Marão Tunnel

The Marão Tunnel Project is part of the so-called European Road 82 - E82, which starts in Porto (in Matosinhos) and extends the A4 motorway to Bragança and Spain.

The total stretch for the global conclusion of the A4 has a total length of 26km, of which 5.667 m correspond to the Marão Tunnel, which consists of two parallel galleries, making a total of 11.335 m of tunnel, which crosses the Serra do Marão in the approximate direction West / East making this the largest road tunnel in the Iberian Peninsula.

The first phase of excavation works on the Marão Tunnel began in July 2009 and was definitively suspended in July 2011, when the two tunnel mouth areas were practically completed and around 7.340 m of the two galleries were excavated.

In February 2014, a new tender was launched for the design and construction of the works necessary to complete the tunnel. The works resumed in October 2014.

Given the significant works' downtime on the first contract, it was necessary to carry out a specific study of the safety conditions in the entire tunnel that had been excavated in the meantime. This aspect, in association with the characteristics of the existing terrains and with an extremely short execution time, constituted enormous challenges for the development of the design.

The current cross-section of each of the tunnels was defined to ensure a minimum useful area of 97.50 m², in order to guarantee that, in the exploration phase, the minimum useful height is of 5.00 m, guaranteeing the insertion of two lanes for each traffic direction.

The tunnel was opened by the conventional sequential excavation method NATM using explosives and heavy excavation equipment. The primary supports installed were materialized through the application of a shotcrete coating of variable thickness depending on the geomechanical and hydrogeological characteristics of the massif traversed, incorporating metallic fibers or electrowelded meshes, and associated with rockboltings or truss elements.

The final covering included a section of reinforced concrete with a constant thickness of 0.35 m, being founded on footings with a thickness of 0.45 m. In the worst areas of the terrain, a threshold was planned for the closing of the section.

Assignment

Base Design for Tender

BAFO proposal technical process (best and final offer)

Detailed Design

Work's Value

88,1 Million €

Dates

from 2009 to 2015

Site

Amarante

Country

Portugal

Client

Teixeira Duarte Construções, S.A / EPOS – Empresa Portuguesa de Obras Subterrâneas, S.A.

Companies

TPF Consultores

Permanent Geotechnical Assistance during the tunnel construction