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DEPARTMENT OF TRANSPORTATION

U.S. COAST GUARD

STATEMENT OF ADMIRAL ARTHUR E. HENN

ON DOMESTIC AND INTERNATIONAL VESSEL CONSTRUCTION STANDARDS

BEFORE THE

SUBCOMMITTEE ON COAST GUARD AND NAVIGATION

COMMITTEE ON MERCHANT MARINE AND FISHERIES

UNITED STATES HOUSE OF REPRESENTATIVES

JUNE 17, 1993

Rear Admiral A. E. "Gene" Henn
Chief, Office of Marine Safety, Security and Environmental Protection
United States Coast Guard

Rear Admiral Arthur Eugene Henn became Chief, Office of Marine Safety, Security and Environmental Protection at Coast Guard Headquarters, Washington, D.C., in June 1991. Prior to this assignment, Rear Admiral Henn was Commander of the Maintenance and Logistics Command, Atlantic.

Earlier assignments included that of Operations and Engineering Officer on the Coast Guard cutter Chincoteague; Assistant Chief, Merchant Marine Technical Branch, New Orleans, LA; and Special Project Action Officer, Merchant Marine Technical Division, Coast Guard Headquarters.

He was also Marine Inspector and Senior Investigating Officer, Marine Inspection Office, Philadelphia, PA; Chief, Engineering Branch and Chief, Marine Technical and Hazardous Materials Division, Coast Guard Headquarters; Captain of the Port, New York; Commander, Group, New York; Commander, Subsector, New York, Maritime Defense Zone, Atlantic; and Chief, Operations Division and Chief of Staff, Eighth Coast Guard District, New Orleans, LA.

A 1962 graduate of the Coast Guard Academy, Rear Admiral Henn earned combined master of science degrees in naval architecture, marine engineering and metallurgical engineering from the University of Michigan in 1968. Also, he is a 1982 graduate of the Army War College.

His decorations include the Legion of Merit, two Meritorious Service Medals, four Coast Guard Commendation Ribbons, Coast Guard Unit Commendation Ribbon, Coast Guard Achievement Medal and two Commandant's Letter of Commendation Ribbons.

Rear Admiral Henn is a member of the American Society of Naval Engineers, American Bureau of Shipping, International Cargo Gear Bureau, Marine Index Bureau, Marine Engineering Council of Underwriters Laboratories and the Sealift Committee of the National Defense Transportation Association.

During the past 20 years, he has represented the United States Coast Guard as a member of delegations to the International Maritime Organization, a United Nations specialized agency. He heads United States delegations to meetings of the Maritime Safety and Marine Environment Protection Committees of IMO.

A native of Cincinnati, Ohio, Rear Admiral Henn is married to the former Susan Frances Pedretti, also from Cincinnati. They have two grown children, David and Jennifer.

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Thank you, Mr. Chairman. I am grateful for the opportunity to meet with you and provide you an updated overview of the Coast Guard's role in the development and enforcement of vessel construction standards.

BACKGROUND

As you know, the Coast Guard has a long history of active involvement with various national and international standards-making committees, and we have successfully ensured that safety has been retained as a key element of the standards-making process. Our participation in the development of shipboard standards began over 20 years ago with our membership on the American Society of Mechanical Engineers (ASME) committees on power boilers and pressure vessels. Since then, as a result of the continued growth in our Congressionally-mandated responsibilities, our sphere of interest and involvement has expanded to encompass more than 60 different standards-making bodies, including Federal advisory committees, national industry professional societies, classification society technical committees, committees in support of international treaties and agreements, and the major international industry standards

organizations. More recently, as our responsibilities with regard to protection of the environment have increased, we have also become active in the development of standards for specialized oil spill removal equipment, vapor recovery during cargo oil transfer, and the reduction of engine exhaust emissions. With respect to shipboard construction standards alone, we currently have over 30 people assigned as either primary or alternate members on over 50 committees or organizations devoted to the development, implementation, and oversight of voluntary consensus vessel construction and operation standards.

