

# **Letter Report**

## **Impact of United States Coast Guard Regulations on United States Flag Registry**

**Transportation Research Board  
*of the National Academies  
of Sciences, Engineering, and Medicine***

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*The National Academies of*  
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TRANSPORTATION RESEARCH BOARD

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Dear Admiral Zukunft:

As required in Section 605 of the Howard Coble Coast Guard and Maritime Transportation Act of 2014 (P.L. 113-281, enacted December 18, 2014), Congress directed the Commandant of the United States Coast Guard (USCG)<sup>1</sup> to engage the National Academies of Sciences, Engineering, and Medicine “to conduct an assessment of authorities under subtitle II of title 46, United States Code, that have been delegated to the Coast Guard and that impact the ability of vessels documented under the laws of the United States to effectively compete in international transportation markets.” The assessment was to “include a review of differences between United States laws, policies, regulations, and guidance governing the inspection of vessels documented under the laws of the United States and standards set by the International Maritime Organization [IMO] governing the inspection of vessels.” The Commandant was required to submit a report to the Committee on Transportation and Infrastructure of the House of Representatives and the committee on Commerce, Science, and Transportation of the Senate within 6 months of engaging the National Academies to carry out the study.<sup>2</sup>

Given the breadth of the requested assessment and the limited time provided for its completion, Transportation Research Board (TRB) staff of the National Research Council (NRC)

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<sup>1</sup> A list of acronyms used in this report can be found in Enclosure E.

<sup>2</sup> <https://www.govtrack.us/congress/bills/113/s2444/text>.

and congressional staff agreed to limit the study to a peer review of two reports that assess impediments to U.S. flag registry for vessels engaged in international commerce: (a) a September 3, 2013, USCG report entitled *Impediments to the United States Flag Registry, Report to Congress*;<sup>3</sup> and (b) a September 2011 U.S. Maritime Administration (MARAD) report entitled *Comparison of U.S. and Foreign-Flag Operating Costs*.<sup>4</sup>

This letter report contains the assessment conducted by the committee convened by NRC for this purpose. The names of the committee members and their affiliations are listed in Enclosure A, and biographical information about the members is provided in Enclosure B.

After the committee was convened, it reviewed the two reports and held a 2-day meeting, at which time it was briefed by USCG personnel, congressional staff, and PricewaterhouseCoopers (PwC) personnel who conducted the surveys and provided the background report to MARAD as input to their report. The committee also heard presentations at the meeting from the U.S. Maritime Coalition and from companies in the supplier, containership, offshore supply vessel (OSV), and classification society domains who offered their perspectives. Other attendees were invited to participate in the open discussions throughout the meeting. The names and affiliations of the participants in the meeting are included in Enclosure C. After deliberating in private on the contents of the reports and on the information it had received, the committee identified additional information needed to accomplish its charge and how to obtain it. The committee completed its report through a series of follow-up conference calls and correspondence. The completed report was independently reviewed by external individuals whose names were not known to the committee at the time of the review. The committee's response to these reviews and subsequent changes to the report were approved by NRC. The names of the reviewers appear in Enclosure D.

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<sup>3</sup> *Impediments to the United States Flag Registry, Report to Congress*. United States Coast Guard, U.S. Department of Homeland Security, 2013.

<sup>4</sup> *Comparison of U.S. and Foreign-Flag Operating Costs*. Maritime Administration, U.S. Department of Transportation, 2011.

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## SUMMARY

The committee reviewed the 2013 USCG *Impediments* report<sup>[3]</sup> and the 2011 MARAD *Comparison* report.<sup>[4]</sup> The USCG report presents “the historical and current efforts by the Coast Guard to harmonize its regulations with international requirements, and provide as much autonomy as possible to the maritime industry” (p. 2). Thus, in the report, USCG focused on design and engineering standards for vessels that require international certificates. According to USCG, the Alternative Compliance Program (ACP) and the Maritime Security Program (MSP) are U.S. flag registry programs “intended to enhance the U.S. flag position in an increasingly competitive international market” (p. 2).

The USCG *Impediments* report discusses USCG’s actions with respect to ACP but only briefly mentions MSP, which the committee believes is the more relevant program to an assessment of international competitiveness. Unlike Jones Act vessels, MSP vessels are exclusively engaged in international trade. The costs of operating under the U.S. flag, after taking into consideration MSP payments and the benefits of cargo preference, must be commensurate with foreign flag costs before an owner will elect to transfer to U.S. registry.

The MARAD report<sup>[4]</sup> examines some of the major cost drivers that affect vessel owners’ decisions on whether to register their vessels under the U.S. flag or a foreign flag. The cost factors examined in the MARAD report include crew, stores and lubricating oils, maintenance and repair (M&R), insurance, and overhead costs.

This committee report discusses and compares the cost factors that affect the competitiveness of the U.S. flag registry, including the cost of complying with USCG regulations.

Over the last 30 years, considerable progress has been made in decreasing U.S. flag regulatory compliance costs while marine safety and environmental performance have seen continuous improvement. The committee finds that the increased costs related to USCG regulatory compliance are now relatively small compared to the increased operational costs associated with crewing and insurance, and therefore concludes that USCG regulatory compliance is not a major impediment to the competitiveness of the U.S. flag registry. However, the committee believes there is room for further improvement in the regulatory process that could reduce costs without increasing safety risk. This report identifies and recommends actions USCG can take in the short term with existing authority to bring about further improvements and other actions that require enabling legislation to be enacted.

*Organization of the Committee's Report.* Following the opening section of introductory comments, this committee report is organized into six additional sections and a conclusion. The second section offers an overview of programs to promote U.S. flag registry and discusses MSP and the Cargo Preference (CP) program. The third section comments on the data presented in the MARAD report and discusses U.S. flag versus foreign flag costs to provide an understanding of the impact of USCG regulations on cost. This economic perspective is followed in the fourth section by a historical perspective on the USCG regulatory process, including ACP. The fifth section contains an assessment of USCG certification and inspection of MSP vessels and the first three of the committee's nine major recommendations. The sixth section provides the committee's assessment of USCG regulations and inspection processes and includes the remaining six recommendations. This section's assessment is divided into the following topics: USCG regulations (Recommendation 4); USCG type approvals (Recommendation 5); USCG auditing, review, inspection, and appeals processes (Recommendations 6 and 7); harmonization



of USCG regulations with international regulations (Recommendation 8); and the regulatory development process (Recommendation 9). The final section considers the effects of non-USCG legislation and regulations.

*USCG Administration of ACP.* The committee finds ACP has significantly reduced the cost of compliance and commends USCG for forging the partnerships with ACP approved classification societies (ACS) that have enabled ACP to be so successful. In particular, the relationship with the American Bureau of Shipping (ABS) has enabled USCG to benefit from the technical expertise of this classification society, which is exposed to the larger world fleet and is on the front line of assessing innovative technologies. The committee believes it is now time to build on this relationship and transfer further responsibilities to ACS. Steps that can be taken to mitigate the regulatory burden are described in Recommendations 4 through 6.

*USCG Certification and Inspection of MSP Vessels.* MSP vessels represent the majority of U.S. flag vessels competing internationally and are, therefore, of primary relevance to this report. Although the Coast Guard believes their certification and inspection process for MSP vessels is consistent with the law and has worked to clarify their requirements, the committee has heard from affected industry representatives that certain USCG requirements applied during vessel reflagging and operation are not consistent with their expectations based on the law. The committee notes that several requirements do not appear to lead to a significant improvement in safety.

The committee's nine recommendations are given here and discussed in greater detail in the report.

**Recommendation 1: The committee recommends that MSP vessels from operating companies with proven safety records in MSP be allowed to enroll in MSP Select at the time of reflagging. Navigation and Vessel Inspection Circular (NVIC) 01-13 Change 1 indicates that MSP Select vessels may be reviewed by a classification society (class), similar to the ACP procedures, without categorically stating the ACP procedure should be applied. A formal tie should be established between the ACP supplements and MSP for modifications and upgrades of vessels enrolled in MSP Select such that MSP vessels are required to meet a standard no higher than that required for ACP vessels.**

**Recommendation 2: The committee recommends application of ACP procedures for acceptance of replacement equipment for MSP vessels. In the interest of providing flexibility in selecting equipment suited to existing vessel arrangements, consideration should be given to allowing type approvals in accordance with ACS rule requirements and international standards only.**

**Recommendation 3: The committee recommends that vessels with a documented history of safe and reliable operation using periodically unmanned machinery space (PUMS) at the time of reflagging should be permitted to continue such operations after about 1,000 hours of operation. If the crew has prior experience operating similar ships with similar control and alarm systems, consideration should be given to eliminating the waiting period.**

**Recognizing that the intent of the MSP legislation was to allow a seamless transfer of international flag ships to U.S. flag, the application of 46 Code of Federal Regulations (CFR) Part 62 Vital Systems Automation requirements to MSP vessels already fully**

**documented for PUMS under international and ACS requirements should be given further consideration.**

*USCG Regulations (Title 46 CFR Shipping and ACP U.S. Supplements).* Notwithstanding prior efforts to harmonize USCG regulations with international regulations and classification society rules, the committee believes a comprehensive risk-based assessment of the costs and benefits of CFR regulations would identify possible reductions in the scope of regulations without sacrificing safety and environmental protection. MSP vessels, almost all of which meet class rules and international regulations but are operated under U.S. flag with U.S. mariners, can serve as a source to compare safety records with those of ACP vessels with comparable service.

**Recommendation 4: The committee recommends that USCG perform a risk-based assessment of the costs and benefits of each regulation in the CFR that exceeds international requirements, eliminating those regulations that cannot be justified on a cost-benefit basis. The committee recognizes the recommended risk-based assessment is a major, long-term effort that may require additional resources for USCG. Therefore, priority should be given to the review of those regulations included in the ACP supplements that apply to vessels with International Convention for the Safety of Life at Sea (SOLAS) certification. The first step in this process should be a comprehensive review of the ACP supplements by USCG in collaboration with ACS and the maritime industry to identify regulations that ACS and/or industry consider redundant or unjustifiable.**

*USCG Type Approvals.* The committee finds that ship owners incur significant costs obtaining certain equipment that is required to be USCG type approved. Due to the limited size

of the U.S. market, USCG type approval requirements can also limit access to the newest and best equipment.

**Recommendation 5: The committee recommends that USCG accept type approval through approved class societies in lieu of USCG-specific approval. This action will build on existing USCG policy that recognizes European Union (EU) type approvals for certain equipment.**

*USCG Auditing, Review, Inspection, and Appeals Processes.* The committee finds overlap between the USCG vessel inspection and plan review processes and those administered by ACS. The partnership with ACS has worked well. The committee believes it is now time to build on this relationship and transfer further responsibilities to ACS.

**Recommendation 6: It is the opinion of the committee that ACS design review and survey personnel can effectively execute their plan review and vessel inspection responsibilities and that USCG can meet its responsibilities by serving in a safety, quality assurance, and oversight role rather than in a project and vessel oversight role. USCG's goal should be to monitor ACS while allowing ACS to perform the vessel inspection role with minimal redundancy between ACS and USCG. With this approach, USCG would still periodically inspect vessels as part of process oversight checking. Current USCG ACS plan review and inspection oversight actions outlined in NVIC 02-95 should be evaluated and streamlined. Application of modern information systems and auditing techniques should be employed to enhance the effectiveness and efficiency of ACS oversight.**

**Recommendation 7: A streamlined process for exemptions, interpretations, and appeals is needed. The current process, as outlined in NVIC 16-82, does not always work as planned, particularly with respect to timeliness.**

*Harmonization of USCG Regulations with International Regulations.* The committee finds that USCG leadership presence at IMO has been instrumental in bringing about higher international standards applicable to all SOLAS–certified and International Convention for the Prevention of Pollution from Ships (MARPOL)–certified vessels, both of U.S. registry and the international fleet.

**Recommendation 8: The committee commends the continued strong U.S. presence at IMO, which is critical to reducing the number of U.S.-specific regulations and raising the safety and environmental performance of the world fleet. USCG should maintain its commitment to raising the standards of international regulations. This goal is most effectively achieved through partnership with ACS and the maritime industry. Thus, USCG should continue to partner with and proactively seek technical expertise from industry experts to serve as advisors on the USCG IMO delegations.**

*Regulatory Development Process.* The committee finds that the USCG process for developing new regulations is robust and well documented. However, regular assessment of the impact of the regulations against preestablished metrics and through comparisons to the world fleet is needed. Performance metrics could include response time for applications, number of vessels enrolled, number and frequency of stakeholder consultations, and regulatory

effectiveness.

**Recommendation 9: USCG should promote continuous, effective, and inclusive communication through periodic scheduled consultation with stakeholders regarding both existing and proposed regulations. Metrics should be established and performance monitored, with regular and timely reporting of results. Whenever practical, regulations should be descriptive and performance based rather than prescriptive.**

The final section of the report, which discusses the impact of non-USCG legislation and regulations, provides a brief commentary on other impediments identified during the committee's review that are not the result of USCG legislation and regulations. Although the committee believes these issues warrant further consideration and investigation, they lie outside the scope of the committee's statement of task.

