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PROCEEDINGS

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COAST GUARD REGULATIONS

Creating a wake of safety, security, and stewardship


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Members of the Key Bridge Response Unified Command conduct operations in Baltimore on April 9, 2024. The Francis Scott Key Bridge collapsed on March 26, after being struck by M/V *Dali*. As part of the unified command, the Coast Guard responded to help safely clear the site and reopen the main passageway to the port of Baltimore by June 10. Coast Guard photo by Petty Officer 1st Class Matthew West

PROCEEDINGS

Summer 2024 Vol. 81, Number 2

Introduction

Standards

Compliance

Assessment

On Deck

On the Cover:

Coast Guard photo by Petty Officer 2nd Class Alejandro Rivera

Shortly after leaving the Port of Baltimore in the early morning hours of March 26, 2024, the M/V Dali, *a Singapore-flagged neopanamax container ship, collided with a support column of Francis Scott Key Bridge.*

The bridge collapsed, killing six construction workers and pinning the ship to the bottom of the Patapsco River. Incidents like this often spur regulatory actions as part of the effort to make shipping safer.

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The articles contained in *Proceedings* are submitted by diverse public and private interests in the maritime community as a means to promote maritime safety and security. The views expressed by the authors do not necessarily represent those of the U.S. Coast Guard or the Department of Homeland Security or represent official policy.

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Assistant Commandant's Perspective

by Rear Admiral Wayne R. Arguin
Assistant Commandant for Prevention Policy
U.S. Coast Guard

Since the early days of the nation, the Coast Guard and its predecessor agencies have protected our nation's waters, harbors, and ports. While much has changed over the centuries with our missions expanding from sea, air, and land into cyberspace, our ethos and operational doctrine remain steadfast. Regardless of the threat, we leverage the full set of our authorities, the ingenuity and leadership of our workforce, and the breadth of our military, law enforcement, and civil partnerships to protect the nation, its waterways, and all who operate on them.

Our national security and economic prosperity are linked to a safe and efficient Marine Transportation System (MTS). It is difficult to overstate the complexity of the MTS and its consequence to the nation if interrupted. It is an integrated network that consists of 25,000 miles of coastal and inland waters and rivers serving 361 ports. However, it is more

Champion's Point of View

by Timothy Brown
Chief of Standards Evaluation & Development
U.S. Coast Guard

The last regulations-focused edition of Proceedings was published in Spring 2010. While preparing this new version, we endeavored to create a tool that mariners, the maritime industry, members of the public, and Coast Guard professionals could use to better understand and engage with the Coast Guard's regulatory development process. This edition of Proceedings does not set policy, but references and links back to the extensive legal and policy framework guiding the regulatory development and compliance activities of the Coast Guard.

This framework is complex and ever-evolving. As this edition was being prepared for publication, the

than ports and waterways. It is cargo and cruise ships, passenger ferries, waterfront terminals, skilled mariners, offshore facilities, buoys and beacons, bridges, and more. The MTS supports $5.4 trillion in economic activity each year and the employment of more than 30 million Americans.

Effective, reasonable, and timely promulgation of regulations and policy are the key to keeping pace with an ever-evolving MTS. The Coast Guard's regulatory development program translates authorities granted by Congressional legislation and consistent with international agreements, including International Maritime Organization (IMO) instruments, into rules that promote the safety and security of the MTS. Public participation is critical to this process due to the diversity of the maritime industry and the dynamic nature of the operating environment. Through the formal regulatory notice and comment process, we gather public feedback. We also incorporate advice from Federal Advisory Committees and refer to industry consensus standards, where appropriate, when crafting regulations. This iterative process ensures we evaluate all options to improve the safety and security of the MTS. I hope that this edition of Proceedings provides valuable insight into the regulatory development process and facilitates deeper engagement with the Coast Guard.

U.S. Supreme Court ruled in the case of *Loper Bright Enterprises v. Raimondo* with impact to future regulatory development activities. The extent and nature of these changes will become more clear over time, and the articles contained within were written prior to publication of the Court's decision.

Like all of its predecessors and like regulatory development, this issue of Proceedings was a team effort. I am grateful to the contributing authors, their supervisors and organizations which allowed them the time to prepare these well-researched articles, and especially to Proceedings editorial staff of, Ms. Samantha Quigley, Mr. Chad Stewart, and Ms. Seila Sarun for their advice and support. Mr. Ben Hawkins, Mr. Mike Blair and Mr. Caleb O'Kray, and especially Ms. Quigley, provided much-needed leadership and continuity to the development of this issue when I was called away to assist with the response to the Francis Scott Key Bridge collapse in Baltimore, and deserve credit as the co-Champions of this edition.

Introduction

The Prevention Concept of Operations

Guiding prevention standards and regulation development

by Timothy Brown
Chief
Office of Standards Evaluation & Development
U.S. Coast Guard

This edition of Proceedings is structured and organized around the Prevention Concept of Operations. Most of the Coast Guard's regulatory development work supports the prevention mission set, and the concept of operations provides a useful lens through which to organize and consider the entire regulatory development program.

The Prevention Concept of Operations—Standards, Compliance, and Assessment—guides all prevention missions, including port security. It begins with establishing expectations in the Marine Transportation System (MTS). Regulations and standards provide a set of baseline requirements and are critical to establishing effective and consistent governance regimes. With effective standards in place, vessel and facility inspectors verify systematic compliance activities to ensure the governance regime is working. This part of the system is vital in identifying and correcting potential risks before they advance further and negatively impact the MTS. Effective assessment is paramount to continuous improvement. It provides process feedback and facilitates the identification of system failures so that corrective actions can be taken to improve standards and compliance activities.

This description is apt and can be visualized as a feedback loop. Lessons learned from marine casualty investigations, emerging technology, and changes observed in the use of the MTS drive changes in legislation, updates to International Maritime Organization (IMO) instruments, revisions to industry consensus standards, and eventually changes to regulations. The process to update regulations includes expert analysis of the economic benefits and costs of the proposed change and review of the potential environmental impact of the requirement. Throughout the process, public input is encouraged through the formal regulatory notice and comment process, advice from federal advisory committees, and the use of industry consensus standards when crafting regulations. Unless good cause can be established for a regulation to become effective immediately, normal process dictates that a proposed rule be published, with public comment received and considered in preparation of the final rule.

Once published, the regulation becomes part of the Coast Guard's compliance efforts. This often includes updates to training programs for field personnel, updates to the supplements and memoranda of understanding/agreement governing oversight of third-party organizations and cooperation with other government agencies, and revisions to guidance and policy documents providing clarity to field personnel and the public. A robust schedule of internal and external audits, a quality management system called the Mission Management System, and a layered scheme of requests for reconsideration and appeal ensure that the regulations are administered fairly and consistently. The effectiveness of compliance activities is monitored, data is collected and analyzed, and, if required, adjustments are made to the regulations or underlying statute, restarting the feedback loop in a spirit of continuous improvement.

While regulatory development is often imagined as the most bureaucratic of endeavors, when properly done it creates legally sufficient, environmentally sound, and economically defensible requirements that are the foundation of the Coast Guard's marine safety, security, and environmental stewardship missions and furthers the execution of the overall Coast Guard strategy.

About the author:

Mr. Timothy Brown has been a member of the Coast Guard Headquarters civil service Prevention staff since 2009 and chief of the Office of Standards Evaluation & Development since 2015. His focus is on marine safety regulatory development, environmental compliance, and marine environmental protection standards development.

PREVENTION CONCEPT OF OPERATIONS

POWERING SAFE, SECURE, SUSTAINABLE MARITIME COMMERCE

Prevention Workforce

A properly sized, trained, and equipped team to provide first rate customer service and achieve mission excellence.

Partnerships

Strong international, federal, state, local, tribal, and industry relationships to drive unity of effort and facilitate the safe, secure movement of maritime commerce.

Knowledge Management

Proper governance, accountability, and technology to smartly and consistently execute prevention operations.

Risk Management

Data-driven intelligence to drive risk-based decisions and safeguard the MTS.

Our Goal Ensure a safe and efficient marine transportation system to protect the vital flow of maritime commerce, the lifeblood of our nation's prosperity and security.

Our Challenge Increased competing demands for MTS use, congested waterways, and evolving system complexities increase the risk of port and waterway disruptions that threaten lives, economic prosperity and national security.

Our Plan Deliver a highly proficient workforce equipped with modern technology and streamlined governance to power safe, secure, sustainable maritime commerce and provide global maritime leadership.

Enhancing Prevention Program Readiness with PROFICIENCY, TECHNOLOGY, and GOVERNANCE.

Standards

The Role of Legislation in the Regulatory Process or: How I Learned to Stop Worrying and Love the Law

by Nathan Leung Eichler
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U.S. Coast Guard

When discussing the interplay between Congress and an executive branch agency, two terms are frequently invoked to describe legal authorities—legislation and regulation.

Broadly speaking, regulation simply refers to any enforceable rule that is placed on society to govern certain actions or behavior. But legislation and regulation have taken on unique meanings in the context of federal governance in the United States. Typically, legislation refers to acts that are passed by Congress—the legislative branch—and enacted into federal law, while regulation refers to the enforceable rules that are issued by executive branch agencies. The basic hierarchy of legal governance is the Constitution as the supreme law, followed by acts of Congress—for example, federal legislation—and finally agency regulations. Many agency regulations have "the force of law," which means they apply to the public and are enforceable as though they were laws passed by Congress.

The relationship between the two types of authorities is complex, but a key point is that legislation passed by Congress is primary. Legislation creates the mechanisms and delegated authorities which allow agencies, like the Coast Guard, to issue regulations. Future legislation can always be passed, which alters the regulatory landscape. Conversely, the authority Congress gives may also be taken away. Regulations exist and operate within these legislative bounds—legislation defines, regulation refines.

In addition, enacted legislation can directly "regulate" the public. Congress always has the option to pass laws that address matters within its constitutional power without implementing regulations. For example, Congress recently amended the statute requiring the immediate reporting of sexual assault and sexual harassment onboard U.S. documented vessels by prescribing certain procedures that went into effect immediately upon the law's enactment.

In the Beginning, there was Legislation

In the early 19th century, the general legal approach was for regulatory norms to stem exclusively from a piece of legislation and be enforced by prosecution in the courts. The basic adage that states Congress passes the law and the president enforces them is a reasonable summation of the 19th century view towards regulation.

One antebellum-era problem is a familiar one, however. The advent of new technology in the shipping industry requires the need for the federal government to balance maritime safety with industry innovation. The early steamboat industry was rife with disasters and deaths caused by exploding boilers. In 1838, the degree of social harm being wrought by the rapid development of the new industry led to one of the first vessel inspection-oriented laws. The law called for a few safety requirements on steamboats and created the role of a steamboat inspector, appointed by federal district judges "to make such inspection when called upon for that purpose, and to give the owner or master of such boat or vessel duplicate certificates of such inspection." These ancestors of modern marine inspectors were appointed by the judiciary and did not possess independent power to enforce penalties, although they did appear to have a great deal of discretion in issuing certifications. Instead, enforcement was accomplished through lawsuits and prosecution in the federal courts. The law provided a few monetary penalties for specific safety failures, but it also subjected vessel owners and masters to criminal liability. Any deaths resulting from a steamboat owner's negligence could result in a guilty party being

The *Spirit of Peoria*, a 160-foot riverboat built in 1988, is seen docked in Louisville, Kentucky, for the 2014 Centennial Festival of Riverboats, which is held to celebrate the history of Ohio River boats. Coast Guard photo by Petty Officer 3rd Class Carlos Vega

"sentenced to confinement at hard labor for a period not more than ten years." Remarkably, with only slight changes from the original statute, the maximum 10-year criminal liability for deaths caused by negligent vessel operations is still relied upon by Department of Justice prosecutors today.

The Industrial Revolution did not end in 1838, though. As technology developed, new industries and markets formed, and society and the economy became ever more complex. As a result, the need for more technologically competent governance grew.

Coast Guard prevention professionals from District 17 in Juneau, Alaska, commemorate the 152nd anniversary of the Steamboat Inspection Service on March 7, 2023. D17 Coast Guard marine inspectors help enforce safety and security in the one of most dynamic and remote parts of the Maritime Transportation System. In addition to keeping the Alaskan MTS flowing, they also deploy throughout the country responding to disasters that affect the environment and port operations. Coast Guard photo by Petty Officer 3rd Class Ilian Borrero-Aguirre

Legislation: The Foundation of Agencies and the Framework for Regulation

Unlike the original 19th century marine inspectors, which were appointed in an ad hoc fashion by federal district courts, since the 20th century, regulatory authority has generally been centered in the executive branch within agencies created by Congress. The regulatory agencies are typically placed within a cabinet-level department, as with the Coast Guard and its current home in the Department of Homeland Security, although there are a few agencies that do not belong to any department. Notably, the Environmental Protection Agency, the Coast Guard's interagency partner in addressing many environmental issues, is one such independent agency.

In the process of creating a regulatory agency, Congress also delegates some of its legislative authority to the agency. This legislative spark is the genesis of a modern regulatory agency. An agency belongs to the executive branch and has enforcement powers but is imbued with the delegated authority of the legislature to create rules. As such, the agency is a hybrid that does not fit neatly within Article I, the legislative branch, or Article II, the executive branch, of the Constitution, which is why agencies are sometimes referred to as the "Fourth Branch." The complexity of modern society calls for the crafting of rules based on the particular expertise that these agencies bring to bear on specific issues within their purview.

In addition to the legislation that brings an agency into existence, Congress continues to pass legislation that prescribes requirements on various aspects of society. Bear in mind that Congress never loses its ability to pass laws on a matter even if it delegated some authority over those issues to a particular agency. Regulatory authorities are subordinate to the legislative authorities. Congress may also pass legislation that addresses an issue broadly and direct the agency to issue further regulations to refine the governmental oversight of society.

Violations of regulations may carry monetary penalties or subject the offender to some other enforcement. In some circumstances, Congress' overarching legislation authorizes criminal prosecution for violations of the law's implementing regulation; however, the agency cannot independently fashion criminal liability through a regulation. For a regulation to have the same enforcement character as legislation, Congress has laid out the process by which regulations are developed through another statute.

As the name suggests, the Administrative Procedure Act (APA), codified to sections 551 through 559 of title 5 of the United States Code, includes the procedural framework that an agency must follow for the proper development of its regulations. Failure to follow the APA process can lead to lawsuits, which may result in the court ordering an injunction that bars a regulation from taking effect.

One critical aspect of the APA process is the emphasis on transparency and the general rule of notifying the public of a proposed rule through publication in the Federal Register. For most regulations, after publication in the Federal Register, the agency must give people the opportunity to participate in the process through submission of written data, views, or arguments. The agency must consider the relevant matter presented but is under

no obligation to accept any of the positions expressed. This notice and comment process is a mechanism that gives the agency more insight into the potential effects of a rule or to highlight issues that need better clarification, especially from a particular industry or other members of the public who will be directly affected by the regulation's implementation. The agency uses information provided in the comments to make adjustments prior to finalizing and issuing the rule.

The Dance: Legislator and Regulator

Once Congress delegates its rulemaking authority, it does not have any formal supervisory role in the development of the regulation. The technical development of the regulations is an executive branch function. However, Congress can intervene through legislation on the same topic and new laws may be passed that supersede or limit regulations. Enacted legislation must be followed, even if it upsets the agency's regulatory agenda or is contrary to the agency's expert judgment. Regulators should remember the legislative process is inherently political. Negotiating within the constraints of the party system and pursuing constituent interests to enact law is the basic role of an elected official—that is a part of the democratic process that was meant to curb executive overreach.

This is not to suggest that an agency does not have an opportunity to engage with Congress. The Congressional oversight committees, senators, and members of the House of Representatives—typically through their professional staff—request or require briefings by agency subject matter experts or reports on specific topics. Some legislation requires reviews of existing regulations, policies, and practice. These are avenues to convey information about the agencies' regulatory efforts, within the bounds of the APA and executive branch procedures. In addition, Congressional staff may request an agency's informal views on pending legislation. This is an opportunity for the agency to convey any technical or practical concerns with the legislation before enactment. Of course, the agency's opinion is just one factor for Congress to consider and the legislative branch is under no obligation to heed that advice. Beyond briefing, reports, regulatory reviews, and informal views on potential legislation, the agency, in accordance with executive branch procedures, can develop and formally submit its own legislative proposals for Congress' consideration.

The executive branch's legislative proposal interagency clearance process, managed by the White House Office of Management and Budget (OMB), allows agencies to address statutory issues that arise within the agencies' respective purviews. For example, when a statutory gap or limitation is discovered, proposing a legislative remedy is an option the agency may consider. A practical, well-justified proposal that aids the agency in accomplishing its regulatory mission brings the issue to the attention of the appropriate oversight committees. If the committees agree the proposal has merit and is politically viable, they may take action to enact new law. It is worth noting that an agency proposal is simply that—a proposal. It is a request from the executive branch to the co-equal legislative branch. An OMB-vetted and formally submitted proposal will likely be considered seriously, but there is no obligation for Congress to act on the proposal; nor is there any agency timeline to which Congress is beholden. Ultimately, it is the prerogative of the legislative branch, subject to the political process, whether to pass new law.

Gaming It Out: The Coast Guard's Role as a Regulatory Agency

The modern Coast Guard is a creature of statute and is provided with a host of various authorities defining its missions and powers. Parallel to these authorities are the various laws Congress has passed that relate to shipping, the marine environment, the Outer Continental Shelf, among others, and which the Coast Guard is intended to regulate. Within these various statutory schemes Congress has authorized or directed the issuance of further regulations, thus laying out the respective arenas and topics the Coast Guard may regulate.

For example, title 46 of the United States Code is the collection of federal laws addressing shipping. Within title 46, certain parts relate to vessels, facilities, and the marine environment, and Congress has enacted statutory requirements that are applicable to a wide span of issues related to maritime commerce. The statutes provide technical definitions and contain other mandates related to vessel inspections, examinations, and manning, among a host of other matters. At times, the law is relatively specific and prescribes precise requirements. However, in the overwhelming number of circumstances, the law sets a general rule and leaves it to the Coast Guard to craft the technical standards, precise means of compliance, and the mechanisms for evaluation and enforcement. Through the APA rulemaking process, the Coast Guard develops rules that meet Congress' intent, fit within the statutory scheme, and are crafted to ensure the safe design and operations of vessels, facilities, and other elements of the Marine Transportation System. All this is accomplished while considering the interests of businesses, state, local and tribal governments, and other affected constituencies. The number of generally framed statutory requirements passed by Congress, many of which are codified in title 46 of the United States Code, is dwarfed by the massive volume of the highly refined, specific regulatory requirements found in the associated titles 33 and 46 of the Code of Federal Regulations.

Conclusion

The processes of legislating and regulating are both lengthy and measured in years. However, at the fundamental level, these drawn-out processes legitimize agency action. By acting only within a scope of authority that has been delegated by the Congress, the agency is bounded by the terms of that delegation. And by following comprehensive APA rulemaking processes, the agency must justify its decision-making and make its process transparent to the public. Not only may the public comment directly to the agency, but the public nature of the process gives constituents a political avenue to address concerns. When Congress acquires knowledge of the rulemaking that can lead to conversations between the agency and Congress, it may spur congressional efforts to legislate on the same topic. The proper formation of regulations uses a process that is embedded within the realm of public discourse. As a result, regulations are ultimately subject to the political decision-making of the elected representatives. In a democratic rule of law system, this is a means of ensuring the propriety and legitimacy of the government's enforcement authority.

Although outside the scope of this brief discussion, a major constitutional actor has been left unaddressed: the third co-equal branch—the judiciary. Agency regulations are subject to judicial review and may be exposed to various degrees of risk for litigation. As one may expect, the activity of agencies and their regulations are constant subjects of litigation. Constitutional challenges are consistently brought to the courts based on arguments over the degree and appropriateness of Congress' delegation of its authority. Lawsuits may argue that regulations overreach because the agency relied on an erroneous interpretation of the authorizing legislation. Most common are challenges to the procedural sufficiency of the rulemaking. In the present legal climate, tougher judicial scrutiny of agency regulations should be expected. Considering this seemingly omnipresent litigation risk, it is critical that the policymakers, technical experts, project managers, economists, and attorneys collaborate closely throughout the rulemaking process to ensure the promulgation of fair, just regulations.

About the author:
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Endnotes:

1. 46 U.S.C. § 10104 provides the requirements and procedures for reporting incidents of sexual assault and sexual harassment. Subsection (f) of the provision provides the Coast Guard with discretion to issue regulations in the future, but such regulations are not required.
2. As an example, the statutory regime for vessel inspection and regulation is codified in part B of subtitle II of title 46, United States Code where Congress has broadly identified various matters subject to regulation, including the types of vessels subject to inspection. In 46 U.S.C. § 3306, Congress provides the clear delegation of authority for the Coast Guard to issue the specific regulations needed to carry out the legislation.
3. For example, a Coast Guard's Captain of the Port (COTP) order typically describes potential federal criminal liability (Class C or D felony) for a failure to comply with the COTP order. This criminal liability was not created by a Coast Guard regulation. It stems from the statutory authority at 46 U.S.C. § 70036 where Congress authorized criminal enforcement for violations of the ports and waterways safety regulations.

Interplay Between Legislation and Regulation

Pursuant to long-standing statutory authorities, the Coast Guard has developed and issued thousands of regulations over the decades to maintain the safe and efficient operation of the Marine Transportation System. Consider the following hypothetical to outline the interplay between legislation and regulation:

A major marine casualty occurs and during the investigation it is revealed that certain novel, but lawful, technologies of a waterfront facility may have contributed to the casualty. However, these design features are not addressed in existing regulations, nor did these features violate any regulation.

While the Coast Guard is considering what, if any, new regulations could be developed, Congress seeks prompt legislative action. Congress requests, and the Coast Guard provides, informal views on the planned legislation to address these features. The legislation considers some of those informal views and may be modified prior to passage. The enacted statute identifies some requirements that are immediately enforceable, but also directs the Coast Guard to develop additional regulations with respect to these design features.

As directed by the legislation, the Coast Guard enforces the new statutory requirements and begins a rulemaking process to develop new regulations through the APA public notice and comment process. Meanwhile, the Coast Guard has discovered that similar technology is being deployed on other facility types and vessels that the new legislation did not address. To ensure that it has the authority to develop broader regulations that address the safety concerns posed to the Marine Transportation System, the Coast Guard prepares a formal legislative proposal for submission to Congress. If enacted, the Coast Guard will have clear authority from Congress to regulate in this area and new regulatory projects can be launched.

The Regulation-Writing Process

Are you ready for some football?

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The key to success is to be a good planner and a good organizer and, to be able to put a good process in place and follow it.
– Legendary football coach Tom Landry

The process of writing Coast Guard regulations that affect a broad population of maritime stakeholders may or may not be more exciting than football, depending on your point of view but, we wanted to get your attention. The informal rulemaking process, also known as notice and comment rulemaking, is typically used by the Coast Guard in developing regulations.

So, how does the game of football relate to regulation writing? Let us take a look at:

- The league and its rules
- The teams and players
- The first half
- Halftime: The fans
- The second half
- The final score
- Recap
- Post-game commentary

Dolimac | iStock/ Getty Images Plus

The League and Its Rules

In football, the league establishes overarching rules, and periodically updates them. These rules dictate how the game is played. Similarly, the informal rulemaking process is governed by a set of laws, executive policy, and judicial rulings to facilitate regulatory and policy development with maximum net benefits. Most significantly, the Administration Procedure Act (APA) establishes requirements and sets the scene for regulatory development. The APA must be followed when we issue new rules, amend existing rules, and even when we repeal rules. There are statutes, such as those in the Paperwork Reduction Act and Regulatory Flexibility Act, as well as Executive Orders, such as Executive Order 12866 (Regulatory Planning and Review) that set out additional requirements.

The league sets a schedule for its games. The unified agenda shows all the rulemaking projects that are scheduled to be published in the next 12 months. Once a determination is made to develop a regulation from the result of a legislative mandate, a marine casualty, or an environmental disaster, for instance, a rulemaking project is initiated. The result will generally be a regulation that will be published in title 33, 46, or 49 of the Code of Federal Regulations (CFR).

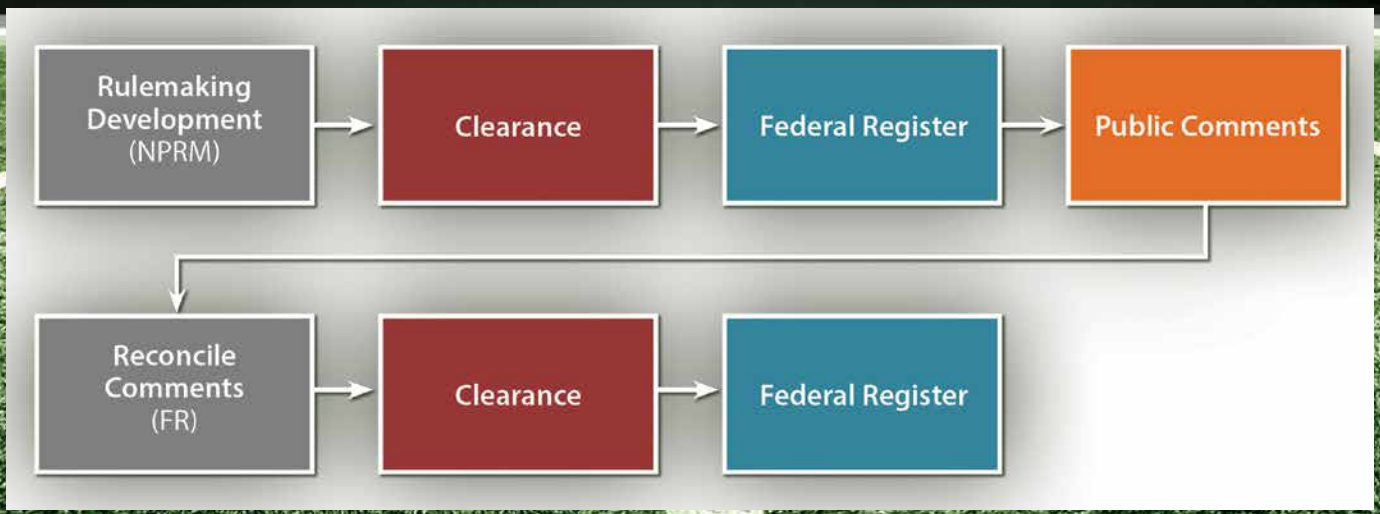
The Teams and Players

First, let us look at one of the opposing teams—the Maritime Miscreants. This team comprises such high-profile players as the well-known halfback Run Aground, the slippery wide receiver Oil Spills, and the tough cornerback Engine Failures. Other players. like Ship Fires, Mariner Injuries, and Cyber Attack, round out the team.

We will call the home team the Regulatory Developers. The Regulatory Developers are overseen by the Maritime Safety and Security Committee (MSSC), the rulemaking governing body comprising senior members at Coast Guard headquarters who represent the various marine safety, maritime security, and environmental protection missions. The MSSC determines which regulations will be pursued by the Regulatory Developers. At any given point, there may be dozens of Coast Guard headquarters rulemaking projects in various stages of development.

The Regulatory Developers team is made up of the following players with a brief description of their general

Regulatory Development Process Overview



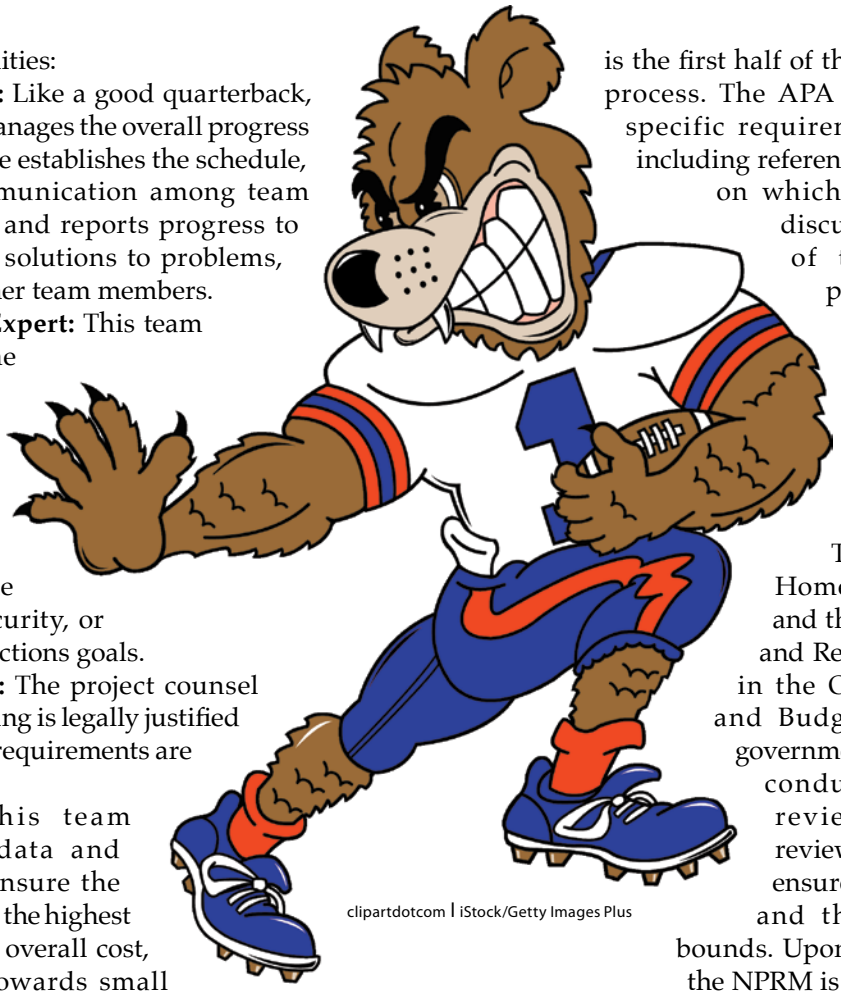
roles and responsibilities:

Project Manager: Like a good quarterback, this team member manages the overall progress of the team. He or she establishes the schedule, ensures good communication among team members, monitors and reports progress to management, finds solutions to problems, and supports the other team members.

Subject Matter Expert: This team member ensures the intended policy and outcome of the project, that is, the project scope, is achieved to meet the intended marine safety, maritime security, or environmental protections goals.

Project Counsel: The project counsel ensures the rulemaking is legally justified and that procedural requirements are being met.

Economist: This team member gathers data and other evidence to ensure the rulemaking provides the highest benefit at the lowest overall cost, including an eye towards small business concerns.



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Environmental Analyst: This team member ensures that all environmental concerns are analyzed and addressed.

Technical Writer: This team member ensures all the pieces fit together so the rulemaking document is suitable for publication in the Federal Register.

The Coast Guard headquarters organization provides coaching to the players as the rulemaking progresses. The team follows the regulatory development program mission management system (MMS), which standardizes strategies and procedures to foster a process that is as repeatable and predictable as possible. This is the playbook that the team uses to advance the ball down the field and toward the end zone. The MMS provides templates, work instructions, and similar information for the team to follow as they advance the rulemaking. A game plan is developed in the form of a project plan, typically using sophisticated project management software. The team analyzes economic, environmental, privacy, and information collection requirements to minimize the impact in the most cost-beneficial manner.

The First Half

Generally, a Notice of Proposed Rulemaking (NPRM) is the first half of the informal rulemaking process. The APA sets out a number of specific requirements for the NPRM, including reference to the legal authority on which the rule is based, a discussion of the substance of the proposals, and publication in the Federal Register. After the NPRM is drafted, extensive internal clearance within the Coast Guard ensures the rulemaking meets its objective. The Department of Homeland Security (DHS) and the Office of Information and Regulatory affairs (OIRA) in the Office of Management and Budget, as well as other government agency stakeholders, conduct further external reviews. These external reviews serve as referees who ensure the rules are followed and the play stays within bounds. Upon review and approval, the NPRM is sent to the Office of the Federal Register for publication.

This is the end of the first half.

Halftime: The Fans

A stadium full of energetic and engaged fans impact the outcome of the game. Likewise, halftime allows stakeholders the opportunity to comment on the proposed regulation. The APA does not establish a minimum comment period, but the Coast Guard usually provides a 90-day period. These comments can be submitted directly via the www.regulations.gov by searching for the proposed regulation's docket number. Public comments are an important participatory component of the informal rulemaking process and can be made by anyone; a fan doesn't have to be a famous pop star to have their input count. Some proposed regulations generate very few comments, but others generate a lot of stakeholder interest resulting in hundreds, if not thousands, of comments. Nonetheless, this public participation is critical to the overall process.

