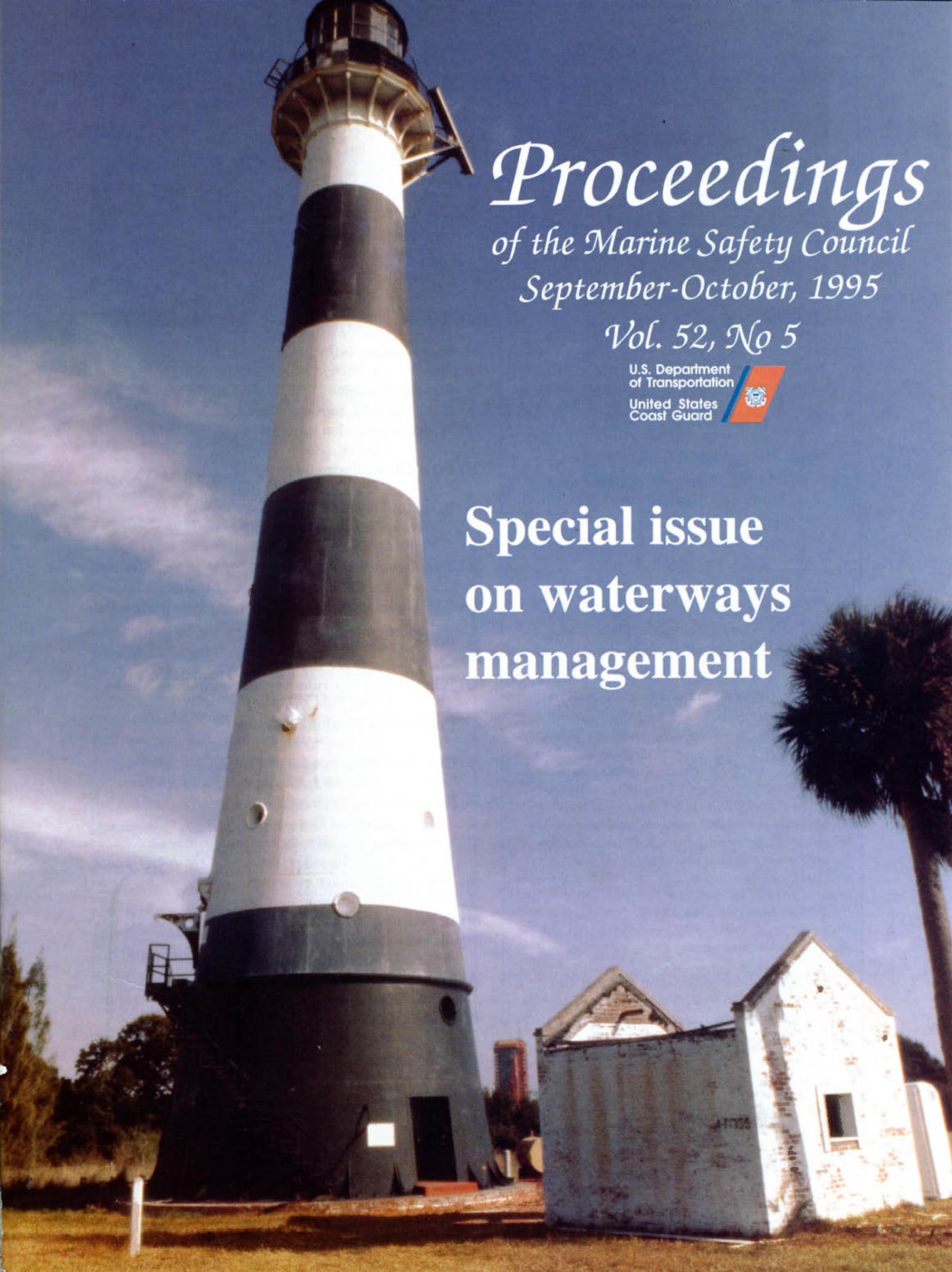

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Special issue on waterways management

Proceedings

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Special waterways management issue

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New York City waterway.

WATERWAYS MANAGEMENT...

What is it?

By RADM Rudy K. Peschel

You might say that "waterways management" began in the United States in 1789, when the first Congress authorized the construction of lighthouses and other aids to navi-gation in our coastal waters. Recognizing that the United States, as a port state, must provide for safe vessel navigation, added legislation greatly expanded our federal responsibilities.

More than 200 years later, managing America's waterways effectively and efficiently remains a challenge. The National Performance Review, a recent White House initiative, focuses on "reinventing" government, emphasizing results and customer satisfaction. Major changes in the federal government will affect the way we do business. Agencies are mandated to develop and implement program standards, linking performance measurements to budget requirements,

To achieve targeted budget reductions, new technologies will be embraced. Differential global positioning and electronic chart displays and information systems will have a major impact on navigation and will affect services mariners require of federal, state and local governments.

Waterways management

The Office of Navigation Safety and Waterways Services recently chartered a quality management board to conduct an extensive review of waterways management. The board concluded that it is a coordinating process that crosses program, office and agency boundaries.

The quality management board defined waterways management as "the proactive stewardship of America's navigable waters to promote their safe, efficient and environmentally sound use among competing interests." Collectively, it addresses issues of waterways safety and environmental protection, while promoting their productive use by a variety of customers to support national and global economic interests.

There are two main waterways management components within the Office of Navigation Safety and Waterway Services:

The navigation safety component is comprised of Short Range Aids to Navigation, Vessel Traffic Services, Radionavigation and Bridge Administration programs. They primarily provide a navigation infrastructure to faci-litate safe transit on the waterways. The focus is on prevention, to reduce the risk of accidents.

The waterway services component consists of Recreational Boating Safety, Search and Rescue, and Ice Operations. While providing navigation services, these programs focus on correction or response, to reduce adverse effects of mishaps.

Continued on page 2

Coordination

Continued from page 1

The Coast Guard's waterways management responsibilities extend beyond the scope of a single office chief. Providing customers with safe, effective, efficient and environmentally sound waterways is a shared burden. It is important that we coordinate our actions to avoid duplication, ensure intercommunications, and achieve customer satisfaction and maritime safety.

Nor does coordination stop within the Coast Guard. Other government agencies, such as the U.S. Army Corps of Engineers, National Oceanic and Atmospheric Administration, Maritime Administration, Defense Mapping Agency Environmental Protection Agency, Minerals Management Service and Office of Pipeline Safety have waterways management responsibilities.

In 1994, the Coast Guard took the lead in forming an Interagency Committee on Waterways Management to coordinate related activities of these agencies. Federally sponsored advisory committees also provide valuable advice and direction.

Special issue

I hope that the articles in this special *Proceedings* issue will give you a better understanding of waterways management, the numerous organizations involved, and the complexity and interdependence of their activities.

I am grateful to RADM Jim Card, chief of the Office of Marine Safety, Security and Environmental Protection for the opportunity to sponsor this edition of Proceedings, and to bring you our message for the sake of navigation safety.

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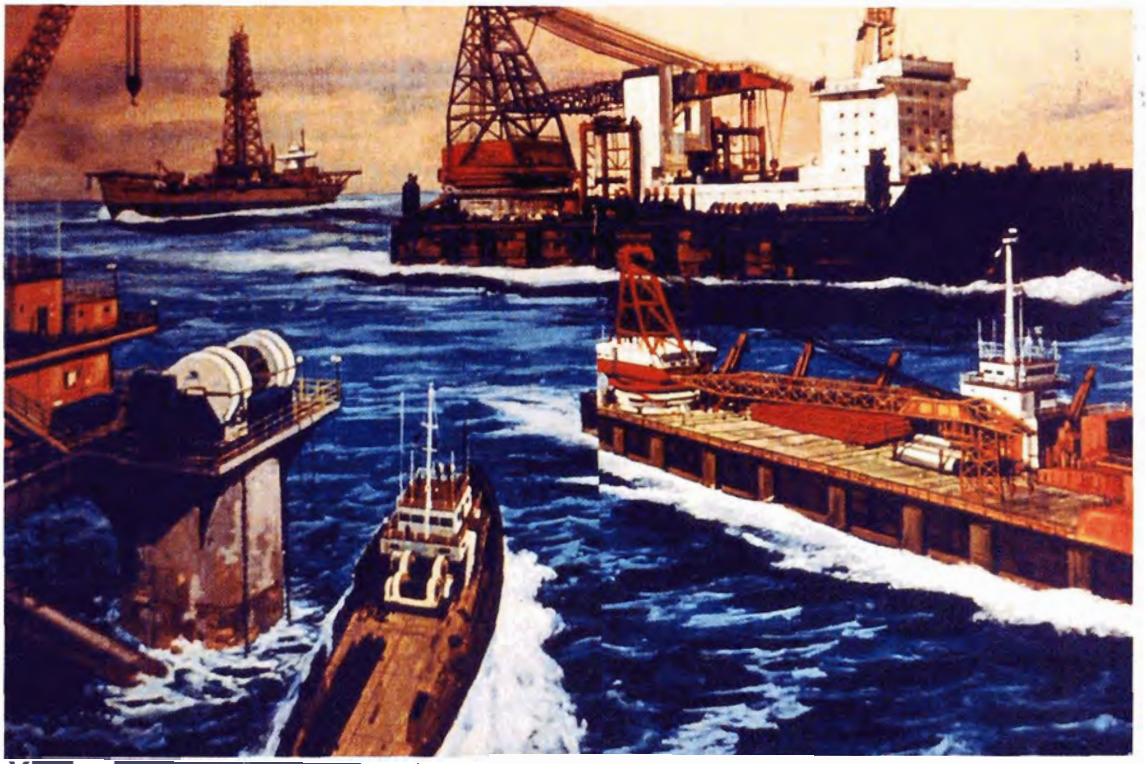
The port of Houston, Texas.



Many ships compete for the same waterway.

Who uses our waterways?

By Mr. Charles F. Klingler

As America enters the 21st century, waterways, including sea coasts, rivers and lakes, are becoming more popular. The number of waterway users is growing as Americans migrate toward the coasts.

Today, there are about 20 million recreation boats, and that number is expected to escalate by four percent every year. Also, waterway-related catastrophes, primarily involving commercial carriers, are growing with adverse, sometimes intolerable effects on the environment.

The Coast Guard is the lead agency responsible for regulating these myriad users and resolving conflicts among them. Relationships between users and their environments are managed by the Coast Guard through up-to-date National Oceanographic and Atmospheric Administration (NOAA) charts with local notices to mariners; relationships between users with rules of the road and the vessel traffic services (VTS); and the relationship between users and docks, bridges and other modes of transportation with navigation safety regulations.

The Coast Guard needs as much information as possible on the users to manage and regulate the waterways. User profiles must first be developed and future trends determined to keep regulations current.

Background

Picture the waterway scene of a pristine coast that unfolded before Christopher Columbus when he dropped anchor. His first challenge was navigating his ship through water deep enough to accommodate the draft. He used "scout" pulling boats that most likely marked the way with floating objects anchored to the bottom. Those devices were the ancestors of today's buoys and aids to navigation.

When more and more ships sailed from Europe to the New World, congestion began, causing ship masters to be concerned with traffic along with navigation. Dock space was not always immediately available for discharging cargo.

A water transportation system evolved to accommodate the movement of people and cargo. Salt water traffic systems were patterned for their location to manage the transition from open ocean sailing to congested harbor maneuvering. Fresh water systems involving river and lake transportation contended with ever changing currents and water levels.

Thus the evolution of America's waterways focuses on three basic relationships:

- vessel to geographic environment,
- vessel to other vessels, and
- vessel to docks and bridges.

Continued on page 4

Continued from page 3

User categories

Waterway user categories were developed independently: one by the International Association of Lighthouse Authorities and the other by the Coast Guard's *Aids to Navigation Manual*. Both sources list four basic user categories:

1) **fishing vessels;**
2) **cargo-carrying vessels;**
3) **recreation vessels; and**
4) **other vessels, including military and research ships.**

Fishing is getting more competitive for waterway use.

Fishing vessels

Commercial fishing vessels are usually found in a salt water environment. Their numbers are growing and their equipment getting more sophisticated. Casualties are also on the rise, along with their costs. Therefore, more restrictions are being imposed on fishing vessel construction, maintenance and operation.

In order to manage increasing costs, groups of vessels are merging into fleets. The operators are becoming more "fleet minded," dissolving old images of rugged independent fishermen into myths of the past.

Cargo-carrying vessels

Bulk freight, container and liquid cargoes are transported from one location to another by merchant vessels. Their time is measured in dollars.

These vessels tend to have maximum capacity loads, which necessitates deep drafts, i.e., small bottom clearance. This limits movement to high tides in some locales.

Cargo-carrying vessels are staffed by licensed officers and crews of varying nationalities. Clear communication in the pilothouse is essential for controlling the vessel, particularly in narrow channels and congested waters. International flavors among foreign-flag vessel officers and crews produce language barriers that can interfere with vessel safety.

In congested waterways, most cargo-carrying ships use local pilots to control the vessels or advise the controlling officer. These pilots have expert knowledge of the waterways for which they are licensed. In the United States, the individual states mandate local licensing regulations.

To accommodate deep-draft ships, channels are being dredged narrower but deeper in some locales. Thus, the same amount of dredge spoils is removed, but more cargo can move in the channels.

The demands of the cargo ships have resulted in improved maritime aids to navigation. They include daytime illuminated range lights providing a visual range line de-picting the channel center even in light fogs; buoys tautly moored to the bottom eliminating watch cir-cles (which buoys on slack moors move); and more accurate electronic navigation signals (i.e., global positioning system).

Where numerous vessel ply the same waters creating heavy traffic, a vessel traffic service (VTS) is or may be established to provide position, course, speed and collision predictions to ships in the system. This allows large ships to sail at up to 20 nautical miles-per-hour in "pea soup" fog without colliding with other cargo vessels. VTS systems continue to expand as the Coast Guard receives funds to install and integrate traffic services in American ports.

To recreation vessels, buoyed channels present barriers, similar to major highways. They must respect these thoroughfares and yield to larger vessels. (This is not the case when recreation vessels engage in regattas or races across buoyed channels.)

Cargo vessel steams under a bridge in a narrow wate

Recreation vessels

Recreational activities are becoming more of a major concern with more than 20 million vessels ranging from large yachts to small motor boats, along with swimmers competing for water use. The number of vessels increases from four to eight percent annually.

The boats are supported by numerous marinas and other shore facilities, providing large incomes for surrounding communities.

During the 1994 Mississippi River drought, upper Missouri River waters fell to such low levels that lake- and river-side marinas in the system were high and dry. Public opinion was divided over keeping the levels up or providing water to the lower systems to run hydro-electric plants. This example of recreational revenue seekers conflicting with electricity producers demonstrates the intense competition over fresh water use.

Swimmers and other aquatic sports groups vie for their share of the waterways. Traditionally, a buoyed area was sufficient to separate swimmers from boaters. Recently, however, the Chesapeake Bay Swim at Annapolis, Maryland, closed the waterway to all commercial and recreational vessel traffic for about five hours for 500 swimmers to compete in a marathon. Wind surfers compete with barge traffic on the Columbia River, especially in the Great Gorge area. Jet skiers can be seen on all types of waterways.

In recent years, environmentalists have influenced the control of recreation vessels' activities in the waterways. No admittance areas are established to protect ecological species, such as coral reefs in Florida. New traffic regulations are enforced along the Florida-Georgia coasts where endangered right whales feed in the winter, and in areas where manatees graze.

State and local authorities are enforcing limited new navigation and anchoring regulations. Some boaters argue that the rulings prevent freedom of navigation.

The ultimate control of recreation vessel operation will be licensing. Waterways with heavy congestion and high accident rates are being targeted for limited licensing of operators. They include Long Island, the Great Lakes and Miami.

Other vessels

Vessels, including military and research ships, which do not farm, transport goods or provide a means of recreation also compete for waterway use. The number of military ships is somewhat static now, but research vessels are slowly increasing. As a group, the number of these users is not significant. In terms of influence, however, the United States Navy has powerful control over waterway usage.

Today's status

The number of users in most categories is growing, while the available waterways remain the same. Relatively speaking, then, user categories, which could be separated physically until recently, must deal with each other on a competitive basis for waterway access.

Are current waterway charts accurate enough to accommodate deep-draft vessels pressing the bottom to haul the maximum cargo?

Can the International Regulations for Preventing Collisions at Sea, (COLREGS), written in 1972 when water space was unlimited, provide sufficient guidance for tomorrow's user in congested passages?

Is there sufficient dock space for timely cargo transfer? Are dock facilities sophisticated enough to allow for rapid transfer of cargo to other transportation modes?

Can swimmers, recreation boats and commercial barges/ships exist together in confined waterways? Criteria to be examined are safety, efficiency and effectiveness.

If it is determined that more regulations are necessary, should a single government agency draft, implement and enforce them?

Future options

Fishing vessels

Over the next 20 years, the economics of ocean farming may affect the fishing industry as well as general waterway transportation. Possible solutions accommodate large international harvesting groups instead of individual fishermen.

Commercial fishing may be carried out in a farming environment with set geographical limits and predicable economic returns. Today, small fish are grown from hatchlings and harvested in large submerged nets.

Tomorrow, fish farms may be designed with barriers to transiting vessels. As the farms occupy more and more waterway space, modern technology may develop acoustical or other type devices to confine the fish, but allow surface vessels to sail over the farms.

Continued on page 6

Continued from page 5

Cargo-carrying vessels

About 99 percent of international cargo, including liquids, transported to the United States is carried by ship. As Third World countries develop and demand more and more modern products, shippers may compete in cargo delivery from one location, across the United States, to another (i.e., from Europe to Japan).

This will be done only if cargo-carrying costs from ship to land transportation to ship are less than by ship sailing around the Straits of Magellan or through the Panama Canal. More efficient off- and on-loading methods must be developed for goods to be "inter-modally" transferred from sea to shore to sea transports.

A key element to this intermodal transportation is the efficient movement of ships in all tides and weather conditions. A ship leaving a European port must know ahead where it will moor, and offloading equipment must be positioned to spring into action when the mooring is completed.

Recreation vessels

The Coast Guard identified significant developments that could influence recreational boating safety in *A Study of Boating Safety Trends in the Decade of the '90s,* published in 1991. The report described how events involving users, vessels, environment and legislation will influence waterways until 2020.

The trends include:

1. enactment and enforcement of comprehensive boating while intoxicated laws;
2. mandatory boating safety education for boating while intoxicated offenders;
3. inclusion of materials on hazards of alcohol use in all recreational boating safety education programs;
4. insufficient number of personal flotation devices (life jackets etc.);
5. need for more marine law enforcement officers;
6. more overcrowded waterways;
7. increased personal watercraft and "thrill craft;"
8. greater state responsibility for recreational boating safety; and
9. increasing insurance claims from boating accidents.

Waterways may evolve like highways. Initially, local and state agencies may do most of the work. As national security demands, the federal government may step in and start linking individual state- and locally-managed waterways.

Vessel traffic services provide vital data to the mariner.

Demands of both commercial cargo carriers and recreational users may compel this action.

Other vessels

The real power over the seas may shift from the Navy to major fish farms, commercial carriers and recreational interests. The power of the military may be replaced by the power of profit.

Research vessels may grow in number and sophistication as industry turns to the sea as an untapped resource for profit and adventure. As costs soar, multnational groups may support research operations. Regulating and enforcing rules of maritime research may be required and conducted by multinational bodies.

Conclusion

Waterways are no longer boundless in accommodating the growing number of users. For the United States to manage its waterways safely, efficiently and effectively, the needs of the users must be considered in designing transportation and recreation areas.

Boundless oceans which separated nations a generation ago may create unity. The economic demands of transportation and recreation, along with regulatory and enforcement requirements, will bind nations together in common interests. With advances in technology and increasing economic demands, people will have to move closer together across the vast oceans.

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WAMS

waterway dynamics

By CDR Christopher Conklin

From lighthouses to buoys, aids to navigation are as essential to mariners as roadway markers and traffic lights are to highway motorists.

One of the Coast Guard's oldest responsibilities is marking more than 1,800 waterways in the United States with aids to navigation. Interaction between the Coast Guard and mariners to improve navigational aid systems and manage these waterways is a long-standing tradition.

WAMS

In the mid-1980s, the Coast Guard developed a Waterways Analysis and Management System (WAMS) to analyze the effectiveness of its efforts to provide safe and efficient navigable waters for the mariner, while protecting the environment. The WAMS formalized and coordinated what had been a somewhat informal and disjointed, though reasonably effective process.

The primary purpose of the WAMS is to analyze aids to navigation requirements of individual waterways and develop efficient ways to provide them. Each waterway is different, so this process is flexible.

A WAMS study has been conducted or is in process for all 1,800 waterways in the United States.

Waterways

A waterway is defined as "a water area providing a means of transportation from one place to another, principally a water area providing a regular route for water traffic, such as a bay, channel, passage, river or regularly traveled parts of the open sea."

Three navigation settings must be considered within each waterway. They are daytime visual, nighttime visual, and radar or reduced visibility (including the use of sound signals). The aids to navigation to consider are:

Navigational buoy.

Major light: Moderate to high candlepower, mounted on a fixed structure (i.e., lighthouse), or a large navigational buoy.

Ranges: Pairs of beacons which usually define a line down the center of a channel.

Beacon: Any fixed aid to navigation. Coast Guard term for all minor lights. Daybeacons have no lights.

Buoy: Unmanned, floating aid to navigation moored to the seabed. They are lighted and unlighted.

ELB: Exposed location buoys are unmanned, floating aids to navigation with major light signals offshore.

Racon: A radar beacon producing a coded response or identifiable radar paint, when triggered by radar signal.

Sound signal: A "fog" signal which transmits sound to alert mariners during periods of restricted visibility.

Radar reflector: A device which reflects electromagnetic energy parallel to the direction of an incident radar pulse to improve response.

Radio aid to navigation: A device which transmits information by radio waves.

Continued on page 8

Continued from page 7

Other waterway management tools considered in a WAMS study include:

Vessel traffic services: A variety of techniques to prevent collisions and groundings in ports and waterways. They also expedite ship movements, increase system capacity and improve all-weather operating abilities.

Traffic separation scheme: A routing measure to separate opposing streams of traffic by lanes and other appropriate means.

Evaluations

A narrative from a WAMS study describes the waterway as seen from a vessel coming from the sea. The following features receive particular attention:

Geographic: channel lengths, widths and depths; bottom types and shore topography.

Facilities: docks, refineries, fisheries and marinas.

Bridges: clearances and operating rules.

Special areas: anchorages, vessel traffic systems and traffic separation schemes.

Objects: underwater pipelines and cables, suspended cables and wrecks.

Environment: tides, current, wind, fog, storms, 80 and 90 percent transmissivity values (visibility measure) for lights, and sensitive areas, such as wildlife refuges, coral reefs and wetlands.

Communications

Verbal and written communication with waterway users is essential for the success of any WAMS study. By accompanying users on their waterway transits, one can gain and document a clear understanding of their needs.

Coast Guard personnel from aids to navigation, vessel traffic service or marine safety units have daily contact with users. They regularly evaluate how aids to navigation and other waterways management tools meet the needs of users.

Written public response is solicited through local notice to mariners and by contact with marine interest groups. Some questions often asked of user groups are:

How many vessels in the group use the waterway each year?

What time, day, week, month or year are they most frequently on the waterway?

What is their vessel tonnage?

What type of cargo is transported?

What is the value of the cargo?

Is cargo off loaded in the waterway?

How often is the waterway transited?

What type of navigation equipment is aboard each vessel?

How maneuverable is each vessel?

What is each user's knowledge and experience level?

"Waterborne Commerce of the United States" published by the Army Corps of Engineers is a source of waterway user information.

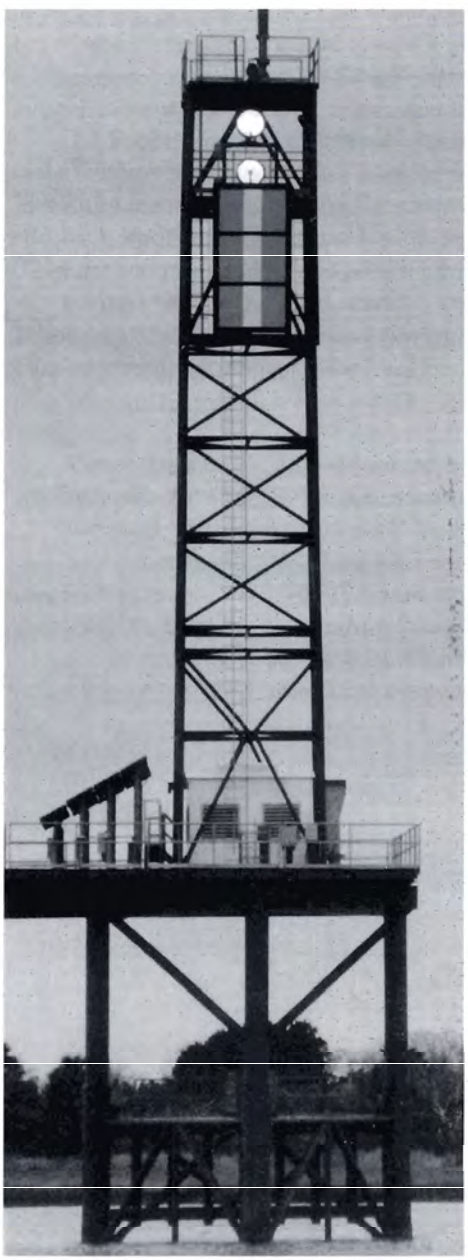
Waterway users are defined by their activities:

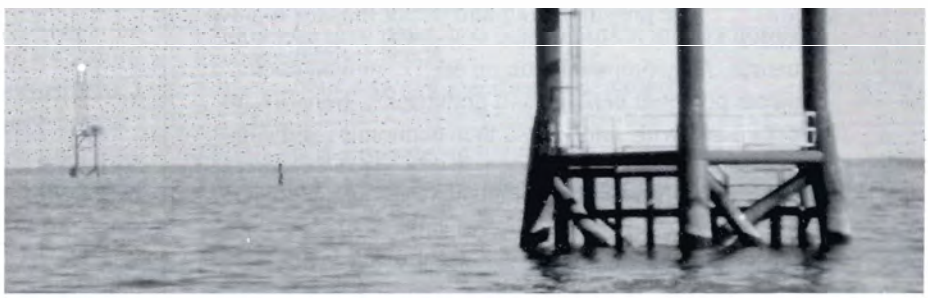
1. **recreational boating**
2. **commercial fishing**
3. **commercial cargo transportation**
4. **passenger transportation**
5. **petroleum/chemical transportation**
6. **military vessel movements**
7. **piloting**
8. **oceanographic surveying**
9. **dredging**
10. **environmental actions**
11. **local government and port authority duties**
12. **boating association, harbor master and yacht club functions.**

Channel ranges

Front beacon.