In the historical evolution of shipboard construction standards, each flag state initially developed and implemented its own standards. The International Maritime Organization (IMO) then became the forum for establishing international safety standards which, ideally, all member states ratify and implement. This process helps create a level playing field among the maritime industry's of the member flag states; however, complete parity has yet to be achieved.

COMPETITIVENESS, COST, AND CONSTRUCTION STANDARDS

Studies conducted and cited by the U.S. maritime industry have shown that the industries competitiveness has been adversely impacted by the cost differential between building a vessel to U.S. standards and building it to some foreign standards; that differential has been reported to be anywhere from 3% to 15% of

the total construction cost. These studies, however, were conducted prior to implementation of the 1981 and 1983 amendments to the 1974 Safety of Life at Sea (SOLAS) Convention. The Convention and its amendments have greatly reduced the gap between U.S. and international standards.

Admittedly, the United States has unilaterally imposed more stringent standards than the international regulations promulgated by IMO. However, these were not discretionary requirements -- they were imposed with congressional support and direction because of their importance to safety. Two examples are the upgraded steering requirements of the Port and Tanker Safety Act of 1978, and the double hull requirements of the Oil Pollution Act of 1990. Nevertheless, a Maritime Administration (MARAD)-sponsored study conducted in 1979 reported that the portion of the total construction cost differential directly attributable to discretionary requirements imposed by the Coast Guard was less than one-half of one percent.

Adopting SOLAS requirements as the sole standards for vessel construction has been suggested by some; however, this is not the panacea it may appear to be. SOLAS provides good general guidelines for vessel design, but it's not a comprehensive construction standard. SOLAS does not adequately address all vital safety systems and is fraught with hundreds of provisions which leave design details to the satisfaction of the flag state. For example, a recent Coast Guard technical review of an

alternative sprinkler system submitted by a foreign manufacturer determined that the system did not afford the safety provided by automatic sprinkler systems. This system had been approved by a foreign flag administration and classification society, but U.S. Coast Guard review of the proposed system revealed several technical problems. Such unproven systems should not be substituted where lives are at risk. While the United States supports and endorses the flexibility allowed by the equivalency provision of SOLAS, we also uphold requirements for passenger safety. The United States will continue to challenge foreign manufacturers, administrations, and classification societies that have a detrimental impact on critical safety systems.

The Coast Guard is leading efforts within several technical subcommittees of IMO's Maritime Safety Committee to broaden the scope and increase the specificity of the various IMO codes and conventions. Topics addressed by current initiatives include safe ship design, construction, and operation, as well as vessel manning standards. One representative project involves the elimination of the "to the satisfaction of the Administration (flag state)" clauses from SOLAS provisions, and the introduction of objective, definitive acceptance criteria. Coast Guard initiatives to improve international standards will provide increased opportunities for levelling U.S. and foreign ship design, construction, and operation standards.

An important factor that has not been addressed directly in the cost studies is the apparent widespread misunderstanding of our regulations, specifically provisions for accepting foreign materials, equipment and arrangements which are shown to be equivalent to those meeting our standards. Provisions for acceptance based upon demonstrated equivalence have always been available to designers and builders and have been frequently employed. The significance of this was pointed out in an industry follow-up study to one of the aforementioned cost studies, wherein certain "premiums" charged by a foreign shipyard for acquiring materials or equipment meeting our requirements were identified and virtually eliminated through use of the equivalency provisions in the regulations. While this is an example of a partial solution, it falls short of resolving the problem for all cases because the equivalencies are typically done on a case by case basis, and the Coast Guard is obligated to treat the comparison documentation submitted by the designer or builder as proprietary information. As yet, there has been no sustained drive within the industry to pool information, knowledge, and resources to address this. As a follow-on to the Shipbuilders Council of America standards comparison project, North American Steel Ship Company (NASSCO) was recently awarded a National Ship Research Program contract to identify standards which the industry believes would help reduce ship construction costs. We will maintain close contact with NASSCO throughout this effort to ensure the establishment of proper safety criteria.

