

## Project Dossier



### PROJECT DOSSIER

## RAIL TUNNEL TO T1 OF BARCELONA-EL PRAT AIRPORT

### PROJECT OVERVIEW

The project was designed to connect the new Terminal 1 of the Barcelona – El Prat International Airport with the Barcelona suburban railway network.

The Terminal 1 was put into service in 2009 to increase the passenger capacity of the Barcelona – El Prat Airport. Now the new tunnel will provide a public transport alternative between the Terminal 1 and the Barcelona city center, as well as with all the Subway Network. It is expected to give service to up to 9 million passengers every year.

The new railway access runs along a total 4,495 m and it includes a tunnel with a total length of 3,385 m. The tunnel boring machine (type EPB named “Gala”) drilled 3,048 m of the total tunnel length. The rest of the tunnel was excavated by cut-and-cover method. The project also included construction of two new stations at Airport Terminals 1 and 2.

The Barcelona – El Prat International Airport is located over the soft soil of the Llobregat Delta. Excavating tunnel at depth of 25.8 m with an enormous tunnel boring machine with 10.6 m dia through a ground with low bearing capacity was a challenge. The challenge escalated as the tunnel crossed under the Hwy C31, the Airport Terminal 2 facilities and the Airport main runway, which was kept into service throughout all the construction works.

Project	Railway Access Tunnel to the New Terminal 1 of the Barcelona-El Prat Airport
Location	Barcelona, Spain
Client	Trazadia (Grupo Álava)
Contractor	Ferrovial – Sacyr – Copcisa
Duration	2016 - 2019



## Monitoring solution

The purpose of the instrumentation and monitoring solution adopted was to control the ground deformations and groundwater variations in the area, to avoid affections to the infrastructure under construction, as well as the existing infrastructures in the area, including the airport runways.

As the tunnel was being excavated quite deep in a ground with low bearing capacity and with high water table, monitoring instrumentation played a critical role. Encardio-rite was the selected supplier of the monitoring instruments deployed in the project.



INSTRUMENT	PURPOSE
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### Existing bridge and pier monitoring

<b>Vibrating wire piezometer</b>	Installed to monitor sub-surface pore pressure and variation of water head
<b>Pressure cells</b>	Installed to monitor pressures applied on precast concrete ring segments and diaphragm walls.
<b>Strain gages</b>	Installed to monitor strain within precast concrete ring segments and diaphragm walls

Hundreds of sensors were successfully installed in the project and gave satisfactory performance during the monitoring period.



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



MINING