Rear beacon.





Casualty history

The records of vessel casualties on a given waterway are analyzed to determine if better aids to navigation or other management tools may have prevented the accidents. If so, changes and/or improvements are considered, such as changing, adding or removing aids to navigation or placing warnings on charts.

Critical categories

Each waterway study includes an evaluation and/or validation of its critical category. United States waterways are classified as critical or noncritical. Generically, a critical waterway supports a large amount of commerce or military traffic. In such a waterway, the degradation of aids to navigation would pose an unacceptable risk of an accident.

Such waterways are classified as militarily, environmentally or navigationally critical.

Militarily: serving military missions.

Environmentally: transporting hazardous materials or dangerous cargoes, or the presence of a sensitive ecosystem.

Navigationally: presenting difficult physical characteristics, navigation problems, aid to navigation establishment problems or high discrepancy rates.

Noncritical: serving commercial and recreational boating interests without undue risks.

Continued on page 10

Continued from page 9

The Coast Guard has classified 1,891 waterways marked with aids to navigation as follows:

Number	Critical classification
182	militarily
136	environmentally
192	navigationally
1,371	noncritical

Analysis

The analysis portion of the WAMS study is based on user needs and standard design considerations, similar to those listed in the International Association of Lighthouse Authorities *"Aids to Navigation Guide."*

The present layout and use of the aids to navigation system is studied and compared with user comments. A recommendation on each comment documents potential benefits and drawbacks. Benefits are prioritized with safety first, then economics and convenience.

Before any major changes are made, the appropriate interest groups are consulted to ensure their needs have been interpreted correctly and to discuss the results of the WAMS study.

The Coast Guard's position on each user comment is stated and WAMS study results are discussed before the final report is submitted. This step can prevent negative public reaction to waterway changes which can be costly, time consuming and embarrassing to correct.

Minor recommended changes are reviewed at the Coast Guard district level. Major alterations require review and approval by Coast Guard headquarters.

Funding

The WAMS process allows the Coast Guard to strive for user satisfaction within defined statutory and funding limits.

As usual, the greatest limiting factor is cost. Documenting user needs, available Coast Guard resources and funding required to make waterways changes lends credible support to budgetary requests.

The Coast Guard presently has a multi-million dollar backlog of waterways acquisition, construction and improvement projects for aids to navigation. WAMS-generated projects compete for limited funding with other undertakings such as marking new Army Corps of Engineers-sponsored waterways or realigned channels.

Thus, some changes requested by waterways users and approved by the Coast Guard may remain on the back-log for years before they can be funded. Projects must be prioritized in order of those affording the greatest benefits in safety and efficiency for the most users.

Conclusion

Presently, the WAMS process is concerned with individual waterways. Eventually, however, it may be expanded to look at the large picture of how waterways interact with each other.

In addition, waterways management initiatives including operating requirements, technological advances and configuration constraints must be factored in as the process evolves. This reflects the systems approach to waterways management, which is essential to the Coast Guard and other responsible organizations.

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Screw-pile lighthouse.

Assessing waterways management

By Mr. Richard Walker

Recent major vessel casualties and oil spills have focused national attention on the Coast Guard's ability to improve and maintain the safety of United States waterways. This includes reducing the risk of accidents and spills, and improving response capabilities of industry and government when mishaps occur.

The Oil Pollution Act of 1990 (OPA 90) directs the Coast Guard to conduct research and development according to the Oil Pollution Research and Technology Plan. Section 3.1.4 of this plan identifies a number of waterways management research topics which address prevention aspects of the government's marine antipollution efforts.

Proper management of our waterways is crucial to improved pollution prevention and response. The Coast Guard Research and Development Center (R&DC) in Groton, Connecticut, plays a major role in this research.

Background

Waterways management is not a new concept to the Coast Guard. The responsibility dates back to 1789, when the first congress authorized the construction of lighthouses and other aids to navigation to enable safe passage of vessels around the young country.

Coast Guard responsibilities have magnified and diversified many times since the first lighthouse was built in Boston. Waterways management, however, is still a major Coast Guard priority.

In response to several major marine disasters in the late 1970s, the Coast Guard created a formal waterways management program in 1979. Since then, the Coast Guard has evolved with the priorities of the times. The actual program disappeared in the process, but the waterways management concept remained.

Many other federal government agencies also have waterways management responsibilities. The National Oceanic and Atmospheric Administration (NOAA), Army Corps of Engineers, Maritime Administration (MARAD), Environmental Protection Agency (EPA), Minerals Management Service and the Navy all have pieces of the waterways management pie.

The Coast Guard must provide an organizational structure to encourage a broad approach to program execution and management, and, in particular, to foster the systems approach in all operational programs. In this regard, waterways management is more a way of thinking and doing business, than a program unto itself.

Assessment

A waterways management assessment project was started by the R&DC in 1993. Its objective is to reduce risks associated with marine transportation, and to provide safe, efficient, effective and environmentally sound waterways. The project will attempt to define user requirements for Coast Guard-provided navigational aids and waterway services, and assess delivery systems. The overall goal is to provide information and products to assist the Coast Guard to efficiently respond to changing user needs.

Four research areas were identified:

#1 waterways management,
#2 waterway users,
#3 navigation risk assessment, and
#4 system effectiveness and benefits.

During the initial phase of the research, baseline analyses were conducted to develop a comprehensive understanding of each topic, and to document their backgrounds, current status, issues and problems. The results are contained in four recent interim reports.

Waterways management

This is a reference document charting the complex web of federal waterways management organizations and responsibilities. The Code of Federal Regulations, United States Code and Coast Guard documents and organizational manuals were reviewed to identify waterways management functions and responsibilities, and the organizations that perform them. Technologies expected to affect future needs are also identified.

This study identified 586 waterways management responsibilities and linked them to missions, functions and organizations. Thirty-three functions were each linked to the four Coast Guard missions: maritime safety, maritime law enforcement, marine environmental protection and national security.

Consolidating this information into one document highlights the magnitude and breadth of waterways management responsibilities in and outside of the Coast Guard. With nearly 100 organizational elements dealing with 586 responsibilities, the report illustrates the difficulty in viewing waterways management from a macro perspective. However, by viewing the multiple components, one can begin to understand the waterways management universe.

Continued on page 12

Continued from page 11

It also points out the critical need for improved cooperation among federal, state, local and private groups with waterway interests. Among federal agencies, more coordination during the budget development process would improve the effectiveness of resources for waterways management.

Waterway users

The ultimate measure of the value of any government program is how well it satisfies the needs of its customers. In the case of waterway users, managers are responsible for providing an infrastructure and support services for vessels ranging from ultra-large oil carriers to small recreational vessels, sail-powered boats to high-speed craft, and military ships to weekend boats.

The broad range of operator skills, experience and training necessitates a wide variety of user requirements for safe navigation. These requirements change as user profiles change, and the rate of change has increased significantly in the past 10 to 15 years.

The advent of modern electronic navigation systems, particularly the differential global positioning system, and electronic chart display and information system are revolutionizing marine navigation.

A basic waterways management problem is determining the best mix of navigational aids and services to satisfy the changing needs of the users. This study phase defines the initial categories of users and their characteristics. The categories represent the variety of users and their differences to support the needs and navigational risk assessments, measurement of effectiveness of Coast Guard aids and services, and an estimate of the benefits of proposed waterway changes.

The navigational needs of each user category were explored, and how mariners use the information provided by typical aids to navigation was studied, as well as the potential impact of new technologies.

Additional study is needed to fully understand the range of users and their navigational requirements. To gain further understanding of this area, field tests will be conducted over the next two years.

Navigation risk assessment

Risk analysis can be an effective tool in aiding resource allocation decisions. In many ways, the exposure of risks can be more constructive than the search for certainty. Understanding the range and severity of risk can promote resolution and action.

As a forecasting technique, risk analysis attempts to distinguish probable from improbable results of alternate courses of action. A proper risk assessment can justify management decisions and promote consensus during the resource allocation process.

The Statue of Liberty overlooks users of New York Har

The baseline analysis reviewed the primary risk assessment methologies, models and practices used by the Coast Guard in waterway design and resource allocation, analyzed their efficiency and recommended potential improvements.

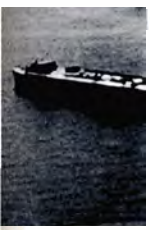
The Waterway Analysis and Management System (WAMS) (See page 7) is the Coast Guard's process for analyzing how a waterway is functioning, particularly for user needs. The Waterway Design Manual and the Relative Risk Factor Model provide guidance when changes and/or improvements are needed. The measure of safety is based on the assessment of the risk associated with transiting each region of the waterway, and is expressed as a relative risk factor.

The study recommended decision-support tools to enhance the Coast Guard's ability to assess risk. The tools are conceptual and are based on perceived needs of waterway managers. They are:

1. **Qualitative risk assessment methodology.** Intended to complement the WAMS, this tool determines the relative impact on safety of any changes to waterway operations or aids to navigation systems.

2. **Resource allocation model.** This proposed application would identify the "best" allocation of resources to satisfy all essential requirements and distribute remaining resources to minimize overall risk. This tool should be useful at all levels.

3. **Comprehensive waterway risk model.** This tool would provide an estimate of vessel accident risks associated with the overall activity in a waterway for representative conditions and usage patterns. Risks would be calculated based on the probability of vessel accidents and consequences. Given the waterway configuration, operation and usage patterns, the model would predict the likelihood of collisions, rammings, groundings, loss of property and environmental harm.



Cooperative risk study

In a cooperative effort, the Coast Guard, Army Corps of Engineers and NOAA are supporting a proposed formulation of a model for ship transit risk. There will be two risk categories - physical and economic. The former relates to the risk of an incident occurring. The latter is the risk of economic loss resulting from that incident.

Physical risk will be posed as the probability that a vessel will run aground on a particular transit. This probability is determined by factors including:

- operator skill - level of training, qualifications, pilots etc.;
- vessel characteristics - types, sizes, maneuverability, maintenance condition, propulsion and steering capabilities, loading condition, etc.;
- transit conditions - marine traffic, navigation aids, waterway management systems etc.;
- topographic difficulty - waterway geometry, hydrological conditions, etc.;
- environmental difficulty - visibility, sea state, currents, etc.; and
- the quality of the operators' information about the waterway and its condition.

Economic risk will be based on expected losses associated with groundings in a region. These losses are related to the physical risk of groundings and other factors such as traffic volumes, vessel size, cargo and environmental sensitivity of the region. Included are economic losses directly associated with the vessel casualty (ship damages, crew injuries, cargo loss) as well as indirect losses in environmental quality, living marine resources and human health risks.

First of all, a list of factors that can be expected to explain the risk of grounding will be developed. Historical data and statistical tests will be used to examine how well the parameters explain the occurrence of groundings.

Two data sets will be developed: one describing transits that resulted in groundings and the other describing safe transits.

The grounding information will come primarily from historical data on actual accidents.

Information on a representative set of safe transits will be generated artificially, based on vessel traffic statistics and historical information on environmental conditions in the study regions.

During the next year of research, the following projects are expected to be accomplished:

- establish database sources for marine accidents and safe passages;
- conduct a statistical analysis on available data for two port regions;
- evaluate existing hydrographic and environmental databases and models;
- identify needs for database population; and
- identify methods for data collection.

Effectiveness and benefits estimations

This topic area is based on the need to measure the effectiveness of waterways improvement efforts, and to determine the overall benefits of the improvements. Performance measures determine how effectively and efficiently the Coast Guard is providing the aids and services required for safe navigation.

Current practices used by the Coast Guard to measure the performance of waterways management and link activities to outcome measures were reviewed. Recommendations were made to improve the Coast Guard's performance measures.

The first step in this process is to establish performance goals for waterways management. This is a responsibility of the project sponsor, and will provide specific direction and focus to future research.

Conclusion

The assessment project is designed to develop the information base and management tools for improved waterways management by the Coast Guard. Driven by the need to look at implications of changing customer requirements and the impact of improved technologies, this investigation will reassess the different categories of waterway users and their needs.

The variety of users often results in conflicting requirements for waterway usage. The challenge of waterways management is to resolve user conflicts and maintain waterways efficiency without sacrificing navigation safety and environmental quality.

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A partnership *written* in water

By LCDR Richard E. Tinker

The Army Corps of Engineers and the Coast Guard share much of the responsibility for the stewardship of United States navigable waters and their management. The two agencies have separate, yet complimentary duties and responsibilities, and over the years have established a very strong partnership.

Partnership

Our country's navigable waterway system is over 25,500 miles long and contains about 300 deep-draft and 600 shallow-draft ports and harbors. Neither the Coast Guard with approximately 37,000 military and 5,600 civilian personnel, or the Corps, with some 600 military and 40,000 civilian employees, can operate independently of each other and accomplish the same objectives as they can by working together. They stretch their resources through cooperative efforts to accomplish navigation missions. They share navigation information, newly developed technology, dredging, facility space, expertise, personnel and responsibility.

Navigation

There are very few things that happen on rivers or in ports that are not passed back and forth between the Corps and the Coast Guard. Up-to-date information, even from databases, is shared formally and informally between members of each organization.

When casualties, shoaling, lock and river closures or other marine incidents occur, the Army Corps of Engineers and the Coast Guard exchange data to gain more knowledge of the situation and make better decisions regarding appropriate responses. The use of this shared information can reduce the number of personnel needed to respond to the incident. Also, the Coast Guard can comment on each Corps permit proposing changes to a waterway.

The Corps also helps the Coast Guard locate obstructions in navigable channels after sinkings, a bridge collapse, shoaling or other causes of channel blockage. When a sunken vessel is located, the Corps tries to find the owner or operator to arrange removal if both agencies agree that it is a hazard to navigation.

Dredging

Dredging is an important part of the Corps' navigation mission and channel maintenance that may directly affect the Coast Guard's aids to navigation program. Especially in remote areas, the Corps will often assist in realigning buoys after a new channel is cut or reestablished after dredging, or will relocate buoys found off station during hydrographic surveys to map the bottom contours of the channel.

During the *Exxon Valdez* oil spill in Prince William Sound, Alaska, in 1989, the Coast Guard asked the Army Corps of Engineers for on-scene support. The Corps dispatched two hopper dredges, *Yaquina* and *Essayons*, to Alaska to assist. The Corps tried to suction oil into the hoppers, but were not successful until they decided to place the draghead upside down so it could be held just under the surface and suck the upper layer of oil from the water.

Research and development

The Coast Guard takes part in Corps research and development projects. For example, the Corps has been working on a computer-driven ship simulation model to use in designing more efficient channels.

When the model needed to be validated, the Coast Guard supplied personnel familiar with the topography, traffic, aids to navigation and other channel characteristics in the simulation area to see if the model really worked.

Conclusion

There are many other ways the two organizations cooperate to better cope with force reductions, budget cuts and dwindling resources. The partnership that has grown between the Army Corps of Engineers and the Coast Guard is important to both agencies, and continues to offer excellent service to waterway users.

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Bucket dredge and scow deepen channel.

Many fingers in the pie

By Ms. Margie Hegy

Managing more than 25,500 miles of waterways is a big job, which is shared by several federal, state and local government agencies. Each agency manages a slice of America's waterways' pie, but may be oblivious to what the other fingers may be doing.

In the spirit of reinventing government and doing more with less, coordinated waterways management becomes extremely critical. Without a network to organize and harmonize all the various "fingers in the pie," the mariner could be caught in the middle.

Forum

In March 1993, the United States Army Corps of Engineers sponsored an interagency conference on waterways navigation research and development. Discussions at this meeting clarified the fact that while many agencies were responsible for various waterways management functions, there was little, if any, coordination among them.

A forum was established through which representatives of the agencies involved with aspects of waterways management could launch cooperative efforts aimed at specific issues. They would also develop overall interagency objectives.

The first meeting of the Interagency Committee on Waterways Management, chaired by the Coast Guard, was conducted in February 1994. Membership consists of representatives of the Environmental Protection Agency, Defense Mapping Agency, Minerals Management Service, United States Army Corps of Engineers, Maritime Administration, National Ocean Services of the National Oceanographic and Atmospheric Administration, Research and Special Programs Administration under the Department of Transportation.

In February 1995, the committee signed a formal agreement identifying its vision, mission and goals.

Objectives

The objectives of the committee are to:

- promote safe and environmentally sound use of waterways;
- optimize the use of national waterways for transportation, recreation, commerce and defense purposes;
- ensure effective waterway information exchange among federal agencies;
- minimize duplicated efforts among waterway-responsible federal agencies and coordinate overlapping waterways management functions;
- elevate public awareness of the importance of our national waterways to our nation's economy;
- assess the effectiveness of all components of the waterways system and develop measures and means for continuous evaluation of navigation safety and efficiency; and
- identify, evaluate and promote specific research and development projects and programs that would benefit from interagency collaboration.

Coordinating issues and activities with other federal waterway managers is essential to provide users with a safe, effective, efficient and environmentally sound waterway system.

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"Without a network to organize and harmonize all the various fingers in the pie, the mariner could be caught in the middle."

Some 76 million recreational boaters use our waterways.

Photograph by Craig Thurber.

Serving 76 million boaters

By CAPT Anthony Stimatz

Waterways management is mostly referred to in connection with commercial maritime transportation. Unfortunately, this view leaves many waterways users — including some 76 million recreational boaters — out of the picture.

A different, more realistic view emerges with a breakdown of actual waterway activities, ranging from swimming and surfing to tanker transits and aircraft operations.

Waterway Activity Spectrum

Personal/ Individual	Recreational Boating	Occupational/ Professional	Commercial Vessel	Aviation/ Aircraft
Swimming	Cruising	Law enforcement	Barges	Seaplanes
Diving	Sailing	Racing	Tankers	Wing/ground
Snorkeling	Skiing	Marine facility	Ferries	Flarecraft
Racing	Fishing	Maintenance	Liveries	Hangliders
Tubing	Hunting	Test & evaluation	Passenger	Float planes
Surfing	Racing	Defense	Fishing	
		Environmental	Cargo	

Across the spectrum and within each area, a great number of activities occur, which involve people, craft and the physical environment in different ways. Each waterway activity area is managed by an equally large number of operations. They include standards, regulations, legislation, data gathering and analysis, permitting, enforcement, international coordination, education and training.

Coast Guard programs

There are Coast Guard programs that completely cover one activity area, such as recreational boating safety and merchant marine safety. Others reach across several areas, like short range and radio aids to navigation, ice operations and bridge administration. Still other programs, including search and rescue, environmental protection and law enforcement, cover all activities.

In addition, the Coast Guard is responsible for many waterway safety support systems, including the National Maritime Distress System, administration of vessel traffic services (VTS), command and control of all Coast Guard operations, and maintenance of support readiness capability for defense purposes.

Definition

A more complete definition of waterways management is: "an integrated systems approach for identifying the basic elements existing in the marine operating environment, evaluating their relative risk or role in properly maintaining and defending that environment, and taking timely appropriate action to maximize the integrity of port and waterway safety to support the goals of and facilitate consensus or resolution between maritime commerce, recreation and conservation interests."

Clearly this definition embodies the purpose of the Coast Guard. Like the Federal Aviation Administration is to aviation or the Federal Highway Administration is to highways, the Coast Guard helps manage, coordinate and respond to activities on the nation's waterways, in the best interests of the United States.

Recreational boating safety

The Coast Guard's Recreational Boating Safety Program works toward balancing the future needs of America's boaters with competing demands of commerce and the environment.

Program vision

As a federal government agency and a public servant, the Coast Guard as the national recreational boating safety coordinator is mandated by congress to improve the boating experience of the American public. The program strives to reach consensus among all stakeholders in waterways activities and across all modes of transportation. Customer needs define workloads and priorities, and customer satisfaction measures the program's success.

Program mission

The mission is to minimize loss of life, personsonal injury, property damage and environmental pollution associated with the use of recreational boats by preventive actions, to maximize the safe use and enjoyment of United States waterways by the public.

Continued on page 18

Our ports and waterways are also used by commercial vessels from all over the world.

Photograph courtesy of the Port of Houston Authority.

Continued from page 17

Program goals

Four basic goals supporting this mission are to improve:

- the demonstrated knowledge, skills abilities and behavior of boaters;
- the safety of boats and associated equipment;
- the physical and operational boating environment; and
- intermodal and interagency cooperation, coordination and assistance.

Commandant goals

The Recreational Boating Safety Program vision, mission and goals are closely aligned with the eight goals of the commandant for the Coast Guard to:

provide leadership and a working environment to enable all personnel to reach their full potential;

- place diversity at center stage;
- fulfill the mandate to streamline without reducing essential services;

maintain a strong response capability — always ready as a military service to meet multi-mission requirements;

enhance its reputation as the world's premier maritime service;

act as an intermodal partner in the implementation of the strategic plan of the Department of Transportation (DOT), particularly in the area of safety;

achieve the highest quality management practices and performance; and

pursue and exploit new technologies to improve productivity and mission performance.

Intermodal system

Although limited in focus by budgetary constraints, the Recreational Boating Safety Program must coordinate with administration, DOT and Coast Guard initiatives as they relate to the intermodal national transportation system. While recreational boaters add little to the efficiency of this system, they have demonstrated their ability to impede, slow or even stop it.

This was graphically illustrated by the recent proposal by Chicago to change opening and closing bridge schedules. This proposal would have restricted the passage of boats even beyond rush hours. City and automobile traffic priorities were pitted against those of boaters on the river. Thus far, the boaters have won.

In contrast, major shippers have expressed concern over transiting harbors filled with recreational boaters. Clearly, the delay of arrivals or departures to avoid weekend boaters would significantly alter the transportation system flow for that harbor area.

Cooperative approach

The Recreational Boating Safety Program must work closely with other waterways management efforts of the Coast Guard. They include search and rescue, law and treaty enforcement, marine environmental protection, merchant marine safety, bridge administration, aids to navigation, domestic ice operations and vessel traffic services.

These activities uniquely define the Coast Guard as a steward of the nation's waterways. This role extends on, over and under navigable waters of the United States out to 200 nautical miles, and, in increasing cases, across international maritime trade routes.

Recreational boating safety efforts are conducted in partnership with the states, the Coast Guard auxiliary, national boating organizations, boat manufacturers, and other federal agencies including the Army Corps of Engineers, National Park Service, Bureau of Land Management and Forest Service.

Conclusion

To harmonize the needs of all waterway users, the Coast Guard must act as a facilitator, consensus builder, standard keeper, moderator and clearinghouse for all issues and information related to boating safety. This role will expand as the needs of some 76 million boaters must be balanced against the economic and environmental requirements of the country. The Coast Guard must cooporate with all stakeholders and partners across the waterway activity spectrum.

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March to precision navigation

By CDR Douglas S. Taggart

By weight, 95 percent of United States overseas trade moves by water. This trade creates local and regional economies and contributes substantially to the national economy. The Department of Transportation estimates cargo activities in ports in 1992 contributed $140 billion in services and $14 billion in federal taxes, added $74 billion to the gross domestic product and generated 1.5 million jobs.

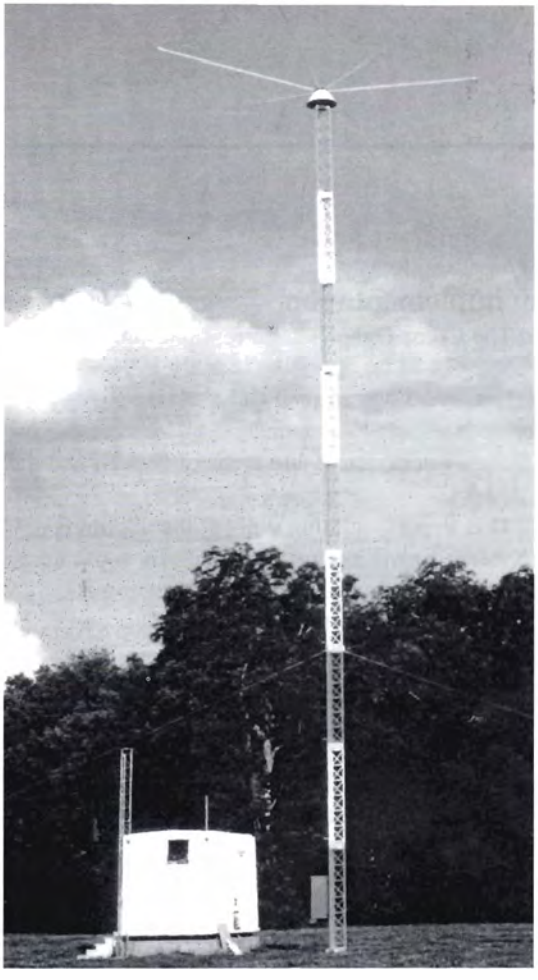
The efficient movement of goods through United States ports depends on the effective performance of the 25,000 miles of navigable channels linking American communities to each other and trading partners overseas. The Coast Guard establishes, operates and maintains electronic aids to navigation to assist maritime commerce, along with the armed services and commercial air facilities.

