

Argentina



Name: Asociación Argentina de Túneles y Espacios Subterráneos (AATES)

Type of Structure: non profit, open association

Number of Members: 45 members, 6 corporate members

ASSOCIATION ACTIVITIES DURING 2018 AND TO DATE

In 2018 the Argentine Tunnelling Association continued working to show society the benefits of the underground environment, both through the implementation of technical events and training courses, and the dissemination of materials via technical and social media.

In September, a 3 Day Tunnelling Congress was held under the title "Progress of Large Underground Works - Sharing Experiences", with the participation of the ITACET Foundation, for the development of a training session about "Management of (User) Safety in Underground Facilities".

Two online webinars were developed for the Argentine Construction Chamber, the first dealing with "Construction of Tunnels with Tunnel Boring Machines" and a second with the use of the "Pipe Jacking Method".

For the Water Company of Buenos Aires, AYSA, a 1 day classroom course was held, focussing on the same technical topics but for site inspectors and foremen. Due to the number of representatives from the company, the course was repeated twice.

CURRENT TUNNELLING ACTIVITIES

Extension of Metro Buenos Aires, Line H - Buenos Aires

North section: 4 new stations constructed with the NATM method, featuring single large caverns of approx. 18m width and approx. 2km single tube double track running tunnels. By the end of 2017 the first 3 stations of this extension were opened to operation, whilst the last one, the end station Facultad de Derecho, was inaugurated in May 2018.

South section: 2 garage and 1 workshop caverns are already in operation; the second workshop cavern is still in construction. The remaining station Saenz, at the South end, is expected to be constructed using PPP, but is yet to be tendered.

Undertunnelling of the Sarmiento Railway Line - Buenos Aires

Replacement of the present Railway Line "Sarmiento", running from the Western

Head Station of Buenos Aires (Station Once) to Station Castelar, located at a distance of approx. 22km, via double track tunnel, mainly excavated by 12m diameter EPBM, and also with a short NATM section. Along this section lie 9 stations, 7 of them mined and 2 in cut & cover. The NATM mined stations have a length of approx. 240m and a cross section of 280m². During 2018 most of the drainage works for the stations were finished and some of the access structures advanced. The running tunnel construction progressed steadily, reaching a total length of approx 6.5km and approaching the intermediate shaft at station Villa Luro. During this year the contractor JV has moved along the basic design of all superficial and underground components of the project and the detail design of all structures which are directly associated with the construction of the running tunnels.

It was decided that the mined stations caverns will be excavated after the passage of the EPB Machine.

Sewer Left Margin Riachuelo River and Emissary - Buenos Aires

This project comprises the construction of two main sewers: one located parallel to the Riachuelo River, on its left, with approx. 9.5km length, and an inner diameter of 3.2m, and the second coming from the city, 5.2km long with a 4.5m diameter, both to be excavated with an EPBM.

Additionally, the project features a Treatment Plant and an Emissary of approx. 12km length with 4.3m inner diameter to be excavated into the La Plata River, also with an EPBM. Three contracts were awarded in 2015 (sewers, plant, emissary), which presently are all in construction. During 2018 the construction of the treatment plant was initiated, after a large landfill. The excavation of the emissary progressed continuously, reaching a total length of 6km. The slurry shield machine used to excavate the left side sewer will begin excavation this year. The EPBM for the construction of the sewer section to the city of Buenos Aires has advanced 2km.

Relief Tunnel of the Vega River - Buenos Aires

This project comprises the construction of a relief tunnel for the existing underground "Vega River", with a total length of 8.4km (6km with a Herrenknecht EPBM of 5.3m i.d.) and the rest by 2.4m i.d. pipe jack, using an AVN 1600 slurry machine, also from Herrenknecht). Additionally, the project comprises other secondary galleries in NATM and various shafts. The project was awarded mid 2016 and is in progress. The break-in of the main EPBM took place in April 2018 and since then, to the end of 2018, approx. 3000m have been excavated, which is half of this tunnel section. The pipe jacking slurry machine started work at the end of August 2018, and completed the second jacking section of 435m length of the total 800m, before Christmas. Meanwhile, some other NATM galleries and intermediate shafts are partially completed.

Underground Water Main "Río Subterráneo Sur" - Buenos Aires

This project will provide a new potable water distribution main, fed by the Gr. Belgrano water purification in Bernal, to the southern area of Buenos Aires, feeding a population of 2.5M people. It consists of a 23km long underground river and 2 large pumping plants, which was tendered for construction by the water company AYSA in 2 contracts. The first, awarded in September 2017, comprises an initial 13.5km long section of the 4.6m dia. main and the pumping station N°1. A Terratec EPBM has already been purchased for this contract, which will start excavation from a launch shaft, currently under construction, in October 2019.

2 Road Tunnels on the National Highway 75 - Province of La Rioja

The project's objective is to bypass a road section aligned within a creek, featuring beautiful gardens and weekend houses, by the construction of 2 bidirectional road tunnels of 560m and 890m in length. The construction is by conventional tunnelling with a shotcrete lining and a prefabricated inner lining. The excavation of the shorter tunnel started in August 2017, with the second commencing in 2018. To the end of 2018 approximately 100m of the top heading section of the first tunnel was completed.