## **COMMITTEE REPORT**

### **Introductory Comments**

In the early 1990s, operators of U.S. flag ships expressed concerns that USCG regulations applied to U.S. flag vessels introduced extra costs that made it difficult for vessel owners to justify operating under the U.S. flag when competing in international trade. One of industry's specific requests was that USCG align its regulations and policies with IMO standards. Another request was that USCG eliminate the duplicative effort required by USCG and classification

societies. To achieve this goal, USCG set up ACP, which allows classification society review and inspection to substitute for those of the USCG. USCG prepared a report to Congress in September 2013 documenting its efforts to conform its programs to IMO requirements.<sup>[3]</sup>

However, concerns remain among some vessel owners and operators; hence the request for this study.

Domestic vessels operate between U.S. ports, which include ports in Puerto Rico, Hawaii, and Alaska. These vessels are subject to the provisions of the Merchant Marine Act of 1920, generally referred to as the Jones Act. Among other provisions, the Jones Act requires that all vessels trading between U.S. ports are of U.S. registry and constructed in the United States. U.S. flag vessels involved in international commerce move cargo between nations, including the United States. Those U.S. flag vessels operating exclusively in international trade may be, and usually are, of foreign construction. All U.S. flag vessels must be crewed by U.S. citizens and U.S. permanent residents.

One hundred sixty-five<sup>5</sup> oceangoing cargo vessels operate under the U.S. flag, about evenly divided between domestic and international trade. The international fleet, however, is dwindling. From a high of nearly 1,300 vessels in the aftermath of World War II, the number of U.S. flag ships in international commerce is currently estimated to be 77,<sup>5</sup> which is less than 1% of the world fleet.

The U.S. flag fleet involved in international commerce is sustained by two federal programs designed to offset the higher cost of operating under the U.S. flag: MSP and the CP

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<sup>5</sup> [http://www.marad.dot.gov/wp-content/uploads/pdf/DS\\_CY15-US-Flag-Fleet-Summary-20151030.pdf](http://www.marad.dot.gov/wp-content/uploads/pdf/DS_CY15-US-Flag-Fleet-Summary-20151030.pdf).

program. MSP provides funding of just over \$3 million annually per vessel to privately owned cargo ships that are useful to the military. On November 25, 2015, the National Defense Authorization Act for Fiscal Year 2016 was signed into law increasing MSP funding to \$3.5 million per vessel for the current fiscal year. At \$3.5 million per vessel, however, MSP funding does not fully offset the cost of operating under the U.S. flag. The authorized funding will increase to \$ 4.999 million in FY 2017; to \$5.0 million in FYs 2018 through 2020; and to \$5.2 million in FY 2021.<sup>6</sup> No commitment has been made by Congress for FY 2022 and beyond, but a determination is expected before that deadline. Congress emphasized its commitment to MSP in Section 3502 of the act, stating that “It is the sense of Congress that dedicated and enhanced support is necessary to stabilize and preserve the Maritime Security Fleet program, a program that provides the Department of Defense (DOD) with on-demand access to world class, economical commercial sealift capacity, assures a United States-flag presence in international commerce, supports a pool of qualified United States merchant mariners needed to crew United States-flag vessels during times of war or national emergency, and serves as a critical component of our national security infrastructure.”

The military can call on these vessels to support military missions through the Voluntary Intermodal Sealift Agreement (VISA) program. At present, the 57 vessels in MSP are required to enroll in this program.<sup>[5]</sup> One hundred fourteen vessels participate in the VISA program.<sup>7</sup> CP applies to 100% of military cargoes and Export-Import Bank cargoes, which must be shipped on U.S. flag vessels, and to 50% of U.S. food aid cargoes. Under limited circumstances MARAD may grant a waiver to these requirements. These programs are described more fully below.

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<sup>6</sup> <http://www.amo-union.org/News.aspx?code=201601-04>.

<sup>7</sup> <http://www.trans-inst.org/defense-programs.html>.



Given the unresolved concern regarding the competitiveness of U.S. flag vessels, the 2014 U.S. Coast Guard Authorization bill directs the Commandant to engage the National Academies to “conduct an assessment of authorities under subtitle II of title 46, United States Code, that have been delegated to the Coast Guard and that impact the ability of vessels documented under the laws of the United States to effectively compete in international transportation markets,” including “a review of differences between United States laws, policies, regulations, and guidance governing the inspection of vessels documented under the laws of the United States and standards set by the International Maritime Organization governing the inspection of vessels.” TRB staff and congressional staff agreed this study would be limited to a peer review of two reports that assess impediments to U.S. flag registry for vessels engaged in international commerce: (a) a 2013 USCG report addressing potential impediments caused by more extensive safety oversight of vessels than is required internationally<sup>[3]</sup> and (b) a 2011 MARAD report that relies on surveys of, and interviews with, operators of U.S. flag vessels.<sup>[4]</sup> For the latter report, PwC surveyed companies operating under the U.S. flag about the major impediments to competing for international cargo. Their September 2011 report (Appendix C of the MARAD report<sup>[4]</sup>) identifies labor costs and the uncertainty of MSP and CP funding as major impediments.

### **Overview of Programs to Promote the U.S. Registry**

For many years, the U.S. registry has been negatively affected by a variety of factors, including the high cost of U.S. labor, taxes, and insurance, as well as environmental and other regulations

that frequently exceed the regulations applicable to foreign flag vessels. Congressionally mandated programs intended to offset these higher costs and enhance the competitiveness of U.S. flag vessels engaged in foreign trade include MSP and the CP program, both of which are administered by MARAD.

The CP program requires certain government-impelled ocean-borne cargo to be moved on U.S. flag vessels. The Military Cargo Preference Act of 1904 mandates that 100% of military cargo moves on U.S. flag vessels, Public Resolution of the 73rd Congress mandates 100% of Export-Import Bank–supported cargoes moves on U.S. flag vessels, and the Cargo Preference Act of 1954 mandates that at least 50% of agricultural cargoes and civilian agency cargoes moves on U.S. flag vessels. The intent of these laws is to provide a revenue base to help sustain U.S. flag vessels engaged in international trade. The volume of all types of preference cargo shipped in 2013 was less than half of that shipped in 1990. The magnitude of this decline was partly offset by increased military shipments between 2002 and 2010, but these shipments have fallen sharply in recent years.<sup>8</sup>

On October 8, 1996, the President signed the Maritime Security Act of 1996 establishing the MSP for fiscal years 1996 through 2005. Subsequently, MSP has been twice reauthorized, until fiscal year 2025. The program requires the Secretary of Transportation, in consultation with the Secretary of Defense, to establish a fleet of active, commercially viable, military-useful, privately owned vessels to meet national defense and other security requirements.

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<sup>8</sup> *Impacts of Reductions in Government Impelled Cargo on the U.S. Merchant Marine: A Report to Congress.* Maritime Administration, Washington, D.C., April 2015.

The need for this program had become evident when the military sought the use of U.S. flag vessels for the first Iraq Conflict in 1990. The U.S. Navy Military Sealift Command had difficulty rapidly securing enough tonnage to serve their needs even though some U.S. flag vessels had previous agreements to do so. Some container line operators were unwilling to submit their vessels to chartered military service due to the disruption it would cause in their commercial liner services. At that time, many U.S. vessel owners were fully involved in global container trades with their vessels, containers, intermodal chassis/railcars, and international port facilities. Companies believed that pulling vessels out of this complex network to serve a military conflict would cause irreparable damage to their individual market segments. Although the military needs were served in this conflict by a portion of the available U.S. flag capacity via negotiated Special Middle East Shipping Agreements (SMESA) for liner type service, time charters, and some foreign flag tonnage, a more robust solution was needed for future transportation support for U.S. deployed troops.

The solution was VISA, which started as a dialogue between the U.S. Transportation Command (USTRANSCOM) and the maritime industry. This discussion developed into a formal partnership between the U.S. government and the industry to provide the DOD with “assured access” to commercial sealift and intermodal capacity to support the emergency deployment and sustainment of U.S. military forces. The intermodal capacity the U.S. flag vessel owners offered included their ships, equipment, terminal facilities, and intermodal management services.

The VISA program provides for a time-phased activation of U.S. vessels and intermodal equipment to coincide with DOD requirements while minimizing disruption to commercial service. In addition, U.S. operators have the flexibility to temporarily use chartered foreign flag

tonnage to fill any gaps in their commercial networks caused by their shifting ships to military service.

VISA provides U.S. flag vessel owners with the operational plans and detailed procedures with which USTRANSCOM will integrate U.S. flag assets into serving deployed U.S. Armed Forces. The MSP legislation provides all the contractual obligations on both sides to allow this service to exist in foreign trades, including mandatory enrollment in VISA. As compensation for enrolling vessels in MSP, each vessel receives an annual payment from MARAD as authorized by annual appropriations from Congress. The purpose of the payment is to partly compensate for the cost difference between U.S. flag operation and non-U.S. flag operation in order to encourage suitable vessels to enroll in MSP.

Because this payment does not fully compensate the owners for the cost of U.S. flag operation of their U.S. vessels, owners must rely on U.S. preference cargo to cover much of their additional costs. With the operating costs (mostly labor) going up faster than the scheduled payments in the current MSP legislation, preference cargo plays an ever-increasing role in covering the higher U.S. flag costs.

46 U.S.C. 53102, *Establishment of Maritime Security Fleet*, delineates criteria for enrollment in MSP, including an age limit at the time of enrollment of 15 years for cargo vessels and 10 years for tankers; defines the citizenship requirements for vessel owners and operators; and requires a determination from DOD that a vessel is suitable for national defense or military purposes in time of war or national emergency. A vessel must be U.S. flagged to enroll in MSP and can only be engaged in foreign trade. Coastwise trading vessels are not eligible.

Due to the age and functionality of many of the U.S. flag vessels in existence when MSP legislation was passed, there is a provision in the law that facilitates USCG reflagging control over the foreign vessels brought into the MSP fleet. This provision is to encourage owners to make available modern, high-quality vessels that provide useful military capability. The legislation indicates that a vessel does not have to meet the CFR requirements or other normal requirements set by USCG for U.S. flag vessels, such as meeting the requirements of a U.S. supplement. The U.S. Coast Guard Authorization Act of 1996 (Public Law 104-324, Sec. 1137, Vessel Standards) states that “foreign vessels, which the Secretary has determined are qualified to be in MSP, shall be eligible for a certificate of inspection provided that:

- (1) The vessel is designed and classed under the rules of the American Bureau of Shipping (ABS) or other society accepted by the Secretary;
- (2) The vessel complies with international agreements and guidelines by the originally documenting country; and
- (3) That country has not been identified as not enforcing international vessel regulation.”

The legislation states that continued eligibility only requires the vessel to maintain compliance with the same standards as for its original enrollment. There are no other requirements in the law with which the vessel must comply to be reflagged and maintain its certificate of inspection (COI).

## **Economic Perspective**

The 2011 MARAD report,<sup>[4]</sup> which predates NVIC 01-13 and NVIC 01-13 Change 1 (discussed in another section of this report), compares the operating costs of U.S. flag vessels engaged in foreign commerce and foreign flag vessels engaged in foreign commerce. The U.S. fleet engaged in foreign commerce is categorized under five ship types: containerships, roll-on/roll-off (RORO) vessels, bulk carriers, general cargo vessels, and tank vessels.

Vessel costs can be divided into the following three categories:

- Operating costs – all costs involved with the operation of the vessel, including crew, stores and lubes, M&R, insurance, and overhead;
- Capital costs – the cost of designing, building, and delivering the ship; and
- Voyage costs – the fuel, canal tolls, and port charges incurred during a voyage.

Operating costs are most applicable to assessing U.S. flag competitiveness in foreign trade as these costs are directly affected by compliance with U.S. law, including USCG regulations. The MARAD report limited discussion to operating costs. Capital costs are considered briefly in the following text as the increased construction cost associated with USCG regulatory oversight provides an indication of the added scope of USCG regulations compared to international standards. Voyage costs are comparable regardless of flag and will not be considered further in this letter report.

Table 1 summarizes daily operating costs for U.S. flag and foreign flag containerships for 2010. MARAD's U.S. flag cost figures are taken from data in MARAD's possession and data

gathered by PwC, which carried out the study on behalf of MARAD. In 2010, MARAD received operating cost data for 84 U.S. flag vessels engaged in foreign trade, 40 of which are containerships. Foreign flag costs were taken from *Ship Operating Costs Annual Review and Forecast*.<sup>9</sup> According to these data, in 2010 the operating costs for U.S. flag containerships were 2.2 times higher than their foreign flag counterparts, and crew costs were 5.5 times higher.

Operating costs, particularly those related to stores, lube oil, M&R, and insurance, vary significantly with ship size. To assess the reasonableness of the MARAD foreign flag data, the committee obtained estimates of operating costs for 4,500- and 6,000-TEU containerships from the database of the Herbert Engineering Corporation’s (HEC) ship evaluation program, as a majority of U.S. flag containerships in foreign trade are in this size range. HEC’s figures are derived from a variety of sources, including Moore Stephens “OpCost” publications<sup>10</sup> and Drewry publications. The MARAD operating costs for foreign flag containerships are in reasonable agreement with the HEC data.

