road N1 in Johannesburg, South Africa was identified as not having sufficient vertical and horizontal clearance. The bridge deck had been previously damaged by heavy vehicles and was externally post tensioned as a repair measure. This meant that jacking the bridge up would be very difficult as well as hazardous. The Client decided that a new replacement bridge with a higher vertical and increased horizontal clearance was necessary.

Fig. 1 The original 7th Avenue Pedestrian Bridge

Fig. 2 The new 7th Avenue Pedestrian Bridge