The Second Half

The first half saw the development of the NPRM followed by a robust halftime with a lively fan base and public participation that generated valuable input and feedback

on the NPRM. Sometimes, public comments prompt the Coast Guard to change its strategy and decide not to issue a rulemaking at all, but, for this game, the public comments were such that we will continue moving forward with a final rule.

The Regulatory Developers go into action in the second half. Since public comments inform and shape the development of the Final Rule, the Developers adjust the second-half game plan by thoroughly considering all public comments.

The economists take the primary lead in responding to feedback regarding costs, small entity impacts, and related economic input. The subject matter expert assists by providing information and analysis related to program requirements. Like the NPRM process in the first half, this half of the rulemaking also includes a thorough internal and external approval process at DHS and OIRA. The Final Rule is signed by either an Assistant Commandant or the Commandant, depending on the level of significance determined by OIRA, before finally being sent to the Office of the Federal Register for publication.

The Final Score

The Regulatory Developers defeat the Maritime Miscreants, and the game is in the record books and published in the Federal Register for inclusion in the CFR. The Final Rule becomes effective and allows the affected entities and stakeholders sufficient time to plan for, and comply with, any new requirements. The APA requires that at least 30 days pass before a Final Rule becomes effective unless there is good cause for a shorter period.

Recap

The Regulatory Developers executed a structured game plan following the MMS to reduce the likelihood of the Maritime Miscreant wreaking havoc in the marine environment. As a review, the following recaps the informal:

- policy development
- analysis of costs and benefits
- Coast Guard internal review
- external review, including DHS and OIRA
- publication as NPRM
- public comment
- re-analysis based on comments received
- Coast Guard internal review
- external review, including DHS and OIRA
- publication as final rule
- inclusion in Code of Federal Regulations

Post-Game Commentary

The post-game commentary comes in many forms. The Regulatory Developers review what went well and what they can do to improve and incorporate lessons learned in the MMS. The MSSC oversees and evaluates the progress and direction of the team, and the updated regulation is monitored for effectiveness and retrospectively reviewed to ensure it remains effective and up to date.

Each game, like a rulemaking project, is unique. Sometimes, the Coast Guard needs information prior to developing an NPRM. In the preseason, we may publish an advanced notice of proposed rulemaking or a request for information to inform a regulatory approach. Additionally, if comments are received during the NPRM comment period that necessitate the Coast Guard adjust the regulatory approach, the game may go into overtime with the publication of a Supplemental Notice to Proposed Rulemaking (SNPRM) prior to pursuing a Final Rule. Like an NPRM, the Regulatory Developers ensure that the SNPRM goes through the same development and public notice and comment process prior to the publication of a Final Rule in the Federal Register.

On rare occasions, the Coast Guard will find good cause for not publishing an NPRM. The APA provides three main possibilities for not publishing an NPRM—it is impracticable, unnecessary, or contrary to public interest. One common example of a rulemaking where the Coast Guard finds good cause to forgo an NPRM because public comment is unnecessary is the annual technical amendment. This exercise is where we make updates to contact information, cross-references, spelling corrections, and other similarly non-substantive changes to our regulations. Other examples include Direct Final Rules and Interim Final Rules, which are special types of rules infrequently used by the Coast Guard.

All stakeholders have input and add value in the creation of a regulation. The process of writing Coast Guard regulations is a dynamic and collaborative effort that includes a wide array of stakeholders. It is not just the Coast Guard regulators who craft a regulation that gets published in the CFR. And like a good football team, the regulatory team follows a game plan with clear goals, stays within scope, manages the clock by staying on schedule, develops a quality product, has team cohesiveness, and meets stakeholder expectations.

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Regulatory Accounting, Transparency, and Flexibility

Benefits to the American people

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An accounting of a regulation's benefits and costs, alternatives, and flexibility options is an enduring and bipartisan fixture in the American regulatory landscape. Executive orders issued by presidents from both parties over the past five decades have built on one another to establish a systematic approach for making the costs and benefits of a regulation, along with alternatives the agency conceived, transparent to the public.

A look at the Coast Guard's regulatory analysis of its 2024 notice of proposed rulemaking (NPRM) on cybersecurity in the Marine Transportation System, or USCG Cybersecurity NPRM in shorthand, provides an illustration of the service's unique mix of missions and congressional mandates. Additionally, the Coast Guard endeavors to apply flexibility in its regulations to accommodate smaller players as it recognizes the outsize role regulations can have on small businesses. Such regulatory accounting and flexibility lead to transparent, informed rulemaking and good governance.

> *For which one of you, when he wants to build a tower, does not first sit down and calculate the cost to see if he has enough to complete it? Otherwise, when he has laid a foundation and is not able to finish, all who observe it begin to ridicule him, saying, 'This man began to build and was not able to finish.'*

In line with this scriptural adage, an accounting of a regulation's benefits and costs on the front end should help minimize buyer remorse and unintended consequences. Additionally, it helps steer policymakers in the direction of promulgating a regulation which attains its objective and maximizes net benefits.

Abbé de Saint-Pierre

Analyzing Cost vs. Benefit

While their history is unclear, cost/benefit analyses trace their origins to an 18th century French prelate, Abbé de Saint-Pierre who, in 1708, measured the marginal benefits of improving roads. Broader adoption of the practice in the United States dates to the 1930s, but the first time the government required cost-benefit analysis was through Executive Order (EO) 12291. Issued by President Ronald Reagan, the order required executive agencies to conduct cost-benefit analyses for major rules under the direction of the Office of Management and Budget's (OMB) Office of Information and Regulatory Affairs (OIRA). President Bill Clinton modified this practice through EO 12866 which has been a stable roadmap for regulatory analysis for the past three decades.

Subsequently, President George W. Bush began a series of updates and course alterations when he issued technical guidance via OMB Circular A-4. The trend continued with President Barack Obama's EO 13563, President Donald Trump's EO 13771, and President Joe Biden's EO 14094 and his revision of Circular A-4, issued November 9, 2023. These executive orders operate under the auspices of the Administrative Procedure Act (APA).

These executive branch mandates and APA enjoy an especially deep nexus on the use of public comments to enrich and inform rulemaking, and to ensure that the public has a voice in the process. Regulatory analyses also consider a complimentary statute, the 1980 Regulatory Flexibility Act (RFA), updated by the 1996 Small Business Regulatory Enforcement Fairness Act (SBREFA). These acts require executive agencies to consider alternative regulatory approaches to minimize the economic impact on small entities, including business, organizations, and governmental jurisdictions, while maintaining the regulatory benefit. The systematization of these good governance practices has reduced regulatory burden on the public, furthered transparency of the process, increased flexibility for small entities, and strengthened rulemaking through the incorporation of public inputs.

The following paragraphs exemplify the principles of cost/benefit analysis within the Coast Guard environment, laying out each essential principle as applied to the USCG Cybersecurity NPRM which was published in the Federal Register on February 22, 2024. This NPRM proposes to update maritime security regulations by adding regulations specifically focused on establishing minimum cybersecurity requirements for U.S.-flagged vessels, Outer Continental Shelf facilities, and U.S. facilities subject to the Maritime Transportation Security Act of 2002 regulations.

The maritime industry is undergoing a significant transformation involving increased use of cyber-connected systems. While these systems improve commercial vessel and port facility operations, they also bring a new set of challenges affecting design, operations, safety, security, training, and the workforce. This proposed rule would help address such current and emerging cybersecurity threats in the Marine Transportation System by adding requirements to help detect, respond to, and recover from cybersecurity risks that may cause transportation security incidents.

Baseline/Change Matrix: Understanding the World Without the Regulation

Obtaining estimates of regulatory costs and benefits involves the development and projection of two states of the world. The first is the state without the regulation, generally referred to as the baseline, and the second is the state after the regulation is enacted. From an economic analysis perspective, the baseline is a reference point from where impact estimates are generated. The comparison of the two states, along with a measurement of their changes, provide the elements for the costs and benefits. Therefore, a correctly specified baseline ensures a more accurate set of analyses.

The Coast Guard begins the analytical components of the regulation by developing a comparison table of the two regulatory worlds—one with and one without the proposed regulation. This table, generally referred to as the Baseline/Change matrix, is the framework for conducting the cost/benefit analyses (Figure 1). The first column of the matrix is the current regulatory text by provision or requirement and represents the state of the world without the regulation, while the second column is the proposed regulatory text and represents the world with the proposed regulation.

A third column represents the economist's initial interpretation of potential economic impacts of the proposed regulatory provisions in comparison to the baseline. This column is the first discussion point for the regulatory team, as it allows for the identification of differences between the impacts intended by the program office, in consultation with legal counsel, and those assessed by the economist.

Figure 1 (Page 20) provides an example section of a Baseline/Change matrix using the USCG Cybersecurity NPRM. The columns that generally

Figure 1. Example Baseline/Change Matrix (USCG Cybersecurity NPRM)			
Current Regulatory Text	**Proposed Regulatory Text**	**Description of Change**	**Affected Population**
	§ 101.650 (d)		
(No Current Regulatory Requirement)	All personnel with access to the IT or OT systems, including contractors, whether part-time, full-time, temporary, or permanent, must have cybersecurity training in the following topics: (i) Relevant provisions of the Cybersecurity Plan; (ii) Recognition and detection of cybersecurity threats and all types of cyber incidents; (iii) Techniques used to circumvent cybersecurity measures; (iv) Procedures for reporting a cyber incident to the CySO; and (v) OT-specific cybersecurity training for all personnel whose duties include using OT.	Requires all personnel with access to Information Technology and Operation Technology systems to receive training in the topics listed.	1) 25 percent of facility owners and operators already comply. Facilities owned by 1,281 owners and operators would need to comply. 2) In-scope vessels owned by 1,602 owners and operators.

follow the description of the change in the matrix include the affected population along with the costs and benefits. For this example, we present the Baseline/Change matrix through only the Affected Population column.

Regulation's Impacts: Who is Affected?

The first step in developing the analytical components of the regulatory analyses requires describing the population that will be affected by the proposed regulation in quantitative terms.

Identifying the affected population requires a thorough review of the proposed regulatory text. The draft text characterizes relevant parts or sections of the Code of Federal Regulations that are being modified along with the entities required to comply with those sections. It also specifies whether a specific subset of the relevant entities is the focus of the proposed regulation.

In the USCG Cybersecurity NPRM, the Coast Guard is proposing to update its maritime security regulations. The regulated population is limited to owners and operators of U.S.-flagged vessels subject to 33 CFR part 104 (Maritime Security: Vessels), facilities subject to 33 CFR part 105 (Maritime Security: Facilities), and OCS facilities subject to 33 CFR part 106 (Marine Security: Outer Continental Shelf (OCS) Facilities). The Coast Guard estimates this proposed rule would affect approximately 10,286 vessels and 3,411 facilities—1,775 and 1,708 owners and operators, respectively.

Figure 1, Column 4 presents the affected population of the USCG Cybersecurity NPRM focusing on the training requirements for personnel with access to information and operation technology on affected vessels and facilities. An estimated 25 percent of the affected facilities are currently conducting cybersecurity training on an annual basis. Therefore, 1,281 of the 1,708 facilities will need to comply with the new requirement. Furthermore, 4,813 barges owned by 173 owners and operators do not need training as they are unmanned. That leaves 1,602 vessel operations that would require training.

Cost/Benefit Analyses: What the Public Gets for What Price

Regulatory analyses focus on the "social costs" and "social benefits" of regulations. This notion expands impacts beyond an individual or firm-level perspective. Individuals or businesses make decisions based on costs and benefits that accrue to them exclusively. Federal regulatory analyses estimate the total social costs and benefits of a regulation, which requires understanding the individual and total effects on all members of society.

Social Costs

To estimate the total social costs that a regulation will impose on all affected entities, the regulation must analyze its impact on finite resources, such as labor, time, and capital and compare that to its pre-regulatory, baseline state. On the whole, the costs of Coast Guard regulations result from the actions that federal, state, and local government agencies; industries, including businesses, producers, and consumers in regulated industries; the general public; and other affected entities undertake to achieve regulatory compliance. Although generally more quantifiable than benefits, estimation of costs still present a number of challenges.

The general approach to developing a cost analysis is to identify the provisions or elements of the regulation that will result in a behavioral change from the affected population and then estimate the cost of that behavioral change for each part of the regulation. The challenge with estimating the costs is first determining the best methods to quantify these changes or "impacts" and then determining the best way to monetize these impacts.

Coast Guard regulations can usually be categorized as administrative (reporting or record keeping) auditing/inspection, drills and exercises, training and certification, medical testing, and/or equipment and materials. Quantification and monetization are often derived by estimating the sum of the following cost components annually over a 10-year period:

- the time each entity will devote to complying which is derived by multiplying its number of affected employees by their individual wage rate multiplied by the minutes/hours it will take to meet the regulatory requirements.
- the costs of equipment, factor inputs, or other materials needed to comply.
- the value of services or goods foregone or "opportunity costs" of the tasks needed to comply with the regulation such as revenue passed up if a vessel/facility needs to be out of service during compliance

The training requirements of the USCG Cybersecurity NPRM can provide a helpful illustration of the costs. The regulatory analysis estimates the undiscounted initial-year and annual cost for facility and OCS facility owners and operators to train employees on aspects of cybersecurity to be approximately $5,935,437, rounded 1,281 facility owners and operators × ((74 employees at each facility company × $60.34 × 1 hour) + (1 Cyber Security Officer developing training × $84.14 × 2 hours)). Following a similar approach, the NPRM estimates the undiscounted initial-year and annual cost of cybersecurity training for vessel employees to be approximately $6,166,909. This number is found by multiplying the number of vessels for each affected vessel category × number of employees for each vessel type × representative mean hourly wage for vessel type × 1 hours for training. Based on these two figures, the total cost for cybersecurity training is estimated at $12,371,931 per year.

Benefits

Coast Guard regulations generate many benefits such as improvements in safety, security, and environmental amenities. Oftentimes, Coast Guard regulations can even result in cost savings to the impacted industries. The regulatory benefits analysis estimates these beneficial outcomes and cost savings to society as a whole, and not just individuals, groups, or organizations.

Similar to the cost analysis, the benefits analysis identifies the provisions or elements of the regulation that will result in behavioral changes from the affected population which will generate beneficial impacts and/or cost savings to society. These changes are measured in comparison to an estimate of baseline damages—equipment, industry, and environmental—injuries, and fatalities occurring in a world without the regulation. Beneficial impacts are determined by quantifying and monetizing the estimated changes to baseline damages and casualties that will result from the provisions of the rule. In the case of equipment damages, monetization is calculated by simply estimating the difference between the damages, measured in monetary terms, without the rule and the expected reduction in monetary damages with the rule in place.

However, when it comes to fatalities, the benefits are calculated by first estimating the difference in fatalities without the rule from the expected reduction in fatalities with the rule. These estimates are then converted to a monetized value using a Value of Statistical Life (VSL) estimate approved by OMB. Within DHS, the Chief Regulatory Economist issues guidance on the VSL to be used by component agencies, including USCG, in regulatory analyses. Specifically, as of April 5, 2021, agencies are directed to use a VSL of $11.6 million (2020 dollars) (DHS 2021). VSL represents changes in fatality risk measured in monetary terms. This value is often misinterpreted as the Willingness to Pay (WTP) to avoid death. However, the calculation for the VSL begins with a base of what an individual's WTP is for a reduction in the risk of a premature death summed over the population that would experience that reduction in risk. To put it another way, VSL represents the aggregate of minor individual reductions in risk.

As an example, say that due to a regulation, the annual risk of fatality is reduced by one in 1 million for a group that consists of 3 million people. Then we can say that three statistical lives are saved annually by implementing the regulation that reduced the risk by one in 1 million. If we express it in monetary terms, if each individual is willing to pay $10 to reduce risk by one in 1 million, then the value of each statistical life saved for a group of 1 million people is $10 million and the value of those three statistical lives saved due to the regulation is $30 million.

As we can see, just like the cost analysis, the challenge with estimating benefits is in determining the best methods to quantify the impacts and then determining the best way to monetize those impacts. Unlike the cost analysis, quantifiable data is not as available and, as a result, monetizing benefits can be difficult or impossible.

In situations where monetization is not possible, some or all of the benefits are often presented qualitatively or using techniques such as break even analysis which allows us to determine where the costs of the proposed rule are equal to the expected reduction in losses from fatalities, injuries, and damages. Break even analysis is designed to answer the question, "How small could the value of the non-quantified benefits be (or how large would the value of the costs need to be) before the rule would yield zero net benefits?"

As an example, a break even analysis is presented below using the benefits of the USCG Cybersecurity NPRM. While the Coast Guard can describe the qualitative benefits this proposed rule may have for owners and operators of U.S.-flagged vessels, facilities, and OCS facilities, it is not able to quantify and monetize benefits. Thus, the break even analysis considers the $80.1 million in total annual costs of the regulation, at a 7 percent discount rate. The analysis calculated break even results from one incident, using the estimated cost of a real-world cyberattack on a regulated entity that suffered an estimated $300 million in business costs and income losses due to the attack. The analysis takes the estimated annualized cost of this proposed rule ($80.1 million) and divides by the avoided loss from the real-world example ($300 million).

From there, the analysis obtains an annual risk-reduction value to the affected entities of approximately 0.267, or about 27 percent ($80.1 million ÷ $300 million), which is the minimum annual risk-reduction percentage that would need to occur to justify imposing the proposed rule to the affected entities. Put another way, the proposed rule would need to reduce the risk or the likelihood of one or more successful cyberattacks, similar to this one, by approximately 27 percent annually for the benefits to justify the estimated costs. To break even, the Coast Guard estimates the rule would have to prevent at least one attack of this type with the same avoidable losses approximately every 3.75 years ($300 million ÷ $80.1 million).

Alternatives: The Other Options Considered

As Circular A-4 notes, evaluation and consideration of the various reasonable alternatives for rulemaking is a necessary step. While still in development of USCG official Regulatory Project Proposals (RPP), the team that develops the RPP evaluates the known regulatory alternatives. The Coast Guard has the development, review, and approval of regulatory proposals formalized with the RPP process. It is important to understand what the impact of an alternative would be prior to selecting the regulatory proposal for a NPRM. OIRA generally recommends that the regulatory analysis include at least three alternatives. However, the ultimate number of alternatives considered and analyzed is a matter of judgment. As a newer focus the 2023 revision to Circular A-4 notes that different alternatives may also have different distributional effects. Finally, the regulatory analysis should not only consider and explain reasonable alternatives but also should discuss the anticipated cost and benefits of the alternatives.

The USCG Cybersecurity NPRM considered and reviewed three alternatives, which included the status quo, which was rejected due to the fact that it would not require the affected entities to conduct penetration tests to determine weaknesses in critical IT and OT systems. Without such tests, there would be an increased risk of cyber incidents which would endanger employees, consumers, and the supply chain.

The second alternative considered was requiring annual penetration testing instead of the proposed requirement of once every five years. The penetration testing requirement is not only a crucial element of a comprehensive cybersecurity strategy, but also one of the most expensive requirements in the proposed rule. An annual requirement for penetration testing would increase the cost by almost 19 percent. This alternative was rejected due to the high costs versus the additional safety it would provide.

The third alternative was making the penetration testing an optional item that would be at the discretion of the owner or operator. When integrated into a comprehensive cybersecurity strategy, penetration testing can be very effective in identifying vulnerabilities. Requiring it in a robust cybersecurity strategy enables organizations to stay ahead of potential threats and better understand how malicious actors could exploit weaknesses in IT and OT systems. Although this alternative would decrease the annualized cost to $76 million, it was not considered worth the additional safety that would be provided by the crucial requirement.

Small Entity Analysis: Providing Flexibility for Smaller Players

There are two primary legislative acts that require federal agencies to consider the impacts of a proposed or final regulation on small entities—the RFA of 1980 and the SBREFA of 1996, which amended the RFA. SBREFA basically applies to all branches of government and gives small businesses a greater voice in the development and enforcement of federal regulations. In addition, EO 13272 Proper Consideration of Small Entities in Agency Rulemaking was published in August 2002. EO 13272 is meant to ensure that agencies work closely with the Office of Advocacy at the Small Business Administration (SBA) to address small business issues as early as possible in the regulatory process. The SBA defines small entities as comprising small businesses, not-for-profit organizations

The U.S. Coast Guard Cutter *Sturgeon Bay*, homeported in Bayonne, New Jersey, patrols in New York Harbor near the Statue of Liberty in July 2005. While the Coast Guard adapts to new technology and risks that require new regulations, its core missions remain the same. Coast Guard photo by Petty Officer 3rd Class Dan Bender

that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

The first decision needed is whether an RFA applies. The RFA applies to any rule subject to notice and comment rulemaking under section 553(b) of the APA. Hence, the RFA is applicable for the USCG Cybersecurity NPRM. Second, the RFA requires the head of an agency to certify that a rulemaking does not have a "significant economic impact on a substantial number of small entities" (SEIOSNOSE). If the Coast Guard cannot certify that its cybersecurity NPRM has no SEIOSNOSE, then it must perform an Initial Regulatory Flexibility Analysis, or IFRA, which the Coast Guard performed for this rulemaking.

The IRFA provides a description of the reasons the USCG Cybersecurity NPRM is being considered and promulgated, including the fact the proposed rule is being promulgated to address current and emerging cybersecurity threats to the maritime security in the MTS. Cybersecurity risks result from vulnerabilities in the operation of vital systems, which increase the likelihood of cyberattacks on facilities, OCS facilities, and vessels. This IRFA also includes a description and

estimate of the number of small entities for which the proposed rule would apply. It estimated the number of owners of facilities, OCS facilities, and vessels in the affected population qualify as small businesses, small not-for-profit organizations, or small governments.

The IRFA found that there are 3,483 affected owners of facilities, or vessels, and that an estimated 3,180 of the entities that may be small would be affected. It also found that it is highly likely that many affected owners already have invested in some of the cybersecurity measures before the publication of the NPRM. In addition, some affected small vessel owners are unlikely to have IT or OT systems to which this NPRM will apply. Those owners will incur only the costs associated with requesting a waiver or equivalence, which are likely to be far less than the estimated costs for the proposed rule.

The SBA's guidance also requires that an IRFA identify all relevant federal rules which may duplicate, overlap, or conflict with the NPRM. The USCG Cybersecurity NPRM IRFA provided the potential areas of overlap and requested public comment related to them. Lastly, unrelated to the regulatory alternatives the Coast Guard was required to consider per Circular A-4, the IRFA must describe any significant alternatives which achieve the objectives of the proposal while minimizing any significant economic impact. The USCG Cybersecurity NPRM has a performance-based requirement as opposed to prescriptive based requirements and therefore this is one of the inherent ways that small entities may have reduced impacts. Another alternative considered in some rulemakings to minimize the impact on small entities is providing the defined small entities a delayed implementation date.

At the final rule stage for this rulemaking, the Coast Guard will review pertinent public comments and any additional data that have been found to assess whether the Commandant can certify that there is no SEIOSNOSE. If the service cannot certify at that stage of the rulemaking, then per the RFA it will conduct a Final Regulatory Flexibility Assessment (FRFA) and publish a Small Entity Compliance Guide for the regulation.

Paperwork Reduction Act: Reducing the Administrative Burden

Under the Paperwork Reduction Act (PRA) all regulatory agencies, including the Coast Guard, are required to account for the administrative burden associated with any "collection of information" on the regulated public. The PRA defines collection of information to include "all oral, written, or electronically transmitted expressions of opinion or fact, including disclosures to third parties or the public, requested or required of 10 or more persons by or for an agency." As a result, all reporting and recordkeeping actions required by a regulation must be quantified and account for the time needed for compliance and should be monetized in dollars on an annual basis. Approval for each collection must be acquired from OIRA. The burden estimates calculated for reporting and recordkeeping requirements are usually a subset of the rule's costs quantified in the regulatory analysis. Each set of reporting and recordkeeping requirements is maintained in Information Collection Request forms categorized according to the type of collection and must seek renewal approval from OIRA every three years. In the case of the USCG Cybersecurity NPRM, responding entities will be required to develop and implement cybersecurity plans and report incidents to the National Response Center. The number of respondents to this collection of information is 1,775 vessel owners and operators and 1,708 facility and OCS facility owners and operators.

Conclusion

In addition to being good governance requirements under the federal regulatory regime, Coast Guard cost/benefit analyses and regulatory flexibility analyses provide three critical benefits for the public—transparency, accountability, and adaptability. As evidenced by the discussion of the USCG Cybersecurity NPRM, both analyses are time-intensive endeavors for the Coast Guard. The service's economic team develops these analyses using multiple technical guides and peer reviews the analysis to ensure high quality and regulatory compliance. These analyses on the front end, however, reduce unintended consequences and ensure that Coast Guard regulations maximize the net benefits for regulated stakeholders, the general public, and the service itself.

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Environmental Analysis and Rulemaking

The Coast Guard's structure for protecting the environment

by Dustin Whiteside
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For almost 200 years, the Coast Guard has protected the country's maritime environment, and it continues this longstanding mission through its rulemaking process.

Evolving risks to the oceans and inland rivers—both natural and human-made—have broadened and modified this mandate. The first serious federal effort to integrate environmental concerns into all government decision-making began when Congress passed the National Environmental Policy Act (NEPA) in 1969. Enacted on January 1, 1970, NEPA responded to the deteriorating human environment and the insufficient examination of environmental and human implications during the planning stages of key federal projects.

NEPA aims to create environments that are secure, healthy, productive, and appealing from aesthetic and cultural perspectives. The act requires that planning and decision-making processes take into account environmental considerations, as well as socioeconomic and technical considerations, and that aids federal agencies in incorporating these principles into their operations. Through a procedure that all federal agencies are required to follow, the act develops a national policy for the preservation and protection of the environment.

With NEPA serving as a legislative environmental umbrella, the Coast Guard ensures that all its rulemaking efforts are also in compliance with a suite of distinct but related environmental statutes:

Under the National Historic Preservation Act, the Coast Guard prepares historic and cultural resources, assesses impacts, assists Coast Guard consultations with a state or tribal historic preservation officer, and resolves impacts through mitigation, and associated documentation and recordkeeping requirements.

Under the Endangered Species Act, the Coast Guard prepares biological assessments or evaluations, assesses impacts and ecological risk, assists the Coast Guard in consultations with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS), and develops management plans for federally listed endangered or threatened species.

Under the Marine Mammal Protection Act, the Coast Guard prepares and documents all assessments and coordination materials and otherwise assists the USCG in consultations with the USFWS and NMFS.

Under the Magnuson Stevens Fishery Conservation Act, the Coast Guard prepares essential fish habitat assessments for all species and life stages of federally managed fishery resources that may occur in the study area. These include species that are managed by the Fishery Management Councils as well as certain highly migratory species.

Under the Migratory Bird Treaty Act, the Coast Guard prepares and documents the evaluation of the potential for its rulemaking action to effect migratory birds adversely, with particular emphasis on species of concern.

Under the Coastal Zone Management Act, the Coast Guard prepares and documents all coordination materials necessary to fulfill the federal consistency review requirements for affected coastal states.

Scaling the Process to the Impacts

As a procedural statute, NEPA lays out a process that scales in accordance with the anticipated impacts. At the lower end of the spectrum is a categorical exclusion. A categorical exclusion—CE or CATEX—is a class of actions that a federal agency has determined, after review by the White House Council on Environmental Quality (CEQ), do not individually or cumulatively have a significant effect on the human environment. The use of categorical exclusions can reduce paperwork and save time and resources. Since most of the Coast Guard's rulemaking projects meet these criteria and are administrative in nature, the sservice's rulemaking regularly uses categorical exclusions established by the Department of Homeland Security in consultation with CEQ.

At the upper end of the NEPA spectrum is an analytical document known as an environmental impact statement (EIS), which outlines the federal action's impact on the human environment. Among the salient elements of the EIS process are the following:

- Public engagement
- Advanced identification of the potential impact
- An analysis of the baseline conditions in order to understand the potential impact of the action
- A set of alternative actions, including a no action alternative

Mitigation measures and the preferred alternative

In instances where a CATEX or EIS determination is not readily evident, the federal agency uses a middle-of-the-road approach, known as an environmental assessment (EA). The EA either finds no significant impact—in which case, the analysis stops there—or it identifies or confirms that there is a significant impact and escalates the analysis from an EA to an EIS.

Based on the type and scope of its current regulations, the Coast Guard has increased its use of EISs for rulemaking projects in recent years. Such Coast Guard regulations with an EIS may have a potential impact on air quality (e.g. emissions), water quality (e.g. vessel discharges), endangered species, cultural resources, scenic and aesthetic elements, and/or have indirect impacts on other federal actions.

Ongoing USCG Regulatory Direction: Codification of Shipping Safety Fairways along the Coasts

The Coast Guard plays a vital role in ensuring continued safe and efficient operation of the Marine Transportation System in U.S. waters. Shipping safety fairways preserve safe and reliable vessel transits along well-established routes. Identifying historic safe and efficient vessel routes serves vessels moving to or among coastal ports, supporting domestic and international trade

To achieve a balance between vessel traffic needs and support for the government's objectives for renewable energy, the Coast Guard is working on several regulatory projects to codify traditional vessel traffic routes into shipping safety fairways and associated routing systems, like traffic separation schemes. This guarantees established navigation routes are kept clear of any obstructions that might compromise navigation safety. Over the past decade, new uses of the exclusive economic zone have necessitated the codification of these shipping safety fairways. Offshore alternative energy production—such as wind farms—will increase domestic energy production. To maintain the safety of both the energy installations and transiting vessels, it is incumbent on the Coast Guard to codify traditional routes into these shipping safety fairways. Codifying

Coast Guard Fireman De'Jon Williams, left, and Jeff Gearhart, a research biologist with the National Oceanic and Atmospheric Association, prepare to release endangered sea turtles into warmer offshore water after approximately 1,500 turtles became displaced due to extreme cold weather throughout the Florida area in January 2010. NEPA works to create and maintain healthy and productive environments. Coast Guard photo by Petty Officer 3rd Class Jaclyn Young

fairways also benefits other agencies and offshore wind developers, providing clear, advance notice of their locations, ensuring that lease areas do not overlap, and expediting the permitting process.

In the specific example of the rulemaking "Shipping Safety Fairways along the Atlantic Coast," the Coast Guard made the determination to conduct a programmatic environmental impact study. As part of its regulatory environmental compliance, the Coast Guard is addressing many of the environmental statutes referenced above.

Conclusion

Counting on its proud legacy of marine environmental stewardship and robust partnerships across federal, state, and tribal governments, the Coast Guard is well poised to continue the high caliber environmental analysis it provides as part of its regulatory mission. Cognizant that new environmental challenges and new congressional mandates are inevitable, the Coast Guard regulatory program will continue to scale the rulemaking NEPA process and be a responsible steward of the marine environment.

About the author:

Dustin Whiteside has more than 10 years of experience as an operations specialist in the United States Coast Guard and a background in meteorology and environmental science. He has been awarded the National Defense Service Medal, Meritorious Unit Commendations, and Military Outstanding Volunteer Service Medal.

Endnotes:

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2. https://www.dhs.gov/sites/default/files/publications/Mgmt_NEPA_AdminRecdetailedCATEXsupport_0.pdf
3. https://www.reginfo.gov/public/do/eAgendaMain

The Coast Guard provides a security zone in July 2003, for the first shipment of liquified natural gas to Cove Point, Maryland, in 23 years. Coast Guard photo by Petty Officer 3rd Class Donnie Brzuska

The International Maritime Organization's Crucial Role in the Coast Guard's Prevention Mission

BY LT EMILY ROWAN
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The Coast Guard, the nation's leading maritime regulatory authority, commits an entire operational mission program to prevention with a focus on the safety, security, and environmental protection of the Marine Transportation System (MTS). This system includes vessels, facilities, waterways, and mariners which together, are the lifeline of our nation's prosperity and security. The prevention mission seeks to ensure the safety of seafarers, thwart marine casualties and property losses, minimize security risks, and protect the marine environment through the development of standards and regulations.

Supporting $4.6 trillion in economic activity each year, the MTS also provides more than 23 million American jobs.[1] Working with multiple federal, state, and local partners, the Coast Guard's maritime prevention professionals develop and enforce federal marine safety, security, and environmental regulations to prevent personnel casualties and property losses, minimize security risks, and ensure the protection of the marine environment.

