

ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUS-TERRAIN ASSOCIATION ITA AITES INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

ARGENTINA

ACTIVITY REPORT 2015



ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUS-TERRAIN ASSOCIATION ITA AITES INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

PRESENTATION

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

TYPE OF STRUCTURE: Non Profit Professional Association, acc. private law

NUMBER OF MEMBERS: 45 affiliate (individuals), 8 corporate members (collective)

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2015 - ACTIVITIES (1)

Main activities:

- Regular (monthly) ExCo Meetings
- Yearly Tunnelling Congress
- Auspice at other Congresses in Argentina (Transportation and Road Congress, Geotechnical Congress)

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2015 - ACTIVITIES (2)

- WG: Shotcrete, with preparation of a theoretical-practical Workshop (Deminar)
- Preparation of an « online » Tunnelling Course (streaming), as a part of the Yearly Training Program of the Argentine Construction Chamber

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TUNNELS - UNDERGROUND WORKS

Extension of Metro Line H

North section: 4 new stations constructed with the NATM method, featuring single large caverns of approx. 18 m width and approx. 2 km single tube double track running tunnels. 2 Stations were opened in 2015, the remaining 2 in 2016.



South Section: 2 new stations and associated running tunnel section, to be constructed with diaphragm walls. 2 parallel twin caverns, one for the train depot and the other for a workshop, constructed with NATM Method, which will enter in operation in 2017. Both stations were postponed.



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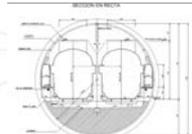
TUNNELS - UNDERGROUND WORKS

Sarmiento Railway Tunnel - Buenos Aires

Replacement of the present Railway Line "Sarmiento", running from the Western Head Station of the city of Buenos Aires until the end station of the metropolitan area, located at a distance of approximately 32 km, by a double track 12 m inner diameter tunnel, to be excavated with a EPB shield machine.

1st phase 16,67 km with 8 Stations, 2nd Phase 12,2 km, both in mined construction; Most of the stations to be built in mined construction and some in C&C.

This project was tendered in 2006, awarded in 2007, with works initiated in 2012, but stopped shortly afterwards, due to financing problems. With the new national government it was re-launched early 2016, always with the same contractor JV.




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TUNNELS - UNDERGROUND WORKS



Purification Plant «J.M. Rosas» Bs. As.
Comprises the construction of a purification plant on a 16 ha site, with a max. capacity of 975 m³/day, 2 intake tunnels: a temporary one, coming from the Lujan River with an iD of 0,9 m and a length of 5,1 km and a definitive one, coming from the Paraná de las Palmas River, with an iD. of 3,6 m and a length of 15 km.

The outlet mains for distribution of the potable water was implemented by means of 1.2 m iD. ductile iron pipes, with bolted connections, installed with open trench excavation.



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TUNNELS - UNDERGROUND WORKS

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 margin, with approx. 10 km length, inner dia. of 2,9 m, to be built with an EPB pipe jacking machine, and the second, coming from the city, with 4,5 m inner dia. and 5,4 km length, to be built with a EPB machine.



Additionally, it features an Emissary of approx. 10,5 km length with 4,1 m inner dia. to be excavated into the La Plata River.

Two contracts were awarded in 2015 and presently the construction works are starting. The machines will start to operate approx. mid of 2016.

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TUNNELS - UNDERGROUND WORKS



Relief Tunnel for Underground River « Vega » - Buenos Aires
This project comprises the construction of 1 EPB relief tunnel for the existing underground “Vega River”, with a total length of 8,4 km (6 km with EPB machine, iD 5,0 m, and the rest in NATM construction).

The tender process of this project was launched in 2013 and awarded end of 2015. Presently, the site inspection tender is in progress. It is expected that the construction works will start in May 2016.



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TUNNELS - UNDERGROUND WORKS

Trans-Andean Tunnels

1) Agua Negra Road Tunnel -14 km (North):
Currently, this is the project of the highest priority for both countries. Its financing would be provided by the IDB. A new pre-qualification process for contractors would be launched in 2016. Construction may start in 2017.



2) Corredor Biocénico del Aconcagua - 52 km Railway Tunnel (Centre):
This private initiative, which is developed in a depth of a Preliminary Design, was still not finally approved by both countries. Within 2016 further decisions are expected.



3) Las Leñas Road Tunnel - 11,6 km (South):
This project is the one with the lowest level of development. Currently, a Feasibility Study was developed in Chile in 2015. Further decisions by both governments are not known.

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FUTURE ACTIVITIES

- WG: Tunnel Drainage and Waterproofing
- Tunneling Course, to be held directly by AATES in different provincial capitals
- Activation of the Young Member Group of the AATES

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AUSTRALASIAN TUNNELLING SOCIETY

AUSTRALIA
ACTIVITY REPORT 2015







PRESENTATION

NAME - Australasian Tunnelling Society

TYPE OF STRUCTURE - The ATS is an Industry based Technical Society of Engineers Australia (EA) and affiliated with AusIMM and IPENZ

NUMBER OF MEMBERS - 549 individual members / 50 corporate Gold and Silver supporting members and 5 Platinum sponsors





2015 - ACTIVITIES

MAIN ACTIVITIES - Monthly technical sessions across 4 Australian Regional Groups, 1 NZ Group plus Shotcrete society

WGs - 1 Animator, 1 Vice A, 7 Participating members and 8 Corresponding members

TRAINING - 3 day Tunnelling design & construction Short Course, including field workshop

PUBLICATIONS - ATS journal published twice per calendar year in conjunction with Tunnelling Journal International.





TUNNELS - UNDERGROUND WORKS

The 5 km long Legacy Way road tunnels constructed by Transcity in Brisbane opened for traffic at 9pm on 25th June 2015







TUNNELS - UNDERGROUND WORKS

LendLease/Bouygues JV has started construction for Transurban on the \$A2.65B NorthConnex in Sydney, twin 9 km long road tunnels linking the M1 to the M2 and M7 motorways







TUNNELS - UNDERGROUND WORKS

CPB/Dragados/John Holland JV has completed excavation of the twin 15.5 km long tunnels for Sydney Metro Stage 1 (North West Rail Link)








TUNNELS - UNDERGROUND WORKS



Work on Perth's Busport is well advanced, with excavation 70% complete

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TUNNELS – UNDERGROUND WORKS



The Waterview road tunnels in Auckland (NZ) are due to be completed by the WellConnected Alliance in early 2017

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TUNNELS – UNDERGROUND WORKS



A Robbins TBM recently completed tunnel excavation for the Grosvenor Mine Access Drifts

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FUTURE ACTIVITIES

WestConnex Road Tunnels – Sydney

- Stage 1B (M4 East) 2 x 3 lane tunnels, 5.5 km long, CPB/Samsung/ John Holland JV to commence in 2016
- Stage 2 (M5 East) 2 x 2/3 lane tunnels, 10 km long, CPB/Dragados/ Samsung JV to commence in 2016
- Stage 3 (M4 South) 2 x 3 lane tunnels, 8.5 km long to commence construction in 2018

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FUTURE ACTIVITIES

- Forrestfield Airport Link, Perth, Twin 7 km long rail tunnels, 3 stations
- Sydney Metro Stage 2 – Twin 15 km long rail tunnels, 7 stations
- Melbourne Metro – Twin 9 km long rail tunnels, 5 stations
- Western Distributor, Melbourne – Twin 3 lane tunnels, 2 km long
- Western Harbour Tunnel, Sydney – Twin 3 lane tunnels, 5.5 km long
- Cross River Rail Link, Brisbane – Twin rail tunnels, ~ 5 km long
- Central Rail Link, Auckland – Twin rail tunnels, 3.5 km long, 3 stations
- Central Interceptor Sewer, Auckland – 4.5 m sewer tunnel, 12 km long

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ITA-AUSTRIA Annual Report

2015

Austrian National Committee of ITA
 Robert Galler
 ITA-Austria representing the Austrian Organisations working in the field of tunnelling, namely ÖGG, ÖIAV, ÖBV, ATA and FSV
 NUMBER OF MEMBERS: 1.500




2015 - ACTIVITIES

Main activities

WGs: Robert Galler Chairman of the ITACET Steering Committee and Vice Animateur of WG19 – Conventional Tunnelling

Trainings were given during the EUROCK 2015 in October in Salzburg and the Southern Railway Link Conference, focussing on Semmering and Koralm Base Tunnels in Graz in November.

Publications were done respectively




TUNNELS – UNDERGROUND WORKS




Focus on High Speed Railway Tunnels:

- Major railway tunnel constructions:
 - Semmering Base Tunnel (2x27km)
 - Koralm Tunnel (2x33km)
 - Brenner Base Tunnel (3x57km + several km of access and connection tunnels)
- Altogether about 240km of tunnel under construction right now.
- Good progress already achieved at the Austrian section of the Baltic-Adriatic trans-European railway – called the „Southern Railway link“




Semmering Base Tunnel

Tunnel works at portal Gloggnitz have already started

- Construction lot Gloggnitz was awarded to the ARGE Implenia-Hochtief



Shaft sinking machinery at Fröschnitzgraben [picture by SWIETELSKY]

Shaft sinking works for both 400 m deep shafts at construction lot Fröschnitzgraben were completed end of 2015, so tunnel works can start at the beginning of 2016.

Construction lot Grautschenhof was tendered end of 2015; tunnel works are intended to start there in May 2016.




Koralmtunnel

KAT 2: Twin tunnel tube system, constructed by a joint-venture of Strabag-Jäger. 70% of the 19 km long construction lot have already been bored by 2 TBMs.

In the western section *KAT 3* (built by PORR), NATM is used in the south tube and an EPB-shield is used in the north tube. EPB started in October 2015 and is running with good progress.

Tunnel *Granitztal* (built by a Joint Venture of Hochtief-Implenia) is following the *Koralmtunnel*. It consists of two single tubes with a length of approx. 6 km each. Tunnel works started in autumn 2015.



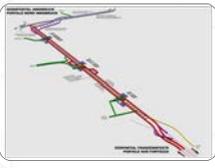

Brenner Base Tunnel

Establishing a powerful north-south connection from Germany via Austria to Italy with a length of about 55 km

In 2015 tunnel works for the 38 km long construction lot Tulfes-Pfons were started by JV STRABAG-Salini-Impreglio.

In September 2015: first open gripper TBM was started.

Construction works for one of the largest lots (Wolf) have been tendered; the decision following the best bid is awaited for autumn 2016.



Schematic layout of the Brenner Base Tunnel [picture by BBT SE]

Focus on motorway tunnels:

- Reconstruction of the motorway Linz to Budweis: 2 double tube tunnels built: Tunnel Götschka (4.4 km, constructed by PORR) and Tunnel Neumarkt (1.0 km, constructed by Swietelsky)
- Tunnel chain KLAUS: 4 second tube tunnels with a total length of about 4 km, built by the JV BEMO-Wayss & Freytag.
- Gleinalm Tunnel: Second tube with a length of 8.4 km is under construction.



Tunnel Götschka [picture by PORR]

Based on safety requirements several motorway tunnels are updated and renovated:

- Tunnel Perjen is getting a second tube due to high volume of traffic.
- The Arlbergtunnel (length 14 km) the Bosruck Tunnel, Tunnel Bruck and Tunnel St. Ruprecht are right now under renovation.



Arlbergtunnel [picture by Joint Venture JÄGER-BEMO-HINTEREGGER]

Focus on hydropower projects:

The Austrian alpine regions are perfectly suitable for hydropower plants:

Vorarlberg: Obervermuntwerk II (pumped-storage hydropower plant) including a cavern with dimensions of 120m x 25m x 39m and tunnel systems with a length of approx. 7 km. Built under very strict environmental regulations at 2000 m above sea level by JV Jäger-Porr-Hinteregger.

Tirol: Grenzkraftwerk Inn power plant under construction; core section is the 23 km long tunnel using a TBM (Hochtief).



Hydro Power Plant Obervermunt II [picture by Wolfgang Weber, JÄGER]

Focus on Metro construction:

Vienna Metro extension line 1:

Shows an alignment with very low overburden and was constructed by STRABAG;

Due to the urban surrounding and the difficult ground conditions this construction site was a big challenge for everyone involved.

Research, development, training and education in tunneling:

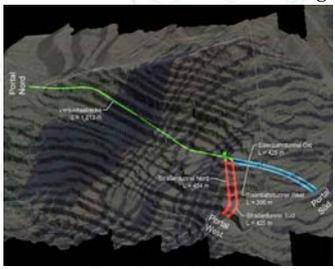
The creation of sustainable infrastructure is increasingly developed in underground facilities → greater challenges for construction-, transport- and energy-providing companies and emergency organizations → **Project: "Research@ZaB - Zentrum am Berg"**

- Underground facility for research, development, education and training purposes
- Meets the requirements of public institutions and represents a "development factory" for private companies as well as concerned universities.

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Research@ZaB - Zentrum am Berg



Research@ZaB - underground facility for research, development, education and training [picture by SEI]

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Tunnelling Conferences in Austria in 2015

- Together with the 64th Geomechanics Colloquium, EUROCK 2015 was successfully organized in Salzburg. 1400 participants from over 30 countries, discussing newest developments in rock mechanics.
- The SOUTHERN RAILWAY LINK conference was organized at the Graz University of Technology. 250 participants followed the presentations focusing on the challenging projects Semmering Base Tunnel and Koralm Tunnel.

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FUTURE ACTIVITIES

- Mönchsberg garage
- S7 tunnel Rudersdorf
- A11 Karawankel tunnel 2nd tube
- S1 Lobau Tunnel
- Power plant Tauernmoos
- TIWAG pumped storage plant Sellrain (Kühtai)
- A26 Westring
- Limberg III
- Power plant Spullersee
- Brannenburg/Kundl

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BELGIUM ACTIVITY REPORT 2015



ABTUS - BVOTS

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- TYPE OF STRUCTURE :
 - Open non-profit association
- NUMBER OF MEMBERS (01.01.2016) :
 - Collective members : 54
 - Individual members : 15

ITA - AITES 42nd General Assembly San Francisco, April 24 - 27, 2016

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2015 – ACTIVITIES

- MAIN NATIONAL ACTIVITIES :
 - **Conferences :**
 - « Alternative energies from the subsurface »
 - **Yearly studyday :**
 - « Renovation of road- and rail tunnels »
 - Technical visits

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MAIN INTERNATIONAL ACTIVITIES :
Participation in :

- WTC and General Assembly of ITA
- AFTES studydays and workshops
 - Swiss Tunnel Congress
 - STUVA Tagung
 - ITA-COSUF meetings
- Annual 6 partner countries meeting

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2014-2015 TUNNELS & UNDERGROUND WORKS



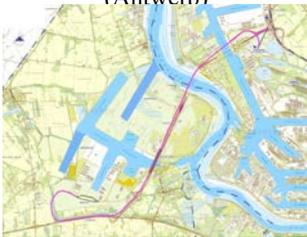
2014 : opening Diabolo-tunnel (Brussels airport)

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• 2015 : opening Liefkenshoektunnel rail (Antwerp)

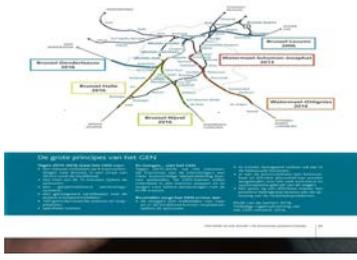


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• December 2015 : expected opening Schuman-Josaphat, but ...



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FUTURE ACTIVITIES

- Metro North in Brussels :**
 - New section 4 km, 5 stations, all underground
 - Transformation of existing section of tramwaytunnel and stations in full metro
- Closing South motorway Ring in Brussels :**
 - Tunnel possibly 7 km, private, tollway

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- **Closing North motorway Ring in Antwerp :**
 - New section 4 km, including tunnels under river Scheldt and former dock
 - New connexion to existing Ring and possibly partial or total light cover of the Ring

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Oosterweelverbinding



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BHUTAN

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2015 - ACTIVITIES

1. Construction of Punatsangchhu-I (1,200 MW), Punatsangchhu-II (1,020 MW) and Mangdechhu (720 MW) Hydropower Projects.
2. Training on Conventional Tunnelling was conducted in September 12 & 13, 2014 in Thimphu, Bhutan.

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TUNNELS – UNDERGROUND WORKS

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1. Punatsangchhu – I Hydropower Project (1,200 MW)

		<ul style="list-style-type: none"> • Work Done • Total UG excavation = 67,487.30 m³ • Total length of tunnels & galleries = 116m
		
Desilting chamber	10 m dia. HRT	
24.5 m dia. Surge Shaft	Underground Power House	

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2. Punatsangchhu –II Hydropower Project (1020 MW)



Desilting chamber



Pressure Shaft



Head Race Tunnel



Surge Shaft

Work Done

- Total UG excavation = 565,906.00 m³
- Total length of tunnels and galleries = 1174.79 m

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•Power House & Transformer Caverns

- Power house cavern (236 m x 51 m) – excavation of machine hall
- Transformer cavern (215.4 m x 14 m x 26.5 m) - excavation

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3. Mangdechhu Hydropower Project (720 MW)



Desilting chamber



Head Race Tunnel



Surge Shaft



Power House

Work Done

- Total underground excavation = 883,234.01 m³
- Total length of tunnels and galleries = 5159.15 m

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FUTURE ACTIVITIES

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1. Kholongchhu Hydropower Project



- Run-of the river hydropower project of 600 MW capacity.
- Total tunnel system = 27 km.
- 2 nos. underground desilting chambers of 350m x 13m x 17.5m
- Underground Power house and transformer caverns of 132m x 21m x 42.5 m and 130m x 16m x 24m

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2. Nikachhu Hydropower Project



- Run-of the river hydropower project of 118 MW capacity.
- Total tunnel system = 21.50 km
- 2 nos. underground desilting chambers of 175 m x 11m x 7.5 m each
- Underground Power house of 67m x 19m x 41m

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– BRAZILIAN TUNNELLING COMMITTEE
– CBT – COMITÉ BRASILEIRO DE TÚNEIS

– Corporate Affiliate Members: 29 (increase of 20%)
– Individual Affiliate Members: 437 (increase of 5%)

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2015 - ACTIVITIES

- In 2015 the Brazilian Tunnelling Committee – CBT
- continued working for showing society the benefits
- of the underground environment, both through the
- implementation of technical events, as the
- dissemination of materials in technical and social
- media.

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- The principal event was the II SIMES – International Symposium of Underground Waterproofing, in December, with more than 140 participants.
- More than 10 Lectures were presented by CBT along the year, and other 5 Lectures to the Young Members Group.

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TUNNELS – UNDERGROUND WORKS



- São Paulo Metro Line 5

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- Rio de Janeiro Metro Line 4

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- Tamoios Road Belt

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FUTURE ACTIVITIES

- For 2016, an award is planned to the best Monography of graduation. The idea is promote the underground works among students.
- Yet, is it planned to continue to organize a book about tunnels, in portuguese.

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•In november, CBT will promote the first Symposium on Safety, Maintenance & Operational Systems of Underground works.

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CANADA ACTIVITY REPORT 2015



Tunnelling Association of Canada
 Association canadienne des tunnels

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ORGANIZATION

- Tunnelling Association of Canada
- STRUCTURE
- The Tunnelling Association of Canada (TAC) was established in 1980 as a national association supported by several regions: British Columbia, Alberta, Manitoba and the Prairies, Ontario, Quebec, and the Maritimes. Key objectives of TAC include:
 - Promote the development and use of underground space to decision makers and the public;
 - Exchange and inform the use of Canadian underground design, excavation and construction technologies;
 - Facilitate the exchange of information on related activities and technical developments;
 - Represent the interests of the tunnelling and underground excavation community in matters of technical and public concerns;
 - Act as an intermediary body between ITA and those individuals and organizations in Canada who are interested in tunnels and underground excavations;
 - Disseminate throughout Canada the news of the activities of ITA and the technical information available as a result of those activities; provide support for the TAC Young Members division;
 - Organize the annual Canadian Tunnelling Awards and bi-annual TAC Conference; and

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ORGANIZATION

- Tunnelling Association of Canada
- STRUCTURE (cont'd)
- The TAC organizational structure consists of the following 6 Officers and 10 Directors:

Officers:	Directors:
• Erik Eberhardt, President, Columbia	Serge Moalli, Director, British Columbia
• Rick Lovat, Immediate Past President	Heinrich Heinz, Director, Alberta
• Steve Skelhorn, Vice President, East	Jason Mann, Director, Manitoba & Prairies
• Bruce Downing, Vice President, West	Walter Triss, Director, Ontario
• Michelle Richards, Treasurer Maritimes	André Rancourt, Director, Québec and
• Derek Zoldy, Secretary	Nichole Boulbee, Director
• Boro Lukajic, Director	
• Lara Reggin, Director	
• Rick Staples, Director	
• Director	Seamus Tynan,

•TAC engages the services of Gibson Group Management Inc. (GGMI) to manage the administration of the association through GGMI's offices in Richmond, British Columbia, Canada.

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2015 - ACTIVITIES

- **Tunnelling Association of Canada**
- Main Activities in 2015
- **TAC 2015 Workshop – Challenges and Innovations in Tunnelling**

*In non-conference years, TAC organizes an industry workshop to coincide with the AGM and the Awards Dinner. The October 4-6, 2015 event at Queen's University in Kingston, Ontario, Canada was a tremendous success attracting over 135 participants. A successful pre-workshop reception on the 4th was well attended, as was the optional technical tour to the Brockville Tunnel on the 6th.