Table 1. Daily Operating Costs for U.S. and Foreign Flag Vessels for 2010

<b>Daily Costs: year 2010</b>	MARAD U.S. Containerships	MARAD Foreign Containerships	Herbert Eng. Foreign 4,500 TEU	Herbert Eng. Foreign 6,000 TEU
Crew costs	\$14,872	\$2,698	\$2,711	\$2,840
Provisions, stores, supplies, lube oil	\$1,053	\$2,200	\$2,202	\$2,853
M&R, spare parts, drydocking	\$2,866	\$3,237	\$2,508	\$3,154
Insurance	\$959	\$868	\$1,018	\$1,235
Management fee/administration	\$1,444	\$581	\$964	\$1,139
Daily operating cost	\$21,194	\$9,584	\$9,402	\$11,221

SOURCE: *Comparison of U.S. and Foreign-Flag Operating Costs*. Maritime Administration, U.S. Department of Transportation, 2011; and HEC.

<sup>9</sup> *Ship Operating Costs Annual Review and Forecast*. Drewry Maritime Research, London, July 25, 2011.

<sup>10</sup> *Benchmarking Vessel Running Costs*. OpCost, Moore Stephens, London, 2009, 2011.

The committee offers the following observations regarding the data in Table 1:

- For U.S. crew costs, the MARAD report notes that in addition to wages, travel costs, benefits, and union fees, U.S. crew costs include subsistence. Databases for foreign flag vessels typically include provisions as a separate category. As provisions are less than 10% of total crew costs, this inconsistency does not unduly affect conclusions drawn from the data.
- International crew costs vary significantly depending on the nationality of the crew. For example, wages for European officers and a Filipino crew are more than double the wages for a vessel with Indian officers and an Indian crew. The HEC crew costs represent an average international crew cost.
- MARAD's cost figures for stores, supplies, and lube oil for U.S. flag vessels appear low; they are less than what is expected for lube oil alone.
- MARAD's M&R cost figures for foreign flag vessels exceed the M&R costs presented for U.S. flag vessels. It is the committee's experience that U.S. costs are higher for a variety of reasons, including the ad valorem duty for nonemergency repair work performed in foreign shipyards and the restriction on foreign riding crews. The MARAD report<sup>[4, p. 12]</sup> explains that "Carriers participating in the PwC survey rated maintenance, repair, and shipyard costs as the second biggest driver of higher U.S. flag operating costs (behind crew costs)." The report specifically referenced the ad valorem duty for nonemergency repair work performed in foreign shipyards and the restriction on foreign riding crews.



- MARAD’s insurance cost figures are only 10% higher for U.S. flag vessels. The two main components of vessel insurance are protection and indemnity (P&I) insurance and hull and machinery (H&M) insurance. Each represents roughly 40% to 50% of insurance costs. It is the committee’s experience that P&I costs are significantly higher for U.S.-crewed vessels. The MARAD report<sup>[4, p. 9]</sup> notes that “Carriers participating in the PwC survey revealed that insurance costs in the United States can be four to five times higher than vessel insurance costs under foreign registries, with protection and indemnity insurance premiums the major contributor to this difference.” As the MSP fleet is relatively young due to vessel age restrictions, it is reasonable to expect that the H&M insurance premiums will also be higher for these U.S. flag vessels.

Notwithstanding the concerns expressed above, the data provided in the MARAD report provide a basis for assessing increased costs for U.S. flag operation.

The MARAD report identified crew wages, insurance, and M&R as key cost items affecting the competitiveness of U.S. flag vessels. To gain an understanding of the relative impact of USCG regulatory compliance on the higher operating costs for U.S. flag vessels, the committee estimated the cost differential for these items and compared their extra costs to the cost of compliance.

Daily operating costs for containerships were taken from the MARAD report<sup>[4]</sup> and multiplied by 365 to obtain annual costs. These costs are presented in Table 2.

*Crew Cost.* U.S. flag containership annual crew cost (\$5,428,280) less foreign flag containership crew cost (\$984,770) equals \$4,443,510 additional costs. Total U.S. flag operating

cost is \$7,735,810 per year. Thus, the increase in crew cost is  $\$4,443,540/\$7,735,810 = 57.4\%$  of the total operating cost.

Table 2. Annual Operating Costs for Foreign Flag and U.S. Flag Containerships

	MARAD Containership Data	
	Foreign Flag	U.S. Flag
<b>Annual Costs: year 2010</b>		
Crew costs	\$984,770	\$5,428,280
Provisions, stores, supplies, lube oil	\$803,000	\$384,345
M&R, spare parts, drydocking	\$1,181,505	\$1,046,090
Insurance	\$316,820	\$350,035
Management fee/administration	\$212,065	\$527,060
Annual operating cost	\$3,498,160	\$7,735,810

SOURCE: *Comparison of U.S. and Foreign-Flag Operating Costs*. Maritime Administration, U.S. Department of Transportation, 2011.

*P&I Insurance Cost.* Roughly 40% of insurance cost is related to P&I insurance, and U.S. P&I costs are reportedly three to five times higher than the same costs for foreign flag vessels.<sup>[4]</sup> The additional P&I costs were estimated as follows: annual insurance costs for foreign flag vessels of  $\$316,820 \times 40\% = \$126,728$  in annual P&I premiums; U.S. flag P&I insurance is  $\$126,728 \times 4 = \$506,912$ . The additional cost over foreign cost is \$380,184, or 4.9% of total operating cost.

*50% Ad Valorem Duty.* Drydocking cost is taken at \$1,173,450 every 5 years, or \$234,690 annualized cost.<sup>11</sup> Certain tasks such as opening and inspection of tanks and machinery are not subject to duty. Assuming two-thirds of the drydocking cost is subject to the 50% tax, the

<sup>11</sup> Cost is derived from HEC's shipbuilding evaluation program database for a 4,500-TEU containership in foreign flag operation.

cost burden is  $\$234,690 \times (2/3) \times 50\%$ , equaling \$78,230 per year, or 1.0% of total operating cost. (Note: The drydocking cost assumes a relatively new vessel typical of the MSP fleet.

Drydocking costs for the older Jones Act ships often exceed \$3 million per docking.)

*USCG Regulatory Cost.* Using data provided by Maersk<sup>12</sup> and its own assessment, the committee estimates the initial cost to convert to U.S. flag following MSP requirements at about \$500,000 to \$1,000,000. (Reflagging outside of MSP is significantly higher in cost.) This cost includes about \$250,000 for PUMS upgrades. The ongoing additional cost of compliance under MSP will vary significantly year to year. The committee estimates this cost to be \$60,000 per year,<sup>[12]</sup> or 0.8% of total operating cost. Compliance costs are primarily related to costs for USCG inspections and the extra cost of USCG-mandated type approval when certain equipment is replaced. Although there is considerable uncertainty in this estimate, the increased cost of compliance will remain a very small portion of the higher operating costs associated with U.S. flag vessels. These findings are summarized in Table 3.

Table 3. Assessment of Increased Operating Costs for a U.S. Flag Containership for 2010

	Cost Difference (U.S. - Foreign)	Percentage of Annual Operating Cost
Crew costs	\$4,443,510	57.4%
P&I insurance	\$380,184	4.9%
50% ad valorem duty	\$78,230	1.0%
USCG regulatory cost	\$60,000	0.8%

<sup>12</sup> *Impediments to U.S. Flag.* Presentation to the committee on September 16, 2015, by Ed Hanley, Maersk Line, Ltd.

Although Jones Act ships, which must be built in the United States and operate primarily in the domestic trade, are not the primary focus of this report, assessment of the increased cost of building these vessels to USCG regulations under ACP provides an indication of the impact of these regulations on U.S. registry competitiveness. Based on the committee's own experience and estimates provided by GD NASSCO (a San Diego-based shipyard), the total cost of USCG compliance during construction in excess of the cost for construction under a flag of convenience and the International Association of Classification Societies (IACS) class is approximately 0.5% to 1.0% of the ship price.

Although the increase in U.S. crew costs over foreign crew costs is 57.4% of the total U.S. operating cost and the increase in U.S. P&I insurance is estimated at 4.9% of the total U.S. operating cost, the cost of compliance with USCG regulations versus a flag of convenience is estimated at only 0.8% of the total U.S. operating cost. **The committee finds that the direct costs of compliance with USCG regulations are not a major impediment to the competitiveness of U.S. flag vessels. This finding should not suggest that improvements in the compliance process are not needed. As discussed later in this report, although the introduction of ACP and the continued efforts to harmonize USCG rules with international regulations and class rules have significantly decreased the cost to sail under U.S. registry, more can be done to improve processes and lower costs associated with flagging vessels under the U.S. flag.**

The major impediments to the competitiveness of U.S. flag vessels are the cost of U.S. crew wages and benefits and, to a lesser extent, the cost of P&I insurance. Crew size for U.S. and internationally flagged oceangoing ships is roughly equivalent, as illustrated in Table 2 of the

MARAD report. However, depending on the makeup of the international officers and crew, U.S. crew costs are between 3.5 and 7.5 times international crew costs. At the committee meeting, Hanley<sup>[12]</sup> stated that U.S. crew costs grew at a rate of 3% to 5% in recent years. Moore Stephens data indicate foreign crew costs during the same period have increased at a rate of 2.2% to 3.4%. Consequently, the gap between U.S. and foreign flag operating costs is not expected to close in future years.<sup>13</sup>

Although USCG establishes manning requirements, it has no influence on the wages and benefits of U.S. crews. Similarly, the higher P&I costs are tied to U.S. legislation and are outside the scope of USCG jurisdiction.

### **Background on the USCG Regulatory Process, Including ACP**

The USCG website states, “A fundamental responsibility of the U.S. government is to safeguard the lives and safety of its citizens. In the maritime realm, this duty falls mainly to the Coast Guard. In partnership with other federal agencies, state, local, and tribal governments, marine industries, and individual mariners, we improve safety at sea through complementary programs of mishap prevention, search and rescue, and accident investigation.”<sup>14</sup> The Marine Safety Program includes enforcing safe and environmentally sound operation of U.S. flag vessels throughout the world. The genesis of the USCG Marine Safety Program began in the 1830s, when Congress passed legislation to protect passengers on steamboats after several explosions killed many passengers, including three U.S. Congressmen and one U.S. Senator. The U.S.

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<sup>13</sup> *Ship Operating Costs: Current and Future Trends*. Richard Greiner, Moore Stephens, December 2012.

<sup>14</sup> <http://www.uscg.mil/top/missions/MaritimeSafety.asp>.

program became more robust as additional legislation was passed in the wake of many more vessel accidents. The Marine Safety Program was well established as the Bureau of Marine Inspection and Navigation when it was transferred to the Coast Guard in 1941. Key to the program, then and now, is establishing standards and regulations for the design and construction of ships, with USCG monitoring compliance to those standards by requiring a comprehensive program of plan review and inspections while a vessel is being built and throughout the vessel's life.

When USCG assumed marine safety responsibilities in 1941, most of the rules and regulations were those published by USCG in the CFR. There were few international standards (e.g., SOLAS in 1929) until the 1960s, when the international community began a serious effort to develop ship safety rules under the Inter-Governmental Maritime Consultative Organization (IMCO), a United Nations specialized agency. USCG was designated by the State Department as the U.S. agency to lead the delegations to IMCO (which is now IMO). Because shipping is international, USCG recognized worldwide vessel safety improvement was best achieved if IMO rules were the standard for all ships trading internationally, including U.S. flag ships. In the 1970s this understanding led to a shift in the USCG safety development focus from U.S. regulations to international rules, and USCG placed its main focus on developing IMO regulations. Since then the USCG delegation, complemented by ACS (in particular ABS) and U.S. maritime industry advisers, has played a leadership role in the development of IMO regulations. The United States has sent strong, technically capable delegations to IMO, which has made the United States one of the most effective countries in advancing ship safety.

USCG and ABS have cooperated for many years to meet the marine safety missions of both organizations. For example, USCG regulations accept ABS structural rules as the U.S. standard for USCG-inspected vessels. To improve the efficiency of plan review and inspection, in 1982 USCG and ABS signed a memorandum of understanding (MOU) that allows ABS to conduct plan review and inspection on behalf of USCG for new vessels or those undergoing major modification. Provisions of the program are outlined in NVIC 10-82, which has had two changes, but remains valid.<sup>15</sup> This MOU was a significant step to improving efficiency for designers and shipyards and was a precursor to the current ACP. Although USCG delegates certain functions to ABS in NVIC 10-82, it retains overall responsibility for the national Marine Safety Program and, therefore, developed an oversight program to ensure ABS was carrying out the program as agreed.

USCG regulations are mostly contained in Title 46 CFR, and many of the regulations when NVIC 10-82 was prepared duplicated class rules and international regulations. This duplication led to a significant amount of extra effort to design to two sets of regulations and standards, and it limited what equipment could be installed. Vessels were required to have surveys by both class surveyors and USCG inspectors for many of the same items.