The Coast Guard has had the honor of leading the U.S. delegations to the International Maritime Organization (IMO) since the IMO Convention entered into force over 50 years ago. Numerous Coast Guard headquarters personnel take the lead in addressing international maritime issues and are assisted by various government and industry advisors. These advisors include members from the Department of State, Department of Homeland Security, Department of Defense, Department of Justice, Environmental Protection Agency, National Oceanic and Atmospheric Administration, National Transportation Safety Board, and a variety of industry experts—all providing the technical support and guidance necessary to advocate U.S. positions on the important maritime issues.

As shipping is global, the United States and the Coast Guard recognize the importance of harmonized

Based in London, the International Maritime Organization plays an integral role in the Coast Guard's prevention mission. Photo courtesy of the International Maritime Organization

requirements for global shipping developed through IMO. Equal application of these requirements gives the United States, as a flag, port, and coastal administration, the tools and authorities to ensure sound maritime safety, security, and environmental stewardship is maintained in our waters and ports, and that our ships are operated in compliance around the world. In establishing these standards, the IMO, a specialized agency of the United Nations, plays a pivotal role in the global governance of international shipping. The IMO is comprised of 175 member states, which share the common goal of increased safety and security alongside enhanced environmental stewardship, while also promoting energy efficiency and innovation in the maritime industry. Three primary IMO instruments form the foundation of the IMO's technical requirements:

- The International Convention for the Safety of Life at Sea (SOLAS), which includes the International Ship and Port Facility Code
- The International Convention for the Prevention of Pollution from Ships (MARPOL)
- The International Convention on Standards of Training, Certification and Watchkeeping

History and Mission of the IMO

In the mid-19th century, the need for unified alignment of international regulations was recognized and resulted in the creation of the United Nations in 1945. Alongside the United Nations, numerous international organizations were formed to highlight the need for regulation in different areas of expertise including:

- the International Civil Aviation Organization established in 1944
- the Food and Agriculture Organization in 1945
- the United Nations Educational, Scientific, Cultural Organization in 1945
- the Inter-Governmental Maritime Consultative Organization (IMCO) in 1948

The Inter-Governmental Maritime Consultative Organization, or IMCO, was established in 1948. This organization was later renamed the International Maritime Organization. With an initial focus on vessel safety in the international maritime environment, this organization has vastly expanded its reach to include environmental protection, legal matters, technical cooperation, and efficiency in shipping. The IMO's emergence was a response to the need for a unified international regime governing shipping with the goal of creating safer, more secure, and environmentally conscious maritime operations. Having recently marked the 75th anniversary of its creation, the organization has made significant regulatory strides to protect the global maritime industry through the publication and implementation of conventions and codes.

The IMO Convention entered into force in 1958, establishing, that it exists, in part, to:

> *... provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships.*

Challenges and Opportunities

Long before the IMO was established, the tragic April 14, 1912, sinking of the White Star Line's RMS *Titanic* and the loss of more than 1,500 of its passengers prompted the development of the SOLAS Convention in 1914. The IMO's first initiative was to adopt and update a new version of SOLAS, establishing the maritime treaty as the cornerstone for international regulation for maritime safety. Notable incidences like the *Torrey Canyon* oil spill off the coast of Cornwall, United Kingdom, in the 1960s and the domestic oil spill from *Exxon Valdez*, have also driven environmental regulatory changes. Outside of maritime casualties, technological advancements have recently motivated the IMO to include autonomous shipping, cyber risk management, and energy efficiency measures aimed at reducing greenhouse gas emissions from ships in its program of work.

Current IMO Structure

The IMO is broken into five committees and seven subcommittees, each of which focuses on a specific aspect of the maritime industry and works to refine the specific subject's standard. The IMO's 2024-2029 strategic plan highlights several priorities in its vision:

> *IMO will uphold its leadership role as the global regulator of shipping, promote greater recognition of the sector's importance to world trade, and enable the advancement of shipping. In this regard, IMO will address the challenges and opportunities presented by ongoing developments in technology, the protection and preservation of the marine environment, tackling climate change, improving the well-being and competence of seafarers, and strengthening the resilience of the maritime industry and global supply chains.*[2]

The IMO has dedicated extensive time and resources to these efforts which have provided a residual wave of progress throughout international Maritime Transportation Systems. These matters of importance mirror those which are a focus for the United States.

The RMS *Titanic* leaves Southampton, England, on April 10, 1912, on its ill-fated inaugural voyage. The ship's sinking spurred development of the International Safety of Life at Sea Convention, or SOLAS. Courtesy photo

While a lasting challenge for the maritime industry, these initiatives have a brighter side; one that continues to shape a safer and more secure maritime environment. However, this work is never done. Safety was, and will remain, the most important responsibility for the IMO, but the ever-evolving threats and challenges of the maritime environment endure. IMO Conventions have been amended over the years and it is paramount to keep these instruments consistent while keeping pace with technological innovation and changes in the industry.

The Coast Guard and the IMO

The Coast Guard's regulatory practices are often reflections of the conventions and standards set forth by IMO, as adopted into U.S. law in treaty and through congressional action. This work is woven into the tapestry of the service's prevention mission through the development of standards that match or exceed the intent of international regulations. Conversely, many of the Coast Guard's national standards influence IMO discussions.

The concept of operations for the Coast Guard prevention mission includes three major elements that contribute to the program's success—the development of standards to meet the maritime transportation expectations, the compliance to verify effective governance, and the conduct of assessments to provide feedback.

As an example of this relationship, the MARPOL is the main international convention addressing environmental regulations and is adopted into U.S. law in the Act to Prevent Pollution from Ships (APPS). For the annexes of MARPOL that have been adopted by the United States, regulations have been implemented to ensure strong domestic and international commitment to environmental stewardship within our waters and from our fleet when abroad. Furthermore, the service has led the regulatory progress regarding emissions, waste management, and oil spill prevention at IMO. Similarly, the SOLAS Convention and associated codes, adopted by the Coast Guard for ships in international service, are the standard for shipboard safety and emergency procedures, subsequently enhancing a safe maritime environment. This work is executed though the prevention workforce, risk and knowledge management, and by forging strong partnerships with international, federal,

LT j.g. James Mitard and LT j.g. Hannah Gribbin from Coast Guard Sector Boston's prevention team check the ventilation system of a commercial cargo ship during a safety and security inspection in Boston, in 2018. These comprehensive inspections are conducted regularly by the Coast Guard to determine whether commercial vessels are being operated safely and in accordance with maritime laws and regulations. Coast Guard photo by Petty Officer 2nd Class Lara Davis

state, local, and tribal governments and industries. Implementing the international regulations through compliance verification promotes global maritime safety and environmental conservation.

Conclusion

The Coast Guard's regulatory framework is expected to evolve with emerging maritime challenges, such as increasing ship traffic, technological advancements, and climate change impacts. The IMO's ongoing development of new conventions, codes, and amendments will continue to shape the service's approach to maritime regulation. Additionally, the Coast Guard will continue to represent the United States at IMO by providing technical subject matter expertise to further enhance international regulations and looks forward to continuing efforts alongside our governmental and industry partners at IMO committees and subcommittees.

The relationship between the Coast Guard and the IMO is integral to the advancement of international maritime regulations. Through adherence to IMO standards and active participation in its initiatives, the Coast Guard contributes to a safer, more secure, and sustainable maritime environment which reflects a shared global commitment to maritime excellence.

About the Author:

LT Emily Rowan has served in the Coast Guard for 10 years as a marine inspector and waterways management division chief. She is a graduate of the U.S. Merchant Marine Academy and George Washington University. LT Rowan currently serves as the United States' IMO coordinator at Coast Guard headquarters.

Endnotes:

1. United States Coast Guard. (n.d.). United States Coast Guard Maritime Commerce Strategic Outlook. (p 4) https://media.defense.gov/2018/Oct/05/2002049100/-1/-1/0/USCG%20MARITIME%20COMMERCE%20STRATEGIC%20OUTLOOK-RELEASABLE.PDF

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Incorporation by Reference

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As an alternative to creating detailed, government-unique standards, the Coast Guard and many other Federal agencies rely on authority from the Freedom of Information Act to reference in regulations standards produced by external sources. The Office of the Federal Register (OFR) oversees this process, known as "incorporation by reference (IBR)," using its procedures codified in title 1 Code of Federal Regulations (CFR), Incorporation by Reference. Under OFR procedures, an agency may incorporate all of a standard, specific parts of a standard, or a standard partly modified by the regulations.

The National Trade and Technology Advancement Act (NTTAA) of 1996 plays an important role in promoting the use of IBR in regulations. Congress passed the NTTAA to facilitate bringing technology to the marketplace, make Federal laboratories available to the private sector, and foster commercialization of innovations resulting from cooperative research with the Federal government.

The Office of Management and Budget (OMB) published Circular A-119, titled *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*, to implement the NTTAA. In Circular A-119, OMB describes the government's policy on Federal agencies' use of external standards in regulations and directs agencies to avoid using government-unique standards whenever it is practical. Otherwise, agencies must report to OMB the reasons for continued use of government-unique standards. Agencies are also encouraged to consult with standards development organizations (SDOs) and to participate in standards development activities when considering references to standards in their regulations.

Consequently, IBR is a remarkably effective tool to minimize the need for government-unique standards, improve rulemaking efficiency, lower the cost of the rulemaking process, reduce the volume of regulatory text, engage the regulated public early, and leverage private sector expertise and resources.

Title 5
United States Code § 552
Freedom of Information Act

Except to the extent that a person has actual and timely notice of the terms thereof, a person may not in any manner be required to resort to, or be adversely affected by, a matter required to be published in the Federal Register and not so published. For the purpose of this paragraph, ***matter reasonably available to the class of persons affected thereby is deemed published in the Federal Register when incorporated by reference*** *[emphasis added] therein with the approval of the Director of the Federal Register.*

What are Standards?

OMB defines a "standard" in their Circular A-119 as:

> *(i) common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices*
> *(ii) the definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, designs, or operations; measurement of quality and quantity in describing materials, processes, products, systems, services, or practices; test methods and sampling procedures; formats for information and communication exchange; or descriptions of fit and measurements of size or strength; and*
> *(iii) terminology, symbols, packaging, marking or labeling requirements as they apply to a product, process, or production method*

Under the provisions of Circular A-119, preference is given to standards developed by organizations whose activities are based on a consensus process with the attributes of openness, balance, due process, an appeals process, and consensus. These processes help ensure that almost anyone interested in a standard's development can participate, and that everyone has an equal voice in

the outcome.

What Other Policies Affect the Coast Guard's Use of IBR?

To help implement the NTTAA, the Department of Commerce charted the Interagency Committee on Standards Policy (ICSP) to advise Federal agencies on matters related to standards policy and to promote consistency and cooperation among agencies. The National Institute of Standards and Technology (NIST) chairs the ICSP and the Coast Guard is a member.

In addition, the Department of Homeland Security (DHS) Management Directive 078-01, Adoption and Maintenance of the Department of Homeland Security National Standards, emphasizes the policies of the NTTAA and lists the advantages to the Department of adopting standards.

In Commandant Instruction 5420.32, Standards Development Program for Marine Safety, Security, and Environmental Stewardship Programs, the Coast Guard documents its philosophy for using standards in regulations and partnering with SDOs.

> *Coast Guard personnel participate in standards-related activities primarily to support regulatory and guidance development. [OMB A-119] governs the scope of our activities.*
> *Our participation in standards development benefits the Coast Guard and the public in many ways:*
> *(1) Incorporation of standards is a force multiplier by leveraging the expertise of industry leaders and resource sharing among the stakeholders*
> *(2) Coast Guard personnel collaborate with experts and learn from their experiences*
> *(3) Entities affected by a regulation or guidance, including equipment manufacturer and users, participate in the development of technical standards that might become incorporated by reference into regulations and guidance*
> *(4) Standards promote consumer confidence that products meet specified performance criteria*
> *(5) Standards promote international regulatory cooperation*
> *(6) Standards help U.S. manufacturers compete in a global marketplace*

What are the Mechanics of IBR?

The OFR establishes the procedures for an agency's proposal to incorporate a standard by reference in their regulations. The procedures are codified in Title 1 Code of Federal Regulations Part 51, Incorporation by Reference, and explained in the OFR publication IBR Handbook. Preapproval can be granted by the OFR if the preamble of a proposed rule includes language to describe the standard proposed for incorporation and how it is reasonably available to the class of persons who would be affected by the regulation. Typically, this is done by identifying the standard title, publisher, and edition. Under the IBR rules, agencies must be specific and may not incorporate a standard by identifying a series. That is, language such as "must comply with the current edition" cannot be used because automatic incorporation of material that often changes, such as an industry standard, would deprive the public the opportunity to comment on revisions to the regulations.

Circular A-119 also describes other factors agencies must consider when deciding whether and which standard to incorporate, including:

- Whether the standard is available for free or otherwise has the least cost
- The degree to which the standard is accepted and used in national and international marketplaces
- The publisher's adherence to the characteristics of a consensus SDO
- The affected parties' ability to comply with the standard
- The agency's ability to enforce the provisions of the standard

Features of Consensus Standards Organizations

Openness: The procedures or processes used are open to interested parties. Such parties are provided meaningful opportunities to participate in standards development on a nondiscriminatory basis. The procedures or processes for participating in standards development and for developing the standard are transparent.

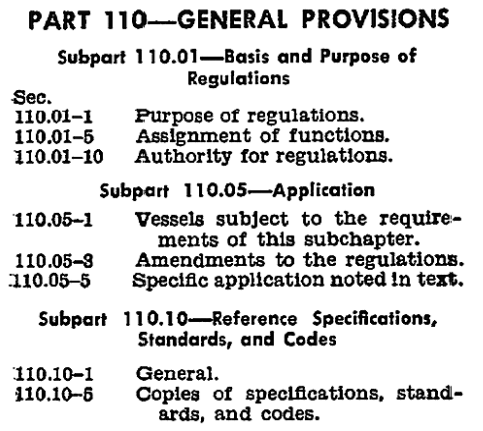
Balance: The standards development process should be balanced. Specifically, there should be meaningful involvement from a broad range of parties, with no single interest dominating the decision-making.

Due process: Due process shall include documented and publicly available policies and procedures, adequate notice of meetings and standards development, sufficient time to review drafts and prepare views and objections, access to views and objections of other participants, and a fair and impartial process for resolving conflicting views.

Appeals process: An appeals process shall be available for the impartial handling of procedural appeals.

Consensus: Consensus is defined as general agreement, but not necessarily unanimity. During the development of consensus, comments and objections are considered using fair, impartial, open, and transparent processes.

46 CFR Part 110—General Provisions 1968 and 2024



PART 110—GENERAL PROVISIONS

Subpart 110.01—Basis and Purpose of Regulations

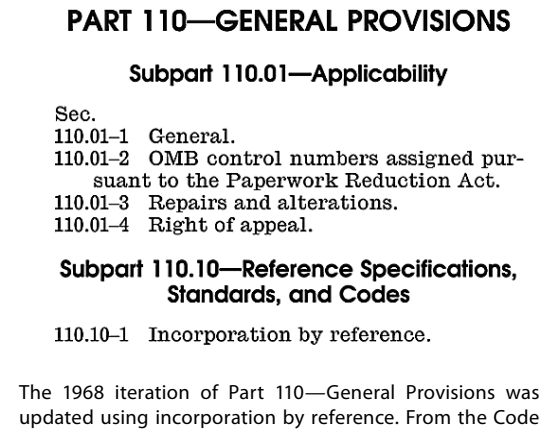
Sec.
110.01–1 Purpose of regulations.
110.01–5 Assignment of functions.
110.01–10 Authority for regulations.

Subpart 110.05—Application

110.05–1 Vessels subject to the requirements of this subchapter.
110.05–3 Amendments to the regulations.
110.05–5 Specific application noted in text.

Subpart 110.10—Reference Specifications, Standards, and Codes

110.10–1 General.
110.10–5 Copies of specifications, standards, and codes.



PART 110—GENERAL PROVISIONS

Subpart 110.01—Applicability

Sec.
110.01–1 General.
110.01–2 OMB control numbers assigned pursuant to the Paperwork Reduction Act.
110.01–3 Repairs and alterations.
110.01–4 Right of appeal.

Subpart 110.10—Reference Specifications, Standards, and Codes

110.10–1 Incorporation by reference.

The 1968 iteration of Part 110—General Provisions was updated using incorporation by reference. From the Code of Federal Regulations

- The extent to which the standard establishes performance rather than design criteria
- The clarity and detail of the standard's language

For the final rule stage, the agency must request approval in writing, repeat in the preamble the specific standard to be incorporated and how it is reasonably available, and provide a copy of the standard to the OFR. The agency must also maintain a copy for public inspection.

One of the Coast Guard's most notable and recent uses of IBR is in 46 CFR Subchapter J, Electrical Engineering. As early as 1952, the Coast Guard mentioned industry standards in 46 CFR Part 110, General Provisions, though not as we do today. Until 1968, the CFR included the specific text of the standards referenced. Today, with incorporation by reference, instead of lengthy regulatory text, the CFR cites the standards incorporated by reference, identifies the publisher and how the standards can be obtained, and details how the standards are used in the regulations.

Part 110.10-1 now recognizes standards for electrical installations on vessels that were developed by several professional organizations including the American Bureau of Shipping, the American National Standards Institute, and the Institute of Electrical and Electronic Engineers, among others. By incorporating standards, the Coast Guard recognizes the extensive and complex work already done by private industry to develop consensus around industry best practices. This helps the Coast Guard meet the directives of Circular A-119 to regulate through use of consensus standards where possible and to recognize where private industry has already developed best practices to meet performance standards set through regulations.

The Coast Guard recently updated dozens of references in Subchapter J (88 FR 16310) and estimated an annualized cost savings of over $51,000 for industry and government just from updating references to outdated standards. Specifically, the rule saves the Coast Guard time when responding to industry requests to use a more recent version of a standard than the one referenced in regulation, such as a request to employ the 2020 edition of a standard rather than the 1990 edition identified in regulation.

In addition to incorporating existing standards, the Coast Guard also participates in developing new and updated consensus standards by actively partnering with 29 SDOs as committee members, secretariats, and chairpersons. Approximately 200 people at Coast Guard headquarters are dedicated to drafting, reviewing, and supporting standards development. In particular, the Coast Guard participates on the International Organization for Standardization (ISO) Technical Committee 8 (TC 8) on Ships and Marine Technology and provides support for the secretariat position. The Coast Guard distributes these draft standards to various technical offices at Coast Guard headquarters, compiles the comments, and returns the results to the TAG as the Coast Guard's contribution to the overall U.S. voting position. In 2023, the TAG secretary coordinated voting on 218 ballots, 82 of which were circulated to the technical offices within the Coast Guard. With this participation, the Coast Guard contributes a regulator perspective to standards while maintaining relationships with private industry experts and keeping a pulse on market trends.

Whose Standards Does the Coast Guard Incorporate by Reference?

Material incorporated by reference in Coast Guard regulations is typically the product of standards development organizations (SDOs).

In addition, intergovernmental organizations like the International Maritime Organization and International Telecommunications Union produce treaties and codes that the Coast Guard incorporates by reference into regulations because the United States is a signatory nation.

Over the past 60 years, the Coast Guard incorporated almost 600 standards into more than 3,000 locations in CFR titles 33, Navigation, and 46, Shipping.

Conclusions

Reliance on industry standards has proven to be an efficient rulemaking tool for more than six decades. The Coast Guard invests considerable resources to its standards development program as an effective way to find a balance between government, industry, and the public needs in the complex and dynamic Marine Transportation System.

About the authors:
Roger Butturini has over 50 years of experience with the Coast Guard. He is the technical advisor with the Project Management Division and is a professional engineer and certified project management professional. He is also active in the Coast Guard's standards development program and a member of the Department of Homeland Security Standards Council.

Catherine Konieczny-Kells is a senior economist with the Coast Guard's Standards and Analysis Division which contributes cost-benefit analyses for regulations and advises on the regulatory process. She also serves as secretary for the U.S. ISO TC8 Technical Advisory Group, managing the voting process during development of international standards.

Some of the SDOs with whom the Coast Guard has the longest history include:

- *American Boat and Yacht Council*
- *American Bureau of Shipping*
- *American Petroleum Institute*
- *American Society of Mechanical Engineers*
- *ASTM International*
- *International Electrotechnical Commission*
- *International Institute of Electrical and Electronics Engineers*
- *International Organization for Standardization*
- *National Fire Protection Association*
- *Underwriters Laboratories*

The Coast Guard regularly incorporates standards written by other organizations into its regulations. Coast Guard chart

Compliance

Design Basis Agreements

Bridging the regulatory gap

BY LT EMILY SYSKO
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Hybrid power propulsion plants, autonomous navigation systems, and rocket recovery platforms are all examples of complex, emerging technologies being adopted by the maritime industry's frontrunners in innovation. With the pace of innovation rapidly increasing, the Coast Guard is challenged with striking a balance between facilitating the modernization of the marine industry and safeguarding the Marine Transportation System (MTS).

The Coast Guard's multifaceted regulatory process is deliberately rigorous. It comprises systematic economic and environmental analyses, detailed rulemaking notices and publications, and persistent stakeholder engagement. Each step of the process requires thorough planning and coordination, ensuring the development of a regulation that will effectively promote a safe, secure, and environmentally sound MTS. This standardized process takes time and consequently can present challenges for early adopters of novel technologies that are not necessarily addressed by existing regulations and standards. Fortunately, the regulations do provide a means by which the Coast Guard can consider new technologies and innovation.

The majority of vessel and equipment regulations provide a means by which the Coast Guard may consider equivalencies. Although the wording is slightly different from subchapter to subchapter, the message remains consistent. For instance, 46 CFR 114.540 under Subchapter K and 46 CFR 175.540 under Subchapter T state:

> *The Commandant may approve any arrangement, fitting, appliance, apparatus, equipment, calculation, information, or test, which provides a level of safety equivalent to that established by specific provisions of this subchapter …*

Through these provisions, the Design Basis Agreement (DBA) process was developed. A formal process for the submittal, review, and approval of DBAs was \published in March 2023. However, the Coast Guard, specifically the Office of Design and Engineering Standards (CG-ENG) at Coast Guard headquarters and previous office designations, has conducted equivalency reviews and approvals through industry appeals and requests since the early 1990s. It was not until the 2023 publication of CG-ENG Policy Letter 01-23 concerning design standard equivalency requests that the Coast Guard officially coined the term "Design Basis Agreement."

A DBA is a framework that establishes an equivalent level of safety when existing regulations are insufficient or do not apply to a vessel or system of novel design. Developing a DBA is a process that requires consistent collaboration between internal Coast Guard offices, other government agencies, regulatory bodies, and industry stakeholders. While not every signed DBA leads to a new regulation or standard, it can be the first step towards developing new standards to account for advances in maritime technology. As technology and novel design concepts are further refined, new standards and alternatives are often developed as part of industry adoption.

Process for Submitting, Reviewing, and Approving a DBA

The Coast Guard handles DBAs on a case-by-case basis, often due to the unique aspects of each innovation or new technology being considered by the stakeholder. DBAs offer a systematic process to integrate technological advancements into the MTS without sacrificing safety or security.

To provide guidance regarding the submission of DBAs, CG-ENG, the office responsible for managing DBAs, published Policy Letter 01-23, Design Basis Agreement Submission Guidance in March 2023. This document outlines the roles and responsibilities of relevant stakeholders involved in submittal, review, and approval. The vessel owner or operator should first contact their local Officer in Charge, Marine Inspection (OCMI), who will then notify the Marine Safety Center (MSC) of the owner/operator's intent to submit vessel plans. They must submit an overview of the design aspects, a full list of certifications, equivalencies, or

exemptions the design is requesting, and a gap analysis.

During the plan review phase, the MSC will determine if the vessel/system design requires a DBA and, should one be required, CG-ENG will lead a review of the conceptual design and submittal. CG-ENG will then determine whether a comprehensive DBA is needed or just a single system or equipment equivalency. The vessel or system design, risk factors, existing regulations and policies, and mitigation measures are all included in the submittal and considered during the review.

A DBA establishes a framework of engineering standards specific to a vessel or floating facility, which is then used by the MSC or the delegated Recognized Organization (RO), as applicable, during the plan review process. The OCMI, RO, or Third-Party Organization (TPO) will then use the DBA when inspecting the vessel during new construction, initial certification, and during subsequent compliance inspections.

The existing standards for a vessel contained in law and regulations remain effective unless a DBA is accepted and approved by the Coast Guard. Once a DBA is approved by the Coast Guard, the agreed upon equivalencies become part of the vessel's standards framework and then can be applied accordingly. All other applicable standards not covered by the DBA remain in effect for that particular vessel. Any modifications to a vessel that have an effect on an approved DBA should be reviewed by the Coast Guard and, if necessary, an updated DBA will be approved by CG-ENG.

The DBA review is an iterative process that requires early and frequent communication and collaboration. To ensure an efficient DBA approval process, it is critical for vessel owners to engage the Coast Guard and other relevant stakeholders in the coordination of a thorough gap analysis and risk assessment.

Practical Implementation of a DBA

Case Study #1: Outer Continental Shelf Innovation

One of the earliest applications of the design basis process was for a tension leg platform floating installation. As is generally the case at the start of a design basis project, industry submitted plans for a novel design for which regulations did not yet exist. The research conducted to determine safety equivalencies for this design ultimately led to the incorporation of stability requirements for tension leg platform floating installations in 46 CFR Subchapter N. Similarly, the oil boom in the early 2000s resulted in the Coast Guard conducting many design reviews and equivalency approvals for novel offshore vessels and platforms, such as floating production storage and offloading units.

Case Study #2: Alternative Fuel Ecosystems

In 2010, the International Maritime Organization adopted stricter emission standards through Annex VI of the International Convention for the Prevention of Pollution from Ships. The new, stricter requirements limited emissions of sulfur oxide, nitrogen oxide, and particulate matter, and ultimately served as the driving force for industry to pursue alternative fuel sources, such as liquified natural gas (LNG). The application of LNG as a fuel source has led to the development of novel vessel designs, including dual-fuel container ships, which operate off marine diesel oil and LNG, bunkering barges, and first-in-kind waterfront liquefaction and storage facilities. In collaboration with the MSC and local OCMIs, CG-ENG conducted thorough design reviews, regulatory analysis, and hazard identification/mitigation to develop a DBA framework that met an equivalent level of safety necessary for the vessels to operate within the MTS. Ongoing efforts are underway to incorporate the design standards used for these vessels into various subchapters of title 46 of the CFR.

Case Study #3: Offshore Wind and Renewable Energy Support Systems

Due to continued interest in using renewable energy resources, the Coast Guard has seen a recent increase in novel technology supporting the offshore wind industry. In 2019, the Coast Guard issued a DBA approval for the construction of the first Jones Act-compliant, self-elevating offshore wind turbine installation vessel. Since the vessel was not built to support drilling services, 46 CFR Subchapter I-A did not apply. As a result, the Coast Guard collaborated with the vessel owner/operators to develop a domestic regulatory framework to establish an equivalent level of safety for the intended operation of the vessel. Ultimately, the Coast Guard applied the regulations of Subchapter I to the vessel and annotated additional regulatory requirements in the DBA to

The Alternative Compliance Program

The Alternate Compliance Program (ACP) provides U.S. vessel owners and operators with an alternative method of complying with inspection requirements. The program reduces the regulatory burden of compliance by capitalizing on the survey and certification functions performed by an Authorized Classification Society.

ACP promotes flexibility in construction, reduces duplicative inspections, and is designed to maintain an equivalent level of safety.

mitigate additional risks associated with the vessel's unique service.

Case Study #4: Sustainability in Commercial Space Exploration Activities

Starting in 2008 with the first successful launch of a privately owned, liquid-filled rocket, the space exploration movement has grown substantially, especially in the past 10 years. As a result, the commercial space industry's pursuit of economically feasible launch and recovery options has led to novel designs such as faring catcher vessels and autonomous drone ships. Industrial vessels are normally constructed in accordance with 46 CFR Subchapter I. However, given that existing regulations do not fully incorporate operational requirements for vessels conducting space support activities, the DBA submittal and review process was used to develop a comprehensive regulatory framework addressing the vessels' design, construction, and operation.

Future Outlook

The DBA process effectively facilitates the review of the industry's request to deviate from existing regulations, however, there are challenges associated with the

A rescue swimmer from New Jersey s Coast Guard Air Station Atlantic City is lowered onto the back section of a nacelle during a search and rescue exercise off the coast of Virginia in October 2023. The service s goal of the unique training was to identify challenges, understand limitations, and develop solutions to uphold its commitment to search and rescue and safety at sea. Coast Guard Photo by Petty Officer 2nd Class Ryan L. Noel

process. Design basis submittal is reviewed on a case-by-case basis. While there is a standardized process for the submittal and review, each approval is unique and requires varying levels of internal and external stakeholder involvement. Often, industry trends start to appear between equivalency requests, sparking the discussion for developing regulations. However, the in-depth technical review and stakeholder engagement required for a DBA approval lends itself to particularly long lead times. Some submittals may be approved within a few months, while others may take up to a year, or occasionally longer, for a framework to be agreed upon. In some cases, if the proposed alternative arrangements do not provide an equivalent level of safety, the submittal may not be approved.

LT Dean Gilbert, from the Coast Guard Research & Development Center (RDC), based in New London, Connecticut, showcases the R/V *Dolph*'s autonomous capabilities during a demonstration at Coast Guard Base Galveston, Texas, in March 2023. The R/V *Dolph* is a 29-foot response boat-small outfitted with a remote piloting system and has been in continuous development by the RDC with the hopes of developing a concept of operations for the integration of uncrewed surface vessels into Coast Guard missions. Coast Guard photo by Petty Officer 2nd Class Ryan Dickinson

Additionally, developing a DBA imposes significant resource demands on industry as the submitter and the Coast Guard as the reviewer. A DBA submittal must include detailed hazard identifications and risk assessments, which often take several months to conduct and require input from subject matter experts. Similarly, given the novel system characteristics presented in a DBA submittal, Coast Guard engineers must broaden their knowledge base, which sometimes involves coordinating with local units and industry partners to conduct field visits.

While significant progress has been made in standardizing the Coast Guard's review of requests for regulatory equivalencies, as with other procedural modifications, there is still room for improvement. To identify trends in the different types of emerging technology being used in the industry, the Coast Guard tracks DBA submittals which provides an opportunity for a rulemaking project to be initiated to introduce regulations pertaining to the new technology. For example, if the Coast Guard sees an increase in DBA submittals over the next few years, there is a possibility for the DBA process to be explicitly written into the CFRs as a new regulation itself. Ultimately, the goal of this rulemaking project would be to streamline the DBA process further, ensuring standardization while also driving shorter timelines for system or vessel approvals.

In summary, the DBA process allows industry stakeholders to pursue novel designs by employing various mitigation strategies such as hazard identifications and regulatory analyses. Similarly, through diligent collaboration with industry partners, the Coast Guard uses the process to facilitate the safe growth of the MTS. The research conducted, and determinations established during the review and approval of a DBA submittal can be leveraged as consideration for the development of timely and effective regulations and standards.

Finally, vessels seeking to use innovative technology not addressed in current domestic regulations are highly encouraged to contact their local OCMI to initiate discussions about their proposal and incorporate the novel design aspects through a design basis agreement.

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Coast Guard's Regulatory Compliance and Emerging Technologies

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As new and emerging technologies rapidly develop in the maritime sector with the aim of increasing efficiency and improving safety and security, the Coast Guard has the monumental challenge of managing oversight while regulations are being developed. Some of these technologies were born from the International Maritime Organization's (IMO) push to cut greenhouse gas (GHG) emissions from ships and a desire to reach net-zero GHG emissions from international shipping by the year 2050. Other examples of change drivers include offshore renewable energy installations being developed as a principal energy source to combat climate changes, and a significant push to enhance the Maritime Transportations System's (MTS) resiliency to cyber incidents.

So how does the Coast Guard immediately bridge the gap of new technologies like autonomous vessels, offshore wind energy, cybersecurity, and alternative fuels when there are no regulations? Managing this new technological era is challenging, but the following article will provide various Coast Guard views and approaches to leveraging policy, regulation, authorities, and industry standards to fill regulatory gaps.