Aids to navigation

The first electronic aids to navigation introduced by the Coast Guard were radiobeacons in 1921. They are nondirectional with ranges of 10 to 175 nautical miles. The radiobeacons were followed by Loran-A in the early 1940s, Loran-C in the late 1950s and Omega in the 1970s.

Loran-A supported the allied effort in World War II for military maritime and aviation purposes. Loran-C, which also supported the Department of Defense, was more accurate than Loran-A. And Omega was the first terrestrial-based worldwide coverage system developed for the Department of Defense. The Coast Guard became involved in its operation in the late 1970s. However, none of these systems meet the navigational needs of harbor and harbor approaches.

The Federal Radio Navigation Plan specifies the harbor and harbor approach navigation accuracy requirements as eight to 20 meters with 99.7 percent availability (the percentage of time a system is available for use). The plan also defines the integrity of a navigation aid as its ability to provide timely warnings to users when the aid should not be used for navigation.



A typical Differential Global Positioning System.

Global positioning

In 1983, the Coast Guard and the Department of Transportation's Volpe National Transportation Systems Center cosponsored research into the use of a Differential Global Positioning System. which increases the accuracy and adds integrity to the Department of Defense's Global Positioning System

Based on a constellation of 24 satellites orbiting the earth at high altitudes, the Global Positioning System provides worldwide radionavigation capabilities that complement the traditional terrestrial-based Loran and Omega systems.

During this same year, a special committee established by the Radio Technical Commission for Maritime Services, a joint government and industry technical standards group, developed standards for a message format to accommodate various communication systems with high accuracy and reliability for air, sea and land users. In 1984, when this was accomplished, the existing radiobeacon network became a convenient approach for transmission of the Differential Global Positioning System corrections.

In 1989 and 1990, the Coast Guard Research and Development Center in Connecticut, modified a radio beacon at Montauk Point, New York, to broadcast differential corrections using the message format. In August 1990, the radiobeacon began broadcasting with a continuous test mode, marking the transition from research and development to operational deployment.

Continued on page 20

Continued from page 19

System implementation

The Coast Guard's Differential Global Positioning System will be operative in early 1996 with 46 broadcast sites and two control sites. It will provide coverage to the Great Lakes, the coastal continental United States, Puerto Rico, and areas of Hawaii and the Gulf of Alaska.

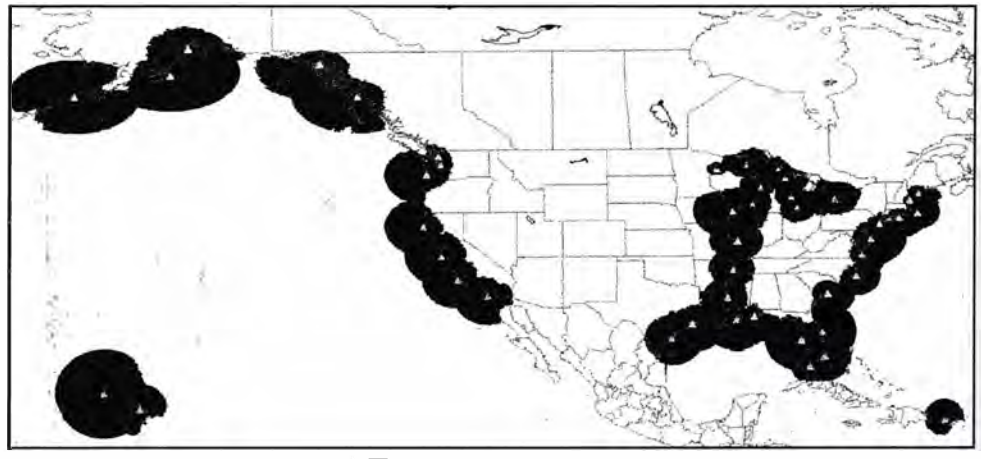
This implementation will fill the Global Positioning System's civil integrity gap with its continuous monitoring of individual satellite accuracy and communicating real-time data to system users. (This gap is the inability of a Global Positioning System satellite to independently determine that its information is valid. Decreasing the warning time of an erroneous signal is built into the Coast Guard's differential system.)

The International Light House Association and the International Maritime Organization recognize the potential safety improvements of an international standard for harbor and harbor approach radio navigation. In fact, the former has endorsed the Differential Global Positioning System and medium frequency maritime radiobeacons as a dependable broadcast medium.

System elements

The functional elements of the Differential Global Positioning System include:

- reference stations — precisely located receiving equipment sites with computers to calculate corrections based on comparing satellite messages to a known location;
- broadcast site — marine radiobeacon providing correction data link to users;
- integrity monitor — precisely located minimum shift keying radiobeacon receivers and Global Positioning System receivers capable of applying differential corrections. The corrected position is compared to the known position for accuracy;
- control station — the site for human, centralized control of service elements, as well as service performance data archiving and processing; and
- communications network — provides a link between sites for passing performance data and control commands.



The Coast Guard's Differential Global Positioning System in January 1996.

Future

The Coast Guard wants to expand the system of 46 broadcast sites planned for 1996 to include 11 additional sites to provide coverage into the western rivers. In addition, radiobeacon transmitters may be modernized with solid state, high efficiency equipment with battery back-up in lieu of diesel generators.

This real-time navigation and positioning capabilities of the Differential Global Positioning System joins with other technology to enhance navigation safety throughout United States waterways.

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POWER of information

By CAPT Edwin E. Rollison, Jr.

The safe, efficient operation of our marine highways depends on investment in and maintenance of ports and waterways. It also depends on the gathering, processing and dissemination of timely, accurate and reliable information to enable responsible decision-making, ashore and afloat.

The Coast Guard is committed to a national effort to enhance the safety, economic vitality and environmental protection of our coasts, ports and waterways through preventive and protective measures. Catastrophic accidents, such as the *Exxon Valdez* oil spill in Prince William Sound, Alaska, in 1989, focus attention on the need to improve these measures.

The Oil Pollution Act of 1990 (OPA 90) identified improved aids to navigation and vessel traffic services (VTS) as a means to enhance maritime safety.

VTS

More than 200 vessel traffic systems are operated by government, commercial and private organizations throughout the world. The Coast Guard's VTS consists of interactive, shore-based systems that provide navigation information and support services to mariners transiting our waterways. The Coast Guard operates eight VTSs in the United States. There are also a number of private VTS-like systems.

The Coast Guard intends to enhance and expand these navigation services through a project called, "VTS 2000." It has five objectives:

establish new systems based on a ports needs study mandated by OPA 90;

2. ensure compatibility with other information systems, i.e., to exchange data with the Coast Guard's Automated Mutual Vessel Emergency Response and the Marine Safety Network, and other government and commercial systems;

develop non-proprietary, "open architecture" flexibility for future changes;

retrofit existing VTSs to create a national system giving all ports the same minimal techni cal capabilities and standard connections with the maritime community; and

enhance logistics support through common software, hardware and other equipment.

Port-needs study

OPA 90 directed the Coast Guard to conduct a port-needs study to objectively evaluate the safety and economic benefits to be gained with a VTS in major ports and waterways. After a cost-benefit analysis, 23 waterways were grouped into three categories: positive, sensitive or negative net benefit.

VTS 2000 focuses on 15 ports categorized as having positive or sensitive benefits, plus two other ports with existing Coast Guard VTS systems. The study estimated combined benefits of more than two billion dollars from collision avoidance, pollution prevention, loss of life, cargo loss or damage, and hazardous material spill prevention in the 17 ports over a 15-year life cycle.

Concept team

In February 1993, the Coast Guard formed a team to analyze VTS 2000 needs and develop an operational concept. The team was made up of 18 representatives from the maritime industry, Coast Guard and other government agencies interested in the project.

The operational concept provides a vision of VTS 2000 when fully implemented. It is based on the belief that the most effective way to reduce accident risks is to provide vessel operators with the necessary information for sound navigation decisions.

The Coast Guard will continue to rely on the advice of the maritime community regarding port design and implementation through the acquisition phase.

Acquisition phase

The major system acquisition process, under the Office of Management and Budget, provides the framework for a uniform planning approach from initial design through deployment, resource management, execution, contracting and meeting oversight requirements of the Department of Transportation and Congress.

The Coast Guard emphasizes the "best value" system for each port, considering individual alternative applications as appropriate. Proposals submitted by industry are being evaluated to identify the most capable contractor to match the needs of a particular port with the most appropriate system attributes.

Continued on page 22

VTS Houston/Galveston serves the port of Houston, Texas. ***Photograph is courtesy of the Port of Houston Authority.***

Continued from page 21

Acquisition and contract strategies provide flexibility to determine the appropriate sensor mix for each port. They also enable us to adapt VTS 2000 to any port. Alternative operating and funding schemes are possible within the scope of these strategies.

The Coast Guard is already participating in one VTS 2000 alternative organization, the Los Angeles/Long Beach Vessel Traffic Information System. A partnership with the state of California was created to operate this system.

National system

VTS 2000 will be a national system, providing standardization and reduction in life-cycle costs. However, the system will be flexible enough to accommodate unique port requirements. To accomplish this, a set of "core" requirements applicable to all ports are being developed, plus specific requirements to fill the needs of individual ports.

Future study

The Coast Guard and the Marine Board of the National Academy of Sciences is commissioning a study to assess issues and recommend advanced information systems. This study will continue the work begun in the board's October 1994 *Minding the Helm* report, which describes the large-scale marine navigation and piloting system. The board will assemble professional experts to help define public and private roles in developing and operating marine information systems.

Conclusion

The Coast Guard is committed to enhancing the safety of marine transportation and protecting the environment with the least possible public investment. VTS is one of several critical means to attain this goal.

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Barge and towing industry establishes comprehensive safety initiatives.

By Mr. Thomas A. Allegretti

The U. S. domestic barge and towing industry plays a vital role in the transportation of our nation's essential commodities, carrying over 50 percent of all grain bound for export, 24 percent of the nation's coal and 35 percent of all petroleum products. In order to ensure the health of the industry and the protection of our nation's waterways, it is essential that safety be the industry's number one priority. Recognizing this, the American Waterways Operators (AWO), the national trade association representing the barge and towing industry, has taken a leadership role in promoting maritime safety through an important new industry-driven initiative for its members — the AWO Responsible Carrier Program. Following is a brief overview of what the program is and what it is designed to accomplish, the philosophy behind it, how it originated, and where it is going from here.

Background

AWO's Responsible Carrier Program is a safety program for barge and towing companies, which establishes operating principles, practices and guidelines which meet or exceed those required by federal law or Coast Guard regulation. The program was officially established on December 7, 1994, when AWO's Board of Directors voted unanimously to approve the program as a code of practice for AWO member companies.

The Board's vote was the culmination of some eight months of effort which got underway in April of last year, when the Board voted to establish a senior-level task force of barge and towing industry executives to put together the outlines of a new safety program for the industry. The task force was charged with developing a series of "recommended positions, practices and standards aimed at enhancing the safety of the barge and towing industry." There were two factors driving this initiative, one internal to AWO and one external.

Internally, this work stemmed from one of 23 objectives laid out in AWO's year-old strategic plan, *AWO 2000*. Among other things, *AWO 2000* directs the association to "improve industry safety and environmental protection by establishing preferred industry operating principles and practices." Externally, the program was a logical next step in the process of industry self-examination, which began in the wake of the September 1993 derailment of the Amtrak *Sunset Limited*. The guiding philosophy behind the program is that while government clearly has a role to play in ensuring safety and protecting the marine environment — principally by setting the floor below which industry operations must not fall — the primary responsibility for ensuring safety in the industry lies not with government, but with the industry itself. We're the ones who know our business best, and we're the ones who have the most ability and the most responsibility for ensuring that we operate to the highest standards of safety and environmental protection.

In early December, at AWO's 50th anniversary luncheon, Transportation Deputy Secretary Mortimer Downey announced the program publicly for the first time, calling it "far-reaching" and a program which "... puts the responsibility for safety in the hands of the industry itself — where it belongs." AWO agrees with Deputy Secretary Downey that the responsibility for ensuring safety rests, first and foremost, with industry itself. Industry must be the first line of defense in the effort to assure safe and environmentally benign operations. Industry must be the first to identify operational problems and to devise solutions. It is only when we fail to do so that we should look to government to fill the void we've left. That philosophy is a principal impetus for the Responsible Carrier Program.

There also exists a fundamental difference between the Responsible Carrier Program and a government rule. The principal objective of developing government regulations is to establish a floor below which no operator should descend. That floor generally describes a *minimum* level of operational prudence to assure public safety. The Responsible Carrier Program does not seek to establish the floor, but to develop principles, standards and practices well *above* those required by law or regulation, and to which responsible companies in our industry should aspire. The members of AWO are within that universe of companies who will aspire to these standards, and the establishment of the Responsible Carrier Program is meant to distinguish them from those companies who operate in compliance with the law, but not well beyond its requirements.

The task force established by the AWO Board to develop the program was small — 13 members — but broadly representative of AWO's diverse membership. It brought together inland, coastal and harbor operators; dry and liquid carriers; large and small companies; and members from each of AWO's five geographic regions.

Continued on page 24

Continued from page 23

In mid-September of last year, after more than five months of intensive effort, the task force produced a draft report which was circulated to all AWO member companies for their review. Regional briefings and outreach sessions were held in St. Louis, Seattle, New York, and Greenville, Mississippi, throughout the month of October to give all AWO members a chance to offer their input on the draft program and help make it a better product. That feedback was used by the task force to refine and improve the program before presenting it to AWO's Board of Directors for approval last December. The program's unanimous approval by the Board is in part reflective of the fact that all segments of AWO's membership had the opportunity to contribute to the program's development.

The program, which emerged from that process is organized into three parts: management and administration, equipment and inspection, and human factors; reflecting the role which each component plays in ensuring safe efficient towing vessel operations.

Management/Administration

The Management/Administration section, the first section of the program, asks companies to look at eight aspects of their operations, and to develop written policies and procedures for each. Of course, simply having company policies and procedures is of limited value if the people in the organization aren't aware of those policies and abiding by them in their daily work, so that's another objective of this section: making sure not only that appropriate policies and procedures are in place, but that they're actually being *put into practice* as the organization goes about its business.

The major categories in which policies and procedures are called for include vessel operating policies and procedures, safety policies and procedures, environmental policies, incident reporting and emergency response, internal audit and review procedures, and organization and personnel policies. Under these headings, some 50 specific policies or procedures — each of which should be consistent with applicable law and regulation, and with the guidelines contained in the equipment and human factors sections of the program —are called for. The emphasis here is on policies and procedures which are important from a safety, as opposed to simply an efficiency, standpoint.

Equipment and Inspection

The second section of the program contains guidelines for vessel equipment and inspection, and is divided into two parts - one for inland towing vessels and one for coastal towing vessels. In most respects, the two sets of guidelines are identical, but there are some differences which reflect the significant differences in the inland and coastal operating environments. This section of the program addresses six major areas: hull, machinery, fire-fighting and lifesaving equipment, navigation and communication equipment, rigging or towing gear, and environmental controls.

Examples of the kinds of things this part of the program does include routine drydocking of towing vessels, as well as formalized annual inspections of such things as doors, windows, walking surfaces and handrails and the like. It establishes guidelines for the development of a comprehensive company maintenance program. It specifies the kinds of fire-fighting, lifesaving, navigation and communications gear which should be carried on a towing vessel, and should be checked and logged on a routine basis. It establishes guidelines for vessel rigging and towing gear, adopting a policy-and-procedure-based approach for inland towing vessels, and more specific guidelines for coastal towing gear. And, it lays out those environmental controls which AWO believes a well-equipped towing vessel should carry -- for example, a spill contingency plan outlining procedures to follow in the event of a fuel spill from the towing vessel, even if the barge in tow isn't carrying oil or chemicals, and isn't required to carry a response plan under OPA 90.

Human Factors

This last section of the program deals with human factors: manning, watchstanding and work hours, and training. The program outlines a set of comprehensive criteria to be taken into account by companies in establishing safe manning levels for their vessels. It establishes maximum work hour limits for all towing vessel personnel, including those not now subject to statutory requirements in this area.

And, it focuses heavily on training, requiring that all vessel crew members receive initial and periodic refresher training in a specified list of subjects. Training requirements are based on the position an individual holds aboard a towing vessel, not Coast Guard license he or she happens to hold, and these requirements cover everyone, from the captain and pilot (or master and mate), to engineers, tankermen and deckhands, both experienced and entry-level.

Implementation

The first major step in implementing the Responsible Carrier Program after the program was approved by AWO's Board and was in the hands of AWO member companies, was the development of an "implementation assistance program" for member companies. In approving the establishment of the Responsible Carrier Program, AWO's Board also established the goal and the expectation that all members of the association will be operating in compliance with the program by January 1, 1998. The implementation assistance program is an ongoing, multi-faceted initiative aimed at ensuring that all AWO members. large and small, have the tools they need to adopt the program.

The first component in AWO's five-part implementation assistance program for member companies is an "implementation timeline," designed to assist AWO member companies in identifying the major steps involved in adopting the program and implementing the program by the stated goal of January 1, 1998. The timeline identifies major milestones on the path toward Responsible Carrier Program implementation and provides reference points to assist companies in gauging their progress toward compliance on schedule. These reference points are designed to be consistent with the target completion dates for other components of the implementation assistance program, including the development of sample policies and procedures, and the compilation of an in-house training library, and the development of an implementation checklist or self-audit tool for companies nearing completion of the implementation process.

Next, we're looking to develop sample policies and procedures, establish a mentor program to facilitate company-to-company information sharing and dialogue, and catalogue the training resources available to help member companies conduct the crew training called for in the human factors section of the program. Other components may also be added as we work with small members to find out what kind of help will best meet their needs.

Another priority initiative will be to put in place a procedure for regular review and updating of the program as we go forward. We want to make sure that this is an evolving document, one which can be modified if we discover there are better ways of doing things or up-dated as time passes and technology changes. AWO feels strongly that safety is really more a process than a destination; we can't just put the program out there and be done with it; we need to continually ask ourselves how we're doing and how we can get better. That will be very important, not just between now and 1998, but after that as well.

Meaningful change

The AWO Responsible Carrier Program marks significant new ground for the association. While the large majority of companies in the industry operate in a way which exceeds that required by Coast Guard regulations, never before has our association taken a role in attempting to gather the industry's varying practices and develop a set of common principles which are recognized as sound and rigorous standards industry-wide.

The program is also a new step for AWO because it offers us the opportunity to lead the way for positive, meaningful change that will make this industry stronger, safer, more environmentally friendly, and which will enhance its reputation and reliability among its shipper-customers. In establishing this program, AWO's members needed to create a program which recognized and respected the industry's operational diversity. The U. S. barge and towing industry spans three coasts, some 25,000 miles of inland and intracoastal waterways, and a wide variety of specific trades from line-haul movments to ship docking work to barge fleeting and shifting. Our industry is wholly distinct from those of deep-sea tankers and dry cargo ships, and the Responsible Carrier Program is deeply rooted in the operational reality of our industry — embracing what we know from experience *will* work and avoiding what has not or will not. These policies were designed to be easily adapted to companies to fit within the context of their specific operational needs.

The goal of the Responsible Carrier Program is clearly to enhance safety and environmental protection. We also recognize that by so doing we ultimately strengthen the health of the American towing industry, and we facilitate its continuing evolution as a productive segment of the U. S. economy and a reliable part of the American flag merchant marine. The bottom line of this initiative is that it will improve the safety performance of our industry. It will make AWO's member companies safer individually and the industry safer as a whole, which benefits all of us. Working together on safety gives us advantages that we don't enjoy individually. By engaging in a cooperative effort, AWO's members feel very good about signing onto this program and they can see the real benefits to doing so.

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Editor's note: this article was printed in its entirety as submitted by AWO.

Traffic management is 100 years old on St. Marys River

By LTJG William B Morgan

It has not always been an easy trip along St. Marys River, historically a vital link between the ore mines of Lake Superior and the steel mills along the shores of the southern Great Lakes.

History

In 1839, the first ship was hauled across the St. Marys' portage. The schooner *Algonquin* was pulled across the strip of land between the river and Lake Superior. By 1855, 15 ships had been dragged across the portage to meet the increasing demands for Lake Superior products.

In 1852, the federal government assumed responsibility for all navigation lights in United States waters on the Great Lakes. This task was to be supervised by a newly created lighthouse board. The 70-mile-long St Marys River had few navigational aids, however, making it a very hazardous waterway.

The opening of the St. Marys Falls Canal (locks) in 1855 greatly increased vessel traffic on the river, trying to cash in on the prosperous Lake Superior trade. The added use also made sailing the river more of a hazard.

The River and Harbor Act of 1880 officially authorized the federal government as the responsible party for the canal. This meant that the government would not only maintain the navigation lights, but operate the locks and make all necessary improvements to the lake and river channels. The state of Michigan could no longer afford to maintain the river system because of steady traffic increases.

On March 6, 1896, Title 33 USC 474 was signed into law. This directed the commandant of the Revenue Cutter Service (the predecessor of the Coast Guard) to prescribe appropriate rules and regulations regarding the movement and anchorage of vessels and rafts in the St. Marys River from Point Iroquois on Lake Superior to Point Detour on Lake Huron.

This marked the beginning of a vessel traffic management system along the St. Marys River.

River Patrol Service

Originally named the River Patrol Service, the vessel traffic management system consisted of the revenue cutter *Morrell* and Lookout Station #1 at Johnson's Point, Lookout Station #2 at the dike and Lookout Station #3 at Little Rapids. The stations were connected by telephone lines to the office of the Pittsburgh Steamship Company in Sault Ste. Marie, Michigan.

During the early days, lookouts communicated with passing ships by kerosene lanterns and signal flags. Often messages were hand delivered to the ships by lookouts rowing small dinghies.

In 1908, the West Neebish Channel was completed and Lookout Station #4 was established. This deep-draft channel enabled larger vessels to sail down the river. It also improved the safety of vessels traveling in both directions. Traffic was routed one way in the especially hazardous areas around Neebish Island. Loaded vessels with deeper drafts transited down river on the west side of the island, and lighter vessels in ballast traveled up river on the east side.

On January 30, 1915, the Revenue Cutter Service merged with the Life Saving Service to form the Coast Guard. Throughout the next several years, many lookout stations were established, then closed as needs and funding levels fluctuated. At one point, there were 11 active stations along the river.

Despite increasing vessel traffic, the River Patrol Service continued to manage the river system with crude communications devices and manned look-out stations.

During the 1940s, all lighthouses and aids to navigation, such as buoys and ranges, along the St. Marys River, including Point Iroquois and Detour Reef Light Stations became part of the River Patrol Service. This added burden actually increased traffic management efficiency along St. Marys River because the Coast Guard was able to control the entire river system through one consolidated command.

In March 1964, the commandant of the Coast Guard approved a proposal to replace the manned lookouts with closed-circuit television at three stations. The first camera site became operational that year at a cost of $27,864.80.

In 1976, there were only three lookout stations in operation. One burned down that year and another was torn down due to dilapidation. This left only Lookout Station #4, which remains operational today.

By 1980, lighthouse automation had begun, which significantly reduced maintenance efforts and costs. Communications were achieved through VHF-FM radios instead of lights and flags.

"Soo control" (the call sign for the vessel traffic service {VTS} control center) had evolved into a vessel movement reporting system that relied heavily on mariners to provide information on traffic flow and hazards.

This on-the-scene information greatly increased the safety of vessels on the river, yet required fewer personnel.

Vessel traffic service

The current VTS uses VHF-FM radios, closed-circuit television, and information from the Army Corps of Engineers and the National Weather Service to provide mariners with accurate, timely safety alerts and instructions while they are transiting the river.

As the 100th anniversary of vessel traffic management on St. Marys River approaches, the dawn of a new era begins. Continuing modernization has led to more effective services to the mariner. New regulations have led the VTS community toward safer, more efficient waterways management.

As we look back on the history of vessel traffic management with its ups and downs, we can look forward to the second century with high expectations for VTS at St. Marys River.

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St. Marys River, Michigan.

Merchant vessel rounds Algiers Point

VTS guides mariners aroun

By LTJG Pete Yelle

The most important waterways management tool in the Port of New Orleans is a unique Vessel Traffic Service (VTS). Established in 1939 by the Army Corps of Engineers, this VTS system is essential in such a heavily congested, hazard-filled port.

New Orleans Port

The Port of New Orleans is located over 100 miles up-river from the mouth of the Mississippi. All vessel traffic from the Gulf of Mexico to inland ports or most major unloading facilities on the river must travel through this port.

Vessel traffic includes deep-draft tank and bulk freight ships, passenger vessels, large ocean-going tow boats and tugs, as well as sightseeing excursion boats, inland tows, river ferries, fishing vessels and gambling casino riverboats. All traffic must contend with normal constraints of river navigation, including severe bends, narrow channels, constant shoaling (See page 67), delicate bridge-span navigation, ever-changing river currents, and high-low water conditions. Combine all these hazards and throw in a major industrial port city with about 1.4 million people, and there is serious potential for a major marine casualty.

The Point

Even more hazardous is a major bend in the river along the city's central business district, which is prime river-front property. Known as "Algiers Point" or simply "The Point," this bend presents a significant navigational challenge for vessels. Indeed, over the years, hundreds of serious accidents have occurred here with loss of life and property.