In the 1990s the U.S. Coast Guard Regulatory Reform Initiative was established to enhance the competitive position of the U.S. maritime industry through elimination of unnecessary duplication of regulations and by recognizing which international and third-party standards provided a level of safety and environmental protection equivalent to current regulations. In effect, ACP was designed to remove impediments to U.S. flag shipping while

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<sup>15</sup> <http://www.uscg.mil/hq/cg5/nvic/pdf/1982/n10-82ch2.pdf>.

maintaining safety performance. USCG worked with ABS to design ACP. For this program, vessels meeting (a) ABS classification society rules, (b) the international standards spelled out in IMO conventions (e.g., SOLAS, MARPOL, International Convention on Load Lines [ICLL; also referred to as LOADLINES]), and (c) the applicable U.S. supplements will meet U.S. requirements and be awarded a COI. The supplement includes U.S. flag requirements not contained in ABS rules or otherwise covered by IMO instruments. ABS is authorized to conduct plan reviews and most surveys on behalf of USCG; and the Coast Guard, after a brief oversight inspection, issues a COI. ABS periodic surveys throughout the life of the vessel are the basis for continuing compliance with USCG requirements. Because USCG retains ultimate responsibility for the U.S. Marine Safety Program, its oversight of the ABS performance is an important aspect of ACP.

Key to ACP are the requirements outlined in the U.S. supplements. In addition to containing those USCG regulations not found in IMO or ABS rules, the supplements include USCG guidance on issues in IMO that are left to “the satisfaction of the Administration.” When the ACP started in 1995, USCG Marine Safety leadership envisioned the supplements would become smaller as international regulations increasingly reflected U.S. safety principles and ABS rules included more international requirements. Ideally, IMO regulations would eventually contain all USCG requirements so the supplements would only need to include U.S. guidance as required by IMO instruments.

One of the requirements for a classification society’s participation in ACP is writing a supplement to its rules that incorporates the portions of USCG regulations that are not in the class society’s rules or cited in international regulations. ABS was the first class society to have



an approved supplement. To date, USCG has approved supplements and delegated authorizations to the following classification societies: ABS, Det Norske Veritas (DNV), Lloyds Register (LR), and Germanischer Lloyd (GL). Bureau Veritas (BV), Registro Italiano Navale (RINA S.P.A.), and Nippon Kaiji Kyokai ClassNK (NKK) are ACS, but they are not yet approved to participate in ACP. (RINA and NKK have applied for ACP authorization.) As described in the USCG report being reviewed by the committee, ACP has considerably reduced the regulatory duplication experienced by U.S. flag vessels. There are currently 391 vessels enrolled in the ACP program, which covers deep-draft ocean-going vessels, as well as passenger vessels, offshore supply vessels, high-speed craft, and mobile offshore drilling units.<sup>16</sup>

The committee finds that the broad constituency involved with ACP (including USCG, the participating classification societies, and the ship owners, shipbuilders, and other stakeholders in the maritime industry) consider ACP a success. Presentations to the committee by ship operators, input from a major U.S. shipyard, and the committee members' own experience all indicate that most industry professionals agree ACP has both significantly reduced the regulatory burden imposed by duplicative USCG regulations contained in the CFR and the number of duplicate surveys by class surveyors and USCG inspectors. GD NASSCO indicated that the cost of compliance associated with vessel construction has been significantly reduced under ACP. The program's desirability to U.S. flag owners is evident by the fact that almost all eligible vessels (with the exception of most MSP vessels, for reasons discussed below) are enrolled in ACP.

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<sup>16</sup> Data provided by Jaideep Sirkar, USCG, in an e-mail dated October 13, 2015, sent to committee member James Card.

**The committee commends USCG for forging the partnerships with ACS that have enabled ACP to be so successful. In particular, the relationship with ABS has enabled USCG to benefit from the technical expertise of this classification society, which is exposed to the larger world fleet and is on the front line of assessing innovative technologies. The committee believes it is now time to build on this relationship and transfer further responsibilities to ACS. Steps that can be taken to reduce regulatory burden are described in Recommendations 4 through 6.**

#### **USCG Certification and Inspection of MSP Vessels**

The majority (57 of about 77) of U.S. flag oceangoing vessels employed in the international transportation markets are enrolled in MSP. Vessels employed in this market were the primary area of interest to the committee, given its charge. Therefore, understanding what impediments related to USCG regulations are faced by MSP vessels was important to the work of this committee.

When a vessel is reflagged, the ship owner or operator is required to prepare a gap analysis, provide various documentation to USCG, make changes to firefighting and life raft equipment, install engine room alarms and controls to enable PUMS operation, conduct drills, and undergo USCG inspections during drydocking. At the committee meeting, industry representatives raised concerns regarding the extent of documentation and time required for reflagging. They indicated that changing to U.S. flag is typically a 3-day process. In contrast, it typically takes 1 day to convert from U.S. flag to another flag.

The hardware and system changes for reflagging can be carried out before the date of reflagging. Consequently, the 3-day period is mostly devoted to documentation and inspection processes and changes related to the vessel's new registration. A gap analysis provides a detailed review of a vessel's systems, equipment, or other items that meet a standard different from U.S. statutory standards (CFR) for a vessel of similar size and service and compares them to U.S. requirements. **Although the gap analysis involves considerable effort, the committee believes the gap analysis serves a necessary purpose and that the ship operator rather than USCG is in the best position to develop it.** As described above in the Economic Perspective section, the committee estimates MSP reflagging costs are about \$500,000 to \$1,000,000, which includes about \$250,000 for PUMS upgrades, plus ongoing costs for USCG compliance at about \$60,000 per year. Industry representatives note these costs are significantly higher than the costs incurred for converting between other registries, which generally do not require changes to equipment.

Ship operators presenting at the committee meeting raised three major concerns regarding application of MSP that merit consideration:

- First, MSP vessels do not benefit from the provisions of ACP. MSP vessels, although they meet class society rules and international regulations required for ACP enrollment, are generally not enrolled in ACP as they were built for non-U.S. flag operation and do not meet all the requirements contained in the applicable U.S. supplements. Converting a foreign-built ship to meet the U.S. supplement requirements can be costly, which is why it is not done. The fact they are not enrolled in ACP means MSP vessels face all the redundant surveys by USCG inspectors and class surveyors with related costs and possible time delays that ACP eliminated.

In NVIC 01-13 Change 1, dated May 26, 2015,<sup>17</sup> USCG partially addressed this issue by offering MSP Select after 3 years of operation under MSP. Change 1 states that inspections by USCG for MSP Select vessels should be “of similar scope and frequency afforded ACP vessels.” Similar to ACP, the surveys that class can carry out with only USCG oversight include dry dock, internal structural, underwater, and cargo tank surveys. Some relief is offered to MSP vessels to the requirement that all changes and replacements not exactly in kind should be in compliance with CFR requirements and approved by USCG. For MSP Select vessels, USCG allows the operator to request that class determine equivalency of the new equipment to existing CFR or alternate standards. USCG then rules on whether the equipment or change can be accepted based on class input, and they will thus not normally require direct submission of plans and documents to the USCG Marine Safety Center for review and approval.

MSP Select vessels still require more extensive review than ACP vessels to obtain approval of equivalency for alternative standards to the CFR requirements. Furthermore, a vessel is eligible to enroll in MSP Select only after 3 years of operation, including one intervening dry dock or underwater survey, and after completion of a hand-over survey. This places a burden on MSP vessels for at least 3 years of operation with full USCG survey and approval requirements under the standard MSP requirements.

USCG has extensive experience with companies that have operated MSP vessels. When a vessel is nominated for MSP from an MSP company with a proven safety record, direct entry to the MSP Select program could be granted based on the company’s safety

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<sup>17</sup> [http://www.uscg.mil/hq/cg5/nvic/pdf/2013/NVIC\\_01-13\\_CH-1\\_\(Full\\_Merged\\_Document-FINAL\).pdf](http://www.uscg.mil/hq/cg5/nvic/pdf/2013/NVIC_01-13_CH-1_(Full_Merged_Document-FINAL).pdf).

performance.

**Recommendation 1: The committee recommends that MSP vessels from operating companies with proven safety records in MSP be allowed to enroll in MSP Select at the time of reflagging. NVIC 01-13 Change 1 indicates that MSP Select vessels may be reviewed by a classification society (class), similar to the ACP procedures, without categorically stating the ACP procedure should be applied. A formal tie should be established between the ACP supplements and MSP for modifications and upgrades of vessels enrolled in MSP Select such that MSP vessels are required to meet a standard no higher than that required for ACP vessels.**

- Second, for MSP vessels, USCG requires that equipment replaced after reflagging either be replaced with the same equipment or be subject to CFR requirements and applicable USCG type approvals. This requirement creates challenges when the identical equipment is no longer available or the ship owner wishes to replace the equipment with more modern and effective models. For example, a presenter at the committee meeting explained that application of the CFR requirements that new boilers and pressure vessels have American Society of Mechanical Engineers (ASME) certification rather than just class certification can add hundreds of thousands of dollars to the cost of replacement equipment. The owners thought continuing to comply with the same class rules and international regulations as they did upon reflagging to U.S. flag should be sufficient, as mentioned in the MSP legislation, and that they should not be required to comply with the CFR for any changes or equipment replacements not exactly replacement in kind. The fact that USCG was requiring CFR compliance seemed to them an expansion of requirements beyond the intent of the MSP

legislation. Other challenges presented by the USCG type approval process include delay of the vessel waiting for USCG-approved equipment and additional costs for long-distance and expedited shipment and customs clearance that would not be incurred if internationally approved, locally available, equipment could be installed.

**Recommendation 2: The committee recommends application of ACP procedures for acceptance of replacement equipment for MSP vessels. In the interest of providing flexibility in selecting equipment suited to existing vessel arrangements, consideration should be given to allowing type approvals in accordance with ACS rule requirements and international standards only.**

- Third, ship operators noted that for some vessels USCG did not permit PUMS watchstanding for several months (2,000 to 3,000 hours), even though the vessel may have had a solid record of unmanned engine room performance in its service up to the time of the reflagging while previously manned by the foreign crew. Furthermore, the expectation of industry was that the reflagging of vessels classed under ACS would not require physical changes to the ship and its systems to satisfy CFR regulations.

Vessels reflagged under MSP typically have proven reliability under the PUMS watchstanding condition for which they were classed in their original flag state. If the vessel was manned fully to USCG standards, it was industry's expectation that no endorsement for PUMS was made nor needed on the COI. However, the master of the vessel could allow the PUMS watchstanding condition based on meeting the following requirements:

- Adhering to NVIC 6-01, which provides guidance on the design and approval of unattended machinery operations;<sup>18</sup>
- Adhering to NVIC 9-97, which provides guidance on new SOLAS amendments;<sup>19</sup>
- Obtaining a letter from the classification society stating the vessel's propulsion and automation systems meet the SOLAS fail-safe requirements and that the shipboard automation and remote control systems meet the class rules; and
- Having watchstanders onboard and assigned in the event of an automation failure.

All vessels under MSP met these requirements and operated under PUMS for their initial operations. As a note, none of the operators requested “reduced manning” for their engine room operations because USCG would require considerably more stringent requirements including additional control systems and control system equipment, a period of proven operation and reliability (trial period), a period of USCG onboard observation, and an acceptable planned maintenance program.

A number of vessels were accepted under PUMS based on the above assumptions. With the recent publication of the “MSP” NVIC (NVIC 01-13, dated February 12, 2013)<sup>20</sup> and NVIC 01-13 Change 1,<sup>[17]</sup> some marine industry stakeholders believe USCG has changed policy on the required degree (or level) of automation equipment associated with engine room watchstanding conditions and the definition of what constitutes an engineering watchstanding condition. Industry presenters stated USCG has changed policy by implementing the full regulatory requirements under Title 46 CFR Part 62 for MSP vessels to

<sup>18</sup> <http://www.uscg.mil/hq/cg5/nvic/pdf/2001/n6-01.pdf>.

<sup>19</sup> <http://www.uscg.mil/hq/cg5/nvic/pdf/1997/n9-97ch1.pdf>.

<sup>20</sup> [http://www.uscg.mil/hq/cg5/nvic/pdf/2013/NVIC%2001-13%20\(Final%20Merged\).pdf](http://www.uscg.mil/hq/cg5/nvic/pdf/2013/NVIC%2001-13%20(Final%20Merged).pdf).

operate in PUMS watchstanding conditions regardless of the vessel manning or previous USCG and classification society approvals under the MSP law. However, USCG stated that NVIC 01-13 has not changed policy but clarified policy that was not consistently applied around the country.<sup>21</sup> The issues surrounding NVIC 01-13 and Change 1 were addressed in four stakeholder meetings in which vessel owners had the opportunity to voice opinions and concerns. USCG states these meetings were the first time in USCG history that any NVIC, similar to a regulatory change, provided the opportunity for public comment. The obvious differences in opinion were discussed in the stakeholder meetings and recorded in the Public Docket.

In response to the policy clarification, various USCG Officers in Charge, Marine Inspection (OCMIs) have been issuing CG-835s (enforcement requirements) for MSP vessels to be operated in the “fully attended” machinery space with the entire plant under fully attended direct supervision. The NVIC provides some relief for existing MSP vessels, allowing PUMS operation until their first drydocking after May 26, 2016, at which time modifications must be made if PUMS operation is to continue.