In the summer of 1992, the Coast Guard conducted a limited comparison of ship design and construction standards between the Code of Federal Register (CFR), and a combination of SOLAS and American Bureau of Shipping (ABS) Rules. The preliminary results showed that a combination of SOLAS and ABS Rules would provide a safety level equivalent to CFR requirements for about half the standards that we reviewed. These results have not been formally published or released. The Maritime Regulatory Reform staff has initiated a formal follow-up of these results.

Our activity with international organizations allows us to share maritime-related information and provides a vehicle for helping shape the future development of safety standards of the worldwide maritime community. Through our continued involvement with various professional society committees, we initiate, develop, evaluate and accept performance-based industry consensus standards in lieu of restrictive federal regulations. This has the following advantages: the standards are familiar to industry, reduces the time necessary to complete the USCG review and acceptance process, and ensures that USCG safety requirements keep pace with the latest industry technology and developments.

The Coast Guard has long been active in standards making organizations. Initial involvements were in the domestic arena with professional societies such as ASME and the American Society for Testing and Materials (ASTM). The Coast Guard is active

internationally as the U.S. representative to the IMO. We participate on two committees, 11 subcommittees, and are typically involved in numerous intercessional correspondence groups. Recent international activity has accelerated interest in making the International Organization of Standards (ISO) and the International Electrotechnical Commission (IEC), the two central bodies for all international industry standards. The United States endorses this and participates at ISO and IEC through close correspondence with and membership on technical advisory groups sponsored through the American National Standards Institute. The international organizations remain the prime focal point for all of our standards efforts to guarantee the uniformity of application worldwide and to minimize burdens imposed on our maritime industry.

RECENT INITIATIVES

Damage Stability

New Coast Guard damage stability regulations for dry cargo ships were recently issued (April 1, 1993). These conformed applicable U.S. regulations with international standards. In addition, the Coast Guard published a notice in the Federal Register (April 2, 1992) that allows a draft IMO intact stability standard for large container ships to be submitted as an equivalent to U.S. requirements for intact stability for container ships greater than 100 meters. The combined effect of these changes will be an average increase of three to eight percent in ship cargo-carrying capacity. The new regulations

removed an economic disadvantage to U.S. carriers and will result in a projected annual benefit as high as $250 million due to the ability to carry additional cargo. The Coast Guard has also begun work on a U.S. proposal to standardize damage stability requirements. Standardization will develop a single probabilistic damage stability method for all ship types. SOLAS regulation 25-1, implemented by this rule, specifically excludes application to ships which are shown to comply with subdivision and damage stability requirements of other international standards. Therefore, offshore supply vessels (OSVs) that comply with the Guidelines for the Design and Construction of OSVs are not required to comply with these rules. A separate rulemaking has already been proposed (CGD 82-004 and 86-074) which will obviate the need for these vessels to comply with the damage stability rules for dry cargo vessels. The Coast Guard does not intend to apply the dry cargo rules to OSVs while the two aforementioned rulemakings are pending.

Design of HSC Code.

The Coast Guard has also taken the lead at IMO in developing an international code for the design of high speed passenger and cargo craft (HSC) code to replace the current dynamically supported craft (DSC) code. The DSC allows latitude in interpreting the code "to the satisfaction of the flag administration's" specifications. The new HSC code will be specific, yet will permit performance requirements to be met using different approaches. This serves shipbuilders' needs for

design flexibility, and meets the increasing world-wide demand for faster transportation of people and cargo. High speed passenger and cargo vessels include small waterplane area twin hull (SWATH) craft, wave-piercing catamarans, air cushioned vehicles, and other novel designs. The Coast Guard has supported development of the HSC code in order to put domestic shipbuilders on an equal footing with overseas shipbuilders. The HSC code is expected to be completed next year.

