

Mexico

Name: Asociación Mexicana De Ingeniería De Túneles Y Obras Subterráneas, A.C.

Type of structure: Civil association

Number of members: Individual members: 165, corporate members: 18, ymg mexico: 67



2017 - ACTIVITIES

Course on Design and Construction of Tunnels

This was carried out from 19th - 20th of October, 2017.

This event was carried out in conjunction with the Civil Engineers College of Jalisco State (CICEJ)

Venue: CICEJ Civil Engineers College of Jalisco State, Mexico

Participants: 200
Members: 27
Non members: 36
Students with scholarship: 137

Master in Engineering with Orientation to Tunnels and Underground Works

Continuation of the Master Course sponsored by our three institutions, the National Autonomous University of México (UNAM), together with AMITOS and the Alliance FIIDEM, are carrying out the 4th generation of the Master in Tunnels and Underground Works. Moreover, the call has just been launched for the 5th generation, for the 2018 program.

Dialog with Students from the UNAM National Autonomous University of Mexico

AMITOS has been called in to generate interest in the final year students in civil engineering and to try to entice them into the tunnelling industry. This happens on a Saturday in a meeting between AMITOS and some 50 students who have expressed their interest and are looking to gain work in the near future.

Certification for Professional Legal Experts in Tunnels and Underground Works

AMITOS, represented by its XV Council of Directors, has continued with the certification of Professional Legal Experts, among its associates, for 2017.

Formation of the YMG Mexico in Amitos

AMITOS had opened the Young Member Group Mexico (GJM Mexico Grupo de Ingenieros Jóvenes AMITOS), but to make it compatible with ITA, we have registered all the young engineers that were on the previous Master Courses and the ones being in the

process in 2017 and 2018. Also we are registering the interested young engineers from the Mexico Polytechnical Institute and other states institutions.

Publications

Amitos Magazine: OBRAS SUBTERRANEAS, has been our continuing publication every 3 months with the help of our Editing Committee formed by interested colleges and ex presidents. It has become a reference magazine for the industry.



List of underground projects underway in Mexico

1. Water and Drainage

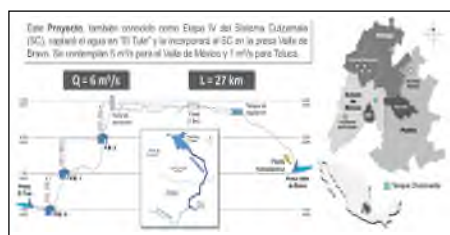
The projects included have been considered as strategic for the achievement of Sustainable Development, and almost all of them have been presented in the National Infrastructure Program (PNI) 2014-2018.

Table 1. Current situation of underground works for drainage and drinking water.

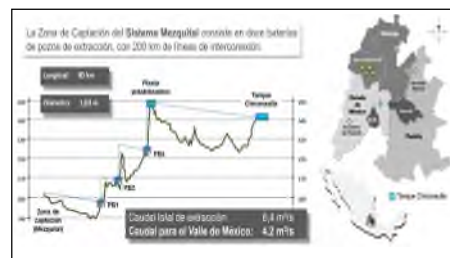
Proyecto	Comisaría	Situación
V.1. Nueva fuente de abastecimiento	Comisaría	In study
V.2. Tercera línea del Sistema Cutzamala	Comisaría	In construction
V.3 P.T.A.R. Atotonilco	Comisaría	Final
V.4. Tercera Línea Oriente	Comisaría	In construction
V.5. Tercera Línea Occidente II	Comisaría	In construction
V.6. Tercera Línea Central	Comisaría	In construction
V.7. Tercera Línea de la Comisaría II	Comisaría	In study

V.1 New Sources of Supply

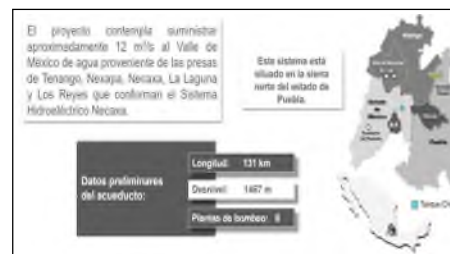
Acueducto del poniente:



Tula - Mezquital:

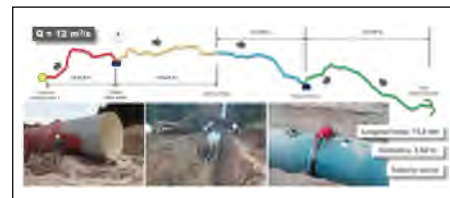


Tecoluitla - Necaxa:



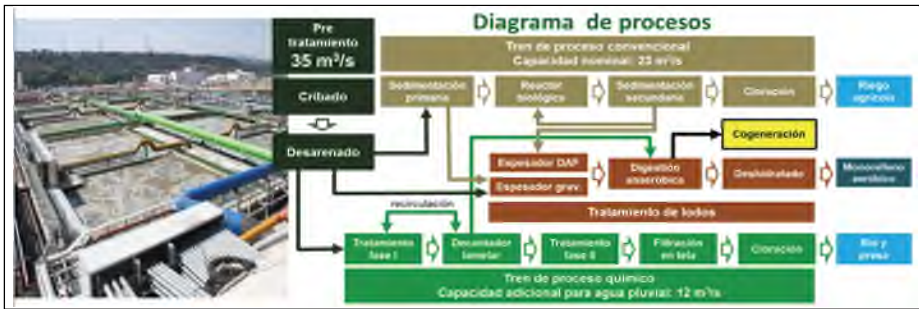
V.2 Third Line of the Cutzamala System

The project starts at Oscillation Tower No. 5, in the municipality of Villa de Allende, crosses the municipalities of Villa Victoria, Almoloya de Juárez, Toluca, Temoaya, Xonacatlán, Otzolotepec, and concludes at the entry portal of the Anasco Tunnel -San José, in the municipality of Lerma. The project envisages supplying approximately 12m³/s to the Valley of Mexico.



V.3 P.T.A.R. Atotonilco

The Valley of Mexico basin presents one of the lowest wastewater treatment rates in the country (6%), which generates pollution and a serious water imbalance in the basin. Benefits: • Treat more than 60% of wastewater generated in the Valley of Mexico. • Irrigation with treated wastewater of more than 80 thousand hectares in the Tula Valley, increasing its agricultural potential. • Sanitation of bodies and



V.6 Tunnel General Channel

With the construction of the Canal General Tunnel, flood protection will be reinforced, since it will dislodge the wastewater and rainwater of the area, working integrally with the Company's River Tunnel and the La Caldera pumping plant. Tunnel Characteristics: Capacity: 20m³/s, length: 7.9km, depth: 25m, diameter: 5m

superficial channels that receive wastewater. • Improve the sanitary conditions of more than 300,000 people living in irrigated areas

V.4 East Emisor Tunnel (TEO)

Hydrological and hydraulic studies concluded the need to reinforce the Main Drainage System with works to discharge up to 150m³/s and others to increase the regulation capacity in rainy seasons. The East Emisor Tunnel will reinforce the Main Drainage System of the Metropolitan Zone of the Valley of Mexico (ZMVM) for the benefit of its 20 million inhabitants, evicting sewage and rainwater, and reducing the risk of flooding. Tunnel Characteristics: Capacity: 150m³/s, length: 62km, depth: 30 to 150m, diameter: 7m

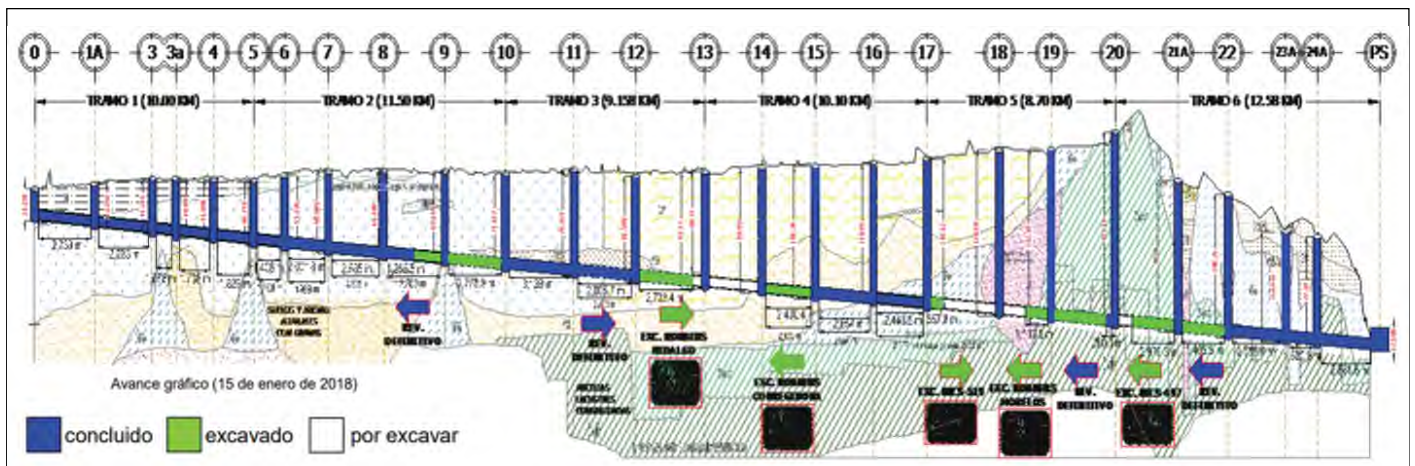
V.5 Poniente Emisor II Tunnel (TEP II)

