



Underground Construction in Soft Ground

Keiichi Fujita & Osamu Kusakabe, editors

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Underground Construction in Soft Ground

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Foreword

The Proceedings on 'Underground Construction in Soft Ground' is published with the intention of collecting national reports and recent studies related to braced excavation and shield tunnelling on the occasion of the International Symposium on 'Underground Construction in Soft Ground' held at New Delhi, India on January 3, 1994. The Symposium was organized by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE), Technical Committee on 'Underground Construction in Soft Ground' (TC-28) and sponsored by the Japanese Society of Soil Mechanics and Foundation Engineering (JSSMFE) under the auspices of the Indian Geotechnical Society (IGS).

The objectives of the Symposium were to present interesting case histories and to discuss the following topics:

1. Braced wall excavation: a) Code of practice; b) Case records on earth and water pressures acting on braced walls; and c) Case records on ground movements associated with braced wall construction and excavation.

2. Tunnelling: a) Code of practice; b) Case records on earth and water pressures acting on tunnel linings; and c) Case records on ground movements associated with tunnel construction.

Submitted national reports and technical papers were 22 and 35, respectively, all of which are included in this Proceedings together with the general reports, technical papers submitted after the Symposium and additional papers.

The ISSMFE TC-28 was formed by Professor N.R. Morgenstern, the past President of ISSMFE elected at the Rio de Janeiro Conference in 1989. The terms of references and members for the TC-28 given by the President are as follows:

1. To collect codes of practice, regulations or authoritative reports on braced walls and tunnels, and to produce a general report on the following topics: a) Earth and water pressures acting on braced walls, and tunnel linings; b) Ground movements associated with underground construction.

2. To organize an international symposium on the topics above in 1993.

3. To participate as invited in the programme to be organized for the 13th ICSMFE, New Delhi.

Committee Members:

K. Fujita (Japan) – Chairman

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N. Som (India)

J. Kruizinga (Netherlands)

During the activities of the ISSMFE TC-28 between 1989 and 1993, it was revealed that the codes of practice and other documents related to braced wall excavation and shield tunnelling were established in a limited number of countries, which cover only provisions in general terms, while the Japanese codes of practice have been prepared by more than eighteen academic societies or governmental organizations and they provide detailed provisions.

A domestic technical committee was set up within the JSSMFE on 'Underground Construction in Soft Ground' (called 'JSSMFE TC-28' hereafter) in 1989, in connection with the activities of the ISSMFE TC-28. The JSSMFE TC-28 consisting of two sub-committees and three working groups carried out three surveys as follows:

1. A survey on Japanese literature related to earth retaining systems for deep excavations, 827 papers in total appeared in the Japanese publications over the period of between 1965 and 1991.

2. A survey on Japanese codes of practice for deep excavations, summarizing 9 major codes.

3. A survey on current practice of shield tunnelling in Japan.

The results of three surveys were divided into 17 categories and summarized in a form of a paper prepared by the members of

JSSMFE TC-28. These papers deal with the same subjects of the ISSMFE TC-28 activities, while the contributions are limited mostly to cover the aspects in Japan. However, it could be regarded as a mile stone for producing a general report on the topics given by the President to the ISSMFE TC-28. These papers are also included in this Proceedings as the additional papers.

On behalf of the ISSMFE TC-28, I would like to express my gratitude to those who have made contributions to the Proceedings and cooperated to hold the Symposium, especially Prof. Morgenstern, Dr Parry, Secretary General of ISSMFE, Prof. Ishihara, past Vice-President of ISSMFE for Asia, and Dr Saxena, Dr Rao, Mr Verma and Dr Kuberan of IGS, also Prof. Gulhahti who arranged the conference room for the Symposium. I would like to extend my thanks to all the members of the ISSMFE TC-28 and the JSSMFE TC-28 who supported the activities of the committee as well as the authors of the general reports, national reports and technical papers.

Keiichi Fujita

Chairman of the ISSMFE TC-28 on Underground Construction in Soft Ground

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This volume contains a collection of 77 papers presented at the International Symposium on Underground Construction in Soft Ground held at New Delhi in 1994, organized by the Technical Committee 28 of the International Society for Soil Mechanics and Foundation Engineering. The papers have been contributed by research workers and engineers all over the world who are engaged in the design and construction of underground structures in soft ground, in particular, braced wall excavations and shield tunnelling. It provides a useful source of reference for information on the current practice of design and construction of braced wall excavation and shield tunnelling at various parts of the world, including 23 national reports on braced wall and/or shield driven tunnel.