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Proceedings
of 16th IAHR-APD Congress
and 3rd Symposium of IAHR-ISHS

Vol. VI : Hydropower Hydraulics

Advances in Water Resources and Hydraulic Engineering

Nanjing, China
October 20-23, 2008

Editors
Changkuan Zhang
Hongwu Tang

Tsinghua University Press

16th Congress of Asia and Pacific Division
of International Association of Hydraulic
Engineering and Research

and

3rd IAHR International Symposium
on Hydraulic Structures

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FOREWORD

As Asian countries continue to be some of most important branches of the International Association of Hydraulic Engineering and Research (IAHR), the IAHR Asia and Pacific Division (IAHR-APD) is playing an ever-increasing active role in the field of Hydraulic research and its practical application. In order to embrace the traditional use of hydraulic structures in water resource development, and to improve water management practices, water quality, and restoration of natural habitats, the International Symposium on Hydraulic Structures (IAHR-ISHS) is held every two years with the intention of advancing our knowledge and understanding of hydraulic phenomena near hydraulic structures.

The 16th Congress of Asia and Pacific Division of IAHR and the 3rd IAHR International Symposium on Hydraulic Structures will jointly be held in Nanjing, China, from October 20 - 23, 2008.

To meet the challenges of, and play vitals roles in, improving the human demand and strain on water resources, the central theme of the congress / symposium is "**Water and Humanity — Friendship, Harmony and Sustainable Development**".

Focusing on this central theme, the set of proceedings consists of six volumes. Each volume subsequently contains four or five sub-themes. In volume 4, the topic of the additional forum on "Resettlement and Social Aspects" is added. The volumes and sub-themes are as follows:

Volumes for the 16th IAHR-APD Congress

Vol. 1: Water Resources and Hydrology

1) Hydrology modeling and real-time flood forecasting
2) Flood management, risk analysis and hazard evaluation
3) Surface and groundwater hydrology, urban hydrology
4) Drought and efficient utilization of water resources

Vol. 2: Environmental and Ecological Hydraulics

1) Environmental effects and management of water resources
2) Flow, jet, plume and stratified flow, hydraulics and ecological hydraulics
3) Contaminant transport modeling and water quality control
4) Ground water pollution

Vol. 3: Fluvial Processes and River Engineering

1) Scour, sediment transportation, river dynamics and fluvial processes
2) Flood control and defense, and river rehabilitation
3) Sediment problems in environment and ecology
4) Soil erosion and watershed management

Vol. 4: Estuarine and Coastal Hydraulics

1) Numerical and physical modeling of coastal engineering
2) Coastal sediment transport and morphology change
3) Wave characteristics and wave-structure interaction
4) Coastal and estuarine environment
5) Resettlement and Social Aspects

Volumes for the 3rd IAHR-HS Symposium

Vol. 5: Hydraulic Structures for Water Projects

1) New developments in design, construction, operation, monitoring and maintenance of hydraulic structures
2) Numerical and physical modeling
3) Risk and safety assessment
4) Instrumentation and technology in laboratory experiments and field tests
5) Sustainable design of hydraulic structures

Vol. 6: Hydropower Hydraulics

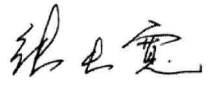
1) Intakes and outlets, spillways, fish ways and energy-dissipating structures
2) Two-phase flow, pipe flow, cavitation, vibration and aeration
3) Hydraulic machinery
4) Environmental and ecological impact of hydraulic structures

A total of 450 papers were submitted to the congress / symposium, one of the strongest responses we've had yet. After thorough review, 392 of these papers, representing 25 countries and regions, are published into six volumes for the proceedings, of which 86.72 % are from Asia, 7.91 % from Europe, 2.81 % from South America, 2.04 % from Australia and New Zealand, 0.26 % from Africa, and 0.26 % from North America.

We would also like to gratefully acknowledge the sponsors and co-sponsors of our Congress: International Association of Hydraulic Engineering and Research, National Natural Science Foundation of China, Chinese Hydraulic Engineering Society, China Society for Hydropower Engineering, State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, National Engineering Research Center of Water Resources Efficient Utilization and Engineering Safety and etc.

Many people have contributed greatly to these proceedings. We would especially like to thank Professor Li Guifen, Professor Wang Lianxiang, Professor V. Sundar, and Professor J. Matos for their gracious guidance and help. We would also like to thank all of the members of the Local Organizing Committee, all of the members of the scientific committee, as well as all of the authors who entered their work into the conference. Also highly appreciated was the dedicated work of Professor Mao Ye, Professor Wang Lingling, Professor Cai Fulin, Professor Sheng Jinchang and Dr. Pan Hong. The editors are also grateful to the reviewers for their diligent work and professional contributions which help maintain the quality of the papers.

We hope that the proceedings will serve as a reference point for water-related issues for researchers, scientists, engineers and managers alike.



Professor C. K. Zhang
Chairman, LOC of the 16th IAHR-APD Congress and the 3rd IAHR-HS Symposium
President of Hohai University
Nanjing, China, Oct. 1st, 2008

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