- **TAC 2015 Awards Dinner**

*2015 was the fourth year that the Tunnelling Association of Canada (TAC) presented achievement awards to recognize deserving individuals and projects in the Canadian tunnelling industry. In 2015, the awards were modified to present the Innovative Project of the Year as well as the Infrastructure Project of the Year. Added in 2015 was the Photo of the Year Award. Full 2015 TAC Achievement Awards details are available on the TAC website at http://www.tunnelcanada.ca/achievement_awards.html.

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2015 - ACTIVITIES

- **Tunnelling Association of Canada**
- Working Groups

• Four TAC members were nominated in 2015 to serve on various ITA Working Groups including:

- Dr. Jinyuan Liu, Ryerson University - ITA WG 2: Research
- Gary Kramer, Hatch Mott MacDonald - ITA WG9: Seismic Effects
- Hamid Javady, MMM Group Limited - ITA WG 17: Long Tunnels at Great Depth
- Dr. Heinrich Heinz, Thurber Engineering - ITA WG 19: Conventional Tunnelling
- TAC members look forward to representing Canada on the WGs.

- Publications

*TAC is coordinating the development of a commemorative "coffee table" book on Canadian Tunnelling. A draft should be available in the fall of 2016 with final printing expected in 2017. In addition, TAC collaborates with *Tunnels & Tunnelling* on their North American edition to publish articles on Canadian tunnelling projects.

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PROJECTS

Toronto-York Spadina Subway Extension Twin Tunnels Project, Toronto, Ontario



The Toronto-York Spadina Subway Extension (TYSE) project is an 8.6 km extension of the existing City of Toronto subway system. The subway extension includes 6.7 km of bored twin tunnels, a 280 m long hand mined section of triple tunnel and six new stations. The project includes the first use in Ontario of trailing shield annulus grouting, and first use in Canada of RFID chips installed within each precast concrete tunnel lining segment used for quality control and future inspection and quality management.

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PROJECTS

ECLRT – Eglinton Cross Town Light Rail Transit, Toronto, Ontario



The ECLRT project is broken up into two contracts. The first contract, currently being constructed by the joint venture of Obayashi / Kenaida / Kenny, has completed their first two tunnel drives between Keele St. and Allen Rd., utilizing two CAT EPB TBMs. The two TBMs were removed, repositioned, commissioned and have resumed mining once again on the balance of the tunnels between Allen Rd. and Laird Dr.

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PROJECTS

OLRT – Ottawa Light Rail Transit, Ottawa, Ontario



The OLRT project is 12.5 km of LRT line, with a 2.5 km tunnel and four underground stations in the downtown core. The P3 contract was awarded to the Rideau Transit Group made up of Ellis Don, SNC Lavalin, and Dragados Canada. Construction is well underway; the tunnel is currently being excavated by SEM and Road-header methods and is scheduled to be completed in 2016.

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PROJECTS

Valley Line LRT Extension – Edmonton, Alberta



In Edmonton, work continues on the \$1.8 Billion low-floor line to Mill Woods from City Centre, which includes an approximately 400 m long twin tunnel section in the North Saskatchewan River valley section.

Final proposals are expected in the fall of 2015 with the successful team selected by the end of 2015. Major construction is expected to begin in 2016, with expected completion in 2020.

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PROJECTS

Upper Lillooet/Boulder Creek Hydroelectric Facilities – Pemberton, BC

The Upper Lillooet HEF is an 81.4 MW plant consisting of an approximately 2500m long inverted D tunnel shaped 6m wide and 5.5m high: to date, a total of approximately 420m of tunnel has been excavated in difficult ground.

The Boulder Creek HEF is a 25.3 MW plant comprising a 2900m long inverted D shaped tunnel 3.6m wide x 4.5m high to be mainly excavated from the downstream portal: in addition, approximately 2km of that tunnel is to be excavated with a 13% uphill grade. So far, 979m of the Boulder Creek tunnel has been excavated.



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PROJECTS

Evergreen Line, Vancouver, BC



The Evergreen Line Rapid Transit Project is an 11 km extension to Greater Vancouver's rapid transit system. The project includes a 2 km long, 10 m diameter bored tunnel. The design-build-finance contract was awarded to EGRT Construction and the tunneling work is being conducted by SNC-SLI Joint Venture. The tunnel was excavated with a CAT EPB TBM – boring was completed in November 2015.

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PROJECTS

Port Mann Water Supply Tunnel, Vancouver, BC



Tunnelling on Metro Vancouver's Port Mann Water Supply Tunnel Project was completed in July 2015. The project consisted of two slurry wall shafts, each approximately 60 m deep and located on either side of the Fraser River, connected with a 1 km long, 3.5 m diameter tunnel. Excavation of the tunnel was carried out using a CAT EPB TBM; construction was undertaken by the McNally-Aecon Joint Venture.

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FUTURE ACTIVITIES

- **Tunnelling Association of Canada**

- 2016 Activities Planned
- The BC and Ontario Chapters are very active and expect to hold 6-8 monthly meetings, each, in 2016. These meetings feature invited speakers on regional tunnelling projects, or technical tours.
- TAC's 2016 Annual Conference will take place in Ottawa, Canada from October 16-18, 2016. Over 250 delegates are expected, as well as in excess of 25 exhibitors. Full details of the conference are available at www.tac2016.ca. The 2016 conference will also feature TAC's Annual Awards Dinner where individuals and projects will be recognized for their outstanding contributions to tunnelling and underground space. Award nominations will close on June 1, 2016.
- The Tunnelling Association of Canada presents the Dan Eisenstein Memorial Scholarship each year to a post-graduate student planning to undertake or currently undertaking post-graduate studies in the field of tunnelling at a recognized university in Canada.
- Finally, efforts to increase TAC's student membership are paying off with over 10% of the total membership expected to be in the student category in 2016. Our chapters are working directly with a number of the universities to run events on campus and student-focused tours.

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CHILE

ACTIVITY REPORT 2015



CTES COMITÉ DE TÚNELES Y ESPACIOS SUBTERRÁNEOS DE CHILE

PRESENTATION

- **NAME:** Chilean Committee for Tunnelling and Underground Space (of the CDT of the Chilean Construction Chamber)
- **TYPE OF STRUCTURE:**

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    graph TD
      Board[Board of Directors CTES-CHILE  
President: Mr. Alejandro Gómez  
Vice Presidents: Mr. Giorgio Poggio and Mr. Hartmut Clausen] --> Executive[Executive Secretariat CDT  
Executive Secretary: Mauricio Álvarez]
      Executive --> Support[Support and Promotion]
      Executive --> Technical[Technical secretariat  
work groups]
      Executive --> Working[Technical working  
Groups Coordinators]
    