Plastic Pipe Testing Procedures

The IMO recently adopted new plastic pipe testing procedures. The United States led the effort to develop these procedures for use of plastic pipe aboard ships. Domestic manufacturing companies and standards-making groups aided significantly in the development effort. The use of plastic pipe in many shipboard piping systems offers shipbuilders a substantial savings in both procurement and installation costs. The United States immediately implemented the international standard for use in piping systems, including automatic sprinkler systems. Such efforts make U.S. construction more competitive with foreign shipyards without compromising safety.

Use of Fiberglass in Vessel Construction

The Coast Guard has initiated a research program to develop a standard for assuring the fire safety of fiberglass structures. Because of fiberglass' unique flammability and heat sensitivity, current regulations limit its use in shipboard construction to

vessels carrying less than 150 passengers. For a number of technical reasons, it would be desirable to use fiberglass in the construction of vessels that carry 150 or more passengers. Unfortunately, a method has not yet been developed by which fiberglass can be reliably protected against the risk of fire. Earlier this year the Coast Guard completed the first phase of research into this issue. Research will continue as funding permits. In the meantime, we are working closely with shipyards on concepts that will provide adequate protection. For example, we recently approved, in concept, a combination fiberglass and aluminum design having numerous additional fire safety features. Additional testing of fire suppression systems to determine their effectiveness on fiberglass is scheduled for later this year.

OCCASIONAL NEED FOR UNILATERAL ACTION

Often we are presented with novel designs which were not envisioned by the regulations, but which cannot wait for time to secure international consensus and adoption of standards. In such cases, we develop unilateral positions to provide industry a reasonable response time. Then we take the issue to the IMO for international agreement.

Hatchless "Open-Top" Container Holds

As one example where unilateral development of interim standards was needed, U.S. shipping is now converting to hatchless "open-top" container hold designs. "Open-top" ships offer tremendous savings to maritime shipping on short voyages by reducing time

spent at the pier. Coast Guard engineers worked closely with Matson Shipping Co. engineers and other U.S. container ship companies to determine the fire hazards posed by carrying certain types of cargo in open-top cargo holds. Working together, we developed a proposed standard and will present it at IMO to ensure that equivalent measures of safety are applied by all countries. To date, four U.S. ships are being modified or are scheduled for this economical modification. The approach of determining the hazards and conducting a fire risk assessment was also used by the Coast Guard in reviewing the strategic sealift fire safety systems where existing regulations did not adequately address the hazards.

Excursion, Dinner, and Gambling Industry Vessels

Another example is the Coast Guard's development of comprehensive alternative design requirements for domestic vessels in the excursion, dinner and casino industry which operate on protected and partially protected routes. Dinner, excursion and gambling trade vessels differ significantly from the traditional ocean-going passenger vessels covered by existing regulations. These vessels being built today are designed with only large spaces for passenger occupancy. This results in higher passenger densities and requires special consideration. The Coast Guard has responded to the designers, builders and owners of this new generation of passenger vessels by developing innovative design and passenger safety system requirements that enhance safety while meeting the industry's needs. The Coast Guard has also led

recent efforts to develop an equivalent alternative method to permit longer and larger public spaces to be used, beyond that allowed by current regulations. The rapid growth rate in this industry is expected to continue and the design advantages offered by the Coast Guard will allow shipbuilders and designers to use numerous performance-based alternatives rather than specifications having narrow scope. The Coast Guard will continue to work with designers, owners and shipyards to satisfy our safety concerns and avoid placing undue burdens on industry.

