

# Design of the Sub-structures for the Gautrain Viaducts



**DISCIPLINE/S:** Structural: Bridge Infrastructure

## PROJECT DESCRIPTION:

The area between Johannesburg and Pretoria is the fastest growing in the country with corresponding major transportation needs. In the mid-seventies, when the PWV Road Network was planned, provision was made for a more direct rail route between Pretoria and Johannesburg. This was on the western side of the N1 Freeway, where the topography was more favourable. The major developments since then have taken place on the eastern side of the N1 Freeway and have therefore made the originally contemplated route impractical. Gautrain is an 80-kilometre commuter rail system in Gauteng, which links Johannesburg, Pretoria, Ekurhuleni and O. R. Tambo International Airport. It was built to relieve the traffic congestion in the Johannesburg–Pretoria traffic corridor and offer commuters a viable alternative to road transport, as Johannesburg has limited public transport infrastructure. The train is expected to cut the number of cars on the N1 Ben Schoeman Highway by 20%, with 100,000 daily passenger trips. Travelling at up to 160 kilometres per hour, Gautrain takes 35 minutes to travel between Johannesburg and Pretoria. From Sandton to the OR Tambo International Airport takes 15 minutes. Nyeleti were responsible to design the substructures for 7 of the viaducts on the southern line, which included piles, pile caps, spread footings, piers, pier heads and perched abutments. For each of the 7 viaducts, the substructure was designed based on the geological conditions and geometry, in order to support the deck structures of the viaducts.

## SALIENT FEATURES:

Various South African & international engineering disciplines and engineering firms collaborated in the design of the system as a whole. The design was based on the Eurocode. The piles for Pier 41 of Viaduct 15.3 had to be designed to extend through two levels of the existing covered parking at OR Tambo International Airport

## CLIENT:

Bombela

(Sub-consultant to Vela-VKE)

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## DATE:

September 2006 – August 2008

Project Value

**R750 million**

