



ITA-CET

Committee on Education and Training

Newsletter

Issue 2

May 2015

IN THIS ISSUE

Message from the chairman



Dear ITA friends,

Having worked for a design consultant for 10 years and then as full professor since 2006, I am used to discussing technical questions with colleagues and students from all around the globe. The main difference between university courses and the ITA-CET training sessions is the very limited time which we have within ITA-CET training sessions to explain quite complex issues. However, I and the whole ITA-CET Committee team enjoy rising to the challenge and we are proud to present issue 2 of our official newsletter.

Over the last few months we have supported training sessions in Mexico, Bhutan, Saudi Arabia, Brazil, Italy, Malaysia and Chile. We are pleased to be able to support the session during the upcoming WTC 2015 in Dubrovnik. In addition, we are currently preparing programmes for future sessions in Myanmar, Brazil, Argentina, China and in San Francisco on the occasion of the WTC 2016 (see article page 3). In all, since the creation of the ITA-CET Committee in 2009, we have

supported 42 sessions gathering more than 4700 participants.

In order to be more efficient in the selection of lecturers for the training sessions, the database of potentially available lecturers has been updated (see article page 3). If you are interested in becoming a lecturer within the ITA-CET Committee, please don't hesitate to get in touch with us!

As for the ITA-CET Committee web site, it has been given a make-over to make it more attractive. Please take a look and give us your feedback - your remarks are welcome!

ITA continues to endorse several Master Courses in tunnelling. Ongoing masters include the one organized by INSA Lyon and ENTPE, called "Tunnels and Underground Structures – From Design to Operation" and the Master organized by Politecnico di Torino, called "Tunnelling and Tunnel Boring Machines". The endorsement of the Master at Warwick University (Tunnelling and Underground Space) has been extended and the ITA-CET Committee is examining the University of Madrid's application for ITA endorsement.

The portfolio of ITA-CET training sessions currently includes 17 topics. The ITA-CET Committee is working on programmes for several new training sessions, such as Numerical Simulation, Auxiliary Measures for Ground Improvement and Resource-efficient Tunnelling (see article page 5).

I think that the ITA CET Foundation and the ITA-CET Committee are on the right track to providing better knowledge in the field of geotechnics and tunnelling around the globe through intensified education and training.

We are open to suggestions! Just contact us!

Rober Galler – ITA-CET Chairman

ITA-CET Steering Board meets in Lyons (page 2)

An overview of the topics discussed

ITA training sessions in 2015: another busy year! (page 3)

A look at the training sessions organized so far this year and forthcoming events

Lecturer database: vital to training session success! (page 3)

We explain how the database facilitates the preparation of training sessions

Feedback from recent training sessions (page 4)

Strengths and suggestions for improvement pinpointed by participants

Future additions to the training session portfolio (page 5)

Details of programmes soon to be added to the training session portfolio

A need for training sessions aimed at tunnel owners (page 5)

We explain why it is important to develop training sessions for these stakeholders

ITA-CET and ITA tech: working together to train professionals (page 6)

A look at how the two Committees can collaborate in education and training actions

Dubrovnik to host the next Committee meeting (page 6)

FOR MORE INFORMATION

<http://www.ita-aites.org/en/wg-committees/committees/ita-cet>

ita-cet.secretariat@developpement-durable.gouv.fr

ITA-CET Steering Board meets in Lyons

by Kristen Drouard

The ITA-CET Steering Board met in Lyons on the 9th January 2015 to discuss the Committee's work progress since the previous meeting. After approval of the previous meeting minutes, discussions kicked off by a look at the current Committee members list and the ongoing update of the lecturer database (see page 3 for more details).

A large part of the meeting was dedicated to discussing ITA training endorsement principles. The ITA endorsement recognizes the efforts of a Member Nation to develop high-quality tunnelling courses. The vocabulary of the current endorsement classification system is sometimes not fully understood and possible improvements will be decided on during the next meeting in May.