Coast Guard Management of U.S. Vessel Regulatory Oversight

The Coast Guard is the principal federal agency with authority to ensure the United States is meeting both domestic and international obligations and responsibilities as a flag, port, and coastal state as specified by the IMO Instruments Implementation (III) Code. By coordinating with other federal entities, the Coast Guard strategically leverages interagency relationships to perform its obligations.

The Commercial Vessel Compliance Flag State Control Division (CG-CVC-4) is one of the offices within the Coast Guard responsible for creating policy that implements these sources of international and federal law. Various incidents led to the inception of this division. These incidents include—the SS *Marine Electric* in 1983, *Deepwater Horizon* in 2010, and most notably the SS *El Faro* in 2015. Over time, these serious marine incidents highlighted a strong need for a more formalized oversight program of the U.S. maritime fleet. Tragically, it was the total loss of the SS *El Faro* and its 33-person crew that served as the catalyst to institute a flag state oversight division.

In a final action memo related to the loss of the SS *El Faro* and its crew, Admiral Paul Zunkunft, the 25th Commandant of the Coast Guard, stated:

> *As the lead agency of the U.S. Flag Administration, the Coast Guard is ultimately responsible to monitor the performance of third parties that perform delegated*

functions and also to guarantee the effectiveness of vessel inspections and surveys. … The Coast Guard must, and will, establish a risk-based and enduring policy framework that is simpler to execute and enables more robust oversight of delegated functions.[1]

Services performed by recognized organizations (RO) and third-party organizations (TPOs) on behalf of the Coast Guard fall under the oversight of CVC-4. The delegation of responsibilities while maintaining oversight is one avenue the Coast Guard has embraced to meet prevention readiness initiatives and provide satisfactory and safe services to the maritime industry as it rapidly advances technologically and on a global scale.

The Coast Guard has delegated specific technical functions to nongovernment TPOs. This strategy allows third parties to perform explicit technical tasks to assess conformity while the Coast Guard considers TPO assessments—surveys, audits, certification, and reports—when evaluating overall regulatory compliance. This is not merely an adoption of third-party rules as an equivalent to federal regulatory standards, but instead a blended delegation strategy which harmonizes third parties, like ROs, with management systems and Coast Guard oversight. Sanctioned regulatory programs rooted in IMO standards, like the Alternate Compliance Program (ACP), allow the Coast Guard to evaluate and certify U.S. vessels based on ROs' reports that ensure the vessel complies with applicable international conventions and treaties, class rules, and supplementary prescribed standards. An RO must satisfy regulatory standards before being considered an approved recognized organization to inspect vessels for compliance with international conventions, RO rules, and a Coast Guard-approved U.S. Supplement under the ACP. This process comprises four criteria, including:

1. meeting the RO Code and U.S. regulatory requirements
2. adopting the single supplement or U.S. approved supplement establishing equivalency with U.S. regulations
3. Receiving specific Coast Guard authorization to act on the service's behalf
4. The classification society must utilize the single s

The ROs attend over 6,500 vessels per year to conduct tasks such as statutory surveys on behalf of the Coast Guard. This compliance oversight provided by ROs on behalf of the Coast Guard allows the service to focus resources on foundational flag state functions like third-party performance monitoring, maritime security, safety management system audits, vertical contract audits, vessel exemptions, and novel vessel activities. The main offices involved are the Office of Commercial Vessel Compliance (CG-CVC), Coast Guard Traveling Inspectors Office (Coast Guard-5P-TI) and local field units.

The Coast Guard is continually working to advance the initiatives of marine safety in alignment with the Maritime Commerce Strategic Outlook[1] and workforce training and performance initiatives. By leveraging effective oversight and use of TPOs for regulatory functions, we ensure the Coast Guard remains able to manage the U.S.-flagged fleet and continues to facilitate national security and lawful commercial trade. Maintaining this level of oversight can be difficult due to new regulatory programs emerging daily in the MTS. For instance, the Coast Guard is actively involved in developing sexual assault/sexual harassment (SASH) prevention policies and the implementation of internal Mission Management System (MMS) processes, which ensures that the guidance provided to industry partners and the public are regularly updated.

Regulated Facilities and Shoreside Compliance

Cyber Security at Maritime Transportation Security Act (MTSA) Regulated Facilities

Cybersecurity threats and their associated risks are one of the principal topics being discussed amongst MTS stakeholders. The Coast Guard remains engaged with industry partners to strengthen the MTS's security posture and cyber hygiene. Furthermore, the Coast Guard, along with our port partners and other government agencies, not only share information but discuss preparedness and response coordination efforts. As cybersecurity regulations continue to be developed, or when they are ambiguous, what can regulated facilities expect from the Coast Guard regarding guidance?

The Coast Guard can provide regulated facilities with technical expertise, specialized capabilities, and the development of clear and concise guidance. These actions are executed by three Coast Guard headquarters

> The RO Code serves as the international standard ... containing minimum criteria against which organizations are assessed towards recognition and authorization and the guidelines for the oversight by flag States.
>
> –International Maritime Organization

offices—the Office of Port and Facility Compliance (CG-FAC) and Coast Guard Cyber Command and its component, Maritime Cyber Readiness Branch. These offices were designed and used for their technical expertise and specialized capabilities to aid in developing further guidance. Additionally, the Cybersecurity and Infrastructure Security Agency, created in 2018, is the agency that developed technical standards for assessments and mitigation efforts. The Coast Guard presents the guidance it develops or receives from other organizations to the field and industry partners in the form of a Navigation and Vessel Inspection Circular (NVIC), Marine Safety Information Bulletins, policy letters, and job aids.

Addressing Cyber Risk at MTSA Regulated Facilities, provides guidance to facility operators until further regulations are created. Specifically, it provides facility owners clarity on assessing, documenting, and addressing computer and network vulnerabilities. Furthermore, the Maritime Cybersecurity Assessment and Annex Guide was created to provide facilities support with meeting the requirements outlined in NVIC 01-20. It also recommends a process for identifying cybersecurity vulnerabilities as facilities are conducting a security assessment during the development of their facility security plans.

With the release of the Cyber Executive Order 14116 from the president of the United States, the Coast Guard continues to adjust and adapt to the ever-evolving world of cybersecurity through policy updates, increased personnel expertise and through longstanding partnerships with the MTS community.

Air Space Security Over Maritime Critical Infrastructure

Whether an unmanned aircraft system (UAS) is intentionally or inadvertently flying over sensitive, critical maritime infrastructures (MCI), they to pose a security challenge for regulated waterfront facilities. The Federal Aviation Administration (FAA) Extension, Safety, and Security Act of 2016 directs the FAA to establish procedures for applicants to petition the agency to prohibit or restrict the operation of UAS in close proximity to a fixed-site facility. Although much of the act has been implemented, strategies to properly implement Section 2209—Applications for Designation—are still being developed. Once fully established, facility owners and operators will have a procedure to petition the FAA to prohibit or restrict the operation of UAS near their facility.

CG-FAC is collaborating with the FAA to establish a process for identifying sensitive MCIs that, if incapacitated, could be detrimental to the interest of national defense. Once identified, the Coast Guard can sponsor MCIs in accordance with 14 CFR Section 99.7, implementing Special Security Instruction (SSI) airspace over the areas identified. It is important to note, however, that while the Coast Guard may sponsor an MCI application for an SSI, the decision to grant it is within the sole discretion of the FAA and requires a national security justification.

The Department of Homeland Security (DHS) has established an FAA/DHS Standard Operating Procedure, and CG-FAC is currently working to standardize the process for the maritime community. In theory, and if approved, the FAA could issue a temporary flight restriction zone to limit air traffic over these identified areas.

However, until this process is complete, there are still best practices that regulated facilities should continue following. A port-wide communication network to address any UAS activities should be developed through the local Area Maritime Security Committee. Perhaps most important, MTSA regulated facility operators and commercial vessels should continue to report suspicious UAS activity to the National Response Center, which will inform the local Captain of the Port.

Shoreside Compliance for Alternative Marine Fuels and Cargos

The path to decarbonization brought on in part by IMO 2050, part of the organization's IMO Green House Gas Strategy, is a global issue intended to usher in a new wave of alternate marine fuels and cargos largely unseen in the maritime environment. As energy producers and shippers explore technical and economic avenues for providing sustainable energy solutions, it is incumbent on the government to develop regulations, guidance, and policy to support the energy transition. It is important that this is done in a manner that does not hinder progress but balances the levels of safety that national and regulatory programs have fostered over the course of decades. This, among others, is the task at hand for CG-FAC.

For many alternative fuels and cargos, like ammonia, ethanol, and liquified gases, the existing regulatory framework for transfer to a vessel at a regulated facility is sufficient to allow operations pending collaboration with the local COTP and appropriate risk assessment. However, current regulation does not account for some products, like such as hydrogen.

So how does the Coast Guard regulate shoreside infrastructure in the absence of regulation? The answer to this challenge is in the Coast Guard's broad authorities and specialized guidance. The service's goal is to facilitate industry while maintaining a level of safety equivalent to the existing regulatory framework for safety and security. The starting point for establishing guidance is the Ports and Waterways Safety Act and the MTSA. These grant Captains of the Ports the authority and jurisdiction

to ensure safety and security at waterfront facilities and on navigable waters. Additionally, title 46 U.S.C. 70011 grants the Coast Guard authority for the oversight of hazardous materials. This means the service has the authority and obligation to establish measures necessary to ensure the safety of our nations port, waterways, and local communities. CG-FAC, along with the Coast Guard Office of Operating and Environmental Standards, are currently working to assess the need for interim guidance and long-term regulatory development.

Where the long-term goal is regulatory development, the short-term strategy will rely on industry standards and a mirror of existing regulations that have a proven safety record. As projects develop, the Coast Guard will strive for the same level of safety as found in 33 CFR Part 127, *Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas* and 33 CFR Part 154, *Facilities Transferring Oil or Hazardous Material in Bulk*. These regulations offer a baseline format for both traditional fixed import/export and mobile facilities.

The final key to success for bringing alternative marine fuels and cargos to the marine industry will lie in collaboration and strong stakeholder engagement. There is a role for everyone—private industry, government, and standards organizations—in navigating this new era of low- and zero-carbon energy. It will take a true team effort to develop the technical expertise and specialized capabilities necessary to facilitate the transition to alternative energy sources while ensuring the safety or our Marine Transportation System.

Coast Guard Regulatory Oversight on Alternatively Fueled Vessels

IMO's commitment to reducing greenhouse gas emissions from the shipping industry by 2050 has led to emerging technologies within the MTS. The Coast Guard Maritime Commerce Strategic Outlook 2018 stated:

> *The accelerated pace of innovation through the MTS poses significant challenges for the Coast Guard. To best ensure an efficient, safe, and secure MTS, the Coast Guard must keep pace with technological advancements, invest in capabilities, apply big data analytics, and adapt to the changing environment.*

While technologies in digitalization and design of vessels both optimize and improve efficiency, finding ways to regulate these vessels will be crucial on the journey to decarbonization. As countries deviate from traditional coal-fired plants to renewable energy sources to generate power, advances in alternative fuels like hydrogen, ammonia, liquefied natural gas (LNG), and nuclear power offer the potential to reduce the carbon footprint around the world. As the world starts to rely on exported fuels like LNG from the United States, the Coast Guard must keep pace with these technologies and future fuels. This shift requires a fresh mindset and a new toolbox for the regulators to promote the safety of the mariners while helping the maritime industry usher in a cleaner, carbon-neutral future.

U.S. Policies on Alternative Fuels

One of the tools needed is historic investments of time and money from federal leadership. Recently enacted policies like the Bipartisan Infrastructure Law and Inflation Reduction Act help private sector and government policies jump-start the discussions for decarbonization. Working with both domestic and international partners to implement large investments in infrastructure is crucial to giving options to safely use energy-efficient, innovative technologies on the MTS. In the past year, the United States and the European Union stood up a joint task force to focus on sustaining U.S. LNG supplies to Europe. This is in addition to maintaining focus on energy market trends and prices to meet the challenging alternative fuel supply issues for the upcoming 2024 winter season.

Given the different strategies imposed by the federal leadership on various fuel sources, decarbonizing the MTS will require diverse solutions and reliance on scaling up resources through research and development. This will help reduce the costs of these fuel sources, making these emerging technologies a promising solution. As part of this strategy, the departments of Energy and Transportation, and the Environmental Protection Agency signed a memorandum of understanding (MOU) to increase collaboration and focus their lines of effort on ensuring safety within the MTS.

Coast Guard Policies Toward Alternative Fuels

The Coast Guard has taken this MOU and restructured its strategic outlook to advance the Commandant's priorities. This includes transforming the total workforce, sharpening the competitive edge, and advancing mission excellence. One of the immediate strategies taken was the implementation of various Coast Guard policies to establish an equivalent level of safety for novel technologies as compared to the traditional fuel systems.

Some lessons learned from the first wave of novel technologies included guidance to industry stakeholders on how to submit the equivalency for designs and standards, also known as a Design Basis Agreement, or DBA. The DBA process allows the Coast Guard time to evaluate alternative arrangements or novel design proposals and serves as a standard framework for the design, plan review, inspection, and certification of these novel vessels. Other lessons learned include the necessity of collaboration between the Coast Guard, industry

stakeholders, and class societies to address risks associated with operating these novel technologies.

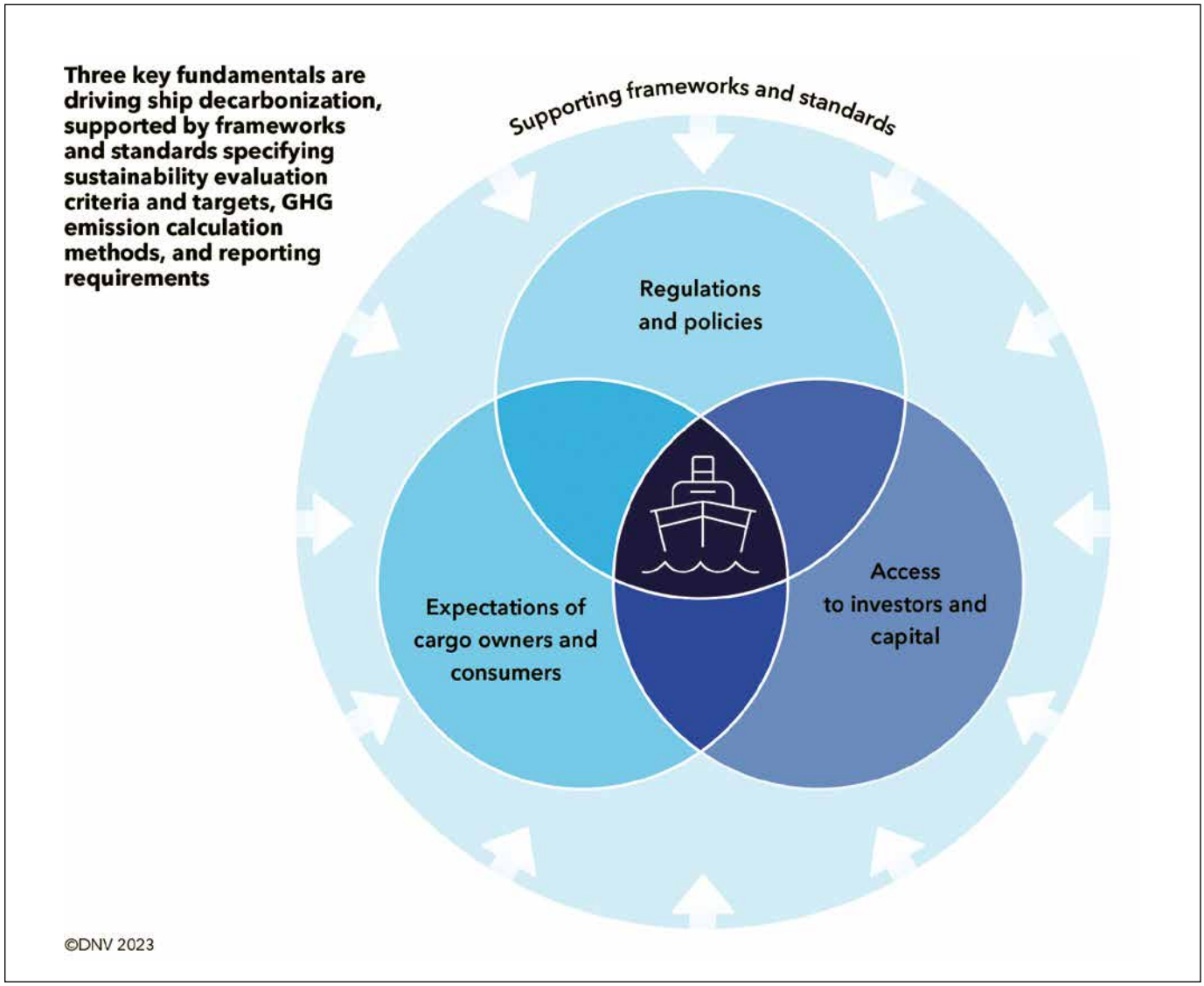
Coast Guard Policy Updates to IGF Code

The International Code of Safety for Ships Using Gases or Other Low-flashpoint Fuels (IGF Code) took effect on January 1, 2017. The IGF Code contains mandatory risk assessment requirements to ensure that risks not anticipated by the code are properly addressed. These risks include guidance related to vessels and waterfront facilities conducting alternative fuel transfer (bunkering) operations, ship-to-ship transfer operations, and simultaneous fuel transfer operations for alternative fuel. While the current code only addresses LNG-fueled vessel designs, IMO has published interim guidelines for methanol as fuel and the use of hydrogen fuel cells. These are to be used as a baseline standard for equivalency until IMO can update the IGF Code to include the additional parts.

Class Rules and NGO Publications

While the immediate strategy is to publish policies as an intermediate solution, the short-term strategy must include reliance on both class societies and industry standards while we consider the long-term strategy of updating the regulations. While the International Association of Class Societies (IACS) members' role is to verify compliance with IGF Code and act as ROs for flag administrations, they also incorporate these IMO codes within their rules to develop additional requirements for alternatively fueled ships. The American Bureau of Shipping stated:

> *To assist uniform application of requirements that may be outside the scope of the IMO approved Codes, IACS members work together to develop a Unified Requirement*



(UR) to cover a wide range of topics to include novel technology systems. To support harmonized application of the IGF code, IACS members also develop a Unified Interpretation (UI).

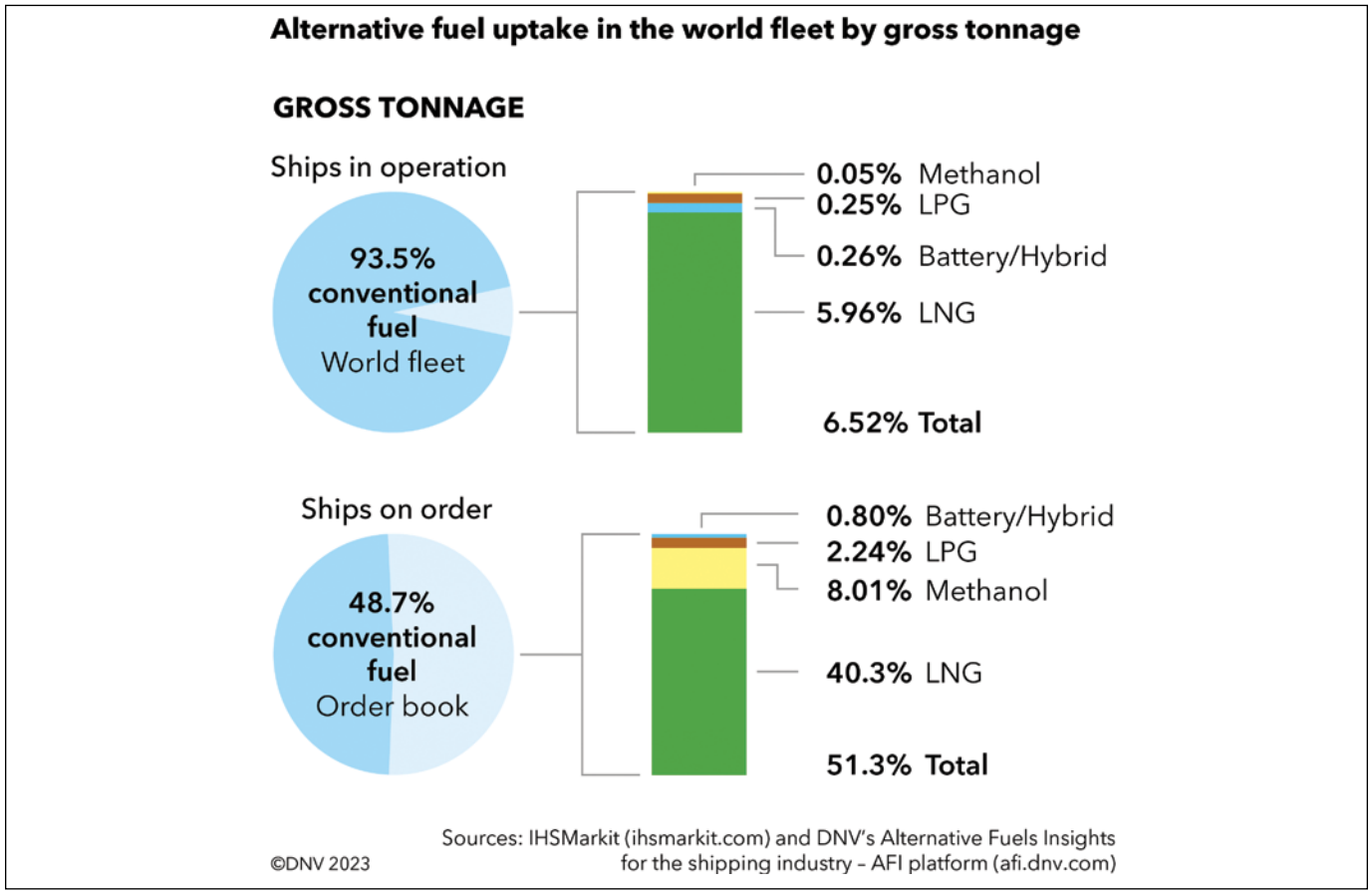
These unified interpretations to the IGF Code and delegated authority as an RO allow class societies, like the American Bureau of Shipping, to conduct certain statutory surveys and certification functions for U.S.-flagged vessels. Reliance on nongovernmental organizations (NGO), like the Society for Gas as a Marine Fuel (SGMF), also aid in the short-term strategy to ensure safety. SGMF has helped publish self-imposed technical and safety industry practices that led to maintaining a higher standard. The society's continued efforts to advise on design, operation, maintenance, and training for alternative-fuel systems greatly aided the Coast Guard in incorporating these standards by reference within our policy and updates to the IMO during the IGF Code revisions.

IMO's strategy of decarbonization by 2050 is a lofty goal. The long-term strategy ultimately calls for regulatory change to enforce IMO standards, recommendations set by industry, and the unified interpretation set by IACS. Until regulatory changes can be implemented, the Coast Guard must rely on subject matter experts to develop modernized training, establish policies, and strengthen partnerships with IACS members and NGOs to safeguard the rapidly changing MTS.

Evolution of Non-Mineral Energy Resource Operations on the U.S. Outer Continental Shelf

By the 1950s, the U.S. government was realizing the need to assert its jurisdiction over Outer Continental Shelf (OCS) activities and enacted the Outer Continental Shelf Lands Act (OCSLA) of 1953. Among other authorities established in the act, the Coast Guard was given "authority to promulgate and enforce such reasonable regulations with respect to lights and other warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on the artificial islands, installations, and other devices." The authority was put into action with the publishing of 33 CFR Subchapter N, Outer Continental Shelf Activities in 1956. Subchapter N implemented design, equipment, and operational requirements for OCS units, which, by definition, includes fixed and floating facilities, Mobile Offshore Drilling Units and other vessels engaged in OCS activities.

Similarly with the Offshore Supply Vessels (OSV), by



the late 1970s the need to enforce minimum safety standards on the vessels serving the expanding OCS world of operations became apparent. To address this need, Public Law (PL) 96-378 requiring the inspection and certification of previously uncertificated OSVs was signed in 1980. In the absence of a dedicated CFR subchapter for these vessels, the Coast Guard promulgated NVIC 8-81, superseded by NVIC 8-91, to implement an interim inspection scheme and guidance for OSVs. The final piece of the puzzle was the 1996 promulgation of 46 CFR Subchapter L. This formally established an inspection subchapter specific to a vessel which "regularly carries goods, supplies, individuals in addition to the crew, or equipment in support of exploration, exploitation, or production of offshore mineral or energy resources."

As discussed earlier, current OCS facilities are regulated via 33 CFR Subchapter N for equipment and operational matters under the Coast Guard's purview, and the authority for those regulations come from OCSLA. The problem with employing that subchapter for the burgeoning offshore non-mineral energies sector of OCS operations, including offshore wind facilities, is that 33 CFR Subchapter N is specifically tied to units "associated with exploration for, or development or production of, the minerals of the Outer Continental Shelf." (see 33 CFR 140.10)[2] Since these offshore wind farms are not associated with "minerals of the OCS" they are not subject to 33 CFR Subchapter N in its current construct. However, the authority still exists since in 2021, PL 116-283 amended OCSLA by adding "non-mineral resources" to the jurisdictional scope of the U.S. on the OCS. To date, the Coast Guard has not interpreted that amendment to be self-implementing for the purpose of 33 CFR Subchapter N, and future rulemakings will be necessary to enact it.

The current regulations needed no amendment to capture the operational work of the U.S.-flagged support vessels serving the development of the current offshore wind projects. Specifically, since 46 CFR Subchapter L is qualified by "offshore mineral or energy resources," no amendments were necessary to apply that regulatory subchapter to vessels serving the offshore wind projects. Even ignoring the minutiae of regulatory verbiage, the world of work for serving the traditional oil and gas industry is operationally very similar. As a result, several vessels previously serving in the Gulf of Mexico have relocated to the Northeastern United States and are gainfully employed in serving the offshore wind projects. This is not to say that all vessels engaged in the support of offshore wind development are by default Subchapter L vessels, as there is a wide array of commercial vessels responding to the need.

As discussed in the alternative vessel fuels section of this article, most new vessels being built or existing vessels being modified to perform work in the offshore wind market require DBAs to cover the increasingly complex vessel systems and operations. DBAs present a unique regulatory challenge since those requirements remain with the vessel for its service life, or until amended, requiring a modified compliance scheme with discrete differences from the general regulations.

Windfarm Leasing and Operations Responsibility

BOEM is responsible for the leasing and construction of offshore windfarms (30 CFR 585). They establish the Wind Energy Areas (WEA) and are responsible for validating that lease construction is in accordance with submitted plans.

BSEE oversees the operational aspects of running the farms, including implementation of the overall lease safety management systems.

Beside the equipment and safety regulations for the facilities and vessels, the Coast Guard has engaged in other regulatory projects associated with non-mineral energy resource activities. In June 2023, the Coast Guard published 33 CFR 147.T01-0277 under 33 CFR Subchapter N, establishing the safety zone for the Vineyard Wind 1 project off the coast of Massachusetts. The new regulation implemented a 500-meter safety zone around each wind turbine location in the wind field.

In October 2023, the Coast Guard released NVIC 02-23, *Guidance on The Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations (OREI) on The Outer Continental Shelf (OCS)*. It highlights the overall federal approval process for offshore renewable energy projects and clarifies the roles of the Coast Guard and other federal agencies at each step in the process. In November 2023, the Coast Guard released NVIC 03-23, *Guidance on Navigational Safety in and Around Offshore Renewable Energy Installations (OREI)*, the contents of which are evident by the title.

Lastly, on January 19, 2023, the Coast Guard released a Notice of Proposed Rule Making in 89 FR 3587 titled *Shipping Safety Fairways Along the Atlantic Coast*. Through this rulemaking, "The Coast Guard is proposing to

establish shipping safety fairways ("fairways") along the Atlantic Coast of the United States, identified in the Atlantic Coast Port Access Route Study." The increasing complexity of coastal marine operations and competing demands for space in the maritime domain have made it necessary for the Coast Guard to pursue this proposed rulemaking.

One noteworthy success of the regulatory groundwork being laid in the evolution of offshore wind in the United States is the collaborative effort of the different agencies which have a role in the approval and oversight of the installations. Principally for the Coast Guard, the coordination is with the Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE). Both bureaus have implemented regulations employing the amended OCSLA authority to oversee renewable energy activities via 30 CFR 585 and 30 CFR 285, respectively. Among other responsibilities, BOEM oversees the establishment and sale of leases in wind energy areas and approves a developer's initial documents necessary for building a windfarm, including necessary surveys, siting decisions, environmental impact assessments, and the construction and operations plan. For the purposes of BOEM's regulatory processes, the Coast Guard serves as a cooperating agency providing expert input regarding navigational safety and OREI interactions or impacts on the Coast Guard's statutory missions on the OCS. Concurrently with BOEM's lease and siting approvals, BSEE reviews and approves the oil spill response plans and safety management systems for the lessee's operations, again consulting with the Coast Guard as appropriate.

The U.S. offshore wind energy sector is inarguably in its infancy, especially when compared to other global offshore wind operations. Every project that goes through the process is a lesson learned on the uphill climb to reach power generation goals. With so few commercial-scale wind farms currently under construction, there is ample opportunity to learn.

Conclusion

Modern times require modern solutions. For regulatory bodies, this means getting creative in navigating the dynamic workload while avoiding unnecessary delays to industry and progress. It also requires organizational leadership to take intentionally strategic action to future-proof our regulations, policies, and practices. None of this implies we will accept unnecessary risks or ignore known industry hazards, but we remain flexible in how we ensure the safety of the environment, the workers, and the public that routinely interact in these burgeoning fields.

For more information

Maritime professionals can access news releases and information at the Coast Guard Maritime Commons blog: https://www.news.uscg.mil/maritime-commons/

The National Response Center can be reached at 1-800-424-8802

For more details and additional cyber resources including cyber-related policy updates, best practices, and interagency resources, please visit the Coast Guard Maritime Cybersecurity Resource Center at https://www.uscg.mil/MaritimeCyber/

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LCDR Daniel A. Gonzales works in the Office of Port & Facility Compliance (CG-FAC) and oversees the program & quality management standards branch. Prior assignments include MSU Port Arthur, MSU Texas City, MSU Lake Charles, the Office of Domestic Port Security Evaluations (CG-PSA-2), and Activities Europe. He received his commission through Officer Candidate School.

LCDR Wade Mendenhall serves as Chief, Facility & Cargo Safety within the Office of Port & Facility Compliance where he oversees national policy, guidance, regulatory development, and advises operational commanders on matters relevant to handling container, explosive, HAZMAT, LNG and alternative fuels and cargos. He holds degrees in Environmental Management and Meteorology.

LCDR Daniel Wilkinson serves as Commanding Officer for Coast Guard's Outer Continental Shelf (OCS) National Center of Expertise. He serves as COMDT's senior technical advisor for OCS facilities and support vessels, and supports headquarters & field units with regulatory compliance matters. He earned his Master of ocean engineering at Florida Institute of Technology.

Endnotes:

1. USCG MARITIME COMMERCE STRATEGIC OUTLOOK-RELEASABLE.PDF (defense.gov)
2. https://www.ecfr.gov/current/title-33/chapter-I/subchapter-N/part-140/subpart-A/section-140.10

Charting the Course to Civilian Nuclear Powered Vessels and Barges

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The maritime industry is working towards a greener fleet to reduce the environmental impact of shipping. Almost every day there is an article or two in the major maritime news outlets discussing various innovative technologies and techniques being deployed. One possibility seems to be in the early stage of development—but it has a bit of a glow.

The vast majority of nuclear-powered vessels are operated by the world's navies, but there are a few examples of maritime nuclear power for civilian uses. Russia has operated nuclear-powered vessels for nonmilitary purposes since the nuclear icebreaker Lenin was placed into service on December 3, 1959. Currently, Russia's nonmilitary nuclear fleet is operated by the Federal State Unitary Enterprise of the Nuclear Fleet (FSUE Atomflot) of the State Atomic Energy Corporation. FSUE Atomflot's active nuclear fleet consists of four icebreakers, the *Sevmorput*, a container ship also capable of carrying lighters, and six additional icebreakers in the design phase or under construction, with several vessels laid up.

Russia has also developed floating nuclear power plants. The *Akademik Lomonosov*, placed in full operation in May 2020, was the first delivered. The two reactors onboard are capable of generating 70 MW of electricity. The power barge can also deliver heating steam ashore and desalinate up to 240,000 cubic meters of sea water per day. Russia plans on building additional power barges.

