Tunnels

FCC Construcción

Value contribution

Internationalization

Present in **25 countries**.

Experience

More than **100 years** of experience.

Innovation

Development of **innovative technologies** in each project.

Care for the environment

Excellent environmental practices in all works.

Environmental Management system according to **BS-EN ISO 14001**.

Professionalism

Team of more than **8,500 professionals** with in-house technical services to support our .

Quality

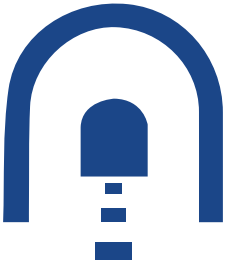
Based on insistent, permanent improvement. Quality management system according to: **BS-EN ISO 9001.**

Security and health

Health Safety and wellbeing of people are our priority. Risk prevention management system labour certified according to: **OHSAS 18001**.

Local development

Community engagement, development and support where we operate.



Extensive tunneling
experience

FCC Construcción has extensive experience in the construction of underground infrastructure. We have built more than 700 kilometers of various types of tunnels for use as; roads, railways, water supply and other vital services amongst others. **FCC** has always applied experience, innovation, professionalism and the guiding principle to extract best value for our clients to employ the most suitable construction methods for every project.

The important progress made in recent decades in the field of continuous drilling and excavation of tunnels, allows us to execute the most challenging, large underground projects demanded by society.

FCC has had more than twenty TBM in service in large infrastructure projects.

Jaen, Spain

Despeñaperros
Tunnel

The Despeñaperros tunnel are **the most relevant of the five pairs which have been constructed as part of the Autovía del Sur (A-4)** between the provinces of Ciudad Real and Jaén. The two tunnels are 1.92 kilometers long southbound and 1.85 kilometers long northbound.

FCC Construcción was awarded the “Acueducto de Segovia” 2013 by the Autovía del Sur A-4. This construction improved road safety resulting a big reduction of traffic accidents, as well as a reduction in travel time for more than 24,000 drivers who travel the route daily.

