



Rennes Metro, a long-lasting involvement

Modelling and works follow-up

2013 – On-going



FRANCE - Rennes

Client

**DODIN CAMPENON
BERNARD**

Highlights

8.1 km tunnel (TBM),
9 stations (2 are
interconnecting with
existing line A),
TBM entry shaft and
4 ventilation/emergency
shafts



The Project

The DODIN CAMPENON BERNARD - SPIE BATIGNOLLES TPCI - GTM OUEST-LEGENDRE OUEST - BOTTE FONDATIONS - SPIE FONDATIONS consortium is contractor for the construction of line B of the Rennes Métropole automatic metro urban transit system, within the framework of works package 1 comprising 8.1 km of tunnel (bored with a tunnel boring machine), 9 stations including 2 interconnecting with the existing line A, the TBM starting shaft and 4 ventilation and emergency shafts.

The tunnel is being bored through a geological context characterised by a very heterogeneous and variable substratum, consisting essentially of a number of Brioverian schist facies, overlain by various thicknesses of substratum alteration (alterites), alluvia and colluvia.

TERRASOL was contracted by the consortium to provide assistance during the tendering process, and has subsequently been working on the geotechnical engineering studies in the execution phase. In parallel, A. Guilloux is working as an expert consultant and participating in the project technical committee.

Key features

- Participation to the works supervision within the Contractors consortium's team
- Finite element modelling (Plaxis 2D and 3D)
- Participation in the Technical Committee

Our Services

In the design phase, TERRASOL carried out the geotechnical engineering studies: definition of the additional soil testing campaign and drafting of the geotechnical synthesis and assumptions for the design of the retaining structures and of the foundations. TERRASOL was subsequently awarded an additional contract for estimating the settlements under the buildings in proximity to the stations excavation works, using 2D finite element calculations (Plaxis software).

TERRASOL has also been working for the last two years in the Works unit reporting to the consortium's technical management: an experienced engineer seconded full time on site is responsible for the geotechnical and geological follow-up of the excavation of the stations and the boring of the tunnel by the TBM. He acts essentially as the geotechnical advisor for the project as a whole. In view of the multiple issues encountered with both the tunnel and the stations, a second TERRASOL engineer was seconded at the end of June 2015 as reinforcement on the operational aspects of geotechnical and geological follow-up of the stations excavation works and on the definition and follow-up of the additional investigations.

In addition, for the last year additional finite element calculations (Plaxis 2D) have been run to update the geotechnical models with respect to the building monitoring results and the station walls movements on the one hand, and to the changes in the retaining structures design proposed during the works (iterative calculations), on the other hand.

Lastly, considering the issues and the retaining walls displacements observed at one of the interconnection stations with existing line A, in spring 2015 TERRASOL was contracted to carry out a 3D modelling of the station under construction : 3D modelling of the new and existing stations, the tunnels and the connecting passages.

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