```

- **NUMBER OF MEMBERS: 84 Members**
Corporate Members: 8 Category Premium, 32 Category Gold, 29 Category Associated and 15 Individual members.




2015 - ACTIVITIES

Main Activities 2015

1. Seminars and Conferences

- Second version Latin American Congress of Tunnels and Underground Space.
- second version of the seminar "Materials and Products for Tunnels"
- Seminar "Generating Innovation in Tunnels"
- Seminar "Productivity in Major Construction Projects Miners"
- International Seminar "Practices and contractual aspects in Underground Works"
- Forum with Universities "Tunnels and Underground Space"
- Seminar: Engineering Challenges in Tunnelling and Underground Space




2015 - ACTIVITIES

Main Activities

2. Technical Lectures

- Efficient lighting in tunnels, Company Schreder.
- Underground Mining in Chile - Company Atlas Copco
- Evolution of Construction Methods Tunnels and subway stations of Santiago - Company Metro de Santiago
- Fundamentals of Geological Engineering for the Design of Underground Works in rock masses - Giorgio Piaggio
- Fire protection in tunnels - Company Promat
- Solutions for precise positioning in tunnels -Company Geocom




2015 - ACTIVITIES

Main Activities

3. Others

- Architecture Contest for the use of the underground space
- Technological Mission: Norway / Sweden / Denmark

Training

- International Course on TBM, ITACET.
- Antofagasta Regional Technical Conference




2015 - ACTIVITIES

Work Groups

- Four work groups in operation
- Average attendance of 15 people per group.
- Design, Planning, Construction and Risk Prevention, Materials and Products

Publications

- 3rd version "Guide for materials and products for tunnelling"
- Directory with Companies members of CTES-CHILE.
- Document translation of ITA-AITES "Code of practice for risk management in the construction of tunnels".
- New Tunnelling Projects Catalog
- Survey of Tunnels and Underground Spaces in Chile
- Mining Construction Magazin (Revista "Construcción Minera")




PROJECT PIPELINE

Project Pipeline:

N°	Sector	Project	Status Oct 2015
1	Infrastructure	New lines 3 and 6 of the Metro Santiago (about 33 km of underground works, with 28 underground stations)	Under construction
2	Infrastructure	Américo Vespucio Oriente Highway (14 km of 3 lanes tunnels. Sections with 2/3 of the length with C&C double deck solution and 1/3 of the length with double tube mixed tunnels).	2 lots under construction, 1 remainder lot to be tendered in 2016
3	Infrastructure	Urban Tunnel Kennedy, 4 lanes, (1,3km)	Under construction
4	Infrastructure	Trans-andean Tunnel Agua Negra (14 km of double tube tunnels)	Binational committee established. Call for bidders expected in 2016
5	Infrastructure	Bi-ocean Corridor Aconcagua (52 km of double tube railway tunnels).	Binational committee established. Call for bidders possible in the upcoming years.
6	Infrastructure	Trans-andean Tunnel Las Leñas (12 km)	Binational committee established. Tender design could start in 2016
7	Infrastructure	Second Tube Melon Tunnel (2,7km)	Bid for concession ongoing







PROJECT PIPELINE

Project Pipeline:

Infrastructure	Tunnel Chamisero de Autopista Nor-Oriente- 1600m starting April 2016	Construction to start in 2016
Infrastructure	Tunnel La Dorsada x x 3000m - starting 2017	Construction to start in 2017
Energy	Hydropower plant Alto Maipo (over 70 km of tunnels, shafts and caverns)	Under Construction
Energy	Hydropower Los Condores (150MW) (TBM tunnel)	Under Construction
Energy	HPP Vahalla, Pump Storage Power plant	Engineering stage
Energy	HPP Mediterraneo, 7,3k of tunnels:	Construction to start in 2016
Energy	Punita Dam, Chilean: 2,3km deviation tunnel	Construction to start in 2016



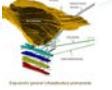






Project Pipeline:

Energy	HPP Nuble (136 MW)	Under construction
Energy	HPP Neltume (200MW) Tunnel 11 km, 6,3 m diameter	under construction
Energy	HPP Cuervo (640 MW), tunnel 11km, discharge tunnel 5km	Environmental approval
Energy	HPP Nido de Aguila and Arandanos (500MW)	Engineering stage
Mining	New Mine Level - Access Tunnels (8, 5km 2 tube tunnels), inner facilities	Under Construction
Mining	Chucucamata Underground Mine - Access Tunnels, Ventilation tunnels, Deep shafts and inner facilities	Under Construction
Mining	Andina 244 - Transfer Tunnel	Under construction









Project Pipeline 2016 - Comments:

- The last commodities boom period has pushed forward a large number of massive underground infra-structure projects for the mining sector, together with the development of new power plants, new expansions of Metro Santiago network and road tunnels. An important portion of Projects listed in the given project pipeline has been so far developed to a certain extend, however with the current economic slowdown experienced in the country, several projects have been cancelled, postponed and/or re-structured.
- Anyhow, it is expected that these large mining projects shall continue to be developed, even if at a slower pace. Additionally, the country has an increasing demand of energy, which cannot only be covered by the construction of new hydro-power plants. Public investment in infra-structure, mainly from the Railway Authority (EFE) and the Ministry of Public Works (MOP) are expected as anti-cyclic measures to counteract the economic depression generated by the end of the mining boom.





ACTIVITIES 2016

Activities already scheduled for 2016:

- ITACET Course on Waterproofing, (March 2016).
- ITACET Workshop: "Risk Management in Tunnelling", (September 2016).
- Technological Mission: San Francisco, United States (WTC2016).
- Third version of the seminar "Materials and Products for Tunnels"
- National Congress of Tunnels and Underground Space
- Second version Forum with Universities "Tunnels and Underground Space"
- Technical talks (talks by Empresas CTES all year)





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CHINA

ACTIVITY REPORT 2015



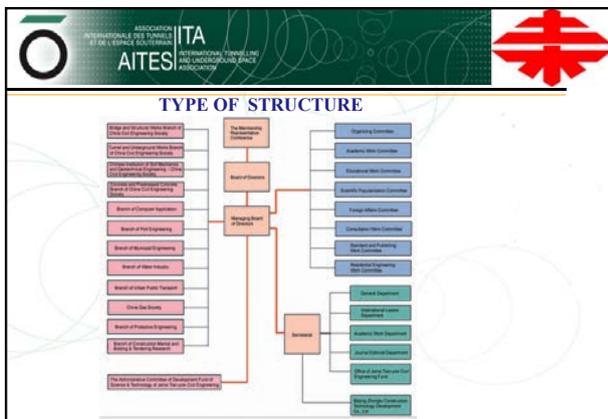




PRESENTATION

NAME:

China Civil Engineering Society(CCES)



2015 - ACTIVITIES

NUMBER OF MEMBERS

Group members: 615
Individual members: 43251

- ### Main Activities
- jointly organized two international academic conferences and six domestic academic conferences;
 - organized compilation of CCES standards;
 - organized preliminary review of Jeme Tien-yow Award for Tunnelling;
 - upgraded CCES-TUWB website;
 - reelected the CCES-TUWB council;
 - won Engineering Awards awarded by ITA;
 - published the official journal "Modern Tunnelling Technology" in 6 issues.

No.	Meeting Name	Time	Venue	Number of Participants
1	Technical Seminar on TBM Cuts	26 th January 2015	Shanghai-Tongji University	More than 30 participants
	Operation Safety and Energy Saving Tunnel and Underground Space — The 2 nd National Academic Symposium on Transportation Infrastructure Construction	25-26 July 2015	Shaohou, Anhui Province	More than 180 participants
	2015 Construction and Management Forum on Geotechnical Tunnel (part 2015) Annual Conference of Specialized Committee of Construction Management & Youth Work of Tunnel and Underground Works Branch of China Civil Engineering Society	17-18 October 2015	Shanghai Xiangsheng Hotel	More than 150 participants
	The 17 th Academic Communication Conference of Waterproofing and Drainage Professional Committee of Tunnel and Underground Works Branch of China Civil Engineering Society	11-13 November 2015	Zhuhai	More than 160 participants
	The 14 th cross-strait academic and technical seminar on tunnelling and underground works	5-6 November 2015	Syilan, Taiwan	60 participants, and 20 participants from CCES

2015 China International Exhibition on Tunnel and Underground Engineering Technology & 2015 Shanghai Symposium on Tunnel and Underground Engineering Technology	8-10 April 2015	Shanghai	More than 120 participants
"One Belt and One Road" International Forum on Civil Engineering (The Parallel Session of Transportation and Tunnel)	20 th November 2015	Beijing	More than 140 participants
The Fourth International Bridge and Tunnel Technology Conference 2015	28th April 2015	Shanghai	More than 800 participants

1. The 17th Academic Communication Conference of Waterproofing and Drainage Professional Committee

The 17th academic communication conference of waterproofing and drainage professional committee was held in Zhuhai from 11th-13th November, 2015. And more than 160 people from the fields of railway, transportation, national defense, municipal engineering, construction industry, hydropower and colleges and universities attended this meeting.

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2. The 14th Cross-Strait Academic and Technical Seminar on Tunnelling and Underground Works

The 14th cross-strait academic and technical seminar on tunnelling and underground works, hosted by Taiwan Tunnelling Association and co-organized by Tunnel and Underground Works Branch of CCES, was held in Yilan, Taiwan from 5th-6th November, 2015. And 167 people attended this meeting, of which 106 people come from Taiwan and 61 people from mainland China (29 people are the members of Tunnel and Underground Works Branch of CCES).




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3. Interconnection and Win-Win Cooperation ——“The Belt and Road” International Forum on Civil Engineering

The parallel session for traffic and tunnelling engineering, hosted jointly by the Tunnel and Underground Works Branch of CCES, Municipal Engineering Branch, Urban Public Transportation Branch and Rail Transit Engineering Branch, was held in 19th-20th November, 2015. More than 140 people attended this meeting and 7 experts from both home and aboard made relevant academic reports.




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Training

The training course for new construction techniques of tunnelling and underground works, hosted by the design and education professional committee of Tunnel and Underground Works Branch, CCES, was held in Beijing from 23rd-26th July, 2015, aiming at improving the overall technical level in tunnelling industry and mastering the current advanced techniques in time. And about 100 people attended this meeting.

Publications

The editorial office of *Modern Tunnelling Technology* has completed the edition of 6 issues (180 articles in total), including the columns of discussion and review, theoretical research, analytical calculation, planning and design, construction technique, construction equipment, etc. , and focusing on current key and difficult topics regarding tunnelling at home and aboard.

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TUNNELS - UNDERGROUND WORKS

the main works for the year 2014-2015 in China

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New Guanjiiao Tunnel on the Qinghai-Tibet Railway, about 32, 645 km long, is the longest railway tunnel in China and is also the longest tunnel in high-altitude area in the world.



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LPG Underground Storage Cavern in Wanhua Industrial Park of Yantai







The construction site of shield-driven tunnel of metro line 5







The underground space of Zoo station along the metro line 5 of Guangzhou







COLOMBIA
ACTIVITY REPORT 2015







PRESENTATION

NAME:
Comité Colombiano de Túneles (Colombian Tunneling Committee)

TYPE OF STRUCTURE:
Non-profit Organization (“Asociación Sin Ánimo de Lucro” in Colombia)

NUMBER OF MEMBERS: Nine (9) members





2015 - ACTIVITIES

Main activities:

Members of the Colombian Tunneling Committee participated in the WTC 2015 in Croatia, as members of working group number 2 (Research) and number 3 (Contractual Practices).

Andrés Marulanda:
Mr. Marulanda was actively involved in activities within work group 3 - Contractual Practices and attended WTC 2015. Moreover, Mr. Marulanda is member of a joint task Group (TG 10) currently undertaking an evaluation of FIDIC forms of contracts in order to produce a FIDIC Standard Form of Contract for Underground Construction Projects.

Camilo Marulanda:
Mr. Marulanda was actively involved in activities within work group 2 - Research, specifically for site investigations, and attended WTC 2015.





2015 - ACTIVITIES

WGs

The Colombian Tunneling Committee does not have domestic working groups

Training:

The Committee organized a graduate course on tunnels in rock and soil, taught at the Escuela Colombiana de Ingenieros (Colombian School of Engineering), including topics on design, construction, contractual aspects and risks. The course took place from May 29 to August 8, 2015. Among the lecturers were several experts who were invited to participate, including Tarcisio Celestino, to lecture on soft soil tunnels and shafts.

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ITA AITES TUNNELS AND UNDERGROUND SPACE CCT

2015 - ACTIVITIES

Training: The Committee organized a graduate course on tunnels in rock and soil.




Part of the CCT organizing staff and lecturers.

One of the lectures of the course.

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2015 - ACTIVITIES

Training: The Committee organized a graduate course on tunnels in rock and soil.



Visit to the underground works of Chivor Hydroelectric Project.

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TUNNELS - UNDERGROUND WORKS

Main works for the year 2014-2015 in Colombia

Colombia is currently undergoing a massive program for the project organization, design and construction of a series of last generation highways (called fourth generation highways) which are intended to enhance the country's economy by reducing travel and transportation costs. These projects, which are going to be built within the next 10 years, include more than 125 km of tunnels (out of which approximately 96 km are more than 2 km long).



El Toyo Tunnel. Taken from Antioquia State Government - <https://www.youtube.com/watch?v=tA_HCdsEI>

A tunnel worth mentioning is the Toyo Tunnel, which will be located on the State of Antioquia and will begin construction on early 2016. The highway project features a 9.7 km long tunnel (the longest and most expensive highway tunnel in Colombia) and 4.37 km of shorter tunnels.

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TUNNELS - UNDERGROUND WORKS

Main works for the year 2014-2015 in Colombia

The pilot tunnel for the Tunnel of La Línea, an 8.6 km long milestone tunnel in Colombia, was completed in 2008, and the tunnel's expected completion and opening is expected to take place on November 2016.



La Línea Tunnel. Taken from National Highway Institute (INVIAS) - <<http://www.reporterosociados.com.co>>

Under construction also are 22 tunnels on the road between Buga and Buenaventura (with 8.8 km of total length) and 19 tunnels on the road between Bogotá and Villavicencio.

Besides, most of the fourth-generation highways involving tunnels are currently under tender for the final design and construction; and should be beginning in works in the next couple of years.

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TUNNELS - UNDERGROUND WORKS

Main works for the year 2014-2015 in Colombia

The electric industry has been working on the development of a series of projects which require underground works to be located on the geologically complex Andes mountain range.

At present the Ituango Hydroelectric Project is being built, featuring approximately 10 km of tunnels and 2400 MW of installed capacity.




Ituango Hydroelectric Project - Underground cavern. Taken from <<https://medellin.gov.co/>>

Final Phase of the excavation of a tunnel on the replacement made of Ituango Hydroelectric Project. Taken From <<http://www.elcolombiano.com>>

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TUNNELS - UNDERGROUND WORKS

Main works for the year 2014-2015 in Colombia

El Quimbo Hydroelectric Project, involving approximately 4 km of tunnels, has been completed recently



El Quimbo Hydroelectric Project - Underground diversion tunnel. Taken from <<http://www.panorama.com/photo/63800782>>

Likewise, small hydropower stations are also under development (ranging from 20 MW to 60 MW installed power), including large tunnels and underground caverns. Approximately 10 km of tunnels of hydropower stations are currently under construction. Moreover, 3 deep underground caverns are under construction.

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Main works for the year 2014-2015 in Colombia



Regarding urban infrastructure, an underground subway system is being considered to be built in the following years in Bogotá, as a response to the demanding situation in terms of public transportation in this city. In consequence, a first critical 24 km long subway line is under study (to be excavated using EPB method), along with its second-phase expansion up to 76 km.

Finally, a series of sewer system projects are currently being developed, which use the latest trenchless technology systems and specifically micro-tunneling (Pipe jacking). The northern interceptor of the Medellín River, which is under construction as applies this technology, is around 8 km long and has diameters between 2.2 m and 2.4 m.

Bogota Subway. Taken from <http://www.bogota.gov.co/>

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Activities planned for 2016

The Committee will organize the 2nd edition of the graduate course on tunnels in rock and soil, taught at the Escuela Colombiana de Ingenieros (Colombian School of Engineering).

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COSTA RICA

ACTIVITY REPORT 2015



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PRESENTATION

ASOCIACIÓN COSTARRICENSE DE OBRAS SUBTERRÁNEAS

Private Non-profit Association
Members: 27 individuals and 4 companies

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2015 - ACTIVITIES

Main activities:

- 1 Course on conventional tunneling (60 participants)
- 2 Seminars on TBM tunneling
- 6 meetings of Board of Directors

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TUNNELS - UNDERGROUND WORKS

Reventazón Hydro Power Project: Discharge tunnel.

Tunnel for sediment management and control of the level of the reservoir.
L=600m, Diameter=7,5m.
Excavated by conventional method. During 2015: construction of the final lining.





TUNNELS - UNDERGROUND WORKS
Reventazón Hydro Power Project: Discharge tunnel.







TUNNELS - UNDERGROUND WORKS

Reventazón Hydro Power Project: Gates gallery.
 Vertical shaft, Depth= 70m, Diameter=14m
 Reinforced concrete lining.





TUNNELS - UNDERGROUND WORKS
Reventazón Hydro Power Project: Gates gallery.







FUTURE ACTIVITIES

- ✓ Central America Regional Course on Tunneling Planning and Financing.
- ✓ Round Table on Road Tunneling
- ✓ Technical tour to a local hydro project





CZECH REPUBLIC
ACTIVITY REPORT 2015







PRESENTATION

NAME: Czech Tunnelling Association (CzTA)
 TYPE OF STRUCTURE: open association
 NUMBER OF MEMBERS:
 companies: 45
 individual members: 53
 total: 98 members



 ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN
 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 2015 - ACTIVITIES

Main activities:

- publishing of the magazine TUNEL
- holding of technical lectures called Tunnelling Afternoons
- organisation of technical trips to abroad



 ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN
 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 2015 - ACTIVITIES

WGs:

- Working group shotcrete
- Working group for conventional tunnelling
- Working Group on designing and structural analysis of underground structures
- Working Group on Technical Education
- Working Group for Mechanised Tunnelling



 ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN
 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 2015 - ACTIVITIES

Training:

CzTA organised three technical lectures called Tunnelling afternoons in 2015:

- *Slovak Tunnels under Construction*
- *Historic Underground Workings*
- *Ejpvovice Tunnels (with the exkursion to the Ejpvovice tunnels)*



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 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 2015 - ACTIVITIES

Training:

CzTA organised a technical trip to tunnel construction sites in Slovakia:

- *Považský Chlmec tunnel*
- *Žilina tunnel*
- *Ovčarsko Tunnel*



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 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 2015 - ACTIVITIES

Publications:

CzTA publishes the magazine „TUNEL“

- since 1992
- 4 issues per year
- it is possible to download it on the CzTA website: www.ita-aites.cz



 ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN
 ASSOCIATION INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE
 TUNNELS - UNDERGROUND WORKS

1. THE CITY CIRCLE ROAD (BLANKA TUNNELS)

- the largest underground construction project in the Czech Republic
- this extensive construction was built within the framework of the development of the north-western part of the City Circle Road (the inner circle), in the Malovanka - Pelc Tyrolka section
- the total length of this section is 6.382km; the aggregate length of tunnels in this section reaches 5.5km

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TUNNELS - UNDERGROUND WORKS

The city circle road was opened on 19th September 2015.



Initial minutes of traffic in the Blanka complex of tunnels (photo by Jakub Karlíček)

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TUNNELS - UNDERGROUND WORKS

2. METRO LINE V.A EXTENSION

- the operating section (the 5th A extension) of the metro line is 6.12km long
- most of the length was built with TBM
- it contains three mined stations (Bořislavka, Veleslavin and Petřiny) and one cut-and-cover station (Nemocnice Motol)

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TUNNELS - UNDERGROUND WORKS

The metro line V.A extension was opened on the 6th April 2015.



Nemocnice Motol station (photo Josef Husák)

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TUNNELS - UNDERGROUND WORKS

3. MODERNISATION OF ROKYCANY - PLZEŇ RAILWAY TRACK SECTION

- it is a part of the national transit railway corridor No. 3 and a part of the Trans-European transport networks
- it is built with TBM, now are completed 3 km of southern tunnel tube



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FUTURE ACTIVITIES

Some activities planned:

- CzTA organizes **13th International Conference Underground Construction Prague 2016**
- it will be held in Prague from **23rd to 25th May 2016**
- it is connected with the **3rd Eastern European Tunnelling Conference (EETC 2016)**
- for further information see **www.ucprague.com**

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We are looking forward to seeing you again in Prague 2016!

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EGYPT

ACTIVITY REPORT 2015



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PRESENTATION

Egyptian Tunnelling Society - ETS

Non Governmental Organization - NGO

- 385 Individual members
- 12 Corporate members

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2015 - ACTIVITIES

ETS held 7 lectures & presentations on the following subjects:

- 1- Seismic Performance of Deep bored tunnels with isolation protection.
- 2- Master builder solutions for underground construction conventional tunnel excavation.
- 3- High Speed Train.
- 4- What is Quality.
- 5- Tahrir Garage.
- 6- Tunnel Codes.
- 7- Floating Tunnels

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AITES | INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

ETS publishes a periodical newsletter every 6 months in Arabic

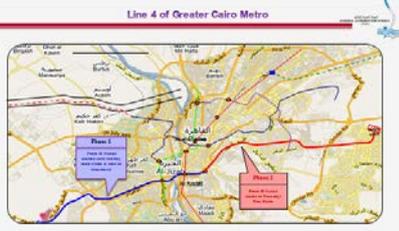
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TUNNELS - UNDERGROUND WORKS