Even though many of these MSP vessels have operated for years under the PUMS notations of SOLAS and classification societies, USCG is requiring full compliance with the CFRs, which include additional equipment installation and continuous full manning through a trial period (1,000 to 3,000 hours of operation) until the approval process is completed.

USCG believes the 1,000-hour trial requirement for vessels with a proven automation system

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<sup>21</sup> Personal communication (e-mail) from Capt. Verne Gifford, Director, Inspections and Compliance, USCG Headquarters, November 8, 2015, sent to committee member James Card.



(2,000 hours of operation can be credited during the reflagging process) allows the new crew the opportunity to become familiar with the new ship system. These requirements are basically as stringent as the requirements to receive a “reduced manning” certification. Some operators installed the required USCG additional equipment and stood watches in the engine room with their fully manned crew, even though they did not reduce the crew when their trial period was complete. Others have elevated protests in the Coast Guard for the CG-835s they have received.

The cost burden to the U.S. flag operators in MSP to meet these NVIC requirements includes the capital costs of the equipment, the testing, and the onboard inspection, which represents about \$250,000 per ship.<sup>[12]</sup> Further costs include the loss of the amount of maintenance that could have been performed by the engineers now required to stand watch. The combined loss of the onboard engineers not doing maintenance, overtime paid to other engineers and/or adding extra engineers to do the necessary maintenance, and obtaining various engine room ratings can cost an operator \$40,000 per month.<sup>[12], 22</sup> This monthly cost would continue for however long USCG would require the “trial period.”

In its white paper provided to the committee, ABS explains that “ACS automation design review and survey rules are effective and proven by implementation in the classing of a vast number of foreign flag vessels. Additional CFR requirements for such designs create a level of duplication that is burdensome on designers, builders, vendors, and owners. Additional documentation and USCG trial period requirements should be balanced with data on automation failure and casualty rates with a focus on where current international standards

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<sup>22</sup> *USA Maritime*. Presentation to the committee on September 16, 2015, by Tim Perry and Brian Peter, American President Lines.

are falling short.”<sup>23</sup>

The USCG position is that a COI allowing U.S. flag operation can be granted without application of CFR regulations but, as clarified in Change 1 to NVIC 01-13, these ships may not be operated on PUMS without meeting certain USCG regulations contained in 46 CFR Part 62. The USCG explained to the committee that they regard this requirement as a manning and watchkeeping issue and not a reflagging issue. Manning and watchkeeping are not included in SOLAS and remain the responsibility of the flag state administration. USCG explained that the requirements are primarily directed at alarm systems and fire pump controls and are justified for safety reasons the USCG outlined in detail in an e-mail to the committee.<sup>24</sup> Some industry representatives believe vessels operating under PUMS with proven track records at the time of reflagging should be allowed to continue operating in this mode. They argue that the USCG requirements exceed international regulations and practice and are therefore not consistent with the MSP legislation.

Based on committee discussions with many of the operators with ships under MSP, it is clear that USCG has not consistently applied CFR regulations related to PUMS. NVIC 01-13 Change 1 is intended to clarify its position and help ensure consistent application. Inconsistent application of policy undermines industry and public confidence in the regulatory process. Although industry is not pleased with the position taken by USCG in Change 1, the committee applauds USCG efforts to clearly state its policy so that it can be uniformly administered.

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<sup>23</sup> *USCG-ABS Relationship and Forward-Looking Thoughts*. White paper prepared by ABS for the committee, American Bureau of Shipping, Houston, Texas, October 1, 2015.

<sup>24</sup> *Explanation of Automation Regulations as It Pertains to NAS Study*. Capt. Kyle McAvoy, USCG, November 13, 2015.

The committee has deliberated on two aspects of this issue: whether the intent of the legislation was to allow a vessel to continue to operate in PUMS mode without being subject to CFR requirements, and if not, whether the regulations being mandated by USCG are justified based on safety reasons. The committee has determined that it is not in a position to provide specific recommendations on these issues as it does not have the legal expertise to assess USCG authority under the MSP legislation, nor is it in a position to carry out the risk and cost–benefit assessments necessary to determine justification for the additional USCG regulations related to PUMS implementation.

**The committee finds that the policy on PUMS, clarified by USCG in NVIC 01-13, requires application of certain parts of the CFR to vessels that were not built to CFR. This policy places a major burden on MSP vessels for which there may not be a clear safety justification; moreover, the policy may not be consistent with the intent of MSP.**

**Recommendation 3: The committee recommends that vessels with a documented history of safe and reliable operation using PUMS at the time of reflagging should be permitted to continue such operations after about 1,000 hours of operation. If the crew has prior experience operating similar ships with similar control and alarm systems, consideration should be given to eliminating the waiting period.**

**Recognizing that the intent of the MSP legislation was to allow a seamless transfer of international flag ships to U.S. flag, the application of 46 CFR Part 62 Vital Systems Automation requirements to MSP vessels already fully documented for PUMS under international and ACS requirements should be given further consideration.**

## **Assessment of USCG Regulations and Inspection Processes**

### USCG Regulations: Title 46 CFR Shipping and ACP U.S. Supplements

Title 46 of the CFR contains most of the USCG regulations pertaining to the design, construction, inspection, documentation, hazardous cargo carriage, and operation of ships, boats, and barges. Many of the USCG regulations contained in Title 46 have been in effect for many years; some of them predate the development of a comprehensive set of international regulations and more extensive class rules that has occurred over the last 30 years.

The committee finds that although ACP has reduced the regulatory burden on ship owners and operators, the U.S. supplements still contain many specific requirements that exceed the requirements in the class rules and international conventions, codes, resolutions, and circulars. The committee heard that some of these additional requirements can be burdensome to owners, and some point to U.S. standards that may not be widely used internationally. Because shipbuilding is on a much larger scale internationally than in the United States, much of the available marine equipment is from international sources or designed for the international market. As discussed below regarding type approval, some qualified equipment may not be available to U.S. flag vessels because of U.S. supplement limitations on the sources of equipment. Some examples of U.S. supplement requirements are as follows:

- Boilers and pressure vessels generally must comply with ASME code or the rules of select classification societies which, for now, are ABS and LR except by special consideration. In the GL and DNV U.S. supplements, ASME code compliance is

required, but boilers constructed to DNV rules can be used with some additional requirements.

- Complex qualitative failure analysis is required for remote propulsion control and automation systems. This requirement is in addition to the detailed requirements for automation design contained in the class rules, many of which also now require a failure mode effects analysis (FMEA), similar to what the supplements require. In addition, a design verification and periodic safety test procedure must be prepared per USCG requirements that in many cases is beyond what class rules require.
- Navigation lights must be Underwriter Laboratories (UL) listed or certified by an independent laboratory to an equivalent standard. UL listed is a U.S. specific standard.
- Detailed requirements are listed for engine order telegraphs that are beyond class requirements.
- Certified safe equipment under the ATEX<sup>25</sup> (potentially explosive atmospheres) standard used in most of the world is not accepted. The ATEX directive consists of two EU directives describing what equipment and work environment are allowed in an environment with an explosive atmosphere.

The examples above are a few of the special requirements contained in the U.S. supplements. As an illustration of the extent of requirements in the U.S. supplements, the ABS U.S. supplement covering ABS rules and SOLAS has 27 pages of regulations (excluding table of contents, explanations, and so forth), the LR U.S. supplement has 51 pages, the GL U.S.

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<sup>25</sup> ATEX is an acronym for the French words “ATmosphères EXplosibles.” It is governed by two EU directives: (1) the ATEX 95 equipment directive 94/9/EC, Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres; and (2) the ATEX 137 workplace directive 99/92/EC, Minimum Requirements for Improving the Safety and Health Protection of Workers Potentially at Risk from Explosive Atmospheres.

supplement has 62 pages, and the DNV U.S. supplement has 41 pages.

- The class U.S. supplements, although they have greatly reduced the burden of meeting all CFR requirements, still contain requirements carried over from the CFR for which an objectively determined, risk-based benefit in enhanced safety is not clear to industry.
- The committee believes the number of requirements in the U.S. supplements could be significantly reduced if a risk-based assessment of their need, including comparison to the safety on non-U.S. flag vessels, was performed. In his presentation at the committee meeting, Hanley<sup>[12]</sup> commented that Maersk U.S. flag vessels do not have any fewer casualties or boast better safety statistics than Maersk Line international vessels, even when crew personal injury claims are excluded. Hanley also noted that personal injury claims tend to be high on U.S. flag vessels for reasons not related to the safety of the vessel.

According to comments provided by ABS<sup>[23]</sup> regarding fostering innovation, “Vessel owners prefer to meet the latest international and ACS standards to take advantage of industry innovations. ACS can change rules and requirements to meet industry and statutory changes much faster than USCG as regulatory efforts take 3-5 years, while rule changes are done in 1-2 years. The need for extensive domestic regulations has substantially decreased as IACS members work together to create standards at the pace of industry advancement and hence provide a more up-to-date comprehensive compendium of marine safety standards. These standards are now referenced by the majority of flag states whose vessels make up the majority of vessels calling on major U.S. ports.”

The committee heard from USCG that the Coast Guard believes both lifesaving and fire protection systems require a somewhat more conservative approach (meaning safer from a USCG perspective) than IMO regulations. For example, USCG requires CO<sub>2</sub> systems to have time delays and other alarms not required by IMO or other flag administrations. Speaking to the committee, Lantz<sup>26</sup> referred to a situation in which the USCG found a time delay would have saved lives. Lantz also cited the U.S. requirement for lifeboats to be international orange. The USCG does not believe yellow boats, which are acceptable in IMO rules, provide needed long-range visibility. USCG in both instances tried to get these provisions into IMO regulations but did not prevail. The committee questions whether these provisions could be justified if the current rule-making process involving risk and cost–benefit assessment were carried out.

**Recommendation 4: The committee recommends that USCG perform a risk-based assessment of the costs and benefits of each regulation in the CFR that exceeds international requirements, eliminating those regulations that cannot be justified on a cost–benefit basis. The committee recognizes the recommended risk-based assessment is a major, long-term effort that may require additional resources for USCG. Therefore, priority should be given to the review of those regulations included in the ACP supplements that apply to vessels with SOLAS certification. The first step in this process should be a comprehensive review of the ACP supplements by USCG in collaboration with ACS and the maritime industry to identify regulations that ACS and/or industry consider redundant or unjustifiable.**

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<sup>26</sup> *Overview of Coast Guard Prevention Standards*. Presentation to the committee on September 17, 2015, by Jeff Lantz, USCG.

## USCG Type Approvals

Notwithstanding ongoing work by the Coast Guard to reduce duplicate inspection and regulations on U.S. flag vessels, an area of concern expressed in multiple presentations at the committee meeting (Hanley,<sup>[12]</sup> Perry,<sup>[22]</sup> Collins,<sup>27</sup> Donovan,<sup>28</sup> Wells<sup>29</sup>) with regard to ACP were the requirements for type approval by USCG of certain safety-related equipment. This same issue was discussed in detail in the cited USCG report.<sup>[3]</sup> Examples of the types of equipment requiring USCG-issued type approvals include the following:

- Lifesaving equipment,
- Fire-extinguishing equipment,
- Structural fire protection,
- Pressure vacuum valves used on tankers,
- Plastic piping, and
- Sewage treatment plants.

The rationale given by USCG for requiring specialized type approvals for these items is that they are listed in SOLAS as requiring the “satisfaction of the Administration.”<sup>[3, p. 5]</sup> As presented by Lantz at the committee meeting, USCG considers these items to be important to ensuring safety of life onboard ships, and for that reason they want to manage the type approval

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<sup>27</sup> *The Classification Society Perspective*. Presentation to the committee on September 16, 2015, by Blaine Collins, DNV and GL.

<sup>28</sup> *Impediments to the United States Flag Registry*. Presentation to the committee on September 16, 2015, by Michael Donovan, The Hiller Companies.

<sup>29</sup> *US vs. Non-US Flag Vessel Regulatory Differences*. Presentation to the committee on September 17, 2015, by Richard Wells, Offshore Marine Services Association.



process by requiring USCG to issue the type approval. This process allows USCG to ensure that compliance of the equipment with the regulations is carefully checked and that independent laboratories are used to validate compliance. Lantz noted that USCG accepts international regulations in many cases, such as the lifesaving appliance (LSA) code for lifesaving equipment and much of the fire safety systems (FSS) code for fire-extinguishing equipment. The Coast Guard also recognizes some foreign approvals, particularly European ones (such as lifesaving equipment per the European Union Mutual Recognition Agreement), as a basis for issuing USCG type approval. Structural fire protection approvals from recognized nations, such as Japan, are also accepted by USCG. Although USCG recognizes these approvals, they want to control the approval process to ensure compliance to high standards.

