Twenty-first Coastal Engineering Conference

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Edited by Billy L. Edge

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ABSTRACT

This book contains over 220 papers presented at the 21st International Conference on Coastal Engineering. The book is divided into six parts: theoretical and observed wave characteristics; coastal processes and sediment transport; coastal structures and related problems; coastal, estaurine and environmental problems; case studies; and ship motions. The individual papers include such topics as the effects of wind, waves, storms and currents, erosion, sedimentation, and beach nourishment. Special emphasis is given to case studies of completed engineering projects. With the inclusion of both the theoretical and the practical, these papers provide the civil engineer with a broad range of information on coastal engineering.

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FOREWORD

The 21st International Conference on Coastal Engineering was held in Malaga, Spain. The 21st ICCE, like the ones before it, was well organized with the primary objective being to share scientific and engineering information and to provide a forum for interaction with other engineers and scientists working similar problems. The time and efforts contributed to that objective were extensive and the results have proven that the planning is a vital part of each conference. All who attended the 21st ICCE will agree that it was a tremendous success in many ways.

Since the conference was held, Dean Morrough P. O'Brien died. Dean O'Brien has been a very familiar person to all who have attended these conferences in the past. His direction and motivation developed the International Coastal Conferences into the very successful forum we now have. For over thirty years, Dean O'Brien served as Chairman of the Council on Wave Research and subsequently the Coastal Engineering Research Council. The importance of his contributions to the Coastal Engineering profession are detailed in the "In Memorium" which is included in this volume. This volume is dedicated to Dean O'Brien for his long standing interest in coastal processes, for his dedication to development of solutions of real problems and for his untiring efforts in the development of this area of engineering.

The papers in the "Proceedings" have been prepared by the authors who made presentations at the 21st International Conference on Coastal Engineering. The authors were asked to make the presentations and submit final papers based upon review of the abstracts which were submitted well in advance of the conference. These abstracts were reviewed by a committee of four professionals active in this field, including representation from the local organizing committee. The papers included in this volume are eligible for discussion in the *Journal of the Waterway Port, Coastal, and Ocean Division* of the ASCE. All papers are eligible for ASCE awards.

Venues for the upcoming conferences are listed below:

22nd	Delft, The Netherlands, 1990
23rd	Venice, Italy, 1992
24th	Kobe, Japan, 1994
25th	USA, 1996

Countries desiring to host a future conference should contact the Secretary of the Coastal Engineering Research Council to receive information about submitting a proposal.

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

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ACKNOWLEDGMENTS

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IN MEMORIAM
MORROUGH PARKER O'BRIEN

Morrough Parker O'Brien died Thursday, the 28th of July, 1988, in Cuernavaca, Mexico. He was 85. Long the leader in coastal engineering, his wisdom and counsel will be greatly missed by all who have been privileged to work with him. He is survived by his wife Mary; a son, Morrough, of Boulder, Colorado; and a daughter, Shiela, of Berkeley, California.

He was born in Hammond, Indiana, on 21 September, 1902. He received a B.S. in Civil Engineering from Massachusetts Institute of Technology in 1925. He did graduate work at Purdue University, 1925–27, and in 1927–28, as a Freeman Scholar, at the Technische Hochschule in Danzig and The Royal College of Engineering in Stockholm. He received three honorary degrees: the D.Sc. from Northwestern University; the D.Eng. from Purdue University; and the LL.D. from the University of California.

O'Brien engaged in three fundamentally different careers. His academic career as Professor and Dean of Engineering at the University of California, Berkeley, spanned the years 1928–59. A second career was his pioneering work in the development of coastal engineering which, while it had some impact on the research programs at Berkeley, was unrelated to his academic pursuits. His third career was his service from 1949 until his death on an annual retainer to General Electric Company.

O'Brien's academic steps were:

Mechanical Engineering:	
Assistant Professor	1928–31
Associate Professor	1931–36
Professor	1936–43
Chairman	1937–43
Department of Engineering: Chairman	1943–59
Professor of Engineering:	1943–59
Dean, College of Engineering:	1943–59
Retired	June 30, 1959

Ernest O. Lawrence and Robert J. Oppenheimer were appointed assistant professors in the same year as O'Brien, and the three became good friends. These associations greatly influenced his views regarding the importance of research in a modern engineering school. During his tenure as Dean of the College of Engineering at Berkeley he led the development of the College to its top-ranked status in many engineering disciplines. He was widely regarded as a powerful and perceptive leader in engineering education, understanding that modern engineering education had to be improved by a systems approach: good students are attracted to good faculty; good faculty are active in research in the outside world; good graduate students are needed to work with the faculty on research. The University furthers the interaction of students, faculty and society by the establishment of an external advisory council, and of such research units as the Institute of Traffic and Transportation Engineering

and the University-wide Water Resources Center, both of these, incidentally, begun at UC with O'Brien's help. UC President Emeritus Clark Kerr, who had served as Chancellor when O'Brien was Dean, remembered him as "the mighty Mike" and the "builder of the College of Engineering and a builder of Berkeley" during the symposium held in O'Brien's honor in March 1987 (see *Shore & Beach*, July/October 1987).