Use of Alternative Fuels

Another example is the use of alternative fuels, an option which has been driven largely by increasingly strict air pollution standards and Federal Government monetary incentives. During the past two years, we conducted concept reviews of two separate projects involving compressed natural gas (CNG) fueled engines: one for a passenger ferry conversion, the other for a new crew boat. No Coast Guard regulations currently address CNG or other alternative fuels. Our primary safety concern was the cylinders needed to store the gas at extremely high pressure, presenting a fire/explosion hazard to the passengers and crew. The operational concern was the weight imposed by use of conventional steel cylinders. In the absence of existing standards for non-steel cylinders, and by working closely with leading industry experts, we were able to approve the use of lightweight fiberglass wrapped aluminum cylinders.

Submersible Vessels

The Coast Guard has also recognized the rapid growth of the emerging passenger carrying submersibles industry. We have allowed growth without jeopardizing the safety of passengers. There are no specific regulations for passenger carrying submersibles. However, we have combined industry standards and existing classification society rules to achieve an extremely well defined baseline for the certification of these vessels. These guidelines have been incorporated into a recently completed Navigation and Vessel Inspection Circular (NVIC) which defines the design and construction characteristics that would provide a level of safety equivalent to that provided by surface vessels. This submersible shipbuilding effort was made possible by our teaming with industry experts and classification societies to develop appropriate guidelines for each new design. This has allowed us to maintain high safety standards while allowing continued growth in our domestic industry.

Automatic Sprinkler Systems

In the past several years, vessel designs have become more and more dependent on the installation of automatic sprinkler systems to ensure the safety of both passengers and cargo. Our sprinkler system regulations are very specific and do not permit designers to take advantage of significant technological advancements. Recognizing this opportunity to improve both safety and economic feasibility, the Coast Guard has taken the initiative to adopt and modify established industry standards, which were developed

by the National Fire Protection Association (NFPA). The Coast Guard has prepared guidance to shipbuilders and designers in the form of a NVIC that allows the application of specific NFPA standards with the necessary modifications applicable to shipboard installations. The Coast Guard also plans to work with NFPA to develop a marine automatic sprinkler standard that can be adopted into regulation.

STANDARDS FOR THE CRUISE SHIP INDUSTRY

The cruise ship building boom, which started in the 1980's, is projected to continue throughout the 1990's. The Coast Guard has increased our verification of the safety of foreign ships operating from U.S. ports. In addition, in 1992 the United States led the IMO in the development and adoption of, for passenger ships, two sets of SOLAS fire safety amendments. The first was adopted in May 1992, and is applicable to all existing passenger ships worldwide. The second, adopted in December 1992, is applicable to every passenger ship built after October 1, 1994. Key requirements are identical; all passenger ships will have to install, during initial construction or retroactively, the latest fire safety features applicable to a modern hotel. These include automatic sprinkler systems, smoke detection systems, improved methods for monitoring and reacting to a fire, and improved means to guide and protect passengers escaping to safe areas. As all existing ships sailing on international voyages will ultimately have to meet the latest fire safety requirements for new ships, `grandfathering' will no longer

create an incentive to retain ships built to outdated standards. Rather these new international regulations will ensure higher minimum standards for the remaining older ships. This meets our objective of equalizing safety requirements internationally.

In the past few years, passenger vessel damage stability criteria have come to the forefront in safety standards development. Ten years ago, the Coast Guard recognized that our domestic regulations and the equivalent criteria in the international convention had become inadequate as a result of the changes that had taken place in vessel hull design. Because the Coast Guard advocates the development and adoption of international standards for all U.S. vessels, we initiated, at IMO, revised damage stability criteria for passenger vessels. In 1988, after much discussion and work, IMO adopted a new set of damage stability requirements for new passenger vessels.

STANDARDS FOR THE DOMESTIC FLEET

Damage Stability

After IMO approved new damage stability criteria, we began an examination of our domestic fleet to ensure that domestically operated vessels have at least an equivalent level of safety to U.S. vessels in international trade. Unlike other vessel types, our domestic passenger ships carry anywhere from 7 to 4,000 people on a single voyage. Hence, a single casualty could result in significant loss of life. For example, damage instability contributed to the loss of 193 lives on March 6, 1987, when the

Herald of Free Enterprise sank in shallow water off the coast of Belgium. Domestically, we have been extremely fortunate to have avoided incidents attributable to the deficiencies that existed in our damage stability regulations.

