

Gautrain Railway Project

Linear Infrastructures

2006 - 2009



SOUTH AFRICA

Client

BOUYGUES TP

Project owner

Gauteng Provincial
Government

Miscellaneous

77 km of new railway line,

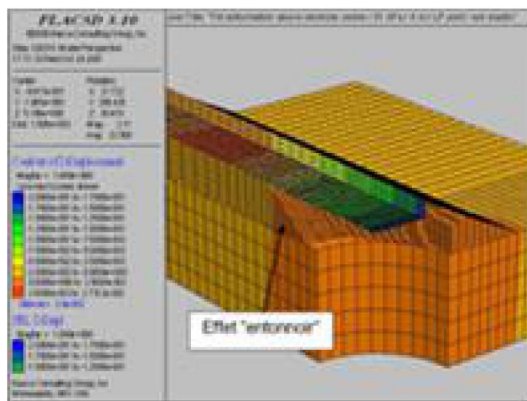
Tunnels: 15,3 km,

Viaducts: 16 (10,4 km),

Standard structures: 48,

Cuttings: 6 million m³

Backfill: 5 million m³



Description of the project

Terrasol was entrusted by Bouygues TP with the geotechnical aspects of one section of the Gautrain project (80 km of a new railway line in South Africa), between 2006 and 2009.



Key features

- Geotechnical studies
- Works monitoring

Description of the mission

Along this section (6 km long), heavily karstified dolomites are overlain with extremely variable altered layers with a thickness ranging from 0 to 80 m. Sinkholes of about tens meters in diameter occur regularly and thus represent the most unfavorable load case for the design of the viaducts foundations and of the earthworks.

The challenge was to design these structures with respect to the « design sinkhole event », which has been defined, after a risk analysis, to be a sinkhole with a diameter of 15 m ; a load case which is not accidental considering the high frequency of the sinkhole events, while the project specifications include strong operational and security requirements.

The structures design allowed proposing various technical construction solutions considering the scale of the soil heterogeneity : for the viaducts, possible solutions ranged from superficial footings to shafts 7 m in diameter and 50 m deep ; for the current section, prestressed concrete beams 180 m long supporting the track. These structures were combined with a whole variety of soil improvement techniques, water management solutions and monitoring equipment.

The works phase confirmed from the very beginning the extremely random geology of these dolomites and of the overlaying altered layer.