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PROCEEDINGS: TECHNICAL SESSION B
FLUVIAL HYDRAULICS

COMPTE RENDU : SÉANCE TECHNIQUE B
HYDRAULIQUE FLUVIALE

Ottawa, Canada
August 21 – 25, 1989
du 21 au 25 août 1989

F6100

FOREWORD

The Proceedings of the XXIII Congress of the International Association for Hydraulics Research contain the text of all the papers presented at the Technical Sessions of the Congress, whether they were presented orally, or as posters. The theme of the Congress, held in Ottawa, Canada, 21-25 August, 1989, was "Hydraulics and the Environment". The four main topics, and their respective subtopics, were:

A. Turbulence in Hydraulics
(1) Physical Mechanisms of Turbulence
(2) Experimental Studies and Empirical Relations
(3) Mathematical Modelling of Turbulence
(4) Measurement Techniques for Turbulent Flows

B. Fluvial Hydraulics
(1) The Cross Section and the Plan Shape of Self-Forming Alluvial Channels
(2) Physical Responses of Rivers to Human Activities
(3) Mechanics of Flow and Sediment Transport on Flood Plains
(4) Erosion and Transport of Cohesive Materials

C. Maritime Hydraulics
(1) Sea Level Trends and Consequent Impacts on Shorelines
(2) Hydrodynamic Forces on Marine Structures
(3) Measurement, Analysis and Simulation of Three-dimensional Sea States
(4) Mathematical Modelling of Shore Evolution

D. Environmental Hydraulics
(1) Diffusion and Dispersion of Pollutants and Heat
(2) Modelling Water Quality in Rivers
(3) Mass Transfer at Air-Water Interface in Lakes and Rivers
(4) Environmental Impact of Large-scale River Diversions

A special session was organised for student papers only. They have also been included in these proceedings. The complete set of proceedings consists of five separate volumes.

Many people have contributed to the preparation of these Proceedings. First of all it should be recognized that many more papers were submitted than could be accepted. This means that there were really many more authors than shown in these proceedings. It also means that the review process was very elaborate. Drs. L. Lau and E. Watt were responsible for developing the program of the Technical Sessions and Dr. R. Townsend arranged the Student Sessions. Extensive use was made of members of the Technical Sections of the IAHR in reviewing the papers. Dr. W. Rodi was the Convenor of Session A; Dr. M.S. Yalin of Session B; Dr. E. Mansard of Session C; and Dr. B.G. Krishnappan of Session D.

The following persons assisted them with the actual review of all submitted papers:

Session A:
E.E. Adams, R.E. Baddour, W.D. Baines, W.T. Bakker, Barczewski, V.H. Chu, A.O. Demuren, T. Dracos, C.A.J. Fletcher, J. Fredsoe, Friedrich, A. Gargett, M. M. Gibson, W. H. Graf, A.J. Grass, E. R. Holley, G. Jirka, R. J. Keller, J. R. Koseff, D. Laurence, M.A. Leschinzer, H.J. Leutheusser, D. Luketina, D. Lyn, J.J. McGuirk, S. S. Monismith, A. Müller, S. Oliver, G. Parker, A. E. Perry, P. J. W. Roberts, G. Scheuerer, M. Sumer, N. Tamai, C. Tropea, T. Tsujimoto, B. Westrich, D.L. Wilkinson, D.H. Wood.

Session B:
G. di Silvio, L.Z. Ding, W.H. Graf, J.F. Kennedy, M. Michiue, H.W. Shen.

Session C:
A.J. Bowen, A. Brampton, Y. Cöeffé, H.J. deVriend, D.L. Forbes, L. Franco, Y. Goda, K. R. Hall, Xi-Zhen Huang, R. T. Hudspeth, S. W. Huntington, M. Isaacson, E. R. Jeffrys, J. W. Kamphuis, P.D. Komar, B. Manoha, F.M. Martinez, M.D. Miles, G.R. Mogridge, A.H. Nielson, Y. Ouellet, F.H. Quinn, R.G. Standing, E.F. Thompson, A. van Tonder, C.L. Vincent, A. Watanabe, D.H. Willis.

Session D:
S. Beltaos, G. Bobba, V.H. Chu, A. El Shaarawi, P. Engel, P. Hamlin, E.J. Hayter, E. R. Holley, H.E. Jobson, Y.L. Lau, J. Marsalek, A. McCorquodale, C. Neill, Y. Ouellet, N. Rajaratnum, G. Tsang, R.B. Ward.

The actual mechanics of producing these proceedings were handled by the Conference Services of the National Research Council, Canada. Mr. K. Charbonneau, Mrs. L. Baignée and Mr. M. Boroczki were responsible for the administration of the entire printing process.

We sincerely hope that this permanent record of the technical presentations of the XXIII Congress of the International Association for Hydraulic Research will become a much used source of reference for both researchers and practitioners of the Science and Engineering of Hydraulics.