At the meeting, ship owners and operators and equipment suppliers (Hanley,<sup>[12]</sup> Perry,<sup>[22]</sup> Donovan,<sup>[28]</sup> Wells<sup>[29]</sup>) commented that USCG type approval requirements add cost to the system and limit the availability of suppliers and models. Much quality equipment today is designed to meet international standards that are essentially the same as the USCG requirements, which means the equipment would likely obtain type approval if it were submitted to the review and approval process. However, that process is costly and time consuming, and it is often considered by manufacturers to be a poor investment in view of the small market to support U.S. flag vessels. This assessment was confirmed in separate discussions with major marine equipment maker Wartsila Hamworthy representatives about obtaining USCG approval for their sewage treatment plants.<sup>30</sup> They noted their latest equipment using the newest technology could pass USCG requirements, but because it is not USCG type approved, it is not available to U.S. flag

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<sup>30</sup> Personal communication between Wartsila Hamworthy and Eugene van Rynbach, Herbert Engineering Corporation, July 2015, regarding availability of latest technology in sewage treatment plants for a U.S. flag passenger vessel design.

vessels. They did not expect sufficient potential orders to justify the cost of obtaining USCG approval, although if a large multiship order were received they would seek it. This lack of interest among competitive, up-to-date manufacturers points to the fact that USCG, in trying to enhance the safety of equipment through requiring specific type approval, may be limiting the available equipment to a small number of suppliers, some of which may not have the best or latest equipment, but which have obtained USCG type approval. An example of this problem was cited by Wells in his presentation.<sup>[29]</sup> He noted that OSV operators have found that only a single supplier of small lifeboats is USCG approved and that these Chinese-built lifeboats are of inferior construction compared to what could be obtained in the international marketplace. So, in some instances, requiring USCG type approval may reduce safety rather than enhance it.

A second issue is that in some cases, particularly fire-extinguishing equipment, USCG has special or additional requirements not contained in the international regulations and codes. For example, CO<sub>2</sub> gas-driven alarms (rather than electric alarms) and time delay on release of CO<sub>2</sub> are both required by USCG, but not by SOLAS, so an internationally designed system would not obtain USCG approval without modifications.<sup>[28]</sup> In the case of these types of equipment, USCG type approval requires system redesign in addition to submission of documentation and testing required for other type approvals for which USCG type approval does not apply extra regulations above the international ones. Some of these requirements may be justified based on a safety analysis of past casualties and other factors, such as for the gas-driven CO<sub>2</sub> alarms, but industry representatives expressed the opinion that it would be helpful if the basis for the extra requirements was more transparent.

For a perspective on how other flag administrations approach the same issue, a discussion was held with the administrators at International Registries, Inc. (IRI) who are responsible for administering the Marshall Islands flag. They stated that for safety-related equipment, such as that for which USCG requires its own type approval, they rely on approval carried out by other flag administrations that are party to the applicable IMO conventions, codes, and specifications or are recognized organizations (class societies).<sup>31</sup> For certification from another flag administration to be accepted, the equipment must be manufactured or assembled and tested within the flag administration's country. They also have additional requirements for documentation and the testing and examination that must be carried out. Exemptions are allowed upon special approval and, in general, equipment approved by the EU Maritime Equipment Directive (MED) will be accepted. A similar standard is used by other reputable flag administrations. The IRI representatives did not know of any instances in which equipment has been found to be substandard or unsafe that was accepted based on using this acceptance protocol for equipment. They said Marshall Islands-registered vessels are regularly subject to port state inspections, including inspections by USCG, and no failures or unsatisfactory reports have been received regarding this type of equipment on vessels with their flag.

**Committee findings related to type approval requirements are as follows:**

- For certain equipment, including lifesaving and firefighting equipment, USCG type approval is mandatory and alternate type approval by class is not accepted. Requirements to obtain USCG type approval for equipment, including safety-related equipment, add cost and limit availability of equipment for U.S. flag vessel owners and operators.

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<sup>31</sup> *Marshall Islands Maritime Administrator Technical Circular*, No. 1, Rev. 2, Item 2.0, Approval of Equipment, January 27, 2014.

- In some cases, limiting the availability of equipment only to those suppliers that have expended the time, effort, and cost to obtain USCG type approval may result in U.S. flag vessels not having access to equipment offering the latest technology. Some observers have suggested that this restriction may also force those vessels to use inferior equipment simply because the equipment has received USCG type approval. This practice may reduce safety rather than enhance it.
- The committee could not identify a statistical basis for USCG requirements for its type approval.

**Recommendation 5: The committee recommends that USCG accept type approval through approved class societies in lieu of USCG-specific approval. This action will build on existing USCG policy that recognizes EU type approvals for certain equipment.**

## USCG Auditing, Review, Inspection, and Appeals Processes

### *Auditing of Classification Societies*

Under ACP, the class society undergoes a rigorous assessment by USCG to ensure it has the understanding and resources to effectively implement approval and inspection services on behalf of USCG. Every ACS has a U.S. supplement to its rules that has been thoroughly vetted by USCG. Program review is administered through quarterly meetings between class and USCG representatives in Washington, D.C., where new and upcoming regulations and interpretations are discussed and projects are reviewed.

### *Plan Review*

Under NVIC 10-82 and ACP, USCG is notified of every plan approved or examined by ABS on behalf of USCG (plan stamped with a USCG stamp) on a weekly basis or sooner. USCG's goal is to review 10% of these plans. For MSP vessels, USCG performs all plan review. For MSP Select vessels, plan review is akin to the ACP process.

### *Inspection*

Under ACP, USCG continues to play an extensive role in vessel inspection. According to NVIC 02-95, which discusses ACP, USCG oversight activities include annual examinations, periodic oversight reexaminations, attendance at drydockings, new construction visits, and attendance at underwater inspection in lieu of drydocking (UWILD) surveys.<sup>32</sup> Ship operator and shipyard input indicates a considerable duplication in inspection services remains, which leads to class surveyors hesitating to make decisions for fear of their decisions being overturned, as well as redundant inspections during which USCG reinspects many of the same items previously covered by the class surveyor. The USCG rationale for taking this approach is that USCG has ultimate responsibility and must provide this level of review and inspection to satisfy its responsibilities.

The already overburdened USCG inspection staff will be further taxed by upcoming requirements to inspect fishing vessels (6,500+ additional vessels) and inland and towing vessels (2,500+ additional vessels). As proposed by USCG, the practical solution is to rely heavily on third-party inspectors to carry out this work. Nevertheless, there will be significant USCG effort

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<sup>32</sup> <http://www.uscg.mil/hq/cg5/nvic/pdf/1995/n2-95ch2.pdf>.

required to oversee and audit the process, and undertaking these additional tasks will require additional resources.

### *Appeals Process*

In 1982 USCG published NVIC 16-82, which outlines the appeals process. The NVIC explains that USCG does not have the authority to waive regulations, equivalent safety provisions will be considered when proposed, and there will be no retribution or negative connotation when an appeal is filed. NVIC 16-82 also notes USCG recognizes that time is generally of the essence when such appeals are filed and that it has a responsibility for timely decisions.<sup>33</sup>

Typical exemption requests start with equivalency requests. The committee was informed that typical USCG turnaround on interpretation and equivalency requests is 4 to 6 weeks, and the exemptions and appeals that may follow can take an additional 6 to 8 weeks. The overall cycle for an exemption or interpretation, and possible further appeal, can take 3 months or longer. USCG explained that 50% of appeals were successful.<sup>[16]</sup>

It is the sense of the maritime industry that, in some instances, this process takes longer than necessary and involves so much uncertainty that owners generally cannot justify appealing a decision. For example, an appeal by American President Lines (APL) related to the MSP PUMS manning requirements and requirements to install ASME-approved pressure vessels took almost 2 years. This appeal was raised to several levels in the USCG and involved a complex issue, so although it may not be typical of other appeals, it does demonstrate that the appeal process can take a long time to be resolved. Noting that maintaining the construction schedule is critical to

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<sup>33</sup> <http://www.uscg.mil/hq/cg5/nvic/pdf/1982/n16-82.pdf>.

successful shipbuilding, GD NASSCO cited the cumbersome appeal process as a reason they sometimes will not appeal a decision they regard as incorrect.

NVIC 16-82 is explicit that “no stigma is attached to anyone that appeals.” The committee believes USCG upper management is committed to a fair process. However, the sense within industry that appealing a decision may have consequences contributes to industry’s lack of confidence in the appeals process.

With regard to the audit, review, inspection, and appeals processes administered by USCG, the committee offers the following recommendations:

**Recommendation 6: It is the opinion of the committee that ACS design review and survey personnel can effectively execute their plan review and vessel inspection responsibilities and that USCG can meet its responsibilities by serving in a safety, quality assurance, and oversight role rather than in a project and vessel oversight role. USCG’s goal should be to monitor ACS while allowing ACS to perform the vessel oversight role with minimal redundancy between ACS and USCG. With this approach, USCG would still periodically inspect vessels as part of process oversight checking. Current USCG ACS plan review and inspection oversight actions outlined in NVIC 02-95 should be evaluated and streamlined. Application of modern information systems and auditing techniques should be employed to enhance the effectiveness and efficiency of ACS oversight.**

**Recommendation 7: A streamlined process for exemptions, interpretations, and appeals is needed. The current process, as outlined in NVIC 16-82, does not always work as planned, particularly with respect to timeliness.**

## Harmonization of USCG Regulations with International Regulations

Historically, USCG has been active at IMO in promoting new regulations and enhancing existing regulations so the level of safety and environmental protection it considers necessary can be achieved. When queried about their current level of involvement at IMO, USCG offered the following explanation:<sup>34</sup>

The US continues to exert a strong, positive influence at the IMO. In fact, the IMO's heavy reliance on the US for technical input, expertise, and capacity has provided many opportunities for the US to provide international leadership. Recent examples of this leadership and the resulting accomplishments include: updates to MARPOL Annexes V and VI; establishment of emission control areas; contributions to the development of the Polar Code and IGF Code; revisions to the IGC Code; development of the mandatory audit scheme; enhancements to passenger ship safety; and the development of the Manila Amendments to the STCW Convention. Additionally, the United States continues to hold key leadership positions at all levels throughout the various IMO bodies. In this regard, the U.S. chairmanships of Council, the HTW sub-committee, the erstwhile NAV sub-committee, and committees of the IMO Assembly are of particular note. Furthermore, at the working level, the United States leads numerous working groups, correspondence groups and drafting groups like the Goal-Based Standards (GBS) working group and the Subdivision and Damage Stability working group. Finally, the United States has played key roles in refining the

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<sup>34</sup> Statement provided by Jaideep Sirkar, USCG, October 20, 2015.



SOLAS amendment process, championing new approaches to the carriage of industrial persons, and considering potential cyber strategies for the maritime community.

**Recommendation 8: The committee commends the continued strong U.S. presence at IMO, which is critical to reducing the number of U.S.-specific regulations and raising the safety and environmental performance of the world fleet. USCG should maintain its commitment to raising the standards of international regulations. This goal is most effectively achieved through partnership with ACS and the maritime industry. Thus, USCG should continue to partner with and proactively seek technical expertise from industry experts to serve as advisors on the USCG IMO delegations.**

### Regulatory Development Process

The committee examined USCG’s regulatory activities in the context of current theory and recommended best practices. Regulatory processes develop statutes and governance for industries, systems, and nations. Their impact on industrial and market competitiveness can be significant. On one hand, regulatory processes can enhance competitiveness by following the principles of “shared value,” in which market competitiveness is enhanced by regulatory processes that simultaneously advance economic and social conditions in the markets in which they operate.<sup>35</sup> On the other hand, regulatory processes can dampen and create barriers to

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<sup>35</sup> Porter, M. E., and M. R. Kramer. Creating Shared Value. *Harvard Business Review*, January–February, 2011. <http://www.srm.nl/docs/default-source/pdf/creating-shared-value.pdf>. Accessed September 25, 2015.

competition.<sup>36</sup> Ideally, regulatory agencies balance these competing extremes and demonstrate best practices in regulatory processes by promoting:

- Communication, providing information to stakeholders on a timely and accessible basis;
- Consultation, encouraging participation and inclusion of stakeholders;
- Consistency, offering equitable treatment across market participants and over time;
- Predictability, facilitating planning by market participants;
- Flexibility, using appropriate instruments in response to changing conditions;
- Independence and autonomy, being free from undue political influence;
- Effectiveness and efficiency, including emphasizing cost-effectiveness in data collection and policies;
- Accountability, following clearly defined processes and rationales for decisions, with a responsive and timely appeal process; and
- Transparency, promoting openness during the process.<sup>37</sup>

Regulations that enhance shared value set goals and stimulate innovation. They highlight a societal objective and create a level playing field to encourage companies to invest in shared value rather than maximize short-term profit.<sup>[35]</sup> Such regulations have a number of characteristics, including the following<sup>[37, p. 2]</sup>:

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<sup>36</sup> Burton, M. The Economic Regulation of U.S. Railroads: Understanding Current Outcomes and Deliberating a Future Course. *Journal of Transportation Law, Logistics, and Policy*, Vol. 78, No. 4, 2011, p. 271.