Barcelona - Gerona, Spain

Bracons
Tunnel

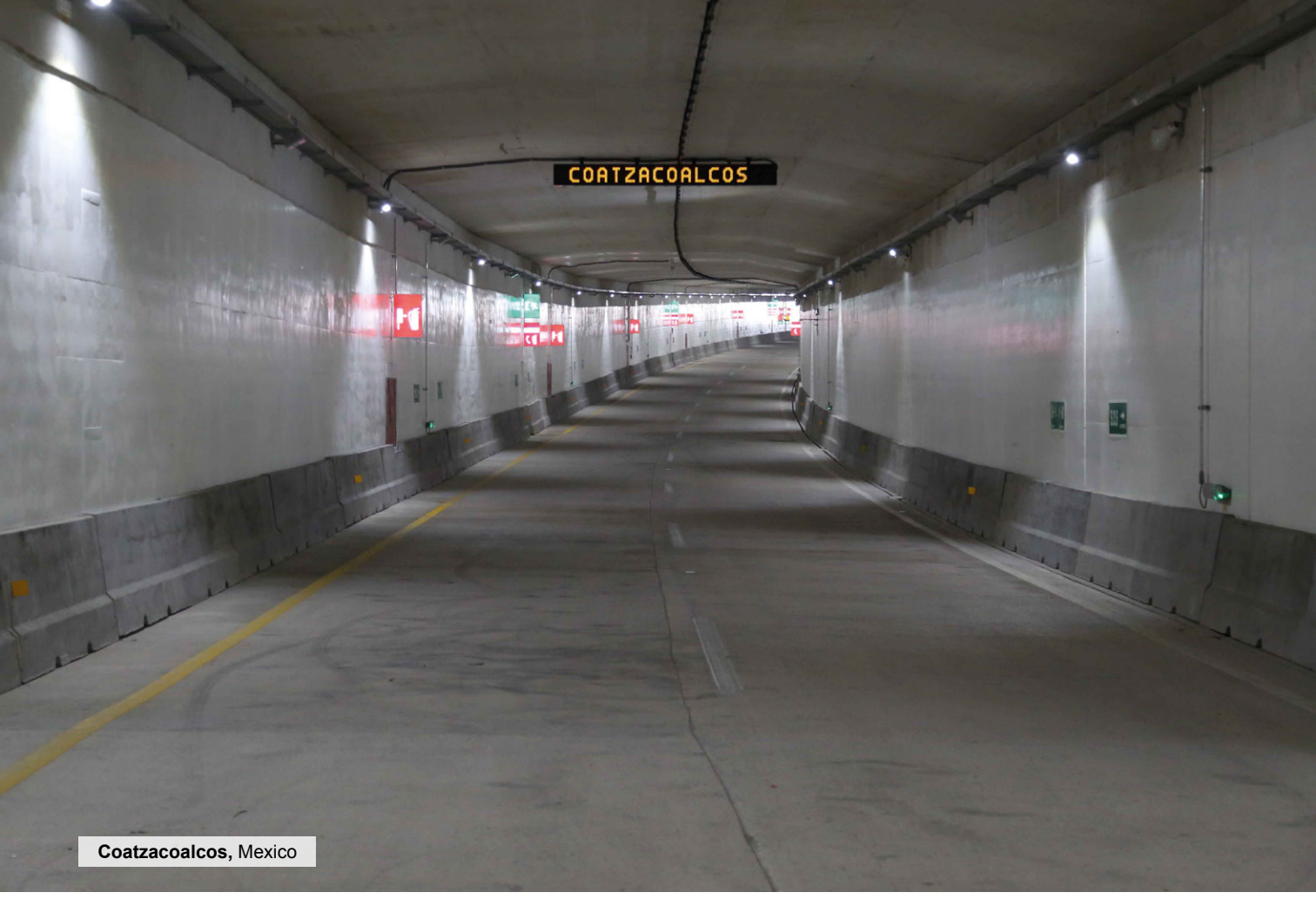
The Bracons tunnel is located on the Torrello - La Vall section d'en Bas of the new Vic - Olot road (Barcelona). Has a total length of 4.57 kilometers. The construction method employed was the New Austrian Method (NATM), digging the tunnel to full section and using seven types of support.

The construction of this infrastructure was of paramount importance for the Vic - Olot road, reducing the time taken to travel between the two communities by half.

Andorra, Andorra

d'Envalira
Tunnel

The d´Envalira tunnel is the highest in Europe and aorms a road connection between the north of the Andorra and the south of France. It consists of a single 2.87 kilometers tunnel with a single carriage way. This tunnel was excavated from the two mouths simultaneously using the New Method Austrian (NATM). Excavation methods varied from the use of explosives in areas of harder rock and machine excavation in more suitable strata. The tunnel d´Envalira is one of the main vehicle access channels in the central Pyrenees area and the only underground passage that connects Andorra to France.



Coatzacoalcos, Mexico

Coatzacoalcos Tunnel

The submerged tunnel of Coatzacoalcos is located southeast of the state of Veracruz (Mexico). This tunnel which was partially submerged and was made with reinforced concrete, post-tensioned longitudinally. It has a total length of 1.14 kilometers, of which 696 meters was submerged. The tunnel was constructed using the Cut and Cover method.

This piece of infrastructure was the first submerged tunnel of Latin America. Currently more than 26,000 vehicles make use of the tunnel daily.

Antioquia, Colombia

Tunnel
Guillermo Gaviria Echeverri

The Toyo tunnel, located between the municipalities of Giraldo and Cañasgordas, is part of the Autovía del Mar that will connect Medellin with the port of Urabá. This tunnel, with a length of 9.74 kilometers, it is the longest of the eight planned for cross the western mountain range of Antioch. The excavation has been completed using the New Austrian Method (NATM). The construction of this infrastructure will result in an improvement in daily travel times for commuters.

When the project is inished, it will become the most tunnel throughout Latin America.

Leon - Asturias, Spain

Pajares
Tunnels

The Pajares tunnels are part of the line project High speed León - Asturias. The project entails the execution of two, 24.6 kilometers long tunnels. FCC excavated 15.05 kilometers on the right track and 9.85 kolometers on the left track. The entire tube was made with two single shield, articulated TBMs.