Feedback from the training courses held in 2014 in Iguassu, Riyadh and Thimphu was presented (see page 5) and led to a discussion on ways to further improve the quality of these events.

The Steering Board members then examined the progress of the four activity groups with a particular focus on the ongoing development of 8 new training course programmes (see page 5).

The Steering Board reviewed the headway made with specific training and education actions outlined in the ITA Strategic Plan 2014-2016. The majority of actions have been implemented and are continuous. One pending action concerns the development of webinars, for which financial and organizational issues are yet to be resolved.



The meeting ended with a look at forthcoming training events organized in collaboration with the ITA CET Foundation (see next page for more details).

The ITA-CET Committee Steering Board will next meet in Dubrovnik, Croatia in May.

Following this meeting in Lyons, a visit of the city's innovative Croix Rousse tunnel was organized for the participants by the Greater Lyons Council (Grand Lyon). This tunnel is an essential traffic route in Lyons and is used by 47,000 vehicles per day.

In 2010, new lighting, ventilation, fire safety, CCTV and AID equipment were installed. The equipment is linked to the Greater Lyons tunnel information system, developed at the same time as the refurbishment works.

This supervision system enables monitoring of all the tunnels in the Lyons area.

In addition to this work, the city authorities adopted an ambitious and innovative approach by adding a safety gallery whose access is dedicated to "green" transport modes (pedestrians and cyclists) and buses. Permanent digital animations are projected onto the tunnel walls, accompanied by sound effects, providing a unique experience for users (see photos).

The tunnel, which reopened in 2013, has since become a tourist attraction, and the "green" tube is now regular host to public events.



The Croix Rousse tunnel in Lyons: both photos courtesy of Yun Bai

ITA training sessions in 2015: another busy year!

by Claude Berenguier

The fruitful collaboration between the ITA-CET Committee and the ITACET Foundation has enabled 3 two-day training sessions to be held so far this year, in three different continents.

In January, a training session on "Conventional tunnelling and ground reinforcing techniques" was held in Turin and was attended by 90 participants. The first two parts were dedicated to general aspects of conventional tunnelling and lessons learnt from conventional tunnelling in different soil and rock conditions. During the last part of the training session, several industrial representatives shared their experience and provided examples of innovations.

At the end of February, a training session on "Tunnelling for transport in urban areas" was held in Kuala Lumpur. The objective was to introduce the design and construction approaches for tunnelling in urban areas, with specific focus on transportation tunnels, for which case studies were provided by the lecturers. This successful training session was attended by about 40 participants.

In March, a two-day training session on "Mechanized tunnelling" was organized in Chile. This training session aimed to provide general information to young engineers and to update tunnelling professionals on topics related to mechanized tunnelling. After a general overview of the topic, the training session examined ground improvement and support systems and operation and management issues. The training session, attended by around 100 participants, ended with case studies and open discussion between lecturers and participants.

Over the forthcoming months, several more training sessions are planned. In May, Myanmar will play host to a session on "Tunnelling and deep excavation for infrastructure in urban areas", a topic for which there is increasing demand. Subjects covered will include design and construction methods, geotechnical aspects, deep excavations for underground structures and specific case studies.

This year, the traditional two-day training session held during the WTC will take place in Dubrovnik in May and will address two quite different topics. The first day will examine the issue of "Soft ground urban tunneling", while the second day will provide an insight into "Rock tunnelling in karst"

Mexico will then play host to a training session on Mechanized tunnelling in June. A training session on "Contractual practices" is also planned in Brazil in June, (to be

confirmed), while in September, Argentina will organize a training session on "Health, safety and logistics in tunnel construction".

Switching continents again, "Long distance and deep undersea tunnels" will be the focus of a training session to be held in Shanghai in October.

Discussions are also underway for training sessions with other countries.

The number and frequency of training sessions continues to be stable, with encouraging feedback and useful suggestions for improvement from the course participants (see page 4).