<sup>37</sup> Berg, S. 1999. Developments in Best-Practice Regulation: Principles, Processes, and Performance. Presented at Incentive Regulation and Overseas Development Conference, Sydney, Australia, November 1999. [http://www.researchgate.net/profile/Sanford\\_Berg/publication/239551517\\_Developments\\_in\\_Best-Practice\\_Regulation/links/53d7b21b0cf2a19eee7fcca2.pdf](http://www.researchgate.net/profile/Sanford_Berg/publication/239551517_Developments_in_Best-Practice_Regulation/links/53d7b21b0cf2a19eee7fcca2.pdf). Accessed September 17, 2015.

- “They set clear and measurable goals.
- They set performance standards but do not prescribe the methods to achieve them—those are left to industry to provide room for innovation.
- They define phase-in periods for meeting standards, which reflect the investment or new-product cycle in the industry.”

Regulatory processes should balance mandates for oversight and control with those that affect market and competitive performance. Effective regulatory processes attempt to synchronize goals and objectives to reduce redundancy and harmonize requirements for the regulated entities to avoid duplication of effort or compliance activities.<sup>38</sup> Regulatory processes are most effective when they consider benefits relative to costs and focus on the results achieved rather than the funds and effort expended.<sup>[35, p. 10]</sup> Performance metrics could include response time for applications, number of vessels enrolled, number and frequency of stakeholder consultations, and regulatory effectiveness.

Periodic review of regulatory programs and practices is helpful to provide oversight and accountability and contributes to continuous process improvement activities. Regulatory process participation in international standards-setting activities not only synchronizes domestic regulations with international provisions, but it also suggests vetting criteria that can lead to greater market inclusion and promote international competition.<sup>39</sup> Key to effective regulatory activities and programs is the availability of continuous and adequate resource availability,

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<sup>38</sup> Simmons, B. A. The International Politics of Harmonization: The Case of Capital Market Regulation. *International Organization*, Vol. 55, No. 3, 2001, pp. 589–620.

<sup>39</sup> Holzinger, K., C. Knill, and T. Sommerer. Environmental Policy Convergence: The Impact of International Harmonization, Transnational Communication, and Regulatory Competition. *International Organization*, Vol. 62, No. 4, 2008, pp. 553–587.

including funding for programs and operations and investment in human capital development.

The confluence of these factors—synchronization and harmonization, communication, transparency, continuous process improvements, and adequate resources—can result in a culture of ongoing regulatory program review, refreshment, and revitalization, all of which can be an impetus to market and economic growth.<sup>[37]. 40</sup>

The committee found that the USCG rule-making process is well documented and generally follows the best practices of regulatory development and oversight described above.<sup>41</sup> In 2011, Executive Order 13563, *Improving Regulation and Regulatory Review*,<sup>42</sup> directed agencies to fashion their regulations to impose the least burden on society, maximize the net benefits, and specify performance objectives. In a paper entitled “The Future of Coast Guard Rulemaking,”<sup>43</sup> USCG explains that “the Coast Guard, a component of DHS [Department of Homeland Security], has promoted removing outdated provisions; amending regulations that no longer serve the same purpose; and streamlining regulations, so that stakeholders can have more

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<sup>40</sup> Weber, R. H. Transparency and the Governance of the Internet. *Computer Law and Security Review*, Vol. 24, No. 4, pp. 342–348.

<sup>41</sup> *Preparation of Regulations*. COMDTINST M16703.1, The Judge Advocate General, USCG, Department of Homeland Security, October 2009. <https://www.uscg.mil/hq/cg5/cg523/COMDTINST%20M16703.pdf>.

U.S. Coast Guard Rulemaking: The Process, Interaction and Analysis, Public Participation. *Proceedings of the Marine Safety and Security Council: The Coast Guard Journal of Safety and Security at Sea*, Spring 2010. [https://www.uscg.mil/proceedings/archive/2010/Vol67\\_No1\\_Spr2010.pdf](https://www.uscg.mil/proceedings/archive/2010/Vol67_No1_Spr2010.pdf).

The Marine Safety and Security Council, Partnering with Industry, Government, and the Public. *Proceedings of the Marine Safety and Security Council: The Coast Guard Journal of Safety and Security at Sea*, Winter 2012–Spring 2013. [https://www.uscg.mil/proceedings/archive/2013/Vol70\\_No1\\_Spr2013.pdf](https://www.uscg.mil/proceedings/archive/2013/Vol70_No1_Spr2013.pdf).

<sup>42</sup> Executive Order 13563, *Improving Regulation and Regulatory Review*, January 18, 2011. <https://www.whitehouse.gov/the-press-office/2011/01/18/executive-order-13563-improving-regulation-and-regulatory-review>.

<sup>43</sup> Urchick, K. The Future of Coast Guard Rulemaking: Ongoing Efforts to Improve the Regulatory Process. *Proceedings of the Marine Safety and Security Council: The Coast Guard Journal of Safety and Security at Sea*, Winter 2012–Spring 2013, pp. 55–56.

predictable, less costly obligations. Following the DHS plan, Coast Guard personnel have analyzed its data to identify problems with existing regulations by using casualty investigations and inspections to identify regulations in need of review.”

Although the committee recognizes that reassessment of existing regulations is an ongoing process, more can be done to remove legacy regulations that cannot be justified on a cost–benefit basis. These concerns are addressed in Recommendation 4. The committee also heard concerns that much of the regulatory development process is not under USCG control. DHS and the Office of Management and Budget (OMB) review and approval take considerable time, at times causing lengthy delays.

**Recommendation 9: USCG should promote continuous, effective, and inclusive communication through periodic scheduled consultation with stakeholders regarding both existing and proposed regulations. Metrics should be established and performance monitored, with regular and timely reporting of results. Whenever practical, regulations should be descriptive and performance based rather than prescriptive.**

### **Impact of Non-USCG Legislation and Regulations**

The committee focused its efforts on impediments to U.S. flag registry from USCG legislation and regulations. However, during this process the committee took note of other impediments that ensue from non-USCG legislation and regulations.

The establishment of standards for ballast water treatment is delegated to the Environmental Protection Agency (EPA) under the Clean Water Act as well as to USCG under

the Invasive Species Act. In 2013, EPA released a vessel general permit (VGP) document pertaining to ballast water management that called for the same water quality-based effluent limitations and monitoring and reporting requirements as *The International Convention for the Control and Management of Ship's Ballast Water and Sediments* adopted by IMO in 2004. The VGP was challenged by environmental organizations, and the U.S. Court of Appeals for the Second Circuit remanded the matter to EPA for further consideration, citing among other items that EPA should have considered a higher standard than the international standard. This remand put USCG in an awkward position with regard to type approval of ballast water treatment systems because the EPA requirements are uncertain, and it has set back worldwide efforts to implement uniform ballast water treatment regulations. The delay caused by the court's action places U.S. flag ship owners in the unenviable position of installing required ballast water treatment systems they may later have to replace or significantly modify, depending on the final resolution of EPA's VGP for ballast water management.

Three other relevant issues are as follows:

- *The Ad Valorem Duty*. The *Comparison of U.S. and Foreign-Flag Operating Costs* report<sup>[4, pp. 11–12]</sup> noted, “As set forth in the Tariff Act of 1930, a 50 percent ad valorem duty is imposed on U.S. flag shipowners for non-emergency repairs of U.S. flag vessels that are conducted in foreign shipyards. . . . Carriers participating in the PwC survey . . . stated that the foreign shipyards are still used for American-flag ship repairs since the cost of having repairs performed overseas and paying the duties is often lower than the cost of having the repairs performed in U.S. shipyards.”

- *P&I Insurance.* The *Comparison of U.S. and Foreign-Flag Operating Costs* report<sup>[4, p. 29]</sup> stated, “The Jones Act provides mariners with the ability to file a lawsuit against carriers for personal injury, which has increased the number of claims and the amounts awarded for job-related personal injuries, resulting in high carrier premiums compared to foreign competitors.”
- *Vessel Emissions.* The EPA, under the Clean Air Act, in 40 CFR sets emission standards for diesel engines, including for diesel engines used in marine service. These standards align with IMO standards only for larger engines (typically for oceangoing ships). For smaller engines, the engines must comply with EPA standards, which are higher than IMO standards. The EPA also requires each engine to have an emission certificate issued by EPA and does not accept international certificates. Obtaining the EPA-issued certificates in a timely fashion is an ongoing concern of U.S. vessel operators, particularly for MSP vessels at reflagging.<sup>44</sup>

The committee encourages USCG to continue to work with MARAD, EPA, and other agencies and organizations, as appropriate, to achieve uniformity for safe, environmentally sound international shipping. Although analysis of these issues is outside the scope of the committee’s mandate, the committee believes they require further study.

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<sup>44</sup> MSP NVIC Project, Comment Matrix, Index #10, Docket 30005.

## Conclusion

The committee, as charged, reviewed two reports: the 2013 USCG *Impediments to the United States Flag Registry, Report to Congress*; and the 2011 MARAD *Comparison of U.S. and Foreign-Flag Operating Costs*. The committee's findings are briefly presented in the Summary and are not repeated here. Specific findings regarding the status of U.S. flag versus foreign flag competitiveness issues as related to the documents under review are provided in the body of this report. On behalf of the committee, I express our appreciation for the opportunity to be of service by analyzing and assessing the issues of concern regarding U.S. flag vessel competitiveness and the importance, not just of ACP, but also of MSP with respect to the identified issues. We hope you find our comments to be constructive in this regard.

Sincerely,



R. Keith Michel (NAE)  
Committee Chair

cc: RADM Paul Thomas  
Jaideep Sirkar  
Lt. Joshua Kapusta  
Ali Gungor  
Capt. Verne Gifford

Enclosure A Committee to Review Impediments to United States Flag Registry  
Enclosure B Committee Biographical Information  
Enclosure C Meeting Participants  
Enclosure D Acknowledgment of Reviewers  
Enclosure E Acronym List



## Enclosure A

### Committee to Review Impediments to United States Flag Registry

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## **Enclosure B**

### **Committee Biographical Information**

**R. Keith Michel, NAE**, is president of the Webb Institute. Prior to this appointment in 2013, he worked for the Herbert Engineering Corporation (HEC), a naval architecture firm, for 38 years. Mr. Michel was chairman of the board of HEC's group of companies and served as president and CEO. At HEC he worked on design, specification development, and contract negotiations for containerships, bulk carriers, and tankers. Mr. Michel has served on numerous industry advisory groups developing guidelines for alternative tanker designs, including groups advising the International Maritime Organization (IMO) and the U.S. Coast Guard. He served as chair of IMO's bulk liquids and gases committee, which was tasked with developing regulations concerning the subdivision of tankers, including criteria for the acceptance of alternative designs to double-hull tankers. His work has included development of methodology, vessel models, and oil outflow analysis. He was a project engineer for the U.S. Coast Guard report on oil outflow analysis for double-hull and hybrid tanker arrangements, which was part of the U.S. Department of Transportation's technical report on the Oil Pollution Act of 1990 to Congress. He has also worked on the development of salvage software used by the U.S. and Canadian Coast Guards, the U.S. Navy, the National Transportation Safety Board, the Maritime Administration, the American Bureau of Shipping (ABS), Lloyd's, and numerous oil and shipping companies. Mr. Michel was Chair of the Marine Board of the Transportation Research Board of the National Research Council (NRC) from 2002 through 2004 and has served on several NRC committees. In 2011 Mr. Michel was awarded the W. Selkirk Owen Award for distinguished service by the Webb Institute Alumni Association. He is a past president of the Society of Naval Architects and Marine Engineers (SNAME). In 2002 he was the recipient of SNAME's highest award, the David W. Taylor Medal. He is a Fellow and Honorary Member of SNAME, a National Associate of the NRC of the National Academy of Sciences, and past Chairman of the Webb Institute Board of Trustees. In 2014, he was elected to the National Academy of Engineering. Mr. Michel holds a B.S. degree in naval architecture and marine engineering from the Webb Institute of Naval Architecture.

**Vice Admiral James C. Card (USCG, retired)** offers professional services to the maritime community based on 42 years of maritime safety, security, and environmental protection experience in the U.S. Coast Guard and ABS. As senior vice president and chief technology officer at ABS he was responsible for overall management of ABS global technology, research, and rule development for ships and offshore facilities. He enjoyed a 36-year U.S. Coast Guard career that included positions as Vice Commandant, Commander of the Pacific Area, and Assistant Commandant for Marine Safety, Security, and Environmental Protection. As leader of the nation's marine safety, maritime security, and environmental protection programs he carefully balanced national needs and priorities with those of maritime commerce. He has authored many papers on marine safety, environmental protection, and concepts for tankers and human factors in marine operations. During his Coast Guard career he led numerous U.S. delegations to IMO. Admiral Card is on the board of directors for the National Veterans Museum, on the Independent Appeal Board for the International Association of Classification Societies (IACS), and on the board of directors of AET (formerly American Eagle Tankers). He is chair of the Marine Board of the National Academy of Sciences. His numerous awards include the Rear Admiral Halert C. Shepherd Award from the Chamber of Shipping of America for achievement in merchant marine safety; the Vice Admiral Jerry Land Medal from SNAME for "outstanding accomplishment in the marine field"; the Roy Wilkins service award from the NAACP; and many military awards, including the Department of Transportation Distinguished Service Medal and the Coast Guard Distinguished Service Medal. Admiral Card is a graduate of the U.S. Coast Guard Academy, the Massachusetts Institute of Technology (M.S. in naval architecture and marine engineering and M.S. in mechanical engineering), and the Industrial College of the Armed Forces.

