

problems and solutions associated with this important and fragile zone.

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Advances in Berthing and Mooring of Ships and Offshore Structures, E. Bratteland, 1988, University of Trondheim, Trondheim (Norway), 500p., \$93.50.

Increased ship sizes, resulting in berths being built and operated at more exposed locations, together with advances in cargo handling and loading—unloading systems have increasingly focused on safety, operational requirements and reduction of frequencies and consequences of accidents. The problems addressed in this volume (NATO ASI SERIES E 146) are twofold related to ships: When berthing the ship with resulting impact, and conditions while the ship is moored at berth. The scope of this ASI and the resulting volume was to present recent advances in berthing and mooring of ships and mooring of offshore platforms, as well as vessels at buoys or storage vessels. Theoretical aspects and models as well as practical applications were dealt with.

Ongoing developments in this field include: Low recoiling fenders, fenders with varying (step) stiffness, use of tension mooring systems, increased emphasis on instrumentation, monitoring and adjustment of fenders and mooring during operation, a more integrated approach to the design of mooring, fenders and berth structures etc.

Although considerable advances have been made in the system approach to berthing and mooring, there are many problems that remain to be solved for proper modelling such as, for example, more reliable hydrodynamic and mechanical inputs and criteria, as well as knowledge on structural characteristics and environmental forces. Further advances are possible by coupling developments in mathematical modelling with realtime measurements and micro-computer technology. Existing information and models should be made available to every-day users and designers in a format that can be easily understood and readily applied to practical situations.

Further developments in integrated design, probabilistic approach and criteria to be

applied are suggested. Cooperative research by existing international organizations is encouraged on mathematical and physical models, full scale measurements and development of new concepts.

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Fjords: Processes and Products, J.P.M. Syvitski, D.C. Burrell and J.N. Skei, 1987, Springer Verlag, Berlin, DM195, 379p., ISBN 3-540-96342-1.

Fjords are coastal environments with a unique combination of physical, biological and chemical characteristics which creates estuarine systems with notable extremes of rugged topography and fragile ecology. World attention has been drawn recently to the tragic oil spill in a fjord (Valdez Arm) in southeast Alaska underlining the necessity of strict environmental management of these areas which have a low capacity for recovery from such disasters. Cold temperatures, slow flushing time and fragile biota in fjords combine to produce an environment that can not easily return to normal after a catastrophic event.

Fjords: Processes and Products is a comprehensive text aimed at earth science research professionals and upper-level students. The authors draw on a wealth of data and personal experience gathered during their careers, as well as information from over 1000 references in published literature. They have divided the book into 3 sections: (1) introduction, (2) processes and products and (3) implications and applications. The treatment is even and the authors clearly have made an attempt to present a balanced picture of fjords in terms of subject matter and geography. All fjord coastlines of the world are included, except for Antarctica, as little is known or published on the 1000 km fjord coastline of the Antarctic Peninsula. The book is written from a geological point of view with emphasis on the importance of physical characteristics such as fjord geometry, sediment input, fjord circulation and mass movement on biota, biochemical processes and general ecology.

The book is well illustrated with maps and figures drawn in a uniform style. Original and published data are provided throughout in support of the text. Some minor factors detract

slightly from the generally high quality production. Figure captions are commonly incomplete so that the reader must search back through the text in order to understand the symbols or graphics depicted in the figure. No separate list of symbols exists to help decipher the equations. Aside from that minor frustration, I found the book easy reading, well referenced and the Environmental Problems: Case Histories presented in the implications/applications section have provided me with an excellent source of teaching examples.

This book is a necessary library addition for earth scientists working in modern environments.

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Hydrodynamics and Sediment Dynamics of Tidal Inlets, Aubrey, D.G. and Weishar, L., 1988, Springer-Verlag, Berlin. DM 88.00, 456p., ISBN 3-540-96888-1.

The volume contains 23 papers presented at the International Symposium on Hydrodynamics and Sediment Dynamics of Tidal Inlets, held at Woods Hole in December 1986. With the exception of two Canadian contributions, all papers deal with examples from the US east coast. About half the volume (ten papers) is devoted to hydrological models, the rest to sediment dynamics. Both principal sections of the book begin with introductory chapters by van de Kreeke (Hydrodynamics of Tidal Inlets) and FitzGerald (Shoreline Erosional-Depositional Processes Associated with Tidal Inlets), which make it easier but not easy for the reader to understand the following state-of-the-art contributions. This is no book for the beginner.

The hydrodynamic section is largely devoted to modeling of tidal processes. This is also true of the second group of papers where under the heading of 'Observations of Tidal Inlet Hydrodynamics' field observations are used to test the respective models. As shown in the papers by Swain (Port of Miami), Rainey (Sikes Cut, Florida) and Rao Vemulakonda *et al.* (Oregon Inlet, North Carolina) the models can be applied to solve coastal engineering problems—apparently with great success.

In the sediment dynamics section the formu-

lae are replaced by measurements and observations. The topics range from the development of flood tidal deltas (Stauble *et al.*) and ebb tidal deltas (Reynolds) to suspended sediment flux and salinity changes in the Upper St. Lawrence Estuary over a tidal cycle (Hamblin *et al.*). Giese gives a valuable insight into the coastal morphodynamics on southeastern Cape Cod. However, the period of observation (charts are available since 1772) seems a bit short to demonstrate cyclical behaviour at a 150-year period.

Sediment trapping by dredging of tidal inlets is an interesting aspect of barrier behaviour, largely neglected so far. Marino and Mehta have come to the conclusion that from the $420 \times 10^6 \text{ m}^3$ of sand trapped in ebb tidal deltas at Florida's east coast, $282 \times 10^6 \text{ m}^3$ result from the artificial opening of new inlets and construction of jetties at the mouth of existing ones.

One of the most interesting aspects touched by various contributors deals with the effects of coastal engineering measures. Amongst other topics, Drapeau deals with the stability of dredge spoil islands and adjacent navigation channels in tidal inlets, and Hansen and Knowles point out the influence of jetty construction on ebb tidal deltas (change from tidal dominance to wave dominance, landward migration of swash bars, ebb-tidal delta elimination). Kana and Mason discuss the consequences of an inlet relocation in South Carolina, and Nordstrom demonstrates the influence of shore protection and dredging on neighbouring beaches.

Of course, there are many more aspects dealt with. Most of the papers are beautifully illustrated, and only occasionally some minor inaccuracies occur. A brief index is provided, restricted largely to place names. The book will be of great use for people involved in coastal research, especially for those dealing with applied work, either modelling the hydrodynamic response or calculating the morphological changes and impact on the sedimentary budget coast by coastal engineering in and around tidal inlets.

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