To check the applicability of the international requirements, the Coast Guard initiated a study on the ability of the major vessel designs that make up our domestic passenger vessel fleet to meet the new international requirements. As a result of this study, we proposed that the requirements be placed only on what are called Subchapter H and Subchapter T passenger vessels. Generally, these are U.S. passenger vessels of 100 gross tons or greater, and those passenger vessels of less than 100 gross tons but greater than 65 feet in length. After very few public comments were received on this issue, these requirements were made final in December 1992. Since that time, we have learned of certain types of vessels, mainly those operating in protected or partially protected waters, which have problems adapting their designs to the new regulations. As a result, we are working with naval architects to develop new standards that establish an equivalent level of safety. A public hearing is scheduled for the summer of 1993 to discuss a permanent solution to this problem.

The other major change in our domestic stability regulations is the proposed periodic stability determination that also was initiated from the completion of work done at the IMO for

passenger ships and for mobile offshore drilling units. The tendency for ships of all types to experience "weight gain" with age is an accepted fact, both domestically and internationally. Incorrect light ship data can result in substantial miscalculation of a vessel's intact and damage stability, especially for vessels in which light ship forms a major part of the full load. Coast Guard inspectors occasionally require a new stability test after noticing that a vessel's operating draft has increased significantly. However, this type of corrective action is cursory at best and only attacks the symptoms of the problem. Stability tests have demonstrated that even the most conscientious operator is often unable to keep track of all changes to a vessel's stability.

The proposed expanded U.S. periodic stability verification requirement is based on knowledge gained about weight growth and the necessity to monitor it in all vulnerable vessel types. Generally, the new U.S. regulation requires a deadweight survey every five years with a full inclining required only when a significant amount of undocumented weight growth is found. The proposed periodic lightweight verification regulations would affect an estimated 2,500 vessels (about 1,300 passenger vessels, 100 Mobile Offshore Drilling Units, 1,100 small cargo vessels).

During the proposed rules comment period, the Coast Guard received letters from 28 firms and individuals representing affected sectors of the marine industry. All of the comments

were addressed in the final rule. However, as the rule implementation time neared, industry raised new concerns on the applicability of the rule and the cost of its implementation to the various vessel types. As a result, the Coast Guard has indefinitely delayed implementation. The comment period will be reopened and a public hearing held on these new concerns. Our future actions will be based on the industry input via the public hearing and any additional written comments.

IMPORTANCE OF ENFORCEMENT

Enforcement of vessel construction standards is as important as their detailed and uniform development. I view enforcement as the natural result of all parties recognizing and fulfilling their respective responsibilities in ensuring maritime safety. The enforcement consists of what I call the five safety nets: (1) the owners and operators, (2) the classification societies, (3) the flag state administration, (4) the insurance companies and Protection and Indemnity (P&I) clubs, and (5) the port state.

In support of this concept, the Coast Guard has spearheaded efforts, both domestically and internationally, to recognize quality organizations and place greater emphasis on the responsibilities of vessel owners and operators and equipment manufacturers. The Coast Guard actively supports improving overall maritime safety, by the following: promoting International Standard for Quality System (ISO 9000) and the "model company" concept; endorsing manufacturer self-

certification of products complying with adopted industry consensus standards; defining internationally the term "recognized classification society;" increasing port state control; re-emphasizing flag state enforcement; and supporting the full use of international standards organizations. These efforts lead to effective use of scarce resources in the development and oversight of standards, and provide the opportunity for components of industry to help themselves become self-policing, quality organizations. These efforts also reflect and support the same general attitude and trends in the maritime community worldwide. Thank you, Mr. Chairman. I would be pleased to answer any questions.