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# Administrative Report for TC-1, Dike Technology and Coastal Engineering

## Compte rendu sur la CT -1

M.A. Van  
*Deltares, Delft, The Netherlands*

### ABSTRACT

TC-1 has been active since the Osaka Conference in 2005. This report describes its Terms of Reference, work and achievements

### RÉSUMÉ

Le comité CT-1 a été très productif depuis 2005. Le présent rapport expose ses protocoles, travaux et les résultats obtenus

## 1 INTRODUCTION

The title given to the Technical Committee at its formation is 'Dike Technology and Coastal engineering', abbreviated as 'TC1'.



Fig 1 Example of TC1 focus: safety of long geotechnical structures as dikes.

This Technical Committee has been established during the Osaka conference in 2005. Note that this TC-number is a reused number. It was foreseen to be a Joint TC. 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. In 2007 it has been decided to be a TC of ISSMGE. So in practice the last 2 years the TC became fully active.

The following paragraphs summarize the Committee's Terms of Reference, list its Membership and its report its Activities. Reference is also made to important on-going activities and to possible future actions.

## 2 TERMS OF REFERENCE

The Terms of Reference of TC1, agreed for in the first committees meeting in 2007 are as follows:

1. discussion state of the art and developing the science and engineering in order to increase fundamental understanding and modeling of strength, deformation and erosion behaviour of soils and failure processes of dikes, dunes, (underwater) dams, reclaimed land, man-made islands and ports in river and coastal zone.
2. contributions to the international congresses of the society to increase the quality of design by including experience,

such as large scale tests, case histories, failures, measurements, simulations and artificial knowledge

3. encouraging international collaboration of experts in multidisciplinary developments of new techniques for constructing and maintaining safe and reliable protection works
4. producing technical reports and encouraging international course and meeting in this research field and exchange experience and ideas on improving communication to other researchers, public and politics for more alertness and awareness

## 3 MEMBERSHIP

The chairman of the committee is  
Dr M.A. Van (The Netherlands).

the secretariat is carried out by:  
Dr. C. Zwanenburg (The Netherlands).

Core members are:  
Dr. M.K. Sharp (USA),  
Dr. Y. Watabe (Japan),  
Dr. Yuan Wang (China).

The committee is further formed by the following members:  
Dr. J. Koester (USA),  
Dr. A. Darrag (Egypt),  
Prof. Dr. M. Achmus (Germany),  
Prof. Dr. Soo Sam Kim (Korea),  
Dr. L. Nagy (Hungary),  
Dr. A. Kort (Norway),  
Dr. F. Gao (China),  
Dr. J.Zhang (China),  
Prof. T. Baytassov (Kazakhstan),  
B.G. Rydell M. Sc.(Sweden),  
Dr.-Ing. M. Pohl (Germany).

## 4 TC1 MEETINGS

The start-up meeting was held at the 14<sup>th</sup> European conference on soil mechanics and geotechnical engineering at Madrid in 2007. 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.

The following meeting has been held at the Baltic Sea conference in Gdansk, in September 2008. In this conference, TC1 organized one of the sessions on climate change.

The third committee meeting will be held in Alexandria in 2009 at the ICSSMGE

5 REPORT ON OTHER TC1 ACTIVITIES 2007 – 2009

This section describes the activities and the achievements of the committee in more detail.

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

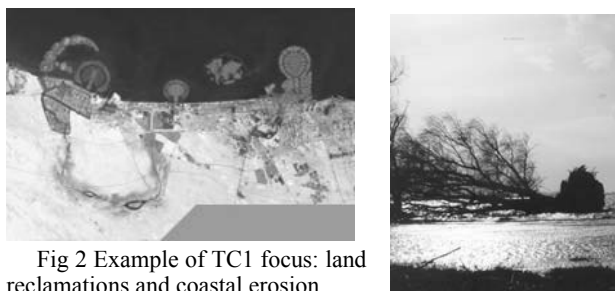


Fig 2 Example of TC1 focus: land reclamations and coastal erosion

As part of the 11<sup>th</sup> Baltic Sea geotechnical conference, TC1 has organized a session. This session comprised also a workshop on dike technology. Organization of a session and workshop is in accordance with item 1 of our Terms of Reference. Other TC1-contributions to this conference 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.

In agreement with item 2 ‘supported to ISSMGE member countries’ in the Terms of Reference TC1 supports the IJkdijk prediction competition. As part of the “IJkdijk project”, in which a full-scale embankment has been loaded to failure, an international prediction competition was organized. This competition requested the competitors to hand in a prediction on the moment of failure of the test facility. 40 persons did respond and the prediction has been won by Tareq Abdoun from USA;

second and third prize where won by Arjan Kort from Norway and Evert de Haan from The Netherlands respectively.



Fig 3: IJkdijk stability test

TC1 activities on international cooperation and producing manuals and reports according to Term of reference item 3 and 4:

*levee manual*

HR Wallingford is leading an initiative for making a levee manual. Some members of TC1 will join this initiative and TC1 will support the activity. In 2009 the scoping phase will be finished and it is foreseen that in 2010-2011 the manual will be produced. The involvement of TC1 in this project can be as review team and/or support group. The support that TC1 can deliver consists of spreading the levee manual and to make sure that manual is known and used.

*Hydraulic fill manual*

The hydraulic fill manual should cover all aspects of creating hydraulic fills including environmental aspects. The hydraulic fill manual should have an equivalent standard as the rock manual. Some TC1 members are involved with experience in hydraulic fills, including environmental aspects. For the hydraulic fill manual TC1 can probably help in a role as review team and/or support group.



Fig 4: Course ‘Understanding Dike safety’

TC1 also supports the international course ‘Understanding Dike Safety’, which course run twice, in 2007 and in 2008. 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>

For the International ISSMGE conference in Alexandria the administrative report with some plans for TC1 for the next 4 years will be produced.

## 6 FUTURE ACTIVITIES NEXT 4-YEAR PERIOD

The foreseen future activities with involvement of TC-1 are:

Continuing the support to the IJkdijk-tests i.e. on failure of piping in 2009/2010

Continuing the support to the levee and hydraulic fill manual.

The successful international course 'Understanding Dike Safety' is planned to be repeated yearly, the next one is scheduled for December 2009 in The Netherlands.

In the meeting in Alexandria the TC will discuss further possible initiatives.

## 7 SUMMARY

TC-1 had a slow start due to discussion about its status as JTC or TC. The last two years the TC became fully active and had 3 meetings in 2007, in 2008 and in 2009. The TC was involved in the Baltic Sea conference in 2008 in Gdansk Poland. It organized a session on climate change and dike technology and coastal engineering. Furthermore, the TC supports the yearly international course 'Understanding Dike Safety'. It also co-organized the IJkdijk full-scale stability test international prediction competition.