

## TC Activity

### TC 39: Geotechnical Engineering for Coastal Disaster Mitigation and Rehabilitation

Chairman: Prof. Jian Chu (Singapore) and Secretary: Dr.K.K. Phoon (Singapore)



TC39 meeting at the Conference GEDMAR08, Nanjing, China (Courtesy of Prof Hideki Ohta)

TC39 is a newly formed technical committee. It was set up in response to the increasing need to coordinate and promote activities related to coastal disaster mitigation and rehabilitation works within ISSMGE. The Chairman and Secretary of TC39 are Dr Jian Chu and Dr Kok Kwang Phoon respectively. It consists of 29 members from 20 countries. The names of the core members and members are listed on our website: <http://reliability.geoengineer.org/TC39/>.

The terms of references of TC39 include:

- 1) To conduct and coordinate research and development activities on coastal related disaster prevention, mitigation and rehabilitation works.
- 2) To work with local professional bodies and governments to provide technical supports and assistance to the planning, coordination and implementation of disaster rehabilitation and disaster mitigation works in the disaster affected regions, and to identify technical problems and potential topics that require more research and development efforts.
- 3) To develop pamphlets for public education and documents or design guides for geotechnical works related to coastal disaster prevention, mitigation and rehabilitation, such as pamphlets providing basic information on tsunami and earthquake in different languages, design guides for disaster rehabilitation and mitigation works, conducting hazard mapping, etc. and
- 4) To coordinate and provide trainings and promote international research collaborations and cooperation through conferences, workshops, short courses, special training sessions, and other activities conducted jointly with local and international communities.

Since 2006, the following major activities have been organized:

- i) Held a Special Session on Geo-hazard Mitigation at the *13th Southeast Asian Geotechnical Conference* to be held in Kuala Lumpur, Malaysia, 8-11 May 2007. The Special Session Speakers and their topics were:  
 Prof Susumu Iai (Kyoto Uni): Seismic performance and assessment of coastal geotechnical structures.  
 Prof Buddhima Indraratna (Wollongong Uni): Reconstruction methods for tsunami affected coastal soils with special reference to low-cost dwellings and rail tracks  
 Prof Robert Lo (New South Wales Uni): Liquefaction of loose fill slopes - myth, possibility and risk mitigation.  
 Dr Jack Pappin (Arup HK): Seismic hazard and site response evaluation in Hong Kong  
 Prof H.D. Tjia (University of Malaya): Tsunamigenic areas in/for the Malaysian region.
- ii) Supported the *4th International Conference on Disaster Prevention and Rehabilitation* was held between 10 and 11 September 2007 in Diponegoro University, Semarang, Indonesia. The conference was chaired by Prof Ani Wardani and co-chaired by Profs. S-C R. Lo, J Chu, and K K Phoon. The conference also marked the official launching of the Research and Development Center for Disaster Prevention and Rehabilitation headed by Prof Ani Wardani. The keynote and invited speakers at this conference included Prof. M.R. Madhav (Vice President for Asia) on "Liquefaction Mitigation of Sand Deposits by Granular Piles", J Chu on "Geotechnical Consideration of Access Road Construction for Disaster Rehabilitation", Prof. Askar Zhussupbekov, President of Kazakhstan Geotechnical Society, on "Geotechnical and Geodisaster Problems in Kazakhstan", K K Phoon on "Some Numerical Consideration in Unsaturated Soil Seepage Analysis", Prof T.G. Sitharam from India on "Microzonation Studies in India: Experiments and Experiences", Mr H. R. Pamekas of Indonesia on "Environment and Disaster Risk Reduction in Aceh and Nias", Dr A. S. Moerwanto of Indonesia on "Handling the Impact of Mud Flow Disaster in Sidoarjo", and Dr A. M. Chaidir of Indonesia on "Anticipation of Disaster due to Sudden and Unpredicted Changes of Expensive Soil during Extreme Global Weather Change: Indonesia Case".
- iii) Organised a Special Session on Disaster Mitigation and Management at the *13th Asian Regional Conf on Soil Mechanics and Geotechnical Engineering*, from 10-14 Dec 2007 at Kolkata, India. The Special Session speakers were:  
 Prof. S.R.Gandhi (IIT Madras) on "Case study on tsunami damages along the coastal of Andaman and Nicobar Islands and Tamilnadu Coast";  
 Dr Shri Pradip Dutta (Z-Tech India Ltd, Kolkata) on "Protection of coastal areas against Tsunami/cyclones";  
 Dr J Chu on "Coastal protection using geo-bag methods";  
 Prof Hideki Ohta (Tokyo Inst Tech) on "A trial of public education".
- iv) Organised the *2nd International Conference on Geotechnical Engineering for Coastal Disaster Mitigation and Rehabilitation (GEDMAR08)*, Nanjing, China, May 30- June2, 2008, jointly with TC4, Chinese Institution of Soil Mechanics and Geotechnical Engineering, Chinese Society of Environmental Geotechnics, and Hohai University. The detail of this conference is reported separately in the same newsletter. The 3rd conference of this series will be held at Semarang, Indonesia in 2011.

