Portugal

Name: Comissão Portuguesa de Túneis e do Espaço Subterrâneo (CPT) – Portuguese Tunnelling Association and Underground Space

Type of Structure: A Committee of Portuguese Geotechnical Society (SPG), non-profit, open association

Number of Members: 70 individual members, 8 corporate members

ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

In 2020 a new CPT Board was appointed. The current president is Dr. Raul Pistone, former vice president. The former president Ing. João Bilé Serra integrates into the board as past president.

There are seven working groups in operation: GT1 - Registry of Tunnels; GT2 - Contractual Practises; GT3 - Health and Safety; GT4 - BIM and Information Management; GT5 - Innovation and Life cycle Management; GT6 - Construction Methodologies: Conventional and Mechanized Methods; YM: Young Members.

In 2020, CPT worked to organize online events on the Public Works Contract Code (CCP) and its use on Complex Underground Works. CPT published a new Guide of Best Contractual Practices for Public and Complex Geotechnical Works, together with two important organizations: Portuguese Engineers Association and Portuguese Association of Engineering and Management Consultants.

GT2 worked with ITA WG3 and published the ITA Report #25: ITA Contractual

Framework Checklist for Subsurface Construction Contracts (2nd Edition / 2020) that is the revision of the 2011 Checklist.

The GT3 worked in the Preparation and Editing of the Technical Guide "Safety and Health in the phases of Project and Construction of Underground Works".

CPT participated in the ITA's WG actively, through meetings and paper contributions.

During 2020 the CPT secured participation in the WTC in Kuala Lumpur and in the 2020 ITA General Assembly as well as the 2021 Extraordinary General Assembly.

CPT participated actively in the board of the European Forum EUTF and in the Iberoamerican Group on Underground Works.

CURRENT TUNNELLING ACTIVITIES

Lisbon Drainage Tunnels-Municipality of Lisbon

New tender in December 2019. EPC contract for two drainage tunnels (4.5km and 1.3km long) with an internal diameter of 5.5m; three shafts in urban areas with approx. 20m depth and 15m diameter.

Reinforcement of the sewage and water system in Basin Q with Microtunnelling

Works date from January 2019 to March 2020. Lump Sum contract of one microtunnelling pipeline with 1.6m diameter and 320m long, between two shafts (launch and reception) and several sewage box culverts.

Lisbon Metro Extension (subway)

The new Metro extension (construction length over 2000m), which will connect the Yellow Line with the Green Line and is expected to open in 2024, was launched in 2020 and is divided in four Design/ Construction EPC tenders: Lots 1 to 4. The expansion works contain two new stations at Estrela and Santos and two new ventilation shafts. Campo Grande and Cais do Sodré stations will also be reconstructed/adapted as part of the project, corresponding to the new circular line "closing points". Once the extension is placed into service, the Green and Yellow lines will be reorganised. The Green Line will run as a circular route and will take over the section of the Yellow Line

between Campo Grande and Rato, while the Yellow Line will run between Odivelas and Telheiras.

The Estrela station will feature an access shaft, a connection cavern, a 110m long main cavern and two lateral galleries for accessing the mezzanine floor from the subway platform. The Pharmacy building from the old Military Hospital will serve as the main access and be completely refurbished by demolishing its inside, while maintaining and reinforcing the façade. The Santos station will be built in an archaeologically sensitive environment, where a fire station currently operates. It consists of a huge central shaft, two symmetrical caverns and lateral access galleries to each one, as well as a tunnel access from Av. Carlos I.

Oporto Metro System- Pink Line

The construction contract was awarded in 2020 and notice to proceed issued in March 2021. The new Pink Line is 3.1km of tunnel, using the conventional method, between Praça da Liberdade and Casa da Música, including 4 Stations (Liberdade, Hospital de Santo António, Galiza and Boavista/Casa da Música) and three ventilation shafts in urban areas.

Oporto Metro System-Yellow Line

The construction contract was awarded in 2020 and notice to proceed issued in March 2021. The new Yellow Line is about 3km long, between Santo Ovídeo and Vila D'Este stations, including three Stations (Manuel Leão, Hospital Santos Silva and Vila d'Este), a ventilation shaft, about 0.9km of tunnel, by the conventional method, between Manuel Leão and Hospital Santos Silva stations, a viaduct and rollingstock maintenance and parking installations.

The new line starts at the Santo Ovídeo station through the construction of a viaduct, extends in an open trench and continues in a tunnel excavated by conventional methods to the Manuel Leão station. The alignment continues in tunnel to the Hospital Santos Silva, where it emerges in a cut & cover tunnel to the Hospital Santos Silva station. Here, an open trench takes the line to Vila D'Este station.

Considering the space available at the surface, the results of the preliminary geological study and the depth at which the Manuel Leão Station will be located, the tunnel work will be carried out using 3 different construction methods, which will be:

Cut & cover excavation: The method with which the Manuel Leão station will be built, and the ventilation and evacuation shaft.

Excavation with an "umbrella": The method with which the portals and sections of the tunnels will be built in conditions of very weathered to decomposed or very fractured rock, and in areas with low cover. This methodology is expected to be adopted in most sections of the tunnel

Excavation by the Sequential Method will be used in the sections of the tunnels and caves in medium or slightly altered rock conditions.

Electrification and refurbishment of the Minho line ancient railway tunnels. IP – Portugal Infrastructures

The electrification of the tunnels will be carried out using the catenary support of the elastic suspension type. The maximum speed allowed by this type of support is 110km/h.

The three tunnels.in this section total 1471m in length:

- São Miguel da Carreira, built in 1876, about 260m long.
- Tamel, built in 1878, about 980m in length.
- Santa Lucrecia, built in 1878, about 230m long.

All tunnels were subjected to rehabilitation works and waterproofing of the vault over the catenary

Rehabilitation of several others ancient rail tunnels

Works dated from 2018 until 2020: Albergaria, Pragal, Seixas, Outeiro Grande, Portas de Rodão, Eirol, Caíde

Alto Tâmega Hydroelectric System – IBERDROLA. Under construction.

The system comprises the following hydroelectric complexes:

Gouvães

Dam height: 30m
Installed power: 880MW
Hydraulic circuit length: 7.6km
Reservoir area and volume: 176ha - 13.7hm^3

Daivões

Dam height: 77.5m
Installed power: 118MW
Hydraulic circuit length: 0.25km
Reservoir area and volume: 340ha – 56.2hm^3

Alto Tâmega

Dam height: 106.5m
Installed power: 160MW
Hydraulic circuit length: Powerhouse at the dam foot
Reservoir area and volume: 468ha – 132hm^3

STATISTICS

1. Length or volume excavated - % mechanized / % conventional during 2020: 3,000m, 100% Conventional

2. Amount (USD or EUR) of tunnelling / underground space facilities awarded in 2020: €400M