Vessels transiting The Point must perfectly align their approach to avoid colliding with numerous obstacles. They include ferries on the city's main route, the greater New Orleans bridge system consisting of two separate bridge spans connecting the city of Algiers with downtown New Orleans, two barge fleets, several river boat moorings and wharf berths.

Adding to the difficulties of this obstacle course is the fact that mariners can't see other vessels coming around The Point. Therefore, strict radio protocol by mariners is essential.

Further magnifying these hazardous conditions is the ever-changing river heights or "stages" on the Mississippi. The Lower Mississippi River is directly fed by most of the Western Rivers, including the Ohio, Missouri, Illinois and Upper Mississippi and their tributaries. During spring months, these rivers swell, creating flood surges through the Midwest, which cause similar conditions in the Lower Mississippi. These high river stages increase the navigational risks around The Point. In fact, river current speeds can climb to more than 11.6 feet-per-second. Flood debris includes large trees, buoys and other projectiles which routinely cause barge fleet breakaways. Statistics demonstrate that the number of casualties triples as the river approaches flood stage at the port.

in the Port of New Orleans.

Photographs by Paula Tomaselli.

hazardous Algiers Point

VTS

Because of the large number of incidents and the potential for a catastrophic casualty, the vessel traffic service (VTS) was established for the Port of New Orleans. Originally, it was set up for only seasonal operations which coincided with periods of high water, which is defined as when the Mississippi River reaches eight feet and rising. During these periods, which normally last two to four months throughout the year, the movement of all vessels within the port of New Orleans is governed by VTS controllers.

The controllers hold at least an unlimited masters (inland or ocean-going) Coast Guard merchant mariner's license or a masters license with a first class pilotage endorsement. Operating from two towers located at critical positions around Algiers Point, the controllers communicate and monitor up- and down-river traffic through a system of radios, radar and red/green traffic lights mounted on the towers.

The controllers primarily regulate traffic sequencing so vessels don't meet or cross on The Point. They are in constant radio contact with vessel traffic to send meeting, overtaking and crossing instructions throughout the VTS area in order that mariners may safely navigate the treacherous area around The Point.

In June 1994, VTS New Orleans went into full-time, year-round operations, largely due to additional hazards created by new riverboat gaming legislation and the ratification of the North American Free Trade Agreement, which lifted many trade barriers resulting in increased commercial vessel traffic between the United States and Mexico.

Conclusion

There has been a noticeable decrease in marine casualties around The Point since the VTS conversion to full-time operations. Local mariners applaud this action, maintaining that the increased Coast Guard presence on the river has forced marginal operators to comply with local marine safety policies and procedures.

Mariners can now fully attend to the job of piloting their vessels throughout the maze around The Point with confidence in a safe voyage.

The new system is constantly changing and evolving to meet the needs of the vessels it serves. However, the future of VTS New Orleans is uncertain. There is a proposal to expand it to include remote video and radar sites along the river, thereby tripling the present VTS service area. This full-service VTS would be similar to those in operation in New York Harbor, Puget Sound and Prince William Sound.

However, if the proposed expansion falls under budget cuts, the New Orleans VTS will remain in operation indefinitely as it is today. Mariners sailing through the port can continue to rely on the VTS to help guide them safety around The Point.

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PORTS *makes navigation safe*

By Dr. Bruce B. Parker

PORTS

In 1991, the National Oceanographic and Atmospheric Administration (NOAA) introduced its first Physical Oceanographic Real-Time System (PORTS) in Tampa Bay, Florida. This centralized data acquisition and dissemination system provides water levels, currents and other oceanographic and meteorological data from an entire bay or harbor to the maritime community in a variety of user-friendly forms.

PORTS encourages safe navigation by providing pilots the information they need to avoid groundings and collisions. Accurate current data is also important for Coast Guard search and rescue operations, and in determining the right of way when two ships approach each other in a narrow channel from opposite directions.

Accurate water level information allows shippers to safely load the maximum amount of goods, thus increasing United States exports. It can also decrease lightering time and off-loading for incoming ships.

Hundreds of millions of dollars are spent dredging the channels of United States ports, yet maximum economic benefit from these channels can be realized with real-time (within minutes of actual measurements) water level data from a relatively inexpensive system like PORTS.

PORTS represents the next important step beyond the predictions provided by NOAA's tide and tidal current tables, which the maritime community has used for more than a century. These tables do not include the effects of wind and river flow, which is provided by PORTS.

PORTS advances environmental protection, because marine accidents often cause hazardous material spills that can destroy a bay's ecosystem, along with the tourism, fishing and other dependent industries.

If an accident occurs, PORTS can mitigate the effects of a hazardous spill by helping to predict the spill's movement, thereby assisting clean-up efforts.

Installations

Since the Tampa Bay installation in 1991, there have been two smaller demonstration PORTS installed in the Port of New York and New Jersey, and in San Francisco Bay, California. Both were funded by NOAA's National Ocean Service. A fourth PORTS is scheduled to be installed in September 1995 in Galveston Bay, Texas.

Each PORTS installation and continuing operation involves a federal/local partnership. The latter usually includes participation by the local maritime association representing all important marine users, and state agencies and a university.

Tampa Bay

The Tampa Bay PORTS provides real-time currents, water levels, winds, barometric pressure, and air and water temperature data from a number of locations. The central facility, including the data acquisition system is located on the campus of the University of South Florida, with remote screens at several area offices, including the Coast Guard.

A voice data response system allows pilots to call PORTS from cellular telephones while onboard a ship they are bringing in or taking out of the bay. The public, including the marine community, has access to this voice system, which receives up to 700 calls a day.

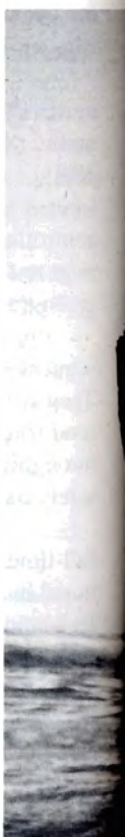
Tampa Bay pilots are especially concerned with currents, particularly at a critical turn where the channel from Port Manatee meets the main channel, and at a second turn further up the bay near old Port Tampa. Currents must be below a knot for large vessels to make these turns safely.

An oil spill resulting from a three-vessel collision in August 1993 just inside the entrance to Tampa Bay demonstrated another important use for PORTS data. The real-time current information was used in predicting the movement of the oil.

New York-New Jersey

In the Port of New York and New Jersey, real-time water level data from four locations is brought directly into the Coast Guard's new vessel traffic services (VTS) center at Governor's Island, along with current and meteorological data off Bergen Point (at the crucial turn from Kill Van Kull into Newark Bay). Maritime users obtain this information via a voice data response system. It is also available on the internet via Columbia University.

Real-time currents off Bergen Point are used by the Coast Guard for right-of-way determinations when two ships approach each other in the narrow Bergen Point West Reach. Right of way must be given to the ship with the "fair tide," because the ship moving with the current has less maneuverability.



When the Coast Guard could only rely on the tidal current tables, it was never certain that wind or river effects had not made the actual currents in the narrow channel different from the predicted tidal currents.

A numerical hydrodynamic model (a computer representation of the water movement in the harbor) is being installed and calibrated to provide predicted currents and water levels at other locations in the harbor, and forecasts of water level and currents including wind and river effects. The model also supports the development of a real-time electronic chart to provide real-time depths, i.e., depths on the chart that change with the tides. The model will also provide currents as input to oil spill trajectory models for use in oil response exercises, mandated by the Oil Pollution Act of 1990.

San Francisco Bay

The demonstration PORTS in San Francisco Bay is being developed as part of a larger project to demonstrate technological solutions to improve waterway management actions.

There is an added environmental purpose to this PORTS. In addition to real-time data from four water-level and wind stations, and a current station, the system includes real-time monitoring of salinity at three locations in Suisun Bay. This supports a state and federal program to deal with detrimental effects of fresh water withdrawal from the Sacramento and San Joaquin Rivers on bay habitats and the Chinook salmon. The data acquisition system is at the California Maritime Academy.

Access

In each harbor and port with PORTS, real-time oceanographic and meteorological information can be accessed via many methods, including phone dial-up with computer and modem, phone dial-up to the voice data response system, and internet. In all cases, the information is updated every six minutes.

Calling the voice response system is like calling a bank for checking account balances. The caller is asked to push "1" for current information, "2" for water level information and so forth.

Need for PORTS

For more than 100 years, mariners have relied on NOAA's tide and tidal current prediction tables, which are required by the Coast Guard to be carried on all vessels of 1,600 or more gross tons. These tables do not, however, tell the mariner what the actual water level or current will be. They only provide astronomical tidal predictions (caused by gravitational effects of the moon and sun). Not included in these predictions are the effects of winds, river flow, atmospheric pressure or water density (salinity or temperature).

Over the years, these tables have been useful in most waterways because the astronomical tide generally dominates wind and river effects, except during storms, and, in most cases, provides a fair representation of actual water levels. Also the astronomical tide itself can be very accurately predicted.

Continued on page 32

Groundings can be prevented with PORTS.

Continued from page 31

Tide and tidal current tables, however, are not enough for today's oil tankers and cargo ships. Many of these vessels are so huge that they are very difficult to maneuver and stop. They can't even enter United States ports except near high tide. Every foot of water depth under keel and every half knot of current flow is crucial. They cannot afford to rely only on tidal predictions and ignore the effects of wind and river flow. They must know exactly what is happening in the waterway immediately. Real-time data measurement and dissemination systems, such as PORTS, provide this information.

Moreover, there are times when even real-time data is not sufficient. It can take hours for a ship to transit some waterways, and a pilot must know what the water level will be in the near future. Likewise, if a ship is taking on cargo and needs to know how much to load to take advantage of the water depths, it is important to know what the levels will be even farther ahead. In such cases, accurate forecasts of changes in water levels due to nontidal forces such as wind and river flow are needed. Water level and current forecasting is much more difficult and less accurate than tidal predictions because it depends on weather forecasts.

New technology

It is only recently that advances in oceanographic instrumentation, computer and telecommunication technologies have produced reliable, real-time oceanographic data for a reasonable cost.

The National Ocean Service has replaced more than half of its old float tide gauges with water-level measuring systems that use an acoustic sensor. With these systems, data can be provided in real time by several telecommunication mechanisms, including satellite.

Real-time current data was difficult and expensive to obtain because it has to be measured in the middle of a channel, whereas water levels can be measured at the end of a pier. Now an acoustic doppler current profiler can sit on the bottom of a channel below ship's keel, and provide current speeds and directions for the water column above it. The profiler is cabled to the shore or to a buoy, and the data radioed to the shore.

Currents can change dramatically with depths in and next to shipping channels or around bends, so that a single current station does not represent the total flow and can miss dangerous shears. An acoustic doppler current profiler installed on a ship or towed catamaran can provide cross-sectional views of currents in a channel as well as views of currents over an entire region of the waterway. This information can be used in combination with the real-time current data obtained from the permanent bottom-mounted profilers.

Other measurement technology improvements will supplement information provided by PORTS with data on waves, visibility and bridge clearances.

Computer technology can provide more power less expensively. Data can now be delivered at a reasonable cost via HF-radio, phone lines, satellite and the internet. Large computer models of a harbor can now be used in real-time situations to provide forecasts and information in areas without sensor measurements.

Forecasting

The National Ocean Service is also developing several prototype projects to forecast water level currents and changes caused by wind and river flow. One is a coastal forecast system, which is a cooperative effort with the National Weather Service and Princeton University.

The first phase of this project is a three-dimensional hydrodynamic computer model of the entire East Coast to the intercontinental shelf break, that is driven by forecast winds from a National Weather Service weather forecast model. The coastal water levels forecast by this system will drive a bay or harbor model for each PORTS area, providing water level and current forecasts throughout the bay or harbor. The first regional forecast project is underway in Chesapeake Bay.

The future

NOAA's ultimate goal is to develop a national PORTS network to provide real-time and forecast oceanographic and meteorological data to mariners in convenient, useful forms. This will help to assure safe, efficient navigation in all United States harbors and waterways, and help protect the environment from hazardous material spills from maritime accidents.

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Winter in Cook Inlet can try the most experienced mariners.

Winter waterway rules prevent mishaps in Alaska

By LCDR John Kwietniak

In previous years, accidents involving vessels unprepared for the harsh Alaska climate occurred with some regularity on Cook Inlet waters. Many vessels did not have minimum standards in protective clothing for their crews, nor adequate protection for the vessel and its equipment. In most cases, the crews were not trained to operate vessels in ice-congested waters.

Most of the weather-related mishaps took place in winter and usually involved a combination of ice, wind and tidal fluctuations. Concerns over vessels, crews and the environment influenced the Coast Guard to establish a special winter program to educate mariners and prevent casualties in prevailing ice conditions.

Winter

Cook Inlet is a 150-mile long body of water in South Central Alaska, bordered on the north by Anchorage and on the south by the Gulf of Alaska. Its width ranges from 10 miles between the East and West Forelands to about 80 miles between the Kenai peninsula and the mouth of the McNeil River in Kamishak Bay. At high tide, the inlet frequently exceeds 30 feet with currents of more than five knots.

Sea ice is normally present from December through March, and some areas in the upper inlet are fully covered with ice. Winter in Cook Inlet can try the most experienced mariners who are not familiar with its harsh conditions. High tides, swift currents and severe cold all make navigation difficult.

Although winter temperatures average 19 degrees F, it is not uncommon for extended periods of weather to go well below zero. Extreme winds intensify the chill factor and provide a catalyst for ice movement along the tidal currents.

Traffic

There are commercial waterfront facilities located in Anchorage, Drift River, Nikiski and Homer. Large commercial vessels generally enter the inlet from the Gulf of Alaska enroute to the Homer pilot station. There a local pilot boards every large vessel to help with navigation.

Homer supports a large commercial fishing fleet, and also has a commercial facility that loads both wood chips and logs. Heading north from Homer along the western shore of Cook Inlet, Redoubt Bay has an oil transfer platform to transfer crude oil in bulk.

Continued on page 34

"The keys to success in most programs are cooperation and communication."

Continued from page 33

Still further north is the port of Nikiski, home of the western hemisphere's only liquefied natural gas loading facility. Two carriers have made routine voyages between Nikiski and Tokyo for the past 24 years. Several product barges and tank vessels also conduct transfer operations in Nikiski. A facility in the area loads bulk liquefied anhydrous ammonia to gas carriers and urea to bulk freighters.

A series of oil and gas production platforms are located even between Nikiski and Anchorage. Container vessels and product tankers comprise most of the traffic going to Anchorage.

Problems

In the past, vessels became disabled because of crews not being prepared to cope with the harsh winter conditions. During a routine boarding a few years ago, boarding officers climbed up the pilot ladder in mustang suits covered with ice only to be greeted by a crew member in sandals, cotton pants and a thin jacket. He would have to handle cargo and moor the vessel in sub-zero temperatures and gusty winds. A hold was placed on the vessel until its owner properly outfitted the crew to operate in Cook Inlet.

This experience, together with a rash of vessels suffering a loss of power due to ice clogging sea chests (sea water intakes), led to the establishment of guidelines for vessel operation in the inlet during winter months. With the help of pilots and operators with long experience in the area, the "winter rules" were developed in 1993.

Winter rules

All commercial tank and freight vessels on a first-time voyage in Cook Inlet or that have not operated over the past winter season there are subject to Coast Guard boardings, normally while at anchor in Kachemak Bay. Winter rules are often checked off along with port-state control regulations, although United States-flag vessels are also subject to the winter rules and are boarded if they are new to the inlet. A qualified marine inspector is in attendance at all boardings to ensure that auxiliary machinery and propulsion plants are ready for a voyage.

It is essential for vessels to maintain sufficient draft to ensure adequate maneuverability, and to keep the sea chest below the bulk of ice. A vessel must have a 10-foot forward draft with six feet over the wheel in Cook Inlet. This requirement often necessitates that freight vessels commit to heavy weather ballasting, normally filling number four or five cargo holds to comply. Any delay in transit is likely to result in two holds filled with ice which must be jackhammered out before loading cargo. If the cargo is water sensitive (i.e., urea), the operator is truly challenged.

Vessels are also required to provide steam installations to both sea chests, and steam operation is also verified. Both masters and chief engineers are instructed to apply steam well before initial ice contact.

Extended deck operations in sub zero weather require sufficient cold weather clothing. This includes heavy winter coats, gloves and boots. Crews who normally work in warm climates are highly appreciative of this requirement.

Additional satisfactory mooring lines are required. Fuel systems to emergency generators and other equipment should be checked out. Also, vessels encountering severe conditions while moored at the facility are required to maintain underway bridge and engineroom watches with main propulsion in immediate standby. Pilots are required to remain aboard during severe conditions.

Partnership

The keys to success in most programs are cooperation and communication. The Coast Guard has formed partnerships with user groups, including industry representatives, vessel agents, pilots and the Cook Inlet Regional Citizens' Advisory Council.

Because of their experience and local knowledge, the pilots' association was used as a sounding board for designing an effective program. Pilots have the full support of the Coast Guard captain of the port on decisions involving vessel safety.

A case in point occurred when a pilot noted insufficient engine RPMs aboard a large bulk freight vessel, which was capable of less than half the normal RPM operating range. It was clear that the parent company was putting pressure on the master to sail. The pilot contacted the captain of the port and the vessel was ordered to anchor in Kachemak bay. It was later discovered that the #2 turbo charger had failed.

Sea ice is normally present from December through March.

Marine industry has supported the winter rules program, with each facility enacting winter rules of their own. They have established mooring requirements and imposed operational restrictions during severe weather conditions. Local facilities have formed a safety committee to discuss terminal issues, potential problems and solutions.

Vessel agents have been diligent in communicating winter rules' requirements to prospective clients. In addition, they oversee the transfer of a cold weather clothing package, eliminating the need for each vessel to purchase separate equipment. The gear is normally placed on board the vessel via pilot boat.

The Cook Inlet Regional Citizens' Advisory Council requires an accountability for Coast Guard actions in the interests of oil spill prevention.

Despite cohesive efforts, some vessels still try to skirt the rules. They can be found anchored in Kachemak Bay, usually for several days, awaiting a return visit from the Coast Guard boarding team.

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"Winter rules" have lowered the rate of weather-related mishaps in Cook Inlet.

Coping with a shrinking channel

By Ms. Patricia Misch

Background

Ever since Roger Williams, the founder of the colony of Rhode Island, established a trading post on the shores of Narragansett Bay in the 1630s, marine transportation has been an essential part of the state's economy. As shallow draft canoes and barges gave way to large ocean-going vessels, a shipping channel was needed.

In 1937, the Army Corps of Engineers was authorized by Congress to build and maintain the Providence River shipping channel. Through regular dredging, this channel has been deepened over time to accommodate larger vessels.

However, no significant dredging of the channel has occurred since 1971, and there has been considerable shoaling (filling up with mud and other earthy materials during normal ebb and flow of the waterway), particularly in the upper portion of Narragansett Bay. In 1992, in response to growing concerns over safety in the channel, the governor of Rhode Island formally requested the Army Corps of Engineers to start a dredging project to maintain Providence harbor and the shipping channel.

The merchant vessel Zeynep K loads scrap metal at the Port of Providence.

Channel status

The Army Corps of Engineers responded by conducting a hydrographic survey of the entire federal shipping channel, including sampling and testing the material that needed dredging. The survey revealed that mid-channel shoaling of three to eight feet was taking place in the northern section of the channel. Further shoaling of six to ten feet along the outer edges of the northern section was narrowing the channel, endangering deep draft vessels. The Army Corps of Engineers reported that restoring the entire channel would entail removing about three million cubic yards of material.

Safety zone

The Coast Guard captain of the port (COTP) of Providence then conducted a risk assessment to determine if there was a threat to safe navigation and continued preservation of the environment. In early 1993, following the assessment, the COTP issued emergency regulations to establish a safety zone in the Providence River and restrict vessel movements in the northern section of the shipping channel.

The safety zone was created to offset inherent risks imposed on safe navigation by the shoaling. There was a real danger of groundings which could lead to loss of life, injury, property loss, and oil or hazardous material discharge. The safety zone would prevent or mitigate such casualties while allowing commercial navigation to continue.

The safety zone limits vessel drafts to a maximum of 35 feet at average mean low water. Vessels with drafts between 35 and 38 feet may transit the channel if there is enough depth under the keel to prevent grounding. Vessels with drafts over 38 feet must have the COTP's permission to transit the channel.

Vessels over 65 feet long are prohibited from passing, meeting or overtaking in the northern section. These vessels are also required to inform all other vessels in the area of their positions and navigation plans. Smaller vessels must keep out of the way of oncoming deep-draft vessel traffic.

On May 1, 1994, the emergency safety zone was enlarged, becoming a regulated navigation area with additional restrictions concerning operations in reduced visibility. The restrictions are working well with no major problems encountered.

Dredging decision

The decision on whether dredging should take place hinges largely on the state's view of existing and projected uses of the channel, as well as environmental, economic and political concerns.

To be competitive and operate at full capacity, ports and marinas need affordable disposal sites. Frequently, there is opposition to such sites.

Proposals for dredged material disposal sites are subject to approval by state agencies and the federal Environmental Protection Agency. Dredging and disposal proposals are based on extensive environmental sampling, testing and impact assessments to identify the most economical and safest alternative. Inevitably, conflicting points of view emerge and need to be addressed as part of the decision process.

Due to the contamination of the dredge spoils with high levels of volatile solids and metals, along with the environmental, health and economic concerns of injecting these sediments into the water column, a decision is not expected in the near future. Recreational users of the bay and commercial fishermen are equally concerned about the potential locations of disposal sites, and whether they could jeopardize prime fishing areas, shellfish harvesting, wetlands, aquatic habitats and beaches.

The approval process for dredging projects sometimes takes years, even decades. Consequently, it is imperative that risk assessments be undertaken by the COTP to preserve the environment and maintain safe navigation.

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The Zeynep K had to transit the Providence River ship channel to arrive at port.

The entrance to the river draws a daily traffic jam on summer weekends.

Cuyahoga River poses a challen

By CDR John J. Davin, Jr.

The Cuyahoga River in Cleveland, Ohio, presents a classic waterways management challenge. Once solely a bustling industrial river, the Cuyahoga has become a popular area for recreational boating and the second most visited tourist attraction in the state. While this economic and cultural expansion has put new life into Cleveland, it has also increased the number of accidents involving large commercial vessels delivering raw materials to industries along the river and the now abundant pleasure craft.

The Coast Guard Marine Safety Office (MSO) in Cleveland has been working with a task force for the past five months to find ways to help reduce the number of collisions between commercial and recreational vessels. Some successful strategies have been developed that could help other ports in similar situations.

Background

Considered navigable for commercial vessels for about six miles, the Cuyahoga River winds a tortuous route through downtown Cleveland. It drew national attention in 1969, when floating oil and debris caught fire and burned. Concern generated by the "burning river" eventually resulted in the Federal Water Pollution Control Act of 1972.

Beginning in the late 1980s, an area known as The Flats near the river mouth began to be developed by restaurants and other waterfront businesses, which built docks for an increasing number of pleasure boats. As this number grew, so did the number of accidents. Between 1985 and 1994, there were 79 serious accidents, costing hundreds of thousands of dollars in damage in property. (There were no fatalities.)

The Flats is now the second largest tourist attraction in the state of Ohio (after the islands in Lake Erie). People come by boats of all sizes to enjoy the river, restaurants, and to watch the huge freighters go by.

In 1989, realizing that something had to be done to increase marine safety on what was suddenly a multiple-use waterway, the Coast Guard captain of the port met with representatives from business establishments, ship owners, industrial customers and recreational boaters to do something about the problem.

Consequently, nine safety zones were created along the river, particularly at sharp bends and knuckles, where docking was prohibited. (A safety zone is a water and/or shore area to which access is limited to authorized persons, vehicles or vessels for safety and/or environmental reasons.) There are provisions for civil penalties of $25,000 per day or per violation, as well as criminal penalties.

The zones did help decrease the number of "run-ins" between commercial and pleasure craft. The safety problem was considered solved.

Task force 1995

The riverfront entertainment and restaurant business catapulted during the next five years, and more pleasure boats began frequenting the area. In the summer of 1994, the number of accidents and complaints from local businesses began to rise again.

Such large numbers of recreational boaters now gather in The Flats on weekends and holidays that boats are rafted out into the river 10 abreast, extending into the dredged navigational channel. This severely restricts the maneuverability of commercial vessels.

In February 1995, the Coast Guard brought together 31 members of industry doing business on the river to discuss their concerns and try to find solutions. The Cuyahoga River Task Force 1995 was formed and established the following subcommittees:

- Safety zones: to justify the need for the present safety zones and possibly recommend new ones;
- Communications: to examine ways to give more advance notice to restaurants and nightclubs when vessels will be transiting the area; and
- Public relations: to find more effective ways to inform pleasure boaters of the risks on the river.

The task force recommended that a new safety zone be formed near the mouth of the river, and that safety zones be identified by marking the river wall with yellow and red paint, and hanging "No docking" signs, similar to "No parking" signs on city streets.

Paging system

It was decided that the most reliable, effective means of notification would be a paging system. A local company provides a service where vessels call a local telephone number with arrival information which is distributed via a pager.

All operators of vessels of 1,600 gross tons or greater are asked to call the service two hours before arriving at the mouth of the river or before getting underway from a dock within the river; giving the name of the vessel, arrival or departure time, and destination.

Participation is voluntary, but local shipping companies show a great deal of support. An affordable service is in place. Pagers are carried by dockhands, bridge tenders, law enforcement officials and representatives of industry.

Conclusion

The cooperation among members of the task force has been outstanding. Sound recommendations to the Coast Guard for voluntary actions will go a long way towards improving marine safety in an efficient, cost-effective manner. It is recommended that this approach be considered in other areas of the country which are faced with similar challenges.