This work presented a great technical, engineering and construction challenge, **becoming the sixth longest railway tunnel in Europe, the seventh in the world and the second in Spain behind the Guadarrama tunnels.**

Madrid - Segovia, Spain

Guadarrama
Tunnel

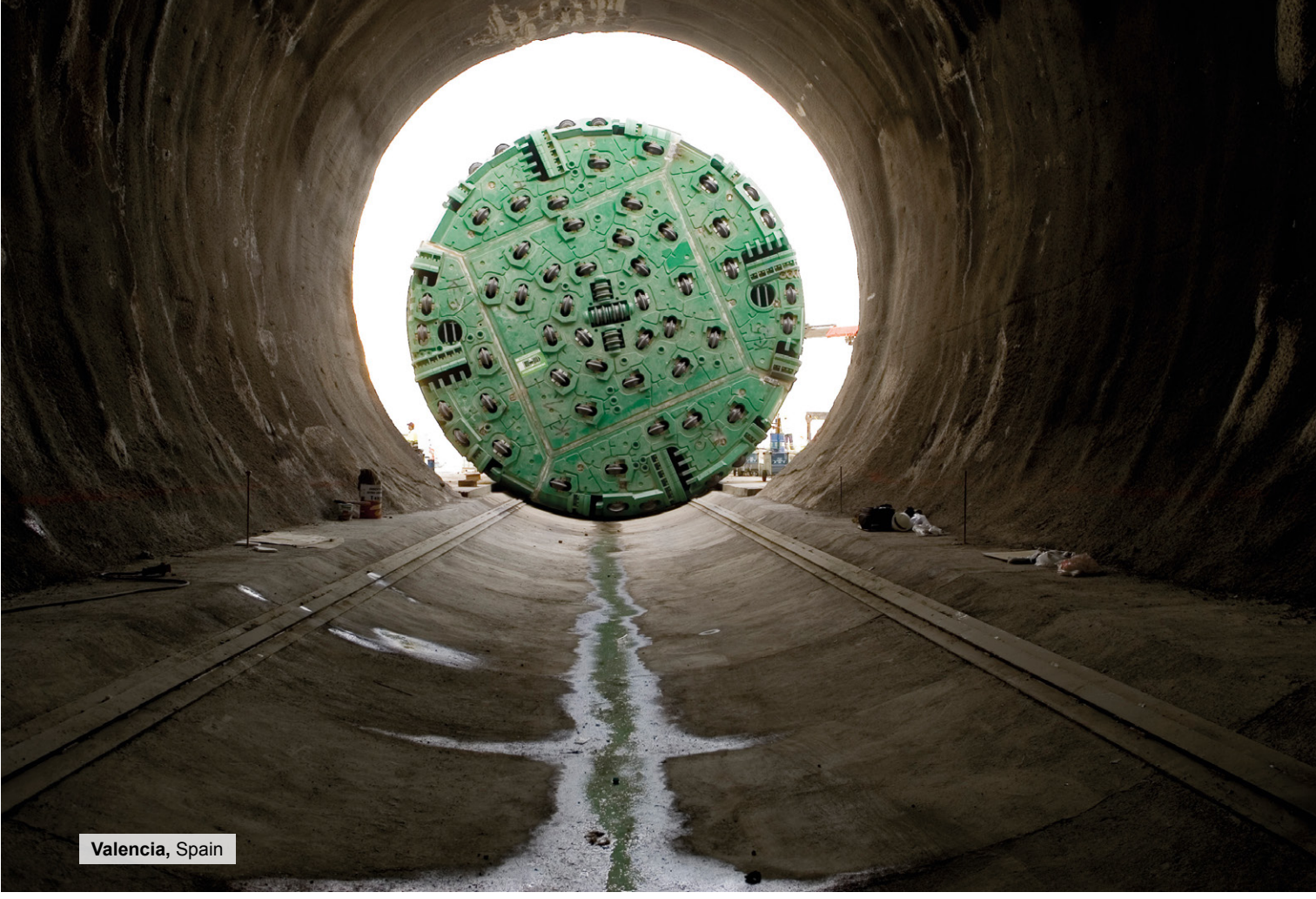
The Guadarrama tunnel is part of the Madrid - Segovia - Valladolid high speed line and connects the downtown area to the North of the country with two 28.4 kilometers, parallel tunnels . The parts executed by FCC was 13.3 kilometers in one tunnel and 15.8 kilometers from the other. The excavation was done by double shield TBM.

