

Colombia



Name: The Colombian Tunnelling Committee

Type of Structure: Non-profit, open association

Number of Members: 7 members that represent more than 2000 engineers in the country

ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

- The members of the working group (TG 10) have contributed to the work carried out between FIDIC and ITA in 2019 'Conditions of Contract for Underground Works'.
- The Committee worked with the Colombian Society of Engineers as part of the review team of the Tunnelling Design Manual Developed by Invias (National Roads Institute).
- The committee carried out technical talks and activities with the following Working Groups:
 - WG3 Contractual practices in underground construction
 - WG6 Maintenance and repair of underground structures
 - WG12 Sprayed concrete use

WG15 Underground and environment
WG19 Conventional tunnelling
YM ITA Young Members Group

In 2020, the Colombian Tunnel Committee prepared three technical publications to be published at the next congress in 2021, called:

- Design and Construction Considerations for Two Shallow Highway Tunnels in Soft Ground - C. Marulanda and R. Gutierrez, Ingetec, Bogotá. Colombia
- Analysis of the Squeezing Phenomenon and Rehabilitation of La Línea Roadway Tunnel - C. Marulanda (1) and R. Gutiérrez (2) - (1) Technical Manager, (2) Head of Tunnelling Department - Geotechnical Division, Ingetec SA, Bogotá, Colombia
- Final Document on in-situ stress

measurement – ITA working group Bulletin No. 12 - Camilo Marulanda, with historical cases.

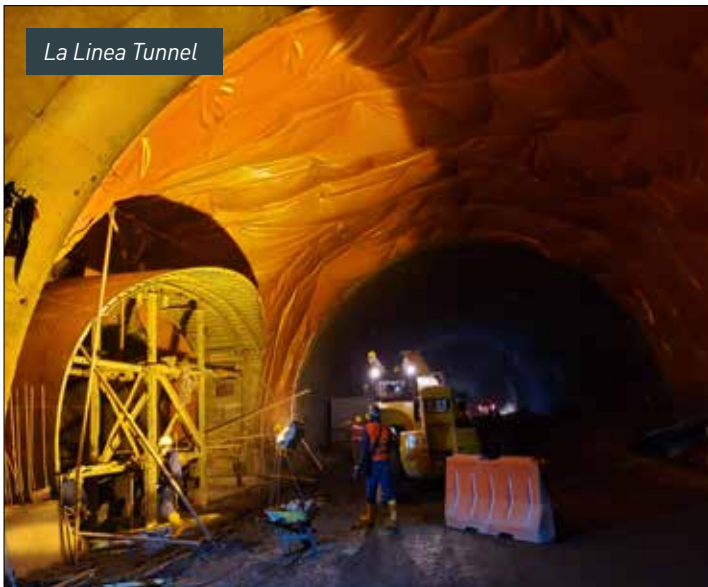
CURRENT TUNNELLING ACTIVITIES

Until 2015, the hydroelectric sector was developing large projects that required, as an integral part of the designs, the construction of tunnels and deep caverns of all kinds, including some roadway tunnels to connect neighboring towns to the projects. The hydroelectric projects have represented a significant growth in the knowledge of the design and construction of tunnels in Colombia.

To mitigate long trips from ports to production centres and vice versa, the design and construction of highway tunnels has increased in recent years, the main objective of which is to improve specifications and reduce longitudinal slopes on the roads.

In recent years, the Colombian government has made large investments through the fourth generation 4G concession plan, which projects the construction of tunnels of different characteristics.

The construction of tunnels has become a fundamental pillar to the national road network with more than



La Linea Tunnel



Balconcitos Tunnel

45km of tunnels currently being built. In the last two decades, the 4.5km long Buenavista tunnels, the 4.6km San Jerónimo tunnel in Antioquia and the Piloto tunnel on the 8.6km line, and the 4.6km long Sumapaz tunnel have been built on the Bogotá- Girardot highway, among others.

At present, several roadway tunnel projects are being developed, where the following stand out:

- Four tunnels on the Ruta del Sol
- Twenty two tunnels on the Buenaventura - Buga road, for a total of 8.8km of tunnel.
- Nineteen tunnels on the Bogotá Villavicencio road.
- The completion of six tunnels totalling 15km on the Highways on the Mountain Range.
- The 8.6km Line tunnel located on the Ibagué and Armenia road, being one of the most challenging due to its geological and geotechnical complexity and making it the longest in the country for at least two years in South America.
- Similarly, in 2020 and 2021, the construction of 25 short tunnels attached to the Linea tunnel will be completed, crossing the central mountain range in Colombia.

FUTURE ASSOCIATION ACTIVITIES

The committee will organize the 2021 Virtual Tunnelling Symposium, in which all Working Groups will participate with topics covered during the year.

The committee will work on an academic article about tunnelling based on the local Working Groups research

The committee will organize more short talks with invited experts, which will be open to all interested members of the community.

STATISTICS

1. Length or volume excavated - % mechanized / % conventional during 2020

100% of the tunnels that are being built in Colombia are excavated with conventional system. Up to date there are no mechanized tunnels.

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

The amount in 2020 - 2021 is of the order of US\$2,500,000,000

Additionally, there are about 84km of tunnels under construction which are expected to be completed by the year 2025.

In terms of hydroelectric plants, the Colombian Energy Mining Planning agency (Upme) has planned three initiatives for hydraulic projects in the country that are in phase three, and already have their final designs and construction schedule settled. These projects are the San Andrés de Cuerquita hydroelectric plant, the Porvenir II project, and the Hidronare hydroelectric plant. The Talasa Microcentral projects are also being carried out.

In addition are projects to generate a greater amount of electrical energy that are in feasibility, they are: The Miel II hydroelectric plant, which would be carried out in the municipality of Caldas and which would have a capacity of 120 megawatts, and the Río San Juan hydroelectric system, which would have a capacity of 117.5 megawatts.

All these projects have a high component of underground works.

EDUCATION ON TUNNELLING IN THE COUNTRY

Postgraduate course on the construction of soft ground and hard rock tunnels/
University: Escuela Colombiana de Ingeniería Julio Garavito/Bogotá, Colombia.

Postgraduate course in Application of the geology and geotechnics in tunnel design/
University: Educación Continua EAFIT

Postgraduate course in design and construction of roadway tunnels/University:
Santo Tomas/Bogotá, Colombia.

Workshop of hard rock slopes and tunnels design/University: Los Andes/Bogotá,
Colombia.

Course in underground construction/University: Los Andes/Bogotá, Colombia.

Course of engineering applied to mining/University: Pontificia Universidad Javeriana/
Bogotá, Colombia.

Course in the project management of roadway engineering, bridges and tunnels/
University: Universidad Nacional de Colombia/Bogotá, Colombia.

Course in tunnels: Design, construction, supervision and technology innovation/
University: Universidad Nacional de Colombia/Bogotá, Colombia.