

CHAPTER 1

Introduction

1-1. Purpose. This manual provides design guidance for improving deep-draft navigation projects. The design goal applicable to project development is to provide a safe, efficient, environmentally sound, and cost-effective waterway for ships and other vessels. An economic objective is to provide for these goals while minimizing and balancing the initial construction costs and future maintenance costs. The general guidance presented in this manual is based on *average* navigation conditions and situations. The design engineer will adapt these guidelines to the local, site-specific conditions of the project. Usually, the final project design will be developed by application of a ship navigation study, incorporating real-time ship simulation tests with local professional pilots. Deviations from this guidance are acceptable if properly substantiated and approved by Headquarters, U.S. Army Corps of Engineers (HQUSACE).

1-2. Applicability. This manual applies to all USACE commands having civil works responsibilities. The manual will be used in project planning, design, construction, operation, and maintenance as applicable.

1-3. Distribution. This publication is approved for public release; distribution is unlimited.

1-4. References. See Appendix A for the complete list of references.

1-5. Scope. Deep-draft navigation projects involve development or improvement of channel systems to provide access to the Nation's ports and harbors. Deep-draft navigation refers to channel depths greater than 15 feet (ft) (4.57 meters (m)) and applies to commercial seagoing vessels and Great Lakes freighters. Generally, the project involves larger, more heavily laden ship traffic that takes advantage of the project improvements. The projects also include, where appropriate, ship turning basins, maneuvering areas, anchorage areas, and other ancillary facilities such as dikes and jetties to improve navigation conditions.

1-6. Background. The navigation mission of the U.S. Army Corps of Engineers (USACE) is one of the oldest activities authorized by the Congress. Waterway and harbor maintenance and improvement to provide ship access to ports has been a major Federal development activity all over the country. Deep-draft navigation projects involve practically all commercial coastal ports, the lower portions of the Mississippi and Columbia Rivers, and a majority of harbors in the Great Lakes and St. Lawrence River system. There is increased emphasis on expanding the capacity of these projects by deepening to accommodate increased draft and larger capacity ships.

1-7. Manual Development. This manual summarizes the results of research, development, and project studies conducted at the U.S. Army Engineer Research and Development Center (ERDC)/(U.S. Army Engineer Waterways Experiment Station (WES)), Vicksburg, MS. The ERDC/WES Ship Simulator, as well as other simulator study results throughout the world, played a significant role in guidance upgrading. The experience of many Corps personnel involved in deep-draft navigation studies and projects is also reflected in the manual.

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1-8. Training. The U.S. Army Engineer Division, Huntsville, offers a 1-week training course entitled “Planning, Design, and Maintenance of Deep Draft Navigation Channels,” which is held at ERDC/WES. The course covers the latest planning and engineering design considerations for the development and improvement of Corps navigation projects. The course notes offer major updating of design concerns and expand the information presented in this manual. If interested, Corps employees should check with their Training Officer for details. Non-Corps personnel may request participation in this training course by contacting CECW-EH. Course information may be obtained from the Corps web site.

1-9. Appendices. Required and related publications cited in this manual are listed alphabetically in Appendix A. Appendix B provides frequently needed units and conversion factors between systems of units. A summary report on recent ERDC/WES Ship Simulator research results is presented in Appendix C. Appendix D provides an example study and a checklist that may be used during study development. Symbols used in this manual are listed in the Notation section of the Glossary. An explanation of terminology frequently encountered by navigation project users of this manual is also provided in the Glossary.