M/V American Republic twists its way down the river.

It is a tight squeeze for commercial vessels even in the absence of pleasure craft.

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Pleasure boats depart marinas within the Cuyahoga River as freighters transit to deliver their cargoes.

Safety focus on towboats

Tank barge perches precariously on Dashield's Lock and Dam on Superbowl Sunday, 1995, after being improperly secured at a barge fleet.

By LT David Fish

Since the 1993 accident involving the towboat *Mauvilla* and the wreck of AMTRAK's *Sunset Limited* train, the Coast Guard has focused significant resources into ensuring that towing vessels are operated safely and responsibly.

Towboats

Towboats come in many shapes and sizes. The larger and more powerful line boats ply the Ohio and Mississippi River systems. Line boats generally have better safety records than pool or shift boats, and are thus subjected to less scrutiny by the Coast Guard

Pool boats range from 50 to 80 feet and have a licensed operator and two or three deckhands. They operate in limited geographic areas, shifting barges from facility to facility. Rarely, if ever, do they make long journeys.

Open fuel tanks pose many safety hazards.

Limiting risk

There are minimal regulations governing towboats, other than some required systems, procedures and equipment. The Code of Federal Regulations, title 46, subchapter "C" as well as the Rules of the Road apply to towboats. For example, they are required to carry light and sound signals, lifesaving and fire-fighting equipment, certified marine sanitation devices, and a minimal amount of garbage and oil pollution equipment. However, marine radar is still optional, although highly recommended.

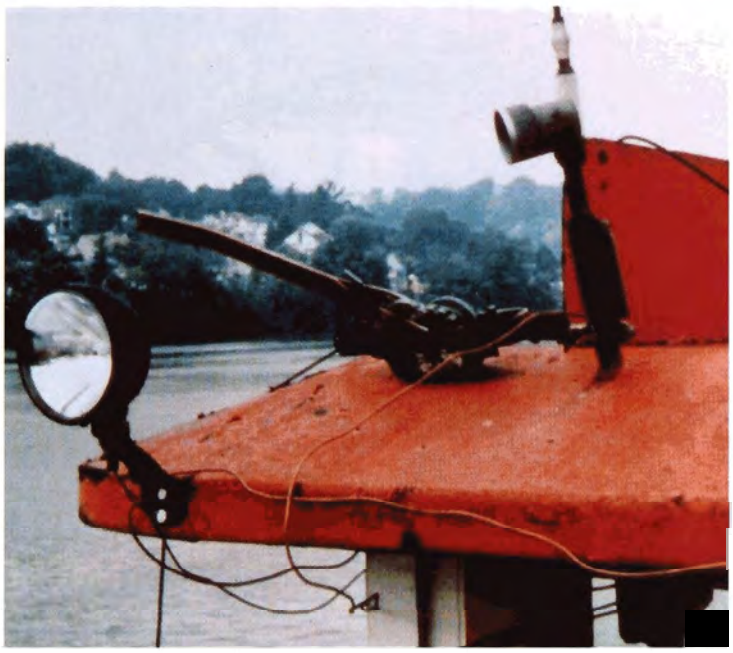
Companies sometimes cut corners and neglect to maintain equipment or install safety systems. In addition, marginal operators fail to invest in required personnel training, pocketing the cost as profit.

Attempting to level the playing field, the Coast Guard will shut down operations for obviously unsafe vessels. The Coast Guard influences the behavior of towboat companies through direct enforcement, education of shoreside personnel and increasing awareness of licensed personnel of their legal responsibilities.

Enforcement

Enforcement is generally the result of random boardings, investigations of casualties or targeted boardings. The latter is based on local intelligence by the Marine Safety Office (MSO) combined with data from the Marine Safety Information System (MSIS).

Towboat boardings are conducted at random during routine harbor patrols or as operations permit. If violations of regulations are uncovered, a warning letter may be issued by the captain of the port (COTP) or the civil penalty process can be initiated.



Bridge is percariously attached to superstructure by jerry-rigged wires.

Tripping hazards on towboats can lead to serious injuries.

If the situation on board the towboat presents an imminent hazard to the port, a COTP order is issued to shut down operations until the vessel is proven to be safe. This is know as "domestic intervention." Vessel operations are prohibited when the COTP determines that a history of accidents, pollution incidents or serious maintenance problems create reasons to believe that the vessel may be unsafe or pose a threat to the marine environment.

In the port city of Pittsburgh, Pennsylvania, the towboat owner must hire an accredited marine surveyor to assess the condition of the vessel and certify to the Coast Guard when the stipulations of the COTP order have been met. Also, the Occupational Safety and Health Administration is notified of these interventions as it shares jurisdiction over uninspected towboats. This partnership has been valuable in improving safety in Pittsburgh.

Prevention

Most enforcement efforts focus on technical or engineering problems. However, the Prevention Through People initiative of the Office of Marine Safety, Security and Environmental Protection points out the need to balance our efforts to address both technical and human issues. In that human error accounts for 80 percent of accidents, if it is ignored, enforcement efforts are inadequate in reducing risks.

To increase awareness of federal requirements, many MSOs have established voluntary compliance education programs. A Towboat Amnesty Program in Pittsburgh educates managers and port engineers in how best to comply with federal requirements.

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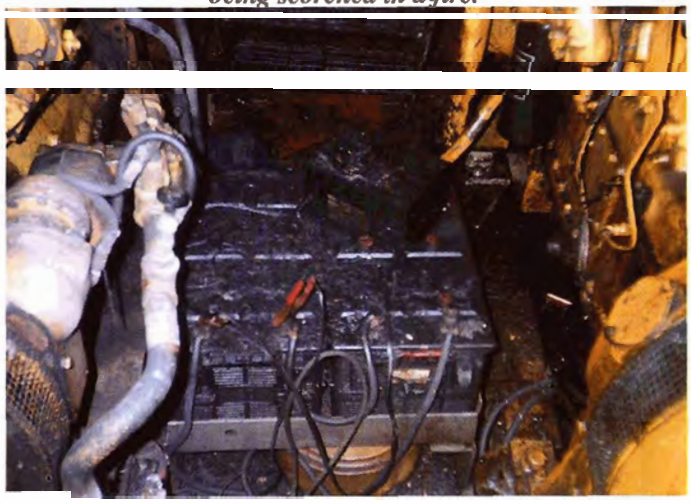
Poor maintenance and haphazard wiring create serious safety risks.

Engineering space should be repaired after being scorched in a fire.



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Towing companies are invited to participate in the amnesty program. Towboat personnel select a vessel to inspect. Recommendations are not limited to uninspected towing vessel regulations, but reflect good marine practices. No civil penalty action is taken on violations identified during the boarding. In exchange, towing company managers agree to conduct a fleet-wide examination of the same intensity.

As a check, the Coast Guard still conducts random towboat boardings to measure performance and the impact of the program.

Another major thrust toward reducing human error in Pittsburgh is the "Road Show." This educational effort aims to inform industry of the investigating officer's purpose and process, and to discuss the relationships between management and individual vessel license holders.

MSO personnel conduct seminars to engage mariners in discussing their roles in keeping marine transportation safe. These road shows focus on operational procedures and the responsibilities of licensed mariners to obey the law. When the scope of their responsibilities was clarified, a more professional approach was apparent, which goes a long way in decreasing accidents and pollution incidents on our waterways.

The learning experience has not been a one-way street. The Coast Guard has also benefited greatly from this dialogue with the marine community.

Conclusion

The Prevention Through People initiative emphasizes that a vessel is only a part of the entire marine transportation system; from navigating to pumping bilges to lighting the crews' quarters. Therefore, enforcement of regulations involving technical and engineering issues must be combined with proactive programs aimed at educating our customers so that together we can achieve a safe, pollution-free environment.

The ultimate responsibility for safety of life and pollution prevention rests with the marine industry. The Coast Guard assists by providing a level playing field and preventing accidents before they happen.

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VTS 2000 —

It is already in New York

By CAPT Thomas H. Gilmour and CDR John H. Olthuis

VTS 2000

Vessel traffic service (VTS) in the year 2000 is envisioned as offering the public a single point of contact in the often confusing maze of Coast Guard mission programs, and entangled command and control found in major port complexes today. But, why must we wait for the year 2000 to provide customers with seamless service?

Current organization

It would be very easy for the Coast Guard in New York and in other major ports to go off in different directions with divergent, uncoordinated, overlapping programs, which results in mass customer confusion. Until recently, this has been problematic.

However, since the VTS began operating in New York in 1991, the Coast Guard commands have made great strides in coordinating diverse efforts. Although it is not solely responsible for this unification, the VTS, with its continuous customer contact, certainly exposes isolated, tangential or diverse programs and helps coordinate their activities.

Relationships

Internal

Regular interaction takes place between the captain of the port, group operations officer, port safety officer and the VTS commanding officer. This group meets every morning for a briefing by the off-going group duty officer and to discuss the port's daily activities. Before assuming the evening watch, the group duty officer visits the VTS to exchange information.

Additionally, in response to incidents of miscommunication, the group commander has chartered two working groups to improve interactions between programs, and ensure that boundaries are transparent to the public.

The first group, led by the VTS, is made up of junior officers from all programs including marine inspection, pollution response, merchant vessel safety, search and rescue, aids to navigation and planning. This group analyzes cases of miscommunication usually caused by lack of understanding one another's duties and responsibilities.

The second group will study watchstanding issues and organization to improve coordination.

External

The group commander/captain of the port talks regularly with many user groups at higher organizational levels. The port safety officer meets regularly with both shoreside and waterside facility and vessel operators. The group operations officer meets regularly with law enforcement and emergency response agencies.

The VTS interacts daily with all pilot organizations in the harbor, agents, tug companies, maritime association members and bridge operators.

Due to these efforts, it is a virtual certainty that Coast Guard customers are being heard and most likely will receive a coordinated response.

Continued on page 44

Coast Guard small boats off Manhattan's Battery are more efficient, thanks to VTS surveillance.

Continued from page 43

Capabilities

A recently installed VTS upgrade provides a computer-based, full-scale geographic presentation of the entire port area. Sensor data from radar and, in the future, automated dependent surveillance can also be presented. The VTS can communicate on any VHF-FM frequency from any one of five sites in the harbor and can observe harbor activities from several closed circuit TV cameras.

Coupled with the surveillance system is a massive database on vessels, cargoes and transit histories. Eventually, this data will be used to model traffic density and develop detailed risk analysis.

New York's VTS is the only one in the country to have a full physical oceanographic real time system (PORTS) installed. (See page 30.) This provides accurate readings from the four water level gauges in the harbor, along with real-time current readings from a Doppler current profiler near the intersection of Newark Bay and the Kill Van Kull waterway at Bergen Point, New Jersey. The system gives the mariner up-to-the-minute tide and current information throughout New York Harbor.

The VTS maintains a "flash fax" system which is preprogrammed with several lists of customers. This system is faster and as widely read as the local notices to mariners. It is used to supplement the normal marine information system for local events such as fireworks, safety zones and presidential security zones.

Typical day

An average of 800 vessel transits takes place in New York Harbor per day, including ferries and excursion vessels. The captains and pilots of transiting vessels are provided relevant, timely and accurate information. The following events occur during a "typical day" at the VTS New York:

- The day starts with port safety personnel notifying the VTS watch officer about a priority I port-state control vessel expected in port by mid-day and requests that the VTS direct the vessel to anchor outside the Verazanno Bridge pending a boarding. When the vessel checks into the VTS at Ambrose, the watch officer arranges for the boarding party to get underway. After several International Safety of Life at Sea (SOLAS) Convention violations are discovered, the vessel is detained until standards can be met. The VTS places the information on display screens, ensuring there will be no movement of the vessel until it is cleared by the Coast Guard's officer in charge, marine inspection.

- Meanwhile, a container vessel inbound Ambrose Channel is counting on a predicted unusually high tide to reach Port Newark with added cargo. The pilot contacts the VTS to check on water level readings and learns that tides are 1.5 feet below normal. The vessel anchors to await more favorable conditions.

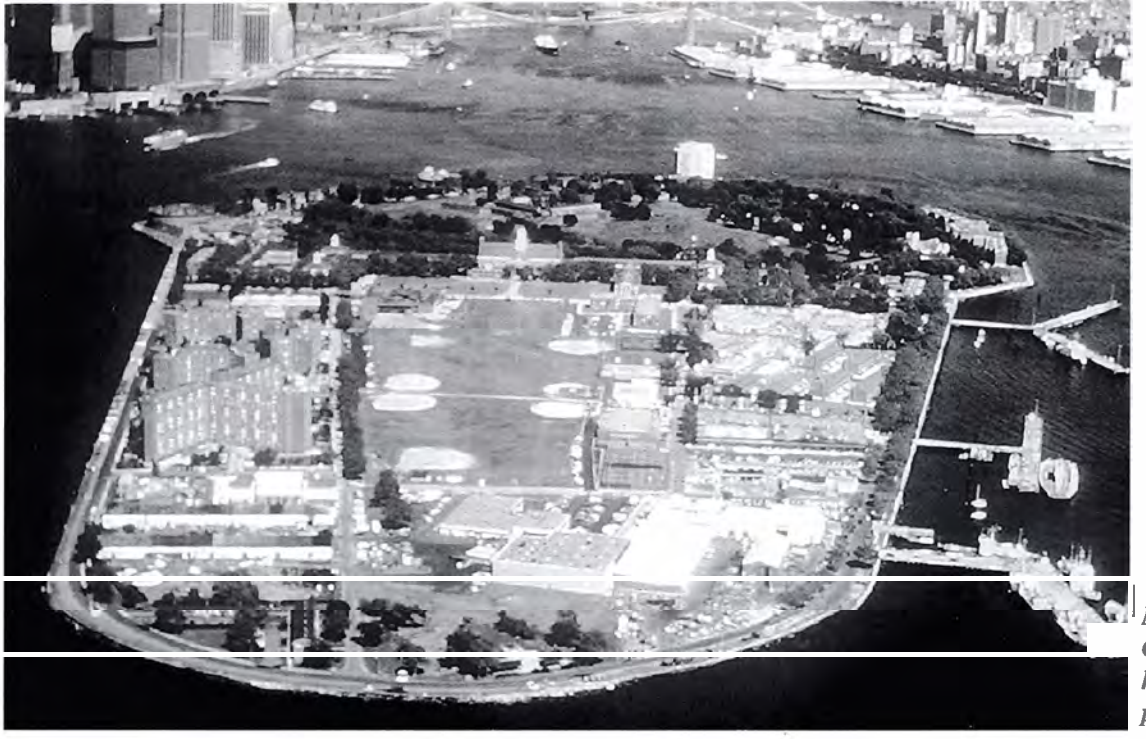
- In the afternoon, a tug and tow underway in the central portion of the VTS area reports a small pleasure craft "fooling around in the middle of the channel." The VTS pans its closed circuit TV cameras into the area and observes a 14-foot open boat with people on board frantically trying to start the engine. The VTS issues an operations notice to warn commercial traffic and notifies group operations. A station boat is dispatched to tow the vessel to safety.

- High northwest winds most likely responsible for the low tides, now cause a loaded oil barge anchored in Bayridge to drag toward shoal water. The VTS alerts the bargeman and secures assistance from a light tug, which holds the barge pending the arrival of a barge company tug directed to the scene. The barge is secured long before it nears the shoal.

- The VTS overhears a bridge-to-bridge conversation between two tugs — one asking if the other needed assistance. The VTS sector operator observes the tug in question maneuvering erratically on the closed circuit TV monitor. It was learned that the tug lost power en route to pick up a loaded oil barge. The tug's company is directed to repair and certify the tug for route and service, and report completion to the group's duty officer before conducting any towing operations in the port.

- During a vessel ride, a VTS operator learns from a tug captain that the optics of a key range in the harbor are often obscured by background lighting. This is reported to the operations officer who recalls that several other trip reports have cited the same problem. The reports are forwarded to the district office for further study and possible generation of an aids to navigation project.

- At sunset, the VTS receives a report that a man has just fallen overboard from a vessel anchored off Staten Island. The VTS immediately contacts a light tug in the vicinity who diverts and recovers the man long before a Coast Guard utility boat could have made it to the scene and just minutes before darkness would have hampered search operations.



New York's Governors Island houses a VTS primary radar site.

- At about 1 a.m. the next morning, an operator notices a vessel depart a remote waterway in the far reaches of the VTS area. The operator knew that illegal fishing activities were known to take place in that area. She observes several suspicious vessel movements and alerts the local station to the activities. A Coast Guard utility boat and state fisheries enforcement officers respond and seize several vessels fishing illegally in state waters.

These are actual events that occurred at VTS New York during the past several months.

Other efforts

Working together, the Coast Guard team has achieved other impressive successful results in managing the port's waterways.

- Most notable was the safe conclusion of the Kill Van Kull Channel improvement project. It forged new ground in waterways management, including ship-control simulations to aid in designing work zones and associated traffic management schemes, interagency cooperation and coordination with the Army Corps of Engineers, and the VTS coordination of aid to navigation changes to ease dredging. The dredging project could not have been completed without the coordination provided by the Coast Guard.

- Over 80 changes to the harbor's aids to navigation were accomplished in a two-week period in 1994. With so much change, the potential for confusing the mariner was real. The VTS kept the up-to-the-minute picture on the changes. A daily synopsis of changes was prepared and faxed to users with the VTS "flash fax."

- The Coast Guard is working closely with the marine community to publish a recommended under-keel clearance for the harbor. Information for the VTS upgrade database is comparing reported vessel draft with waterway depths in various locations. This data provides the basis for daily risk management determinations in the harbor.

Conclusion

All Coast Guard commands are working together to provide a single point of contact for customers in the Ports of New York and New Jersey. On the horizon is the potential for even further integration if a proposal to create a Coast Guard activity in New York is approved. If so, its operations and the port's waterways will be overseen and coordinated from an operations center made up of VTS, communications, command and crisis action sub-centers. With this organization in place, waterway activities will be even more closely coordinated, efficient and effective.

As the future of waterways management, the Coast Guard and privatization of VTS are debated, the lessons being learned in a complex port like New York should be taken into account. The mission coordination value and waterway oversight offered by a VTS is of great value to the Coast Guard officer charged with the safety and efficiency of a major port complex.

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Tug's role in tanker escorting

By LCDR Sharon K. Richey

Background

Under Title IV (prevention and removal) of the Oil Pollution Act of 1990 (OPA 90), single-hulled tankers over 5,000 gross tons transporting oil in bulk in Prince William and Puget Sounds must be escorted by at least two towing vessels. The state of California's OPA 90 legislative parallel, the Lempert-Keene-Seastrand Bill (SB2040), requires that "a determination be made as to the circumstances under which tankers shall be accompanied by a tugboat or tugboats while navigating in the harbors of the state."

California issued interim tank vessel escort regulations for the San Francisco Bay area, effective in May 1993. The state requires laden tankers to be escorted in certain navigational zones with a tug or tugs having an ahead bollard pull equal to the tanker's deadweight tonnage (one pound bollard pull equals one ton deadweight). Bollard pull is the force in pounds that a towing vessel can exert against a stationary object.

With interim regulations in place, the Tug Escort Subcommittee of the San Francisco Bay Harbor Safety Committee further studied the tug escort issues to draft permanent guidelines for final state regulations. One goal was to investigate the method of sizing of tugs to tankers.

Prince William Sound and Puget Sound Federal Tanker Escort Regulations were published in August 1994. These regulations are based on certain performance and operational requirements, including that the "tanker must not exceed a speed beyond which the escort vessels can reasonably be expected to safely bring the tanker under control within the navigational limits of the waterway" or a "thou shalt not ground" decree. A heightened and focused interest in tanker escorting grew from these mandates.

Role of tug

The first issue was the role of the tug in an escorting situation. Peripheral functions of an escort vessel include activities such as navigational assistant or "second set of eyes" and pollution or fire-fighting response. However, the primary role of the escort vessel is to assist the tanker that may experience a loss of propulsion or steering control.

The next question is, "how will the master determine the number and type of tugs necessary to fulfill the intended role of the escort?"

Other questions include: "Where will the tug position itself relative to the tanker during a transit and in an emergency?"

"How will the tug make up to the tanker to be most effective?"

These and other questions were posed to a marine engineering consulting firm in Seattle, Washington.

Tanker escort study

The *San Francisco Bay Tanker Escort Study* is one of several studies addressing the physical science of tanker escorting by tugs. The primary objective of this study was to define the escort requirements for tank vessels operating in the bay area, accounting for waterway geography (including depth, type of bottom navigational constraints, current and wind), vessel size and transit speed.

The study was based on the worst case scenario with simultaneous loss of propulsion and steering with a 35-degree hard-over rudder failure. The study used both computer simulation and full-scale trials.

As part of the analysis, it was first necessary to define the navigational constraints imposed on a disabled tanker by the bridges, channel widths, rocks, islands and bottom contours of San Francisco Bay. Using the criteria that, with 95 percent certainty, the disabled tanker would not ground, the engineering firm calculated "tanker demands" and "tug capabilities" to match the right tug(s) to a specific tanker to prevent the tanker from grounding. To match the right tug(s) to a specific tanker, one simply uses the tug(s) with the capability equal to the tanker demand.

The results suggested reduced transit speeds of 10 knots or less and, in most cases, a least two tugs per tanker, and three or four for the largest tankers entering the bay.

Questions

The subcommittee then raised questions concerning the overall impact of reduced tanker speeds on vessel traffic management within the bay. For example, how would the traffic patterns and flow in the bay be affected by slowing one-third of the commercial vessel traffic? To answer this, Vessel Traffic Service San Francisco coordinated a project with graduate students of a local university who developed a vessel traffic routing model. This computerized tool can assess how changes in policies or procedure impact delay and travel time of ships using a particular routing system. The study concluded that the delays imposed in San Francisco Bay were not significant.

One difference between existing federal and possible future state regulations concerned the extent of mechanical failure to which a tug would have to respond. Federal regulations require the escort vessel to influence the tanker's speed and course in the event of a steering or propulsion failure to reduce grounding or collision risks. A subcommittee work group conducted a cursory review of vessel casualty data for the past ten years, and concluded that the simultaneous propulsion and steering failure (as in the engineering firm's study) would be rare, and that it would be more reasonable to base escort regulations on single-failure casualties. Engineers are conducting more research to determine tanker demand based on a single-failure casualty.

Tanker escort plan

At the same time, the maritime industry in ports under federal escort regulations began developing plans to meet the new requirements. The federal regulations are performance based.

They do not dictate how to specifically match a tug to a tanker or how to use the tug, but simply state that the tug must meet minimum performance and operational requirements, including: towing the tanker at four knots in calm conditions and holding it in a steady position against a 45-knot headwind; holding the tanker on a steady course against a 35-degree locked rudder at six knots; and turning the tanker 90 degrees, assuming a free-swinging rudder and a speed of six knots within the same distance that it could turn itself with a hard-over rudder. In addition, the "thou shalt not ground" and other operational requirements apply.

In response to these performance and operational requirements, industry has begun developing tanker-and-tug specific escort plans. At a minimum,the following elements are considered necessary components of a viable tanker escort plan:

1. Tug to tanker match

The selection of the appropriate tug(s) for a given tanker relies on several variables including: desired transit speed, tanker displacement, type of failure(s) and navigational constraints of the waterway. All factor into the selection process and define "tanker demand" under a given failure mode. Also, "tug capability" must be evaluated. A tug to tanker fit can be made by simply matching it to the tanker's demand.