The interest in nuclear-powered vessels and floating nuclear power plants has spread globally in recent years. In December 2022, Bureau Veritas, a classification society, and ThorCon, a nuclear facility manufacturer, entered into an agreement for technology qualification and development of a power barge with 500 MW molten salt nuclear (MSR) reactor for operation in Indonesia. In January 2023, Samsung Heavy Industries announced it completed the conceptual design for a power barge with a compact MSR. In February 2023, nine parties in South Korea signed a memorandum of understanding to develop small modular reactors (SMR) as the propulsion mechanism for large ships. In December 2023, China State Shipbuilding Corporation submitted a concept design for a 24,000 20-foot equivalent units (TEU) containership powered by an MSR. Two concepts being pursued include using advanced reactor designs for vessel propulsion and the use of barges as mobile nuclear power plants.

The U.S. Department of Energy funded the American Bureau of Shipping (ABS) to perform a study of nuclear propulsion onboard large cargo vessels. To complete this study, ABS partnered with Herbert Engineering Corporation to assess reactor plant designs for a 14,000 TEU post-Panamax container vessel and a 157,000 deadweight tonnage Suezmax tanker. Completed in July 2023, the study demonstrated a carbon-free propulsion option that would last the 25-year design service life of the vessel.

Additionally, NuScale, a designer of next generation SMRs is partnering with Canadian mobile-reactor company Prodigy Clean Energy to design a "marine power station," which is scalable up to about 900 MW. The Electric Power Research Institute has also proposed using a floating power plant to manufacture green fuels. In September 2023, BWXT, another nuclear facility manufacturer, and Crowley announced that they are partnering to develop a power barge in the 5–50 MW range.

The Coast Guard's Regulatory Approach

Typically, the Coast Guard requires a two-part approach to regulatory oversight. First vessel or barge designs would undergo plan review by the Coast Guard's Marine Safety Center, complying with the published regulatory standards for vessel design, vessel type, and equipment found in Chapter I of Title 46 of the Code of Federal Regulations (CFR). Following the plan review, the local Officer in Charge of Marine Inspections (OCMI),

would ensure the vessel's or barge's physical construction adhered to the plans reviewed by the Marine Safety Center. The OCMI would also ensure the proper manning requirements prior to the issuance of a certificate of inspection that allows the vessel to operate.

In cases where existing regulation does not exist, such as with a vessel or barge with a nuclear reactor installed onboard, the applicant may seek equivalencies to the regulations by first providing technical information to support review of their novel concept. This technical information is submitted to the Coast Guard Headquarters Office of Design and Engineering Standards for the review and acceptance of proposed engineering design standards to be determined by a design basis agreement (DBA). Pending acceptance by the service, the DBA provides a unique engineering standard for a specific vessel, allowing it to continue through plan review and approval. Currently, Chapter I of 46 CFR does not have any regulations or referenced engineering standards for nuclear reactors and associated systems.

The Russian nuclear-powered icebreaker *Rossiya* evacuates a team of Russian scientists from Russian research station North Pole 37 after the scientists determined the ice had become unsafe months ahead of their anticipated departure. Coast Guard photo by Auxiliarist Drew Herman

Beyond the DBA, both credentialing and operations must be addressed by various Coast Guard headquarters offices. Currently no regulatory standards or civilian training programs exist to either qualify mariners to operate a nuclear reactor and associated systems or ensure the safety and security of such a vessel or barge. The current statutory requirements and regulatory guidance for operation of nuclear reactors is provided by the Nuclear Regulatory Commission (NRC). Prior to the operation of a vessel or barge, the gaps and conflicts of regulatory guidance in these regulations would need to be addressed and agreed upon between the owner of the vessel or barge, the Coast Guard, and the NRC. Should this agreement be reached, the design review and inspection processes should be similar to traditional vessels.

The Nuclear Regulatory Commission's Regulatory Approach

The NRC uses a very similar approach where licensing reviews are performed on submissions made by applicants with a follow-on inspection program to ensure compliance with the conditions placed on the licensee. The NRC regulates nuclear power plants through a process of permits and licenses. The original licensing process involved two steps. The first required an applicant to apply for a construction permit. Once the facility was fully constructed, the permit holder would apply for an operating license allowing them to operate the nuclear reactor.

In 1989, the NRC began allowing an alternate licensing process, called a combined operating license. Essentially, this combined the construction permit and operating license, applying certain conditions. Specifically, under the alternative licensing process, the licensee needs to obtain approval from the NRC prior to operating its nuclear power plant. There were also other licensing alternatives introduced in 1989, such as early site permits that allow an applicant to obtain approval for a reactor site and certified standard designs that can be used to preapprove "off-the-shelf" designs.

Technical reviews of the application are performed during the licensing process in a manner similar to the way design reviews are performed for vessels. There are essentially four groups involved with the review and final determination for construction permits, operating licenses, or combined operating licenses—the NRC staff, the Advisory Committee on Reactor Safeguards (ACRS), Atomic Safety and Licensing Board (ASLB), and the NRC's commissioners.

The NRC staff performs a review of the application against the requirements documented in regulation or endorsed within regulatory guidance. The output of the

NRC staff's review is a safety evaluation that presents a determination of whether all the NRC's requirements are met. Compliance with all of these regulatory requirements provides the presumption of reactor safety. The NRC also conducts an environmental review in accordance with the National Environmental Policy Act (NEPA).

ACRS, an advisory group of technical experts independent of the NRC staff, performs an independent review of construction permits, operating licenses, and combined operating licenses. This group's review includes a public meeting that discusses the NRC's safety evaluation. It then reports the results of its review to the NRC's five-member commission.

The ASLB's three-member panel, composed of one lawyer and two technically qualified persons, conducts a mandatory public hearing for construction permits. For operating licenses, a Federal Register notice is published to allow for the public to petition for a hearing if its interests will be affected. During the hearing, members of the public may submit written or oral statements to the licensing board to be entered into the hearing record. The review of licensing actions presents several opportunities for public involvement, notifications are made through the FR and other media outlets.

Inspection activities at commercial nuclear power plants are controlled through a process called the Reactor Oversight Program. The NRC uses the Reactor Oversight Program to inspect, measure, and assess the safety and security performance of commercial nuclear power plants, as well as to respond to declining performance of regulatory requirements at the facility. The NRC's inspection program starts with baseline inspections, which are the minimum level of inspection required to ensure plant safety and security. Inspections beyond the baseline program are performed in response to specific events at a plant or changes in a plant's performance. The commission maintains at least two resident inspectors that work full time at the plant performing inspection duties. The resident inspectors are aided by traveling inspectors from the NRC's regional offices to perform more specialized inspections or when additional inspection activities are required after an incident.

To ensure nuclear power plants have adequately qualified operators, the NRC licenses reactor operators and senior reactor operators using the procedures and criteria in 10 CFR Part 55. Applicants are required to, among other things, pass the requisite written examination and operating test. While not identical to the Coast Guard licensing process, there are parallels between the written examinations and demonstrations required by Standards of Training and Certification of Watchkeeping (STCW). Historically, operators have been licensed to a specific facility rather than a reactor type. Additionally, requirements exist for plant leadership to hold operator licenses to fulfill their duties.

Looking Backwards to Chart the Regulatory Course Ahead

As maritime and nuclear energy firms work together to deliver these conceptual designs into operations, one large unknown remains—the regulatory landscape by which these nuclear maritime assets will be overseen. Currently, there are two authorities with regulatory jurisdiction in the United States, the Coast Guard for vessels or barges, and the Nuclear Regulatory Commission for nuclear facilities.

This of course begs more questions. Aboard the vessel, where does the nuclear facility end and the regular aspects of the vessel begin? What special requirements will be placed on the vessel or barge to permit use of a nuclear reactor? How will operators be licensed? Two examples from the past may help illuminate a workable regulatory framework going forward—Nuclear Ship *Savannah* and the MH-1A *Sturgis*.

The Atomic Energy Act of 1954 declared:

… the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.

Christened in 1959, the NS *Savannah* became the world's first nuclear-powered cargo vessel when it was placed into service in 1962. The vessel was a break-bulk cargo vessel outfitted to carry a limited number of passengers and powered by a two-loop pressurized water reactor, rated for 70 MW (thermal), or enough power for the vessel to reach 20 knots. Ultimately, the hybrid cargo-passenger design did not prove economically feasible and no additional nuclear-powered cargo vessels were built. The ship was removed from active service in 1970, defueled in 1971, and the nuclear reactor rendered permanently inoperable in 1976, at which point it was placed into long-term protective status until active decommissioning activities started in the early 2020s.

In November 1952, the Army activated the Army Nuclear Power Division under the Office of the Chief of Engineers. While the Army ended up developing

multiple stationary, portable, and mobile designs, only one had a maritime aspect to it. The MH-1A program was contracted in 1961. The mobile high-power field reactor MH-1A, which later came to be named *Sturgis*, was planned to be a 10 MW (electric) nuclear power plant built on a floating vessel. The Army Corps of Engineers contracted with ABS to perform reviews of proposed vessels, which at the time was adequate for Coast Guard approval. While moored at Fort Belvoir, Virginia, the MH-1A reactor was brought online for the first time on January 25, 1967. The Army issued press releases announcing the world's first floating nuclear power station, designed to provide "emergency electric power to communities hit by earthquakes, hurricanes, and other peacetime disasters."

The *Sturgis* was deployed to the Panama Canal Zone to provide power to make up for power generation shortages. Arriving August 7, 1968, the *Sturgis* operated in support of the Panama Canal Zone from 1968 to 1976, but was plagued by chronic mechanical problems requiring redesigns and replacements of equipment, low operational availability, and a significant number of unplanned shutdowns, often referred to as Safety Control Rod Axe Man, or SCRAM.

Both the NS *Savannah* and the *Sturgis* were overseen by the Atomic Energy Commission, which had oversight authority for both military and civilian nuclear activities. The Energy Reorganization Act of 1974 split the functions of the Atomic Energy Commission between the newly established Nuclear Regulatory Commission and the Energy Research and Development Administration, which later became the Department of Energy. The NRC was assigned regulatory authority for civilian nuclear activities, specifically excluding military uses of nuclear power. The Department of Energy became responsible for the development and production of nuclear weapons, promotion of nuclear power, and other energy-related work. The regulations for both the Coast Guard and the NRC have been updated from those used for the *Savannah* and *Sturgis* projects due to safety and security incidents, development of innovative technologies, and changes in industry practices.

Comparison of Regulatory Approaches and Possible Gaps

Both the Coast Guard and NRC are ultimately attempting to achieve a acceptable level of safety and security in their regulatory domains. Each agency uses a regulatory framework that involves technical reviews of plans and follow-on inspection of activities, as well as licensing and/or credentialing individuals performing required safety functions. Titles 10 and 46 of the CFR show that both agencies use a mixture of deterministic and performance-based rules to achieve safety and security goals. As such, there seem to be no clear structural obstructions that would prevent the Coast Guard and NRC from sharing regulatory responsibility for civilian nuclear facilities located on vessels and/or barges. However, there are several areas where clear requirements do not appear to exist in regulations.

Siting

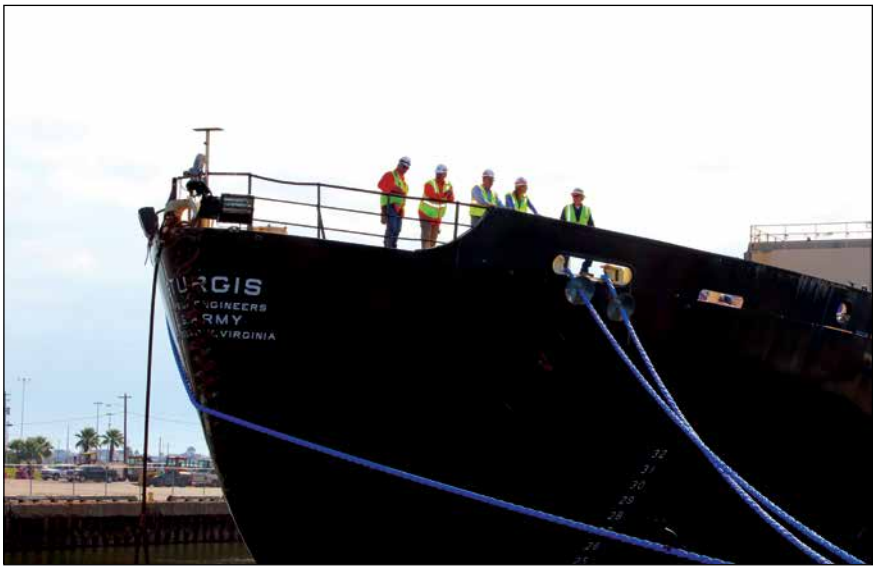
Licensing reviews for nuclear facilities are for a specific site with specific characteristics. Applicants must submit significant meteorological, hydrological, geographic, population, and other data to demonstrate the proposed site is suitable for a nuclear power plant. Once a site is selected, site information is used in emergency planning activities. Construction of a nuclear power plant onboard a vessel or barge presents three specific siting concerns—required characteristics of the vessel or barge, mobile nuclear power plants access to waterways, and

NS *Savannah* reaches the Golden Gate Bridge in 1962. The *Savannah* was the world's first nuclear-powered cargo vessel. Photo courtesy of the National Archives and Records Administration

emergency planning considerations.

Public Participation

All licensing activities performed by the NRC involve the public, and many important issues involve public meetings. The Coast Guard looks forward to a wealth of public stakeholder participation for future nuclear regulatory efforts. As requirements from the Coast Guard may affect the nuclear facility on board a vessel, and vice-versa, an adequate level of public involvement in Coast Guard activities may be necessary to support shared regulatory responsibility.



Army Corps of Engineers personnel from Galveston, Texas, and Baltimore districts discuss *Sturgis'* decommissioning progress aboard the vessel during a December 2015 site visit in Galveston. *Sturgis*, a former World War II Liberty Ship, was converted into the first floating nuclear power plant in the 1960s. Army Photo by Chris Gardner

Security Requirements

The NRC sets security requirements for nuclear power plants and for the handling of nuclear materials. Currently, these rules are focused on land-based facilities and do not consider maritime facilities. The Coast Guards sets security requirements for both vessels and port facilities. While these security requirements include the handling of hazardous material, such as nuclear materials, they do not take into account nuclear reactors being operated on board vessels, in port facilities, or waterways.

Operator Licensing

Currently, the Coast Guard licenses engineering officers based on horsepower rating, type of service, and type of propulsion plant. This style of licensure is broad enough to allow crews to move between vessels with little additional training or familiarization required. The NRC has traditionally licensed operators to a single facility. Additional flexibilities in operator licensing may be desired by industry to support operations vessels or power barges.

While requirements related to siting, public participation, security requirements, and operator licensing at this time appear to be missing necessary aspects to fully consider construction of nuclear power plants on vessels or barges, there may be others that are less evident. Defining these requirements will likely require policy decisions and rulemaking by the Coast Guard and the NRC. Additional coordination related to reviews of application for, and any inspection activities of, maritime nuclear power vessels or barges will also be required.

Recommended Course Forward

The Coast Guard and the NRC have adjoining jurisdictions for nuclear power plants on vessels or barges. There is a demonstrated interest in developing maritime nuclear facilities both domestically and internationally. A stronger working relationship between the regulatory activities of the Coast Guard and the NRC would benefit the public and the entities being regulated. Thus, establishing a memorandum of understanding between the Coast Guard and the NRC could help establish a clear boundary of authorities, identify critical rulemaking efforts, and establish procedures for handling related applications. The pace of work can be defined by continued levels of interest and related applications received.

Editor's note:
This article was prepared by employees of the U.S. Nuclear Regulatory Commission and U.S. Coast Guard on their own time apart from their regular duties. Neither agency has approved nor disapproved its technical content.

About the authors:
Michael E. Fitzgerald studied marine engineering at the U.S. Merchant Marine Academy. As a surface warfare officer in the Navy, he served onboard the USS Vicksburg (CG 69) and USS George H.W. Bush (CVN 77). As a civil servant, he has worked for the U.S. Maritime Administration, the Naval Sea Systems Command (NAVSEA), and is currently a reactor operations engineer at the Nuclear Regulatory Commission. Additionally, Michael holds Master of Science degrees in engineering management and mechanical engineering from Catholic University of America and is a licensed professional engineer.

LCDR Dimitri N. Weiner studied marine engineering at the U.S. Merchant Marine Academy. As a marine safety officer with the Coast Guard, he has served a marine inspector at Sector Miami and Marine Safety Unit Lake Charles, Louisiana, a staff engineer at the Coast Guard's Office of Design and Engineering Standards, and is currently the executive officer of Marine Safety Unit Port Canaveral. Dimitri holds Master of Science in engineering degrees in naval architecture as well as marine engineering and industrial and operational engineering from the University of Michigan.

172 Years of Mariner Credentialing

Adaptation to a changing world is the key to success

BY DAVID PROHASKA
Strategic Advisor
National Maritime Center
U.S. Coast Guard

On August 30, 2024, the nation marks the 172nd anniversary of the Steamboat Inspection Act of 1852. Passed in response to more than 20 years of steam boiler explosions, ship fires, and loss of life, the act established licensing requirements for engineers and pilots. To meet the threats and challenges of an increasingly mechanized and technologically advanced society, this early licensing program evolved into today's Mariner Credentialing Program with the aim of saving life, property, and marine resources and promoting strong maritime commerce.

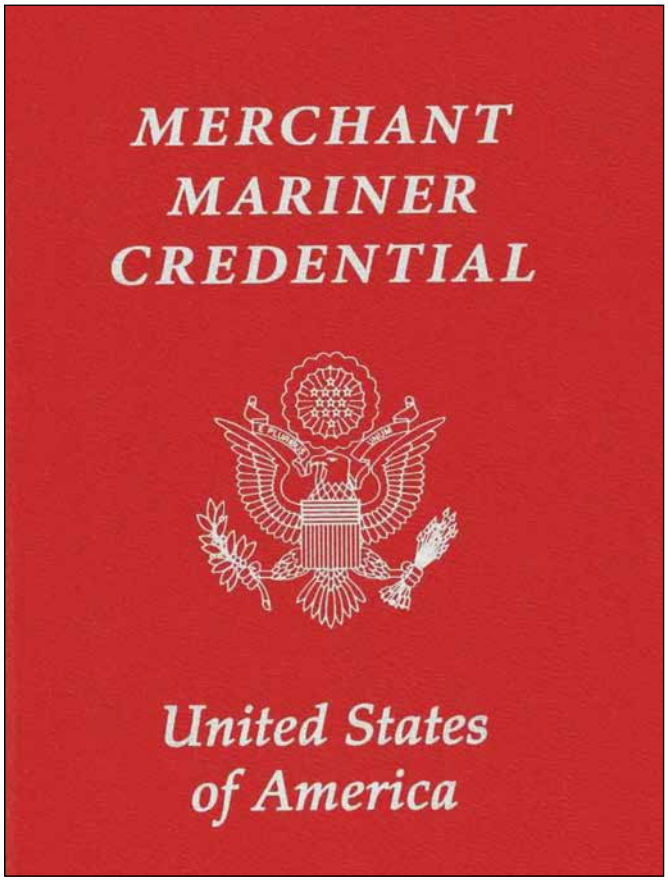
Today, in one of many efforts to protect the $5.4 trillion in economic activity generated by the maritime industry, the Coast Guard's National Maritime Center (NMC) evaluates mariner suitability and qualifications before issuing credentials. A key measure of regulatory success, the credential represents each mariner's competence and suitability to safely operate within their capacities. Though the look and feel of a mariner credential and the issuing agency may have changed since 1852, it is currently the Department of Homeland Security's responsibility.

Merchant Mariner Credentialing Program

The credentialing program continues to observe five key principles introduced in 1996 by Admiral James Card's Prevention Through People initiative:

- Honor the mariner: Seek and respect the opinion of those who "do the work" at sea and ashore
- take a quality approach
- seek nonregulatory solutions
- share commitment
- manage risk

Today's centralized Mariner Credentialing Program addresses risk through rigorous vetting of criminal history—including any record of sexual assault or sexual harassment—along with examining the National Driver Registry for information that will help NMC more thoroughly determine suitability to hold a credential. Mariners who apply for a credential are also thoroughly screened for professional qualifications, sea service, use of illegal substances, and training completion. They are also certified for medical fitness, which is a separate credential.



The National Maritime Center recently began issuing Merchant Mariner Credentials in the new 8.5" x 11" format. They are printed front and back on waterproof, tear proof synthetic paper. Photo courtesy of the National Maritime Center

A robust system of internal and external audits supports a culture of continuous improvement and reduces systematic nocompliance with the reglations. While risk is mitigated by auditing external training providers at the source before fraudulent activity can impact the public trust, the recently added compliance staff investigates potential misconduct based on reports of fraudulent training, credentialing, or medical certification.

The National Maritime Center

Under the late Senator Robert Byrd's auspices, the National Maritime Center successfully centralized in West Virginia in 2008. Since NMC's centralization in 2009, regulatory initiatives include the move to combine licenses and documents into a single, easy-to-carry conveyance. This was followed in late 2013 with updated codifying international standards that, in part, led to medical fitness being conveyed by a separate certificate.

NMC employees are committed to producing error-free, on-time results that meet requirements. So, it makes sense that, as technology continues advancing, NMC is working to make possible a web-based IT platform that will allow mariners to apply for a credential from anywhere in the world while minimizing application errors and wasted time.

The Mariner Credentialing Program engages often with industry through meetings, federal advisory committees, and the rulemaking process to satisfy a shared commitment and collaboratively ensure regulations observe the executive intent to minimize regulatory burden.

Conclusion

Even as we sail beyond 172 years of credentialing evolution, steadfast and vigilant work remains to be done every day by the dedicated mariner credentialing staffs. The NMC serves as a catalyst, honoring the mariner while strengthening the MTS on behalf of the nation.

About the author:
David Prohaska has served 48 years with the Coast Guard, the past 15 have been in a civilian capacity with the National Maritime Center where he is currently a strategic advisor.

References:
46 U.S.C. 7510(d): Merchant Mariner Credential means: "license, certificate, or document"
United States Coast Guard Strategy, 2022
Coast Guard Publication 1 (2014)

The Coast Guard takes many steps to ensure the safety and viability of the Marine Transportation System including issuing individual mariner credentials and conducing port state control examinations like the one on this 472-foot Singapore-flagged commercial cargo vessel *Kota Raja* in the Port of Guam in June 2023. A Coast Guard Forces Micronesia Sector Guam team conducted the examination. Coast Guard photo by Chief Warrant Officer Sara Muir

Advancing the Safety, Security, and Efficiency of the Marine Transportation System

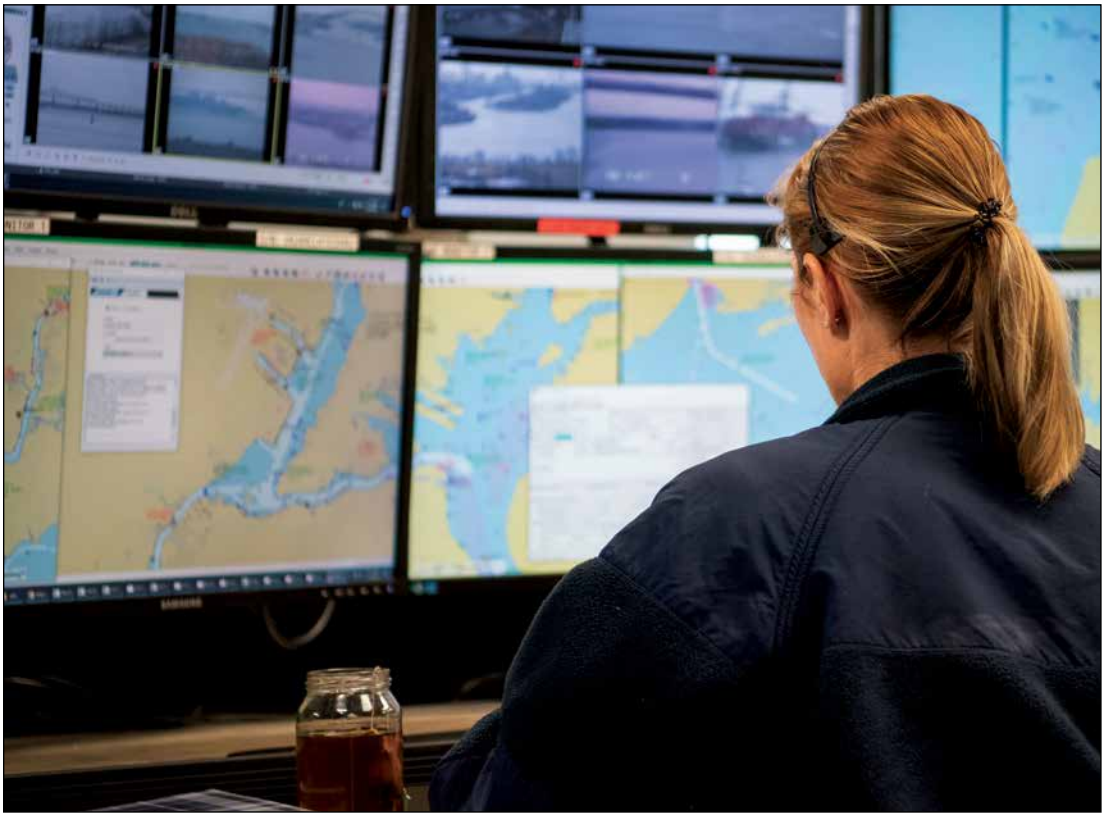
BY LT KRISTOPHER ELEAZER
Waterways Risk Assessment Project Officer
Navigation Center
U.S. Coast Guard

The Coast Guard Navigation Center (NAVCEN) is a command within the Marine Transportation Systems Management Directorate. It brings together a unique set of specialists and capabilities to data in support of waterways management activities. The NAVCEN's team of 53 uniformed and civilian members drawn from technical domains including prevention and afloat officers, operations specialists, data analysts, and programmers is located in Alexandria, Virginia. This diverse group of experts provides information products and services for waterways managers and users that inform maritime governance and improve the safety and efficiency of the Marine Transportation System (MTS).

NAVCEN is on the forefront of the effort to update and inform decision-making within waterways management by developing systems to provide quantitative rigor to historically qualitative waterways assessments. At the same time it presents spatial representation of existing Marine Safety Information (MSI).

One example of NAVCEN's efforts to facilitate data-driven decision-making is the analysts' employment of Automatic Identification System (AIS) data to review vessel movements and illustrate waterway use. These examinations of historical vessel data help identify emergent trends in an area of operations and can also be used to ensure broadcast AIS compliance. NAVCEN data products have helped waterways managers determine sites for new anchorages, graphically present marine closure areas for space launch and recovery activities, develop traffic routing measures, and engage with port partners

Ships wait in Astoria bay, Oregon, in December 2021 for their turn to transit up the Columbia River to load cargo. The Coast Guard Navigation Center is responsible for providing data and services that help waterways managers do their jobs effectively. Ian Thompkins | iStock/Getty Images Plus



Coast Guard operations specialists from Vessel Traffic Service New York monitor commercial traffic in New York Harbor in January 2022. The Vessel Traffic Service relies on information from Automatic Identification Systems to provide active monitoring and navigational advice for vessels in particularly confined and busy waterways. Coast Guard photo by Petty Officer 3rd Class Ryan Schultz

and stakeholders.

To further bolster the safety and efficiency of the MTS, NAVCEN's Waterways Risk Assessment Division facilitates Ports and Waterways Safety Assessment (PAWSA) workshops across the United States. The primary objective of these workshops is to improve the cooperation between government agencies and the private sector. Workshop participants, including port partners and stakeholders, work collaboratively to identify risk factors within a given waterway and evaluate potential mitigations. Participants are dynamically engaged to ensure environmental, public safety, and economic impacts are fully represented when identifying risk interventions.

NAVCEN is also involved in the distribution of navigation safety information products. Its Marine Safety Information Distribution Division manages a dedicated website that is critical to the Coast Guard's ability to publicly release MSI and data products to waterway users. The division continuously maintains and updates the website to ensure the timely and reliable dissemination of navigation information including: the Light List, Local Notice to Mariners, International Ice Patrol products, GPS Ephemeris Data, GPS Constellation status information, and public notices for bridges.

Team members at NAVCEN are also responsible for receiving inquiries and reports from MTS stakeholders and civil GPS users. Operations specialists assigned to NAVCEN maintain a 24-hour watch to ensure the reliability of critical systems including GPS and vessel tracking. These watch standers monitor the performance of the Long-Range Information and Tracking (LRIT) system and receive disruption reports from civil GPS users, coordinating the response with partner agencies.

Since its origins managing the Omega navigation system, a worldwide radio system used primarily for maritime navigation and operated from 1968 to 1997, NAVCEN has continuously evolved over the decades to modernize navigation information services for maritime professionals. Today, it centralizes the various capabilities and areas of expertise necessary to provide waterway managers and users the means to make data-driven decisions with authoritative and accessible information products. In the future, NAVCEN's tradition of innovation will continue to provide waterways managers and stakeholders the tools needed to meet the challenges of an increasingly complex and technology-driven MTS.

About the author:
LT Kristopher Eleazer graduated from the U.S. Coast Guard Academy in 2018. Upon commissioning, he reported to the Coast Guard Cutter Forward, *a 270-foot medium endurance cutter homeported in Portsmouth, Virginia, serving as the ship's assistant navigator. In 2020, LT Eleazer transferred to Marine Safety Detachment Panama City, Florida, as an apprentice marine inspector. In 2023, he transferred to his current unit, the Coast Guard Navigation Center, and serves as a waterways risk assessment project officer.*

From West Virginia's Mountain Ridges to Ship Bridges

Certificates of documentation and the National Vessel Documentation Center

BY CHRISTINA G. WASHBURN
Director
National Vessel Documentation Center
U.S. Coast Guard

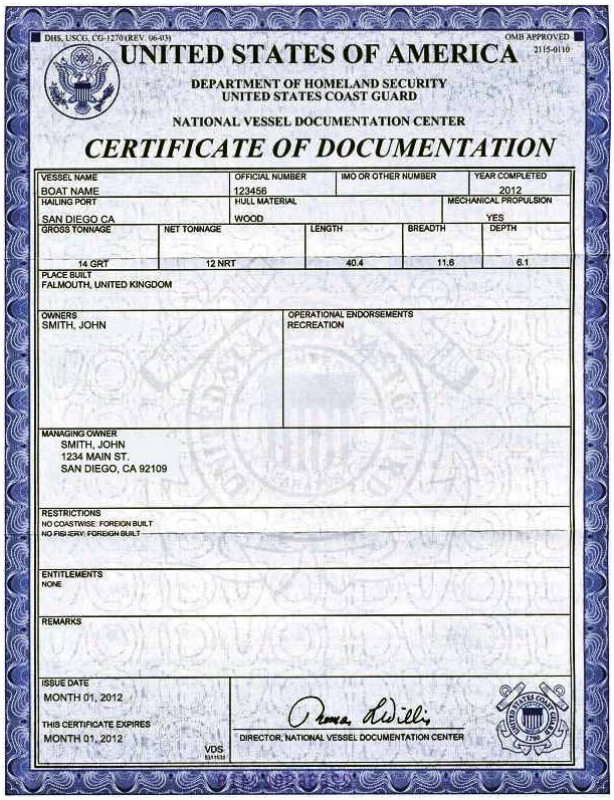
National Vessel Documentation Center's Mission Statement: *To facilitate maritime commerce and vessel financing while protecting the economic privileges of U.S. citizens through the enforcement of regulations and to also provide a register of vessels available in time of war or emergency to defend and protect the United States of America.*

The next time you step on a U.S.-flagged vessel for an inspection, investigation, or vacation, look for the vessel's Certificate of Documentation (COD), typically displayed below deck, camouflaged with the scenery. While this document largely goes unnoticed—even by the crew—it is an essential document for the vessel's operation.

While on vacation last fall, I boarded a sunset cruise in the Florida Keys. The combination of a fully staffed crew training new deckhands and minimal passengers gave our family lots of time to interact with the crew while enjoying the sailing experience. When visiting the cabin below deck, I pointed to the framed COD and commented that it was issued out of my office. At first, they thought I was telling my own sea story. I countered that, in fact, that was my signature on the document. They laughingly provided a pen and paper, challenging me to sign and prove it. After comparing signatures and confirming my authenticity, they excitedly asked more about the COD process and experience working for the Coast Guard. Given three of the four passengers onboard work in the prevention program, energetic conversation ensued, all espousing the love of our professions.