The project takes advantage of the open-air channel of the current West Emitter, receiving the water from the new TEP II. With the

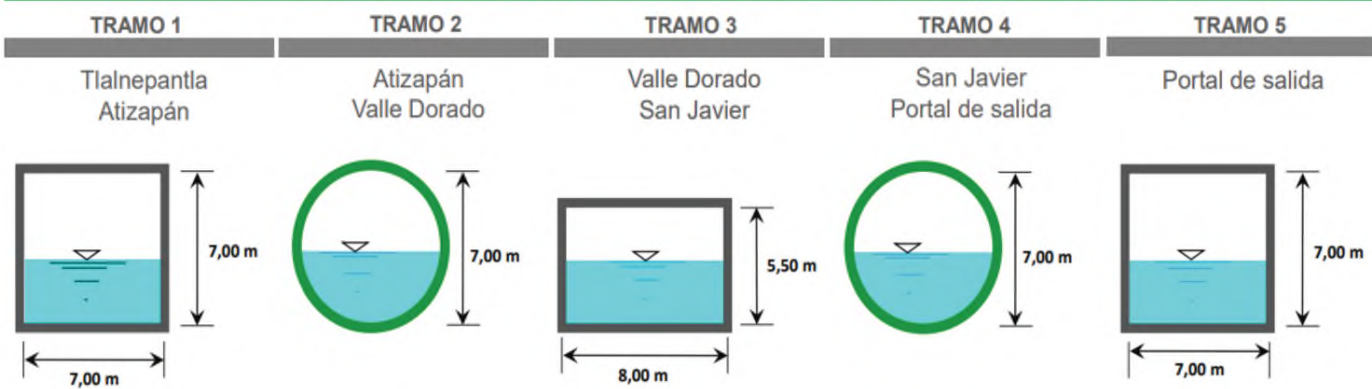


construction of the TEP II, the Norponiente zone will be protected from floods and catastrophes associated with extraordinary rain events (municipalities of Naucalpan, Tlalneantla, Atizapán and Cuautitlán Izcalli, in the State of Mexico). Tunnel Characteristics: Capacity: 112m³/s

V.7 Túnel Río de la Compañía II



Sección transversal de los cinco tramos principales



2. Roads

Table of highway projects under construction

NAME	No. TUNELS	LONG. TOTAL (m)
Vialidad Interiores Estado de México	2	706
Libramiento Sur Morelia	2	1,100
Libramiento Poniente Morelia	1	350
Naucalpan-Toluca(Estado de México)	2	730
Libramiento Tamazunchale, San Luis Potosí	1	145
Barranca Larga - Ventanilla Oaxaca	5	595
Carretera escénica Alternativa (Acatúnel) Acapulco Guerrero	1	3,160
Libramiento Norponiente de Acapulco	3	800
Mitla-Tehuantepec II, Oaxaca	8	446
Atizapán-Atzacmulco	5	1,325
Carretera Jala-Compostela	1	230
Tepic- San Blas	1	100
Carretera Jala-puerto Vallarta, Jalisco	1	1,356
TOTAL (m)		11,043

3. Rail Transport

Interurban Train Tunnel Mexico

The Toluca Project is under construction with a total length of 57.7km, 4.7km consists of 2 tunnels in parallel with an excavation diameter of 8.5m and a finished diameter of 7.5m, with interconnection galleries at every 250m. The TBMs used are 2 EPBMs (Earth Pressure Balanced) with a total length of 127m.

Line 12 Metro Extension

This project under construction is using the conventional method using shearing machines, with an average diameter of 11m and will have 13 ports between six and 13m, and a total length of 4.6km.

Line 3 Metro Monterrey

This project currently under construction has a total length of 7,439m of which 880m are tunnel with an average diameter of 8m.