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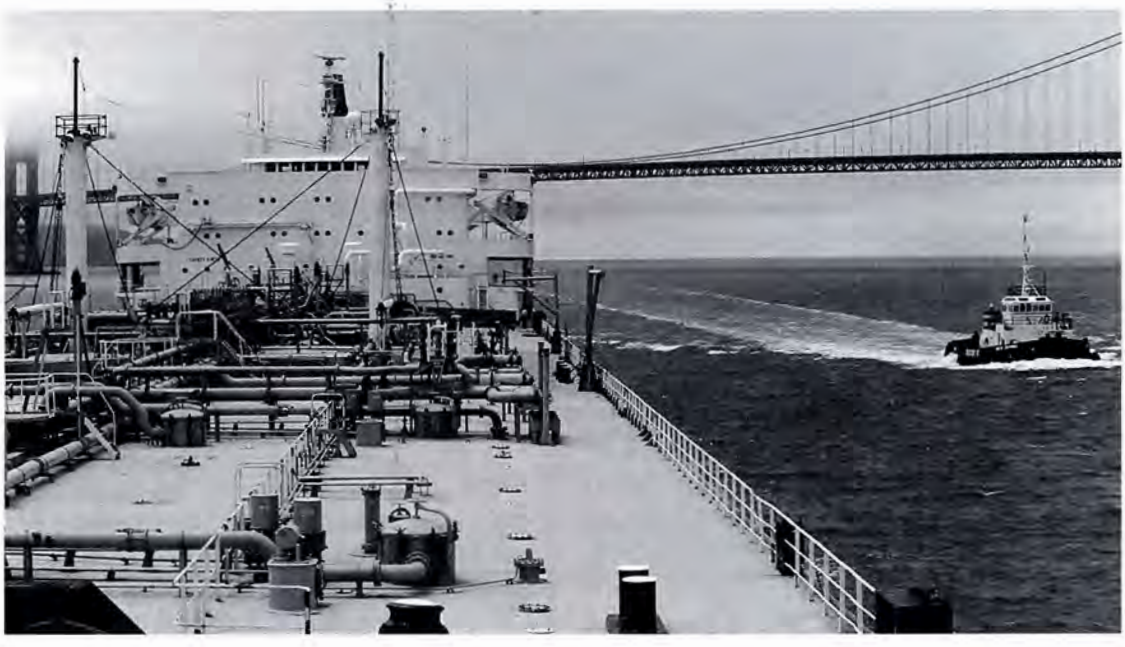

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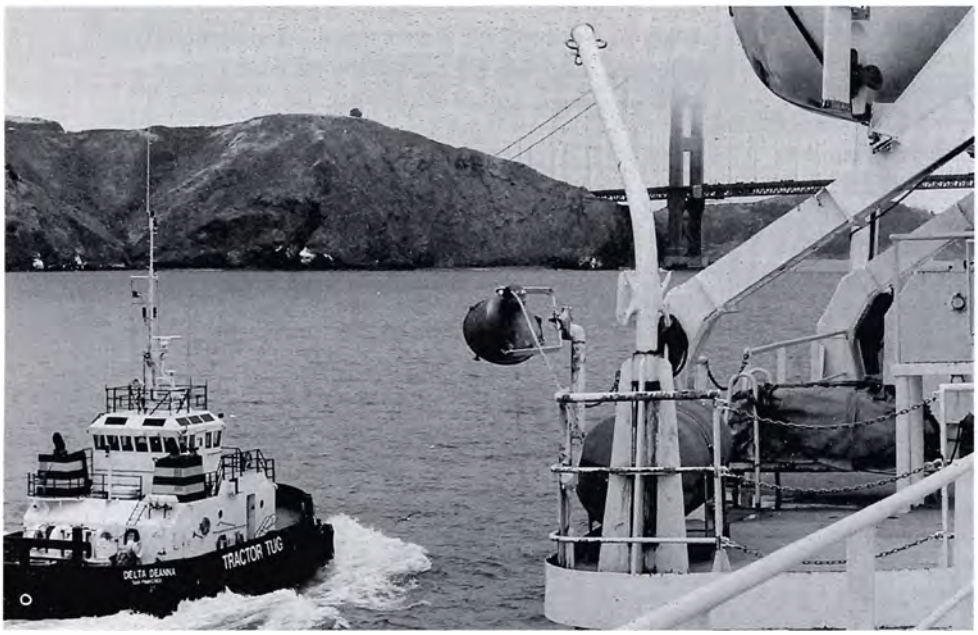
2. Waterway analysis

A given port may contain a variety of waterway types encountered during a transit, each possibly requiring a different assist mode. A long, wide waterway will lend itself to greater tanker speeds and allow for an untethered escort tug. A narrow channel may require reduced speeds with tethered tug(s).

Other characteristics may factor into the risk, such as the type of bottom, i.e., soft mud or hard rock. Bridges and other constraint points are high risk and additional precautionary measures should be considered. Are there routes which unnecessarily bring the tanker close to a navigational hazard? The entire transit route should be analyzed to achieve risk reduction. The tug(s) selected should be able to meet the highest demand imposed by the tanker in a given waterway.



3. Emergency procedures

Tugs can assist tankers in a variety of ways, including retarding, opposing and steering as a rudder. The appropriate response is based on several factors including the geographic location and speed of the tanker. Specific procedures should be developed for making an emergency towline connection. Will the tanker or the tug provide the towline? Which chock will be used? How will the messenger line be prepared and handled? How will the response equipment be immediately available? Where will the crews be positioned and what are their responsibilities? In conducting a waterway analysis, the best assist mode and procedures must be chosen and prepared in advance of an emergency.

4. Equipment

The better equipped the tug and tanker are to execute an emergency tow connection, the greater the chances are of a favorable outcome. Decisions must be made as to which towline will be used and exactly how the connection will be made before an emergency takes place. Feasibility questions should also be addressed. Can the tanker's strong points withstand the maximum potential forces exerted by the tug of choice? Can the towline sustain expected maximum forces and strain?

5. Pre-escort conference

Federal regulations require a pre-escort conference before a transit. The regulations, 33 CFR 168.60, specifically list the minimum topics to be addressed in the conference. A specific detailed tug-and-tanker escort plan may serve well as the basis for the pre-escort conference. A simple one-page checklist may ensure all necessary topics are discussed.

6. Drills and training

Once the emergency towing equipment is identified and emergency procedures developed, it is critical that "human factors" be addressed through training and drills. The best plans, procedures and equipment will not prevent a casualty if the responsible personnel fail to properly carry them out. Practice in making emergency towing connections is especially important to ensuring that timely, effective actions will be carried out in an emergency.

Conclusion

The process of expanding our knowledge with respect to understanding and categorizing the experiences of tanker escorting is ongoing. The maritime industry has faced many challenges while wrestling with these issues.

However, by combining the goal of reducing transit risk with the effective and timely use of tugs in an emergency, we are moving forward with steady progress toward finding meaningful solutions to improving safety in our ports and waterways.

LCDR Sharon K. Richey is chief of Port Operations at MSO San Fransico Bay, Coast Guard Island, Bldg. 14, Alameda, California 94501-5100.
Telephone: (510) 437-3073.

Investigator's Corner

Between June 10 and June 23, 1995, four passenger vessels were involved in casualties, which required all passengers to disembark. Although these accidents occurred within a two weeks, a downward trend in passenger vessel safety is not indicated.

No one on board was injured in these casualties. There was no panic as the crews responded to the emergencies in a professional manner, properly mustering and accounting for all passengers. In addition, quick response by Coast Guard cutters and aircraft allowed for immediate evacuation if necessary.

Issues raised by these incidents will be addressed by the Coast Guard's Prevention Through People initiative. Efforts will concentrate on determining the root causes to apply the necessary remedies in partnership with the maritime community.

Celebration

An electrical fire broke out in the main engine control room of the Liberian-flagged cruise ship *Celebration* at around 11 a.m. on June 18, about 35 miles from San Salvador Island. The space was evacuated and the fire extinguished with a fixed Halon system.

The fire disabled the main electrical and engine control systems. Operating on emergency power, the eight-year-old *Celebration* was without air conditioning, hot water and hot food.

The *Ecstasy*, another Carnival cruise liner, safely transferred the *Celebration's* passengers aboard to be returned to Miami. Then three commercial tugs towed the vessel to Freeport in the Bahamas, where it will be investigated by a Liberian surveyor, with the participation of the Coast Guard and the National Transportation Safety Board (NTSB).

American Queen

On its maiden voyage on June 18, the *American Queen*, a United States excursion boat, was intentionally grounded on a sand bar in the Ohio River to await a pubic relations film crew. Arrangements had been made to photograph the vessel from a helicopter.

While waiting for the crew, the river level dropped and the *American Queen* could not free itself, even with tug assistance. Passengers and fuel were offloaded and a dredge removed sand around the vessel.

The *American Queen* was refloated on June 21 and was found to be in class condition after its hull was inspected by the American Bureau of Shipping and the Coast Guard.

Royal Majesty

At approximately 11 p.m. on June 10, the Panamanian-flagged cruise ship *Royal Majesty* ran aground about 10 miles east of Nantucket Island. The three-year-old vessel suffered some bottom damage to the centerline fuel tanks, but no pollution occurred.

The 32,400 gross ton Royal *Majesty* was refloated by five tugboats and arrived in Boston on June 12. Lloyd's Register of Shipping conducted a damage survey with the Coast Guard in attendance. A formal Coast Guard investigation is in progress.

Star Princess

At around 2 a.m. on June 23, the Liberian-flagged *Star Princess* grounded on Poundstone Rock in the Lynn Canal, about 21 miles north of Juneau, Alaska. At the time, the 1,600-passenger cruise liner was commanded by an Alaskan pilot.

No mechanical problems were found and the cause of the grounding has not been determined. Extensive hull damage was noted after underwater surveys. Three fuel tanks were compromised, but only a slight oil sheen was apparent.

The Coast Guard, NTSB and Liberian government will conduct a joint investigation.

The readers of Proceedings are encouraged to comment on this new column and to suggest topics they would like to have covered.

Contact LT Shelley Atkinson with comments and suggestions at (202) 267-1418.

The following deck questions should be answered using chart number 12221TR, Chesapeake Bay Entrance.

Deck

Your vessel has a draft of 9.0 feet (2.7 meters). Your height of eye is 15 feet (4.6 meters). Use 10° W variation where necessary. Gyro error is 2° W. The deviation table is:

HDG. MAG	DEV.	HDG. MAG	DEV.
000°	0°	180°	1° E
030°	1° W	210°	2° E
060°	2° W	240°	3° E
090°	4° W	270°	3° E
120°	2° W	300°	2° E
150°	1° W	330°	1° E

1. At 1400, your position is LAT 37° 14.7' N, LONG 76°22.3' W. From this position, you head for the York River Entrance Channel buoy "17." What should you steer per standard magnetic compass for this heading?

A. 108° psc.
B. 119° psc.
C. 122° psc.
D. 125° psc.

2. At 1430, your position is LAT 37° 12.8' N, LONG 76°17.7' W. You come left and steer 045° T, leading you through a channel bordered by yellow buoys. The dashed magenta lines between buoys mark____.

A. York River Entrance Channel
B. New Point Comfort shoal area
C. the piloting channel for Mobjack Bay
D. fish trap areas

3. From your 1430 fix, you order turns for 8 knots. You steer 045 °T and experience no set and drift. At what time would you expect to have New Point Comfort Spit Light "4" abeam?

A. 1452.
B. 1458.
C. 1504.
D. 1510.

4. At 1540, your position is LAT 37° 18.4' N, LONG 76°10.5' W. Which course should you steer per gyrocompass to head for the entrance to Cape Charles City?

A. 109° pgc.
B. 117° pgc.
C. 123° pgc.
D. 129° pgc.

5. You arrive at Cape Charles City at 1700 and depart at 1800. You are underway in Chesapeake Bay and encounter heavy fog. At 1830, you obtain the following Loran-C readings:

9960-X-27224
9960-Y-41456
9960-Z-58572

What is your 1830 position?

A. LAT 37°10.3' N, LONG 76°04.5' W.
B. LAT 37°10.3' N, LONG 76°06.5' W.
C. LAT 37°12.3' N, LONG 76°04.4' W.
D. LAT 37°12.3' N, LONG 76°06.5' W.

6. From your 1830 fix, you continue south on a course of 150°T turning RPMs for 6 knots. You encounter a flood current in the direction of 330°T at 2 knots. Adjusting your course for set and drift, which course would you steer to make good a course of 150°T while turning RPMs for 6 knots?

A. 144°T.
B. 150°T.
C. 158°T.
D. 162°T.

7. At 1915, you take visual bearings of Cape Charles Light at 107° pgc, and Cape Henry Light at 172° pgc. The radar bearing and range for Chesapeake Channel Tunnel South Light is 189° pgc at 7.2 miles. What is your 1915 position?

A. LAT 37°03.5' N, LONG 76°05,9' W.
B. LAT 37°03.5' N, LONG 76°09.3' W.
C. LAT 37°05.9' N, LONG 76°03.5' W.
D. LAT 37°09.3' N, LONG 76°03.1' W.

8. From your 1915 fix, you come right and steer a course of 200°T. At 2000, your position is LAT 37°05.5' N, LONG 76°07.0' W. You want to pass through Chesapeake Channel. With no set and drift, what course would you steer per standard magnetic compass to make good a course of 145°T?

A. 134°.
B. 139°.
C. 151°.
D. 156°.

9. At 2100, you have passed through the Chesapeake Bay Bridge and Tunnel, and determine your position to be LAT 37°01.3' N, LONG 76°03.0' W. The current is flooding in a direction of 303°T at 2.5 knots. Adjusting for set and drift, what should you steer while turning RPMs for 6 knots to make good a course of 175°T?

A. 156°T.
B. 164°T.
C. 183°T.
C. 190°T.

10. At 2150, your position is LAT 36°57.2' N, LONG 76°01.3' W. In this position on the chart, you note a light magenta line running in a direction of 030°T. This line indicates the limits of _____.

A. a precautionary area
B. a pilotage area
C. the Cape Henry Light red sector
D. chart 12222

11. At 2200, you are in position LAT 36°57.5' N, LONG 76°02.5' W, heading up to Thimble Shoals Auxiliary Channel to Hampton Roads. According to the Coast Pilot, what is the depth of the auxiliary channel on either side of the main channel?

A. 28 feet.
B. 32 feet.
C. 36 feet.
D. 45 feet.

12. From your 2200 fix, you steer 288°T to go up the Thimble Shoal North Auxiliary Channel. At 6 knots, what time would you pass buoy "18" at the channel's west end? (There are no set and drift.)

A. 2239.
B. 2255.
C. 2315.
D. 2344.

13. At 2205, you are in Thimble Shoal North Auxiliary Channel abeam of lighted gong buoy "4." The visibility decreases to 5 miles. You turn RPMs for 6 knots without set and drift. What time would you expect Old Point Comfort Light to become visible?

A. 2210.
B. 2231.
C. 2246.
D. 2258.

14. Old Point Comfort's mean high water level is __.

A. 2.6 feet
B. 1.2 feet
C. 0.0 feet
D. -3.5 feet

15. You are entering Norfolk Harbor, having just passed Craney Island. What chart should you use for your final approach into Norfolk Harbor?

A. 12223.
B. 12245.
C. 12248.
D. 12253.

ANSWERS

1-D, 2-D, 3-B, 4-D, 5-C, 6-B, 7-D, 8-D,
9-A, 10-B, 11-B, 12-D, 13-C, 14-A, 15-D.

If you have any questions concerning Nautical Queries, please contact the National Maritime Center. Telephone: (703) 235-1300.

Notice of proposed rulemaking

CGD 95-010, Alternate compliance via recognized classification society and United States supplement to rule (46 CFR parts 30, 31, 70, 71, 90, 91 and 107) RIN 2115-AF11 (June 22).

The Coast Guard proposes to amend regulations to provide owners of United States tank vessels, passenger vessels and mobile offshore drilling units an alternative method to fulfill the requirements for vessel design, inspection and certification. Under this proposal, the Coast Guard would issue a certificate of inspection based upon a recognized classification society's reports that the vessel complies with the International Convention for the Safety of Life at Sea, as amended (SOLAS 74/83), other applicable international conventions, classification society rules and other specified requirements. This will reduce the burden on vessel owners and operators by eliminating duplicative plan reviews and inspections by the classification society and the Coast Guard.

DATE: Comments must be received by September 20, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CCD 95-010), Coast Guard headquarters, 2200 Second Street, S.W., Washington, D.C. 20593-0001, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477. Comments on collection-of information requirements must be mailed also to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, N.W., Washington, D.C. 20503, ATTN: Desk Officer, Coast Guard

The executive secretary of the Marine Safety Council maintains the public docket for this rulemaking. Comments will be part of this docket and will be available for inspection or copying at room 3406, workdays, between 8 a.m. and 3 p.m.

For further information, contact: Mr. Albert G. Kirchner, Jr., Human and Ship Design Branch, Design and Engineering Standards Division, Standards Directorate. Telephone: (202) 267-0168.

Interim rule with request for comments

CGD 94-110, Recreational inflatable personal flotation device standards (46 CFR part 160) RIN 2115-AE96 (June 23).

The Coast Guard is establishing regulations for approval of inflatable personal flotation devices (PFDs) for recreational boaters. These regulations establish structural and performance standards for inflatable PFDs, as well as the procedures for Coast Guard approval of inflatable PFDs. These standards are intended to allow for approval of inflatable PFDs which should be more amenable to continuous wear by recreational boaters than currently approved PFDs, thereby increasing use of PFDs by the boating public and saving lives.

DATE: This rule was effective July 24, 1995. Comments must be received by October 23, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CCD 94-110), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477. Comments on collection-of information requirements must be mailed also to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, N.W., Washington, D.C. 20503, ATTN: Desk Officer, Coast Guard.

The executive secretary of the Marine Safety Council maintains the public docket for this rulemaking. Comments will be part of this docket and available for inspection or copying at room 3406, workdays, between 8 a.m. and 3 p.m.

A copy of the material listed in "Incorporation by Reference" of this preamble is available for inspection at room 1404, Coast Guard headquarters.

For further information, contact: Mr. Samual E. Wehr, Lifesaving and Fire Safety Standards Branch, Design and Engineering Standards Division, Standards Directorate. Telephone: (202) 267-1444. A copy of this interim rule may be obtained by calling 1-800-368-5647. In Washington, D.C., call 267-0780.

Notice of proposed rulemaking

CGD 93-055, Approval of inflatable personal flotation devices for recreational boaters (33 CFR parts 175, 179 and 181) (46 CFR parts 2, 159 and 160) RIN 2115-AE58 (June 23).

The Coast Guard proposes to establish approval procedures for recreational inflatable personal flotation devices (PFDs), revise the approval procedures for other kinds of recreational PFDs and make editorial changes. These procedures are intended to establish an efficient approval procedure for PFDs. The Coast Guard anticipates that recreational boaters will be more likely to wear inflatable PFDs than currently approved devices, increasing use of PFDs and saving lives.

DATE: Comments must be received by October 23, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CCD 93-055), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477. Comments on collection-of information requirements must be mailed also to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, N.W., Washington, D.C. 20503, ATTN: Desk Officer, Coast Guard.

The executive secretary of the Marine Safety Council maintains the public docket for this rulemaking. Comments will be part of this docket and available for inspection or copying at room 3406, workdays, between 8 a.m. and 3 p.m.

A copy of the material listed in "Incorporation by Reference" of this preamble is available for inspection at room 1404, Coast Guard headquarters.

For further information, contact: Mr. Robert Markle, Lifesaving and Fire Safety Standards Branch, Design and Engineering Standards Division, Standards Directorate. Telephone: (202) 267-1444. A copy of this interim rule may be obtained by calling 1-800-368-5647. In Washington, D.C., call 267-0780.

Request for comments

CGD 95-016, Outer Continental Shelf activities (33 CFR parts 140 through 147) (June 27).

The Coast Guard is considering amending its regulations on Outer Continental Shelf (OCS) activities. Possible amendments may include improvements to the personnel safety regulations for fixed OCS facilities, new regulations governing the operation of mobile inland drilling units on the OCS, and an alignment of the requirements for foreign vessels engaged in OCS activities with those for United States vessels similarly engaged. The Coast Guard requests comments on these as well as other subjects related to OSC activities.

DATE: Comments must be received by September 25, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CCD 95-016), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477.

The executive secretary of the Marine Safety Council maintains the public docket for this rulemaking. Comments will be part of this docket and available for inspection or copying at room 3406, workdays, between 8 a.m. and 3 p.m.

For further information, contact: Mr. James Magill, Vessel and Facility Operating Standards Branch, Operating and Environmental Standards Division, Standards Directorate.
Telephone: (202) 267-0224.

Continud on page 54

Continued from page 53

Final rule

CGD 95-901, Noxious liquid substances lists (33 CFR part 151) RIN 2115-AF08 (June 29).

The Coast Guard is amending its noxious liquid substances regulations to include substances recently authorized by the Coast Guard or added to the IMO's chemical codes by making minor technical and editorial changes and corrections. This action also updates the current lists of oil-like and non-oil-like noxious liquid substances allowed for carriage.

DATE: This rule was effective June 29, 1995.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays.
Telephone: (202) 267-1477.

For further information, contact: Mr. Curtis Payne, Hazard Materials Standards Branch, Operating and Environmental Standards Division, Standards Directorate. Telephone: (202) 267-1577.

Final rule

CGD 94-902, Obsolete bulk hazardous materials (46 CFR parts 30, 150, 151 and 153) RIN 2115-AF06 (June 29).

The Coast Guard is amending its regulations on carriage of bulk hazardous materials by deleting commodities that are no longer viable as bulk liquid cargoes, and cancelling the classifications of obsolete commodities not included in those regulations. This action will help to ensure that Coast Guard requirements are current and that the hazardous materials tables and lists are free of entries that unnecessarily complicate the Coast Guard's regulations.

DATE: This rule was effective August 28, 1995.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays.
Telephone: (202) 267-1477.

For further information, contact: Mr. Curtis Payne, Hazard Materials Standards Branch, Operating and Environmental Standards Division, Standards Directorate. Telephone: (202) 267-1577.

Final rule

CGD 95-900, Bulk hazardous materials (46 CFR parts 30, 150, 151 and 153) RIN 2115-AF07 (June 29).

The Coast Guard is amending its regulations on carriage of bulk hazardous materials by adding cargoes recently authorized for carriage by the Coast Guard or added to the IMO's chemical codes and by making minor technical and editorial changes and corrections. This action will update the bulk hazardous materials tables and better inform persons shipping a bulk hazardous material of its compatibility and special handling requirements.

DATE: This rule was effective August 28, 1995.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays.
Telephone: (202) 267-1477.

For further information, contact: Mr. Curtis Payne, Hazard Materials Standards Branch, Operating and Environmental Standards Division, Standards Directorate. Telephone: (202) 267-1577.

Final rule

CGD 95-057, Certification of Coast Guard rulemaking procedures (33 CFR parts 1, 23 and 177) RIN 2115-AF20 (June30).

The Coast Guard is revising the regulations describing its rulemaking procedures to accurately reflect the rulemaking procedures currently in use. This revision clarifies delegations of authority and removes references to hearing officers, which the Coast Guard no longer uses in its regulatory process. It also clarifies who is designated to receive service of process and requests to testify on behalf of members and employees of the Coast Guard.

DATE: This rule was effective June 30, 1995.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays.
Telephone: (202) 267-1477.

For further information, contact: LT R. Goldberg, staff attorney, Regulations and Administrative Law Division, Office of Chief Counsel.
Telephone: (202) 267-6004

Notice

CGD 95-048, Annual certification of Cook Inlet Regional Citizens' Advisory Council (June 30).

Under the Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Act of 1990, the Coast Guard may certify, on an annual basis, a voluntary advisory group in lieu of a regional citizen's advisory council for Cook Inlet, Alaska. This certification allows the advisory group to monitor the activities of oil tankers and facilities under the Cook Inlet Program.

DATES: June 1, 1995, through May 31, 1996.

For further information, contact: Mrs. Janice Jackson, Port and Environmental Management Branch, Marine Response Division, Field Activities Directorate. Telephone: (202) 267-0500.

Notice of charter renewal

CGD 95-056, Chemical Transportation Advisory Committee (CTAC) (July 3).

The secretary of Transportation has renewed the CTAC charter to remain in effect for two years from May 27 1995 to May 27, 1997. The purpose of CTAC is to provide expertise on regulatory requirements for promoting safety in the transportation of hazardous materials on vessels and the transfer of these materials between vessels and waterfront activities. CTAC acts solely in an advisory capacity to the Coast Guard.

For further information, contact: CDR Kevin Cook, executive director, Operating and Environmental Standards Division, Standards Directorate. Telephone: (202) 267-1217.

Notice of proposed rulemaking

CGD09-95-018, Safety Zone; Cuyahoga River, Cleveland, Ohio (July 17).

The Coast Guard proposes to add a new permanent safety zone in the Cuyahoga River in Cleveland, Ohio. The new zone near the mouth of the river, would restrict the mooring of boats in the area from the Conrail No. 1 railroad bridge south for 600 feet.

DATE: Comments must be in by September 15, 1995.

Addresses: Comments should be mailed or delivered to LTJG Nathan Knapp, project officer, Coast Guard COTP 1055 E. Ninth Street, Cleveland, Ohio. 44114.

For further information, contact: LTJG Nathan Knapp, Telephone: (216) 522-4405.

Notice

CGD 95-044, Annual certification of Prince William Sound Regional Citizens' Advisory Council (July 17).

Under the Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Act of 1990, the Coast Guard may certify, on an annual basis, a voluntary advisory group in lieu of a regional citizen's advisory council for Prince William Sound, Alaska. This certification allows the advisory group to monitor the activities of oil tankers and facilities under the Prince William Sound Program established by the act. The purpose of this notice is to inform the public that the Coast Guard has recertified the alternative voluntary advisory group for Prince William Sound.

DATES: July 1, 1995, through June 30, 1996.

For further information, contact: Mrs. Janice Jackson, Port and Environmental Management Branch, Marine Response Division, Field Activities Directorate. Telephone: (202) 267-0500.

Notice of withdrawal

CGD 74-284, Fixed fire-extinguishing systems for pleasure craft and other uninspected vessels (46 CFR parts 25, 26 and 162) RIN 2115-AA08 (July 20).

This rulemaking was initiated to establish standards and procedures for approving gaseous-type fixed fire-extinguishing systems for pleasure craft and other uninspected vessels. At the time, most fixed systems for pleasure craft used Halon 1301 and Halon 1211 as the extinguishing agents, and several of the provisions of this rulemaking specifically would have allowed (though not required) the use of halons. Since then, halons have been identified as an ozone-depleting substance; on January 1, 1995, their production was terminated. The Coast Guard considered redrafting this rulemaking to allow the use of halon replacement gases instead of halons. However, the development of these gases is incomplete. The Coast Guard is withdrawing this project for the present time.

DATE: This withdrawal was effective July 20, 1995.

For further information, contact: Mr. Klaus Wahle, project manager, Lifesaving and Fire Safety Standards Branch, Design and Engineering Standards Division, Standards Directorate. Telephone: (202) 267-1444.

Continued on page 56

Continued from page 54

Final rule

CGD 88-049, Waterfront facilities handling liquefied hazardous gas (33 CFR parts 126 and 127) RIN 2115-AD06 (August 3).

The Coast Guard is amending its regulations for waterfront facilities capable of transferring liquefied hazardous gas (LHG) in bulk to and from vessels. The transfer of LHG prevents hazards similar to those from the transfer of liquefied natural gas (LNG), yet facilities capable of transferring LNG in bulk are subject to much more stringent requirements. The amended regulations will strengthen the requirements for the transfer of LHG and move those requirements from part 126 to part 127.

DATE: The rule is effective January 30, 1996.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406) (CGD 88-049), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477.