That encounter reminded me how distant certain documentation processes can feel. Vessel owners know they need a COD to legally operate, and some are more familiar with the documentation process than others. But how applications are processed and from where a COD is issued was more of a mystery. The crew was surprised to learn that a team of 94 dedicated civilian employees in an unexpected location—the U.S. Coast Guard National Vessel Documentation Center (NVDC) in Falling Waters, West Virginia—was the source.

Falling under CG-5PC's Inspections and Compliance directorate, NVDC processes approximately 350,000 applications per year and issues a variety of documents including CODs, Abstracts of Title (A/Ts), and Certificates of Ownership (COOs). CODs are required for vessels weighing at least five net tons and operating in coastwise trade or fishing activities on navigable waters of the United States, or in the Exclusive Economic


DHS, USCG, CG-1270 (REV. 06-03) OMB APPROVED 2115-0110

UNITED STATES OF AMERICA

DEPARTMENT OF HOMELAND SECURITY
UNITED STATES COAST GUARD

NATIONAL VESSEL DOCUMENTATION CENTER

CERTIFICATE OF DOCUMENTATION

VESSEL NAME	OFFICIAL NUMBER	IMO OR OTHER NUMBER	YEAR COMPLETED
BOAT NAME	123456		2012
HAILING PORT	HULL MATERIAL		MECHANICAL PROPULSION
SAN DIEGO CA	WOOD		YES

GROSS TONNAGE	NET TONNAGE	LENGTH	BREADTH	DEPTH
14 GRT	12 NRT	40.4	11.6	6.1

PLACE BUILT
FALMOUTH, UNITED KINGDOM

OWNERS
SMITH, JOHN

OPERATIONAL ENDORSEMENTS
RECREATION

MANAGING OWNER
SMITH, JOHN
1234 MAIN ST.
SAN DIEGO, CA 92109

RESTRICTIONS
NO COASTWISE: FOREIGN BUILT
NO FISHERY: FOREIGN BUILT

ENTITLEMENTS
NONE

REMARKS

ISSUE DATE
MONTH 01, 2012

THIS CERTIFICATE EXPIRES
MONTH 01, 2012

VDS

DIRECTOR, NATIONAL VESSEL DOCUMENTATION CENTER

Zone. CODs are optional for the same vessels when they are used for recreational purposes.

Although it lacks the fame of some of the Coast Guard's more widely recognized missions, vessel documentation is an extremely important program with roots that run deep. The establishment of the current facility in August 1995 makes NVDC seem new, but its origins are older than the Coast Guard itself, with the documentation of vessels dating back to the First Congress of the U.S. government.[1]

Federal documentation provides conclusive evidence of nationality for international purposes, supports unhindered commerce between the states, and admits vessels to certain restricted trade opportunities, such as coastwise trade and the fisheries. NVDC also serves as custodian to many historical documents and books, such as the Register of House Flags, Funnel Marks and Night Signals of American Vessels and Foreign Steamship Lines. These items, dating back to 1883, were passed down from the various departments and offices under which the program has operated. If you're ever fortunate enough to visit the NVDC, you'll see vessel certificates dating back to 1799 and 1833, signed by John Adams and Andrew Jackson, respectively, hanging in the reception area.

Petty Officer 2nd Class Omar Borges, a Coast Guard marine science technician at Sector San Juan, Puerto Rico, inspects a vessel thrown onto a beach in St. Croix, U.S. Virgin Islands, by Hurricane Omar in 2008. If the vessel carried a Coast Guard Certificate of Documentation, the vessel's owner could be contacted regarding next steps. Coast Guard photo by Petty Officer 3rd Class Barry Bena

The NVDC is also charged with reviewing U.S. and foreign ship rebuild requests, wrecked vessel and new vessel ruling requests. Additionally, it issues Bowater Certificates of Compliance, which are special waivers for certain foreign-owned companies, and Oil Spill Response Letters of Qualification. NVDC staff also work with law enforcement and other agencies to provide vessel/owner information and respond to Freedom of Information Act requests.

Instituted in 1789 to facilitate commerce between the newly established states, and to certify vessel nationality for international objectives, the vessel documentation program has continued to grow. Its current state is the result of years of labor-intensive, time-consuming, and meticulous record-keeping. Services once performed via telegrams or visits to U.S. ports can now be accomplished electronically from one centralized location in Berkeley County, West Virginia.

About the author:
Christina Washburn began her career with the Coast Guard in 1998, working in both the Mariner Licensing and Vessel Documentation programs. She holds a Bachelor of Science in computer science and Master of Science in strategic leadership degree, and currently serves as the director of the National Vessel Documentation Center in Falling Waters, West Virginia.

Endnote:

1. 11th Act of the First Congress, Chapters XI and XXI

The Marine Safety Center

Providing the Coast Guard's prevention and response missions with engineering capabilities

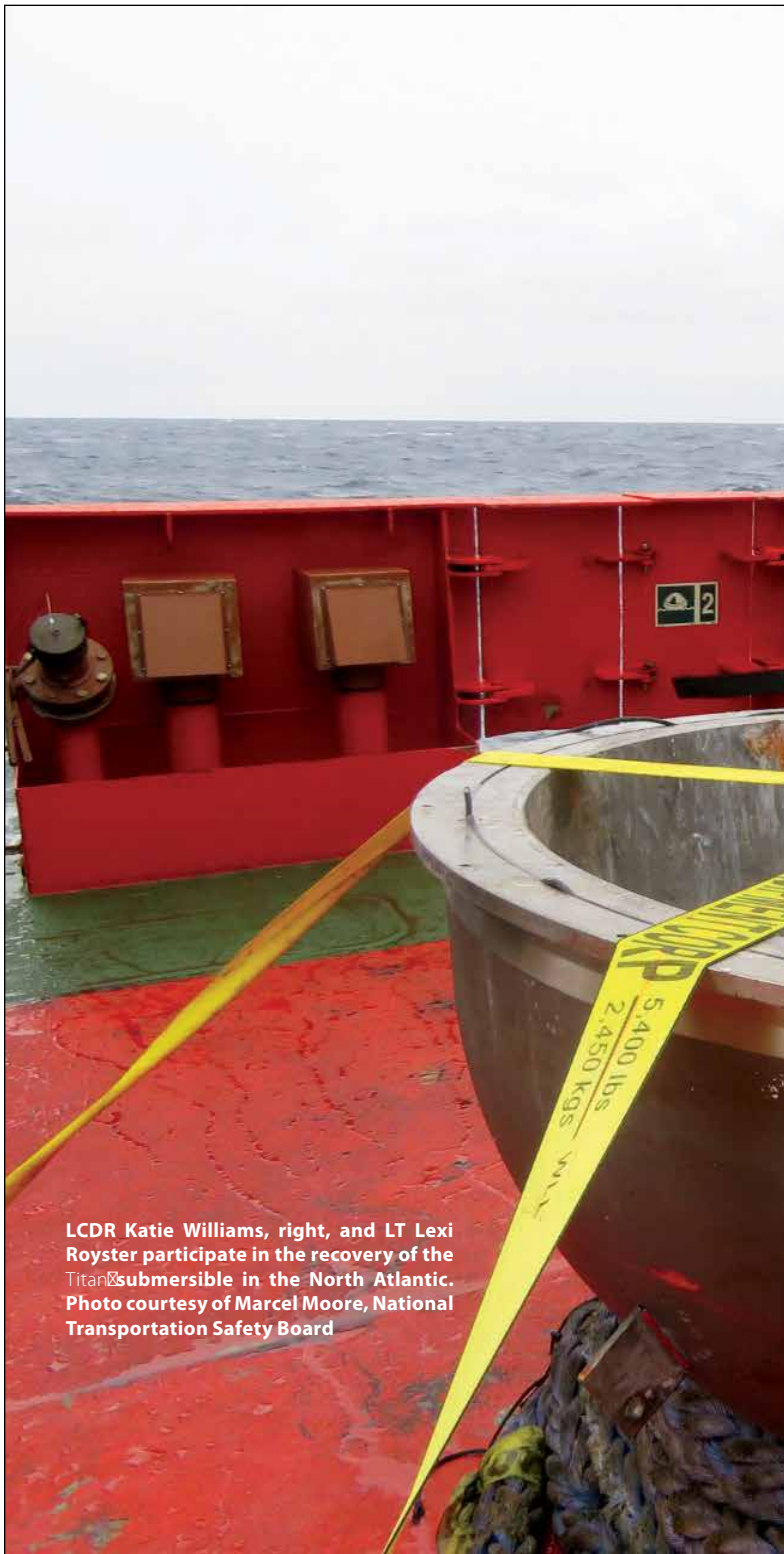
BY CAPT ROBERT C. COMPHER, P.E.
Commanding Officer
Marine Safety Center
U.S. Coast Guard

The Marine Safety Center (MSC) supports the people and objectives of the marine safety, security, and environmental protection programs through the verification of compliance with technical standards for the design, construction, alteration, and repair of commercial vessels. The MSC is an independent headquarters command that was established in 1986 by consolidating the Coast Guard Merchant Marine Technical offices located in New York, New Orleans, Cleveland, and San Francisco. Currently, the MSC has a complement of 33 officers, 31 civilians, and six contract employees, forming a team highly educated and trained across a wide variety of engineering disciplines.

The MSC's primary mission is the review and approval of plans for the design, construction, alteration, and repair of U.S. and foreign flag commercial vessels subject to U.S. laws, regulations, and international standards. The MSC coordinates these actions with Coast Guard sector commands and marine safety units and works closely with the maritime community, including naval architects, marine engineers, vessel classification societies, and the shipbuilding industry. In an average year, MSC processes approximately 18,000 plans in support of the commercial vessel industry's new construction and repair activities.

The MSC is also responsible for the oversight of third parties that have been authorized to review and approve commercial vessel designs on behalf of the Coast Guard. This is in addition to serving as the approval authority for all security plans for U.S. vessels under the Maritime Transportation Security Act.

In addition to its primary duties, the MSC supports Coast Guard field commanders by providing emergency salvage engineering assistance and post-casualty forensic engineering analysis. The MSC's Salvage Engineering Response Team (SERT) is at the ready 24 hours a day to rapidly evaluate a vessel's stability and structural integrity following a grounding, collision, or similar casualty. The SERT works closely, remotely or on-scene, with Coast Guard strike teams, Navy salvage teams, classification societies' rapid response teams, naval architects,



LCDR Katie Williams, right, and LT Lexi Royster participate in the recovery of the Titan submersible in the North Atlantic. Photo courtesy of Marcel Moore, National Transportation Safety Board

and engineers to protect life, property, and the marine environment. Throughout its 38-year history, the MSC has become an increasingly vital Coast Guard resource in its primary prevention role, as well as its role in supporting emergency response operations. Engineering capability is at the core of prevention expertise and provides a foundation for each component of the marine safety mission. As the Marine Transportation System expands, and vessels and engineering systems become larger and more complex, it is critical to understand the regulated industry and drivers of new technology. The MSC fills this gap and has maintained a high level of engineering expertise while adapting to meet the changing needs of the marine industry, Coast Guard field commanders, and evolving marine safety, security, and environmental protection programs.

About the author:

Captain Robert C. Compher is a career prevention officer and marine safety engineer. He has served in the Coast Guard for 27 years and is currently the commanding officer of the Coast Guard Marine Safety Center in Washington.

Assessment

Navigating New Waters

The Coast Guard's integration of geospatial visualization in rulemaking

by Evan Morris
Data Scientist
Office of Standards Evaluation & Development
U.S. Coast Guard

In the process of rulemaking, data plays an integral role. It serves as the foundation upon which sound, evidence-based regulations are built, ensuring that policies not only address current challenges but also anticipate future needs. This principle is echoed in the tenets of Executive Order (EO) 12866, which underscores the necessity for regulations to be founded on the most recent, appropriate, transparent, and authoritative data available. The use of high-quality data ensures regulatory actions are targeted and proportionate, while minimizing unintended consequences and maximizing societal benefits. Furthermore, transparency in the data used for rulemaking fosters public trust and encourages stakeholder engagement, creating a more inclusive and responsive regulatory environment. Thus, the integration of rigorous data analysis into the rulemaking process is indispensable for achieving the balance of regulatory objectives, stakeholder needs, and the public interest.

The Coast Guard recently created the Office of Data and Analytics, which ensures homogenized standards for data management and infrastructure across the organization. This office enables mission leaders to ask specific questions and get the answers they need more quickly by establishing four Coast Guard data governance roles:

- data owner
- data steward
- data supervisor
- data operator

In the Office of Standards Evaluation and Analysis, we are data stewards and operators. We collect and manage most of the assistant commandant for Prevention Policy's commercial regulations and standards data, focusing on data collection, sanitization, transformation, and reporting. This includes being stewards of, but not limited to, Marine Information for Safety and Law Enforcement (MISLE) data, port call data, mariner credential data and Coast Guard rulemakings. Like most government agencies and private corporations, there are challenges with data management, particularly in ensuring the relevance and accuracy of data amidst rapidly changing mediums for recording data and ensuring accuracies in data capture. Additionally, balancing the need for comprehensive data collection with concerns for privacy and security remains a critical hurdle requiring meticulous attention to detail and robust safeguards to maintain the integrity and trustworthiness of the rulemaking process.

In our ongoing effort to enhance maritime safety and environmental stewardship, the Coast Guard has developed a comprehensive geographic information systems (GIS) dashboard, leveraging the MISLE database. This innovative tool serves as a public resource in visualizing and understanding significant maritime incidents over the past decade. By cataloging events that resulted in substantial property damage, injuries, or fatalities, the dashboard provides an overview of maritime incidents which facilitates a deeper analysis of trends, patterns, and areas requiring focused attention. The underlying data comes from MISLE which captures an array of data collected by Coast Guard offices, including vessel inspections, marine casualties, pollution incidents, and enforcement actions. In the case of this GIS initiative, the Coast Guard focuses on significant marine casualties to

What is an Executive Order?

Executive orders in the United States are directives issued by the president to federal administrative agencies, often used to guide the operations of the government. They are rooted in the Constitution, which grants the president broad executive powers. This practice has been a tool for presidents to implement policy and manage the federal government's operations without the need for congressional approval.

Title: Executive Order #12866: Regulatory Planning and Review
Author: The White House
Date: June, 1994

THE WHITE HOUSE

Office of the Press Secretary

September 30, 1993

EXECUTIVE ORDER #12866

REGULATORY PLANNING AND REVIEW

The American people deserve a regulatory system that works for them, not against them: a regulatory system that protects and improves their health, safety, environment, and well-being and improves the performance of the economy without imposing unacceptable or unreasonable costs on society; regulatory policies that recognize that the private sector and private markets are the best engine for economic growth; regulatory approaches that respect the role of State, local, and tribal governments; and regulations that are effective, consistent, sensible, and understandable. We do not have such a regulatory system today.

With this Executive order, the Federal Government begins a program to reform and make more efficient the regulatory process. The objectives of this Executive order are to enhance planning and coordination with respect to both new and existing regulations; to reaffirm the primacy of Federal agencies in the regulatory decision-making process; to restore the integrity and legitimacy of regulatory review and oversight; and to make the process more accessible and open to the public. In pursuing these objectives, the regulatory process shall be conducted so as to meet applicable statutory requirements and with due regard to the discretion that has been entrusted to the Federal agencies.

Accordingly, by the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Statement of Regulatory Philosophy and Principles.

a. The Regulatory Philosophy. Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve

focus on the subset of casualties that required significant resources and to eliminate any potential white noise in the data. This initiative not only underscores our commitment to safeguarding our waters but also enhances transparency, allowing for informed decision-making and public engagement in maritime safety efforts.

Alignment with the Evidence Act

The creation and deployment of the significant maritime incident dashboard are in line with the principles of the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act), and in line with the principles of transparency and reproducibility championed by EO 12866. By systematically organizing and presenting data on maritime incidents, the dashboard exemplifies the Coast Guard's commitment to evidence-building activities, as mandated by the Evidence Act. This initiative reflects our commitment to improving access to data, expanding our evaluation capacity, and ensuring that our policymaking processes are informed by reliable, empirical evidence. This dashboard can help facilitate agency coordination, enhancing our ability to use data in crafting policies that bolster maritime safety and environmental protection more easily with other interested government agencies.

Furthermore, the Evidence Act's emphasis on open data and the strategic use of information is mirrored in our approach to developing and enhancing the dashboard. By making our data publicly available and easily interpretable, we are not only adhering to the Open Government Data Act provisions but also fostering a culture of transparency and accountability. The dashboard serves as a commitment to these principles, enabling stakeholders and the public to access the publicly available information that influences maritime safety policies and practices. This information is simply repackaged data from our publicly available Port Information Exchange Database, however, it is presented visually and is much more easily ingestible for any end user.

Future Expansion and Geographic Responsibilities

Looking ahead, the Coast Guard is committed to expanding the use of GIS dashboards to encompass other critical facets of the MISLE database, notably incidents of oil spills. This expansion aligns with our strategic goals of enhancing maritime safety, protecting the marine environment, and providing a clear, comprehensive view of the challenges and threats facing U.S. territorial waters. By integrating additional data layers and analytics into our GIS dashboards, we aim to provide a more holistic view of our operational landscape, enabling more nuanced analysis of MISLE data. The Coast Guard plans on publishing notices of intent for our data initiatives, and we encourage public input in shaping the direction of the type of data they would like to see, as well as the medium in which to present that data.

Conclusion

In conclusion, the Coast Guard's forward-thinking approach in presenting data through the GIS spatial dashboard and other initiatives underlines our dedication to maritime safety, environmental protection, and transparent governance. By meticulously managing, analyzing, and sharing data, we not only uphold the ideals of the Evidence Act and EO 12866, but also foster a culture of accountability and informed decision-making.

As we expand our data endeavors, incorporating public feedback and embracing the dynamic nature of data management, we continue to pave the way for innovative, data-driven solutions. These efforts not only enhance our operational effectiveness but also strengthen the trust and collaboration between the Coast Guard, other government agencies, and the public we serve. In this journey, our commitment remains unwavering. We leverage the power of data to safeguard our maritime domain, ensuring a safer, more secure, and sustainable future for all.

About the author:

Evan Morris has been a data scientist with the Office of Standards Evaluation and Analysis with a specialization in business analytics. He graduated with a masters degree in international commerce from George Mason University in 2013. He then pursued a technical degree in business analytics from numerous accredited universities online programs.

For more information

Access the Significant Maritime Incidents tool at: www.arcgis.com/apps/dashboards/ef53a8bb76e2415696e56a718888619b

The Port Information Exchange Database can be found at: cgmix.uscg.mil/PSIX/Default

The Feedback Loop

How investigations inform regulations

BY LCDR CHAD YEAMANS
Commanding Officer
Investigations National Center of Expertise
U.S. Coast Guard

LCDR GIM KANG
Attorney Advisor
Investigations National Center of Expertise
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On a frigid December night in 2019, the fishing vessel *Scandies Rose* and its crew departed Kodiak, Alaska, bound for the Bering Sea. The 116-foot fishing vessel, publicly recognized for its appearances in the popular show *The Deadliest Catch*, was a reputable workhorse of the Alaskan crab fleet.

The planned voyage took the *Scandies Rose* along the south side of the Alaskan Peninsula, an area known for its fierce weather systems with intensely cold winds blowing out of the numerous inlets and coves. The vessel's captain was aware of the National Weather Service forecasts, which included gale force winds and heavy freezing spray, conditions that were unpredictable and could have deadly consequences for even the most experienced mariners. Still, the vessel proceeded along its track as it transited from the Shelikof Strait toward False Pass and the Bering Sea.

Between 6 a.m. and 8 a.m. on the morning of December 31, the crew reported the initial signs of ice accumulating on their crab pots and exterior of the vessel. Undeterred, the vessel maintained its course and speed in the gradually worsening conditions No attempts were made to

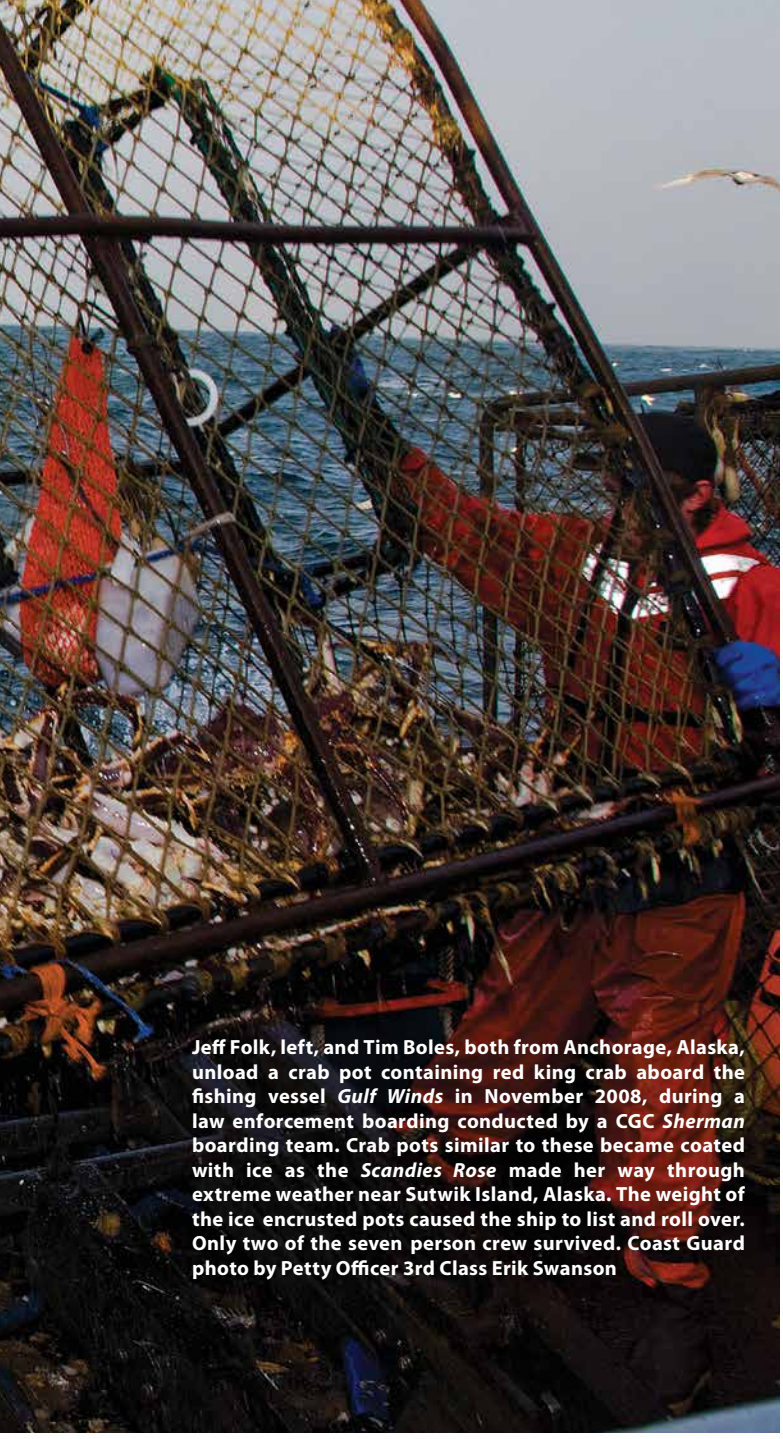
The 130-foot crab fishing vessel, *Scandies Rose*, sank near Sutwik Island, Alaska, on December 31, 2019. Seen here moored in Seattle, the vessel was homeported in Dutch Harbor, Alaska. Courtesy photo by Erling Jacobsen

reduce the accumulation of ice through course change or through manual ice removal by the crew.

At around 7:15 pm, the vessel's captain woke for watch and noticed the vessel had begun to list to starboard. He proceeded to place a series of cellphone calls and the tone of his voice on each call reflected the seriousness of the situation onboard. Upon completion of a final call, the captain noted that they were experiencing a 20-degree list to starboard, 60-70 knot winds, and a temperature of 12 degrees Fahrenheit. He decided to seek shelter, and the *Scandies Rose* altered course for the protected side of Sutwik Island, just 2.5 miles north of their position. At 9:45 p.m., the vessel altered course again, this time towards the head of Sutwik Island.

In a final conversation with another fishing vessel, the *Pacific Sounder*, the captain, with a noteworthy tone of stress in his voice, explained that the list had worsened. Only minutes later, he could be heard over a VHF radio mayday call announcing, "We are rolling over." In a final desperate act, he was heard reading out his vessel's GPS position before communications were lost.

The Coast Guard Sector Anchorage and National Command Centers were engaged, and an expansive search and rescue operation was launched that included both helicopters and fixed wing aircraft. Amazingly and despite the terrible conditions, two of the seven-person crew were able to don survival suits and were found by a Coast Guard helicopter four hours later. Despite mild



Jeff Folk, left, and Tim Boles, both from Anchorage, Alaska, unload a crab pot containing red king crab aboard the fishing vessel *Gulf Winds* in November 2008, during a law enforcement boarding conducted by a CGC *Sherman* boarding team. Crab pots similar to these became coated with ice as the *Scandies Rose* made her way through extreme weather near Sutwik Island, Alaska. The weight of the ice encrusted pots caused the ship to list and roll over. Only two of the seven person crew survived. Coast Guard photo by Petty Officer 3rd Class Erik Swanson

hypothermia, both survived. Yet at 6:08 pm on January 1, 2020, the Coast Guard suspended the search and rescue operations without having located any additional survivors. The five missing crew members were never found.

The Coast Guard convened a Marine Board of Investigation (MBI), the highest level of marine casualty investigation, to look into the events surrounding the loss of the *Scandies Rose*. Through the course of the extensive investigation, the MBI identified witnesses, conducted interviews, and collected hundreds of pieces of evidence. Electronic navigation data was gathered from automated identification sites and GPS, processed, and then plotted to gain a thorough understanding of the vessel's exact track, course, and speed. In Seattle, a three-member board of Coast Guard officers alongside representatives from the National Transportation Safety Board (NTSB) received 10 days of exhaustive verbal testimony from survivors, industry experts, and naval architects as part of a public hearing.

Additionally, the Coast Guard conducted a first-of-its-kind scientific study of ice accumulation on Bering Sea crab pots. The MBI partnered with the Army Corps of Engineers and the Coast Guard Research and Development Center to design and run a full series of tests at the Cold Regions Research and Engineering Lab in Hanover, New Hampshire. The team tested ice accumulation on these pots in a special chamber kept below zero degrees and tracked the thickness and the weight of ice buildup across several different scenarios.

The weight of the accumulated ice far exceeded the expectations of researchers. In different trials, the study showed "the weight of the ice accreted in the pots equaled or exceeded the pot's original weight." In one preliminary test conducted on board a Coast Guard icebreaker in the Arctic, researchers placed a single crab pot on the deck and watched as within a matter of hours the ice accumulation was so thick and heavy that the crane designated to weigh the pot could no longer lift it, meaning the total weight of the pot was more than two times the original weight of the pot itself. These experiments provided another fascinating insight: The total weight did not appear to be related to accumulation thickness, implying that a visual inspection or visual evaluation could not accurately tell the observer how dangerously heavy a pot was becoming. Armed with these lessons learned, the results of the ice study could serve as a baseline for a paradigm shift in the Coast Guard's fundamental understanding of ice and the impact of its accumulation.

While many other contributing factors were identified and can be reviewed in the full report of investigation, upon conclusion of the investigation, the MBI ultimately determined that the primary causal factors that contributed to the casualty included:

- a failure to take action to prevent excessive ice accumulation
- the unsafe stability conditions due to inaccurate stability instructions
- the vessel carrying near the maximum number of crab pots permitted
- the excessive weight of ice accumulation
- a lack of effective stability regulations that do not accurately account for the asymmetrical nature of icing

Finally, as is the case in many Coast Guard marine casualty investigations, the Marine Board made several safety recommendations. These recommendations

ranged from establishing working groups to drafting a series of tasks to address the specific issues identified in the case of the *Scandies Rose*. Other recommendations included clarifying existing regulations or procedures and promoting the use of properly installed and configured Digital Selective Calling, or DSC. As a result, the Coast Guard, state of Alaska, and members of the Alaskan fishing community have begun taking steps in accordance with these recommendations. At the time of this writing, the Marine Exchange of Alaska has already installed the support infrastructure for DSC at over 70 sites along the Alaskan coastline.

A Dark History

The story of the tragic loss of the *Scandies Rose* serves as just one recent example of how the marine casualty investigations mission fulfills a critical role within the Coast Guard and the Maritime Transportation System. The program has been a vital arm of marine safety since 1838 when the program's predecessor, the Steamboat Inspection Service, was established. In 1832 alone, about 14 percent of the steam vessels in operation were destroyed by explosions, killing more than 1,000 people. These explosions occurred largely because there were no inspection laws or rules of navigation. In some cases, mariner incompetence, negligence, misconduct, or all three were causal factors. It was Congressman James Sener, of Virginia, that eventually sponsored the legislation creating the modern marine investigations program on June 20, 1874. Yet the mission and the Coast Guard has continued to evolve. Over the next 200 years, some of the most terrible maritime accidents in history were examined by the Coast Guard or its agency predecessors. The *General Slocum*, *Eastland*, and *Grandcamp*, casualties of the early 20th century, resulted in the loss of thousands of lives. The loss of the *Edmund Fitzgerald* in November 1975 became nautical folklore and highlighted the dangers of November storms on the Great Lakes.

The SS *Marine Electric* sank off the coast of Virginia in 1983, and the investigation resulted in some of the most important maritime reforms in U.S. history, including tightened inspection regulations, mandatory survival suits, as well as helping create the now famous Coast Guard rescue swimmer program. In 2015, the motor vessel *El Faro* was lost at sea along with her entire crew when it travelled into the eye of Hurricane Joaquin. The subsequent investigation resulted in the creation of a new office at Coast Guard headquarters responsible for Flag State Control and changed how the Coast Guard approached Military Sealift Command ships and the commercial inspections Alternative Compliance Program.

Coast Guard investigators responded to and investigated thousands of marine casualties, a longstanding tradition that originated in the era of the steam ships, but it was not until the casualty and oil spill of the *Cosco*

Addressing the Human Element Post-Incident

It is worth noting that safety recommendations are not the only way the investigations mission addresses public safety issues post incident. Certainly, identifying and correcting mechanical malfunctions and environmental realities are important ways to ensure our waterways are safer. Often, however, it is human behaviors that have also played a significant role in causing or contributing to an incident. Therefore, the Coast Guard has been using a process known as "suspension and revocation" to correct these human behaviors for over a 100 years.

After a marine casualty investigation is complete, the Coast Guard can and does take action to suspend or revoke mariner credentials, licenses, and documents to further enhance safety at sea. This is a practice that the Coast Guard and its predecessors have overseen since 1911, when the first revocation happened in the case of the Manhattan. In that case, the license of a towing vessel operator was revoked after being found at fault for a barge collision and upon appeal, the federal courts upheld the revocation finding that "willful violation of regulations issued pursuant to [federal law] in the manner now prescribed for incompetency, misconduct, or unskillfulness," were appropriate grounds for license forfeiture. Since those days, Title 46 United States Code, Chapter 77, and 46 CFR Part 5 have been broadened to include several more bases for suspension and revocation though "incompetency, misconduct, and unskillfulness," now called negligence, remain.

It is important to emphasize that these, and other bases for suspension and revocation, are remedial in nature. That is, the point is not for the mariner to get arrested or go to jail if they are found to have operated their vessel unskillfully. The ultimate goal of the suspension and revocation program is to remove those mariners who are unsafe, remediate those behaviors that make them unsafe, and then allow them to return to operating on the waterways, if possible. In some cases, there is no remediating certain behaviors and the only adequate means to ensure waterway safety is to remove that mariner permanently by revoking the credential.

Busan, that the Coast Guard marine casualty investigation mission itself would become the target of an investigation.

Enter the NCOEs

The nation was still heavily engaged in the Global War on Terrorism when the events surrounding the *Cosco Busan* unfolded in the San Francisco Bay area.