The Guadarrama tunnel is the fourth longest in Europe and the fifth of the world. The project was awarded the demarcation of Madrid of Colegio de Ingenieros de Caminos, Canales y Puertos (CICP).

Barcelona, Spain

Tarrasa Rambla
Can Roca
Tunnel extension

The extension of the Generalitat Railways line of Catalonia (FGC) included the construction of a double tunnel that run through the centre of Terrassa, serving the UPC / Vall stations - Paradís and Can Roca and the new RENFE station. The completing of the two tunnels, 3.17 kilometers and 3.13 kilometers long, was performed by Earth Pressure Balance tunnel boring machines. The extension of this line has improved mobility in the Vallès and its connections with Barcelona as well as with its metropolitan area, providing service to more than 30,000 travellers daily.



Valencia, Spain

La Cabrera
Tunnel

The tunnel of La Cabrera is located on the section Siete Aguas-Buñol of the high-speed line Madrid - Cuenca - Valencia. This is the longest tunnel of this high-speed section with 7.25 kilometers in length. The Madrid side it completed using the New Austrian Method (NATM) and the Valencia side a double shield tunnel boring machine (TBM).

During 2018, the number of passengers who used this High-speed line, amounted to 2.5 million.

Atocha - **Chamartin**

High speed line tunnel

The high-speed underground section between Atocha - Chamartín involved the construction of the platform and the tunnel between both railway stations. Bored to accommodate double international track and width, the tunnel length is 6.82 kilometers. **Most of the tunnel has been excavated with tunnel boring machine**. The tunnel execution was an engineering challenge, given the urban environment in the which it was executed; requiring multiple crossings with existing heritage buildings, and transport infrastructure.

Toronto, Canada

Highway 407 station and Northern **Tunnels**

Highway 407 Station is a newly constructed underground station; 165 meters in length and 23 meters below ground. The station consists of three levels, two underground and one on the surface. The 8.36 kilometers section of tunnel was constructed using three methods; earth pressure balance (EPB) TBM; the “false tunnel” system and sequential excavation or Austrian method.

The 2015 Major Infrastructure (Canadian) award for Project of the Year granted by the Association of Tunnels of Canada (TAC) highlighted the project’s success.

Panama, Panama

Panama
Metro
Line 1

Line 1 of the Panama metro runs from north to south of the capital and it links the city centre with the suburban neighbourhoods. Its extension includes a total 15.9 kilometers tunnel. There are 14 stations along the line (6 elevated, 7 underground and 1 half buried).

The tunnel section was executed by 2 EPB tunnel boring machines. The line 1 construction for the Panama subway turned out to be the first subway built in Central America, which was of direct benefit to more than one million users.

Madrid, Spain

Underground
M-30

The work consisted of burying 1,666 meters: two tunnels of three lanes traffic lanes, that link to the south bypass and two others with two lanes, which go to the south node. For implementation the “Cut & Cover” method was used.This complex engineering project required careful planning and coordination of the different activities which attained successful completion four months ahead of schedule.

Some of the project benefits include; recovery of the Manzanares river bank, freeing it from vehicular traffic and restoring pedestrian footpaths whilst creating a large green corridor.

Lima, Peru

Metro Lima
Line 2 and 4

The project consists of the construction of 35 stations underground metro, linked along 35 kilometers of tunnels. The excavation combined the use of TBM's with the New Austrian Method (NATM). **FCC Construcción, received the Americas Deal of The Year 2015 award for this project.** This project will serve more than 600,000 thousand people each day.