- The Greater Cairo Metro Line 3 is 47 Km length of which nearly 29 Km are underground together with 38 stations. The route extends from Cairo Airport to Imbaba. Additional branch to Mohandeseen of 6 Km, is added which shall be also constructed in underground. The line crosses the River Nile twice. The planned capacity of the line when completed is 2.1 million passengers / day. The works on of the Cairo metro line 3 phase 1, had already operation in February 2012, the phase includes 4.5km in deep tunneling & 5 underground stations. Also, Phase 2 had already started in July 2009 parallel with phase 1& includes 6.5km. & 4 stations all underground. Hoping to finish this phase by May 2014. The tender documents for phase 3A, 3B & 3C are under preparation and it is planned to start April 2016. Also, phase 4A & 4B are under construction and it is planned to operation in February 2018. Phase 4C to the airport is under study.
- The Line 4, phase I of Cairo Metro is already tendered and planned to start at December of 2016. The Study Area is defined by: a Phase 1 of the proposed Metro Line 4, running from a depot/workshop via the Grand Egyptian Museum to El Malek El Saleh Station with a length of about 16km; and a Phase 2 route between El Malek El Saleh via El Sawaha Square and direct to Ring Road Exit #18 with a length of about 18km, namely "Northern Route". In addition, an alternative Phase 2 route, starting from El Malek El Saleh to Nasr City with a length of about 23.5km, namely "Eastern Route" was evaluated and compared with the originally proposed northern route.
- The transportation study for Greater Cairo Area had been finished proposing 6 lines of metro till 2025. Three further metro lines are recommended in this study in addition to the already 3 basic lines [lines 1 & 2 being finished , line 3, and line 4 are now under construction].

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AITES | INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

FUTURE ACTIVITIES



Line 4 is the based of connecting 6 %of October and New Cairo with metro network It provides the service to transport passengers to areas of high population density in the areas of the pyramid , Faisal ,Giza ,Nasr City ,Al-Arhar University and New Cairo.

2015 - ACTIVITIES

Work groups :

- GT30 : Bolting design
- GT32 : Geological and geotechnical uncertainties and risks
- GT35 : Management and re-use of excavation materials
- GT36 : Geometry, concrete, formwork and concreting of tunnel linings
- GT37 : Fire resistance of railway tunnels
- GT38 : Design, dimensioning and execution of precast steel fibre reinforced concrete arch
- GT40 : Rail tracks and track beds in tunnels
- GT41 : Underground works and sustainable development
- GT42 : Consideration of the radon in the conception
- GT43 : Application of the new geotechnical engineering standard to the underground
- GT44 : Asbestos bearing rocks

2015 - ACTIVITIES

Training :

- **Post-graduate specialised Master' degree**
TUNNELS AND UNDERGROUND STRUCTURES from design to operation
 90 professional speakers and professors
 One semester of coursework (October to February) - One semester of internship (March to July)
 . 4th Promotion 2014-2015 : 11 graduates of 6 nations
 . 5th Promotion 2015-2016 : 9 students of 4 nations
 . 6th Promotion 2016-2017 : <https://www.insa-lyon.fr/fr/mastere-ouvrages-souterrains#0>
 - **Short intermediate training courses in the Master's degree**

2015 - ACTIVITIES

**POST-GRADUATE
SPECIALISED
MASTER' DEGREE**



4th Promotion 2014-2015 5th Promotion 2015-2016

THEORETICAL AND PRACTICAL TRAINING IN GEOLOGY

2015 - ACTIVITIES

Publications :

- **Bimonthly technical magazine : 'Tunnels et Espace Souterrain' T.E.S.**
 N°247-248-249-250-251-252
 (More than 30 technical articles - 70 pages by TES)
http://www.aftes.asso.fr/publications_revue-tunnels.html
- **Technical recommendations**
 GT 25 : Economic control and contractualization
 GT 43 : Application of the new geotechnical engineering standard to the underground structures

2015 - ACTIVITIES



6 'Tunnels et Espace Souterrain' T.E.S. - 2 'Recommendations'

2015 - ACTIVITIES

AFTES IN DUBROVNIK WTC2015



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TUNNELS - UNDERGROUND WORKS

GRAND PARIS EXPRESS

On the horizon 2030:

- 200 km of automatic metro will be created
- 68 new stations will connect the poles of Paris, 3 airports and TGV stations
- 2 million travelers will borrow every day this new network

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TUNNELS - UNDERGROUND WORKS

TELT (Tunnel Euralpin Lyon Turin) [2 x 57 km]

Key locations and features shown in the diagram include: Puits d'Avrieux, Puits de Val Cenis, Portail d'entrée Salles, Turin, La Madona, Vitarodin-Bourget / Modane, Le Prag, Saint-Norin-la-Porte, Sain Julien-Morandins, and Rameaux de communication.

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TUNNELS - OTHER UNDERGROUND WORKS

SAFETY GALLERIES IN THE "SAVOIE" REGION

Fréjus tunnel 12 km	Siaix Tunnel 1,5 km	Le Chat Tunnel 1 km
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TUNNELS - UNDERGROUND WORKS PROJECTS

CIGEO/ANDRA PROJECT, BURE, FRANCE

INDUSTRIAL AREA FOR GEOLOGICAL STORAGE OF NUCLEAR WASTE

2 above-ground installations
Underground installations at 500 m of depth

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SOME FUTURE ACTIVITIES <http://www.aftes.asso.fr/evenements.html>

- Forecast of conferences and construction site visits in 2016

Dates	Lieux	Organisateurs	Thèmes	
14 janvier 2016	Paris	CNAM	CGI - AFTES	Amiante naturelle
2 février 2016	Paris	FNTP	AFTES Comex	IITA CUS - PN Ville 18D - Casopie
10 mars 2016	Paris	Chantier	AFTES IJF	M14 lot 1 de la gare Saint-Lazare à la Porte de Clichy
17 mars	Paris	CNAM	CFMR - AFTES	Mécanique des roches dans les laboratoires de recherche souterrains
8 avril 2016	Lyon	CEU	AFTES Sud Est	Equipements des ouvrages souterrains
20 avril 2016	Schwanau	Herrenknecht	AFTES IJF	Construction tunneliers - Usine Herrenknecht
23 au 26 avril 2016	San Francisco	WTC 2016	AFTES	Congres Mondial des Tunneliers
mai 2016	Modane	TELT Chantier	AFTES Sud est	Tunnelier - Accès - Premiers travaux
14 juin 2016	Paris	FNTP	AFTES Mardis	Recommandation
novembre 2016	Nice	Tram Chantier	AFTES Sud Est	Travaux
4 octobre 2016	Paris	FNTP	AFTES Mardis	Conférence technique
14 octobre 2016	Lyon	Mercurio	AFTES Sud Est	Conférences Management des plateformes souterraines
3 novembre	Paris	CNAM	CGI - AFTES	Stockage d'énergie en souterrain
24 novembre	Paris	FNTP	AFTES Mardis	Recommandation
décembre 2016	Moutiers	Chantier	AFTES Sud Est	Travaux de la galerie de sécurité du tunnel du Siaix
décembre 2016	Paris	FNTP	AFTES	Assemblée générale + Conférence + Remise des diplômes mastere

- Participation at numerous congresses of the member nations
- Publication of recommendations and technical magazines

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FUTURE CONGRESS

AFTES TRIENNIAL CONGRESS PARIS 2017 NOVEMBER 13-15

THE VOLUE IS UNDERGROUND

L'ESPACE SOUTERRAIN NOTRE RICHESSE



**GERMANY
ACTIVITY REPORT**




PRESENTATION

German Tunneling Committee
Registered non-profit, restricted association
(limited to 30 individual members)



2015 – ACTIVITIES

- **Recommendation for contracts with low potential for conflicts** has been published (only German, see website for download)
- **DACH-meeting** (German, Austrian, Swiss Tunnelling Committees) in Austria (½ day technical seminar and site visit)



2015 – ACTIVITIES

Working groups (1/2):

- Financing of tunnels via PPP/BOT-projects
- Technical evaluation of bids during tendering procedure
- Recommendations for contracts with low potential for conflicts
- Requirements for refuge chambers



2015 – ACTIVITIES

Working groups (2/2):

- Strategic development of design offices
- Face support pressure calculation in shield tunnelling
- Life-cycle costs calculation
- External communication of DAUB



2015 – ACTIVITIES

Publications of DAUB can be found in/on

- Journal “tunnel” (www.tunnel-online.info)
- “German Handbook of Tunnelling” (published annually, Taschenbuch Tunnelbau)
- Recommendations are available for download from website (www.daub-ita.de); the majority are bi-lingual (German/English)





2015 – ACTIVITIES

STUVA-Conference in Dortmund

- more than 1850 participants
- 165 exhibitors on 6,000 m² display area
- 2 days of high-level lectures on tunnelling and tunnel operation







TUNNELS – UNDERGROUND WORKS

U5 Metro Berlin, Town hall – Brandenburg gate
 hydroschild drive
 (Ø = 6.7 m),
 2 single track tubes,
 2.2 km, 3 stations
 (ground freezing)



Photo: Michael F. Mehnert, CC BY-SA 3.0, via Wikimedia Commons





TUNNELS – UNDERGROUND WORKS

Boßler tunnel, High-Speed-Railway-Line
 Wendlingen–Ulm,
 near Stuttgart,
 8.8 km,
 TBM (Ø = 11.38 m),
 shotcreting method



Photo: Amim Kilgus





TUNNELS – UNDERGROUND WORKS

Karlsruhe Combined Solution, inner-city
 tram tunnel
 below
 Kaiserstrasse,
 TBM
 (Ø = 9.32 m),
 length 2.4 km







FUTURE ACTIVITIES

Regular meetings
 with Austrian and Swiss colleagues

Munich Tunnel Symposium
 3 June 2016

InnoTrans
 Tunnel Forum, 20–23 September 2016
 Leading int. trade fair for transport technology








FUTURE ACTIVITIES

Sealing of buildings by injections
 9–10 November 2016,
 useful information on

- afterwards sealing of concrete structures
- geotechnical sealing injections









FUTURE ACTIVITIES

STUVA-Conference 2017 

- 6–8 December 2017 in Stuttgart
- Topics on tunnelling and tunnel operation
- Even more growth expected



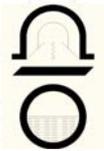






GREECE

ACTIVITY REPORT 2015









PRESENTATION

NAME:
GREEK TUNNELLING SOCIETY (Ε.Ε.Σ.Υ.Ε.)
 Member Nation of the International Tunnelling Association
 22 Panormou Str., T. K. 11523 Athens, Greece.
 e-mail: eesy@metal.ntua.gr & srapt@egnatia.gr - URL: www.eesy.gr

TYPE OF STRUCTURE:
 Independent society operating according to the Greek Law for scientific non profit organisations.

NUMBER OF MEMBERS:
 425 members







2015 - ACTIVITIES

Main activities:

- The ITA Executive Council has unanimously accepted to recognize the ancient "Eupalinos Aqueduct Tunnel" in Samos Island as a tunnelling landmark. This event was celebrated during the opening ceremony of the WTC in 2015, on May 25th in Dubrovnik, Croatia. The Greek Tunnelling Society developed and maintain a special web site for Eupalinos Tunnel: www.eupalinos-tunnel.gr
- During the opening ceremony of the WTC 2015, Prof. Tassios delivered the heritage lecture titled "The trend towards large scale public - works in ancient Greece"



Prof. T.P. Tassios during his presentation.







2015 - ACTIVITIES

Main activities:

- At the end of September 2015, as agreed at the General Assembly of Eastern European countries held in Athens on 28 September 2014, the Tunneling Association of Belarus organized and conducted a technical excursion in the facilities of the underground infrastructures of Minsk. The event was held between 23rd and 24th September 2015. Minsk was visited by the representatives from Greece, Hungary and the Czech Republic. The GIS was represented by its vice-president Mrs V. Giouta-Mitra.









2015 - ACTIVITIES

Main activities:

- On the 30th of November 2015, a special lecture was delivered by Dr. Julia Viggiani, Professor at the TOR VERGATA Polytechnic of Rome, Italy titled: «Evaluating the effects of tunnelling on historical buildings: the example of Line C of Roma underground» for the celebration of Saint Barbara's feast Day. The lecture is available in the following link: <https://www.youtube.com/watch?v=XiuMFPQFWWhQ>
- On the 19-12-2015 a site visit in tunnels under construction along the Korinthos - Patra highway concession project was organized by the GIS. The site visit was attended by approximately 30 members who had the chance to experience "from inside" various construction stages of 4 tunnels.



2015 - ACTIVITIES

WGs:

- The Young Members Group, established in September 2014, counts already 30 members.
- A WG was established having as scope of work to re-construct the web site of the Greek Tunnelling Society. Moreover, it is planned to develop a database with all underground structures all over Greece.
- The WG on final lining design and unreinforced concrete linings has suspended its work due to the course of some arbitration procedures in concession projects in Greece on this subject. As the findings of the arbitration have been finalized the WG is reactivated for the new cycle.

2015 - ACTIVITIES

Publications:

Tunnel Bulletin (in Greek): Three (3) issues during 2015.

TUNNELS - UNDERGROUND WORKS

- Athens Metro: The works for new Metro Line 3 Aghia Marina to Piraeus, including 7.6 km long tunnels, with 6 modern Metro Stations (and 8 ventilation shafts), are in full progress, both for TBM/EPB driven running tunnels (tunnel boring works have been completed by 51%) and construction of Stations.




Athens Metro/Line 3, from Aghia Marina to Piraeus.

TUNNELS - UNDERGROUND WORKS

- Thessaloniki Metro.
 - Main Line: Works for the Thessaloniki metro main line [involving 13 stations, 9.5 km of tunnels (7.7 km to be bored by two TBM/EPB and the rest using cut & cover and NATM techniques) and a depot], have been restarted by January 2016, after a 1 year suspension due to contractual disputes. Progress rate (as per January 2016): Civil works: 55% completed, Tunnel boring works: 73% completed, Supply and installation of escalators in various Stations of the Project: in progress.
 - Extension to Kalamaria: This underground extension shall be 4.78 km long with 5 new Stations. Works for the construction of 5 Stations and of the TBM/EPB start shaft, are in full progress.




Thessaloniki Metro (main line).
Thessaloniki Metro (Extension to Kalamaria).

TUNNELS - UNDERGROUND WORKS

- The works in the three twin bore highway tunnels (T1: ~2km, T2: ~6km and T3: ~3km) with a total single tube length of ~22 km, at the Tempi gorgo along the Malakos - Kleidi concession project are under completion. In tunnels T1 and T2 civil works have been fully completed and E/M works have been completed by 85%. In tunnel T3 civil works have been completed by 98% and E/M works by 75%.
- Works for nine (9) highway tunnels of the Elefsis - Corinth - Patras - Pyrgos concession project (I/V Olympia Odos) are in full progress. These are the tunnels at Derventi, Mavra Litharia, Akrata, Platanos, Aghios Georgios, Koliri, Elias, Panagopoulos and Xylokastris. Six tunnels are of single tube unidirectional traffic type and three tunnels are twin tube unidirectional. Total length of single tube: 16 Km.
- Along the Ionian Highway four (4) twin bore tunnels with a total single tube length of 13.6km (Kalydona 1200m long each branch, Makryneia 500m long each branch, Klokova 2900m long each branch and Ampelia 1000m long each branch) are in full progress. As far as the progress of the works is concerned Kalydona tunnel has been completed by 95% (E/M works remain), Makryneia tunnel has been completed by 80%, Klokova tunnel has been completed by 40% and Ampelia tunnel has been completed by 60%.
- Highway tunnels for Styfida by-pass are completed and already operational.
- Excavation and final lining at the 9km long single track twin tube Kallidromo rail tunnel (total length 18 km single tube) have been completed. Remaining civil works and E/M works are in progress.
- Along the Lianokladi - Domokos rail section: Civil works for 3 small double track tunnels with a total length of 1.62km, and the 6.4km long single track twin bore tunnel of Mt Orithys (13km single tube length), including one access tunnel (1.8km long) are completed. Remaining civil works and E/M works are in progress.



FUTURE ACTIVITIES

- On the 18th of March 2016 a half day seminar is organized by the Greek Tunnelling Society and its Young Members Group which is referred to "Mechanized Tunneling". The seminar is sponsored by HERRENKNECHT AG.

Session 1 - Types and Operations

- Introduction - History
- TBM Types
- TBM Logistics
- TBM Operations (Excavation, Grouting, Segmental Lining, Face Inspection, Monitoring)

Session 2 - Guided Bore Tunnel

- Study of risks & contingencies to overcome problems

Session 3 - Case Studies

- Metro, Road and Hydropower Projects

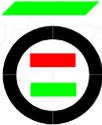
Session 4 - Mega TBMs

- Review, Pitfalls and Future Trends

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HUNGARY ACTIVITY REPORT 2015



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PRESENTATION

NUMBER OF MEMBERS :
80 Members , 21 legal entities, 59 individuals

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2015 - ACTIVITIES

Main activities:
 Hungarian Association holds professional presentations as annual trainings (Lecturer Days, Conferences etc.) every year according the annual work-program

Training: Professional training days 2 times /year and social events

Publications: 5 publications On the WTC-2015 in Dubrovnik and On the Eurock 2015 & Geomechanics Colloquium in Salzburg

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NEWS FROM BUDAPEST- HUNGARY PROJECTS ARE GOING ON

- **Radioactive waste repository in Bataapáti** (for low- and intermediate level). Both Underground shafts were finished in 2015.
- **M0-highway ring tunnell**, the northern sector, the draft design
- **Southern Railway Tunnell** renovation of design
- **M85 highway section Peresztég-Sopron**, draft design for Tunnell under the Vienna Hill

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FUTURE ACTIVITIES (2016)

- **On May and September: Lecturer Days**
- **On November: Tunnelling Days and Social Events- Annual conference of Hungarian Tunnelling Association**
- **On December: St. Barbara's Tunnelling Dinner**

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ICELAND ACTIVITY REPORT 2015





PRESENTATION


Name: The Icelandic Tunnelling Society
Type of structure: Independant Society of corporate and ordinary members, founded 1974.
Number of members: A total of 17 corporate members and 45 ordinary members (individuals).



2015 - ACTIVITIES


Main activities: Every year about four board meetings, one annual meeting with invited speakers. Occasional seminars.
WGs: Four corresponding members in four working groups.
Training: No training programme.
Publications: No special publications.



TUNNELS - UNDERGROUND WORKS


Main works for the year 2015:
Vadlaheidi Tunnel: Excavation continued on this 7,2 km long road tunnel (66 m²) in North Iceland. At the end of year 2015 some 4,6 km had been excavated. Problems encountered due to geothermal activity (up to 65°C), fault collapse and large inflow of cold water. Project delayed for at least one year.
Nordfjörður Tunnel: Breakthrough reached in September 2015 on this 7,5 km long road tunnel in East Iceland (54 m²). Final rock support and installations ongoing. Will be opened for traffic in 2017.
Bakki Tunnel: Bids opened in September 2015 for this 1 km long industrial transport tunnel in North Iceland (75 m²). Excavation expected to start in March 2016.





Vadlaheidi Road Tunnel: Collapsed fault debris







Vadlaheidi Road Tunnel: Hot water during drilling for grouting, 65°C.







Nordfjörður Tunnel: sediment rock (tuff) at face



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Nordfjörður Tunnel: sediment rock (tuff). Lattice girders and wire mesh



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Bakki tunnel: South portal tunnelface



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FUTURE ACTIVITIES

Some further tunnels are planned in the next future:

Bids were opened in January 2016 for the extension of the **Burfell Hydroelectric Plant** in South Iceland (100 MW). This involves underground powerhouse, access and tailrace tunnels and two shafts. Tunnel excavation will start summer 2016.

Other hydroelectric projects involving tunnelling work are being planned.

Further road tunnels are on the horizon such as the **Dyrafjörður Tunnel** in NW Iceland which will be approx. 5,6 km long. Tendering expected 2016.

Other road tunnel projects being investigated such as the **Fjardarheidi Tunnel**, approximately 13 km long in East Iceland.

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INDIA
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TAI

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PRESENTATION

Name: Tunnelling Association of India

Type of Structure: President

**Vice Presidents (2 Nos.),
 Secretary General**

**Treasurer and
 Executive Council Members – 20 Nos.**

No. of Members: 300

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ACTIVITIES

- ❑ **Main Activity:** Dissemination of information about the latest technological development in the execution of tunnel and underground projects by organizing symposia, seminars, workshops, and training courses in liaison with national and international organizations.
- ❑ **WGs:** Constituted WGs on different topics to prepare the manual/guidelines for the use of field engineers
- ❑ **Training:** Organized the following workshops
- ❖ Workshop on "Tunnel Design and Construction" Issues and Challenges" 13-14th April 2015, New Delhi
- ❑ **Conferences/Seminars**
- ❖ TUNNELLING ASIA' 2015 - Underground Space Development for Better Environment and Safety: Issues & Challenges, 15-16th April 2015, New Delhi
- ❖ Conclave on Tunnelling in Infrastructure Development: Issues and Challenges, 29-30 October 2015 at Mumbai

Tunnel & underground Works - Indian Scenario				
Length in KM				
Sector	Completed	Under Construction	Planned	Total
Hydro Tunnels	1108	487	570	2165
Metro Tunnels	68	81	480	629
Railway Tunnels	138	194	418	750
Road and Highway	11	46	120	177
Irrigation, Urban Water Supply and Sewerage Tunnels	183	167	242	592
Total	1508	975	1830	4313
Underground Cavern	5.5 MMT		12.5 MMT	18.0 MMT

TUNNELS - UNDERGROUND WORKS	
<p>Metro Network : For metro network. 31 cities of a route length of 1714 Km out of which 480 Km has been planned underground. The metro system is currently operational in 5 cities across India. Delhi is leading with 190 kMs of operational length and the construction for another 140 kMs is in progress.</p> <p>Hydropower: Out of 244000 MW available hydropower potential including Pumped Storage Development, so far about 40000 MW has been developed. 980 major hydropower tunnel works covering over 2,165 km. 496 tunnels with a length of over 1,108 km have been completed and 484 tunnels with about 1,057 km length are under implementation/planned</p>	

TUNNELS - UNDERGROUND WORKS	
<p>Railway Network: the second largest rail network in the world - executing many projects in difficult terrain conditions - 3300 km long Dedicated Freight Corridor Projects to facilitate faster movement of trains carrying goods. Out of 453 railway tunnels covering 332 km, about 316 tunnels covering 138 km length have been completed and about 137 tunnel works covering 194 km are underway on various rail line projects, biggest project being the 124-kM Jammu-Udhampur-Katra-Qazigund-Baramulla rail line</p> <p>Road Network: 3.3 million kilometres road network - the second largest in the world. About 30 roads and highway tunnels covering over 120 km are planned to be awarded and implemented in next ten years.</p>	

TUNNELS - UNDERGROUND WORKS	
<p>Irrigation, Urban Water Supply and Sewerage Tunnels: Over 72 irrigation, urban water and sewerage tunnels spanning over 350 km, 60 tunnels with a length of over 183 km have been completed and 12 tunnels with about 167 km length are under implementation. World longest TBM bored Irrigation Tunnel: Srisailem Left Bank Canal Tunnel Scheme in Andhra Pradesh, Length 51 km, dia 9.20 m- 2 Nos. tunnels is under execution.</p> <p>Underground Cavern: To create energy security which shall go a long way in creating economic stability in the country, first crude oil storage cavern at Vizag was constructed recently. In phase-I of the Indian strategic crude oil reserve programme involves construction of the storage units of 5.33 MMT and in Phase-II involves stocking of strategic reserves involve storage units of 12.5 MMT.</p>	