For further information, contact: Mr. Gary W. Chappell, Systems Support Branch, Information Resources Division, Resource Management Directorate. Telephone: (202) 267-0491

Final rule

CGD 94-070, Facsimile filing of instruments (46 CFR part 67) RIN 2115-AE98 (August 7).

The Coast Guard is amending its vessel documentation regulations to provide for optional filing of commercial instruments by facsimile, and to establish a filing and recording handling fee for filing instruments by facsimile. This facsimile filing will assist the centralized vessel documentation center to deliver timely services to distant customers, is responsive to time sensitive matters and will further streamline the process.

DATE: This rule is effective October 1, 1995.

Addresses: Unless otherwise indicated, documents referenced in this preamble are available for inspection or copying at the office of the executive secretary, Marine Safety Council (G-LRA/3406) (CGD 94-070), Coast Guard headquarters, between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477.

For further information, contact: Ms. Patricia Williams, National Vessel Documentation Center. Telephone (800) 799-8362.

Request for comments

CGD 93-051, Proof of commitment to employ aboard U.S. merchant vessels (45 CFR parts 12 and 16) (August 7).

The Coast Guard scheduled a public meeting to discuss proof of commitment to employ aboard U.S. merchant vessels. The purpose is to receive feedback on how the elimination of the letter (proof) of commitment affects the maritime industry. Until June 1994, a letter of commitment for employment aboard a U.S. merchant vessel was required for an applicant to receive an original, entry level merchant mariner's document to ensure that the applicant intended to work in the maritime industry. With the advent of user fees and chemical testing requirements to obtain this document, it was determined that the letter was no longer needed.

DATES: The meeting was scheduled for September 5, 1995, from 10 a.m. to 12 p.m. Written material must be received by September 30, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA), Coast Guard headquarters, or may be delivered to room 3406 at the above address between 8 a.m. and 3 p.m., workdays. Comments will be available for inspection or copying in 3406 workdays, during the same hours.

For further information, contact: Mrs. Justine Bunnell, Marine Personnel Division (NMC-4), National Maritime Center, 4200 Wilson Blvd. Suite 510, Arlington, VA 22203-1804. Telephone: (703) 235-1951.

Reopening of comment period

CGD 95-041, Propeller accidents involving houseboats and other displacement type recreational vessels (33 CFR part 183) (August 9).

In a notice published May 11, 1995 (60 FR 25191), the Coast Guard solicited comments on aspects of propeller accident avoidance. The comment period closed July 10. This notice reopens the period.

DATE: Comments must be in by November 7, 1995.

Addresses: Comments may be mailed to the executive secretary, Marine Safety Council (G-LRA/3406) (CCD 95-041), Coast Guard headquarters, or may be delivered to room 3406 between 8 a.m. and 3 p.m., workdays. Telephone: (202) 267-1477.

For further information, contact: Mr. Alston Solihan, Auxiliary, Boating, and Consumer Affairs Division, Office of Navigation Safety and Waterway Services. Telephone: (202) 267-0981.

Notice of availability; request for comments

CGD 95-066, National Environmental Policy Act environmental assessment for Coast Guard activities along the Atlantic Coast (August 9).

The Coast Guard gives notice of the availability of an environmental assessment and a proposed finding of no significant impact for public review and comment. These documents have been prepared for Coast Guard operations in the marine environment of the Atlantic coast from the northern tip of Maine south to Puerto Rico. The assessment focuses on six whale and five turtle endangered or threatened species.

DATE: Comments must be received by September 8, 1995.

Addresses: Comments, questions or requests for copies of the documents should be mailed to LCDR Wesley Marquardt, Coast Guard headquarters (G-NIO), Room 1201. Comments will be available for inspection and copying in room 1201 from 8 a.m. to 4 p.m., workdays.

For further information contact: LCDR Wesley Marquardt, Office of Navigation Safety and Waterway Services. Telephone: (202) 267-1454.

Temporary rule

CGD02-95-016, Safety zone: Lower Mississippi River, mile 593.0 to mile 597.0 (33 CFR part 165) RIN 2115-AA97 (August 11).

The Coast Guard is establishing a temporary safety zone on the Lower Mississippi River between mile 593.0 and mile 597.0. The zone is needed to protect vessel traffic from a collision hazard during weir dike construction operations. Entry of vessels or persons into this zone is prohibited unless specifically authorized by the captain of the port.

EFFECTIVE DATES: This regulation is effective from 7 a.m. August 10, 1995 until 11:55 p.m. on September 30, 1995.

For further information, contact: LTJG Roberts, assistant chief operations officer, captain of the port, 200 Jefferson Avenue, Suite 1301. Memphis, TN 38103. Telephone: (901) 544-3941.

Temporary final rule

CGD01 95-096, Safety zone: east passage, Narragansett Bay, RI (33 CFR part 165) RIN 2115-AA97 (August 17).

The Coast Guard established a temporary safety zone in Narragansett Bay around the group of swimmers participating in the 19th annual "Swim the Bay" event on August 19, 1995. This zone was needed to protect the participants from the hazards caused by vessel traffic in Narragansett Bay.

EFFECTIVE DATES: This regulation was effective August 19, 1995, unless extended or terminated sooner by the captain of the port, Providence.

For further information, contact: LTJG Bruce L. Davis of Marine Safety Office Providence. Telephone: (401) 435-2300.

Notice of certificates of alternative compliance issued

CGD 95-034, Vessel certifications of alternative compliance and exceptions (August 18).

This document provides the required notice of certificates of alternative compliance issued by the Coast Guard which have not been previously published in the *Federal Register*. This notice identifies vessels, which, due to their special construction and purpose, cannot comply fully with certain provisions of the International Navigation Rules for Preventing Collisions at Sea (72 COLREGS), without interfering with that vessel's special functions and identifies the alternative provisions to which each vessel must comply.

DATES: This notice lists certificates of alternative compliance issued between January 1993 and July 1995.

Addresses: Certificates of alternative compliance may be examined at and copies are available upon request from the Office of Navigation Safety and Waterway Service (G-NVT-3).

For further information, contact: Ms. Diane Appleby, marine safety specialist, Vessel Traffic Service Division between 8 a.m. and 5 p.m., workdays. Telephone: (202) 267-0352.

We reorganized to serve you better

The Office of Marine Safety, Security and Environmental Protection reorganized headquarters staffon August 1 to better serve our many customers in industry and government, as well as the general public.

Previously, we were organized along program lines, such as merchant vessel inspection, marine licensing or marine environmental protection. This served many internal purposes well, but it didn't fully account for the broader needs of our customers, which often spanned several program areas.

The new organization is based on a system of directorates, each of which will focus on specific customers and address a broad range of concerns. The three directorates, located at Coast Guard headquarters, are: Standards, Field Activities and Resource Management. In addition, there is a new unit called the National Maritime Center, 4200 Wilson Boulevard, Suite 510, Arlington, Virginia 22203.

Standards

The customers include the maritime industry, standards development organizations and public interest groups. This directorate develops public policy, technical standards and regulations.

Field Activities

The primary customers are the Coast Guard district offices and field units responsible for compliance, response and investigative actions directly affecting the public. This directorate also oversees third party organizations authorized to act on the Coast Guard's behalf, such as the American Bureau of Shipping.

The directorate will provide policy guidance on marine safety field activities, including vessel inspection and manning, casualty investigations, and pollution prevention and response. It will be the appeals' authority for customer issues that cannot be resolved at the local level.

Resource Management

Serving internal customers, this directorate will provide planning, budgeting, training, resource and information managment to support the Coast Guard's marine safety and environmental protection missions.

National Maritime Center

This new unit will directly serve the public, as well as provide specialized support to Coast Guard field activities. Its services include vessel plan review and documentation, marine personnel licensing and records management.

The *Proceedings* magazine will be published by the center beginning with the next issue.

Customer benefits

The organization has been "flattened out," with considerable decision-making authority delegated to the directorates. Thus, we anticipate a marked reduction in the time needed for customers to obtain decisions from headquaters. Policies covering former separate program areas also should be more consistant.

We are just getting the reorganization off the ground, but we will greatly appreciate your feedback after you have worked with us in the new framework.

Farewell from the editor

Dear readers, contributors -- friends,

Thanks to you, these past five years have been a marvelous experience for me. I have gained so much -- knowledge of the maritime commuinty, enormous satisfaction and personal growth.

With your encouragement and Coast Guard support, I have watched Proceedings grow from a black and white 28-page periodical to a colorful, thematic magazine with up to 80 pages. Our first thematic issue was devoted to passenger vessels in September-October 1990, and Proceedings appeared in color in May-June 1992 with a special issue on the Oil Pollution Act of 1990.

Since then, we've added spot color, more full color and extra pages. We've developed special issues on most safety and environmental protection concerns from hazardous materials, fire protection and human factors in marine casualties to offshore drilling, inland barge and towing, lifesaving systems, port-state control and, now, waterways management. I have had great fun orchestrating these issues, but the credit belongs to you.

It has been an exciting, fulfilling period for me. Now, on the eve of what I hope will be a restful, yet productive retirement, I extend heartfelt thanks to you -- the Proceedings supporters, contributors and subscribers for a truly gratifying five years.

Betty A. Murphy

Systems can mean safety

By Dr. Martha Grabowski

Mariners are independent souls. For centuries, they have been making decisions without asking or even telling anyone else (except maybe their crews). That attitude works most of the time. But, there are other times, especially in today's congested waterways, when such decisions can cause delays and even accidents involving other vessels. There are occasions, such as when fog or obstacles obscure or block the way, when a master or pilot could use a little help from the outside, an automated or human expert. Too often, however, there isn't any.

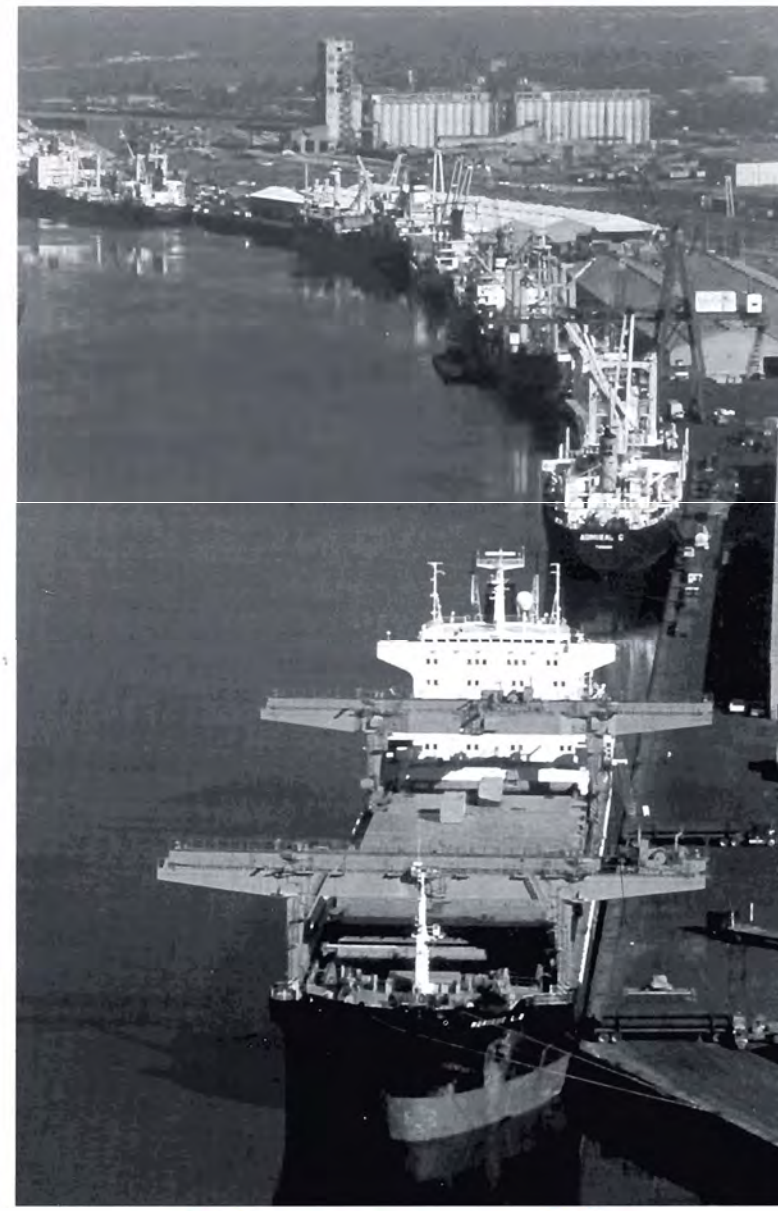
The problem

United States ports and waterways are not equipped to provide system wide communication, traffic management or expert decision making. So many individuals and organizations oversee so many different parts of our waterways, there is really no coherent "system," and certainly no overall manager.

Vessel operations rarely are coordinated, even across a specific port area and ports are not centrally managed, as they are in some countries. There are some national waterways traffic and safety programs, such as aids to navigation systems. However, upgrading and performance monitoring may vary by region.

Some have compared our ports and waterways systems to a silent ballet choreographed by a variety of people. Even though the ballet is executed with daily precision, when a member of the troupe is out of step with the rest of the company, there is no system-wide mechanism to communicate a half-step delay. Also, resuming the ballet is extremely difficult with so many independent choreographers, each with their own view of the artistic piece and the importance of different principal dancers.

Continued on page 60



Waterways are like "silent ballets"

Continued from page 59

In other modes of transportation, there are structures for "interdependent" decision making involving different parties, and for assuring a minimum level of communication and performance. In aviation, pilots take direction from air traffic controllers who monitor all aircraft in a given area. In addition, the latest precision navigation, surveillance and communications technologies are installed both aloft and on the ground. On highways and railways, there are stoplights, along with some overall monitoring and direction of traffic. Intelligent highways of the future offer even more data and information sharing. (For example, electronic signs alert drivers to congestion ahead on some interstates.)

In contrast, the waterways system is supported by navigational aids, pilots with VHF radios, and a variety of information and decision technology in different ports and different regions of the country. The question is, can a more cohesive and safer system be fashioned to support the ballet?

Some solutions

Technologies are available to provide mariners and shore personnel with the same information for decision making. In particular, timely data about weather and traffic conditions can contribute a great deal to efficiency and safety.

Major ports and shipping companies are interested in modern technologies, but are reluctant to assume the costs. Other barriers include the slow evolution of standards and training to match the level of hardware development. Thus, the problem isn't so much the availability of new technologies, but their implementation. Following are examples of some solutions, which are largely based on a recent study, *Minding the Helm*, by the Marine Board of the National Research Council in Washington, D.C.

Vessel traffic services

The only formal organizational structure for decision making that exists in maritime transportation today is vessel traffic services (VTS). These interactive shore-based communications systems, usually augmented by surveillance equipment such as radar, are in about 20 United States ports and waterways. Some are privately owned, others are run by the Coast Guard. Studies demonstrate that they improve safety, while also offering environmental and economic benefits.

Today, each VTS is an independent entity. Some systems simply give vessel operators information, such as weather reports, while others provide traffic advisories or assist with maneuvers.

The VTS concept, however, could provide added benefits. Standardization, for example, would assure a minimum level of performance and give mariners entering port an idea of what to expect. Performance standards could be established and VTS personnel could be given standardized training. Pilot expertise, crucial to safe waterway passage, could be a standard component in effective VTS, and appropriate vessel and cargo data could be relayed between ports.

Even though human error is the major cause of maritime accidents, typically, VTS data is obtained, processed, interpreted and transmitted by human operators. Moreover, these operators rely on voice radio, a notoriously inefficient medium that produces additional mistakes and misunderstandings.

Electronic data collection, processing, interpretation and transmission would be far more reliable. Linking VTS with common shipboard equipment so that electronic chart, automatic dependent surveillance system, navigation, communication and intelligent decision aid information could be shared automatically between all parties in the system is also desirable. Such sharing can improve system safety and help develop common "mental maps" of the waterways ballet.

Simple, cost-effective means of assuring full participation in the VTS can go a long way toward improving waterway safety by ensuring that all the dancers can hear the same music and know what other members of the troupe are doing.

Over the long run, the benefits of VTS can be extended to additional ports, and linked together in regional or national networks. Whether these systems should be operated privately or by the Coast Guard depends a great deal on funding resources.

Electronic charts

Traditional nautical charts are not very precise as they are usually based on old data obtained by old methods. It takes time to plot a course by hand on paper, which can distract the crew from events occurring on the water. Electronic charts, now being adopted in every maritime sector, can provide instant, accurate displays of a vessel's position and the surroundings.

However, a few issues must be resolved before the industry can enjoy the full benefits of electronic charts. First, precise hydrographic data must be obtained by modern surveying equipment, and all data must be converted into digital form, which will take up to ten years. Also, electronic charts must receive legal status, or paper charts will have to be maintained too.

The best available technical means of improving safety might be the combination of an electronic chart and the differential global positioning system. (See page 19.) This would provide accurate position fixes in harbors and their approaches using data broadcast by the Coast Guard.

Even more advanced might be an electronic chart display and information system, which receives position data from radio navigation instruments and integrates it with voyage plans and a hydrographic database to provide a real-time display of the ship's position. Some prototype systems have embedded voyage planning, weather status and forecasting, docking and local piloting capabilities.

A variety of electronic navigation systems are on the market today. The question is what type is appropriate for different vessels, situations and organizations, and how quickly legal and performance standards issues can be resolved. Assuming these hurdles are cleared, the daunting tasks of resurveying the oceans and coastal areas with modern techniques, and of converting that data to digital form, loom on the horizon.

Real-time monitoring

Technology can provide real-time information on weather, water levels, tides, currents and other environmental conditions. Advanced systems also recommend changes in voyage plans. Whether installed on vessels or in ports, these systems can help vessel operators select the best routes, avoid costly detours and delays, and reduce the risks of sailing in bad weather.

Available technologies include electronic tide predictors, weather routing systems, and hull-stress monitoring systems, which use sensors and computer models to provide expert advice on safe speed and heading.

Also on the horizon is an expanded application of the physical oceanographic real-time system (PORTS) (See page 30), which uses sensors placed at multiple locations in a port to measure real-time water level and temperature, and current and wind velocities. The data is transmitted by radio every hour. This system is already installed in Tampa, Florida, and is being developed for San Francisco Bay.

Data management and communications

Cargo shipping companies already use automated computer-based data management and electronic communication systems to keep track of products and itineraries. These are essential technologies in the competitive commercial world, and the maritime industry needs to leverage them effectively. A few VTS systems share information electronically across national boundaries, and some VTS, marine exchanges and port authorities collect and distribute vessel arrival and departure data. These concepts could be applied to port-wide, regional or even national traffic monitoring and information sharing.

"The full benefits of advanced technologies will not be realized unless they are used universally."

Ranging from voice to broadband data transmission services, ship-to-ship and ship-to-shore communications systems are essential to mariners. Varying widely in capability from vessel to vessel, these systems share information about location, cargo status and environmental conditions. Although reasonably effective, the process could be improved. Key problems include channel saturation, insufficient bandwidth and accommodation of vessels without adequate equipment.

Channel saturation is due partly to a few operators who use the channels without authorization and/or discipline. Radio frequencies tend to become congested at the worst times, such as emergencies. Obvious solutions include improving discipline, removing unauthorized users and, in some cases, providing dedicated navigation communication channels. Bandwidth (information-carrying capacity) is another problem with heavily used systems. An emerging technology called digital selective calling, for example, will permit automatic alerts to be issued, but may not have enough bandwidth for broad-based VTS applications.

The benefits of system wide data management could be considerable. For example, reporting near misses is basic to modern aviation, but nonexistent in United States maritime industry. A European VTS tapes voice and digitized radar of all near misses in its service area. This information is available for accident investigations and training, and could enhance safety.

The full benefits of advanced technologies will not be realized unless they are used universally. A port may have a fully equipped VTS, for example, but questions remain about vessels without the apparatus necessary to interact with the system. One option is a portable communications, navigation and surveillance system being developed for private use in Tampa. This backpack-type equipment can be carried by a local pilot boarding a vessel to direct its movements upon port arrival or departure. Even something as simple as a cellular telephone, often used to coordinate supplies, might be provided to vessels on a temporary basis. Simple transceivers for small vessels could help ensure that the VTS enjoys near-100 percent participation.

Continued on page 62

" A key to success lies in examining the ports and waterways system as a whole . . ."

Continued from page 61

Integration

Just as important as implementing advanced technologies is an understanding of their interactions and their resulting possibilities. These interactions could be helpful or could introduce dysfunctions. For example, as advanced systems are installed on vessels, the opportunity arises to develop port-wide networks which could be linked to a VTS. This presents new services and uses, but mariners presented with these technologies are often faced with different standards and requirements in different ports. Achieving the right balance between new technology and services, and the difficulties they introduce, is a challenge.

The role of advanced technologies in intermodal linkages also needs to be addressed. Should cargo ship itineraries, for example, be linked electronically to train schedules? What is a reasonable degree of sharing between different transportation modes? What level of sharing and integration fosters system growth, and what level impedes growth? These issues are addressed in aviation, but not in the maritime world.

Conclusion

Studying the ports and waterways system as a whole, and characterizing its information needs, leads us to systems as solutions for waterway problems. It may be that improving safety has more to do with truly integrated systems providing VTS, electronic chart, real-time environmental information and communications data, than it does with providing these individual technologies in a piecemeal fashion. We may invite dysfunctions, thereby reducing the level of safety, by introducing these technologies individually in a piecemeal fashion. A key to success lies in examining the ports and waterways system as a whole, including internal and external interactions.

We can live in a world of silent ballet performances under the constant threat of a dancer misstepping — or we can open our eyes to the possibilities of integrated advanced technologies and take the necessary steps to ensure safety in maritime transportation. We have the motivation and opportunity - what we need now is the means.

Dr. Martha Grabowski is a professor at LeMoyne College, Syracuse, New York 13214, and at Rensselaer Polytechnic Institute, Troy, New York 12180-3590.

Telephone: (315) 445-4427 or (518) 276-2954.

Bridges are conflicting links

"Drawbridge operating schedules conflict with both water and land transportation. When they open, they restrict land traffic and when they close, they restrict water traffic."

By Mr. Nick Mpras

Keeping the nation's waterways reasonably unobstructed by the approximately 24,000 bridges under Coast Guard jurisdiction is a real challenge. The responsibility for waterways management affects land as well as water transportation.

The Coast Guard ensures safe and reasonably unobstructed passage of commercial, national defense and recreational vessels through or under bridges on the nation's waterways under several acts. At the same time, the Coast Guard must see that national transportation goals are met.

To meet these objectives, the Coast Guard issues permits for constructing or modifying bridges, orders obstructive bridges to be altered or removed, regulates bridge navigational lighting and movable bridge operation, and considers the potential impact on all transportation systems and environmental quality.

Conflicts

Bridge customers' needs and desires vary and, at times, diverge and generate conflict between land and sea transportation, and environmental groups and developers.

Bridges across United States navigable waters obstruct navigation while facilitating land traffic. Bridges constructed for easing development or resource exploration conflict with environmental organizations.

Drawbridge operating schedules conflict with both water and land transportation. When they open, they restrict land traffic and when they close, they restrict water traffic.

Attempts to satisfy any single interest, competes with the needs of other interests. The conflicts among competing users increases the demand on the Coast Guard for resolution.

The increase in vessel and port capacity will necessitate greater bridge clearances. Yet construction of high-level or movable bridges to provide these clearances will be resisted by bridge sponsors as too costly. In addition, environmental groups are becoming more vocal concerning environmental consequences of bridge construction. All these issues must be considered with each bridge project.

Continued on page 64

Continued from page 63

Deterioration

It was estimated by the National Transportation Research Board that about 90 percent of the nation's bridges are either substandard or dangerously deteriorated. The Intermodal Surface Transportation Efficiency Act of 1991 earmarked 155 billion dollars to the states for a six-year highway and bridge construction/rehabilitation program.

As bridges become substandard and/or dangerously deteriorated, they must be replaced for public safety, and to satisfy the needs of commerce, transportation and defense. Bridges are an integral part of our transportation system and touch the lives of everyone who uses waterways or highways. Failure of our bridge system affects national defense, economic well being, personal safety, and access to education, cultural, professional and recreational facilities.

Pressures

The demands on the Coast Guard's Bridge Administration Program are expected to increase. A number of new international bridge projects are anticipated because of the passage of the North America Free Trade Agreement. New bridges between the United States, Canada and Mexico will be needed to facilitate international commerce.

Pressure to process permit applications quicker will increase. Also, Congress and the marine industry will be pressing for altering bridges that restrict commercial vessel passage. Requests to limit drawbridge openings will also increase as land traffic gets more congested.

Conclusion

Should the Coast Guard fail in its responsibilities to keep the nation's waterways open, the ability of the United States to compete as a maritime nation will be impeded. National defense vessels will not be able to go through waterways into home port facilities.

In addition, the Coast Guard's ability to perform such vital traditional missions as search and rescue, aids to navigation, and other vessel safety initiatives will be jeopardized.

That is the downside. The reality is that the Coast Guard will keep America's waterways open and the bridges will continue providing their vital links for land traffic. There will always be conflicts, but the Coast Guard will be there to balance the needs of land and sea transportation, so that everyone can enjoy freedom of movement with maximum safety and minimum inconvenience.

Mr. Nick Mpras is chief of the Bridge Administration Division, Office of Navigation Safety and Waterway Services.

Telephone: (202) 267-0368.

Ten-barge tow is pushed through drawspan of Burlington-Northern railroad bridge over Upper Mississippi River in Burlington, Iowa.