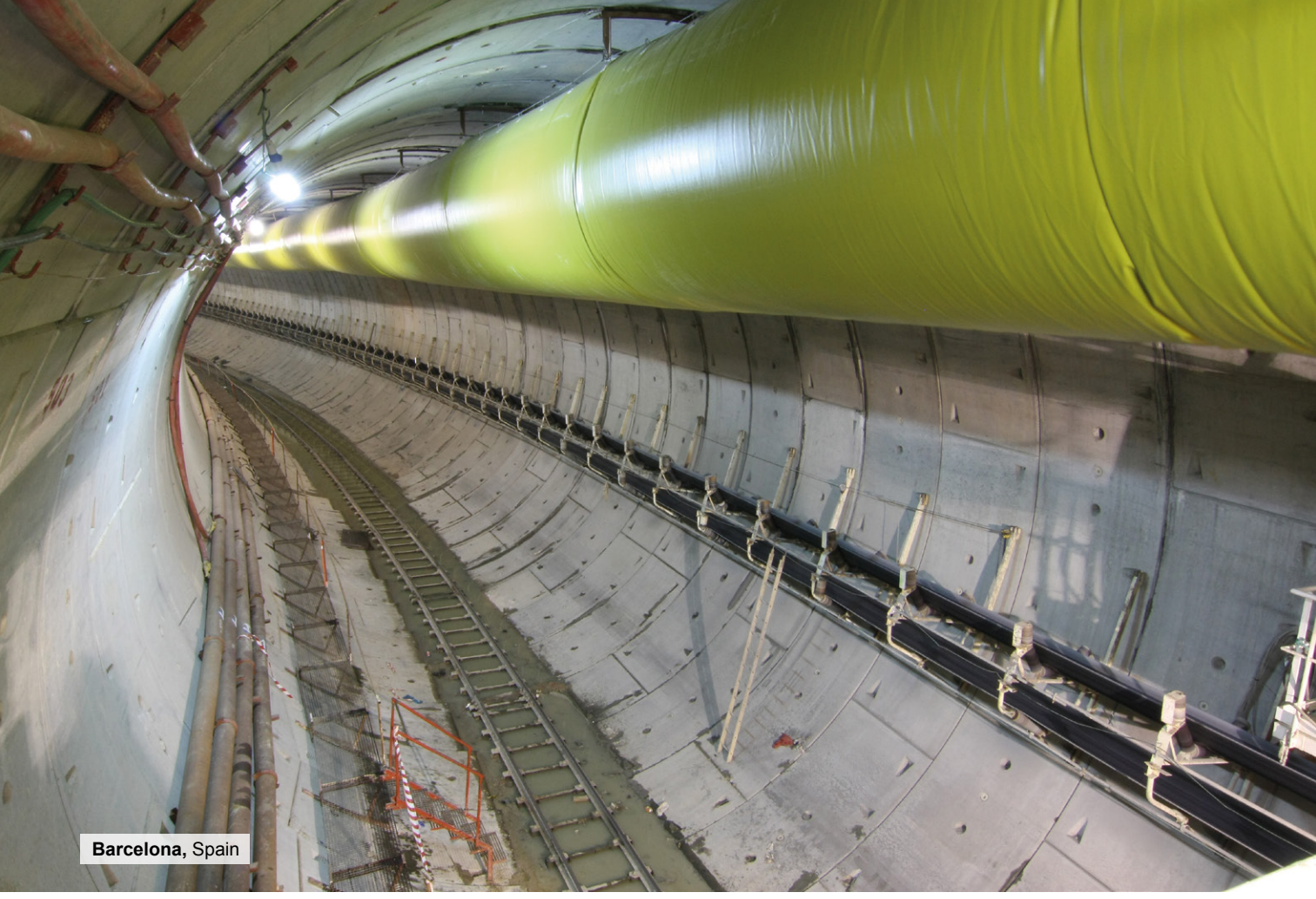
Riyadh, Saudi Arabia

Riyadh
Metro
Lines 4, 5 and 6

The construction of lines 4, 5 and 6 of the Riyadh metro comprises 64 kilometers of which 22.6 are underground.