Construction of Underground Metro works by tunneling in DMRTS Phase-III				
Corridor	Route length of Underground Section(Km)	Length of Tunneling by TBM (Km)	No. of TBMs used	No. of Underground Stations
Central Secretariat -Kashmere Gate (Red Line)	9.370	13.991	09	07
Majlis Park to Shiv Vihar (Pink Line)	19.117	26.031	13	12
Janakpuri West to Kalindi Kunj (Magenta Line)	23.807	33.659	22	15
Dwarka -Najafgarh	1.541	1.272	01	01
Total	53.835	74.953	45	35

Salient Features	
<ul style="list-style-type: none"> Total 45 Earth Pressure Balancing Tunnel Boring Machines (TBMs) have been deployed by the contractors. 26 TBMs had been working simultaneously at the peak period. 20 TBMs are still working. Cranes up to 800 metric ton capacity were used for lowering of Tunnel Boring Machines. Some contractors used 125 metric ton capacity gantry cranes for lowering of TBMs <p>Geology: The geology of Delhi can broadly be divided into two types of ground.</p> <ul style="list-style-type: none"> Firstly, the zone in the vicinity of the River Yamuna basin comprises alluvium, made up of fine to medium sands, silts, clay and gravel plus kankar. This geology is normally described as 'Delhi Silt', which is cohesive in nature and is an ideal medium for bored tunneling. Secondly, there is the Precambrian formation comprising quartzite rock inter bedded with mica schist, varying from intact to highly weathered in nature and often in the form of loose boulders. This geology is a very abrasive tough rock which presents extreme challenges for tunneling. It is often found in combination with loose boulders, which further makes the tunneling difficult and extremely slow. 	

Salient Features

- ❖ **Water Table :** The water level varies from 2 meters below ground level in the Yamuna floodplain to 30 m below in the areas on the west and south of Delhi.
- ❖ There are total 74 tunnel drives out of which 57 drives have been completed and remaining 17 are in progress. Thus, overall present progress of tunneling is 91%.
- ❖ The internal finished dia. of all the tunnels is 5.7 to 5.8 meter.
- ❖ Precast segmental lining has been used. Each ring comprises of 6 segments including one key segment. Length of ring varies from 1200 mm to 1500 mm.
- ❖ The precast tunnel lining segments are with M-50 concrete with use of mero silica. These have been cast in 13 state of the art segment casting yards developed by different contractors with steam curing facilities to reduce the de-molding time and increase the production capacity.
- ❖ Total 53725 no. of lining rings have been used in Phase-III.

Salient Features

- ❖ For the first time in Delhi Metro, two of the tunnels drives have been completed by dragging the TBMs through station. Naraina station box was completed with a temporary base slab on which both the TBMs were dragged through the station for completing small length of tunnel on the other side of the station.
- ❖ Two stage grouting after erection of inner lining segments has been used for minimizing the ground settlement.
- ❖ Total quantity of earth excavation by TBMs is approximately 21 lakhs cubic meter. This earth is being used to fill low lying areas of various government departments in Delhi.
- ❖ Proper arrangement of fresh air for workers has always been made using tunnel ventilation systems.
- ❖ Only controlled access to tunnels during tunneling has been allowed so that only the authorized persons could go inside.

Salient Features

- ❖ Underground lines in Phase-III have crossed below the existing operational underground metro line at two locations (Yellow line at Hauz Khas and INA) and crossed below the operational elevated metro lines at 8 locations (Kashmere Gate, Pragati Maidan, Azadpur, Netaji Subhash Place, Lajpat Nagar, ramp of Airport Line, Kalkaji and Janakpuri West). Tunnel drives have crossed operating Indian Railway Tracks at 4 locations.
- ❖ All such crossings involved very meticulous planning and execution to avoid excessive settlements and damage to the operating lines.
- ❖ Tunnel drives below old buildings have been completed with minimum effect on a structures.
- ❖ Tunneling in line No. 6 has been successfully completed through an area having many heritage buildings.

Delhi Metros

Underground Station at Chawdi Bazar, Delhi

Tunnel by TBM Malviya Nagar to Hauz Khas, Delhi

Twin Tunnel using NATM at Saket New Delhi

Udyog Bhawan Station, Delhi

Completed Tunnel Segment Erection

MUMBAI METRO LINE 3

33.5 km underground
 Stations: 27 (26 U/G+1)
 Completion cost : Rs. 23,136 Cr.
 Soft loan (JICA) : 57.2 %
 Contribution by GoI/GoM/
 Others : 42.8%
 EIRR : 17.89%
 FIRR: 3.2%
 Implementation : 2015-2020

Chennai Metro Rail Project

- Chennai Metropolis is the 4th largest in the country, encompassing an area of 1189 sq.km and having an estimated population of over 8.3million as of the year 2008.
- It is an important administrative center and serves as the capital to the state of Tamil Nadu. It is also the center for Bharatnatyam and Classical music.
- Chennai city's modern image as a buzzing industrial and commercial hub coexists with its cultural personality.

Chennai Metro Rail Project

Description	Under Ground (Km)	Elevated (Km)	Total (Km)
Corridor I	13.8	11.8	25.26
Corridor II	9.9	11.4	21.3
Total	23.7	23.2	46.91

Description	Under Ground (Nos)	Elevated (Nos)	Total (Nos)
Corridor I	11	6	17
Corridor II	9	7	15
Total	19	13	32

Chennai Metro Rail Project - Overview

- The Chennai Metro Rail Project**
 - Underground Stations
 - Tunnels
 - Cross passages
- Challenges in Construction**
 - Land acquisition
 - Site constraints
 - Sub-soil conditions
 - Working in residential areas
 - Working near arterial roads wi
 - Working near sensitive buildings
 - Interface with other departments
 - Multi-modal integration & Ensuring connectivity

th traffic

GEOLOGY

Soil: Thickness of overburden soil is average at about 7m.
Composition: Fill, Residual soil(Marine Clay, Sandy Silty Clay, Clayey Silty Sand)
Rock : Highly to moderately weathered Rock: Volcanic in nature (Basalt, Breccia, Tuff)
Ground Water: Ground water Level : 1.0 m to 3.0 m below ground level

TAI Conferences Proceedings

TAI Periodical


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TAI Publications 




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FUTURE ACTIVITIES 

To organise:

- ❖ Training Programmes for the Young engineers
- ❖ Workshops
- ❖ Symposium
- ❖ International Conférences

Publications
Manual on Rock Mechanics

Periodical
TAI Journal


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TAI Forthcoming Events 

- ❖ Best practices in cross passage construction: Investigation, design and execution, May 2016 New Delhi
- ❖ Training programme on tunnel design and construction for MMRC engineers
- ❖ Workshop on Tunnel design and construction: Issues and challenges, Bangalore/Chennai
- ❖ Conclave on Tunnelling in Infrastructure development: Issues and Challenges at Kolkatta
- ❖ Tunnelling in Himalayan geology, October Jammu & Kashmir
- ❖ Tunnelling Asia, February 2017 at New Delhi
- ❖ Workshop on Software application in tunnelling at New delhi


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Thank you


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PRESENTATION 

IRAN

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PRESENTATION 

Iranian Tunnelling Association (IRTA)

Tehran, North Karegar Ave., after 2nd St., Building 467 (new No. 1839), 5th Floor, Unit 41 - Postcode: 1413693155

Tel.: +98-21-88630495 / +98-21-88630496

Fax: +98-21-88008754 - Web: www.irta.ir / Email: info@irta.ir

Independent Association (approved as a scientific association by the Ministry of Science, Research and Technology of Iran and active following regulations of Iran Scientific Associations Commission)



PRESENTATION

Individual (non-student) Members : 705
Student Members : 410
Corporate Members : 155



2015 - ACTIVITIES

Main activities

- Holding monthly technical presentations and seminars
- Publishing the Quarterly "Tunnel" Magazine
- Publishing the bi-annual "Tunnelling and Underground Space Engineering" Journal together with Shahrood Technical University
- Holding Tunnelling Conferences at national and international levels every two years (holding the 2nd Regional and 11th Iranian Tunnelling Conference in November 2015)
- Publishing books on tunnelling subjects
- Consulting firms and companies on technical matters
- Keeping records of tunnelling activities in Iran



2015 - ACTIVITIES

The Working Groups of IRTA include:

- WORKING GROUP of RESEARCH (previously Training and Planning)
- WORKING GROUP of CONTRACTUAL PRACTICES
- WORKING GROUP of HEALTH AND SAFETY IN WORKS
- WORKING GROUP of MAINTENANCE AND REPAIR
- WORKING GROUP of SEISMIC EFFECTS
- WORKING GROUP of IMMERSED AND FLOATING TUNNELS
- WORKING GROUP of SPRAYED CONCRETE USE
- WORKING GROUP of MECHANIZATION OF EXCAVATION
- WORKING GROUP of UNDERGROUND AND ENVIRONMENT
- WORKING GROUP of LONG TUNNELS AT GREAT DEPTH
- WORKING GROUP of CONVENTIONAL TUNNELLING
- WORKING GROUP of URBAN PROBLEMS, UNDERGROUND SOLUTIONS
- WORKING GROUP of LIFE CYCLE ASSET MANAGEMENT



2015 - ACTIVITIES

Training

- Holding monthly technical presentations and seminars
- Holding technical courses and workshops (eg. at 2nd Regional and 11th Iranian Tunnelling Conference) presented by national and international experts

Publications

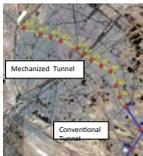
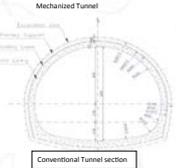
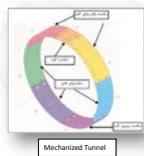
- Publishing the Quarterly "Tunnel" Magazine
- Publishing the bi-annual "Tunnelling and Underground Space Engineering" Journal together with Shahrood Technical University
- Publishing books on tunnelling subjects




Qom Metro Mechanized Tunnel Achievements

Qom lies approximately 130 kilometers southwest of Tehran. Qom's Metro Line A consist of a length of about 14 km and 14 stations. The project is of EPC type and is currently under construction.

The route is constructed by mechanized tunneling (about 10.2 km) and conventional tunneling (about 3.8 km). The construction of about 6 km of mechanized part has been completed (January 2016).




A tight control of all parts of mechanized tunneling is being carried out in order to assure quality of segment manufacturing, installation and tunnel performance. The steps of quality control include:

- 1- Manufacturing and pre-installation controls
- 2- Installation controls
- 3- Post-installation controls
- 4- Special Controls (when tunneling influences other buildings and utilities)

Some great results and records has been achieved in this project as follows

- Max. daily progress: 33 m (26 Dec 2015)
- Max. monthly progress: 555 m (Feb 2015)
- Avg. monthly progress 472 m
- Surface settlement: less than 10mm
- Fully control of cracks in segments
- Modify segment transportation using an optimum combination of tracks and MSV machines
- Installing a precise risk assessment process for all buildings and utilities adjacent to the tunnel rout
- Tunneling adjacent to important buildings and utilities with minimum side-effects

FUTURE ACTIVITIES

- Continue different publications, holding monthly seminars, and organizing workshops
- Expanding Iranian Tunnel Database by collecting data from projects during design and construction phases
- Collaborating with research activities of universities and organizations

ITALY
ACTIVITY REPORT 2015

PRESENTATION

ITALIAN TUNNELLING SOCIETY Società Italiana Gallerie
Italian Tunneling Society
Member of International Tunneling Association (ITA)

TYPE OF STRUCTURE
SIG is a scientific, not-for-profit association, founded in 1974; its function is to promote, coordinate and spread studies and research in the field of tunnelling and underground construction works. SIG is a founding nation of ITA

NUMBER OF MEMBERS
The association currently counts 600 members, which represent public companies and organization, general contractors, manufactures, engineering firm and consultants, universities, construction companies.
At present, 80% of SIG members are individuals and the remaining 20% are corporate members.

2014-2015 — ACTIVITIES

Main activities 2014-2015:

- SIG International Conference – Samoter 2014 – Verona, 8 May 2014 – *Excavation ground and rocks in underground works: problem or opportunity?*
- SIG International Conference - Expotunnel – Bologna, 23 and 24 October 2014 *Innovation in underground construction*
- SIG Conference for Santa Barbara 2014 – Turin, 3 December *40 years in SIG: Past Presidents meet next generation*
- SIG International Conference - Expotunnel – Milano, 8 and 9 October 2015 *Using ground and underground wisely to avoid environmental disarray*
- SIG Conference for Santa Barbara 2015 – Rome, 3 December 2015 *Muir Wood's Spirit – Prof. Pietro Lunardi Lecture*
- *Technical Visit on job-site: 5 one day visits on main Italian tunnel jobsites (2015)*

2014-2015 — ACTIVITIES

WGs

The association takes part in the ITA-AITES working group (WGs). Our experts proactively collaborate with their international colleagues in order to exchange expertise and experience, hence divulging technical, scientific and business know how in underground construction. Moreover, the SIG board has also established 2 working groups within the association: WG1 on Tunneling and Underground Works Design that will update the design guideline in accordance with the actual European standards and regulations, and WG2 that deals with environmental aspects about managing of excavated material from tunnels.

WORKING GROUPS	ITALIAN REPRESENTATIVES
WG1 RESEARCH	Dr. Eng. MICHELE CROCCO Politecnico di Torino
WG2 CONSTRUCTION PRACTICES	Dr. Eng. VITO RIZZI Ingegneria
WG3 HEALTH & SAFETY IN TUNNELS	Dr. Eng. CARLO ANTONI C&A
WG4 MAINTENANCE AND REPAIR	Dr. Eng. MICHELE CROCCO Ingegneria
WG5 SPECIAL EFFECTS	Dr. Eng. MICHELE CROCCO Ingegneria
WG6 TUNNELS & FLOATING TUNNELS	Dr. Eng. MICHELE CROCCO Ingegneria
WG7 SPECIALIZED JOB	Dr. Eng. MICHELE CROCCO Ingegneria
WG8 TIME MANAGEMENT OF EXCAVATION	Dr. Eng. MICHELE CROCCO Ingegneria
WG9 UNDERGROUND AND ENVIRONMENT	Dr. Eng. MICHELE CROCCO Ingegneria
WG10 TUNNELS, TUNNELS AND GREAT DEPTH	Dr. Eng. ANDREA PIZZOLI Ingegneria
WG11 FUNCTIONAL TUNNELING	Dr. Eng. ANDREA PIZZOLI Ingegneria
WG12 SPECIAL PROBLEMS, UNDERGROUND SOLUTIONS	Dr. Eng. ANDREA PIZZOLI Ingegneria
WG13 LIFE CYCLE ASSET MANAGEMENT	Dr. Eng. ANDREA PIZZOLI Ingegneria

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 2014-2015 — ACTIVITIES

Training

- Training Course SIG & ITACET Foundation – Turin, 15 and 16 January 2014
Conventional Tunnelling and Ground Reinforcing Techniques
- Politecnico di Torino 2nd level Specializing Master – Turin, 2015-2016
Tunnelling and Tunnel Boring Machines
 This Master Course, that has now reached its 10th edition, is endorsed by the Italian Tunnelling Society SIG and the International Tunnelling Society ITA.
- University “La Sapienza” 2nd level Specializing Master – Rome, 2015-2016
 It is endorsed by the Italian Tunnelling Society SIG.
Geotechnical Works, Design and Construction
- Several SIG members involved as lecturers in the ITACET Foundation Training Course Riyadh, 25 – 27 January 2016
Landslides and Tunnelling & Rock falls and protection techniques

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 2014-2015 — ACTIVITIES

Publications

- Periodical “Gallerie e Grandi Opere in Sottterraneo” (Tunnels and Underground Structures) – (4 publications/year)
 Since 1976, the periodical “Gallerie e Grandi Opere Sotterranee” is SIG’s pride and glory. It is currently published once every three months and it reached issue 116 in december 2015. The periodical presents technical and scientific articles, as well as Editor’s opinion, news about construction works and tenders around the world, bulletin from the Italian tunnelling market, reports on technical visits, scheduled training courses and international congress.
- The Italian Art of Tunnelling 2014 – Handbook on underground projects involving italian companies on going in Italy and abroad
- The Italian Art of Tunnelling 2016 – Handbook on underground works
- SIG Conferences Proceedings (publication of all the papers presented during the Association’s Conferences).

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AITES
 2015 - ACTIVITIES
 SIG MEMBERS AWARDS

2015 ITA Tunnelling Awards

Innovative Use of Underground Space - Toledo Metro Station on Line 1 in Naples

The Toledo Station is a unique example of a decentralised museum, offering dynamic fruition of the artists’ creations, as the citizens have the possibility to travel an open artistic itinerary.

Contractor of the Year - Salini Impregilo

Life Time Achievement - Prof. Sebastiano Pelizza

Muir Wood Lecture 2015 - Prof. Pietro Lunardi



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AITES
 2014 - 2015 - TUNNELS - UNDERGROUND WORKS

Main Projects:

Metro

- Naples metro line 1 and line 6
- Rome metro line C
- Milan metro line 4 and line 5

Highways

- Motorway A1 Bologna - Florence
- Motorway Italy-France: Frejus Safety Tunnel

Railway

- Milano - Genova High Speed Railway line
- Florence Underground railway pass for HS line
- Brenner Base Tunnel - Periadriatic fault exploratory tunnel
- Torino-Lyon railway line - Maddalena exploratory tunnel

2010 - 2015

- Rome metro line C
- Milan metro line 4 and 5
- Extension Catania metro line
- Palermo metro line
- Extension Turin metro line (Lingotto-Bengasi)
- Brenner base tunnel, periadriatic fault exploratory tunnel
- Frejus base tunnel, Maddalena exploratory tunnel
- Terzo valico - high speed railway tunnels between Genova and Tortona
- Florence underground railway
- Palermo underground railway
- Cefalo-Castelbuono railway
- Pavoncelli tunnel (Aveellino)
- Motorway S5600 Caltanissetta tunnel
- Motorway A1 Bologna-Florence, new alternative pass (Val di Sambro, Grizzana, Casere, Sparvo tunnels)
- Motorway Italy-France: Frejus safety tunnel
- Motorway A14 widening of existing tunnels.

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AITES
 2014 - 2015 - TUNNELS - UNDERGROUND WORKS

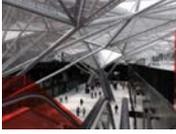
Metro Projects

Naples metro line 1 and 6

The Naples Metro Lines 1 and 6 are included into an integrated metro system serving the whole city that today embodies six underground railway lines and four funiculars. This is one of the largest infrastructure projects currently under construction in Italy and it will see, at last, the service expanded with two rail lines, 93 km of track and a further 30 km of new light rail connecting 114 stations together.

Rome metro line C

Line C is the third Metro Line in Rome. It is the most important of strategic infrastructure in Italy and it is one of the biggest European construction projects: the overall investment is about 3.800 billion euro. Line C is the first metro line in Italy to be fully automated. Line C crosses the entire city of Rome like a backbone, from the east to the north-west. It extends for about 25,5 km (18 km underground), with 30 new stations (20 underground).





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 2014 - 2015 - TUNNELS - UNDERGROUND WORKS

Highway Projects

Variante di Valico (A1 Bologna - Florence)

Expansion of the Appennine section of the A1 motorway, between Bologna and Florence, that is a **strategic stretch which links northern and southern Italy** and also plays a major role in the movement of people and goods between Europe and the Mediterranean. The project consist of 66,6 km with about 50% of the alignment excavated by TBM and conventional tunnelling.

Frejus Safety Tunnel

The Frejus road tunnel is a double tube tunnel one way each direction, which links France with Italy and runs parallel to the Frejus railway tunnel.

The second tube will enter into service in 2019, making the Frejus tunnel the longest double tube road tunnel in Europe.

The project involves the construction of a safety tunnel and passageways connecting with the existing road tunnel along which new emergency shelters can be built.





Sparvo Tunnel (Variante valico)
 FFR-TBM/Martini

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2014 - 2015 - TUNNELS - UNDERGROUND WORKS

Railway Projects

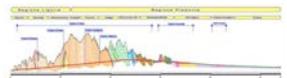
Brenner Base Tunnel

The BBT runs for 55 km between Tüfles/Innsbruck and Fortezza and, considering the Innsbruck by-pass, it runs for a total of 64 km, making it the **longest underground railway stretch in the world**. The works include the construction of two single track tunnel (9 m dia.) with underground safety area every 20 km and an exploratory/service tunnel (6 m dia.). In 2016 all the civil works Italian side will be in construction.



Milano - Genova High Speed Railway

27 km base tunnel, consisting of 2 single track tunnel with 1 underground safe area and the Serravalle tunnel (2 single track tunnels) that is 6km long.



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2016 - FUTURE ACTIVITIES

Planned Activities

- SIG International Conference - Expotunnel - Bologna, 20 and 21 October 2016 - *Challenging and demanding tunnelling projects: design, construction and managing*
- BEPIPS Meeting (planned): Bologna 21 October 2016
- SIG Conference for Santa Barbara 2016 - Rome, 2 December 2016
- Technical Visit on job-site: 5 one day visits on main Italian tunnel jobsites (2016)
- Permanent conferences on main underground projects: Brennero base tunnel - Milano Genova HS railway line

2016 - 2025

- Rome metro line B (extension)
- Rome metro line C (extension)
- Milan metro line 5 (extension)
- Brescia metro line 1
- Brenner base tunnel
- Fregene base Tunnel
- Milan-Verona: high speed railway tunnels between Brescia and Vicenza
- Terzo valico: high speed railway tunnels between Genova and Torino
- Motorway 5564D: Caltanissetta tunnel
- Pedemontana motorway: Selloero and Morozzone tunnels
- Motorway A1: Santa Lucia tunnel
- Motorway Marche-Umbria: Pale tunnel
- New Cole: Tenda road tunnel
- Road link between A14 and Ancona harbour: Palombella and Ghettanello tunnels
- New Aurelia Motorway: Coppacini, San Paolo tunnels and La Spezia by-pass tunnels



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2016 - FUTURE ACTIVITIES

Naples Future Projects

Naples Underground Line1 and Line 6 Extension

Line 1 Ext: 2 twin tunnels of 6.7 m in diameter (tot of 3km) with four new stations
Line 6 Ext: single tube tunnel of 8.3 m in diameter (tot of 7km) with 4+3 new stations.



Naples-Bari High Speed Railway Line

The new Naples-Bari high speed/high capacity railway line is an important and strategic work for both national and international connections with the South of Italy. It has been included in Corridor 5 "Scandinavia-Mediterranean" of the Trans-European Railway Network (TEN-T) that sees in Naples the division of Corridor in both south direction, with the stretch Naples-Palermo, and south-east direction with the Naples-Bari line.




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2019 - FUTURE ACTIVITIES



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2019 - FUTURE ACTIVITIES

ITALIAN TUNNELLING SOCIETY CANDIDATE TO HOST WORLD TUNNEL CONGRESS 2019 IN NAPLES
WE ARE LOOKING FORWARD TO HOST YOU IN NAPLES!



ENGINEERING | ART | ARCHITECTURE | INNOVATION | ARCHAEOLOGY

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JTA

JAPAN

ACTIVITY REPORT 2015

JTA

JAPAN TUNNELLING ASSOCIATION

Towards 50th Anniversary





PRESENTATION

