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Edited by Billy L. Edge



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ABSTRACT

This proceedings contains over 260 papers presented at the 23rd International Conference on Coastal Engineering which was held in Venice, Italy, October 4-9, 1992. The book is divided into seven parts: 1) Characteristics of waves and currents; 2) long waves and storm surges; 3) coastal structures; 4) the Italian coast; 5) coastal processes and sediment transport; 6) coastal, estuarine and environmental problems; and 7) case studies. The individual papers include such topics as the effects of wind, waves, storms and currents as well as the study of sedimentation and beach nourishment. Special emphasis is given to case studies of completed engineering projects. With the inclusion of both theoretical and practical information, these papers provide the civil engineer and related fields with a broad range of information on coastal engineering.

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FOREWORD

The Twenty-third International Conference on Coastal Engineering was a truly successful Conference. Its success was marked by the culmination of extensive planning and coordination. More than 678 abstracts were submitted for consideration, but only 321 could be accepted for presentation at the Conference. Moreover, owing to mechanical requirements of the printing process to keep the *Proceedings* in three volumes, papers were limited in pages and some contributions which should have been included could not be accepted for the final publication.

The Twenty-third Conference also marked a major milestone in the continuous contribution of Professor Robert L. Wiegel to the organization and conduct of these conferences; at this Conference he announced his retirement from the leadership of the Council. For forty-two years he has been directly involved with every conference since the first conference was held in Long Beach, California. He served as Vice-Chairman of the Council on Wave Research of the Engineering Foundation in the early years of the Conference and later as Chairman of the Coastal Engineering Research Council of the American Society of Civil Engineers. Because of his long and dedicated service and leadership of the coastal engineering community, the Council voted to dedicate the *Proceedings* of the Twenty-third Conference to Professor Robert L. Wiegel.

Robert L. Wiegel

Professor Wiegel is Professor Emeritus of the Department of Civil Engineering of the University of California at Berkeley. He graduated from the University of California at Berkeley in 1943 with a degree in Mechanical Engineering. After serving in the Second World War, he returned to Berkeley where he obtained a Master of Science degree. He stayed on at Berkeley as a Research Engineer and later a Lecturer in Mechanical Engineering until he became a Professor in the Department of Civil Engineering. He subsequently served as Director of the State's Technical Services Program and also as Acting Dean of the College of Engineering. Most of the readers of this volume know many of the 26 Doctoral students he supervised who have gone on to become leaders in this area or one of the many Masters students he prepared to work in the area of coastal engineering. His teaching, research and professional contributions at Berkeley are well known and respected by his peers around the world.

Professor Wiegel has been bestowed many honors and awards in recognition of his outstanding accomplishments. He received the Research Prize from the American Society of Civil Engineers in 1962 and in 1969 he was invited to give the General Lecture at the Symposium to Dedicate the Delft Hydraulics Laboratory Facilities. In 1975, he was elected Member of the National Academy of Engineering. He is currently an Honorary Member and Fellow of the American Society of Civil Engineers and holds an extensive record of service to the Society. In 1977 he was elected to Senior Queens Fellow in Marine Science, Aus-



tralia. He received the Moffatt-Nichol Harbor and Coastal Engineering Award and International Coastal Engineering Award in 1978 and 1985, respectively, from the American Society of Civil Engineers.

During his active professional career, he has served on many boards, panels and commissions of the State of California, the United States, the United Nations, NATO and many individual nations. He has lectured in most countries with coastal resources and problems and many countries without these resources. Professor Wiegel has also been a Visiting Professor to The Polish Academy of Sciences and the University of Cairo. He received the Outstanding Civilian Service Medal from the U.S. Army Corps of Engineers in 1985. Professor Wiegel was the General Chairman and organizer of the *Symposium to Honor Morrrough P. O'Brien: Working Solutions*, which was sponsored by the American Shore and Beach Preservation Association and the Coastal Engineering Research Council, the ASCE Waterway, Port, Coastal and Ocean Engineering Division and the University of California's College of Engineering.

Professor Wiegel has authored more than 125 publications and 100 technical reports on various phases of coastal and ocean engineering, including the famous text *Oceanographical Engineering* which was published in 1964. He is currently the editor for *Shore & Beach*, the Journal of the American Shore and Beach Preservation Association.

Needless to say, it is with pleasure that the writer is able to dedicate the *Proceedings* of the Twenty-third International Conference on Coastal Engineering to Professor Robert L. Wiegel.

Billy L. Edge, Secretary
Coastal Engineering Research Council
American Society of Civil Engineers

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