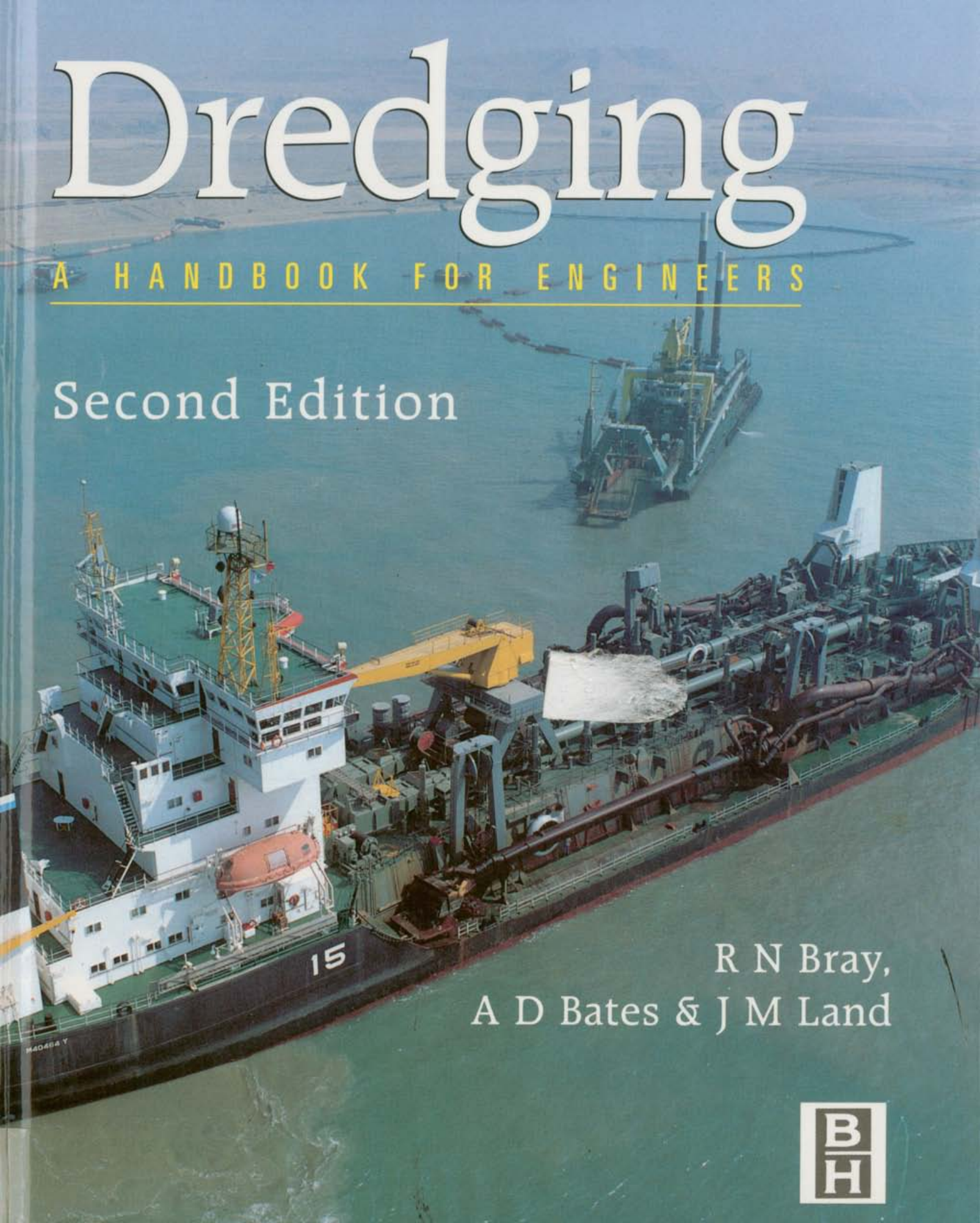
Dredging

A HANDBOOK FOR ENGINEERS

Second Edition



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Foreword

It is a privilege to prepare a foreword for the interesting and informative book prepared by R. N. Bray, A. D. Bates and J. M. Land; *Dredging: A Handbook for Engineers.*

Dredging technology has resulted in many significant contributions over an extended period; including such notable achievements as the Suez and Panama Canals as well as providing access from the sea to the major ports of the world. While the majority of the world's population are probably aware of these and similar achievements, it is likely that only a limited number of people realize that these accomplishments would not have been possible without progressive improvements in dredging technology.

With rare exceptions, the navigation channels serving the major ports of the world require periodic dredging to provide navigable depths for the safe and efficient transportation of international maritime commerce. It is not an exaggeration to state that without access to the sea and the ports of the world, the world economy would experience a significant negative impact.

Dredging technology is applicable to a wide variety of functions in addition to being essential to maritime commerce. They include 1) improvement of water flow to provide flood control benefits; 2) removal of polluted sediments for processing or capping with clean material; 3) construction materials for concrete mix, landfills and dikes and levees; 4) beach nourishment and restoration; 5) mineral and gem mining; and 6) hurricane protection.