Japan Tunnelling Association
 Non-Profit Organization
 Affiliate : 205
 Individual : 1126 (as of February, 2016)





2015 - ACTIVITIES

Main activities

The goal of JTA is to promote advances in construction and underground space by studying questions related thereto.





2015 - ACTIVITIES

WGs: JTA consists of four committees and each committee has WGs and task forces.
 Technology/International Communication/Events/Public Relation

Each main activities are :

- Investigation, research and information interchanges on general technique and on subjects of specific projects.
- Meetings such as lectures, symposiums, workshops and site visits
- Publication of reports and documents
- International cooperation
- Publicity activities





2015 - ACTIVITIES

Training

The following training courses organised by Events committee to engineers of middle standing

- Two-days seminars
- Site Visits
- Lectures on topics of the year





2015 - ACTIVITIES

Publications

Monthly journal: Tunnelling and Underground(Japanese edition)
 Biyearly journal : Tunnelling Activities in Japan 2016(English edition)





TUNNELS - UNDERGROUND WORKS

【Hokuriku Shinkansen】

Project of further extension from Nagano to Tsuruga has started since 2012.
 Shin-Hokuriku Tunnel is 19.5 km, the longest in this extension.



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JTA

TUNNELS - UNDERGROUND WORKS

【Road Tunnel】

For the Tokyo Port Tunnels, EPB type machine with an outer diameter of 12.2m in 1470m route including a construction segment under the seafloor.

The westbound lane is in service and the eastbound lane will be in service in 2018.



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【Underground Facility】

The project for construction of Large-scale Cryogenic Gravitational Wave Telescope facilities.

The total excavation length of 7,697m.

The construction work adopted long-hole blasting and eclipse the national record for excavation speed by NATM method.



Photo Long-hole blasting status

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FUTURE ACTIVITIES

Chuo Shinkansen Line with Maglev System

The construction planning of urban tunnel, the total of 60km from Shinagawa to Nagoya under the Act of Special Measures concerning Public Use of Deep Underground.

The section of mountain tunnels, each exceeding 20km.



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KTA

KOREA

ACTIVITY REPORT 2015



Korean Tunnelling and Underground Space Association

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 ASSOCIATION OF TUNNELLERS AND UNDERGROUND SPACE ENGINEERS
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KTA

PRESENTATION

KTA (Korean Tunnelling and Underground Space Association)



ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN
 ASSOCIATION OF TUNNELLERS AND UNDERGROUND SPACE ENGINEERS
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KTA

PRESENTATION

TYPE OF STRUCTURE

Established in 1992 as a non-profit incorporated association, KTA is the tunnel-oriented national organization to comply with the international aims of ITA. Most of the KTA members are tunnel engineers, but not limited to the civil engineering field and recent expansion into the field of fire, disaster prevention and ventilation within tunnels, among others, are noteworthy.

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 INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

PRESENTATION

NUMBER OF MEMBERS
 The total number of members as of 2015 is 2,653 with 60 corporate members

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2015 - ACTIVITIES

Main activities
 KTA hosted;
2015 KTA General Assembly & Annual Conference
 Seoul, April 23th
 (194 Domestic participants)



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2015 - ACTIVITIES

Main activities
 KTA hosted;
International Forum on Subsea Tunnelling (TU-SEOUL 2015)
 Seoul, September 2-3
 (178 International participants)



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2015 - ACTIVITIES

Main activities
 KTA hosted;
2015 Fall KTA Annual Conference
 Seoul, November 5th
 (133 Domestic participants)



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2015 - ACTIVITIES

Main activities
 KTA participated;
ITA Tunnelling awards 2015
 Hagerbach, Switzerland, November 19th
Awarded
"Tunnel Project of The Year 50-500 Million €"
1st Phase of Low and Intermediate Level Radioactive Waste Disposal Facility Construction in Korea



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2015 - ACTIVITIES

WGs
 A total 8 working groups in KTA:
 standard & specification, mechanized tunnelling, tunnelling & support, geotechnical survey & IT, urban tunneling, disaster prevention & environment, utility tunnels, special underground structures

ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN | **ITA**
AITES | INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

2015 - ACTIVITIES

WGs
 Technical seminar on support design and maintenance
 (hosted by WG of tunnelling & support)

Technical tour on The 2nd Tunnel
 (hosted by WG of special underground structures)



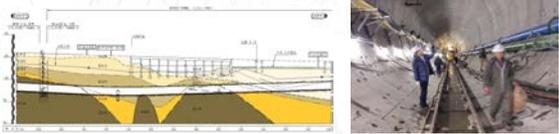
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AITES | INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

2015 - ACTIVITIES

Publications
 Domestic technical journal "Tunnelling Technology"
 (6 issues 59 papers in 2015)
 Quarterly magazine "Nature, Human Being and Tunnel"

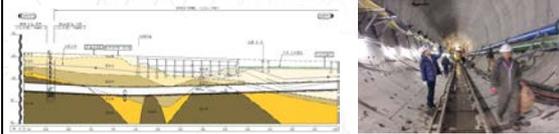
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TUNNELS - UNDERGROUND WORKS
Wonju-Gangneung Railway Tunnel Construction
 Dia. 8.1m Slurry Shield TBM
 Main Infra for The Winter Games in PyeongChang



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TUNNELS - UNDERGROUND WORKS
Wonju-Gangneung Railway Tunnel Construction
 Dia. 8.1m Slurry Shield TBM
 Main Infra for The Winter Games in PyeongChang



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MEXICO
ACTIVITY REPORT 2015



ASOCIACIÓN MEXICANA DE INGENIERÍA DE TÚNELES Y OBRAS SUBTERRÁNEAS A. C.

ASSOCIATION INTERNATIONALE DES TUNNELIERS ET DE L'ESPACE SOUTERRAIN | **ITA**
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PRESENTATION
AMITOS
ASOCIACION MEXICANA DE INGENIERIA EN TUNELES Y OBRAS SUBTERRANEAS, A. C.

CIVIL ASSOCIATION

INDIVIDUAL MEMBERS	142
CORPORATE MEMBERS	25
YMG MEXICO	21 (IN PROGRES)

2015 - ACTIVITIES

3rd INTERNATIONAL COURSE OF TUNNELS AND UNDERGROUND WORKS
 It was carried out from 29 to 30 of June, of 2015.
THIS EVENT WAS DONE IN CONJUNCTION WITH ITACET FOUNDATION AND AMITOS

Venue: Hotel Riu Plaza Guadalajara, Jalisco, Mexico

Participants:	188
Members	52
Non members	90
Students with scholarship	12

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 FIDEM, are carrying out the 3rd generation of the Master in Tunnels and Underground Works. Moreover, it just been launched the call for the 4th generation, for the 2016 program.

COURSE IN DESIGN, CONSTRUCTION AND TUNNEL MAINTENANCE
 AMITOS were asked to present a 40 hr Tunneling Course to the technical personnel of CONAGUA, the Mexico Water Commission held in combination with the CAPIT which is the Actualization Office of the CICM Mexico Civil Engineers College. This was held on CONAGUA facilities on the 5th to 16th of October 2015.

DIALOG WITH STUDENTS OF THE UNAM NATIONAL AUTONOMOUS UNIVERSITY OF MEXICO
 AMITOS has been called in to generate interest on the students of last year to become civil engineers and try to induce them into the tunneling experience. This event is done on a Saturday with the presence of our colleges and 65 students which express their interest and they are looking to work in the near future.

CERTIFICATION FOR PROFESSIONAL LEGAL EXPERTS IN TUNNELS AND UNDERGROUND WORKS
 AMITOS represented by its XIV Council of Directors, has come to the first certification, for the first group of Professional Legal Experts, among its associates, for 2015.

TUNNELING WORKS INDUCTION FOR THE BENEMERITA UNIVERSIDAD AUTONOMA DE PUEBLA
 AMITOS with the help of it's colleges has participated on a conference directed to the students of final year of engineering to induce and give information on tunnel work, with different underground applications.

FORMATION OF THE YMG MEXICO IN AMITOS
 AMITOS had open the students chapter, but to make it compatible with ITA, we had modified it to become the YMG MEXICO, for this chapter we have registered all the young engineers that were on the previous Master Course generations and the one being in the process this year 2016. Also we are the process to register the interested students of the Mexico Polytechnical Institute

DONATION AND IMPLEMENTATION OF DESIGN SOFTWARE FOR THE UNAM NATIONAL UNIVERSIDAD AUTONOMOUS OF MEXICO COMPUTATIONAL LABORATORY
 AMITOS was proud to be part of the means, thru three of it's members to donate the PRAXIS Software specialized in Tunnel Design to the Computer Laboratory of the Master Course in Tunneling.

PUBLICATIONS
AMITOS MAGAZINE:
 OBRAS SUBTERRANEAS, has been our continuing publication which is publish every 3 months with the help of our Editing Committee formed by interested colleges and ex presidents. It has become to be a reference magazine of the industry.



TUNNELS - UNDERGROUND WORKS
TEO TUNEL EMISOR ORIENTE
 Length: 62 Km
 Finish Diameter: 7 m
 Shafts: 24






TEP II TUNEL EMISOR PONIENTE II
 Length: 5.6 Km
 Finish Diameter: 7.0 m
 Shafts: 1





TUNEL CANAL GENERAL
 Length: 7.9 Km
 Finish Diameter: 5.0 m
 Shafts: 4




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










FUTURE ACTIVITIES

4TH INTERNATIONAL SYMPOSIUM ON TUNNELS & SHAFTS
 AMITOS in coordination with SMIG Geotechnical Engineering Mexican Society is organizing the next 4th International Symposium to be held the days 26 & 27 of May, 2016 on the facilities of the CICM, Mexico Civil Engineers College

4th INTERNATIONAL COURSE OF TUNNELS AND UNDERGROUND WORKS
 To be carried out with the help and participation of **ITA CET FOUNDATION** to be program on the 20 & 21, October 2016.
 In this occasion the program will be directed on Soft Ground Tunnels, Pipe jacking and Micro tunneling, all of this due to the construction of the new Mexico City Airport, which is planned to install it on the most difficult ground of the ancient lakes in Mexico City.
 Venue: To be determined





NEPAL

ACTIVITY REPORT 2015







PRESENTATION

NEPAL TUNNELLING ASSOCIATION
NON PROFITABLE ORGANIZATION
(EXECUTIVE COMMITTEE)
82 MEMBERS





2015 - ACTIVITIES

No activities due to M 7.8 Earthquake in 25 April 2015 and M 7.3 aftershocks in 12 May 2015



Photo: Kantipur





TUNNELS - UNDERGROUND WORKS

- Mostly hydro tunnels
- Total 16 km tunnels (2 to 7m) excavated in year 2015
 - ✓ by conventional: drill and blast method
- 12 km long tunnel by TBM contract awarded and under preparation





TUNNELS - UNDERGROUND WORKS

- 40 M USD contract mainly hydro tunnels projects for the year 2015
- More than 15 Hydro tunnel projects under bidding process





TUNNELS - UNDERGROUND WORKS







FUTURE ACTIVITIES

- One day Nepal Tunnelling Congress on September 2016
- One day Training on « Contract and Risk sharing » on September 2016





NETHERLANDS ACTIVITY REPORT 2015



Dutch Royal Institute of Engineers
 Department of Tunnelling and Underground Space TTOW





PRESENTATION

- The Royal Institution of Engineers in the Netherlands is an association with individual members who are also member of the various departments of the association.
- The Department of Tunnelling and Underground Space is with 600 members one of the larger departments within the association.

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2015 - ACTIVITIES

Main activities

- New developments seminar (2015: Land tunnels)
- Excursions to various projects:
 - Yvelertunnel, Tunnel in renovation
 - New University building VU Amsterdam
 - Spaarndammertunnel

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2015 - Participation in working groups

Working Group	Participant	Corresponding member
2 Research		Adam Bezuijen
6 Maintenance & Repair	Jan Jonker René van den Bosch	
9 Seismic Effects	Eelco van Putten	
11 Immersed & Floating Tunnels	Eelco van Putten	Hans deWit Hans Hjelde Peter van Westendorp Oscar Koster Andre de Graaf
14 Mechanization of Excavation		Frank Kaalberg
20 Urban Problems, Underground Solutions	Wout Broere (Animator)	
21 Life Cycle Asset Management	Merten Hinsenveld	

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2015 - Participation in Committees

Committee	Participant
ITACUS	Han Admiraal (president)
ITA-COSUF	Johan Bosch (SB-member & WG4-chair)
ITA-CET	Various teachers

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TUNNELS - UNDERGROUND WORKS

A4 Midden Delfland Sunkenroad and cut and cover road tunnel project (Opened to public December 2015)



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TUNNELS - UNDERGROUND WORKS

Delft Spoorzone project:
Cut and cover rail tunnel through the inner city; first 2 rail tracks and underground station opened in 2015




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TUNNELS - UNDERGROUND WORKS

A2 highway: Two storey road tunnel under the inner city of Maastricht (civil work completed in 2015, without delays)




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TUNNELS - UNDERGROUND WORKS

Sluiskil (bored) tunnel finished & opened in 2015



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TUNNELS - UNDERGROUND WORKS

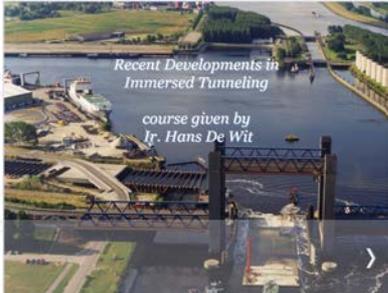
Large projects in preparation:

- Blankenberg Immersed road tunnel, Rotterdam area.
(Start construction 2017)
- Amsterdam Zuidas dok large cut and cover road tunnel.
(Start construction 2017)
- Rotterdamse Baan, large bored road tunnel, Den Haag area,
(Start construction 2017)
- Several smaller tunnels

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Recent Developments in Immersed Tunneling

course given by
 Ir. Hans De Wit



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Day 1 in Delft



Day 2 in Amsterdam

<p>09:00 Introduction by the Chairman 09:30 Introduction to immersed tunneling 10:30 Recent developments immersed tunneling 11:30 Design aspects and maintenance in immersion joints 12:30 Lunch 13:30 Construction/execution aspects immersed tunnels 14:30 Immersion used for other purposes as illustrated by:</p> <ul style="list-style-type: none"> • the Venetian surge barrier, and • the immersion of aqueducts <p>15:30 Comparison between bored, conventional and immersed tunneling 16:30 Workshop design of an immersed tunnel 18:30 Dinner in Delft 20:30 Networking reception in Delft</p>	<p>09:00 Excursion to Trelleborg, the world's leading manufacturer of aluminum guiders for immersed tunnels. Followed by a visit to the transportation department of the Rijkswaterstaat in Rhijn for an overview of tunnels. 12:30 Lunch 13:30 Excursion to the North-South line immersed tunnel in Amsterdam. Project visit and lecture about this tunnel underneath the historical centre of Amsterdam. 18:30 Dinner in Amsterdam 20:30 Closing remarks and networking reception in Amsterdam</p>
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[More information?](#)

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NORWAY

ACTIVITY REPORT 2015



ASSOCIATION INTERNATIONALE DES TUNNELS ET DE L'ESPACE SOUTERRAIN | ITA
 AITES | INTERNATIONAL TUNNELLING AND UNDERGROUND SPACE ASSOCIATION | NFF NORWEGIAN TUNNELLING SOCIETY

PRESENTATION

Norwegian Tunnelling Society NFF

Street address: Vestfjordgaten 4, 1338 Sandvika, Norway
 Postal address: P.O. Box 626, 1303 Sandvika, Norway
 Web (English) - www.tunnel.no
 Web (Norwegian) - www.nff.no
 E-mail - nff@nff.no

Type of structure
 Association of individual as well as company members related to rock excavation in general and tunnelling in particular.

Number of members
 1200 individual members
 100 company members




2015 - ACTIVITIES

Main activities

The Society has the motto « Surface problems – Underground solutions ». The main activities are :

- Strengthen the Norwegian underground technology
- Utilization of the underground
- Get more people into the underground business
- Health and Safety in underground works
- Create interesting meeting places for professionals and networking

WGs

The work is organized in different committees:

- The International Committee
- The Research and development Committee
- Committee for Training and Education
- The Rock Blasting Committee
- The Public Relations Committee




2015 - ACTIVITIES

Training

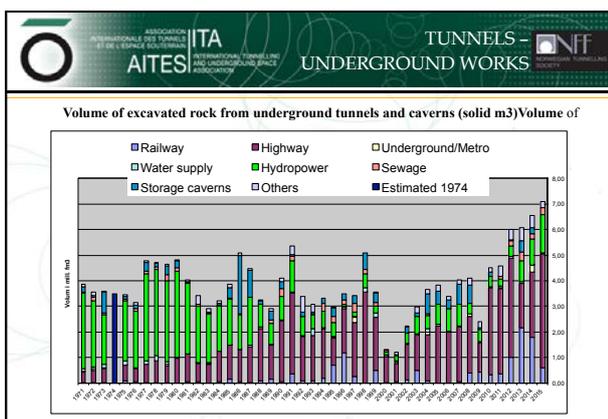
Different courses in rock blasting techniques, grouting, rock support and many others.

Publications

- Publication no. 24 - "Health, Safety and Environment in Norwegian Tunnelling" (English language)
- Handbook in "Underground Working Environment" (Norwegian language)
- Short introduction to the use of TBM (Norwegian language)

WTC 2017

The organizing committee for the World Tunnel Congress 2017 to be held in Bergen, Norway is very active in the preparations for this event.






FUTURE ACTIVITIES

During the WTC in Dubrovnik the Norwegian Tunnelling Society made promotion for the WTC 2017 as well as for Norwegian company members.






FUTURE ACTIVITIES

Other main activities:

- The Rock Blasting day - 850 participants
- The International Forum - 60 participants
- The Tunnelling days - 150 participants
- Various courses in rock blasting, sprayed concrete and grouting techniques
- Several activities for the Young Members network
- New strategic plan for the work inside the Society




FUTURE ACTIVITIES

Some activities planned for 2016:

- Participation at the WTC in San Francisco
- New publication in the English language series, title "Rock Caverns in Norwegian tunnelling"
- Rock Blasting Day and several other courses and seminars
- Continue the preparations for the WTC 2017 in Bergen, call for papers out 1st of March

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POLAND

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PRESENTATION

NAME:
 Subcommittee of Underground Construction
 of Polish Committee on Geotechnics

TYPE OF STRUCTURE - association open to public

NUMBER OF MEMBERS - 67 Individual Members
 8 Corporate Supporting Members

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2015 - ACTIVITIES

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Organization and Participation in

1st Conference Underground Structures 2015,
 8-9.09.2015 Kraków

The conference endorsed by ITA

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Participation of members in ITA activities:

Anna Siemińska-Lewandowska - Member of
 Executive Council, Tutor of WG15

Emilia Roguska - Member of the Steering Board
 of ITA Young Members Group

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Participation in WTC 2015 in Dubrovnik:

Monika Mitew-Czajewska – president
 Jerzy Lejk – vice president
 Anna Siemińska-Lewandowska - secretary
 Emilia Roguska – member
 Władysław Kluczewski - member




Journals

- Budownictwo Górnicze i Tunelowe - Mine and Tunnel Engineering, ISSN 1234-5342
- Geoinżynieria- drogi, mosty, tunele - Geoen지니어ing- roads, bridges, tunnels ISSN 1895-0426




Journals

- Inżynieria i Budownictwo – Engineering and Construction, ISSN 0021-0315
- Górnictwo i Geoinżynieria – Mining and Geoen지니어ing, ISSN 1732-6702




Publications

Siemińska-Lewandowska, A., Construction of metro station underneath the existing road tunnel; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 245-252.

Mitew-Czajewska, M., Evaluation of deep excavation impact on surrounding structures – a case study; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 161-172.

Lejk, J., The technical and economic conditions for the construction of the central section of Metro Line II in Warsaw; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 85-96.




Publications

Mitew-Czajewska, M., Geotechnical investigation and static analysis of deep excavation walls – a case study of metro station construction in Warsaw; Annals of Warsaw University of Life Sciences – SGGW. Land Reclamation No 47 (2), 2015, p. 163-170.

Roguska, E., Lejk, J., Fuzzy risk matrix as a risk assessment method - a case study; See tunnel. Promoting Tunnelling in SER / Kolić D. (red.), 2015, ITA AITES, ISBN 978-953-55728-5-5, p. 796-797

Józefiak, K., Zbiciak, A., Maślakowski, M., [et al], Numerical Modelling and Bearing Capacity Analysis of Pile Foundation; Procedia Engineering, Elsevier BV, vol. 111, 2015, p. 356-363.




Publications

Madryas, C., et al., Microtunneling as an alternative for crossing rivers during the execution of urban network infrastructure; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 105-111.

Kolonko, A., & Kolonko, A., Variable-diameter conduits for water grids; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 47-62.

Petrow-Ganew, D., Zur Linde, L., Abel, T., Trenchless installation technologies of sea outfalls, intakes and landfalls; Underground Infrastructure of Urban Areas 3. Madryas et al. Publisher, Taylor & Francis Group, London, ISBN 978-1-138-02652-0 CRC Press, p. 1-12.




TUNNELS – UNDERGROUND WORKS

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Road tunnel under the Martwa Wisła

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Road tunnel under the Martwa Wisła river in Gdańsk will be open to public on 22 April 2016

The total length of the passage will be 1970 m (approach ramps - 340 m, cut and cover tunnels - 680 m, two 1076 m long tunnels executed using 12,56 diameter Mixshield TBM)

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Road tunnel under the Martwa Wisła

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Road tunnel in Warsaw - a part of south city ring

The tunnel will be 2.700 m long, 3 lanes in each direction; construction method - cut and cover. Design works in progress. Due date March 2019. Contractor: Astaldi S.p.A.

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Road tunnel in Warsaw - a part of south city ring

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Road tunnel in Warsaw - a part of south city ring

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2nd metro line in Warsaw
Contractors for the Design and Build contract for the extension of this line were chosen in:

- east (3 stations, 3.1 km) - Astaldi S.p.A.
- west direction (3 stations, 3.4 km) - Gülermak Ağır Sanayi İnşaat ve Taahhüt A.Ş.

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2nd metro line in Warsaw - extension east and west

— 1st metro line
— 2nd metro line
— Extension of 2nd metro line
— Planned

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Tunnel under Luboń Mały - south Poland

Over 2 km bored tunnel on the S7 motorway from Kraków to Zakopane (polish skiing resort)
The tender procedure is in final stage, the contract should be signed in 2016.
Due date 2021-2022.

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Tunnel under Luboń Mały - south Poland (2016-2021)

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Tunnel under Luboń Mały - south Poland (2016-2021)




FUTURE ACTIVITIES




Organization and Participation in

2nd Conference Underground Structures 2016,
14-15.09.2016 Kraków




PORTUGAL

ACTIVITY REPORT 2015





PRESENTATION

Comissão Portuguesa de Túneis e Espaço Subterrâneo (CPT)

A Committee of Sociedade Portuguesa de Geotecnia

120 individual members, 14 collective members

Website <http://www.spgeotecnia.pt/cptuneis/>




PRESENTATION

Current office

President : Dr João Bilé Serra (biles@lnec.pt)

Vice-President : Dr Raúl Sarra Pistone (rp@coba.pt) and Eng Frederico Melâneo (frederico.melaneo@sapo.pt)

Treasurer : Professor Ricardo Resende (rresende@gmail.com)

Secretary : Eng Luís Miranda (lmiranda@lnec.pt)




2015 - ACTIVITIES