Participants at the training session in Kuala Lumpur, February 2015 (photo courtesy of S. Eskesen)

Lecturer database: vital to training session success!

by Kristen Drouard

The success of the training sessions prepared by the ITA-CET Committee and organized by the ITACET Foundation is heavily dependent on the lecturers who are willing to give their time and share their expert knowledge.

It is therefore vital that the two organizations mentioned above regularly update and share a "lecturer database" providing important information on tunnelling professionals willing to lecture in ITA training sessions.

This database includes information on the professional background of lecturers (in the form of a short biography), their contact details, specialized fields, topics that they would be willing to lecture on, abstracts of proposed lectures and ability to teach in a language other than their mother tongue.

In September 2014, a questionnaire was sent to the list of tunnelling professionals in the database in order to establish if they still

wished to be called upon as an ITA lecturer and if so in which fields. The replies to this questionnaire have allowed the database to be updated and improved.

Certain professionals on the previous list had retired or are no longer part of the tunnelling profession. Others expressed their wish to update the list of topics on which they felt confident lecturing.

As part of the questionnaire, potential lecturers were asked to provide abstracts of proposed lectures for topics that they wished to lecture on. These abstracts are highly useful to the ITA-CET Committee, who choose the lecturers for each training session

and establish the training session programmes. They help the ITA-CET Committee and Foundation guarantee that lectures will be of high quality and cover the topics requested by the client.

Suggestions for possible new training session topics were made by several lecturers:

- compressed air works and mixed gas intervention,
- hydropower tunnels,
- urban TBM/EPBM tunnelling: advances in face excavation support technologies,
- geotechnical failures: prevention, legal and commercial consequences,
- regulated ground investigations: fundamental project benefits,
- geotechnical contract principles: construction supervision and project management,
- underground structures: creating public awareness,
- long and steep inclined/deep tunnels.

The ITA-CET Committee Steering Board will examine if and how these topics could be integrated into the training session portfolio in the future.

Improvements to the database have been made by colour-coding which lecturers in the list have already taught in ITA training courses and indicating the specific topics that they have lectured on. This has provided a clearer view of the lecturers in the database who have not yet had the opportunity to actively teach in a training course.

The aim is to try to progressively involve these lecturers whenever possible, particularly those who answered the questionnaire and reaffirmed their interest in actively participating in ITA training events.

Maintaining this lecturer database is a continuous process, but vital to the preparation of training courses. If you received this questionnaire from the ITA-CET

secretariat and have not yet answered, it is not too late to do so! We can only call on lecturers from whom we have sufficient information.

The ITA-CET Steering Board would like to take this opportunity to thank all those who answered the questionnaire and all the lecturers whose time and effort ensure that these training courses continue to be a success.

Feedback from recent training sessions

by Kristen Drouard

While the ITA-CET Committee and ITA CET Foundation do their utmost to ensure that the training sessions offered meet client and participant expectations, there is always room for improvement.

Whenever possible, evaluation forms are handed out and collected at the end of each training session. These forms enable participants to give their opinion on various aspects of the session such as:

- clarity and relevance of training session objectives,
- structure of the training session,
- coverage and development of important topics,

- speakers competence and speaking skills,
- balance between talks and discussions,
- level of the training session,
- quality of visual aids and documents.

They also enable participants to freely suggest any improvements that they feel relevant.

Feedback from the evaluation forms collected at recent training sessions has provided a useful insight into course strengths and areas where progress can be made.

Strengths regularly cited by the vast majority of participants are the knowledge and experience of the lecturers and the diversity of topics covered.

Suggestions for improvement include the duration of the training session. Some participants considered certain training sessions too short, as they would have liked to examine the topics more in-depth. One

possible solution in the future would be to propose an initial two-day training session as is currently the case, and then a further more advanced course where topics could be examined in greater detail. This matter requires further thought and debate.