**Joseph H. Comer, III**, has more than 35 years' experience in marketing, contracts, personnel, design, and production from a variety of positions he has held in the marine industry. As a principal at Ship Architects, Inc., he represents clients performing a variety of naval architecture, shipbuilding technology, and regulatory interface activities for marine projects. His past projects include leading change management processes to implement manufacturing concepts for marine products; initiating technology transfer from shipyards in Europe and Asia to U.S. shipbuilding;

planning the construction of a new generation of supply vessels; and acting as an owner's representative during the design and construction of various high-speed, naval, and tanker vessels. He is a fellow member of SNAME, where he has been a member of the Ship Machinery Committee since 1991. Mr. Comer holds a B.S. in naval architecture and marine engineering from the University of Michigan.

**Martha R. Grabowski** is the Distinguished McDevitt Chair in information systems and professor and director of the information systems program at Le Moyne College and a research professor in the Department of Industrial and Systems Engineering at Rensselaer Polytechnic Institute in Troy, New York. She is a member of ABS and a lifetime national associate of the National Academies and NRC, where she most recently chaired the National Academies' policy study assessing U.S. arctic oil spill response capabilities. Dr. Grabowski's research focuses on the impact of technology on individuals, groups, and organizations in complex, safety-critical systems; risk analysis and risk mitigation in large-scale systems; and the role of human and organizational error in high-consequence settings. Her research team is currently developing a series of resource allocation and effectiveness models for Arctic oil spill response and search and rescue (SAR) for the U.S. Department of Homeland Security. She and her team are also investigating the role of complexity in large-scale disaster response efforts for the National Science Foundation and the U.S. Army Corps of Engineers. Dr. Grabowski was designated a Google Glass Explorer in 2013 and is studying the impact of wearable, immersive augmented reality (WIAR) systems for shipboard navigation, Arctic oil spill response, and SAR applications in remote and infrastructure-poor locations. Dr. Grabowski is a licensed former merchant officer and retired lieutenant commander in the U.S. Naval Reserve. She is a recent past chair of the Marine Board and has served on numerous NRC committees, including chairing the NRC committee on Naval Engineering in the 21st Century and vice-chairing the committee on Review of the Tsunami Warning and Forecast System and Overview of the Nation's Tsunami Preparedness. Dr. Grabowski earned a B.S. from the U.S. Merchant Marine Academy and an M.B.A., an M.S. (engineering), and a Ph.D. (management and information systems) from Rensselaer Polytechnic Institute.

**Henry S. Marcus** is professor emeritus of marine systems in the Center for Ocean Engineering within the Department of Mechanical Engineering at Massachusetts Institute of Technology (MIT), where he held teaching and research positions for more than 40 years and directed MIT's Ocean Systems Management Program. Dr. Marcus has also been a marine transportation consultant to many government agencies and various maritime industries. He was a member of the National Academies' Marine Board in the 1990s, has served on several Marine Board committees, and chaired a Marine Board committee on Tank Vessel Design that reviewed ship design approaches to oil spill prevention. He has served as a member of the Federal Transportation Advisory Group and as a member of the Marine Transportation Systems National Advisory Council, and he has authored or coauthored six books and numerous articles on various aspects of the marine industry. In 2013 he was the recipient of SNAME's William H. Webb Medal. Dr. Marcus earned a B.S. in naval architecture from the Webb Institute, two M.S. degrees (naval architecture and shipping management) from MIT, and a D.B.A. from Harvard Business School.

**Eugene K. Pentimonti**, Director of Eno Transportation Foundation, has over three decades of broad-based management experience in the shipping industry, where he has played key roles in the planning, engineering, and construction of the industry's shift to containerization and in evaluating and designing vessels. Among his specific accomplishments, Mr. Pentimonti helped to design and build five diesel-powered, non-Panamax C-10 vessels, each with a container-carrying capacity of approximately 4,300 TEUs. He was also closely involved with the engineering, construction, and operation of the industry's first doublestack trains. Mr. Pentimonti has served as president of wholesale operations at Pacer International, Inc., since April 2000. Prior to joining Pacer Stacktrain, he served as vice president (1979 to 1996) and senior vice president (1996 to 2000) for the American Trucking Association. His other career highlights include his work as a consultant to Parsons Brinkerhoff and the Lockheed Martin IMS Corporation and as senior vice president of the American Trucking Association. In 2009, he retired from his position of senior vice president at Maersk Line, Ltd., where he was responsible for Maersk's legislative, regulatory, and international government affairs. Mr. Pentimonti is a graduate of the U.S. Merchant Marine Academy at Kings Point, and he received his master's

degree in engineering and management from the Massachusetts Institute of Technology.

**Eugene A. Van Rynbach** is a vice president at Herbert Engineering Corporation (HEC) and manager of their Annapolis, Maryland, office. He joined HEC in 2005 after an extensive career in the ship operation and engineering fields. At HEC he has worked as the deputy engineering manager for the FPSO EnQuest producer major at B+V Shipyard in Hamburg, and he has participated in a variety of projects, including preparation of a suite of RORO vessel designs for MARAD and other organizations for American Marine Highways, LNG propulsion system design, conversion of a RORO ship to partial containership, several new-building projects, vessel life extension studies, tanker piping system modifications, preparation of tanker survey planning documents, tanker barge construction cost estimates, technical support and plan approval management for a floating dry dock being built in China, and evaluation of steel renewals for ships undergoing repairs. Prior to joining HEC, Mr. Van Rynbach worked for 15 years as manager of technical services for the containership operator Sea-Land Service and its offshoot, U.S. Ship Management. His areas of responsibility included vessel new construction, conversions, major modifications, technical engineering, development of procedures for complex repairs, evaluation of vessel capabilities and potential improvements, and providing technical advice to management. Mr. Van Rynbach was a principal with the consulting firm J.D. Van Rynbach & Associates, Inc., for 7 years during the 1980s. Before that, he worked for 2 years for American President Lines in Oakland, California, as a staff engineer in the Marine Operations department, where he was involved with energy conservations efforts, vessel modifications, and vessel capability evaluations and improvements. From 1979 through 1980 he worked for Sea-Land Service. Prior to that he worked for several years as a ship operating marine engineer, obtaining a U.S. marine engineer's license as a 3rd engineer, motor vessel, unlimited horsepower. In his early career after graduation, Mr. Van Rynbach worked as a hull technical engineer for ABS at its headquarters in New York, doing plan approval for new construction of ships and mobile drilling rigs, and he also worked on the engineering staff at a small shipping company in New York. Mr. Van Rynbach earned a B.Sc. degree, with honors, in mechanical engineering with a specialization in naval architecture from the University of California, Berkeley, in 1974. In 1992 he received an M.Sc. degree, with honors, in transportation

management from SUNY Maritime College, Fort Schuyler, New York. He is a member of ABS and SNAME, and he received the Linnard Prize from SNAME for presenting the best paper at the 1995 SNAME annual meeting.

## Enclosure C

### Meeting Participants

#### Committee

R. Keith Michel, NAE, *Chair*  
James C. Card  
Joseph H. Comer, III  
Martha R. Grabowski  
Henry S. Marcus  
Eugene Pentimonti  
Eugene A. Van Rynbach

#### Speakers

David Anderson, General Manager, Maritime Technical Services, Maersk Line, Ltd.  
Blaine Collins, Vice President, Group Government and Public Affairs – US, DNV, and GL  
Michael Donovan, Director, Marine Business Development, The Hiller Companies, Inc.  
Ed Hanley, Vice President, Labor Relations, Maersk Line, Ltd.  
Jack Harrald, Affiliated Faculty Member, Virginia Tech Global Forum on Urban and Regional Resilience  
Jeffrey Lantz, Director, Commercial Regulations and Standards for the U.S. Coast Guard and Assistant Commandant for Marine Safety, Security, and Stewardship, USCG Headquarters  
David Park, Public Sector Practice, PricewaterhouseCoopers, LLP  
Tim Perry, Director, Legislative and Regulatory Affairs, American President Lines Maritime, Ltd.  
Brian Peter (Commander USCG, retired), Safety, Quality, and Environmental Management Systems, American President Lines Maritime, Ltd.  
Jaideep Sirkar, Chief, Naval Architecture Division (CG-ENG-2), Office of Design and Engineering Standards, USCG Headquarters  
Richard Wells, Vice President, Offshore Marine Service Association

#### Guests

Kylee Anastasi, Director, Capital Projects and Infrastructure, PricewaterhouseCoopers, LLP  
Mark Baumgardner, Director, Public Sector Advisory, PricewaterhouseCoopers, LLP  
Craig Bone, Vice President, Government Operations, American Bureau of Shipping  
Joe Cox, President and CEO, Chamber of Shipping  
Rhonda Davis, Maritime Security Program, Maritime Administration  
Owen Doherty, Associate Administrator for Business and Finance Development, Maritime Administration



Jan Downing, Senior Trade Specialist, Office of Cargo and Commercial Sealift, Maritime Administration  
Lt. Karima Greenaway, Classification Society Coordinator for Standards Development, USCG Headquarters  
John J. (J.J.) Jaskot, Attorney, Jones Walker, LLP  
Cdr. Scott L. Johnson, Chief, Human Element and Ship Design Division, Office of Design and Engineering Standards, USCG Headquarters  
Lt. Joshua Kapusta, Naval Architecture Division, USCG Headquarters  
Jonathan Kaskin, Chair, TRB Military Transportation Committee (AT035)  
Ron Kiss, President Emeritus, Webb Institute  
Charles Rawson, Naval Architecture Division, USCG Headquarters  
John Clark Rayfield, Staff Director, Subcommittee on Coast Guard and Maritime Transportation  
Mark Remijan (Captain USCG, retired), Director, Operations, American President Lines Maritime, Ltd.  
Brett Scott, PAC Director and Lobbyist, Maersk Line, Ltd.

#### **Transportation Research Board Staff**

Scott Brotemarkle  
Steve Godwin  
Beverly Huey  
Amelia Mathis

## **Enclosure D**

### **Acknowledgment of Reviewers**

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise in accordance with procedures approved by NRC's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. Thanks are extended to the following individuals for their review of this report: Craig E. Bone, American Bureau of Shipping; Kevin S. Cook, U.S. Coast Guard (retired); Charles R. Cushing, NAE, C.R. Cushing & Co., Inc.; Jonathan D. Kaskin, U.S. Navy (retired); Ronald K. Kiss, president emeritus, Webb Institute; Peter Weber, SeaRiver Maritime, Inc. (retired); Robert Johnston, REJ Shipping, LLC; and Don Walsh, NAE, U.S. Navy (retired).

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of this report was overseen by Malcolm MacKinnon, III, NAE, MacKinnon-Searle Consortium, LLC; and Susan Hanson, NAS, Clark University. Appointed by NRC, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

## **Enclosure E**

### **Acronym List**

ABS	American Bureau of Shipping
ACP	Alternative Compliance Program
ACS	approved classification societies
ASME	American Society of Mechanical Engineers
APL	American President Lines
ATEX	potentially explosive atmospheres (Fr. ATmosphères EXplosibles)
BV	Bureau Veritas
CFR	Code of Federal Regulations
COI	certificate of inspection
CP	Cargo Preference
DHS	Department of Homeland Security
DNV	Det Norske Veritas
DOD	Department of Defense
EPA	Environmental Protection Agency
EU	European Union
FMEA	failure mode effects analysis
FSS	fire safety systems
GL	Germanischer Lloyd
HEC	Herbert Engineering Corp.
H&M	hull and machinery
IACS	International Association of Classification Societies
ICLL	International Convention on Load Lines (also referred to as LOADLINES)
IMCO	Inter-Governmental Maritime Consultative Organization
IMO	International Maritime Organization
IRI	International Registries, Inc.
LSA	lifesaving appliance

LR	Lloyds Register
MARAD	Maritime Administration
MARPOL	International Convention for the Prevention of Pollution from Ships
MED	Maritime Equipment Directive
MIT	Massachusetts Institute of Technology
MOU	memorandum of understanding
M&R	maintenance and repair
MSP	Maritime Security Program
NKK	Nippon Kaiji Kyokai ClassNK
NRC	National Research Council
NVIC	Navigation and Vessel Inspection Circular
OCMIs	Officers in Charge, Marine Inspection
OMB	Office of Management and Budget
OSV	offshore supply vessel
P&I	protection and indemnity
PUMS	periodically unmanned machinery space
PwC	PricewaterhouseCoopers
RINA S.P.A.	Registro Italiano Navale
RORO	roll-on/roll-off
SAR	search and rescue
SNAME	Society of Naval Architects and Marine Engineers
SOLAS	International Convention for the Safety of Life at Sea
TRB	Transportation Research Board, National Research Council
UL	Underwriter Laboratories
USCG	United States Coast Guard
USTRANSCOM	U.S. Transportation Command
UWILD	underwater inspection in lieu of drydocking
VGP	vessel general permit
VISA	Voluntary Intermodal Sealift Agreement
WIAR	wearable, immersive augmented reality