In spite of the importance of dredging technology and its major achievements over time, the literature on the subject was quite limited until the evolution of the non-profit making World Organization of Dredging Associations in 1967. Since then, there has been a significant increase in the number of technical papers presented at seminars and conferences and in trade journals. However, the number of published manuscripts which fully address the entire scope of dredging technology continues to be limited.

This volume addresses all aspects of dredging technology. The book is written by individuals who are expert in the field so its contents can be easily understood by management and ownership personnel as well as those engaged in dredging activities on a day to day basis.

It includes detailed discussions of the improvements which have occurred over the years, the design and construction of a wide variety of dredging equipment, dredging procedures and operations, contractual arrangements and a thorough coverage of topics relative to the protection and enhancement of the environment.

Due to its timeliness, comprehensive nature and accurate coverage of all the aspects of dredging technology, this book should be included in the libraries of colleges and universities as well as the offices of those individuals engaged in maritime activities including port authorities, ship owners and operators, and design and construction engineers.

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Preface to the First Edition

Over the past ten years there has been a considerable improvement in the amount of information published on the subject of dredging. In spite of this, the practicability gap – that sparsely populated area between case history and theoretical report – has remained remarkably barren. With a few notable exceptions, there appears to have been little effort directed towards extracting the essence of the subject from the mass of accumulated technical information from the site and the laboratory.

Although the technology of dredging is complex it should not be necessary for the engineer to concern himself with its intricate details. This book, therefore, has been written for those engineers and students who have not the time, nor perhaps the inclination, to delve deeply into the abundance of highly specialised papers on each aspect of the subject. The object is to provide a readable and useful guide to the users of dredging equipment, their methods of operation, capabilities and place in maritime and fluvial civil engineering.

One of the greatest problems in tackling an unfamiliar branch of engineering is to get the feel of the subject and, in this respect, dredging is no exception. The intangibility of the work and the obfuscation which surrounds the prowess of the major exponents of the science do little to aid the outsider. However, the technical secrecy which, it is claimed, is necessary to maintain commercial competitiveness is instrumental in fostering a degree of misunderstanding in those not acquainted with the dredging profession. For, without an adequate amount of knowledge, the engineer is unable to discover whether he is being overcharged for relatively simple work or whether the work is really difficult and justifies a high unit cost. In order to try and overcome this problem I have resorted to discussing average characteristics, outputs, etc., and it has been necessary to make many generalisations. For similar reasons the book is virtually devoid of mathematics, with the exception of some simple algebraic statements, and even these have not been developed in the text. In short this is intended to be a practical handbook which, if it does not provide the answer directly, points out the types of problem which may be encountered and suggests a number of ways by which they can be overcome.

Many of the subjects mentioned in the text are worthy of detailed study and it is hoped that, by referring to the sources mentioned, the engineer will be encouraged to research them further. Indeed some aspects, such as estimating output, ship behaviour and reclamation, could well be expanded into treatises in their own right. It is hoped that the condensed coverage given here will be more manageable for general use.

A considerable time has elapsed since the inception of this book during which my everyday work and my writing have been allowed to mingle with considerable freedom. My sincere thanks are, therefore, due to the Partners of Livesey and Henderson for permitting me to work in this manner and also to my colleagues for putting up with it. My appreciation is also due for the assistance, facilities and helpful comments which have been forthcoming from them all. Apart from the numerous organisations who, unknowingly, have assisted me and those which are listed in the acknowledgements, I would also like to record my special thanks to Captain Cornelius J. Wennink for his comments on Chapter 9. Finally, my grateful thanks to Caroline Pontin and Rosemary Lemon for battling with my handwriting and corrections respectively and Nigel Wright for transforming my rough sketches into illustrations.

R. N. Bray
1979

Preface to the Second Edition

Since the original publication date of this book in 1979 there has been a considerable amount of technical development in the dredging industry. During the same period the legislative and environmental framework within which dredging is carried out has become better defined and more rigorously imposed. For these reasons a minor updating of the text would have been inadequate and the authors have resorted to a major re-write of much of the book. However, some chapters which proved to be particularly popular in the First Edition, such as that covering production estimating, have been retained because the basic principles remain unaltered.

Apart from the overall updating of most of the subjects which has been undertaken, the book is now more comprehensive. It covers more types of dredger, includes greater detail of ancillary equipment, such as instrumentation and pipelines, and contains new chapters on project implementation and costing. Many of the illustrations and all the photographs are new. We hope that this will make the book more interesting and useful.

Although the pace of technological development in most industries seems to accelerate continually, and dredging is no exception, there is always a need for a basic balanced readable treatise on the fundamentals of the field. After a somewhat lengthy gestation period, we believe that we have now produced the most comprehensive primer on the subject. To have extended the text into the realms of higher technology and greater detail would have almost certainly ensured that parts of the work would have been obsolete, prior to publication, so fast does the scene now change.

Welcome to a fascinating field of engineering. You will soon discover that what at first appears to be a narrow, specialist aspect of maritime engineering will emerge as a hugely varied subject, encompassing many of the major scientific and engineering disciplines.

R. N. Bray
A. D. Bates
J. M. Land
December 1995