O'Brien received a number of honors from the University. O'Brien Hall, which houses the Hydraulic Laboratory and the Water Resources Center Archives, was named after him. The portrait of O'Brien reproduced with this article hangs in the entry hall of this building. He was awarded the Doctor of Laws degree. In April 1988 he was awarded the Clark Kerr Award, given by the Academic Senate to "an individual considered to have made an extraordinary and distinguished contribution to the advancement of higher education." This Award, presented by Kerr himself, was particularly notable in that it was given to O'Brien as one of four leaders "who played pivotal roles in building the academic strength of the campus." A photo of the presentation is reproduced below. Dean O'Brien was also awarded the Lamme Award for excellence in teaching by the American Society of Engineering Education.

O'Brien continued to be active in university education after his retirement from the University of California, working with Massachusetts Institute of Technology, Harvard University, and Purdue University. From 1968 on he was a part-time consultant and Professor of Coastal Engineering at the University of Florida, participating in many research projects in collaboration with Professor Robert G. Dean.

O'Brien was the founder of modern coastal engineering. He wrote a number of papers on the subject which have had a lasting influence. He was appointed Civil Engineer for the U.S. Army Board on Sand Movement and Beach Erosion in 1929, and initiated research by this board on coastal engineering. In 1930 he made field studies along the coasts of Washington, Oregon and California, and wrote a detailed seven-volume report on the results of his observations. A landmark paper on the relationship between tidal prism and entrance area was one of the results of these studies. He summarized many of his observations and thoughts on beach processes and the effects of structures on beaches in his paper "The Coast of California as a Beach Erosion Laboratory" (*Shore & Beach*, July 1936). In 1938 he was appointed a member of the Beach Erosion Board, U.S. Army Corps of Engineers, and served on it until it was abolished in 1963. He was then appointed to its successor, the Coastal Engineering Research Board, serving there from 1963 until 1978, a total of forty years on the two boards.

The years of World War II were extremely busy for O'Brien, serving as Chairman of the Mechanical Engineering Department until 1943 when he was appointed both Dean of the College of Engineering and also Chairman of the Department of Engineering. He was Executive Engineer of the Radiation Laboratory under Professor E.O. Lawrence in 1942–43. O'Brien was asked by Lawrence and General Groves, the Manhattan Project Director, to recruit an engineering team to design the production facilities at Oak Ridge for the electromagnetic system. O'Brien said that probably the most important thing he did in his life was to convince them that there was not time to build a competent staff, that they should hire companies with an established engineering staff to do the job. He was in charge of the Statewide University of California Engineering Science and Management War Training program, 1940–44, when the program registered 46,000 students who worked under 1,800

instructors. He worked for the U.S. Navy Bureau of Ships on underwater sound, on cavitation generated by submarine propellers (the results of this research were immediately implemented by submariners), and on the design and operation of amphibious craft. He also worked with Professor H.U. Sverdrup of the Scripps Institution of Oceanography on the forecasting of waves, and he directed a program of field and laboratory studies of landing craft for the Bureau.

In 1950 he and Professor Joe W. Johnson started what are now known as the International Conferences on Coastal Engineering. The first of these was held in Long Beach, California, under the auspices of the University Engineering Extension, each paper being by invitation. The most recent of these conferences was held in Torremolinos, Spain, in June 1988 when more than five hundred abstracts were submitted for consideration and fewer than half could be accomodated (O'Brien served on the Technical Papers Review Committee).

O'Brien had a strong public service orientation. He was a member of the Army Scientific Advisory Panel, 1954–65, serving as its chairman, 1961–65; a member of the Defense Science Board, 1961–65; member of the Board of the National Science Foundation (a Presidential appointment), 1958–60; and he served on numerous committees of the National Research Council.

He was active in professional societies. He was elected honorary member of the American Society of Civil Engineers (1976), the American Society of Mechanical Engineers (1979), and the Japan Society of Civil Engineers (1988). He was elected to membership in the National Academy of Engineering in 1969.

O'Brien was a leader in several fields of engineering, including pumps and air compressors. The compressor design for the first American axial flow jet engine was laid out exactly in accordance with the method presented in the paper by O'Brien and Folsom entitled "The Design of Propeller Pumps and Fans," It was incorporated in what became the J47 engine with a production run of thousands. He was elected to the General Electric Company Propulsion Hall of Fame in 1984.

In March 1987, the *Symposium to Honor Morrough P. O'Brien—Working Solutions: Shore and Beach* was held at the University of California at Berkeley. The State University of New York at Stony Brook established the M.P. O'Brien Fellowships in 1987. The American Shore and Beach Preservation (O'Brien served as its president from 1978 to 1983) is establishing the *Morrough P. O'Brien Award for Outstanding Achievement in Shore and Beach Preservation.*

Robert L. Wiegel

Joe W. Johnson

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