Final Report

UMTRI 97-06

NSRP 0480

SHIPBUILDING STANDARDS MASTER PLAN UPDATE

Submitted to

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July 1, 1997

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NSRP 0480		

4. Title and Subtitle	5. Report Date
United States Shipbuilding Standards Master Plan Update	July 1, 1997
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
The Marine Systems Division	UMTRI 97-06
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
The University of Michigan Transportation Research Institute 2901 Baxter Road, Ann Arbor, Michigan 48109	11. Contract or Grant No. P.O. # P2480T-0-K1
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Technical
Newport News Shipbuilding Company 4101 Washington Avenue Newport News, Virginia 23607	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The Shipbuilding Standards Master Plan was developed as NSRP Project 0360 in November 1992. This Standards Master Plan Update project was conceived to update the earlier project. Much has changed in shipbuilding standards, and most of the basic seven initiatives identified for the 1992 Master Plan have been resolved. They are:

1. Establish a communications center for shipbuilding standards.
2. Become more involved in international standards.
3. Gain more domestic involvement in the shipbuilding standards community.
4. Refine the process for identifying and developing new shipbuilding standards.
5. Coordinate existing standards.
6. Convert the U.S. shipbuilding industry to the metric system.
7. Develop a marketing strategy for the plan.
8. Adopt or convert existing global standards for domestic use.

This update includes an updated survey, the SP-6 tactical plan, new windows into standards on the internet, and more.

17. Key Words	18. Distribution Statement
standards, standardization, shipbuilding	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	69	

EXECUTIVE SUMMARY

The latest Shipbuilding Standards Master Plan was delivered in 1992 as NSRP 0360. That Plan was developed using extensive interviews, surveys, and an iterative editing process to include the views and opinions of the key persons and organizations involved in the processes of developing, managing, and using standards in the marine industries.

This Standards Master Plan Update was commissioned by the SP-6 Panel to track how the previous plan was working. The previous plan was developed in conjunction with the Standards Planning Workshop (published as NSRP 0344). Together, these documents were used as primary references for the work program and direction of the SP-6 Panel

The eight initiatives identified by the previous plan are used as an outline for its assessment:

1. Establish a communications center for shipbuilding standards.
2. Become more involved in international standards.
3. Gain more domestic involvement in the shipbuilding standards community.
4. Refine the process for identifying and developing new shipbuilding standards.
5. Coordinate existing standards.
6. Convert the U.S. shipbuilding industry to the metric system.
7. Develop a marketing strategy for the plan.
8. Adopt or convert existing global standards for domestic use.

The update project included another survey to sense any shifts in opinions related to shipbuilding standards. The results indicate that opinions on most issues are the same. It also studied the actions of the SP-6 Panel and other standards-related activities to determine the project findings. It publishes and references the SP-6 Tactical Plan developed in 1995.

Basically, the SP-6 Panel and shipbuilding standards have made progress on most of the initiatives and plans, but not nearly enough to have a fully efficient shipbuilding standards program. Ongoing and planned research projects are moving the group towards a useable standards program. The rate of movement and the expected final resolution of ongoing work are still unknown.

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Appendices

ACRONYMS and INITIALISMS

ABS - American Bureau of Shipping
AIA - Aerospace Industries Associatoin
API - American Petroleum Institute
ASME - American Society of Mechanical Engineers
ASTM - American Society for Testing and Materials
ASTM F-25 - ASTM Committee F-25 on Shipbuilding Standards
AWO - American Waterways Operators
DOD - Department of Defense
GCRMTC - Gulf Coast Region Maritime Technology Center
NSWC, CarderockDiv - Naval Surface Warfare Center, Carderock Division, formerly DTRC - David Taylor Research Center
ECB - Executive Control Board of the NSRP
IACS - International Association of Classification Societies
IHS - Information Handling Services
ISO - International Organization for Standardization
MARAD - Maritime Administration of the U.S. Department of Transportation
NAPVO - National Association of Passenger Vessel Owners (curently PVA)
NDCP - Navy Document Conversion Plan
NGS - Non - Government Standards
NSRP - National Shipbuilding Research Program
NIST - National Institute of Standards and Technology
NMRI - National Maritime Research Institute
PVA - Passenger Vessel Association
SAE- Society of Automotive Engineers
SCA - Shipbuilders Council of America
SNAME - Society of Naval Architects and Marine Engineers
SP-6 - The Marine Industry Standards Panel of the SPC of SNAME
SPC - Ship Production Committee
SSPC - Ship Structures Painting Council
TAG - Technical Advisory Group
UMTRI - The University of MichiganTransportation Research Institute
USCG - U.S. Coast Guard