The time allowed for interactive discussions was also considered too short in some cases. Finally, some participants feel that the quality of the visual aids could be improved by introducing more films/animations into the lectures and by improving the readability of the handouts. The printed slides provided in the form of a "notepad" are sometimes considered too small to be easily read.

The ITA-CET Committee and the ITA CET Foundation will continue to work in close collaboration and will examine how these suggestions can be put into practice.

Future additions to the training session portfolio

by Bérénice Moreau and Robert Galler

The ITA-CET Committee and ITA CET Foundation training session portfolio currently includes the following topics: Conventional tunnelling, Health and safety during construction, Immersed tunnels, Innovations in tunnelling, Maintenance and operation in road tunnels, Management of (user) safety in underground facilities, Mechanized tunnelling, Monitoring and control in tunnelling, Principles for tunnel design, Principles for maintenance and repair of tunnels, Underground space use, Risk management, Site investigations, Sprayed concrete, Planning, construction and operation of common utility tunnels and Waterproofing.

Eight additional training session programmes are currently being developed: Resource-efficient Tunnelling, Life-Cycle Assessment, Contractual practices, Auxiliary Measures for Ground Improvement, Numerical Simulation, Design Methods, Use of Reinforced Fibre Concrete and Sub-surface use. Here we take a brief look at the issues that some of these future training programmes will attempt to cover.

Improving resource efficiency by using excavated material as raw material for the tunnel construction site as well as for other industrial sectors should become state-of-the-art. The ITA-CET training session "Resource-efficient tunnelling", will aim to strengthen the know-how in automated chemical, physical and mineralogical online analysis techniques, which are followed by a separation plant using recycling units like crushers, sieves, etc. all mounted on a bypass conveyor belt. The excavated material can be directly reused either on site or be transported to the particular industry sector.

The aim is to place the whole process completely underground, from the characterization of the excavated material to its classification and processing. This process will help move towards zero waste from underground construction sites and will contribute to greater resource efficiency.

"Design methods" and "Numerical Simulation" in tunneling are two new programmes which focus on the calculations performed to assess tunnel stability. Whereas the programme "Principles for Design" is aimed at a broad public, these new programmes are aimed at professionals in tunnelling with previous knowledge of soil or geo-mechanics.

"Design Methods" will aim to present the design methods commonly used to assess tunnel stability. The programme intends to cover geomechanical classifications, block

stability analysis, the modulus reaction method, convergence confinement method, numerical methods, face stability and settlement analysis. Each method will be illustrated by examples, whilst highlighting the advantages and drawbacks when applied to a tunnel project. The progressive use of these methods in a tunnel project and the similarities between each of them will be presented. The fields of application and the limits of each method will also be highlighted.

The programme on "Numerical Simulation" will focus on this method by opposition to the empirical and analytical methods listed above. Numerical models and the associated parameters will be presented, highlighting their use, advantages and drawbacks. This session will be illustrated by case studies of numerical simulation implementation in tunnelling.

"Life Cycle Assessment" in tunnelling is a response to the increase in sustainable development issues in tunnelling. This programme will provide details of methodologies and tools that can be used to assess environmental impacts, especially life cycle assessment (LCA). It is important to explain the limits of LCA and how it could be implemented in the early stages of a linear infrastructure project. Finally the programme will offer the chance to reflect on the impact of these issues on the contractual process.

A need for training sessions aimed at tunnel owners

by Michel Deffayet

To meet training expectations, the ITA-CET Committee has developed around 20 training session programmes, which can be tailored to the specific requirements of clients at their request. As might be expected, focus has been given to technical training sessions, either aimed at providing a general overview of usable techniques or at examining certain specific methods or techniques in detail.

However, it also appears necessary to provide a reminder of important issues, to explain the role of the various stakeholders in the study and works processes and to show that these processes are gradual and conducted in successive stages. This is particularly important when the trainees are representatives of tunnel owners or public authorities. Although it is not their role to be able to choose the most appropriate type of TBM, they must be aware of the importance of prior geological and geotechnical investigations, for example.

