



Marine Wastewater Outfalls and Treatment Systems

By Philip J. W. Roberts, Henry J. Salas, Fred M. Reiff

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Wastewater disposal by marine outfalls is proven and effective and is a reliable and cost effective solution with minimal environmental impacts. The design and siting of submarine outfalls is a complex task that relies on many disciplines including oceanography, civil and environmental engineering, marine biology, construction, economics, and public relations. *Marine Wastewater Outfalls and Treatment Systems* brings these disciplines together and outlines all tasks involved in the planning and design of a wastewater system involving a marine outfall. This book concerns the design of marine wastewater disposal systems: that is an ocean outfall plus treatment plant. All aspects of outfall design and planning are covered, including water quality design criteria, mathematical modelling of water quality and dilution, gathering required oceanographic data, appropriate wastewater treatment for marine discharges, construction materials for marine pipelines, forces on pipelines and outfall design, outfall hydraulics, outfall construction, tunnelled outfalls, operation and maintenance, monitoring, case studies are discussed and methods for gaining public acceptance for the project are presented. Finally, costs for many outfalls around the world are summarized and methods for estimating costs are given. This is the first book to consider all aspects of marine outfall planning and construction. The authors are all extensively involved with outfall schemes and aware of recent developments. The science and technology of all aspects of outfall discharges into coastal waters and estuaries of treated municipal or industrial wastewater has advanced considerably over the past few years. *Marine Wastewater Outfalls and Treatment Systems* provides an up to date and comprehensive summary of this rapidly developing area.

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- Sales Rank: #3579809 in Books
- Brand: Brand: Intl Water Assn
- Published on: 2015-08-04
- Original language: English
- Number of items: 1
- Dimensions: 9.21" h x 1.13" w x 6.14" l, 2.45 pounds
- Binding: Hardcover
- 520 pages

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