

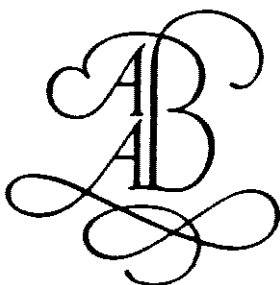
PROCEEDINGS OF AN IOWA HYDRAULICS COLLOQUIUM
IOWA CITY/IOWA/USA/22-24 MAY 1995

Issues and Directions in Hydraulics

Edited by

TATSUAKI NAKATO & ROBERT ETTEMA

Iowa Institute of Hydraulic Research, The University of Iowa, USA



A.A. BALKEMA / ROTTERDAM / BROOKFIELD / 1996

Table of contents

Acknowledgements	XI
Introduction to the Colloquium	XIII
Biographical sketch of John F. Kennedy	XXI
Opening speech	XXIII
<i>1 Hydraulics education</i>	
Education in hydraulics: From the nineties to the zeros <i>J.S.McNown & H.Kobus</i>	3
Education in hydraulics: From the nineties to the zeros – Discussions <i>P.Y.Julien, E.Macagno, A.J.Raudkivi & N.Tamai</i>	17
<i>2 River mechanics: Sediment transport</i>	
Fundamentals of sediment transport <i>A.J.Raudkivi</i>	29
Cohesive sediment transport <i>B.G.Krishnappan</i>	41
Combining laboratory, field, and mathematical modeling research for bed forms, hydraulic roughness, and sediment transport during floods <i>L.C.van Rijn</i>	55
Equilibrium slopes and the sediment loads of rivers <i>C.F.Nordin, Jr</i>	75
Fundamentals of sediment transport – Discussions <i>J.Aguirre-Pe, A.T.Moncada-M. & E.Macagno</i>	87

Sediment transport: Gaps between phenomena, concepts, and the need for predicting tools – Discussion <i>A. Müller</i>	93
 <i>3 River mechanics: Channel instability</i>	
The stability of a sandy river bed <i>J. Fredsøe</i>	99
Gravel-bed channel instability <i>G. Parker</i>	115
The variability of large alluvial rivers: Significance for river engineering <i>S.A. Schumm</i>	135
Wave generation and development on a sandy river bed – Discussion <i>S.E. Coleman</i>	145
 <i>4 River mechanics: Ice</i>	
Hydraulics of ice-covered rivers <i>S. Beltaos</i>	159
Understanding the properties of river and lake ice <i>G.W. Timco</i>	167
A note on the Iowa low-temperature flow facility – Discussion <i>P. Larsen</i>	179
Hydraulics of ice-covered rivers – Discussion <i>Q. Guo</i>	181
 <i>5 Hydraulic structures</i>	
Hydraulic research in transition: The evolving role of hydraulic structures – From development to management of water <i>P.H. Burgi</i>	187
Channel hydraulic structures <i>S. Fukuoka</i>	199
 <i>6 Industrial and thermal hydraulics: Power-plant hydraulics</i>	
Modeling turbulent fluid flows in nuclear and fossil-fuel power plants <i>P.-L. Viollet</i>	213
Thermal discharges into reversing tidal environments: Predictive modeling and regulatory issues <i>G.H. Jirka</i>	231

On post LOCA hydraulics <i>G.E.Hecker</i>	245
An engineer's view of power plant hydraulics <i>D.K.Holway</i>	261
 <i>7 Frontiers in hydraulics: Environmental and social impacts</i>	
Global environmental change <i>J.L.Schnoor</i>	269
Perspectives on the future of hydraulics and electric generating plants <i>J.P.Smith</i>	279
Hydraulic models as a guide to fish passage designs <i>D.E.Weitkamp</i>	287
 <i>8 Frontiers in hydraulics: Hydrology and water resources</i>	
A pathway toward improving hydrologic predictions <i>D.L.Fread</i>	297
Spatial hydrologic modeling <i>D.R.Maidment</i>	305
Trends and needs in hydrologic research: An opinion – Discussion <i>R.L.Bras & W.F.Krajewski</i>	313
 <i>9 Frontiers in hydraulics: Computational hydraulics</i>	
Fundamental issues in numerical hydraulics <i>J.A.Liggett</i>	321
Present and future perspectives in hydroinformatics <i>G.S.Rodenhuis</i>	333
Advancements in computational systems for hydraulic and hydrologic modeling <i>J.P.Holland</i>	343
Remarks on computational hydraulics – Discussion <i>F.M.Holly, Jr</i>	353
Fundamental issues in numerical hydraulics – Discussion <i>E.Macagno</i>	357
 <i>10 International perspectives and open forum</i>	
Hydrology and hydraulics: Partners in design of hydraulic systems <i>E.J.Plata</i>	361

Hydraulic research in Latin America <i>J.I.Ordóñez</i>	369
Impact of High Aswan Dam on Egypt <i>M.M.Gasser</i>	377
Current status of hydraulic research in India <i>P.P.Vaidyaraman</i>	389
Frontiers in hydraulics: An Asian perspective <i>Chin-lien Yen</i>	397
Turning towards the needy: The unexplored direction <i>E.Naudascher</i>	405
Hydrology and hydraulics: Partners in design of hydraulic systems – Discussion <i>E.Macagno</i>	413
Impact of the High Aswan Dam on Egypt – Discussion <i>E.Naudascher</i>	415
Turning towards the needy: The unexplored direction – Discussions <i>B.D.Barkdoll, E.Macagno & A.J.Raudkivi</i>	419
 <i>Closure</i>	
Closure of Sessions 1, 6, 8, and 9 <i>Ben Chie Yen</i>	429
Closure of Sessions 2, 3, and 5 <i>D.W.Knight</i>	435
Closure of Sessions 4, 7, and 10 <i>T.Carstens</i>	463
 <i>Banquet speeches</i>	
Reminiscences of Jack Kennedy <i>R.Ettema, H.Rouse, N.H.Brooks, R.G.Hering, T.Carstens, R.A.Elder, E.J.Plata, C.A.Fassò, J & C.Fix, M.Janssen, C.Mutel, J.Matos Silva, T.W.Sturm, O.F.Vasiliev, D.Vernon & S.G.Kennedy</i>	475
Author index	495

Organized by Iowa Institute of Hydraulic Research, College of Engineering,
The University of Iowa, Iowa City, Iowa 52242, USA

The texts of the various papers in this volume were set under the supervision of the editors.

Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by A.A. Balkema, Rotterdam, provided that the base fee of US\$1.50 per copy, plus US\$0.10 per page is paid directly to Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, USA. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Service is: 90 5410 810 X/96 US\$1.50 + US\$0.10.

Published by

A.A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, Netherlands (Fax: +31.10.413.5947)

A.A. Balkema Publishers, Old Post Road, Brookfield, VT 05036, USA (Fax: +1.802.276.3837)

ISBN 90 5410 810 X

© 1996 A.A. Balkema, Rotterdam

Printed in the Netherlands