Generally speaking, tunnel owners are assisted by consultants and technical advisors and are not expected to take their place. However, they must know how to ask the right questions, obtain basic technical facts and rough orders of magnitude and be capable of questioning certain options put forward, in order to make sound decisions.

The ITA-CET Committee is therefore developing training sessions aimed at tunnel owners. These training sessions will highlight the manner in which studies are conducted, from the initial project outline right up to the tunnel opening or tunnel operation and maintenance stages.

They will focus on identifying the set of functions that the new tunnel must fulfill, then on the coordination of studies and the validation of the work conducted by the project manager and the design team, followed by the awarding of contracts to construction companies and the monitoring and acceptance of the works.

These training session programmes will also focus on risk management issues and the responsibilities of each party.

ITA-CET and ITA tech: working together to train professionals

By Volker Wetzig

ITAtch and ITA-CET are both committees within the large ITA family and focus on varied topics related to the construction and operation of underground infrastructures.

The goal of the ITAtch committee is to promote new and state-of-the-art construction technologies and methods for the sustainable development of underground space.

ITAtch members are prime sponsors and supporters. The committee is organized into activity groups which cover all processes related to underground construction, such as Investigation, Excavation, Support, Lining and waterproofing, Installation and interior works, Monitoring, Rehabilitation and Design. The activity groups develop technical ideas and concepts based on emerging

technologies for future use in underground construction.

One of the first outputs of the ITAtch Committee is the document entitled "Design Guidance for Spray-applied Waterproofing Membranes". Within this document the urgent need for training and certification is highlighted.

The ITA-CET Committee ensures the quality of the training and education activities through a careful selection and endorsement of speakers and lectures. It works in collaboration with the ITA CET Foundation, which takes care of all organizational aspects of training sessions. The ITA-CET Committee is organized into Activity Groups and Activity Group 2 promotes an education and training concept which takes into account existing national and regional training centres and provides a scheme for mutual recognition of training courses based on common standards. These standards can be defined by ITAtch activity groups.

The first ITA-CET endorsement for the certification of blue collar workers is granted to the EFNARC nozzle-man certification scheme (please visit www.efnarc.org). EFNARC, an independent organization, has developed this certification scheme.



Nozzle-men at work: photo courtesy of ITAtch

The ITA-CET endorsement for training and certification refers to:

- The certification body
 - Independent organization
 - Established organization
- The certification process
 - Confidentiality
 - Documentation, traceability,
 - Defined and reliable process
 - Duration of the theoretical and practical part.

This nozzle-man certification scheme has now been running for several years. The process is acknowledged in the underground construction industry and all parties involved (owners, designers, contractors) are increasingly demanding only certified nozzle-men for their construction sites.

Dubrovnik to host the next Committee meeting

By Michel Deffayet

The ITA-CET Committee is pleased to announce its next meeting, which will take place on the afternoon of 25th May in Dubrovnik, during the WTC 2015.

All Committee members are welcome to attend this meeting which is a chance to look at the work achieved by the Committee over the last months and discuss ongoing actions.



Photo courtesy of Picography

The meeting will kick off by looking at organizational issues (Committee members and lecturer database). A presentation will then be made of the actions carried out by each of the four activity groups.

The endorsement of courses by ITA is an important issue on the meeting agenda. There will be a discussion on the types of

training events endorsed by ITA, followed by a discussion on the endorsement of the AETOS Master at the University of Madrid, Spain.

The Committee's communication actions will also be presented, notably the newsletter and the web site.

Financial issues will then be examined with a look at expenses over the 2014-2015 period and the budget for the 2015-2016 period.

The last item on the agenda is the relationship with the ITA CET Foundation and the preparation of training sessions over the forthcoming months.

We look forward to seeing you there!