INTRODUCTION

The most recent Shipbuilding Standards Master Plan was planned in 1990 and delivered in 1992 as NSRP 0360. That Plan[1] was developed using extensive interviews, surveys, and an iterative editing process to include the views and opinions of the key persons and organizations involved in the processes of developing, managing and using standards in the marine industries.

This Standards Master Plan Update was planned by the SP-6 Panel in 1993 and commissioned in 1994 to track how the previous Plan was working. The previous Plan was developed in conjunction with the Standards Planning Workshop (NSRP 0344). The survey for the earlier Plan was used as a catalyst for the workshop. Together, these documents were used as primary references for the work program and direction of the SP-6 Panel.

The update project included another survey (Appendix A) to sense any shifts in opinions related to shipbuilding standards. It also studied the actions of the SP-6 Panel and other standards-related activities to determine the project findings. It publishes and references the SP-6 Tactical Plan developed in 1995.

REVIEW OF INITIATIVES

Following are the initiatives developed for the previous Plan. For that Plan, the initiatives were considered necessary for having an effective National Shipbuilding Standards Program. These initiatives were discussed in more detail and supported by research and data in Volume II of the Plan, reported as NSRP 0360. The format for this update of the 1992 Plan is to restate those initiatives and discuss the current situation.

1. Establish a Communications Center for Shipbuilding Standards.

Objectives:

a. Become knowledgeable of and coordinate activities among all organizations involved in shipbuilding and shipbuilding standards.
b. Establish a central, unbiased, reference source of all U.S. and foreign shipbuilding standards.
c. Disseminate standards information, including ISO[2], to industry.
d. Facilitate solutions to discrepancies among different sources of standards and among users and writers.

Specific Action Areas:

Short Term (one to two years)

a. Use the funded (or selected for funding) existing projects to develop the functions related to the Communications Center.
b. Identify and evaluate possible performing organizations: NSRP Documentation Center, SP-6 Program Manager, Carderock Division NSWC, SCA, ASTM F-25, NIST, IHS, NMRI or some combination.
c. Acquire seed money, in the neighborhood of $50,000 to $100,000, from the Navy's Industrial Competitiveness Programs.

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[1] The 1992 Plan is hereinafter referred to as the Plan (with upper case P)

[2] International Organization for Standardization - other acronyms are listed on page iv.

Long Term (three to five years)

a. Establish broader based support, both in participation and financial forms, from the Navy, other owners (both government and private), member shipyards, and the rest of the marine industry.
b. Establish continuing sources of funding, possibly from the Industrial Competitiveness Program, USCG, MARAD, DOD, SCA and its constituent members, and the Department of Commerce (NIST), or some combination.

Communications Center Discussion

The communications center issue was addressed in SP-6 project 6-94-3, the Shipbuilding Standards Resource and Education Center. In parallel with that project, MARAD started the National Maritime Resource and Education Center. This Center is based on a library resource of standards based at the MARAD library[3] in the Department of Transportation building in Washington, DC. The GCRMTC and UMTRI showed interest in performing the expanded tasks of a Communications Center, but funding has not materialized.

A number of the items listed in this first initiative have been resolved to some extent. The SP-6 Panel, as well as most of the shipbuilders, have become more knowledgeable of organizations involved in shipbuilding and shipbuilding standards. Much of this has been related to increased involvement in building for commercial customers and in the government's increased use of commercial standards in naval auxiliary ships. However, the coordination of activities between parties involved in standards is still not to the level needed for a fully efficient program. There are still only two or three shipbuilding representatives on the ASTM F-25 Committee; and Subcommittee F25.80 is the official liaison to the ISO TC-8 Ships and Marine Technology Committee involved in international shipbuilding standards.