Vessel-bridge collisions can be prevented

By LCDR Rand Wintermute

The Coast Guard has always been aware of the vulnerability of bridges to collisions by vessels on navigable waterways. Response procedures have been developed that traditionally focused on the maritime impacts of such incidents. Recent vessel collisions with the Claiborne Avenue Bridge in New Orlean, Louisiana; CSX Railroad Bridge in Bayou Canot, Alabama; and Conrail Bridge in Toledo, Ohio, reinforce the necessity for procedures to address all elements of transportation safety.

Historically around the Conrail Bridge site, Coast Guard petty officers take current readings by the ancient method of climbing down an oily, grease-coated ladder under a rat-infested bridge as 100-unit trains pass seven feet over their heads every 45 seconds. Like in olden times, they hold a 20-foot pole with a flow meter paddle wheel attached at the end to acquire current flow speeds for vessels before they cross under the bridge.

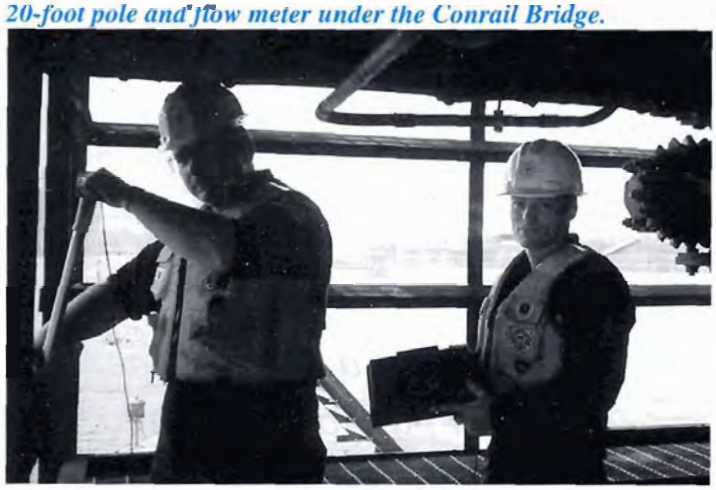
Conrail Bridge

The Conrail Corporation Railroad Bridge is a major link in the transcontinental railroad system for Toledo, Ohio. The bridge, located 5.76 miles upriver from the mouth of the Maumee River, which empties into Lake Erie, is the intersection of vital transportation arteries in the port city. Here the main rail corridor between Chicago and New York crosses a midwestern waterway which carries large quantities of American grain, iron ore, coal, petroleum and general cargo to Far East and European ports around the world.

In 1994, there were 348 vessel transits under the Conrail Bridge. During the same year, the metal "swing" bridge averaged more than 100 separate unit trains (pulling more than 80 cars) every day. (In comparison, Detroit's busiest railroad bridge averages only 35 separate unit trains per day.)

Continued on page 66

Coast Guard petty officers take current readings with a 20-foot pole and flow meter under the Conrail Bridge.



"What a small price to pay for averting disaster!"

Continued from page 65

A casualty at this river crossing can literally shut down factories from New Jersey to Oklahoma to California. Since May 1986, there have been seven accidents involving vessels colliding into the Conrail bridge, resulting in the loss of millions of dollars through transportation delays and repairs. (The Conrail Corporation estimates that a one-day shutdown of the bridge results in 1.2 million dollars in lost revenue.)

At the same time, maritime commercial revenue loss to the grain elevators, due to shutdown or delay caused by an obstruction in the waterway, has been estimated by the Toledo Port Authority to easily exceed 1.2 million dollars.

Navigation hindrances

There are several potential hindrances to safe navigation at this delicate transit area.

- Practically all cargo vessels transiting this area are large foreign ships, mostly Canadian, whose masters may not be completely familiar with its hazardous conditions. Moreover, Canadian vessels are not required to have a local river pilot on board when transiting the Maumee River from Lake Erie.

- The Conrail Bridge swings open to expose a draw only 35 meters (115 feet) wide. Most cargo vessels crossing the draw are 24 to 25 meters at the beam. Under ideal conditions, this leaves just four to six meters on each side for a 185- to 215-meter vessel to pass through.

- Just upstream from the bridge, the river makes a bend which decreases its width from 452 to 215 meters. During the spring "freshet" season and after a heavy rain, a high volume of water passes through the restricted channel at the bridge, causing abnormally swift currents, sometimes over six knots. This presents extreme hazards for vessels attempting to navigate through this area. An outbound vessel has only a short distance in which to line up with the narrow bridge draw. A vessel entering this current must make precise adjustments to compensate as there is no "second chance."

- The potential for a vessel losing control and colliding with the bridge exists when a large ship passes through the draw, especially when it moves downstream with the current. A review of the seven casualties which occurred at the site revealed that:

    - collisions with the bridge took place during higher than normal currents,
    - most of the vessels were Canadian "Lakers" with no river pilots aboard,
    - five happened at night,
    - four happened while goingoutbound, and
    - there was a lack of consistent standardized current flow/wind speed/ river depth data.

Measuring method

In the spring of 1995, after meeting with various vessel masters, the Coast Guard Marine Safety Office (MSO Toledo) took a close look at the old fashioned way current speed, wind speed and direction and river depth is measured under Conrail Bridge.

It was decided that more precise instrumentation for collecting data was in order. An inexpensive, but reliable current meter system with wind speed and direction, along with a depth-sounding device would provide the masters with quantitative measurements from which to determine whether to proceed with transit, request tug assistance or "hove to."

The Toledo-Lucas County Port Authority offered to purchase the instruments for all vessels entering the Maumee River to prevent serious marine casualties. The total cost, including a maintenance contract, will not exceed $6,000.

What a small price to pay for averting disaster!

LCDR Rand Wintermute is the bridge safety supervisor at MSO Toledo, Federal Building, Room 501, 234 Summit Street, Toledo, Ohio 43604-1590. Telephone: (419) 259-6398.

Silt happens!

By LCDR Richard E. Tinker

More than 25,500 miles of commercially navigable channels make up the waterway system in the United States. These channels crisscross the country, connecting cities in 41 states with suppliers, manufacturers and consumers in this country and all over the world. Shipping products and materials by water is a cost-effective and energy-efficient alternative to highway, rail or air transportation.

The primary agency in charge of operation and maintenance of our nation's waterway system is the U.S. Army Corps of Engineers. While some sections of the system require only minimal maintenance, about 12,000 miles of inland and coastal waterways require regular maintenance to ensure that the navigation channel continues to provide adequate and reliable water depths for commercial vessels and recreational boats.

An important part of channel maintenance is removing bottom silt and sediments that have been deposited by water currents and are creating shoals, which decrease the water depth. Left unchecked, shoaling can easily close a channel, causing significant shipping delays. To keep ahead of the game, the Corps regularly conducts hydrographic surveys of the waterways to determine when and where shoaling may occur and dredging will be necessary.

Filling the hopper.

The Corps' dredging program maintains navigable channels to specific congressionally-authorized depths throughout most of the nation's waterway system. Reliable channel depths allow shippers to use the most economical vessels to transport their goods. It also helps reduce shipping delays, casualties and pollution that can be caused by shoaling and grounding.

Continued on page 68

The Corps hopper dredge McFarland sidecasts in open water.

Continued from page 67

Background

The dredging program began with the Rivers and Harbors Act of 1824, when Congress assigned the Corps with clearing the channels of the Ohio and Mississippi Rivers of logjams and tree stumps. As the nation's waterway system grew, so did the Corps responsibility for its maintenance. Today, about 300 million cubic yards of dredged material are removed every year from channels at a cost of more than $500 million.

About 86 percent of this dredging is done by contractors hired by the Corps. The remaining 14 percent is done by a fleet of dredges maintained by the Corps for national emergencies and to supplement commercial dredges during peak times. In national emergencies, like war or a major catastrophic event, the ability to move goods quickly is very important. The Corps is authorized by congress to maintain a fleet of 12 dredges, positioned throughout the country, which can immediately respond to channel clearance orders to expedite shipping during emergencies.

The Corps is a world leader in developing dredging technology both in the efficient and economical removal of sediment from channels, and in developing environmentally-friendly methods of dredging and disposing of dredged materials.

Research and development is an important part of the dredging program. The Corps is always seeking more economical methods of hydrographic surveying, position fixing, sediment removal and material disposal.

Equipment

The most commonly used dredges are either hydraulic or mechanical. Hydraulic dredges use a centrifugal pump to remove sediment and transport it in a liquid form to a discharge area. Mechanical dredges use some form of a bucket to excavate and raise bottom material.

Due to their ability to move large quantities of material in short periods of time, hydraulic dredges conduct over 90 percent of the work in this country. **There are four types of hydraulic dredges: pipeline, hopper, sidecaster and dustpan.**

Pipelines are normally non-self propelled dredges which use a cutterhead mechanism to break up a wide range of bottom materials, including soft rock. The broken up material is then sucked up through a pipe through the dredge pump and then pushed through the pipeline a considerable distance before being discharged into a disposal area.

Hoppers or trailing suction dredges are usually self-propelled ocean-going vessels between 150 and 550 feet in length. The vessels contain a hopper which holds dredged material after it is sucked off the bottom by movable dragarms that are lowered into place. When the hopper is full, the vessel proceeds to a disposal area where the material is dumped, either through doors in the hopper bottom or by splitting the hull.

Dredging is a fine example of the Corps' motto, *"Essayons" . . . "We serve."*

Dustpan dredge Iadwin deepens the Mississippi River.

Sidecasters are hopper dredges without hoppers. A sidecaster pumps dredged material out of a discharge pipe supported by a boom. This pipe is directed away from the vessel so that the material is moved from the area being dredged.

Dustpans have very large suction heads, generally in the shape of dustpans. They have water jets to help break up and move the dredged material into a pipeline, where it is discharged into a planned disposal area in another part of the water.

Mechanical dredges, on the other hand, do not make direct use of pumps. Some type of bucket is lowered into the water to excavate and raise the bottom material. The bucket can be attached to the vessel by wire rope, structural boom or chain-driven conveyor belt.

This dredge may be shore-based for close in operations or the bucket mechanism can be mounted on a barge for off-shore work, The dredged material is usually deposited into hopper barges or scows that are taken away for disposal.

Although mechanical dredges can not excavate the large volume of material needed in high production jobs, they have several advantages for other type work. For example, they can handle large rocks and other debris that are hard to pass through the hydraulic pumps. Also, deep dredging work is easily accomplished by adding more wire to the bucket, but extending the suction pipe on hydraulic dredges is very difficult.

Economically, the mechanical dredge has other advantages over the hopper types. First, there is less water mixed with the sediments which must be handled at the disposal area. Second, the equipment is cheaper and can easily be adapted to non-dredging construction work. Also, since the mechanical dredge usually uses separate hopper barges to transport material to the disposal site, the dredge can be operated continuously without stopping to dispose of dredged material.

Continued on page 70

Bucket dredge removes silt.

Corps dustpan dredge Potter works on the Mississippi River.

Continued from page 69

Environment

Dredging can affect the environment in several ways. Besides removing bottom material used as habitats by certain organisms, the operations affect water quality, current and tidal patterns, the disposal area and the number and type of vessels that transit the area. It is also possible that the dredged sediments have been contaminated over time with hazardous materials. Moving them could reintroduce harmful elements into the water column. All of these problems must be satisfactorily solved before any dredging is conducted.

The Army Corps of Engineers is reducing such negative impacts by careful research before dredging operations begin. Bottom materials are sampled and tested for hazardous elements. A determination is made if any endangered species are threatened by such operations. Public notice is posted for concerned citizens to comment on proposed dredging.

The Corps carefully evaluates disposal options to determine the safest methods and locations before issuing permits to begin work. Generally, disposal sites are located near dredging sites, however, where no close alternative sites are available, disposal areas may be located as far as 30 miles or more from the dredging sites. The state where the project is located must certify the water quality permit. Without this certification, no dredging will be conducted.

Only about two percent of sediments dredged by the Corps are contaminated with hazardous or toxic chemicals. These chemicals may have been introduced more than 100 years ago when it was common practice to dispose of waste in the rivers. Many harmful chemicals have been trapped in bottom sediments ever since.

Removal may be the best alternative in some cases, while "capping" (covering the contaminated area with non-permeable material) is preferred in others. Although removal and proper disposal is very expensive, capping will prevent further dredging without disturbing the original sediments.

Although dredged material is often referred to as "spoil," this is a misnomer. Dredged material is used to build beaches, constructs islands, builds levees and serves as construction material and as rich soil replacements for farmlands. In fact, the concrete for constructing the Pentagon was mixed with sand dredged from the Potomac River. And, Washington D.C.'s National Airport is one of many built on areas filled with dredged materials.

The Corps is finding other beneficial uses for dredged material. For example, it was recently tested as a base for shrimp aquaculture, and it has been used to build nesting habitats for wildlife refuges throughout the waterway system.

Conclusion

A water-use conflict exists regarding dredging. While ports and industry support increased dredging to allow larger, deeper draft vessels in the trade, environmentalists want to limit the practice due to perceived negative effects on the environment.

Stopping, or even reducing dredging can have immediate and long-range effects on the nation's economy. It is the Corps' mission to maximize the waterway's ability to support the economy and develop more effective, efficient methods of dredging, while continuing to make the process more environmentally friendly.

Dredging is a fine example of the Corps' motto, ***"Essayons" . . . "We serve."***

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Stairways of water

Lock on the Ohio River

By LCDR Richard E. Tinker

The skipper is proceeding down the Ohio River. Pushing out ahead of his 145-foot, 6,000-horse-power towboat are 15 "jumbo" barges, each 195-feet long and 35-feet wide, and carrying 1,500 tons of coal (the equivalent of 60 semi-trailer truck loads). The overall dimensions of the tow are 1,120-feet long by 105-feet wide, with five rows of barges three abreast.

The skipper knows this section of the river well. It is relatively straight without many problems. Today, the currents and winds are stronger than normal, but still workable. The skipper selects channel 13 on his VHF and contacts the operator of an Army Corps of Engineers lock a few miles ahead.

They discuss the approach to the lock and the dam. The skipper is warned about heavy winds and that there is an upbound tow preparing to lock up and that he should tie off to a mooring cell and wait for this tow to clear his position. Then he should approach the lock with his barges flat against the guardwall by the 200-foot mark, and then tie off and wait for the lights.

The lock operator's information is essential because, in a short while, the skipper must take his tow into the main lock chamber which only allows two and one-half-foot clearance on each side and 40 feet at each end. This is not easy under perfect conditions, and somewhat harder today because of the currents and strong winds.

As the upbound tow passes his position, the skipper proceeds to the guardwall, carefully using his rudders and engine to counteract the powerful currents and keep the wind from blowing him away from the guardwall. He slides down the guardwall, anticipating tying off with the front of his tow 200 feet from the upstream lock gate.

The skipper waits patiently for the green light signaling that the lock operator is ready for him. Carefully, he moves his tow into the chamber. The deckhands are his eyes and a radio his ears as he maneuvers the tow into position and begins the long slide down the lockwall, stopping short of the downstream gate, a slight margin of open space on each end of the tow.

Continued on page 72

Towboat manuevers barges in lock chamber.

Continued from page 71

The deckhands secure the barges and the upstream gates close behind him. A lock operator comes to pick up the tow's "vessel log" describing the cargo. The Corps maintains a record of tonnage and commodities that pass through the locks, and cumulatively through the nation's waterways.

When all is ready, the entire tow begins to drop, slowly going down with the water level in the chamber — a total of 30 feet. The lockage allows more than 32 million gallons of water to pass through. When the water level in the chamber reaches the same as the tailwater, the downstream lock gates open, and the tow proceeds down river.

Locks

Going though a lock may sound like a lot of work and not without danger, but it takes place thousands of times a day across the country. On a complete transit of the Ohio River, for example, a tow must pass through 20 locks. Overall, the Army Corps of Engineers operates 235 lock chambers at 191 sites throughout our nation's waterways.

Water transportation remains one of the most energy and cost-efficient means of carrying bulk commodities. Without the Corps' systems of locks and dams, many waterways would be useless or too dangerous for shipping goods.

Most of the locks operate nonstop, seven days a week, although there are some small, remote locks that are in use on a published schedule. During peak shipping periods, tows may have to wait several hours in a line before they can pass through a lock. In 1993, Lock 52 on the Ohio River passed the greatest cargo tonnage (94.5 million) and the most barges (102,696).

Lock chambers vary in size from 30 by 90 feet to 110 by 1,200 feet. The John Day Lock on the Columbia River in Oregon has the greatest single lift, raising and lowering vessels up to 110 feet. The two oldest locks still in operation are Kentucky River Locks 1 and 2, which opened in 1839. The newest are the auxiliary lock chamber at Melvin Price Lock and Dam on the Mississippi River, which opened in June 1994, and Locks 4 and 5 on the Red River in Louisiana, which opened in December 1994.

New lock construction has come to a virtual standstill. However, waterway users must face the fact that as of January 1995, nearly half of all lock chambers were more than 50 years old. And the costs for repair and rehabilitation are on the rise.

"Water transportation remains one of the most energy and cost-efficient means of carrying bulk commodities."

Tow locks through on the Ohio River.

Conclusion

The system of locks is only part of the inland and coastal navigation system designed, built, maintained and operated by the Army Corps of Engineers to allow reliable navigation throughout the waterways. The locks have proven to be a safe, efficient and economical means of providing safe navigation, while supporting the economic growth of the maritime shipping industry and the nation.

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When is a voyage "*manifestly unsafe?*"

By LCDR Paul Cormier

Aids to navigation, bridge administration, ice breaking operations and vessel traffic management are all waterways management tools used to prevent casualties with the greatest potential for loss of life, limb and property. Declaring "manifestly unsafe voyages" protects uninspected passenger and recreational vessels at risk from catastrophes at sea.

Candidate for manifestly unsafe voyage investigation?

Unsafe voyages

A manifestly unsafe voyage is clearly apparent through sight or understanding to be unsafe. This does not imply that such voyages are declared on impulse upon first sight of what appears to be an unsafe vessel or route.

Human nature dictates that first impressions influence decisions. At first glance, some vessels appear to be seaworthy while others do not. Also, some voyages seem safe when others do not. Only a thorough investigation can determine if a voyage would be clearly unsafe. Such determinations stem from educated decisions, not knee-jerk reactions.

Manifestly unsafe voyage determinations apply to specific voyages on specific bodies of water. Such determinations are distinguished from those arrived at from a broader authority to terminate unsafe operations on uninspected recreation and passenger vessels.

This authority is found in 33 CFR 177.07 (46 USC 4308). The distinction is made in 33 CFR 177.04 (a). (This authority should not be confused with that used to terminate unsafe operations or practices on commercial fishing vessels {46 USC 4505}.)

Jurisdiction

Regulations authorizing the declaration of manifestly unsafe voyages extend to uninspected recreational and passenger vessels operating on waters subject to the United States. This jurisdiction extends to vessels owned in the United States that operate on the high seas.

Some exceptions to the applicability of manifestly unsafe voyages are found in title 33 CFR 177.01. For example, United States public vessels and foreign vessels' innocent passage through United States waters are specifically excluded. Also, these rules do not apply to inspected vessels, because they are subject to more stringent safety standards.

Son of Town Hall is towed from upper New York Bay to the East River. Coast Guard provides escort.

Designations

Manifestly unsafe voyages can be designated for:

- **unsuitable design or configuration:**
- **improper construction or inadequate material condition; or**
- **improper or inadequate operational and safety equipment.**

Manifestly unsafe voyages are documented in orders from Coast Guard district commanders. Such regulations specify the voyages and bodies of water.

Before designating a voyage as manifestly unsafe, a qualified Coast Guard marine inspector usually conducts an investigation to the extent time permits. Coast Guard inspections are normally conducted according to clear mandatory standards. However, there are no such standards for uninspected homemade boats, which are evaluated according to an inspector's knowledge and experience.

Constitutional rights

Determining a manifestly unsafe voyage is not done lightly. Every member of the Coast Guard swears to uphold the United States Constitution, whereby personal rights are protected. Safety of life at sea is the Coast Guard's main mission.

Determining a manifestly unsafe voyage is often a choice between protecting an individual's life or his or her liberty. The latter is a freedom from restraint, which conflicts with the concept of declaring manifestly unsafe voyages.

To deal with such conflicts, the Coast Guard commandant delegates the authority to declare a manifestly unsafe voyage to ten district commanders, all of whom are admirals. This responsibility cannot be delegated to subordinates.

Even though no written standards exist for these unique voyages, limiting the number of decision-makers precludes trampling on an individual's right to life, liberty and the pursuit of happiness.

Incidents

The following case histories illustrate the informed decision making that goes into declaring manifest unsafe voyages.

Lunar Research

The pleasure craft *Lunar Research* is a 24-foot wooden hull that was declared manifestly unsafe by the First Coast Guard District commander on August 24, 1989. Apparent to the naked eye were inadequate material and hull deterioration, creating an unsafe condition. At first glance, the vessel was not seaworthy.

This is a rather simple case, except that the decision was contrary to the vessel owner's plan. The vessel's voyage was suspended.

Continued on page 76

There is a natural tendency to second-guess decisions regarding manifestly unsafe voyages. Those whose first impression formed their opinion are happy and supportive when a manifestly unsafe voyage is declared. However, when an investigation does not result in voyage termination, the support does not shift with these results, especially when the vessel is an eyesore. (The *Son of Town Hall* illustrates this point on page 76)

Son of Town Hall under construction on lower west side of Manhattan.

Continued from page 75

Town Hall

The pleasure craft, *Town Hall*, is an example of accurate gut reactions where the supportive decisions were justifiably delayed. When the voyage was finally terminated, the public was supportive, but the owner was not.

The *Town Hall* was a 45-foot paddlewheel houseboat on a rusted steel hull. Marine inspection reports cited that the deck was wasted and "not remotely watertight." Holes were intentionally cut below the waterline to permit the insertion of foam, which the owners considered a primary means of flotation. (The hull was not considered the source of buoyancy.)

During the inspection in Provincetown, Massachusetts in August 1990, it was noted that the propulsion system was a crude design — "a marvel to behold; a slant-6 Dodge van engine and transmission" coupled to a series of pulleys, shafts and belts. However, there was no immediate cause to support the determination of a manifestly unsafe voyage, and a Coast Guard boarding party did not recommend termination.

Like many candidates for manifestly unsafe determinations, the orange-colored *Town Hall* was an eyesore moored near affluent waterfront marinas. Many citizens sighed with relief when it finally left Provincetown on October 9, 1990.

After many propulsion mishaps and several groundings, the *Town Hall* was surveyed by another Coast Guard inspector at Port Jefferson, Long Island. This inspector declared the propulsion system unsuitable because the vessel could not be maneuvered effectively. Upon the recommendation of the officer in charge of marine inspection New York, the *Town Hall's* intended voyage to Mexico was declared manifestly unsafe on August 16. 1991. The owner's liberty was upheld until it was proven that life was at stake.

Son of Town Hall

Undaunted by the previous experience, the owner of the *Town Hall* later built the *Son of Town Hall* on Manhattan's West Side, near the *Town Hall's* final resting place. Cloaked in a canary yellow canopy, the long narrow vessel looked like a banana.

A detailed Coast Guard inspection of the *Son of Town Hall* revealed that it was a *Kon Tiki*-type raft with junk-style battened sails and outriggers. It was designed to sail down wind only —where the elements would take it.

Materials used to build the craft were recycled from an abandoned golf driving range and a defunct open-air night club on the pier. The vessel's structure was made from two-by-four studs, two-by-six planks and plywood fastened by nails, screws and lashings. Out of sight was the keel made of 34-foot long timbers surrounded with foam, poured to provide buoyancy. There was no hull that could flood.

The owner had a Coast Guard license with an auxiliary sail endorsement. A summer trip between New York and Provincetown was planned for good weather in daylight hours only, anchoring at harbors of safe refuge. The voyage was charted in protected and partly protected waters. The raft design lent itself to beaching and the owners had assistance insurance.

After a thorough investigation by Coast Guard inspectors on May 24, 1995, it was decided to allow the vessel to make the voyage. The *Son of Town Hall* was towed up the East River through Hell Gate and western Long Island Sound past Execution Rock. The voyage began in June and concluded safely in August 1995.

The decision not to impose a manifestly unsafe voyage was based on many safety measures, practices, experiences and knowledge. Ultimately, the conflict between liberty and life was not as crucial.

Father's Day

Initially, the vessel *Father's Day*, a five-foot four-inch long capsule designed to drift in prevailing currents appeared to be unsafe for its intended voyage. The vessel's beam seemed to be nearly equal to its length. The draft was about four feet. Allegedly, there were nine internal airtight compartments within a hull encased in multiple layers of fiberglass. A blunt configuration limited speed.

This was an innovative homemade design whose first attempt to complete a transatlantic crossing was declared manifestly unsafe in June 1992 in the Fifth Coast Guard District. Two subsequent attempts to depart from Nova Scotia in 1993 were unsuccessful. A fourth try was declared a manifestly unsafe voyage by the First Coast Guard District commander and terminated on June 3, 1993.

The Coast Guard did not want to stifle the traditional American spirit for adventure. However, this adventure had a very low probability for success and a high probability for loss of life. Foresight indicated the odds were stacked up against the *Father's Day*.

The owner of the vessel beat the predicted odds, however. A retired airline pilot, he departed St. John's, Newfoundland, in the small *Father's Day* on June 14, 1993, and arrived at Falmouth, England, after 104 days at sea. He recaptured the record he had held for 25 years for crossing the Atlantic in the smallest boat. He was 19 days overdue, but survived.

While the crossing was successful, the two decisions to declare a manifestly unsafe voyage were proper and well founded.

Conclusion

The record is clear. Uninspected recreational and passenger vessel owners enjoy freedom of the seas. They will continue to do so until a voyage appears to be life threatening. Only then will the Coast Guard consider declaring a manifestly unsafe voyage.

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Son of Town Hall is inspected by the Coast Guard.

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