## TC Activity

### TC 41: Geotechnical Infrastructure of Mega Cities and New Capitals

Chairman: Dr. Arsenio Negro Jr. (Brazil)

The second meeting of the Technical Committee 41, Geotechnical Infrastructure of Mega Cities and New Capitals, took place on the 25th and on the 26th of August 2008 in the village of Buzios, situated in an attractive peninsula, 160km northeast of Rio de Janeiro, bathed by the cold sea currents of the South Atlantic, at the Brazilian southern coast (Figure 1). The first TC41 meeting took place on the 18th of June, earlier this year in, a joint Session with TC38 “Geotechnical Challenges in Mega Cities and New Capitals”, during the International Conference Development of Urban Areas and Geotechnical Engineering, organized by TC38 Soil-Structure Interaction in Saint Petersburg, Russia.



Figure 1: Bird's view of Buzios Peninsula from the east.

the complex challenges of the urban environment. Prof. Roger Frank (France), Vice-President for Europe, discussed the reinforcement of foundations with micro-piles in urban areas, making reference to the French research project on micro-piles FOREVER. Prof. Hirokazu Akagi (Japan) summarized recent underground projects in Tokyo and introduced the audience to the English translation of the book “Underground Construction Technology in Japan” published recently and available in CD format through the Japanese Geotechnical Society. Dr. Tarcisio B. Celestino (Brazil) discussed the uncertainty associated to underground construction in urban areas and the consequence for insurance.

Prof. Askar Zhussupbekov (Kazakhstan) presented the different foundation solutions used in the construction of modern high rise buildings built in Kazakhstan's new capital, Astana. The last two lectures of the Workshop by Dr. Nick Barton (Norway) and by Prof. Andre Assis (Brazil), see Figure 2, presented two distinct views of the collapse of the Pinheiros underground Metro station, which took place on January 2007, in Sao Paulo, Brazil. The station cavern was being excavated in fractured rock and the accident caused 7 fatalities. The technical investigations on the causes of collapse were completed but the legal process continues.

Professors M. Pacheco, S. Fontoura and A. Sayao, from Brazil, acted as discussion moderators. The complete set of the TC41 Workshop lectures were edited and published as a Special Lectures Volume of the COBRAMSEG Proceedings, with the help of Prof. A. L. Nunes, and are available in paper and in CD formats through [www.abms.com.br](http://www.abms.com.br). The Workshop organizers were Dr. A. Negro, TC41 Chairman, and Mr. F. Falconi, Workshop Secretary.

This second TC41 meeting was held in the format of a two half days Workshop, parallel to the 14th Brazilian Congress of Soil Mechanics and Geotechnical Engineering (COBRAMSEG) and with the support of the Brazilian Society of Soil Mechanics and Geotechnical Engineering. More than 100 participants were gathered to attend lectures given by experts of a variety of geotechnical fields, following the purpose of TC41: to become a forum for those dealing with the diversity of geotechnical problems in large urban centers.

The TC41 Workshop was opened by President Pedro Seco e Pinto who addressed his aims with the creation of TC41. He was followed by Prof. Marcio S. S. de Almeida (Brazil) who summarized the geotechnical components of lowland reclamation in Rio for residential and industrial purposes. The second speaker was Prof. P. Kulatilake (USA) who discussed steep rock slopes in urban areas in the western part of North America. Prof. Paulo Ivo Queiroz (Brazil) addressed the occupation of contaminated areas in metropolises, focusing the case of Sao Paulo City, in which the remaining stocks of land for edification are former industrial sites.

Prof. Waldemar Hachich (Brazil), Vice-President for South America, presented his views on teaching geotechnical engineering while educating future engineers to cope with



Figure 2: Dr. Barton (centre) and Prof. Assis (right) discussing Pinheiros Station accident. Prof. Sayao, who acted as Discussion Moderator, is on the left.