Main activities

- Local Working groups
- Organization of Workshop and International Seminar
- Participation in ITA-AITES Working Groups

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ITA AITES CPT

2015 - ACTIVITIES

WGs

- WG1 « Tunnelling in Portugal » editorial WG
- WG2 « Contractual practices in public works »
- WG3 « Health and safety in underground works »
- WG4 « Immersed Tunnels »

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2015 - ACTIVITIES

Training

- Workshop « New Structural Solutions in Underground Works », Lisboa, May 21st 2015, 80 participants
- Workshop « Contractual Risks in Complex Underground Works », Lisboa, December 2nd 2015, 100 participants

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2015 - ACTIVITIES

Publications

Book « Tunnelling in Portugal », available at CPT website

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TUNNELS - UNDERGROUND WORKS

Túnel do Marão (IP)

Tunnel constructed under a design/build contract, being the owner Infraestruturas de Portugal, SA and the contractors Teixeira Duarte, S.A. and EPOS, S.A. A twin tube tunnel 5,6 km long with a 107 m² cross section. Total cost of 88 million euros with a 17 months deadline for the final phase of the works, now under completion. The tunnel is part of the E82 connection from Porto to Vila Real and Bragança, and then to Tordesillas (Spain)



<http://www.infraestruturasdeportugal.pt/node/625>

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TUNNELS - UNDERGROUND WORKS

Laúca Hydropower Plant, Hydraulic Circuit
(GAMEK - Gabinete de Aproveitamento do Médio Kwanza, Angola)

Completion of the sub-contract of the excavation and primary support of the hydraulic circuit. It integrates a total of 8 km of pressurized galleries with a cross section area of 112 m² and 8 m diameter shafts with a total height of 480 m. The sub-contract value is 60 million USD. The general contractor is Odebrecht Angola Construção e Projectos de Engenharia, Lda and the sub-contractor is Portuguese EPOS SA.

Construction Management and Supervision undertaken by COBA - Consultores de Engenharia Ambiente, SA.

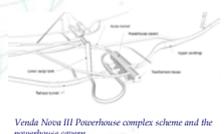


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TUNNELS - UNDERGROUND WORKS

Venda Nova III (EDP)



The new powerhouse consists of a large cavern, about 150 m in length, 27 m span and nearly 60 m high, located at an intermediate position of the hydraulic circuit with two main chambers.

The hydraulic circuit consists mainly of an unlined headrace tunnel 2840 m long, with a 12.0 m in diameter modified circular shape and 13.8% slope, and an unlined tailrace tunnel, almost horizontal, 1380 m long, with the same cross section as the headrace tunnel. An upper surge tank, located roughly 390 m upstream from the powerhouse, consisting of a 78 m height concrete lined surge shaft with a 13 m diameter, a lower / feeding chamber and an expansion reservoir at the surface and two unlined vertical shafts (360 m deep and 5.4 m diameter) connecting the surge tank to the headrace tunnel.



Venda Nova III Powerhouse complex scheme and the powerhouse cavern

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TUNNELS - UNDERGROUND WORKS | CPT

Caracas (Venezuela)

Design/Build contract awarded to Teixeira Duarte SA and EPOSSA for a twin tube road tunnel with a total length of 2x2820 m and a cross section area of 106 m². Total value of the contract 435 million USD with a total completion time of 42 months.

Geological and Geotechnical Assessment, Preliminary and Final Design of Structures, Geotechnics and Drainage and Technical Advisory by Portuguese CENOR Consulting Engineers



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RAIL | ريل

QATAR ACTIVITY REPORT 2015

RAIL | ريل
 RAIL | ريل
 Accompanying a Vision

Qatar



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 Accompanying a Vision

PRESENTATION

Qatar Rail
 Tunnel for Urban Metro network



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2015 - ACTIVITIES

- 21 TBMs active for a total planned tunnel length of 111,280 m.
- 2 TBMs completed their planned drives and are getting currently disassembled.
- Guinness World Record for the highest number of tunnel boring machines working simultaneously in one project.



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Currently bored tunnel



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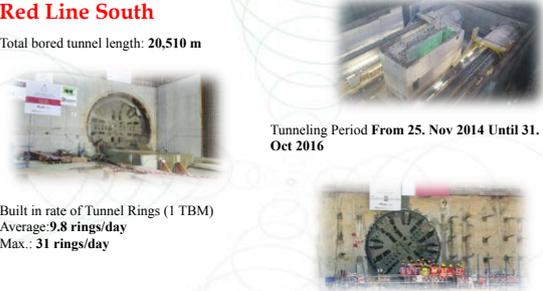
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 Accompanying a Vision

Red Line South

Total bored tunnel length: **20,510 m**

Tunneling Period From 25. Nov 2014 Until 31. Oct 2016

Built in rate of Tunnel Rings (1 TBM)
 Average: 9.8 rings/day
 Max.: 31 rings/day







Red Line North

Total bored tunnel length: **24,474 m**



Tunneling Period From Aug 2014 Until Mar 2016

Built in rate of Tunnel Rings (1 TBM)
Average: **15.5 rings/day**
Max.: **19 rings/day**





Green Line

Total bored tunnel length: **32,999 m**




Tunneling Period From 16. Nov 2014 Until 12. Apr 2016

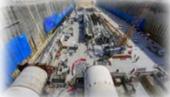
Built in rate of Tunnel Rings (1 TBM)
Average: **19 rings/day**
Max.: **40 rings/day**





Gold Line

Total bored tunnel length: **18,750 m**



Tunneling Period From March 2015 Until May 2016







FUTURE ACTIVITIES

TBMs will complete their tunnel drives in 2016 and will be transported to the logistics sites for dismantling while Track Works will commence








ROMANIA

ACTIVITY REPORT 2015







PRESENTATION

Romanian Tunneling Association – ART
National Association

- 8 corporate members
- 88 individual members

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ART

2015 - ACTIVITIES

Main activities:

- Working Group « Research » :
 - implementation of Eurocodes (1, 2, 3, 7 and 8) in Romanian tunneling works;
 - reviewing norms for seismic response and waterproofing in tunneling.
- Relationship with MN from: Poland, Hungary, Croatia, Greece, Turkey, Bulgaria (see EETC and SETC).
- Constructii subterane (Underground constructions) Magazine (special issue).
 - “Works on Metro Line 5. Special conditions on Eroilor 2 station.”
 - “TBM launching on Line 4: geotechnical aspects.”
- Electronic News Bulletin.
- Website under construction.
- General Assembly of ART to be held in October 2016.

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TUNNELS - UNDERGROUND WORKS



Metro Line 5
 Lot 1.2 - Valea Indrimei Sector (cut and cover tunnel, station and depot) awarded to Max Bögl.
 Lot 1.1 - Raul Doamnei - Eroilor (6 km, TBM method tunnels, 9 stations cut and cover method awarded to ASTALDI-FCC-DELTA ACM-AB CONSTRUCT JV.
 Tunnel: TBM 1 (started on 21 September 2013) and TBM 2 (started on 22 November 2013) total length 6065 m.
 Tunnel TBM today: 92% performed (100% between Raul Doamnei - Academia Militara; 50% between Academia Militara - Eroilor 2).
 Stations: Academia Militara - all stations 100% structure performed.
 Under works: 5 % for railway, finishing, installations awarded to a JV formed by: Astaldi SpA, Abtom Romania, TIAB Sa, Aktor & Schindler.

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TUNNELS - UNDERGROUND WORKS



Metro Line 5
 Preliminary works for TBM breaking through from Academia Militara station to Eroilor 2 station.



Metro Line 5
 TBM breaking through in Eroilor 2 station.

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TUNNELS - UNDERGROUND WORKS



Metro Line 4
 Section 3, Bazilescu - Straulesti: 2 stations, 1 depot, 2,7 km in length.
 Stations performing: Laminorului: 100%; Straulesti: 100%; depot: 100%; cut and cover works: 85%.
 TBM tunnels: 92%

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TUNNELS - UNDERGROUND WORKS



Metro Line 4
 Preliminary works for TBM breaking through in Straulesti station.



Metro Line 4
 Tunnel 2 between Straulesti station and Laminorului station.

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FUTURE ACTIVITIES



Preparing tender for Metro Line 6, Metro Link between Central Railway station "Gara de Nord" and "Henri Coanda" (Otopeni) International Airport. Tender Documents, Feasibility study and Preliminary Design performed by a JV from Padoce (Japan), MetroSA (Romania) and Oriental Concess (Japan).

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RUSSIA

ACTIVITY REPORT 2015



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RUSSIAN TUNNELLING ASSOCIATION
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PRESENTATION

NAME: Russian Tunnelling Association
TYPE OF STRUCTURE: Russian Public Organization
NUMBER OF MEMBERS: 86

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2015 - ACTIVITIES

Main activities:
 Public activities aimed at improving methods of planning, designing, construction and operation of tunnels and underground facilities, as well as at forming a comprehensive approach to underground space development within professional community.

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2015 - ACTIVITIES

WGs: 7

- WG 2: "RESEARCH"
- WG 9: "SEISMIC EFFECTS"
- WG 14: "MECHANIZED TUNNELLING"
- WG 15: "UNDERGROUND AND ENVIRONMENT"
- WG 17: "LONG TUNNELS AT GREAT DEPTH"
- WG 19: "CONVENTIONAL TUNNELLING"
- WG 21: "LIFE CYCLE ASSET MANAGEMENT"

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2015 - ACTIVITIES

Training:
 Tunneling Association of Russia and Moscow State University of Railway Engineering (MIIT) created by joint decision the department "Transport tunnels and subways" at the University, the main task of which is training of technical staff of design and construction companies engaged in field of underground construction.

Publications:

- Articles about metro and tunnel construction (tunneling) in magazines "Metro and Tunnels", "Engineering Works", "Underground horizons".
- Abstracts from scientific and technical conferences on issues of metro and tunnel construction (tunneling).

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TUNNELS - UNDERGROUND WORKS

Mansky railway tunnel



In August 2014, the new Mansky railway tunnel was put into operational use on the Abakan – Taishet section of the Krasnoyarsk Railway. New tunnel total length – 2,464.868 m. Service / drainage gallery length – 2,470.934 m.

The service / drainage gallery was built using the shield tunneling and drilling and blasting driving techniques. The tunnel section of 300.74 meters was driven using the drilling and blasting technique, and the Lovat RME-139SE 21100 Tunnel Boring Machine with a cutting diameter of 3.56 meters was used to bore 2,166.2 meters of the gallery by the shield tunneling.



After driving of the cap part of the tunnel through the 120-meter-long section by the tunnel-boring machine assembly, the tunneling was done using the Lovat-RME375SE Tunnel Boring Machine with a cutting diameter of 9.54 m.

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TUNNELS – UNDERGROUND WORKS

Rocksky Motorway Tunnel



On November 5, 2014, after reconstruction, the Rocksky motorway tunnel driven through the Greater Caucasus Mountain Range and connecting the Northern and Southern Ostia was put into operational use. Main tunnel total length – 3730 m. The service gallery length – 3805 m.

The reconstruction was done in two stages. At the first stage (2010-2012), the reconstruction of the service gallery was completed. It included removal of the gallery existing reinforced concrete lining, gallery re-driving to enlarge the cross-sectional area from 13 to 26 square meters, installation of temporary lining and utility lines, and putting in place tunnel entry facility areas. After that, the traffic from the main tunnel was shifted into the reconstructed gallery.



At the second stage (2012-2014), the main tunnel cross-sectional area was enlarged from 65 to 75 square meters, tunnel waterproofing and permanent lining as well as utility lines were installed and road paving operations done.

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TUNNELS – UNDERGROUND WORKS

Long-term Growth Plan for Moscow Metro



In accordance with the decree of the Government of the city of Moscow, in the period from 2012 to 2020, the metro long-term growth plan is being implemented in Moscow.

It provides for the construction of more than 157 kilometers of new metro lines and 78 new metro stations until 2020. Within the frames of the plan, in 2012-2013, 8 metro stations (22 kilometers of running tunnels in the single-track valuation) were put into operational use, the "Mar'ina Roscha" station second entrance chamber was constructed, and the "Pechatniki" Electric Depot reconstructed as well.

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TUNNELS – UNDERGROUND WORKS

Long-term Growth Plan for Moscow Metro

In 2014-2015, 4 metro stations were put into operational use.

2014 – stations:

- "Spartak" of the Tagansko-Krasnopresnenskaya line;
- "Troparevo" of the Sokolnicheskaya line (2.72 kilometers of running tunnels in the single-track valuation).

2015 – stations:

- "Kotelniki" of the Tagansko-Krasnopresnenskaya line (1.7 kilometers of running tunnels in the single-track valuation);
- "Tekhnopark" of the Zamoskvoretskaya line.



"Spartak" station entrance chamber (2014)



"Troparevo" station (2014)



"Kotelniki" station (2015)



"Tekhnopark" station (2015)

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TUNNELS – UNDERGROUND WORKS

Long-term Growth Plan for Moscow Metro

In 2016, 2 metro stations were already put into operational use:

- "Rumyantsevo" and "Salariyevo".

The length of running tunnels in the single-track valuation from station "Troparevo" to station "Salariyevo" is 4.2 kilometers.

"Rumyantsevo" station is located near the Kievskoye federal highway and is the first Moscow metro station constructed beyond the Moscow Automobile Ring Road. Stained-glass panels inspired by paintings of Dutch artist Piet Mondrian are the station's main decorations. The station is two-storied. The first one consists of the 162 meter long platform, whereas the second is designed for the ticket hall and service rooms.

The metro station of "Salariyevo" has become the 200th in the Moscow subway rapid transit system and the second one constructed in the "New Moscow". It is located between the Kievskoye federal highway and the village of Salariyevo. Its design is of the constructivism style. The walls, ceiling and floor of the station are broken into squares of different colors.



"Rumyantsevo" station (2016)



"Salariyevo" station (2016)

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FUTURE ACTIVITIES

Long-term Growth Plan for Moscow Metro

By the end of 2016, 27 kilometers of metro lines in the single-track valuation and 12 new stations are planned to be put into service including the following:

7 stations, being the continuation of existing metro lines ("Khovrino" of the Zamoskvoretskaya line, "Butyrskaya", "Fonvizinskaya" and Petrovsko-Razumovskaya of the Lyublinsko-Dmitrovskaya line, "Lomonosovskiy prospect", "Minskaya" and "Ramenki" of the Kalininsko-Solntsevskaya line) and 5 stations of the Third interchange circuit ("Delovoi Tsentr", "Petrovsky Park", "Khodynskoye Pole", "Khoroshyovskaya", "Shelepikha").



Design of Khovrino station



Design of Minskaya station



Design of "Shelepikha" station

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SAUDI ARABIA

ACTIVITY REPORT 2015



ASSOCIATION INTERNATIONALE DES TUNNELS ET DE L'ESPACE SOUTERRAIN
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PRESENTATION

NAME : Ministry of Transport
TYPE OF STRUCTURE : Transportation activities and Road constructions
NUMBER OF MEMBERS: Ministry of Transport

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2015 - ACTIVITIES

Main activities

WGs: Road construction and Railways

Training: Transportation ,tunnelling, bridge and structures,pavements,landslides and rockfalls

Publications:Transportation &communication magazine

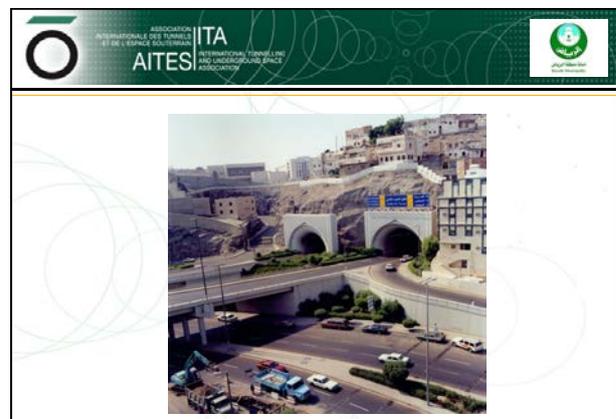
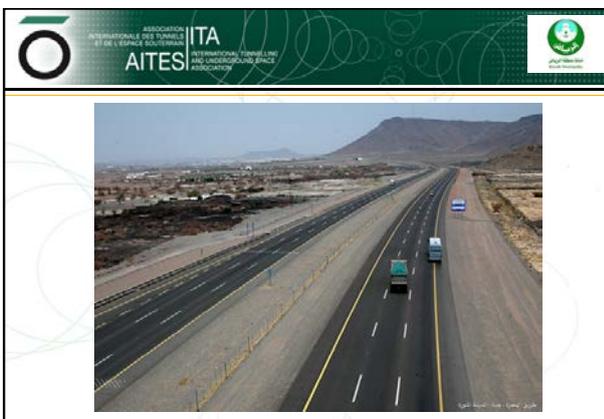
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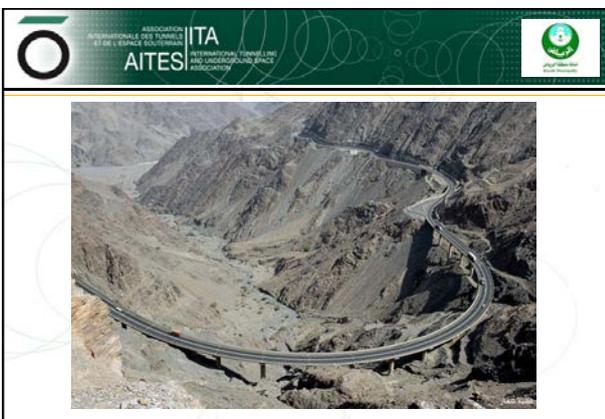
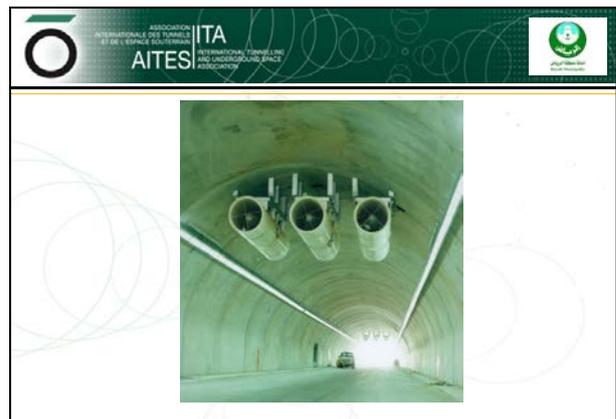
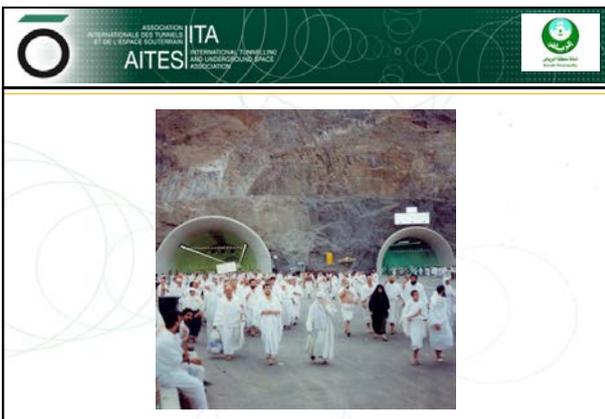
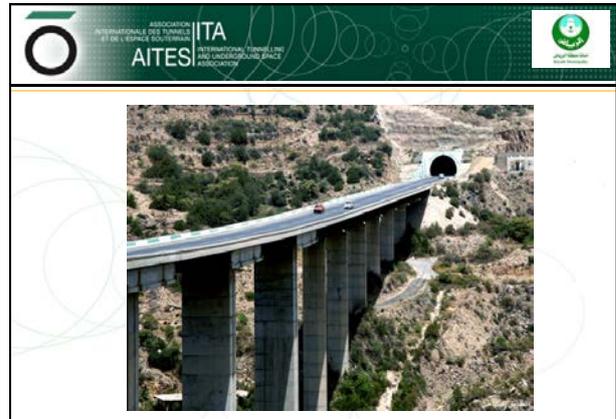
TUNNELS - UNDERGROUND WORKS

- 1- Ministry of transport is one of the members in ITA, it has been very active one and has participated in several conferences and activities held by ITA and other international agencies.
- 2- MOT. has executed a modern network of roads totaling 65000 km at the end of 2015.

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- 3- The total numbers of mountainous tunnel in Saudi Arabia 105 with total length 42km and more than 6000 bridges.
- 4- MOT.was chosen by ITA & IRF to organize many international conferences, workshops and training sessions in different fields such as: safety in tunnels, tunnelling, excavation, roads, railways, transportation, operations, utilities and protection techniques





FUTURE ACTIVITIES

The East-West Railway:

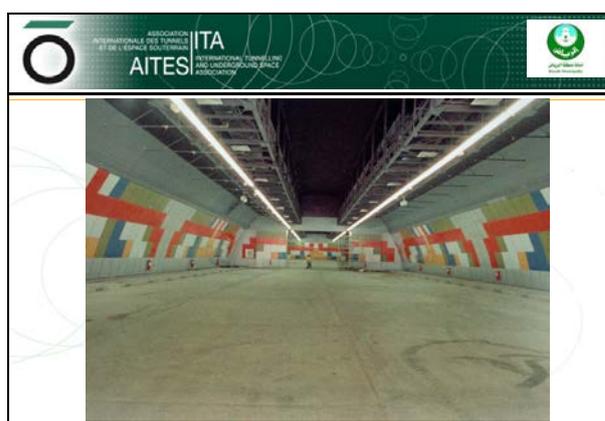
This railway Will connect (Jubail-Dammam-Riyadh-Jiddah),14 tunnel with total length 20km Will be executed in this project. In addition to the construction of tunnels, this project includes the construction of: road over and under bridges, retaining walls, protection and diversion Works for utilities, And level crossing etc.

The track is to be constructed as double line


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design of tunnel assumes twin single track tunnels which will carry double container wagons on single track section.

- Walkways have been provided to allow an emergency egress of railway personnel and passengers.
- Tunnel alignments have been designed to allow gravity drainage.
- The average external and internal areas of tunnels are 90.026m² and 67.661m² respectively




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 PODZEMNE GRADNJE
 SLOVENIAN SOCIETY FOR
 UNDERGROUND STRUCTURES

SLOVENIA
ACTIVITY REPORT 2015


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PRESENTATION

NAME: Slovenian Society for Underground Structures
 TYPE OF STRUCTURE: Non-profit association
 NUMBER OF MEMBERS: 83 (+8 YM)


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2015 - ACTIVITIES


- WGs: Our members participate in WG 17 and WG 5
- Publications: ACTA GEOTECHNICA SLOVENICA; RMZ, MATERIALS and GEOENVIRONMENT
- Establishment of the SSUS Young Members Group
- Participation at WTC 2015 in Dubrovnik


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TUNNELS - UNDERGROUND WORKS


Karavanke Tunnel

Preliminary design for upgrading the existing single bidirectional transalpine base tunnel with a second tube to form a twin highway tunnel tube system. Total tunnel length is 8 km and has more than 1000 m of overburden. The tunnel passes through very heterogeneous rock material from perm, carbon to triassic formations, squeezing ground and difficult hydrogeological conditions.




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TUNNELS - UNDERGROUND WORKS


Tunnel Valeta

Tunnel Valeta is a single tube bidirectional tunnel connecting highway H6 and national local roads leading to Piran. Tunnel is 880 m long and accompanied with an escape tunnel of smaller cross section which allows unidirectional single lane transport of rescue vehicles. Both tubes are connected with two cross passages for rescue vehicles and one pedestrian cross passage.




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TUNNELS - UNDERGROUND WORKS


Tunnel Lucan

Lucan tunnel is a twin tube, two and three lane highway tunnel with an approximate length of 1070 m on the highway H6, section Jagodje - Lucija. The tunnel has three cross passages, two of them are designed for pedestrians and one for the rescue vehicles. Overburden rises up to about 85 m.

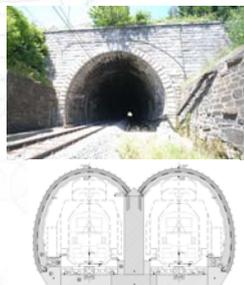



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TUNNELS - UNDERGROUND WORKS


Šentilj Tunnel

Preliminary design for the rehabilitation of the one tube - one lane railway tunnel into a two lane one. 250 m long tunnel was built in several steps, with different materials, partially destroyed and rebuilt. The project consists of comparing two solutions, first one with a central pillar followed by an enlargement, second one using the "Tunnel-in-Tunnel System" method that allows smooth operation of the railway under the protection portal.




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TUNNELS - UNDERGROUND WORKS


Construction works were completed at Markovec and Sten Tunnel



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FUTURE ACTIVITIES

- 11th International Symposium on Tunnel Construction and Underground Structures (Slovenija)
- Participation at WTC 2016 in San Francisco
- Cooperation in new Working Groups

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SOUTH AFRICA
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SAIMM
 THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY

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PRESENTATION

SANCOT
 Functions as a Committee within SAIMM
 (South African Institute of Mining and Metallurgy)

NUMBER OF MEMBERS:
 Company Affiliates = 107
 Individual = 4638

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2015 - ACTIVITIES

Main activities

- Progress of local Working Groups:
 - Shaft Sinking / Vertical Tunnelling (Jean Walls/D Vogt) – in progress.
 - Geotechnical Investigations (Ron Tluczek) – substantially complete.
 - Contractual Practice (Andy Griffiths) – in progress.
 - Sprayed Concrete Durability (Chris Viljoen) – in progress.
 - Life Cycle Asset Management (Monique Wainstein) – in progress.
- Participation in ITA Working Groups:
 - WG2 Research (Ron Tluczek)
 - WG12 Sprayed Concrete Use (Chris Viljoen)
 - WG21 Life Cycle Asset Management (Monique Wainstein)

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2015 - ACTIVITIES

Main activities (continued)

- Development of Young Professional Forum and participation in ITA-YM (Lucky Nene).
- Training: Conferences, Technical Talks.
- Publications:
 - Articles in SAIMM Journal (Sprayed Concrete Status Report).
 - Articles/newsletter on Website focussing on projects.
 - South African Tunnels Database (being updated).
 - Alec Wilson Award was not awarded this year.

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2015 - ACTIVITIES

Main activities (continued)

- Membership expansion drive.
- Continued support of Lesotho Tunnelling Society through Montso Lebetsa.

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TUNNELS - UNDERGROUND WORKS

1. Projects in Planning Stage.

- Huguenot Tunnel
- Lesotho Highlands Water Project Phase 2
- Two major Department of Water & Sanitation water transfer schemes: Mkomazi (Dams with 30 km tunnel) and Mzimvubu (Dam with 8 km tunnel).
- Gautrain Metro Tunnels Phase 2: Some 15km metro tunnel to expand the present network toward the North-West of Johannesburg.
- A number of sea outfalls for desalination projects in Durban and Cape Town.
- Use of micro tunnelling techniques in sewer collector applications.

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TUNNELS - UNDERGROUND WORKS

2. Projects under Construction.

- Commissioning of Ingula Pumped Storage Scheme in progress. Target completion is 2017.



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FUTURE ACTIVITIES

- Follow-up to our SANCOT 2015 Conference on Mechanised Underground Excavation in Mining and Civil Engineering planned for November 2016.
- Planning a conference on Asset Management in support of the local WG 21 work.
- Continuing expansion of SANCOT visibility with publications, conferences, website.
- Development of Young Professional Forum and participation in ITA-YM