On November 7, 2007, at 8:30 a.m., the motor vessel *Cosco Busan* was proceeding in heavy fog when it struck the San Francisco-Oakland Bay Bridge. The collision created a large gash in the port side of the vessel, which caused 53,000 gallons of fuel to spill into the surrounding bay, impacting the coastline. Due to concerns about the Coast Guard's response and investigation, House Speaker Nancy Pelosi, D-California,and Representative Elijah Cummings, D-Maryland, chairman of the House Subcommittee on Coast Guard and Maritime Transportation, ordered a review of the incident. A 30-day brief and an Office of the Inspector General report was prepared identifying a number of flaws in the Coast Guard's casualty investigation of the incident.

The report was the culmination of an effort that began in 2007 when the Coast Guard discovered marine safety missions were becoming neglected due to the Coast Guard's heavy shift towards maritime security missions post-9/11. Ultimately, it was concluded that the professionalism of the Coast Guard's marine safety program needed reinforcement and that the personnel assigned to the program needed to shift away from a "jack-of-all-trades, master of none" model of marine safety professional growth. In response, the Coast Guard embarked upon a five-year Marine Safety Performance Plan that occurred from fiscal years 2009-2014, and, in 2010, Congress authorized the National Centers of Expertise as part of that plan. President Barack Obama then signed into law the legislation that brought the National Centers of Expertise into being, stating at signing:

Today I have signed into law H.R. 3619, the Coast Guard Authorization Act of 2010. This Act strengthens the Coast Guard as a military service and branch of the Armed Forces in the Department of Homeland Security by providing organizational flexibility for the Coast Guard. … Additionally, the act materially enhances marine safety and maritime security missions of the Coast Guard.

As a result of that legislation, the Investigations National Center of Expertise (INCOE) was created to carry out its statutory mission as enacted into law under Title 14 U.S. Code, Section 313, which states:

Any center established under [this] subsection shall -

(1) promote, facilitate, and conduct education, training, and activities authorized under 93(a)(4);

(2) be a repository of information on operations, practices, and resources related to the mission for which the center was established; and

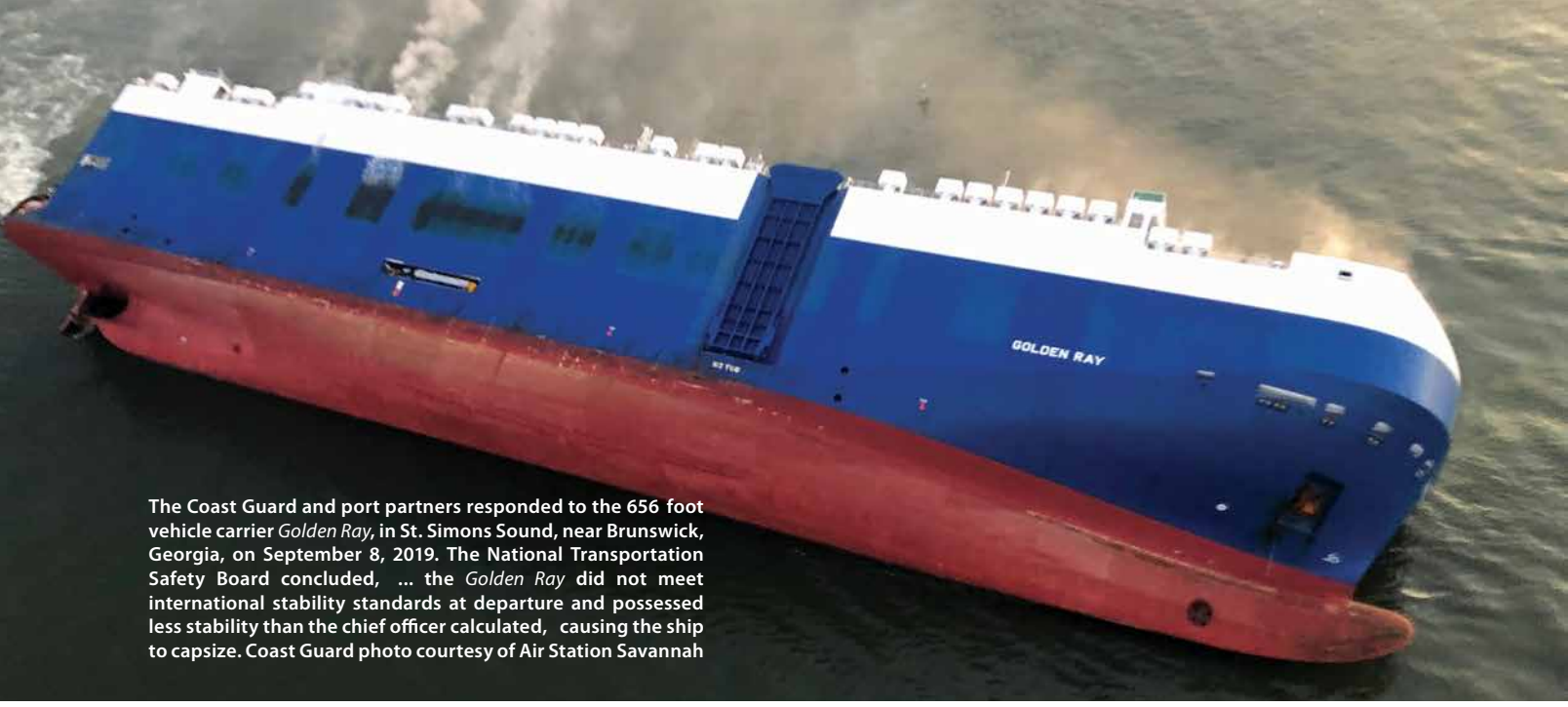
(3) perform and support the mission for which the center was established.

The earliest iterations of the Investigations National Center of Expertise, like its sister centers, excelled at the first two statutory responsibilities to become trainers and use its repository of information as a call line that assisted field investigators. More than a decade later, with a robust staff of civilian investigators alongside a complement of two experienced active-duty investigators, the center regularly projects its expertise into the field to fulfill its third responsibility of performing the investigations mission. In 2012, an attorney-advisor from the Coast Guard's Judge Advocate General was added to enhance the office's capabilities and provide field marine investigators a ready resource for legal analysis. In addition to the INCOE, specialized support to the investigations mission is provided by the Marine Safety Laboratory, reporting to the Office of Investigations and Analysis at Coast Guard Headquarters. The Marine Safety Laboratory in New London, Connecticut, assists Coast Guard investigators by providing forensic services, oil analysis,and expert testimony in response to oil pollution incidents.

The Marine Safety Laboratory in New London, Connecticut, assists Coast Guard investigators by providing forensic services, oil analysis, and expert testimony in response to oil pollution incidents.

Today, members of the INCOE are directly assigned as subject matter experts and technical advisors to the highest profile, multicausal cases within the Coast Guard's jurisdiction. Its members advise, conduct interviews and analysis, and create products to directly support and enhance field investigators and Coast Guard marine casualty investigations worldwide. Recently, INCOE made significant contributions to investigations into the losses of *El Faro*, *Destination*, *Stretch Duck 7*, *Golden Ray*, *Conception*, *Scandies Rose*, *Seacor Power*, and many others.

The Coast Guard's focus on investigation accuracy and proficiency, combined with the initiation and involvement of the NCOEs, has resulted in the highest quality marine casualty investigations program in the service's history. Today, there are currently around 120 marine casualty investigators throughout the Coast Guard that



The Coast Guard and port partners responded to the 656 foot vehicle carrier *Golden Ray*, in St. Simons Sound, near Brunswick, Georgia, on September 8, 2019. The National Transportation Safety Board concluded, ... the *Golden Ray* did not meet international stability standards at departure and possessed less stability than the chief officer calculated, causing the ship to capsize. Coast Guard photo courtesy of Air Station Savannah

respond to, investigate, and review approximately 2,400 reportable marine casualties a year. The data collected has provided Coast Guard headquarters, Congress, and the public decades worth of critical marine incident data for legislation, outreach, and education to prevent future incidents.

Conclusion

Ultimately, the Coast Guard's marine casualty investigation program could be superficially described as the simple fulfillment of one of its 11 statutory missions. However, it is better understood as a solemn duty which the Coast Guard provides to both the living and the dead. When a vessel disappears without a trace, or when people seemingly alive and well just days before perish, it is not uncommon for the thoughts of the public to immediately gravitate towards the allure of a torrid mystery. The public's fascination with these vessel disasters continues to grow and can be demonstrated by the ever-increasing amount of online amateur content on social media and YouTube. This public guesswork notwithstanding, the marine casualty investigator can enjoy no such luxury, as they share a duty towards truth which must be observed in the painstaking business of resolving mysteries into a chronicle of actionable facts.

About the authors:

LCDR Chad Yeamans is the commanding officer of the Investigations National Center of Expertise, where he leads a highly specialized team of expert casualty investigators through some of the highest profile, multicausal incident investigations within the Coast Guard's jurisdiction. He has spent 19 years on active duty, 17 of them in prevention with multiple assignments across the Coast Guard Districts Eight and Nine. LCDR Yeamans holds a Master of Science in human resources development from Villanova University and is a licensed HR professional through the Society of Human Resource Management (SHRM).

LCDR Gim Kang is the Investigations National Center of Expertise attorney. He has served in the Coast Guard for 15 years and his prior legal assignments include serving as an attorney for the Coast Guard Academy, the Coast Guard's First District, and later the Eighth District. Before practicing law, he also had assignments at the Ninth District Command Center and Port Security Unit 309. He is a 2000 graduate of Purdue University and graduated from Chicago-Kent College of Law in 2008.

References:
The Manhattan Circuit Court of Appeals, Second Circuit, 86 F.329, 108 C.C.A. 407. March 13, 1911

For more information

More information on the *Scandies Rose* incident can be found at: https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/INV/docs/boards/SCANDIES%20ROSE%20ROI%20-%2030DEC21_Final%20-%20Redacted.pdf?ver=Dodwr3ybpBFlL21AFW3Jow%3d%3d

REACT Ice Accretion report is available at:
https://www.news.uscg.mil/Portals/11/Headquarters/Investigations/Scandies-Rose/REACT%20Report%20Ice%20Accretion%20on%20Crab%20Pots.pdf?ver=zjHkgls0agGyoCEFMKPhzw%3D%3D

The Coast Guard's Federal Advisory Committees

Vital voices from the public

BY MELANEE LIBBY
Senior Group Federal Officer
U.S. Coast Guard

RYAN OWENS
Alternate Designated Federal Officer
National Maritime Security Advisory Committee
U.S. Coast Guard

The Coast Guard strives to have strong interaction with both the public and industry partners. To ensure the public has knowledge of and an opportunity to participate in such interactions, the Coast Guard implements the provisions of the Federal Advisory Committee Act (FACA) whenever applicable.

FACA was enacted by Congress in 1972 (Public Law 92-463) to ensure that advice provided to the executive branch by individuals, groups, organizations, or special interests does not have undue influence on government actions. FACA requires that the advice from committees, task forces, boards, working groups, commissions, etc., be both objective and accessible to the public. It also requires that the public knows who the members of committees are, when and where the committee will meet, and what issues will be discussed. Meetings must be open to the public, and the information provided to committee members must be provided to the public.

The Coast Guard manages 10 statutory committees. These advisory committees represent a valuable partnership with the maritime industry and play an important role by providing advice that helps the Coast Guard in meeting its statutory and regulatory oversight functions.

Statutory Committees Managed by the Coast Guard

- National Boating Safety Advisory Committee
- National Chemical Transportation Safety Advisory Committee
- National Commercial Fishing Safety Advisory Committee
- National Merchant Marine Personnel Advisory Committee
- National Merchant Mariner Medical Advisory Committee
- National Maritime Security Advisory Committee
- National Offshore Safety Advisory Committee
- National Navigation Safety Advisory Committee
- National Towing Safety Advisory Committee
- Great Lakes Pilotage Advisory Committee

Coast Guard Committees

At least 171 industry members sit on Coast Guard federal advisory committees bringing a wide variety of expertise, knowledge, and experience in matters relating to the function of the committees. Each committee membership is diversely balanced according to its charter. The diversity ensures open discussions and recommendations that assist the Coast Guard in developing regulations and policies that affect the segment of the industry that each committee represents. In 2023, the Coast Guard held 21 committee meetings, issued at least 69 task statements. Additionally, committees provided at least 540 recommendations.

The National Maritime Security Advisory Committee

Created in 2003, after the passage of the Maritime Transportation Security Act (MTSA), the National Maritime Security Advisory Committee (NMSAC) was especially busy in 2023. It is tasked with providing guidance to the Coast Guard and Department of Homeland Security regarding implementation of regulations or policies to secure the Marine Transportation System (MTS). Past efforts have largely focused on the implementation of minimum-security requirements to a vessel or facility's physical security but in the past five years, it has seen a shift in focus to helping the Coast Guard understand and mitigate cyber threats faced by maritime partners.

In the 2018 Federal Aviation Administration's

The National Maritime Security Advisory Committee's mission encompasses every aspect of maritime security, from the ship, to the facility, to the port workers. Iam Anupong | iStock/Getty Images Plus

reauthorization legislation, Congress tasked the Coast Guard to work with NMSAC in the development of a cyber risk assessment model. Known as the Maritime Cyber Assessment and Annex Guide, NMSAC was integral in providing an industry perspective on the development of this guide. Additionally, the committee recently provided guidance to the Coast Guard on identifying existing inefficiencies or gaps related to cyber information sharing and providing actionable short-term and long-term recommendations for enhancing cyber information sharing between the government and MTS stakeholders.

While cyber-related risks are at the forefront the committee's recent work, it continues to look at the evolving physical risks within the MTS. Some of the committee's continuing work includes identifying opportunities to improve the maritime community's ability to address threats from unmanned systems in the maritime environment, as well as providing recommendations to improve the maritime community's ability to address an active shooter and/or other active threats. Additionally, it is providing input on the update of NVIC 03-03, Implementation Guidance for the Regulations Mandated by the Maritime Transportation Security Act of 2002 for Facilities.

About the authors:
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IMO Audits

Accountability at the highest level

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The sea embodies the power of human will—a prospect of harmony and a means for prosperity when treasured, disastrous if ignored.

The quintessential origin story for maritime regulatory reform opens with a disaster scene or series of catastrophic events. Naturally, the inspiration for the International Maritime Organization (IMO) Member State Audit Scheme (IMSAS) follows suit, and it is a typical sequence.

The year was 1997 and the 26-year-old Russian oil tanker *Nakhodka* was beset by weather in the Sea of Japan. Tragically, it broke in two, triggering the worst oil spill in Japan's history. Emulsified oil from the ship's cargo and fuel tanks washed over 190 miles of shoreline with devastating impacts to coastal fishing, fish farming, wildlife, tourism, and natural preserves. Over 200,000 responders took part in collecting 36,000 cubic meters of contaminated waste. The ship's master was never recovered, and three responders perished in the aftermath. A special committee convened by Japan to investigate the casualty concluded that the ship was improperly maintained and unseaworthy despite valid trading certificates attesting the contrary.

The break up of the Russian oil tanker *Nakhodka* in the Sea of Japan resulted in the worst oil spill in Japanese history, impacting the portion of the shoreline indicated in red. Map by ctrlapls1| iStock/ Getty Images

In the wake of the *Nakhodka* incident, sentiment grew that substandard shipping persisted not because international maritime safety and environmental regulations were inadequate but because the rules were either inconsistently implemented or ineffectively enforced by member states. A latent crisis of authority would draw considerable concern, as the member states themselves are responsible for establishing and maintaining an effective system to discharge their obligations under international law and over the seas. An obligation stimulated by the very significance of the ocean economy, a sprawling domain encompassing 70 percent of the Earth's surface and within just 60 miles from 40 percent of the world's population.,

Ocean activity is the backbone of the global economy, accounting for approximately 90 percent of world trade. It is a source of marine-based energy and seafood and about 99 percent of transoceanic digital communications are transmitted by undersea cable. Despite its significance, the great enabler is vulnerable to pollution, climate change, over-exploitation, and conflict. In response, a coalition of 19 countries called for a model audit scheme to objectively assess the overall performance of how member states administer and enforce various mandatory IMO instruments.

The co-sponsors referenced the International Civil Aviation Organization's (ICAO) Universal Safety Oversight Audit Program (USOAP) as a comparable

standard. Prompted by the 1990 crash of Avianca Flight 052 that killed 73 people, the USOAP was initiated in 1996 on a voluntary basis, becoming mandatory in 1999. The program combines safety oversight assessments with technical assistance to both identify gaps and assist states in implementing ICAO standards more effectively. While this USOAP was not a precise model that could be immediately repackaged for use in maritime affairs, it served as a reference framework that helped the IMO develop its approach. Decades later, as the first IMSAS audit cycle nears completion, member states must now set their sights on implementing effective corrective actions and developing mutually agreeable accountability measures.

The Evolution of Member State Governance

The Voluntary IMO Member State Audit Scheme (VIMSAS) was implemented in 2003 to promote and assist member states with improving their capabilities and performance as flag, port, and coastal states. With the Coast Guard serving as the lead federal agency, the United States underwent a VIMSAS audit in 2008 based on the Code for the Implementation of Mandatory IMO Instruments (IMO Resolution A.973(24)), 2005. Seventy-five audits were completed under the VIMSAS and during the transitional period. The mandatory IMSAS commenced on January 1, 2016. By the end of 2023, 116 of the IMO's 175 member states and two associated members have been audited under the IMSAS. Another 25 audits are scheduled for 2024, with the first audit cycle set to be completed by 2025.

As criteria for the audit scheme, IMO adopted the IMO Instruments Implementation (III) Code (IMO Resolution A.1070(28)), 2013, which pertains to the following conventions:

- The International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS 1974) including the Protocol of 1988, as amended.
- The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997; as amended (MARPOL 73/78) and (MARPOL PROT 1997).
- The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW 1978/95).
- The International Convention on Load Lines, 1966 (LL 66) and the Protocol of 1988 (LL PROT 1988).
- The International Convention on Tonnage Measurement of Ships, 1969 (Tonnage 69).
- The Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREG 1972) .

The objective of the III Code is to enhance global maritime safety, protection of the marine environment, and to assist states in the implementation of IMO instruments. Recognizing that each state has a unique character, depending on geography and circumstance, some may have a greater role as a flag state than as a port state or as a coastal state. Conversely, others may have a greater role as a coastal state or a port state than as a flag state. The purpose of the audit scheme is to determine the extent that member states are implementing and enforcing the applicable IMO instruments as set forth in the III Code.

Under the scheme, audits are coordinated by the Member State Audit section of the Department for Member State Audit and Implementation Support (MSAIS) at the IMO Secretariat. Audit teams are formed from qualified officials, nominated as auditors by member states, and audit officers from the IMO Secretariat. Qualified officials must meet the established criteria, which includes knowledge of international conventions, functions of a maritime administration, as well as previous auditing skills and experience. Audit officers from the IMO Secretariat promote the consistent implementation of mandatory IMO instruments and aid member states in their performance in accordance with the III Code.

The United States: A Member State

Member states are contracting governments or parties to the multilateral treaty known as the Convention on the International Maritime Organization. As a member state, the United States has roles under the relevant IMO instruments as a flag, port, and coastal state. A flag state, or flag administration, is the government of the state whose flag a ship is entitled to fly, thereby having primary responsibility to exercise control over such ships, ensuring they comply with relevant international rules and regulations. A port state is the government of a state with authority over national ports, including the inspection and control of foreign ships operating therein, to verify compliance with the relevant international conventions. Coastal state means the government of the state exercising jurisdiction over its sovereign maritime zones and includes responsibility for search and rescue, aids to navigation, meteorological and hydrographic services, vessel traffic services, and radio communications.

The Coast Guard is the primary maritime regulatory authority in the United States and has the responsibility to coordinate with interagency stakeholders, the public, and third parties for many of the member state requirements defined by the applicable IMO instruments. The following executive departments and federal agencies also have authority and primary responsibilities under the III Code and associated IMO instruments:

- The Department of State

- National Oceanographic and Atmospheric Administration
- Environmental Protection Agency
- The Army Corps of Engineers
- National Transportation Safety Board
- Federal Communications Commission
- National Geospatial-Intelligence Agency

The Maritime Administration and Department of Justice also participate in interagency efforts with respect to the III Code. Interdepartmental groups, such as the Committee on the Marine Transportation System and the National Search and Rescue Committee, coordinate and make recommendations regarding federal policies covered under various international conventions. Additionally, chartered federal advisory committees provide public input and advice to federal agencies regarding IMO instruments.

As a flag administration, the United States has entered into formal third-party agreements with vetted and accepted classification societies and other specialized organizations, collectively known as recognized organizations (ROs) under IMO regulations. These agreements delegate certain statutory survey and certification functions for U.S.-flagged vessels. Delegated functions are those related to Coast Guard commercial vessel inspections carried out to verify compliance with applicable international treaties. This may include authorization to issue international convention certificates required to be carried by commercial vessels as evidence that they have been inspected and have met the required standards. The Federal Communications Commission has similar delegation responsibilities for required radio certificates and related surveys.

The Coast Guard is the United States' primary maritime regulatory authority and is responsible for coordinating with interagency stakeholders as well as the public and third parties for many member state requirements. Coast Guard illustration by CDR Cordyn F. Heard IV

Under the international framework, the Code for Recognized Organizations (RO Code, IMO Resolutions MEPC.237(65) and MSC.349(92)), 2015, serve as the consolidated standard for how organizations are recognized and includes guidelines for flag state oversight. In addition, the III Code requires flag states to establish or participate in an oversight program to monitor ROs and to ensure its international obligations are fully met. The Coast Guard has executed memorandums of cooperation with Transport Canada and the European Commission, respectively, for the oversight of mutually recognized organizations. These memorandums provide a framework for sharing information, coordinating activities, and developing best practices for the oversight of recognized organizations. Collaborating in this fashion increases transparency, while relieving the regulatory burden on recognized organizations by reducing duplicate oversight activities.

Similarly, the International Quality Assessment Review Body (IQARB) was established in 2019 to broaden the collaborative oversight efforts of the IMO and the International Association of Classification Societies (IACS). Since many ROs operate internationally, they are authorized by multiple member states. The development of IQARB is intended to increase transparency of information and reduce redundancy of effort. Under the IQARB, member states and maritime industry association representatives review information submitted by ROs and issue "factual statements" when the evidence submitted verifies ongoing implementation of an externally audited quality management system by the RO. Under the IQARB, flag states have the option to incorporate the factual statements into their oversight procedures required by the III Code. This can be accepted under the IMSAS as additional, but not alternative, evidence of RO oversight by the flag state.

A Functional Framework

The 2022 United States Consolidated Strategy for the III Code serves as the framework to ensure the United States meets its international obligations and responsibilities as a flag, port, and coastal state as prescribed by the III Code. It is designed to complement existing strategies such as the Coast Guard's Maritime Commerce Strategic Outlook, 2018, and Climate Framework, 2023. The strategy underscores the vision to enhance global maritime safety, security, and protection of the marine environment through effective engagement and implementation

of the IMO instruments. Three lines of effort outline the United States' objectives to ensure compliance with the III Code.

Comprehensive Compliance: Implement a mechanism for effective adoption, incorporation, implementation, and enforcement of IMO instruments.

Interagency Coordination: Facilitate effective interagency collaboration with federal agencies and other stakeholders.

Continuous Improvement: The United States is committed to continual improvement of its performance in maritime safety and environmental protection activities.

Institutional Improvement

The III Code requires member states to continually improve their measures for implementing the conventions and protocols to which they are party. In this regard, continuous improvement entails rigorous and effective application and enforcement of national legislation and compliance monitoring. Further, member states are required to identify and eliminate causes of any nonconformities or potential non-conformities to prevent occurrence or reoccurrence. This includes addressing the findings identified during the member state audit. The Coast Guard's Mission Management System (MMS), an ISO 9001-based quality management system, drives continuous improvement in fulfillment of domestic and international obligations within the scope of the III Code.

Since the VIMSAS audit in 2008, the Coast Guard has continued to develop interagency capabilities by implementing and expanding the MMS to ensure continual improvement of III Code-related processes. Additionally, it has trained a nationwide cadre of MMS professionals, and conducted routine ISO 9001-based audits across the interagency to monitor system efficacy. Future efforts will continue to incorporate coastal state programs, as well as Coast Guard areas and districts, into the MMS to ensure consistency at all levels of the interagency. An area for further development identified by IMSAS audit encourages the United States to continue advancing interagency coordination through the MMS to more effectively monitor performance and ensure continuous improvement. The importance of continued commitment and drive to achieve full compliance in all areas through a comprehensive monitoring program, such as MMS, is critical to fostering a sustainable culture aimed at continual improvement.

The Audit Experience

Preparations for the first mandatory IMO Member State Audit of the United States started with the completion of the pre-audit questionnaire (PAQ) well over a year prior to the scheduled appointment. The PAQ and its annex are completed in advance to provide the audit team with context of the member state's organization and regulatory structure. The actual audit engagement occurred over a two-week period, which started in February and closed in March 2022. Common U.S. interagency goals for the audit included further improvement of flag, port, and coastal state systems used to fulfill the United States' obligations to IMO instruments, and continual growth and enhancement of the Coast Guard's MMS.

The participating auditors hailed from Canada, Italy, Sweden, Finland, and the IMO Secretariat. More than 85 participants from nine federal agencies and 22 U.S. Coast Guard offices participated in 30 sessions, providing 210 pieces of supporting evidence across 45 audit tasks to demonstrate overall compliance with the IMO instruments. Coast Guard Sector Virginia, a shore-based operational unit, was the field representative for the audit and served to objectively validate both implementation and enforcement of the IMO instruments. Several areas of positive development were identified:

Support of search and rescue (SAR) plan development with other member states and the mobile training team for SAR. The United States carries out cooperative efforts to support the international SAR system by providing training and technical assistance to improve partner nations' search planning capabilities. The National Search and Rescue School, and Coast Guard Mobile Training Teams provide partner nations with installation and training on the Search and Rescue Optimal Planning System.

Pollution response, assistance to other member states. The United States provides international pollution response assistance and was assisting foreign governments by evaluating existing contingency plans, developing incident specific plans, advising on appropriate mitigation measures and efficiency of efforts undertaken, as well as by carrying out joint exercises.

Port state control detention review board. The United States convenes a weekly port state control detention review board to determine if detentions met the guidance established by the organization and Coast Guard policy. This board was established in 2018 to standardize detention review and validation processes, to promote consistency in detention reporting, and to provide greater transparency to Coast Guard operational commands about the final decisions regarding their detentions.

Whistleblower protocols. The United States leverages existing whistleblower laws to encourage seafarer reporting of violations observed on its ships anywhere in the world and all ships operating in its waters. The United States protected whistleblowers from retaliation and all reports were investigated. In August 2020, the United States implemented the CGTips mobile app.

Since the audit, several actions have been taken to

A member of the Coast Guard's Sector Virginia prevention department conducts shipping container inspection training. The inspection training was held both at the Port of Virginia and aboard a foreign vessel. Coast Guard photo by Petty Officer 3rd Class Mikaela McGee

further advance the MMS including:

- revising the Mission Management System, COMDTINST 5200.4B
- updating the Mission Management System Internal Audit Tactics, Techniques, and Procedures (TTP), CGTTP 4-09.5C
- establishing a centralized Quality Management Office (CG-5PQ)

The centralized Quality Management Office will be responsible for the continued implementation, administration, and coordination of the MMS across Coast Guard directorates and throughout the interagency. Central to this charge is the conviction to continually refine the interagency network and to further install the MMS across all functional elements under the III Code. The initial CG-5PQ positions are scheduled to come online in the summer of 2024.

Incentivizing the IMSAS

The *Nakhodka* disaster was a watershed moment, a realization of the need for maritime regulatory reform of the highest magnitude. The implementation of the IMSAS was a well-intended commitment to ensuring accountability and continuous improvement, and although a solid foundation has been established, work remains. As the first IMSAS audit cycle nears completion in 2025, the international community must now improve conditions to ensure accountability. At a global level, the ultimate goal of the audit process is to address audit findings by effectively implementing corrective actions to improve compliance with the mandatory IMO instruments. However, currently there are no measures defined in the IMSAS Procedures—IMO Resolution A.1067(28), annex, part II—for cases where a member state fails to implement a corrective action plan by the agreed upon deadline, or more disturbingly, does nothing and elects to leave audit findings unresolved.

An IMO analysis of 37 document-based follow-up audits showed that 15 member states did not provide corrective action plans for all findings and observations identified during their audits. Furthermore, the analysis revealed that out of 610 corrective actions for those 37 member states, only 33 corrective actions, or 5 percent, were found completed. Of those, only 15, or 2.4 percent, were found to be effectively implemented. The outcome of the analysis indicates a lack of capacity in many of the audited member states to implement corrective actions

and to engage in providing relevant evidence to effectively complete the audit follow-up process.

By reestablishing a joint working group on the Member State Audit Scheme, the IMO is now considering enhancements for the second audit cycle. One such proposal is to employ a continuous monitoring approach (CMA), which incorporates risk factors such as unresolved findings into the IMSAS process to determine schedule priority, frequency, and audit scope. The ICAO USOAP has used a CMA since 2013 to support monitoring activities based on an analysis of safety risk factors.

Another proposition is for the IMO to publish IMSAS performance results in a manner similar to the ICAO USOAP Interactive Viewer, which reports effective implementation scores and lists member states with unresolved safety concerns. This information can then be operationalized by port state control programs to further incentivize compliance. For example, the flag administration qualification requirements for the Coast Guard's QUALSHIP 21 Initiative, which recognizes high-quality shipping, can be modified to require not only evidence of undergoing an audit but also addressing any findings within established timelines. Similar actions can be undertaken by the various regional port state control regimes, which weigh the risk factors of flag administration performance.

Unresolved findings undermine the legitimacy of the IMSAS and subvert the integrity of maritime governance. While calls for enhanced monitoring may not be welcomed by all, transparent performance data can prove effective when made publicly available, and Coast Guard regulatory projects are an important avenue for addressing IMSAS deficiencies. This is not intended as a name-and-shame campaign but, rather, to incentivize post-audit behavior in the spirit of continuous improvement. When leveraged properly, the IMSAS can focus resources on the effective prioritization of corrective action for the betterment of the international community. After all, holistic accountability is the essence of a healthy ocean economy and prosperous global system.

About the author:
CDR Corydon Heard attends the Eisenhower School for National Security and Resource Strategy. He is a graduate of the U.S. Merchant Marine Academy, a credentialed unlimited Merchant Marine officer, master Coast Guard operations ashore-prevention officer, an IMO-designated lead auditor, and the single point of contact's representative for the member state audit of the United States.

Chief Warrant Officer Dennis Croyle, a member of Coast Guard Sector San Diego's prevention department, watches as the crew boat departs from the tanker ship *Ardenne Venture* after an annual exam off the coast of San Diego in August 2012. The Coast Guard carries out exams on foreign vessels to ensure they comply with U.S. and international regulations governing necessary safety equipment, crew qualifications and pollution restrictions prior to operating in U.S. waters and ports. Coast Guard photo by Petty Officer 1st Class Henry Dunphy

GAO and OIG Audits

Providing constructive program assessments

BY CDR MATTHEW ZINN
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Oversight, management, coordination, and execution of audits is a core function within the federal government. Designated as the service's Component Audit Liaison (CAL) and manager of its audit program, the External Coordination Division, or CG-823, resides within the Coast Guard Office of Budget and Programs. One of this division's main responsibilities is to assist the Commandant with every aspect of the audit process, serving as the principal point of contact for external governmental agencies. Oversight, management, coordination, and execution of these audits is a core function within the federal government.

These externally conducted audits provide management with a valuable assessment of Coast Guard programs, activities, and operations. Although some information (findings and recommendations) may appear critical in nature, the Coast Guard must view these reports as constructive and in the best interests of Department of Homeland Security and the service. The objective evaluation and analysis of the information provided in an audit can increase the Coast Guard's effectiveness and efficiency. Findings and recommendations can also serve to identify weaknesses with the intent to eliminate waste, fraud, abuse, or mismanagement of Coast Guard resources.[1]

As of February 2024, the Coast Guard is the lead for 26 Government Accountability Office (GAO) audits, seven OIG audits, and is involved in 32 others. This includes overseeing, managing, and coordinating management accountability by serving as the liaison for, and monitoring results of, audits of Coast Guard programs by external organizations, such as the GAO and DHS Office of the Inspector General.[2]

Some recent marine safety related audits include egress requirements for historic wood sailing vessels,[3] Great Lakes winter shipping,[4] and evaluation of the Streamlined Inspection Programs.[5] Auditor interactions with the Assistant Commandant for Prevention Policy and local field units directly contributed to enhanced understanding and awareness of the service's maritime safety, security, and stewardship missions. Forging these professional relationships with GAO and OIG is critical to help auditors successfully complete their reviews and assessments.