Line 3 Light Rail Guadalajara

The project consists of a total length of 22km, with a tunnel length of 5.5km, with an inside diameter of 9.5m, and 5 underground stations. The TBM used is an EPB (Earth Pressure Balance) of 11.5m in diameter.

Shopping Centers, Parking Lots

San Luis Potosí

Construction of Underground Parking Plaza Fundadores. Due to the great tourist demand in the state of San Luis Potosí, the construction of a deep underground parking lot in the Fundadores Plaza has been projected, thus facilitating access to the center of the city of Potosí.

Morelos

Reconstruction of the Building 1 UAEM with underground parking. On January 2018 the reconstruction began of Building no. 1 of the UAEM which will have four levels, 200 parking spaces, respecting the

horizontality of the original building, as well as the central part of the access, which will use a steel structure calculated to withstand an earthquake of 9° on the Richter scale. It will have emergency staircases and five C-type staircase modules, which according to the regulations of the National Institute of Educational Physical Infrastructure (INIFED), would serve as a shelter for its concrete structure, which will allow the inhabitants of the third and fourth floor to not go down to ground level in case of evacuation.

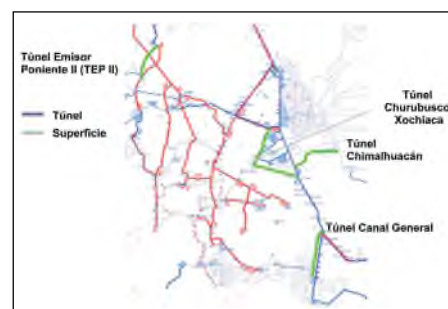
Querétaro

This Olympic Stadium project involves the construction of public underground parking of two or three levels, to mitigate the problem of the lack of parking spaces that exists in the city's Historic Center. With this project, we plan to take full advantage of the location of the work (since it will be very close to the historic center), to highlight the practicality of undertaking such urban underground workings.

Garden Santa Fe

This is a sustainable commercial center at 35m depth, with a surface of 60,000m², four levels of parking - with 1,600 parking spaces, two levels of shopping centers, 70 commercial premises, and an installed treatment plant that allows treatment of 160,000 liters of water per day. It has photovoltaic cells for energy saving.

Metropolitan Drain Network



TUNNELS – UNDERGROUND WORKS

Teo Túnel Emisor Oriente

Capacity	150m ³ /sec
Length:	62km
Finish Diameter:	7m
Shafts:	26 - 160m deep
Portal:	1

Tep II Túnel Emisor Poniente II

Length:	5.6km
Finish Diameter:	7m
Shafts:	1

Túnel Canal General

Length:	7.9km
Finish Diameter:	5m
Shafts:	4

Acatúnel

Length:	3.3km
Finish Diameter:	14.02m/17.52m.
Shafts:	None

Libramiento Acapulco Zihuatanejo

Length:	800m
Finish Diameter:	14.02m/22.52m.
Shafts:	None

Túnel Ferrocarril Manzanillo

Length:	860m
Finish Diameter:	6m/12m.
Shafts:	None

FUTURE ACTIVITIES

International Summit

AMITOS has the pleasure of coordinating with the ITA, an International Summit event that will be held, at the facilities of the College of Civil Engineers of Mexico, from May 31 to June 2, 2018 in Mexico City.

On this occasion the program will be tailored to bring together the best international and national tunnelling engineering experts to disseminate knowledge, get the best analysis in tunnelling construction, and to give the best decisions on going conventional or mechanized in the construction of tunnels and underground works. It will include best procedures and recommendations, round table discussions, and face to face talks.

5th International Symposium on Tunnels and Shafts

AMITOS and the Mexican Society for Geotechnical Engineering (SMIG) will hold the 5th International Symposium from 16th to 18th of August, combining the specialties of both technical associations. The aim is to identify the state of practice and advances in the design and construction of tunnels and shafts. In addition, the diffusion of recent international and national experiences is pursued to benefit the professional engineers, professors and interested students.

Design and Construction Tunnel Course in Guadalajara, Jal. Mexico

AMITOS and Jalisco Civil Engineers College in Guadalajara, Jalisco Mexico (CICEJ), both trade associations specializing in civil engineering, have established a commitment to provide training each year, for the new engineers and to provide updates to professionals, in everything related to underground work in the construction of the tunnels in Jalisco State. Works are conventional as well as mechanized tunnel on the Guadalajara Metro. This year, it will take place from October 18th to 20th, 2018, at the facilities of the CICEJ.