- Line 4 (yellow): 6.22 kilometers was built by the “Cut & Cover” system.
- Line 5 (green), used two TBMs (Tunnel Boring Machines) to build a 13.7km line.
- Line 6 (purple): 3.12 kilometers of tunnel executed using the “Cut & Cover” system.

It is the largest metro project in the developed world by a Spanish company.

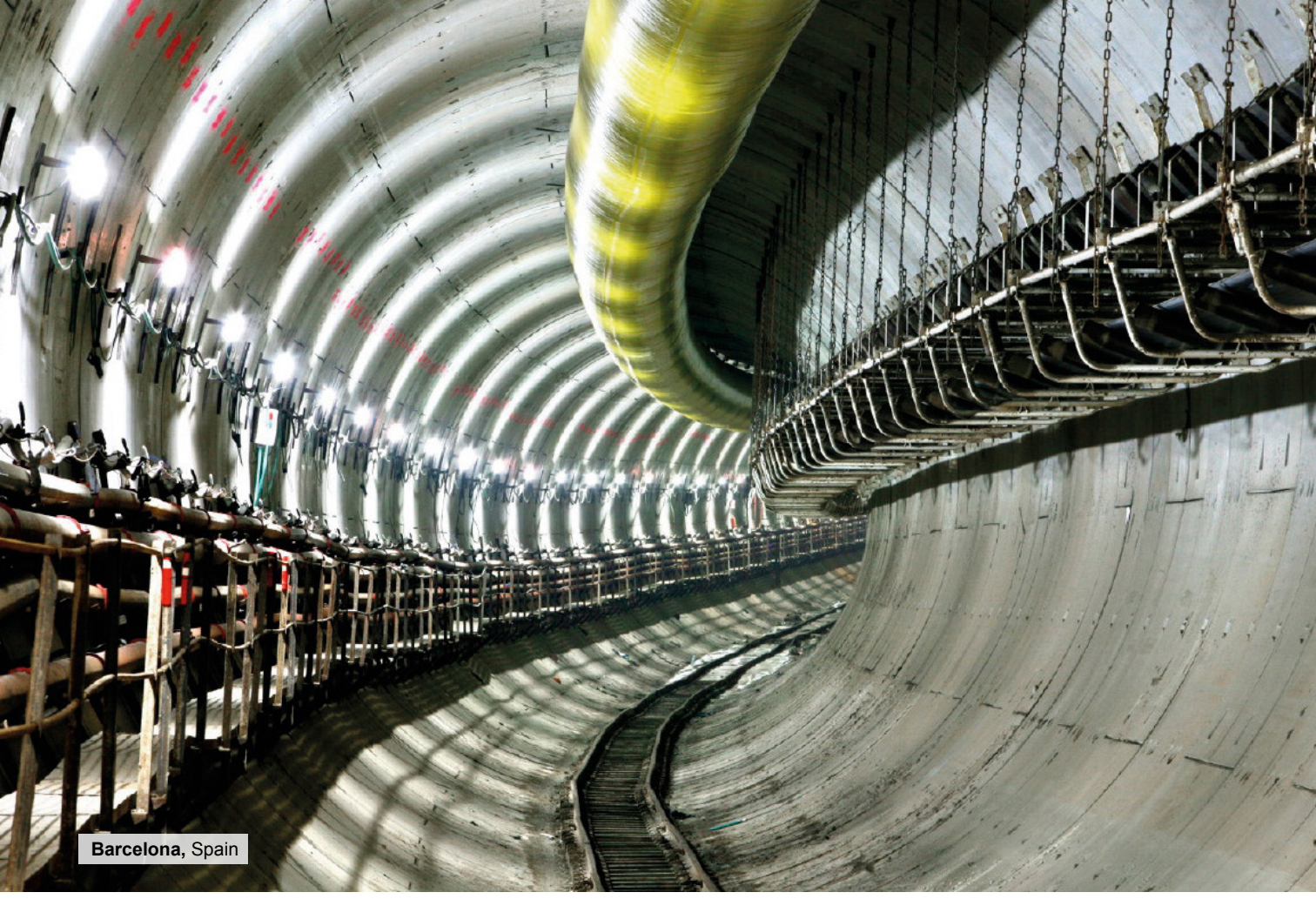


Barcelona, Spain

Barcelona
Metro
Line 9

Section 4 Bon Pastor - Can Zam.