## TC Activity

### TC 1: Coastal Engineering and Dyke Technology

Chairman: Dr Meindert Van (Netherlands) and Secretary: Dr. C. Zwanenburg (Netherlands)

This contribution comprises a report of the activities of Technical Committee 1 of the ISSMGE, on the subject of coastal engineering and dike technology. The activities of the committee have been focused on defining its scope, preparation of the TC1 contribution to the 11<sup>th</sup> Baltic Sea conference, Gdansk September 2008 and start up of courses, reports and manual initiatives as stated in our Terms of Reference.

#### Executive Summary

In 2007, the committee was formed and the terms of reference were formulated. The start - up meeting was held at the 14<sup>th</sup> European conference on soil mechanics and geotechnical engineering at Madrid. In this meeting, a further focus in activities is established. The topics to be addressed in TC1 will be lined up with the regional research programmes running in the individual countries. The regional programmes represent the topics of local interest. Links between the different local research programmes form the basis of the focus for TC1. Regarding the regional topics of interest the main common items to focus on are:

- risk based evaluation of long geotechnical structures with a focus on impact of climate change on levees and coastline (includes sub-soil heterogeneity, safety philosophy and risk communication)
- measurement and inspection techniques of these structures
- failure mechanisms (focus on erosion, overtopping, piping and stability, plus effect of vegetation)
- building techniques (especially in built areas) of these structures

The following meeting will be held at the Baltic Sea conference in Gdansk, September 2008. In this conference, TC1 will organize one of the sessions.

#### Report on TC Activities 2007 - 2008

*Meetings and Workshops:* TC1 held its start up meeting in Madrid during the 14<sup>th</sup> European conference on soil mechanics and geotechnical engineering in Madrid. Six members were present. The Terms of Reference were officially approved and a further focus was discussed. It is agreed to focus on:

- risk based evaluation of long geotechnical structures with a focus on impact of climate change on levees and coastline (includes sub-soil heterogeneity, safety philosophy and risk communication)
- measurement and inspection techniques of these structures
- geotechnical mechanisms (focus on erosion, overtopping, piping and stability, plus effect of vegetation)
- building techniques (especially in built areas) of these structures
- land reclamation and ports

As part of the 11<sup>th</sup> Baltic Sea geotechnical conference, TC1 will organise a session. This session comprises a workshop on dike technology. Organising a session and workshop is in accordance with item 1 of our Terms of Reference. Other contributions are paper presentations with the following titles: Climate proof geotechnical innovations integrated in spatial planning and flood risk, Climate change resistant coastline by biological in-situ reinforcement of sand, Evaluation of Levee Failures in New Orleans from Hurricane Katrina, Geotechnical decision basis for sustainable coastal areas, Application of the isotache concept to long-term consolidation of Osaka Bay clay, Strength of dike clay covers during wave overtopping.

*Support to ISSMGE member countries:* In agreement with item 2 in the Terms of Reference TC1 supports the ijkdiik prediction competition. As part of the "IJKdijk project", in which a full scale embankment will be loaded to failure, a prediction competition is started. This competition requests the competitors to hand in a prediction on the moment of failure of the test facility. TC1 supports this competition and will present information of this competition to possible competitors.

TC1 also supports the international course understanding dike safety. Support of this course fits very well in fulfilling our Terms of Reference number 4, regarding knowledge transfer; the course provides a platform to present new research to the working field. The course will be scheduled yearly. More information on this course can be found on: <http://www.geodelftacademy.nl>

*Roadmap and Milestones:* As mentioned in the previous section, the first TC1 workshop will be held during the Baltic Sea Conference in Gdansk, September 15-18<sup>th</sup>, 2008. The proceedings of this workshop will then be a first milestone (kind of draft TC1-report). The Baltic Sea proceedings will be the input for the next workshop that will be held during the next ISSMGE conference held at Alexandria 2009. During the next international ISSMGE conference a proposal for a working plan for TC1 for the next 4 years will be presented to ISSMGE-board. At this moment the option for a co-operation with TC39, geotechnical engineering for coastal disaster mitigation and rehabilitation is being discussed. Concrete actions in agreement with item 3 in our Terms of Reference need to be established and will be a discussion point in our next meeting.

#### Final Remarks

Due to a discussion on the status of our committee, whether it should be a joint technical committee, JTC, or a technical committee, TC, the committee started late. Now, the activities of TC1 are getting momentum. At the XVII ISSMGE conference in Alexandria, Egypt, the committee will report its results.

*Reported by Dr Meindert Van, Chair of TC1 and Dr. C. Zwanenburg*