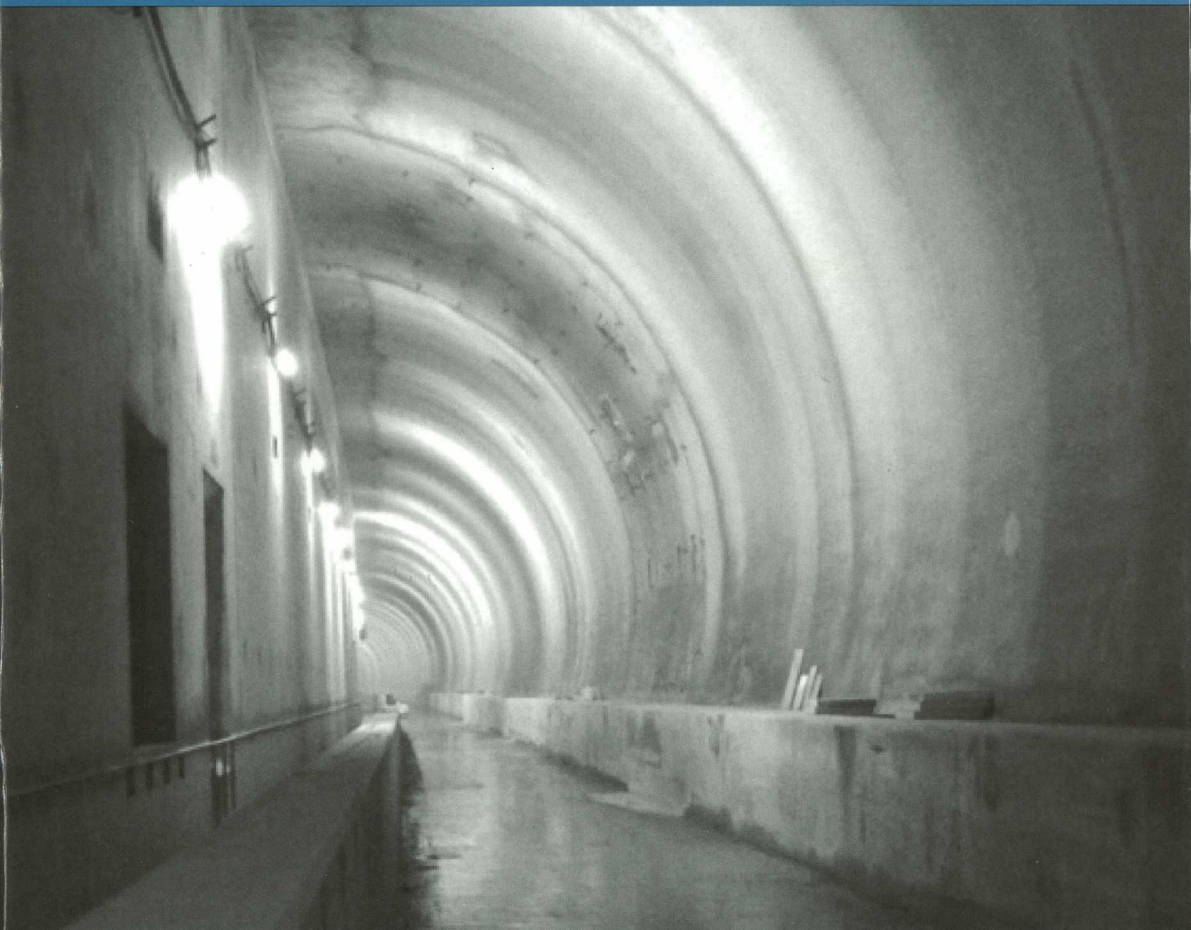




K.J. Bakker, A. Bezuijen, W. Broere & E.A. Kwast, editors

GEO TECHNICAL ASPECTS OF UNDERGROUND CONSTRUCTION IN SOFT GROUND



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Geotechnical Aspects of Underground Construction in Soft Ground

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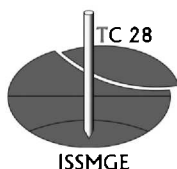
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Preface

In 1989, the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) established a committee known as Technical Committee 28 (TC28) "Underground Construction in Soft Ground", with the main purpose to provide a forum for interchange of ideas and discussion amongst representatives from many countries with an active interest in tunnelling and deep excavations in the urban environment.