GAO Authorities and Responsibilities

The GAO is led by the comptroller general of the United States, who serves as an agent of Congress, and is authorized and directed by law to make audits of federal government agencies. Established by the Budget and Accounting Act of 1921, the "Comptroller General shall investigate, at the seat of government or elsewhere, all matters related to the receipt, disbursement, and application of public funds."[6] Additionally, the Office of Management and Budget Circular A-50 (Revised) provides the policies and procedures for use by executive agencies when considering audit reports issued by GAO, OIG, and non-federal auditors.[7]

GAO audits are independent examinations for Congress to determine how effectively, efficiently, and economically the agency under audit has carried out its authorized programs, activities, and operations. Auditors follow the professional standards presented in the Government Auditing Standards, also known as the Yellow Book.[8]

OIG Authorities and Responsibilities

The Inspector General Act of 1978 (5 U.S.C. § 4) was enacted by Congress to establish an independent and objective organization to ensure integrity and efficiency in government. The OIG is led by an Inspector General who is appointed by the president and subject to Senate confirmation.[9]

OIG's mission is to:

- conduct independent and objective audits and investigations relating to DHS programs and operations
- promote economy, efficiency, and effectiveness in DHS programs and operations
- prevent and detect waste, fraud, and abuse
- keep the Secretary of DHS and Congress fully informed and updated on and deficiencies in

DHS programs and operations and the necessity for, and progress of, corrective action[10]

Similar to GAO, OIG auditors follow the professional standards presented in the Yellow Book.

DHS Leadership Roles and Responsibilities

The Departmental GAO-OIG Audit Liaison (DAL) is the primary management official within DHS responsible for GAO- and OIG-related activities on behalf of the undersecretary for management. DHS Management Directives #077-02[11] and #0810.1[12] establish departmental policy regarding GAO and OIG relations concerning audit activities, respectively.

The DAL's core function is to ensure mutually beneficial and productive relations with all audit organizations having an interest in the department, auditor access to records and employee, and oversight of CAL activities.[13] The DAL monitors and tracks the status of GAO and OIG activities including:

- status of responses to GAO and OIG requests for departmental records and interviews
- DHS comments on GAO and OIG draft reports and testimony
- any follow-up on GAO and OIG recommendations
- coordinate with and oversee the activities of DHS's CALs to ensure proper and efficient implementation of DHS Management Directive #077-02

As outlined in Directive #077-02, the senior component accountable official (SCAO) has responsibility for and authority over the component's audit and review activities. As a senior official, the SCAO enables and assists the designated program officials (DPOs) and CALs with implementation of the audit process. The deputy assistant commandant for resources is designated as the Coast Guard's SCAO with authority over all Coast Guard activities.

Liaison with GAO and OIG

Within the Coast Guard, CG-823 serves as the primary liaison to the DAL and reports to the SCAO. As the Coast Guard CAL, CG-823 has the responsibility for maintaining connection with GAO and OIG on audits, information requests, site visits, and meeting engagements. This includes day-to-day responsibility for overall component relations with GAO and OIG and ensuring auditors are provided timely and appropriate access to records and Coast Guard employees.

The SCAO has designated the staff of the Program Review Division (CG-821) as the DPO for each Coast Guard audit. DPOs, DHS personnel whom GAO and OIG may contact directly for records, information, and meeting requests, serve as the auditor's primary source of information. Additionally, DPOs are personnel with responsibility for, or knowledge of, the program that the auditors are reviewing.[14]

Audit Process

Audit Notification: Either the auditors or the DAL will send a notification letter to CG-823 announcing the start of an audit. Audits can be self-initiated or requested by a member of Congress, committee, or legislation. In the letter, GAO and OIG will outline the objectives of the audit, projected completion date, scope of work, and audit team members. The DAL will determine which DHS component is the lead component and which are subcomponents for the audit. The Coast Guard CAL (CG-823), in coordination with a CG-821 Program Reviewer, will identify the appropriate programs and send a copy of the notification letter to each program official.

Entrance Conference: The entrance conference is required by DHS policy to be scheduled within 10 business days of receipt of the notification letter. To schedule the entrance conference, CG-823 coordinates with the CG-821 Program Reviewer, programs, the DAL, and the other respective CALs, as necessary.

The entrance conference is designed to be a short briefing conducted by the audit team with the purpose of better defining objectives, scope, and methodology of the audit. It also ensures all key Coast Guard personnel have been identified and sets a general timeline for the audit.[15] Audit timelines vary; some can be as short as six months, while others can take more than a year to complete.

Fieldwork (Conduct of the Audit): As previously discussed, both GAO and OIG conduct their audits by using the accepted auditing and accounting standards presented in the Yellow Book.

The Coast Guard CAL (CG-823) coordinates the document requests and responses between the auditors and the program, CG-821 Program Reviewer, and SCAO.

Although most audits start and entrance conferences occur at Coast Guard headquarters, auditors will often request to visit field units. Once specific sites are identified, CG-823 will notify and coordinate with the CG-821 program reviewer and the field unit representatives to facilitate the visits.

Site visits often entail meeting with senior leadership, holding small group discussions with certain branches or divisions, and accompanying Coast Guard members on operations, like facility or vessel inspections. This is an opportunity for the auditors to validate their initial findings and obtain valuable hands-on experience. Should there be any follow-up actions after the site visit, CG-823 will coordinate with the field unit and CG-821 program reviewer on providing responses back to the auditors.

Completion of the Audit: Towards the end of the audit, GAO and OIG will provide their preliminary results, subject to further review and revision by the audit team, for Coast Guard review. The OIG will call this its Notice of Findings and Recommendations, while GAO calls it the Statement of Facts.

Coast Guard programs will have 10 days from receipt of either document to provide technical comments. These comments are the Coast Guard's opportunity to address any accuracy, sensitivity, context and perspective or editorial concerns.

Exit Conference: The exit conference is held for the audit team to discuss their findings and recommendations with Coast Guard officials and review the technical comments provided. It also allows an opportunity to address any issues Coast Guard management may have about the audit.

Draft Report: Following the exit conference, the audit team will issue its draft report for Coast Guard review. Again, the Coast Guard programs will have the opportunity to provide technical comments on the draft report.

Should the draft report contain recommendations for Coast Guard action, a management response letter will be prepared to address each recommendation for concurrence or nonconcurrence. Generally, Coast Guard programs will have 30 days to review the draft report and prepare responses.

Additionally, if an audit is considered high priority by the DAL and contains recommendations for Coast Guard action, senior leadership talking points (SLTP) will be required. The SLTP is a summary of the combined draft report, recommendations made, and overall messaging of the final report once it is released. The SLTP is intended to inform DHS leadership and the Offices of Public and Legislative Affairs of the imminent release of final audit reports.

Final Report: Following the receipt and review of the Coast Guard's technical comments to the draft report and management response letter, the audit team will issue a final report, which includes a copy of the management response letter.

This report will summarize the proposed actions discussed for each recommendation and provide a determination of whether the corrective actions are sufficient to close the recommendation(s). Depending on the determination, GAO and OIG will annotate a recommendation as closed-implemented, open-resolved, or open-unresolved. Recommendations that the Coast Guard does not concur with are annotated as either closed-not implemented or open-unresolved.

Corrective Actions and Follow-Up

For GAO audits, the DAL must provide Congress with the implementation status for each recommendation 180 days after the final report is released. For OIG, the Coast Guard must formally provide a status update to the auditors 90 days after the final report is released. Each letter must address the status of actions taken, ongoing, or plans to resolve and implement the recommendation.

Closing and resolving open audit recommendations helps demonstrate to Congress and the public how seriously DHS takes these recommendations while fostering ongoing productive and meaningful relationships with the auditors. Open audit recommendations are monitored by the Coast Guard CAL.

As of February 2024, CG-823 is currently tracking 127 open audit recommendations. Department-wide, Coast Guard has the third-most open audit recommendations, behind only Customs and Board Protection's 128, and the Federal Emergency Management Agency's 155.

Conclusion

External audits of Coast Guard programs, activities, and operations are essential in promoting economy, efficiency, and effectiveness. Audits provide Coast Guard management with beneficial independent assessments to improve and enhance the service. Additionally, Coast Guard programs and field units play an integral role in supporting GAO and OIG engagements and building trust with the auditors. Just as Congress is keenly aware of Coast Guard-related audits, strengthening these partnerships while enhancing audit awareness will pay dividends.

About the author:

CDR Matthew Zinn is the division chief of the External Coordination Division at Coast Guard headquarters in Washington, D.C. He is a graduate of the Coast Guard Academy and an operations ashore-prevention officer.

Endnotes:

1. Audits and Evaluations of Coast Guard Units and Activities, COMDTINST M7520.2A (Cancelled)
2. CG-8 Functional Statements, approved July 29, 2022
3. Coast Guard: Enforcement of Egress Requirements for Historic Wood Sailing Vessels | U.S. GAO
4. Coast Guard: Improved Reporting on Domestic Icebreaking Performance Could Clarify Resource Needs and Tradeoffs | U.S. GAO
5. OIG-23-46 - The United States Coast Guard Needs to Determine the Impact and Effectiveness of Its Streamlined Inspection Program (dhs.gov)
6. The Budget and Accounting Act (gao.gov)
7. Circular No. A-50 -- Audit Followup (archives.gov)
8. Yellow Book: Government Auditing Standards | U.S. GAO
9. About Us | Office of Inspector General (dhs.gov)
10. 5 USC Ch. 4: INSPECTORS GENERAL (house.gov)
11. Relations with the U.S. Government Accountability Office (dhs.gov)
12. Department of Homeland Security (dhs.gov)
13. CFO At a Glance_01.23.2023_DAL.PUB (dhs.gov)
14. Relations with the U.S. Government Accountability Office (dhs.gov)
15. Audits and Evaluations of Coast Guard Units and Activities, COMDTINST M7520.2A (Cancelled)

Historical Snapshot

The Selling of Semper Paratus

BY LCDR KRYSTYN PECORA
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The director steps to the podium and firmly taps his baton, bringing the military band to attention in the recording studio. The 55-person ensemble sits poised, ready to play a medley of service tunes and marching songs for their latest ceremonial CD, which will be distributed to Coast Guard units to play at countless retirements and changes of command. Finally, the musical group reaches their own service song, *Semper Paratus*.

While most Coast Guardsmen's hearts swell with pride at the sound of the familiar melody, for the band members, it's a poignant moment, stinging like the pain from an old wound. While they recorded the service songs of the Army, Navy, and Marine Corps free of charge, the band cannot say the same of their own anthem. The copyright and licenses of *Semper Paratus* are held by three separate companies, and the U.S. Coast Guard Band pays for the privilege to record it.

The story of the Coast Guard's service song began in the winter of 1922 on the decks of the cutter *Yamacraw*. CAPT Francis Saltus Van Boskerck, the commanding officer, was suddenly struck by a moment of inspiration and descended below to his cabin. When he emerged, he brought with him a ballad strewn with the legendary feats of the small seagoing service destined to be America's maritime guardians. Van Boskerck's pride in his service was evident in the poem–his 23 years at sea provided ample fodder for the verses. A career cutterman, Van Boskerck truly served from the Aztec shore to the Arctic zones. It's not hard to conjure images of him battling "the surf and storm and howling gales" while in command of the famed cutter BEAR on a six-month patrol in the Bering Sea in 1921.

Drawing upon his experiences and the service's rich heritage, Van Boskerck wrote the song with the intent of keeping alive and building of our fine traditions, morale of the service and general pride in the Coast Guard. Expecting a lukewarm reception from the wardroom, he presented the poem to his fellow officers. Van Boskerck was shocked when he was encouraged to set the rhyme to music. Alas, the rigors of command and his subsequent tours at the Naval War College and as district commander of the Great Lakes District proved too demanding to follow through with his quest until four years later.

CAPT Francis Saltus Van Boskerck

Van Boskerck found an unexpected respite as the commander of the Bering Sea Patrol, stationed ashore in Unalaska, Alaska. The unforgiving terrain of the Aleutian Islands provided startlingly fertile ground for his creative efforts to blossom. With the musical assistance of two Public Health Service employees, Alf E.

Nannestad and Joseph O. Fournier, the threesome composed the musical score seated at a piano.

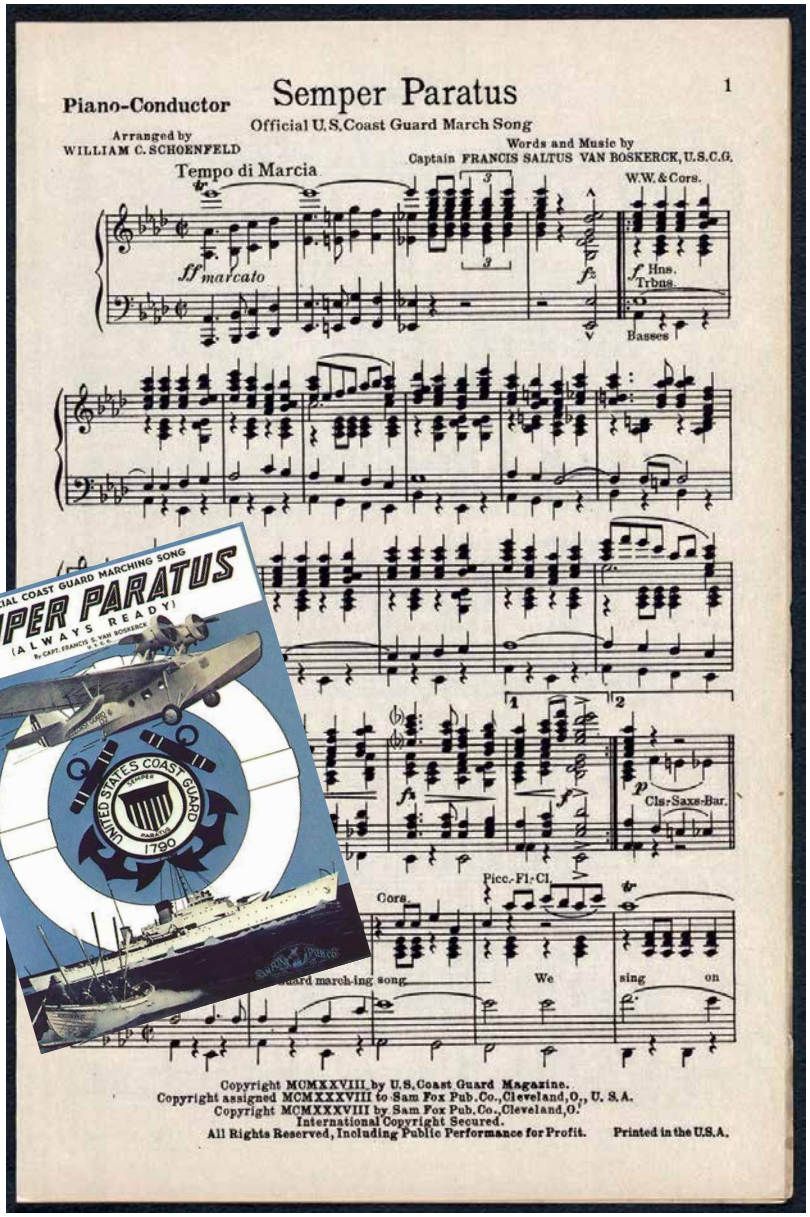
Van Boskerck departed the West Coast for what would be his last Coast Guard tour, the Captain of the Port of Norfolk in Virginia. It was there, in the neighborhood of Ghent, where *Semper Paratus* was publicly debuted in the winter of 1926-27. Played by an orchestra at a meeting of the League of Coast Guard Women, known today as Coast Guard Mutual Assistance, the song was excitedly received. Van Boskerck had a hit on his hands.

In fall of 1927, seemingly sensing his own mortality, Van Boskerck traveled to Washington, D.C., to meet with the editor and publisher of Coast Guard magazine, Army Air Corps Lt. Col. Harvey Miller. He carried with him a well-worn copy of *Semper Paratus* and implored Miller to make his song as recognizable as the service songs of the other military services. Miller promised he'd try, and Van Boskerck departed to catch his ferry back to Norfolk, Virginia. That evening, as the ferry plowed the waters of the Chesapeake, Van Boskerck was struck by an apparent heart attack and died at sea, leaving the future of his contribution to the Coast Guard in Miller's hands.

Miller's vow to Van Boskerck became deeply sentimental–he felt obligated to fulfill the captain's final wish. Miller enlisted the help of Lt. William Sima, the ninth Naval Academy bandmaster, to expand the simple melody into a full orchestral presenta With the entire composition complete, a gala musical event was held in Washington to formally premiere *Semper Paratus*, featuring a realistic storm scene, nautically dressed chorus girls and armed personnel from cutter *Apache*, while a male quartet dressed in life-saving station garb sang the service's new anthem.

Seizing upon the enthusiastic recep tion, Miller published the song an piano score in the April 1928 issue the U.S. Coast Guard magazine with t Commandant of the Coast Guard, RA Frederick C. Billard, endorsing the son the service's anthem. Miller even took the additional step to copyright the April issue of the magazine, with the Service Publishing Co. located at Coast Guard Headquarters listed as the rightful owners, protecting the enclosed song. However, despite his efforts, years later, Miller struggled to distribute the song outside of the National Capitol Region, sending copies to bands and orchestras throughout the nation at his own expense. Despite the service's devotion to the song, musical society continuously rejected the composition. Perhaps the mere idea of a cutterman creating a significant musical contribution was simply discordant.

Fate finally smiled on Miller's quest, and the song was used in two movies, B*order Flight* and *March of Time*, which garnered the attention of the Sam Fox Music Publishing Co. Intrigued by the song's potential, the publishing company coordinated with Miller to purchase the copyright for $50 so the song could be distributed on a national level, and the copyright was transferred in 1938. In 1942, Sam Fox Music Publishing, in conjunction



From 1938 until early 2024, the copyright and licenses of the Coast Guard's *Semper Paratus* were held by companies outside the service and its band paid $175 for the privilege of recording it. Photos courtesy of the Library of Congress and the Coast Guard

with Miller's U.S. Coast Guard magazine, launched a campaign to popularize the service's song, and *Semper Paratus* ultimately reached No. 16 on the music charts.

The transfer of the copyright to Sam Fox Music Publishing Co. came with the stipulation all royalties be paid to Van Boskerck's widow, Carlotta. However, she refused any royalty payments out of a sentiment of good will. Her only interest was that the song be used by the Coast Guard in accordance with her husband's wishes. An agreement was struck between the United States Government, Sam Fox Publishing Company, and the American Society of Composers, Authors and Publishers (ASCAP), as noted in the November 1942 issue of The Bulletin, allowing the royalty-free usage of the song "in any program sponsored by the United States Government, or the United States Coast Guard, and presented with the knowledge and cooperation of the latter."

As generations of Coast Guardsmen ran through the course of their careers, decades passed, and *Semper Paratus* became an elemental component of the service's culture. The copyright remained with Sam Fox Music Publishing Co. until 2000, when Warner/Chappell Music, a subsidiary of Warner Bros. Entertainment, acquired the entire Sam Fox music library. Alfred Music assumed the management of the mechanical rights for *Semper Paratus* in 2005, which includes printing and recording of the song. These companies actively manage copyright and associated licenses, and to this day collect royalties from the service's song.

However, it appears the initial agreement established between Sam Fox Publishing Co. and the Coast Guard is no longer being honored by these three companies. The U.S. Coast Guard Band pays Alfred Music a licensing fee of $175 every time they wish to record or rearrange the service's anthem. Of note, the Air Force's service song is also owned by a private company, Carl Fischer Music; however, a formal agreement relinquished the Air Force from the payment of any royalty or licensing fees for their service song. A company spokesperson noted, "It was the right thing to do."

For the past 77 years, attempts to either purchase the copyright or release to the public domain have been made by various Coast Guard-affiliated groups. The first attempt occurred in 1940, when the Coast Guard Academy Alumni Association unsuccessfully attempted to purchase the rights from Sam Fox Publishing Co. Attempts have increased during the past decade, but the rights and licenses remain with Warner/Chappell, ASCAP, and Alfred Music.

It was possible that a legal challenge could be pursued on the basis that Miller, with the best intentions, unwittingly sold government property to a private entity without proper authorization. *Semper Paratus* was written on a Coast Guard vessel by a Coast Guard employee and musically arranged by several different government employees, all with the intention to create a service anthem for the Coast Guard. In addition, the initial copyright was registered to an office within Coast Guard Headquarters. These factors indicate the song was government property and subsequently in the public domain 10 years before the copyright was sold.

Reclaiming *Semper Paratus* was not a matter of mission execution and certainly is not the most pressing issue the service faces today. The Coast Guard has successfully undertaken countless missions and directly met its challenges in the past 77 years regardless of the song's ownership. However, ownership of the song is a matter of service pride; moreover, it's a matter of principle. The U.S. Coast Guard Band should not have to pay for the privilege to record *Semper Paratus*.

In early 2024, that privilege was restored when *Semper Paratus* was officially released to the public domain.

Editor's note: This article originally appeared in the December 2015 issue of The Bulletin, Vol. 77, No. 6.

About the author:

LCDR Krystyn Pecora is currently the External Affairs Officer for the Fifth Coast Guard District. She is a permanent cutterman having served aboard Sitkinak, Bertholf, *and* Sherman *(twice). She graduated from the Coast Guard Academy in 2004 and earned her Masters in media and communications studies from Florida State University in 2013.*

A U.S. Coast Guard Band member warms up as a boat patrols the Potomac River near Fort Lesley J. McNair in Washington, D.C., in May 2010. DoD photo by Cherie Cullen

Semper Paratus

By Coast Guard CAPT Francis Saltus Van Boskerck

First Verse
From Aztec Shore to Arctic Zone,
To Europe and Far East,
The Flag is carried by our ships
In times of war and peace;
And never have we struck it yet
In spite of foemen's might,
Who cheered our crews and cheered again
For showing how to fight.

Chorus
We're always ready for the call,
We place our trust in Thee.
Through surf and storm and howling gale,
High shall our purpose be.
"Semper Paratus" is our guide,
Our fame, our glory too.
To fight to save or fight and die,
Aye! Coast Guard we are for you!

Second Verse
***Surveyor* and *Narcissus*,**
The *Eagle* and *Dispatch*,
The *Hudson* and *Tampa*,
These names are hard to match;
From Barrow's shores to Paraguay,
Great Lakes or ocean's wave,
The Coast Guard fights through storms and winds,
To punish or to save.

Third Verse
Aye! We've been always ready!
To do, to fight, or die
Write glory to the shield we wear
In letters to the sky.
To sink the foe or save the maimed,
Our mission and our pride.
We'll carry on 'til Kingdom Come,
Ideals for which we've died.

Chemical of the Quarter

Understanding Lithium Batteries

by Hillary Sadoff
Chemical Engineer
Hazardous Materials Division
U.S. Coast Guard Office of Design and Engineering Standards

What is it?

In Fall 2020, lithium batteries were featured in the Chemical of the Quarter. So, why would an update about batteries be needed so soon? Well, batteries keep our lives going. Most people use cellphones, smart watches, laptops, electric toothbrushes, and even hybrid or electric vehicles. These all contain batteries, but most people do not think of the significant risk they pose.

What's Changed?

New battery chemistries, like sodium and hybrid lithium and sodium, have been developed and are being added to model regulations. With new chemistries, these batteries are regulated during transportation in the same way as other Class 9 goods within Title 49 CFR, the hazardous materials regulations, and the International Maritime Dangerous Goods Code.

New battery chemistries are being transported as Class 9 goods. Courtesy photo

In December 2021, the United Nations' Sub-Committee on the Transportation of Dangerous Goods (UNTDG) agreed to add two new entries to the Dangerous Goods List of the Model Regulations:

- UN 3551 Sodium ion batteries with organic electrolyte
- UN 3552 Sodium ion batteries with organic electrolyte contained in equipment or packed with equipment

In December 2023, the UNTDG agreed to update the model regulations again. The next issuance of the model regulations will be in force in January 2025, and significant strides are being made to reduce the risks associated with batteries in transportation. Hybrid batteries now have text outlining conditions that must be met before transportation, and the lithium or sodium battery mark will be known as a universal battery mark.

Used throughout the transportation chain, this mark is a visual aid indicating to first responders that a package contains a battery that poses a risk. Further, the UNTDG decided that vehicles powered only by hybrid batteries containing both lithium-ion cells and sodium-ion cells shall be assigned to the entry UN 3556 Vehicle, Lithium Ion Battery Powered. This makes clearer which UN number to assign when transporting a vehicle, as well as alerts shippers and first responders to the hazard.

Why should I Care?

When lithium batteries become overheated or damaged, they can undergo an exothermic reaction known as thermal runaway, which causes more heat to be generated. If multiple batteries are transported next to one another, the heat from one damaged battery can spread to another battery, making any fire larger. A secondary concern to thermal runaway is the release of gases. A reaction between lithium and water, from firefighting or even just humidity in the air, can produce highly flammable hydrogen gas. Further, batteries undergoing thermal runaway can release corrosive gases that are harmful to first responders and others that may breathe in the smoke.

What is Being Done?

The International Maritime Organization is addressing recent concerns regarding vessel transportation of vehicles, including electric and hybrid vehicles powered by lithium-ion batteries, through a correspondence group. The group is revising the special provisions for the carriage of vehicles on vessels in the International Maritime Dangerous Goods Code.

About the author:
Hillary Sadoff, who coordinates the International Maritime Organization correspondence group, is a chemical engineer in the Coast Guard's Hazardous Materials Division in the Office of Design and Engineering Standards. Her primary responsibilities revolve around areas of packaged hazardous materials shipments by water. She serves as the Coast Guard's subject matter expert for rulemaking projects, harmonizing international and domestic packaged hazardous materials regulations. She earned her degree in chemical engineering from the University of Maryland, College Park, and has a graduate certificate in project management from Boston University.

Nautical Engineering Queries

Questions

Prepared by NMC Engineering Examination Team

1. An eight cylinder, four-stroke cycle, single acting diesel engine has a 650 mm bore and a 1,400 mm stroke. What will be the developed indicated metric horsepower if the average mean effective pressure is 30 kg/cm2 at a speed of 100 RPM?

A. 1,689 kW
B. 9,111 kW
C. 12,388 kW
D. 24,766 kW

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2. Concerning the charging of refrigerant into a vapor compression refrigerating system, which of the following is true?

A. When charging as a vapor it should be directly to the receiver only.
B. When charging as a liquid it may be to the low or high side.
C. When charging as a liquid it should be to the high side only.
D. When charging as a liquid it should be to the low side only.

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3. What is the purpose of heat-treating steel?

A. Develop ductility
B. Relieve stresses
C. Improve machining qualities
D. All of the above

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4. In order for the automatic lifeboat drain to operate properly,

A. the cap should be removed to drain the boat when it is waterborne.
B. the cage must be free of rubbish or the ball may not seat properly.
C. there is an automatic ball check located in a siphon tube.
D. the small lever to release the rubber ball float must be turned counterclockwise.

1. A. 1,689 kW — Incorrect answer

B. 9,111 kW — **Correct answer.** Using a P-V diagram and its resultant information, will identify the thermodynamic information which can express the mechanical efficiency of an engine. N x p x l(m) x a(cm2) x n / 4500″

C. 12,388 kW — Incorrect answer

D. 24,766 kW — Incorrect answer

Reference: Modern Marine Engineer's Manual, *Vol. II, pages 16-12 to 16-15. N x p x l(m) x a(cm2) x n / 4500*

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2. A. when charging as a vapor it should be directly to the receiver only — Incorrect answer

B. when charging as a liquid it may be to the low or high side — Incorrect answer

C. When charging as a liquid it should be to the high side only. — **Correct answer.** "Liquid refrigerant is charged into the system through the charging valve upstream of the filter-drier. In this way the refrigerant vaporizes as it passes through the evaporator

D. when charging as a liquid it should be to the low side only — Incorrect answer

Reference: Marine Refrigeration and Air Conditioning, *Harbach, p. 276*

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3. A. Develop ductility — Incorrect answer

B. Relieve stresses — Incorrect answer

C. Improve machining qualities — Incorrect answer

D. All of the above — **Correct answer.** Heat treatment consists of heating a metal alloy to a temperature below its melting point and then cooling it in a particular manner. The result is some desired change in the material properties."

Reference: Introduction to Marine Engineering, *Taylor, page 331 to 332*

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4. A. the cap should be removed to drain the boat when it is waterborne — Incorrect answer

B. the cage must be free of rubbish or the ball may not seat properly — **Correct answer.** One or more drains are provided in each lifeboat to allow for water to run out when the boat is out of the water. A small metal cage forms part of the drain extending below the shell of the boat. Within the cage, a rubber ball floats when the boat is in the water to act as an automatic closing valve.

C. there is an automatic ball check located in a siphon tube — Incorrect answer

D. the small lever to release the rubber ball float must be turned counterclockwise — Incorrect answer

Reference: The Cornell Manual for Lifeboatman, *2nd Ed, Keever, page 12*

Nautical Deck Queries

Questions

Prepared by NMC Engineering Examination Team

1. BOTH INLAND & INTERNATIONAL The term "power-driven vessel" refers to any vessel _____

A. with propelling machinery onboard whether in use or not.
B. with propelling machinery in use.
C. making way against the current.
D. traveling at a speed greater than that of the current.

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2. A situation has occurred where it becomes necessary for you to be towed. What action should be taken to prevent your vessel from yawing?

A. Shift weight to the bow.
B. Shift weight to the center of the boat.
C. Shift weight to the stern.
D. Throw excess weight overboard

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3. On an OSV, when may a work vest be substituted for a required life jacket?

A. To replace a damaged life jacket
B. For use during fire drills
C. For use during boat drill
D. At no time

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4. Which are the two most effective generating forces of surface ocean currents?

A. Temperature and salinity differences in the water
B. Wind and density differences in the water
C. Water depth and underwater topography
D. Rotation of the earth and continental interference

1. A. with propelling machinery onboard whether in use or not — Incorrect answer

B. with propelling machinery in use — **Correct answer.** "The term 'power-driven vessel' means any vessel propelled by machinery."

C. making way against the current — Incorrect answer

D. traveling at a speed greater than that of the current — Incorrect answer

Reference: International and Inland Rule 3(b)

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2. A. Shift weight to the bow — Incorrect answer

B. Shift weight to the center of the boat — Incorrect answer

C. Shift weight to the stern — **Correct answer.** *"A small boat in tow should be trimmed by the stern; trimming by the head causes (the vessel) to yaw. In a seaway, this condition is aggravated and it is increasingly important to keep the bow relatively light."*

D. Throw excess weight overboard — Incorrect answer

Reference: Chapman Piloting and Seamanship, *68th Ed., page 366*

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3. A. To replace a damaged life jacket — Incorrect answer

B. For use during fire drills — Incorrect answer

C. For use during boat drills — Incorrect answer

D. At no time — **Correct answer.** *"(b) The vest may not count towards the vessel's complement of lifejackets. (c) The vest may not be worn instead of a lifejacket during a drill."*

Reference: 46 CFR 131.720(b)(c)

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4. A. Temperature and salinity differences in the water — Incorrect answer

B. Wind and density differences in the water — **Correct answer.** *"The surface circulation of the world's oceans is mostly wind-driven…The primary generating forces of ocean currents are wind and differences in water density caused by variations in heat and salinity."*

C. Water depth and underwater topography — Incorrect answer

D. Rotation of the earth and continental interference — Incorrect answer

Reference: Bowditch *2019 Ed, Vol. I, page 583*

In the News: Man Rescued Near the Bahamas

A U.S. Coast Guard Air Station Clearwater MH 60 Jayhawk crew hoists a man from a disabled vessel adrift near Samana Cay, Bahamas, on May 20, 2024. The individual was promptly given electrolytes and water and reported in good health. Coast Guard photo by LT Scott Kellerman

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The *Marine Electric*, a 605 foot World War II era cargo ship, was nearly 40 years old when it broke apart in stormy seas off the coast of Virginia on February 12, 1983. Thirty one of the 34 crew members succumbed to hypothermia. This tragedy spurred several seminal improvements to safety standards. It also prompted the establishment of the Coast Guard rescue swimmer program. Coast Guard photo