

PREFACE

It is a privilege to be asked to write a prefatory note on this remarkable reference book, the latest in the Hydraulic Machinery book series. It is unusually wide in scope, ranging from basic research to engineering applications. Its publication marks the achievement of a large team of specialists in cavitation research and in the design and operation of hydro-turbines and storage pumps.

Although the problem of cavitation in machines is an old one, dating back at least to the time of Galileo (16th century), it has not yet been completely solved. This is because hydraulic machines are faced with increasingly severe performance requirements demanded by economic pressures. The need to provide cheaper designs involving smaller and more powerful machines rotating at higher speeds continues to heighten the danger of cavitation. Despite improved techniques that have been developed for detecting and measuring cavitation, and thereby assessing the damage capacity of cavitating flows, they do not necessarily solve the problem, but may nevertheless provide useful guidance for avoiding trouble.

The International Editorial Committee of the book series decided to initiate an up to date review of the state of the art of coping with practical cavitation problems in hydraulic machinery. An imposing team of twenty specialists was formed to cover topics ranging from basic cavitation research, machine design and performance, cavitation and abrasion damage and its repair, and also cavitation induced machine vibration and transient oscillations. A study of the chapter headings will show the particularly wide variety of topics covered in one volume; it is also a welcome trend that they range from basic science/applied physics to engineering operations. This has required a well conceived plan and efficient organisation by a patient and indefatigable Editor who has also written several of the sections. With exemplary co-operation he and the other authors have been engaged for twelve years in producing this comprehensive review of current knowledge.

Congratulations and thanks are therefore due to all concerned with launching and completing this monumental task. I am sure that all readers will be most grateful to the international team's outstanding achievement in assembling this treasure trove.

S.P. Hutton
Emeritus Professor
University of Southampton