The line connects the neighbourhood of Bon Pastor with Oliveres. Section 4 of line 9 of the Barcelona metro, was 4.29 kilometers, and was executed by tunnel boring machine. Construction was carried out with a TBM capable of working in open mode and closed (EPB).



Barcelona, Spain

Barcelona
Metro
Line 9

Extension of the southern section.

The extension of the southern section of line 9 joins the University Zone station, in the district of Les Corts, with the T-1 and T-2 terminals of the Prat airport. FCC built 14.9 kilometers of tunnels to cover; 7 stations and 13 ventilation wells, with a total of 19.5 kilometers underground and 13 stations in the entire section.

In 2017, the section of Metro Line 9 was awarded Section University Zone-T1 Barcelona Airport.

Malaga - Cadiz, Spain

Guadairo
Majaceite
Hydraulic tunnel

The hydraulic tunnel of Buitreras, located between the provinces from Málaga and Cádiz, with approximately 12 kilometers long. It allows the transfer of fresh water between the basins from the Guadiaro and Majaceite rivers. The main part of the work entailed excavation of a 4.90 meters diameter circular tunnel, made using a double TBM telescopic shield.

The works guarantee fresh water supply to over one million people.

Aqueduct II
Queretaro

The aqueduct has a length of 123 kilometers and runs from northeast to southeast; much of the territory of the state of Querétaro. The production capacity is 1,500 litres per second. The Querétaro Aqueduct is one of the most important hydraulic works in Mexico meeting the water supply challenges by guaranteeing the supply to a million people.

In 2012 this FCC built aqueduct in Mexico was selected by KPMG as one of the 100 best urban projects of the World.

Queretaro, Mexico

Barcelona, Spain

Tunnel and pipping
Fontsanta - Trinitat

The Fontsanta - Trinitat hydraulic tunnel (Barcelona) allows direct water pipe connections between Fonstana to Trinitat. With total Pipe lengths of 14.9 kilometers, of which 2.9 kilometers are laid in a trench and 12 kilometers in a tunnel that can be accessed for maintenance. The tunnel section was executed with two TBMs. The construction of this work has made it possible to supply drinking water to a population of more than five million people.

Tenerife, Spain

"Anillo Insular " **Road**

This is a key infrastructure to improve mobility and connectivity between the north and south of the island of Tenerife, as well as to relieve traffic congestion on the TF-5 highway in the direction of Santa Cruz de Tenerife.

The project consists of the construction of the road section of the closure of the Tenerife “Anillo Insular” Road between kilometer point 11,270 with the connection with the TF-5 in the town of San Juan del Reparo, in the municipality of El Tanque, and kilometer point 22,609 with the connection with the TF-1 in Santiago del Teide.

The Erjos Tunnel is made up of two parallel tubes, each 5.1 kilometers long, running under the Teno Massif, and is the longest tunnel in the archipelago and one of the longest road tunnels in Spain.

WE ARE **FCC**

More than 1,000 kilometers of tunnels

More than 10,000 kilometers of highways

More than 3,500 kilometers of railways (1,500 kilometers of high speed and 450 kilometers of metro)

More than 5,500,000 square meters of airport runways

More than 2,500,000 square meters of airport terminals

60 kilometers of dykes and 50 kilometers of docks

130,000 homes built
More than 40 million square meters of non-residential building

More than 3,000 kilometers of gas and oil pipelines

More than 20,000 kilometers of water pipe

More than 110 water treatment plants

www.fcc.es
www.fccco.es

Construcción

Avd. Camino de Santiago, 40
28050 Madrid, Spain
Phone: +34 91 757 38 03/04
Fax: +34 757 38 25/26