

Navigation Engineering

Practice and Ethical Standards

ASCE Manuals and Reports on Engineering Practice No. 116

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Navigation Engineering Practice and Ethical Standards

A Task Committee of the
Waterways and Navigation Engineering
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PREFACE

This manual was produced by a Task Committee of the Waterways Committee and Navigation Engineering Committee of the Coasts, Oceans, Ports, and Rivers Institute, American Society of Civil Engineers.

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CHAPTER 1
INTRODUCTION

1.1 BACKGROUND AND PURPOSE

1.1.1 Background

By Congressional decree, the U.S. Army Corps of Engineers was given authority and funds to build and maintain inland waterways for navigation, ship channels for ocean-going vessels, and numerous small boat harbors. In the past, ethical considerations for navigation project design criteria were self-contained knowledge within the Corps design community. The design philosophy and design criteria were often verbally passed from senior engineers to junior engineers. The few criteria that existed were scattered throughout several Engineer Manuals and Regulations.

ASCE Manual No. 50, Report on Small Craft Harbors (1969), was the first attempt to consolidate some of the Corps's navigation criteria for small boat harbors. Consolidation of criteria for inland barge navigation systems and deep-draft ship channels was undertaken by the Corps in the 1970s. This effort resulted in the publication of Layout and Design of Shallow Draft Waterways, EM 1110-2-1611 (1980), and Hydraulic Design of Deep Draft Navigation Projects, EM 1110-2-1613 (1983).

Until recently, the Corps was the exclusive designer and maintainer of navigation channels in the United States. However, with the current move to contract out design and privatize many government missions, there has emerged a private sector audience that can benefit from past experience and lessons learned.

Unfortunately, in the 1980s and 1990s there was a government-wide initiative to reduce federal regulations. The Corps manuals were vulnerable to this purge. The ASCE Waterways Committee was aware of the potential loss of this valuable design information and undertook a preservation mission.

This Ethics Manual, along with ASCE Manuals No. 94, Inland Navigation: Locks, Dams, and Channels (McCartney et al. 1995), and No. 107, Ship Channel Design and Operation (McCartney et al. 2005), presents not only Corps navigation design practice and experience, but also foreign country practice and activities of other U.S. agencies with navigation missions.

This Manual is intended to be a reference to explain the ethical roots of navigation engineering criteria. The target audience includes beginning engineers in the Corps, private sector engineers in the United States and overseas, other U.S. government agencies involved with navigation, and university students pursuing navigation-related studies.

1.1.2 Purpose

The purpose of this Manual is to present engineering criteria and practices for design, operation, and management of navigation projects, and demonstrate how those criteria and practices are interwoven with engineering ethics.

The levee failures during Hurricane Katrina (2005) raised many questions, including engineering criteria suitability, level of protection decisions, and risk assessment. Although levees are generally considered an element of a flood control project, the same questions arise in navigation projects. These Katrina-related questions point out the need to explain the origin of design, the design process to consider criteria and risk, and project operation needed to achieve the design goals. They also clearly point to a need for ethical decision-making at every level. During the design process, pressures to reduce cost can threaten safety, efficiency, and reliability. This Manual supports adherence to sound criteria by showing how engineering ethics is interwoven into navigation project design and operation to achieve the objective of public safety. This Manual differs somewhat from the usual "how-to-do-it" format by including a "why-we-do-it" aspect, which includes an historic perspective on criteria development.

1.2 NAVIGATION PROJECTS

Navigation projects provide for waterborne transport of people and goods—by ships, barges, ferries, and other vessels. They consist of ports, harbors, channels, locks, and related facilities, and they constitute vital links in the U.S. Marine Transportation System—a collection of people, facilities, organizations, and equipment that work together to move people and goods from origin to destination using waterborne carriers for at least one component of the journey.

Navigation projects include channels for ships, barges, and other watercraft. For the purposes of this Manual, they also include the water