In 1994, TC28, chaired by Professor K. Fujita, organized its first symposium, which coincided with the ISSMGE's International Conference in New Delhi. Professor R.J. Mair then succeeded Professor Fujita as Chairman of TC28, and three day symposia were subsequently held in London (1996), Tokyo (1999) and Toulouse (2002). This volume contains the Proceedings of the fifth symposium of the series, held in Amsterdam in June 2005.

The terms of reference for Technical Committee 28 are: to provide a data source of information about the design, construction and analysis of deep excavations and tunnels, with particular emphasis on the development, effects and control of ground movements; to encourage the production of national reports on the design and monitoring of deep excavations and tunnels by ISSMGE Member Societies; and to disseminate and discuss these reports at international symposia on Geotechnical Aspects of Underground Construction in Soft Ground.

In agreement with these terms of reference, the following themes were established:

- Tunnelling in soft ground
- Mitigating measures
- Numerical analysis of tunnels and deep excavations
- Monitoring of underground constructions
- Deep excavations

For practical purposes, the first theme was split into two presentation sessions: Design Methods for Tunnels, Influences on Foundations; and The Construction of Bored Tunnels.

The first two days of the Symposium were dedicated to technical discussion sessions, with presentations of general reports and individual papers. The opening lecture was given by Professor Arnold Verruijt, and two invited special lectures were given. The first, by Professor Robert Mair, was an overview of the key technical advances achieved during the first ten years of TC28; and the second, on Deep Excavations in the Singapore area, was presented by Mr. Nick Shirlaw.

The third day of the Symposium was dedicated to technical visits. Field trips were organised to the Groene Hart Tunnel, to the construction site of the new North/South Metro Line in Amsterdam, and to the Randstad Rail site in Rotterdam, all of which were under construction at the time.

This volume of the Proceedings contains 131 papers, including the general reports, special lectures and notes on the discussions in the technical sessions. All the papers have been reviewed both by the Scientific Committee and by members of TC28. The collection of papers and reports published in this volume provides a major source of reference on underground construction in soft ground.

The success of the Symposium, must be attributed to the authors of papers, the speakers at the Symposium and the delegates that came to Amsterdam to present their work, either orally or in the poster session as well as participating in the discussions.

Special thanks go to the Dutch Public Works Department and to the companies, both from The Netherlands and from abroad, that were willing to give financial support to the organization of this Symposium; a list of the sponsors is included in this proceedings.

K.J. Bakker & R.J. Mair
Chairmen of the Symposium

A. Bezuijen, W. Broere & E.A. Kwast
Editors

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The Symposium of Technical Committee 28 on Underground Construction in Soft Ground was organized by the Royal Institution of Engineers in The Netherlands KIVI/Niria under the auspices of the International Society for Soil Mechanics and Geotechnical Engineering.

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This volume contains a collection of 122 papers, six reports on Symposium themes, two reports on special lectures and notes on the technical discussion sessions, presented at the Fifth International Symposium on *Geotechnical Aspects of Underground Construction in Soft Ground* held in Amsterdam (The Netherlands), 15-17 June 2005.

The symposium was organized by the Technical Committee 28 "Underground Construction in Soft Ground" of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). This is the latest in a series which began in New Delhi in 1994 and was followed by symposia in London (1996), Tokyo (1999) and Toulouse (2002). The Amsterdam Symposium was sponsored by the Dutch Public Works Department (Rijkswaterstaat) and by various national and international companies.

Delegates from 34 countries discussed the contributions of researchers and engineers involved in aspects of research, design and methods of underground construction.

The contributions cover:

- . Design methods for tunnels, influences on foundation
- . Bored Tunnels: construction
- . Mitigating measures
- . Numerical analysis of tunnels and deep excavations
- . Monitoring of underground constructions
- . Deep excavations

The general reports give an overview of the different papers listed in the six technical sessions of the symposium. The proceedings include a report on the special lecture on Tunnelling, including an overview of the work being discussed in the last four symposia of TC28 by Professor Mair, and a report on Deep Excavation in the Singapore area by Mr Shirlaw.

The volume provides a valuable source of reference on the current practice of analysis, design and construction of tunnels and deep excavations in soft ground.

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