

# PREFACE

*Under the Statues of the International Association for Earthquake Engineering the Objects of the Association are listed as:*

*Art. 2.1- The objects of the Association shall be to promote international cooperation among scientists and engineers in the field of earthquake engineering through interchange of knowledge, ideas, and results of research and practical experience.*

*Art. 2.2- The Association will accomplish its objects by:*

- (a) holding world conferences,*
- (b) interchanging information, and*
- (c) extending technical cooperation.*

*In fulfillment of these objectives of the IAEE, and after the previous six World Conference in Berkeley (1956), Tokyo and Kyoto (1960), Auckland and Wellington (1965), Santiago (1969), Rome (1973) and New Delhi (1977), the Seventh World Conference on Earthquake Engineering was held during September 8th through September 13th, 1980 at Atatürk Kültür Merkezi (Atatürk Cultural Center) in Istanbul.*

*The Seventh World Conference on Earthquake Engineering was organized by the Turkish National Committee on Earthquake Engineering under the auspices of the Government of Turkey-Ministry of Reconstruction and Resettlement and in cooperation with the Earthquake Research Institute of the same Ministry, Istanbul Technical University, Middle East Technical University and Bogazici University.*

*The purpose of the Conference was to provide a suitable setting for bringing together individuals from diverse disciplines of Earthquake Engineering to create a vehicle for exchange of ideas and information and motivate cooperation amongst those involved in research, application and implementation. The scope of the Conference was planned to encompass the Geoscience, Civil and Structural Engineering, Social and Economical Planning and Regulatory aspects of the Earthquake Engineering as well as reports on recent earthquakes, state-of-the-art panel reports on various subjects and progress reports of institutions engaged in Earthquake Engineering.*

*In overwhelming response to the Call for Papers, over 900 abstracts of papers originating from about 45 countries were submitted to the International Association of Earthquake Engineering and to the Organizing Committee of the Conference for review. From these abstracts 754 papers were selected for inclusion in the Conference Proceedings.*

*The Organizing Committee of the Conference is exceedingly honored and gratified that 757 participants and 194 accompanying persons from 42 countries and the United Nations Office, representing various universities, government agencies, engineering firms and industries, attended and contributed to the success of the Conference. Two thirds of the total foreign participation was from Japan, USA and Italy. It is also noted with pleasure that, among other countries, it was the first attendance of the Peoples Republic of China to the World Conferences on Earthquake Engineering.*

*The Proceedings of the Conference encompass 754 technical papers distributed in nine volumes covering a total of 5200 pages. These papers have been reproduced by offset lithography directly from the authors' typescripts and no editings has taken place except cut and paste type rearrangement of the length of same papers and to delete certain portions or insert amendments at the authors's request.*

*The topical arrangement of the Volumes of the Proceedings are as follows:*

**VOLUME 1. GEOSCIENCE ASPECTS, PART I**

- Seismic Wave Propagation
- Seismic Source Studies
- Seismic Micro-and Macro-Regionalization
- Seismic Risk Analysis

**VOLUME 2. GEOSCIENCE ASPECTS, PART II**

- Strong Motion Instrumentation and Data Collection
- Influence of Local Conditions of Ground Motion
- Simulated and Artificially Generated Ground Motions
- Spectral Analysis and Interpretation of Ground Motion

**VOLUME 3. GEOTECHNICAL ASPECTS**

- Dynamic Properties and Behaviour of Soils and Rocks
- Dynamic Properties and Behaviour of Soil and Rock Structures
- Geotechnical Experimental Investigations
- Dynamic Properties and Behaviour of Foundations, Piles and Retaining Walls

**VOLUME 4. STRUCTURAL ASPECTS, PART I**

- Earthquake Resistant Design of Buildings
- Earthquake Resistant Design of Rural Housing
- Repair and Strengthening of Structures

**VOLUME 5. STRUCTURAL ASPECTS, PART II**

- Methods of Dynamic Analysis

**VOLUME 6. STRUCTURAL ASPECTS, PART III**

- System Identification
- Interaction Problems
- Experimental Facilities and Investigation of Structures and Models
- Non Deterministic Properties and Behaviour of Structures

**VOLUME 7. STRUCTURAL ASPECTS, PART IV**

- Experimental Facilities and Investigation of Structures and Models
- Deterministic Dynamic Properties and Behaviour of Structures
- Vibration Measurement of Full Scale Structures
- Dynamic Behaviour of Structural Materials and Components

VOLUME 8. CIVIL ENGINEERING ASPECTS

- Nuclear Power Plants
- Dams and Other Hydraulic Structures
- Buried Structures
- Lifeline Structures, Pipelines, Bridges
- Miscellaneous Civil Engineering Facilities
- Base Isolation

VOLUME 9. SOCIO-ECONOMIC ASPECTS  
STUDIES OF SPECIFIC EARTHQUAKES  
PROGRESS REPORTS

VOLUME 10. OPENING AND CLOSING CEREMONIES  
LIST OF PARTICIPANTS  
GENERAL LIST OF CONTENTS  
GENERAL AUTHOR INDEX

*In topical arrangement of the submitted papers a classification similar to the one adapted in the Abstract Journal in Earthquake Engineering of the Earthquake Engineering Research Center, University of California, Berkeley have utilized.*

*The state-of-the-art panel reports and the discussions were an important part of the Conference. These reports and the panel discussions will be compiled and seperately printed for the benefit of the Earthquake Engineering community of the world.*

*The publication of these Proceedings prior to the Conference was made possible through the untiring and strenous efforts of the head, Mr. Oktay Ergunay, the assistant head, Mr. Oktay Yurdatapan and the whole staff of the Earthquake Research Institute and also through the generous financial support of the Ministry of Reconstruction and Resettlement. Mr. Timucin Tumer, the Director General of the State Hydraulic Works, have generously permitted the printing of the Proceedings in the printing shop of his Directorate.*

*Professors Uğur Ersoy, Mete Sözen, Muaffak Uzümeri and Dr. John A. Blume, President of the EERI, were instrumental in trying to encourage participation from the new world. Professors K. Kubo and Y. Ohta kindly gave their time and energy for the same cause in Japan. On behalf of the Organizing Committee we express our sincere appreciation for their such invaluable contribution to the success of the Conference.*

*A note of thanks is due Professor Muzaffer Ipek for his meticulous organization and supervision of the computerization of the Conference program and his assistance in the preparation of the last two circulars.*

*Special thanks go to the state-of-the-art panel secretaries, panel members and to the session co-chairpersons for their acceptance to serve in such important roles at the Conference.*

*We would also like to thank our colleagues, assistants, technicians, secretaries and students who helped in many ways in the preparations for the Conference. Their names go unmentioned, but, it should be noted that, without their unselfish assistance the Conference could not have been realized.*

*Finally, on behalf of the Organizing Committee, we would like to acknowledge the outstanding contribution of each and every author and co-author, whose papers constitute the Proceedings.*

*Ankara  
Jan. 20, 1981*

*Mustafa Erdik  
Aybars Gürpınar  
Organizing Secretaries*