J. Ploeg
Co-Chairman of Congress
National Research Council Canada

AVANT-PROPOS

Le Compte rendu du XXIII Congrès de l'Association internationale de recherches hydrauliques contient le texte de toutes les communications présentées dans le cadre des séances techniques du congrès, qu'elles aient été présentées oralement ou sous forme d'affiches. Ce congrès, qui s'est tenue à Ottawa, au Canada, du 21 au 25 août 1989, s'intitulait "L'hydraulique et l'environnement". Les quatre principaux thèmes et leurs sous-thèmes respectifs étaient les suivants:

A. Turbulence en hydraulique
(1) Mécanismes physiques de la turbulence
(2) Etudes expérimentales et relations empiriques
(3) Modélisation mathématique de la turbulence
(4) Techniques de mesure des écoulements turbulents

B. Hydraulique fluviale
(1) Profils en coupe transversale et en plan des chenaux alluviaux auto-formants
(2) Réactions physiques des cours d'eau aux activités humaines
(3) Mécanique de l'écoulement et du transport des sédiments sur les plaines inondables
(4) Erosion et transport des matériaux cohésifs.

C. Hydraulique maritime
(1) Tendances au niveau de la mer et impacts sur les côtes
(2) Efforts hydrodynamiques sur les ouvrages maritimes
(3) Mesure, analyse et simulation des états tridimensionnels de la mer
(4) Modélisation mathématique de l'évolution des côtes.

D. Hydraulique de l'environnement
(1) Diffusion et dispersion des polluants et de la chaleur
(2) Modélisation de la qualité de l'eau dans les cours d'eau
(3) Transfert de masse à l'interface air-eau dans les lacs et cours d'eau
(4) Impact des dérivations importantes de cours d'eau sur l'environnement.

Une séance spéciale était organisée pour les communications présentées par des étudiants. Ces communications sont également reproduites dans le compte rendu. Le jeu complet du compte rendu consiste en cinq volumes distincts.

Bon nombre de gens ont participé à la préparation de ce compte rendu. J'aimerais mentionner en premier lieu que nous avons reçu beaucoup plus de communications que nous n'avons pu accepter. Cela veut donc dire que le nombre d'auteurs était beaucoup plus élevé que ne le laisse croire le compte rendu. Cela veut dire aussi que le processus d'examen a été très difficile. Les Drs L. Lau et E. Watt étaient chargés du programme des séances techniques et le Dr R. Townsend de la séance réservée aux étudiants. Les membres de la section technique de l'AIRH ont également participé considérablement à

l'examen des communications. Les présidents de séance étaient le Dr W. Rodi pour la séance A, le Dr M.S. Yallin pour la séance B, le Dr E. Mansard pour la séance C et le Dr B.G. Krishnappan pour la séance D.

Les personnes suivantes les ont aidé à examiner les communications soumises:

Séance A:
E.E. Adams, R.E. Baddour, W.D. Baines, W.T. Bakker, Barczewski, V.H. Chu, A.O. Demuren, T. Dracos, C.A.J. Fletcher, J. Fredsoe, Friedrich, A. Gargett, M.M. Gibson, W.H. Graf, A.J. Grass, E.R. Holley, G. Jirka, R.J. Keller, J.R. Koseff, D. Laurence, M.A. Leschinzer, H.J. Leutheusser, D. Luketina, D. Lyn, J.J. McGuirk, S.S. Monismith, A. Müller, S. Oliver, G. Parker, A.E. Perry, P.J.W. Roberts, G. Scheuerer, M. Sumer, N. Tamai, C. Tropea, T. Tsujimoto, B. Westrich, D.L. Wilkinson, D.H. Wood.

Séance B:
G. di Silvio, L.Z. Ding, W.H. Graf, J.F. Kennedy, M. Michiue, H.W. Shen.

Séance C:
A.J. Bowen, A. Brampton, Y. Cöeffé, H.J. deVriend, D.L. Forbes, L. Franco, Y. Goda, K.R. Hall, Xi-Zhen Huang, R.T. Hudspeth, S.W. Huntington, M. Isaacson, E.R. Jeffrys, J.W. Kamphuis, P.D. Komar, B. Manoha, F.M. Martinez, M.D. Miles, G.R. Mogridge, A.H. Nielson, Y. Ouellet, F.H. Quinn, R.G. Standing, E.F. Thompson, A. van Tonder, C.L. Vincent, A. Watanabe, D.H. Willis.

Séance D:
S. Beltaos, G. Bobba, V.H. Chu, A. El Shaarawi, P. Engel, P. Hamlin, E.J. Hayter, E.R. Holley, H.E. Jobson, Y.L. Lau, J. Marsalek, A. McCorquodale, C. Neill, Y. Ouellet, N. Rajaratnum, G. Tsang, R.B. Ward.

Le Service des conférences du Conseil national de recherches Canada s'est chargé de la mécanique comme telle de la production du compte rendu. M. K. Charbonneau, Mme L. Baignée et M. M. Boroczki s'est occupé de l'administration du processus d'impression complet.

Nous espèrons sincèrement que cet enregistrement permanent des présentations techniques faites dans le cadre du XXIII Congrès de l'Association internationale de recherches hydrauliques deviendra, tant pour les chercheurs que pour les praticiens de la science et du génie hydraulique, une source de référence largement consultée.

J. Ploeg
Le coprésident du congrès
Conseil national de recherches Canada

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