Several Sewer projects in Buenos Aires

Within Buenos Aires a large quantity of sewer projects are being implemented, by means of pipe jacking, as requested by the Water and Sanitation Company AYSA. In 2018 there were eight active projects using pipe jacking in Argentina, with lengths between 2000m and 5000m. Typical diameters used range between 0.8m and 1.5m, with jacking sections between 200m - 300m.

Highway "Paseo del Bajo", City of Buenos Aires

This new highway runs alongside the coast of Buenos Aires, closing the circle around the city. Its central 8km long section, located between the "Puerto Madero" neighbourhood and the city downtown, features an alignment located within a trench, with frequent crossings where it is covered. This highway is scheduled to be inaugurated mid 2019.

FUTURE TUNNELLING ACTIVITIES

Red de Expresos Regionales (RER)

In 2016, the present national government presented this very challenging project, featuring the underground inter-connection of the 3 main railway head stations in Buenos Aires: West Station "Once", South Station "Constitución" and North Station "Retiro".

The project comprises 20km of new railway lines, approx. 85% in an underground alignment with the rest on viaducts. Besides the underground enlargement of the head stations, 4 new underground stations will be constructed with the NATM method with approx. 280m² cross section. During the present year, all three viaducts were initiated and are fairly advanced, with completion set for mid-2019. However, the first 2 contracts for the underground section between Head Station Constitución (South) and Head Station Retiro (North), comprising the extension of the Roca and Belgrano railway lines, tendered in 2017, were delayed. These contracts cover the underground Station Constitución and the Central Roca Station, together with approx. 8km of 2 track running tunnels. Presently this section is being adjusted by the Authority to optimise it from a technical-economical point of view. As a part of this process it was decided not to incorporate the Belgrano railway in the first phase. The date for a new tender is still not defined, but it will be in either 2019 or 2020. The investment

for this section of the RER project is budgeted for US\$3.5bn. In parallel, the tender design of the section between the Head Station Once (West) and the Head Station Retiro, crossing the Section at the Central Roca Station, is being developed, which will be tendered in a second construction phase. The whole project will take at least 8 years, with an estimated budget of US\$5bn.

Bi-National Trans Andean Tunnels - Argentina - Chile

Agua Negra Tunnel: This 14km long, twin tube Road Tunnel is the project of the highest priority for both countries. Its financing will be provided by the IDB for the Argentine part, whereas Chile will finance its part without the support of the bank. A new pre-qualification process for contractors was launched in 2017, with the short list of companies published in 2018. According to the latest developments, it seems that both countries still do not agree on a final technical solution for this project. Meanwhile, the bi-national Authority EBITAN is fairly advanced in the preparation of the tender documents, a process which is supported by the IDB.

Corredor Bi-oceánico del Aconcagua: This Private Initiative, featuring a railway connection between Mendoza (Argentina) and Los Andes (Chile) with a 52km long base tunnel, developed so far to a preliminary design, was finally approved by both countries. According to our present knowledge, no further design activities are in progress by the private group who developed this initiative.

Las Leñas Tunnel: This approx. 11km long, twin tube Road Tunnel is officially recognized by both countries as the second most important bi-national base tunnel. It has been decided that a tender will be launched for the development of a geological survey and a revision of the currently proposed alignment and tunnel concept. This tender was published in December 2018 and is presently in progress. The associated study would have a duration of approx. 1.5 years.

Tunnel Cristo Redentor - Second Tube: With the support of the IDB during the present year the design of the second tube of the existing Cristo Redentor road tunnel, of approx. 3.1km length, was completed and prepared for tender for construction. This second tube will be constructed as an enlargement of the existing single track "Caracoles" railway tunnel, which was part of the

Transandean Railway from Buenos Aires to Valparaiso and has been out of operation since 1978. To the end of 2018 both countries did still not agree on the final version of the tender documents, which means that this project is also expected to commence in 2019.

Metro Buenos Aires

For 2019 onwards the Buenos Aires city government is planning to construct the new Metro Line "F", a circumferential line which crosses most of the existing lines, and also extend both Lines "H" and "E", one of them probably to the domestic city airport "Aeroparque".

STATISTICS

1. Length or volume excavated - % mechanized/% conventional during 2018

- Length excavated: approx: 17.5km (not including small diameter pipe jacking galleries)
- % Mechanized: 97% - conventional: 3%

2. Amount (USD or EUR) of tunnelling/underground space facilities awarded in 2018

- There were no large tunnelling contracts awarded during 2018

3. List of tunnels completed:

- There were no tunnelling contracts completed in 2018

4. List of tunnels under construction

- Undertunnelling of the Sarmiento Railway, Buenos Aires
- Relief Tunnel of the Vega River, City of Buenos Aires
- Sewer tunnel Riachuelo and emissary into the Rio de la Plata River
- 2 Road Tunnels on the Highway 75 in the Province of La Rioja
- "Río Subterráneo Sur", water main, in Buenos Aires

EDUCATION ON TUNNELLING IN THE COUNTRY

Postgraduate Course of Design and Construction of Tunnels and Underground Works at the Engineering Faculty of the University of Buenos Aires, held for the first time in 2018, with a duration of 32 hours. Both lecturers, the engineers Ezequiel Zielonka and Jorge Laiun, are members of AATES.