ADVANCED DAM ENGINEERING FOR DESIGN, CONSTRUCTION, AND REHABILITATION

Edited by

Robert B. Jansen
Consulting Civil Engineer

VAN NOSTRAND REINHOLD
New York

Library of Congress Catalog Card Number 87-21066

ISBN 0-442-24397-9

Printed in the United States of America

Van Nostrand Reinhold
115 Fifth Avenue
New York, New York 10003

Van Nostrand Reinhold International Company Limited
11 New Fetter Lane
London EC4P 4EE, England

Van Nostrand Reinhold
480 La Trobe Street
Melbourne, Victoria 3000, Australia

Macmillan of Canada
Division of Canada Publishing Corporation
164 Commander Boulevard
Agincourt, Ontario M1S 3C7, Canada

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Advanced dam engineering for design, construction, and rehabilitation.

Includes index.
1. Dams—Design and construction. I. Jansen, Robert B., 1922-
TC540.A33 1988 627'.8 87-21066
ISBN 0-442-24397-9

PREFACE

The present state of the art of dam engineering has been attained by a continuous search for new ideas and methods while incorporating the lessons of the past. In the last 20 years particularly there have been major innovations, due largely to a concerted effort to blend the best of theory and practice. Accompanying these achievements, there has been a significant trend toward free interchange among the professional disciplines, including open discussion of problems and their solutions. The inseparable relationships of hydrology, geology, and seismology to engineering have been increasingly recognized in this field, where progress is founded on interdisciplinary cooperation.

This book presents advances in dam engineering that have been achieved in recent years or are under way. Attention is given to practical aspects of design, construction, operation, and rehabilitation. Case histories are reviewed to demonstrate principles and procedures of proven value. Lessons drawn from, or reinforced by, accidents and failures are examined. The fundamentals of this field are covered primarily as a means of introducing and facilitating an understanding of concepts and practices that represent the leading edge of technology. Both simplified and comprehensive procedures are presented. Strong emphasis is placed on technical aspects, with only general consideration given to administrative, financial, social, legal, environmental, and political factors, which, though important, are covered in other publications.

The rapid progress in recent times has resulted from the combined efforts of engineers and associated scientists, as exemplified by the authorities who have contributed to this book. These individuals have brought extensive knowledge to the task, drawn from experience throughout the world. With the convergence of such distinguished talent, the opportunity for accomplishment was substantial. I gratefully acknowledge the generous cooperation of these writers, and am indebted also to other persons and organizations that have allowed reference to their publications; and I have attempted to acknowledge this obligation in the sections where the material is used. These courtesies are deeply appreciated.

Special credit is due to C. F. Corns, T. P. Dolen, L. B. James, R. W. Kramer, T. M. Leps, G. Lombardi, J. Lowe III, J. M. Raphael, and E. T. Scherich for their work as reviewers, and to those who served as coordinators, namely, C. B. Cecilio, C. F. Corns, C. A. Fetzer, L. B. James, P. C. Knodel, R. W. Kramer, J. D. Lytle, E. T. Scherich, and G. S. Tarbox.

The participants hope that they have contributed usefully to improved practices in the engineering of dams.

Robert B. Jansen

CONTENTS