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PRESENTATION

NAME: AETOS, SPANISH TUNNELLING AND UNDERGROUND SPACE ASSOCIATION

TYPE OF STRUCTURE: SCIENTIFIC ASSOCIATION

NUMBER OF MEMBERS: 282

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2015 - ACTIVITIES

The AETOS General Assembly took place on June the 24th, 2015.

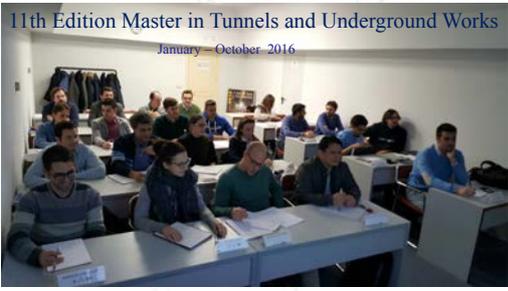
Four Technical Guides were presented:

- Safety Recommendations in the execution of tunnel and underground works. (*Medidas de Seguridad en la ejecución de túneles y obras subterráneas*)
- Characterization of geological, hydrogeological and geotechnical risks and uncertainties. (*Caracterización de las incertidumbres y los riesgos geológicos, hidrogeológicos y geotécnicos*)
- Guide for the design, manufacture and commissioning work of the shotcrete in underground works. (*Guía para el Diseño, Fabricación y Puesta en Obra del Hormigón Proyectado en Obras Subterráneas*)
- Recommendations for Instrumentation and monitoring in the project and construction of urban tunnels. (*Guía sobre Instrumentación y Auscultación en el Proyecto y Construcción de Túneles Urbanos*)

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11th Edition Master in Tunnels and Underground Works

January - October 2016



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2015 - WGs

The following AETOS WGs have been active in 2015:

- WG1-5. RISK PREVENTION AND SAFETY AT WORK
- WG 2. RESEARCH
- WG6-12. MAINTENANCE, REPAIR
- WG 9-15. UNDERGROUND AND ENVIRONMENT
- WG11-20. URBAN PROBLEMS, UNDERGROUND SOLUTIONS AND SHOTCRETE USE

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acciona



CHUQUICAMATA AIR INJECTION TUNNELS, ANTOFAGASTA, CHILE

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DRAGADOS

Tunnels and Underground Works

Ottawa Light Rail Transit (OLRT) – (CANADA) (UNDER CONSTRUCTION)

This Project includes 2,106 m of running tunnel and three stations (Lyon, Parliament and Rideau) of 120 m in length each one. The rest of the line is above-ground. The whole underground stretch is being excavated with SBM (Sequential Excavation Method) by road headers.

Main figures:

- Total length: 2,466 m
- Stations: 3 (120 m in length each one)
- Tunnel Section: 61 m²
- Station Section: 355 m²
- Excavation volume: 446,500 m³
- Completion year: 2016




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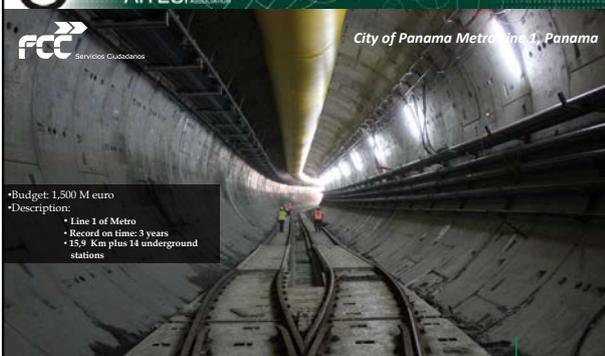
fcc Servicios Ciudadanos

City of Panama Metro Line 1, Panama

Budget: 1.500 M euro

Description:

- Line 1 of Metro
- Record on time: 3 years
- 15,9 Km plus 14 underground stations



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ferrovial

CROSSRAIL (LONDON): WESTERN TUNNEL AND 6 STATIONS




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TUNNEL ENGINEERING: METROS

RIYADH METRO (SAUDI ARABIA)

SECTION: Lines 4, 5 & 6 Riyadh metro. Mechanized tunnels and conventional methods
 CLIENT: FCC, SAMSUNG, ALSTOM, STRUKTON, FREYSSINET

TECHNICAL DATA

SCOPE: 44.43 km in Total Tunnels (28.44 km) and Viaducts (20.73 km), 25 Stations, 2 Depot facilities, 7 Park & Ride facilities.

SECTION: 9.5 m diameter TBM excavation, 8.5 m width NATM excavation.

SCOPE OF WORK: Detailed Design, Geotechnical engineering, tunnels and stations.

CONSTRUCTION PROCESS: EPB, TBM and New Austrian Tunneling Method (NATM)

CONSTRUCTION VALUE: 7,800 million EUR; 9,000 million USD

LOCATION: Riyadh, Saudi Arabia





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FUTURE ACTIVITIES

The next General Assembly will be held on June the 22th, 2016. The AETOS WGs are actively preparing new Technical Guides to be distributed



In the second semester of 2016 a Conference on HST (AVE) tunnels in the Basque Country will be held



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SWEDEN

ACTIVITY REPORT 2015



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PRESENTATION

NAME
 Swedish Rock Construction Committee, Bergsprängningskommittén (BK)

TYPE OF STRUCTURE
 A non-profit national organization.

NUMBER OF MEMBERS
 92 corporate members from public and private clients, contractors, suppliers, mining companies, consulting firms, institutions and research organizations.

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2015 - ACTIVITIES

Main activities

The main activity is to arrange an annual Swedish congress. In addition international conferences are arranged (not annually). An important purpose is to create a platform for networking within the Swedish and international underground space industry. BK is also actively participating in research and development projects with the purpose of developing the underground space industry.

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2015 - ACTIVITIES

WGs

BK is represented in 12 WGs.

WG2	Per Tengborg, BeFo
WG3	Thomas Dalmain, Trafikverket
WG5	Peter Dime, Jensen Ventilation
WG6	Hans Hargelius, Trafikverket
WG11	Rickard Torpö, NCC
WG12	Tommy Ellisson, Besab
WG14	Gunnar Nord, Atlas Copco
WG15	Donald Jonsson, Nitro Consult
WG17	Daniel Morfeldt, Mineconsult
WG19	Bengt Niklasson, Gesosigma
WG20	Beatrice Lindström, Trafikverket/Bengt Ludvig, Petroteam
WG21	Mattias Roslin, Trafikverket


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2015 - ACTIVITIES 

Training

Nothing to report


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2015 - ACTIVITIES 

Publications

Swedish contributions to ITA-WTC 2015:

Andersson, C., Olofsson, O.: **Rock Mechanics analyses in early design phases**

Andersson, A., Roslin, M.: **Load capacity of inner lining systems due to impact from falling rocks**

Books:

Stille, H.: **Rock Grouting – Theories and applications**. BeFo, ISBN 978-91-637-7638-0


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TUNNELS - UNDERGROUND WORKS 

Norsborg Metro Depot completed

New above ground workshop connected to a 320 000 m³ underground depot. Total tunnel length is 2.7 km. The project won the Outstanding Project Award at Hagerbach in November 2015.





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TUNNELS - UNDERGROUND WORKS 

E4 Stockholm By-Pass (Förbifart Stockholm)

This mega project includes an 18 km long road tunnel with an excavation volume of 6 500 000 m³. The major underground contracts have been signed and construction has started.




Photographer: Mikael Ullén


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TUNNELS - UNDERGROUND WORKS 

Strängnäs-Härad Raitunnel

The railway through the city of Strängnäs is being upgraded from single to double track over a section of 8.5 km. The Design and Built contract includes nine bridges, a new 3.5 km long rock tunnel (total volume of 243 000 m³) and rail technical installations.



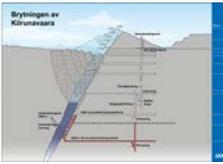


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TUNNELS - UNDERGROUND WORKS 

Relocation of the city of Kiruna

LKAB is developing the Kiruna mine with a new main level at 1365 m below ground. This has implications for the city of Kiruna due to deformations on the ground level. A huge relocation plan, affecting 25 % of the city, has started and will continue until 2035.





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TUNNELS - UNDERGROUND WORKS


ITACUS u2fc

ITACUS, BK and BeFo arranged an urban underground future conversation in Stockholm in March 2015. The meeting gathered people from the underground industry but also city planners who highly appreciated the potential to further explore the subsurface space.





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FUTURE ACTIVITIES


Stockholm Metro Extension

Planning and design is ongoing for a large extension of the Stockholm metro. Construction is planned to start during 2017.

EFEE congress in Stockholm 2017

The European Federation of Explosive Engineers arranges the 9th World Congress in Stockholm 10th - 12th of September 2017. This event, arranged *In the spirit of Alfred Nobel*, is expected to gather up to 400 delegates.


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TUTG
 Thailand Underground & Tunnelling Group

THAILAND

ACTIVITY REPORT 2015


TUTG
 Thailand Underground & Tunnelling Group


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TUTG
 Thailand Underground & Tunnelling Group

PRESENTATION

NAME: Thailand Underground and Tunnelling Group (TUTG), The Engineering Institute of Thailand

TYPE OF STRUCTURE : Non-profits Organization

NUMBER OF MEMBERS : 60


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TUTG
 Thailand Underground & Tunnelling Group

2015 - ACTIVITIES

Main Activities : Support and disseminate all knowledges related to the use of underground space and tunnel construction both in the metro area (urban area) and rural area.


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TUTG
 Thailand Underground & Tunnelling Group

2015 - ACTIVITIES

WGs: During 21-27 May 2015, WTC 2015 at Dubrovnik, Croatia which was successfully organized, TUTG advisory committees - Dr.Noppadol Phien-wej and Dr.Harald Wagner, TUTG President - Dr.Aphichat Sramoon, TUTG Vice President - Dr.Auttakit Asanprakit and Mr.Preedee Ngamsantikul, TUTG Secretary - Mr.Siripong Nakthong and others have participated in the WG meetings.

2015 - ACTIVITIES

Working Groups	Participant in WG meetings (WTC2015)
ITAYMG Young Member	Mr.Siripong Nakthong
GT 02 Research	
GT 03 Contractual Practices	
GT 05 Health and Safety in Works	
GT 06 Maintenance and Repair	Dr.Auttakit Asanprakit
GT 09 Seismic Effects	
GT 11 Immersed and Floating Tunnels	
GT 12 Sprayed Concrete Use	Mr.Preechote Ngamsantikul
GT 14 Mechanization of Excavation	Mr.Teepraphat Sukkaew Dr.Aphichat Sraamoon
GT 15 Underground and Environment	Dr.Harald Wagner
GT 17 Long Tunnels at Great Depth	
GT 19 Conventional Tunnelling	Mr.Siripong Nakthong
GT 20 Urban Problems, Underground Solutions	Dr.Harald Wagner
GT 21 Life Cycle Asset Management	

2015 - ACTIVITIES

Bi-monthly Tea Talk Seminar

No.	Date	Topic	Speaker
1	25-2-2015	Tunnelling Best Practice - State of the Art Tunnel Design Supported by Modern Planning Tools	ILF Consulting Engineer (Asia) Ltd.
2	29-4-2015	Safety Aspects of Close Proximity of Tunnel Drive in Public Housing Estate	TY Lin International
3	24-6-2015	Rock Tunnelling with Non-Blasting Excavation	Right Tunnelling Co.,Ltd.
4	26-8-2015	Support Systems for Deep Urban Excavations	Prof. Shahabudin Yaroubi Tarbiat Modares University, Faculty of Engineering, Tehran, Iran

2015 - ACTIVITIES

Half-Day Seminar

No.	Date	Topic	Speaker
1	28-9-2015	Steel Fibre Reinforced Concrete Sprayed Concrete Lining Design and Application	Robert Maccaferri Underground Solutions
2	09-12-2015	Outline of Design & Construction Manual and Advanced Technologies & Latest projects of Press-in method	Giken Ltd.

Seminar :
Brainstorming – Designing of long water diversion tunnel
23-24 February 2016, Royal Irrigation Department Pak Kret, Bangkok

2015 - ACTIVITIES

Conference :

2nd Thai Geotechnical Conference (co-organized with EIT)
Date 14-16 October 2015, S31 Hotel, Bangkok

Training :

In-house Training on
“Tunnelling Concept and Construction Management for Thai Railway Sustainable Development”
Date 19-23 January 2015, SRT Engineering School, Bangkok

2015 - ACTIVITIES

Publications

- Sramoon, A. and Asanprakit, A.
“Advance and Innovation in Mechanized Tunnelling”
Proceedings of the 5th GEOINDO 2015 International Conference
- Jongpradist, P., Tunsakul, J., Kongkitkul, W., Fadsiri, N., Arangelovski, G. and Youwai, S. (2015):
“High Internal Pressure Induced Fracture Patterns in Rock Masses Surrounding Cavems: Experimental Study Using Physical Model Tests” Engineering Geology, Vol. 197, pp. 158-171
- Lueprasert P., Jongpradist, P., Charoenpak, K., Chaipanna, P. and Suwansawat, S. (2015): “Three dimensional finite element analyses for preliminary establishment of tunnel influence zone due to nearby pile loading” Maejo Int. J. of Sci. and Tech., Vol. 9(2), pp. 209-223.
- Detkhong T, Trakoonjannak K and Jongpradist P. (2015) “Tunneling influence zones for existing piles of bridge approach”, The 2015 World Congress on Advances in Structural Engineering and Mechanics, Songdo Convensia, Incheon, South Korea (August 25-29, 2015)

TUNNELS – UNDERGROUND WORKS

MRT Blue Line Extension Project (Hua Lamphong – Bang Khae & Tao Poon – Tha Phra Sections) in Bangkok

The project is a 27 km heavy rail transit system with four (4) underground stations and fifteen (15) elevated stations. It also contains three (3) intervention shafts, one (1) railway bridge, one (1) depot with operation control centre and two (2) park and ride building facilities.

At present, the overall progress of civil works is around 80.3% as of February 2016.







FUTURE ACTIVITIES

2016	Bi-monthly Tea Talk Seminar Training on Soft Ground Tunnelling (May 2016) Training on Rock Tunnelling (November 2016) Concrete Asia 2016 (Co-organizer) 3 rd Thai Geotechnical Conference (Co-organizer)
2017 or 2018	1 st ASEAN Tunnelling Conference, co-organized with Vietnam Tunneling Association (VTA)





TURKEY

ACTIVITY REPORT 2015


 YOLLAR TÜRK MİLLİ KOMİTESİ
 TURKISH ROAD ASSOCIATION





PRESENTATION

NAME: TURKISH ROAD ASSOCIATION (TRA) - YOLLAR TÜRK MİLLİ KOMİTESİ (YTMK)
 Karayolları Genel Müdürlüğü A Blok Kat: 12
 06100 Yücepete - ANKARA / TURKEY
 Phone : 90 312 418 79 05 - 417 24 02
 Fax : 90 312 425 82 10
 E-Mail : komite@ytmk.org.tr
 Web : www.tra.org.tr

TYPE OF STRUCTURE: TRA is an open association. Its function is to promote, coordinate and spread studies and research in the field of roads, highways, motorways, tunnelling and other underground works.

NUMBER OF MEMBERS: As of January 2016 TRA has 604 members of which 533 are individuals and 71 are corporate members which represent Universities, Consultants, Contractors, Manufacturers and some of the other Governmental Organizations





2015 - ACTIVITIES

Main activities :

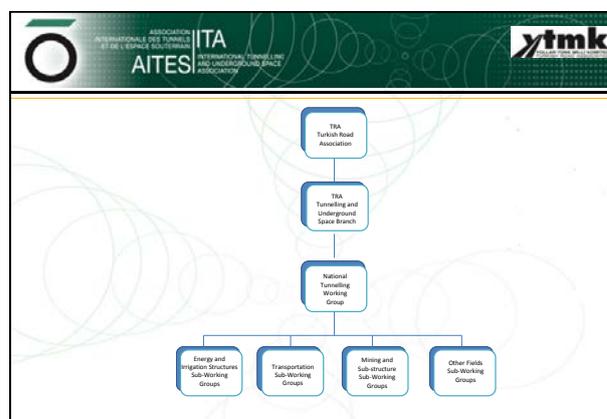
1. TUNNELLING SEMINAR (March 31 - April 1, 2015, Ankara)
2. 1st IRF EUROPE & CENTRAL ASIA REGIONAL CONGRESS & EXHIBITION (September 15- 18, 2015, Istanbul)
3. TUNNEL ENGINEER TRAINING COURSE-I (Solutions For Emerging Geological and Geotechnical Problems in Tunnel Design and Construction) (October 5-9, 2015, Izmir)
4. ORGANIZATION OF 1st NATIONAL CONGRESS ON TUNNELLING AND UNDERGROUND SPACE
5. ORGANIZATION OF ROADS, BRIDGES AND TUNNELS FAIR





Working Groups:

TRA has established Tunnelling and Underground Space Branch on April 24, 2014. Communication network and National Tunnelling Working Group were formed with the participation of colleagues from different tunneling sectors in Turkey. First meeting of the National Tunnelling Working Group was held and the main topics for the sub-working groups were determined.







Training: TRA organized :

- Tunnelling Seminar on March 31 – April 1, 2015 : Tunnel Design, Specifications, Construction and Contractual Practices with Case Studies
- Tunnel Engineer Training Course-II (Solutions For Emerging Geological and Geotechnical Problems in Tunnel Design and Construction) (October 5-9, 2015, İzmir)





Tunnel Engineer Training Course-II, theoretical training







- Tunnel Engineer Training Course-II : October 5-9, 2015, İzmir, Practical Training







TUNNELS – UNDERGROUND WORKS

Publications:

- TRA has publishing TRA Bulletin four times a year since January 2013. News about working groups, important events is shared with all members by these bulletins as well as the website. The 7th bulletin was on tunnelling in 2014.
- In 2015, The presentations of Tunnelling Seminar were disseminated as soft copies
- In 2015 Tunnel Engineer Training Course notes were disseminated as soft copies





FUTURE ACTIVITIES

Slides describing the main works for the year 2015 in the country with photos





1st IRF Europe & Central Asia Regional Congress & Exhibition (September 15- 18, 2015, Istanbul) was co-organized by TRA & IRF Washington. Turkish Group presented 'Innovations in Tunnel Constructions'















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PS4/TS1.2 Session: Innovations in Tunnel Constructions, Moderator Prof. Dr. Mahir Vardar, Panelists: Ahmet Şirin, Tülin Solak, Ahmet İrfan Ünal, Beyhan Yaraman

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KARAYOLLARI GENEL MÜDÜRLÜĞÜ | İZ Yatırım Bankası ve Sabotejine Katıldığı | ytmk

Tünelcilik Semineri / **Tunnelling Seminar**

Tünel Tasarım, Şartname, Yapım ve Sözleşmesel Pratikler Vaka Analizleriyle / Tunnel Design, Guidelines, Construction and Contractual Practices with Case Studies

31 Mart - 01 Nisan 2015 Ankara / March 31st - April 1st, 2015 Ankara

HOŞ GELDİNİZ / **WELCOME**

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Tunnelling Seminar Participants

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Tunnelling Seminar invited speakers Prof. Dr. Wulf Schubert, Dr. Alfred Fasching, Bernard Kohlbeck and Hanns Wagner from Austria.

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Some activities planned in 2016:

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Candidacy For WTC 2019

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ytmk

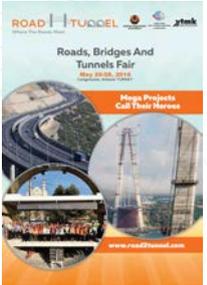
1st National Congress on Tunnelling and Underground Space on May 26 - 28, 2016, Ankara



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Roads, Bridges and Tunnels Fair on May 26-28, 2016, Ankara



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On May 2016, A course for Engineering Geology, Site Investigation Techniques, Drilling and Laboratory Tests for Tunnels.

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THANKS !

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Danish Society for Tunnels and Underground Works

**DENMARK
ACTIVITY REPORT 2015**

Danish Society for Tunnels and Underground Works

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Danish Society for Tunnels and Underground Works

PRESENTATION

Danish Society for Tunnels and Underground Works
Members:

- 37 Company Members
- 13 Personal Members
- 12 Young Members





2015 - ACTIVITIES

Main activities:
 Five Member Meetings / Site visits i 2015
 One half-day seminar in connection with AGM





FEHMARNBELT FIXED LINK

- April 2015: The 18 km immersed tunnel was approved in the Danish Parliament
- March 2016: Award of major civil works contracts
- May 2016: Signing of civil works contracts







TUNNELS - UNDERGROUND WORKS

Copenhagen Metro - Cityringen

Cityringen consists of 17 underground stations in and will be completed in 2019.

In collaboration with the municipal authorities of Copenhagen and Frederiksberg, the Danish government has concluded a contract to expand the existing Metro with a new city circle line (Cityringen).

Cityringen is a completely new Metro line constructed on the same principles as the existing Copenhagen Metro net. The Cityringen circle line will be a 15 km underground railway under downtown Copenhagen, the "bridge quarters" and Frederiksberg.

Lord Mayor of Copenhagen Frank Jensen celebrates that 50 % of the tunnel has been completed mid-December 2015.








TUNNELS - UNDERGROUND WORKS

Copenhagen Metro - Nordhavn

A 2.5 km extension of the new Cityringen metro line in Copenhagen has been designed by the Ramboll-Arup JV in association with COBE Architects.

The project consists of a twin running tunnel, 1.8 km long, from a bifurcation chamber at the Cityringen Metro, running to a new underground station at Nordhavn and then a short section of cut and cover tunnel and ramp leading up to a 250 m long elevated portion of the line, terminating at the new Orientkaj station. The underground works contract has been awarded to MetNord JV (Züblin and Hochtief).

The execution of the secant piles for the station box is completed ahead of schedule. The station box is used as launching shaft for the TBM's starting in March 2016.

The elevated section and Orientkaj station was contracted to MetNord JV and construction works will start in April 2016.







TUNNELS - UNDERGROUND WORKS

Copenhagen Metro - Sydhavn

A 5 km extension of Cityringen to the South harbour area is being designed.

The project consists of 5 new stations and 5 km of metro lines. The tunnels will be twin running tunnel constructed by two TBM of either EPB or slurry type. The tunnel will be located in the Copenhagen limestone and for the Southern part in Bryozoa limestone. There is a known fault zone, the Carlsberg fault, in between the two types of limestone. The stations will be cut&cover stations following the same concept as used for the Cityringen metro line with the architectural design adjusted to the local town conditions. The project includes two cross overs to be constructed in open box or caverns structures. The South Harbour metro extension will connect to the Cityringen at the Havneholmen bifurcation chamber presently being constructed as part of Cityringen.

The tender process for Contractors was initiated in Dec. 2015 and the project is planned for completion in 2023





TUNNELS - UNDERGROUND WORKS

Nordhavnsvej

Client: Municipality of Copenhagen
 Consultant: Ramboll, Contractor: Züblin

Nordhavnsvej (Northern Harbour Road) is under construction and will be opened in 2018. The road will be approximately 1.65 km long including a 620 m Cut & Cover tunnel. The cross section of the tunnel consists of 2 road lanes in each direction.

Nordhavnstunnel

Client: Danish Road Directorate
 Consultant: Ramboll

The Nordhavnstunnel (North Harbour Tunnel) will connect Nordhavnsvejen with Nordhavn (development).

The project is now in the EIA phase. Construction is expected to start at the earliest early 2018. The project consists of a 1 - 1.5 km long road cut and cover tunnel, 2 lanes in each direction.






TUNNELS - UNDERGROUND WORKS

TP4 Urban Tunnels, Copenhagen - Ringsted

Client: Bandedanmark
 Contractor: Per Aarsleff A/S
 Construction period: February 2014 to April 2017.
 Total project comprising 3.7 km of new railway as part of the new railway from Copenhagen to Ringsted.



Kulbane tunnel:
 695 m long tunnel consisting of permanent sheet pile walls with element deck and base slab cast in situ. The sheet pile walls and the ceiling are covered with fire insulation which is sprayed on. The current situation is that sheet piles, concrete and fire insulation are 100% complete. Installations are ongoing.

Hvidovrevej tunnel:
 560 m long tunnel consisting of secant pile walls with inner wall of concrete cast in situ, base slab cast in situ and element deck. Walls and ceiling are covered with fire insulation. The current situation is that secant pile walls are 100% complete. Base slab and inner walls are being carried out.



TUNNELS - UNDERGROUND WORKS

Damhusledningen

Tunneling, Damhusåen Stream, Copenhagen
 Client: HOFOR
 Contractor: Østergaard A/S



Construction of a 3.4-km-long reservoir pipe of DN3000 mm along the Damhusåen Stream, incl. structures. The tunnel is divided into 4 sections of 960 m, 640 m, 740 m and 1060 m. 5 construction pits are established with secant piles of 12-20 m in diameter and with a depth of about 18 m. 3 start pits and 2 reception pits. Subsequently, structures of various designs are cast in the pits. The tunneling is carried out in the Copenhagen limestone of varying hardness with flint layers of different thicknesses. The reservoir pipe is established by tunneling with an EPB machine which has just completed section no. 3 of 740 m. On 7 March 2016, the EPB machine started on the last section of 1060 m, with expected completion in August 2016. The last section crosses the railway at Hvidovre Station.



FUTURE ACTIVITIES

6 - 8 member meetings / site visits will be arranged

Seminar in connection with ITA Board meeting in Denmark in June



SWITZERLAND

Activity Report 2015