Standards information is widely available from a number of sources. The internet (Appendix B) has a great amount of information available about ASTM, ISO, ANSI, SAE, and DOD and foreign standards sources, among others. Many of the sites allow searches for specific standards based on key words. For those who do not have access to the internet, SP-6 standards database projects, NSRP 0361, 0456 and 0488, have developed a consolidated index to shipbuilding standards from numerous sources and provided a number of ways to search for standards. Discrepancies between users and writers of standards are resolved on a one-to-one basis, for example between the shipbuilder and the USCG on a decision to accept certain items as equivalent to USCG Regulations. However, a number of SP-6 projects are gaining on this issue. Projects 6-93-1 (now NSRP 0438) and 6-94-1 (NSRP 0489) have produced analyses of equivalencies for a number of key pieces of equipment and provided methodologies for performing these analyses.

However, sifting through the mass amount of information available on shipbuilding standards is too big a task for most shipbuilders. There are limited resources at most shipbuilders, so they are not fully staffing a group that can deal with the myriad of standards issues. The coordination of activities is still needed.

2. Become More Involved in International Standards.

Objectives:

a. Participate more fully in ISO.
b. SP-6 should be a regular member of the ISO TAG.
c. Shipyards should be represented on the TAG.
d. A liaison between IACS and SP-6 should be established.

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[3] Accessible through the Internet at http://marad.dot.gov/nmrec/

Specific Action Areas:

a. ECB. Continue to fund ISO support projects, preferably as a regular line item on the NSRP budget.
b. SP-6. Represent a strong presence of shipbuilders on the ISO TAG to TC-8.
c. SP-6. Investigate other avenues of representation in foreign and international standards organizations.
d. Create a database or library of international shipbuilding standards at a central repository for reference and access.

International Standards Involvement Discussion

Much of the SP-6 Panel's and shipbuilder's involvement in international standards is hindered by the Panel's lack of involvement in ASTM F-25 through which much of the ISO TC-8 Technical Advisory Committee program is worked. However, a few individual shipbuilders are becoming quite heavily involved in international standards by necessity through foreign flag contracts. This involvement would be much more efficient if it were addressed ahead of time by the activities of the Panel members.

The Panel was officially represented on the TAG through the ECB Chairman, and on IACS by the membership of an ABS executive on the Panel. Presently, the official link between SP-6 and ISO is through the SNAME Technical and Research Committee, although this link has not been exercised. The Panel has continued to support and encourage support of the U.S. ISO TC-8 effort. It has not investigated to any depth other avenues of representation in foreign and international standards organizations. The ongoing database projects[4] have provided indexes to foreign standards but are not funded to provide abstracts or full text versions of the standards.

3. Gain More Domestic Involvement in the Shipbuilding Standards Community.

Objectives:

a. Expand SP-6 membership.
b. Expand the communications links among involved organizations.
c. Get more shipbuilders involved with ASTM F-25.

Specific Action Areas:

a. SP-6. Recreate the mailing list, identify people and organizations who are or should be important to SP-6, balance the membership with builders, suppliers, and related marine industry people.
b. SP-6. Conduct membership drive, solicit members from outside the normal areas such as AWO and NAPVO (now PVA).
c. SP-6. Develop a recruiting package.
d. ASTM. Bring membership ratio in line with the "Blue Book."
e. SP-6. Establish a liaison with other standards writing organizations such as API, SAE, AIA, SSPC.

Domestic Involvement Discussion

The SP-6 membership has been expanded somewhat, but not to the extent desired by the Panel. Participation by major builders is fairly continuous, and the Panel has worked to get the information (via a frequently updated mailing list) to some of the smaller yards that do not have the resources to participate fully. There are still just a few shipbuilders involved with ASTM F-25, and none involved with other standards-writing organizations.

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[4] The current database project is 6-92-1 Phase II, soon to be published as NSRP 0488.

4. Refine the Process for Identifying and Developing New Shipbuilding Standards.

Objectives:

a. Avoid duplication of established foreign or international standards.
b. Expedite standards through the process.
c. Consider the reduction of shipbuilding process time in processing standards.

Specific Action Areas:

a. SP-6 and F-25 should have a filter to avoid development of new standards when applicable foreign or international standards already exist.
b. SP-6. Evaluate the possibility of other standards-writing organizations developing certain standards.
c. SP-6. Work with the other NSRP Panels to facilitate getting the applicable results of their work developed into shipbuilding standards.
d. SP-6 and F-25. Participate in and use the program set up at NAVSEA to track standards through the process and reduce process time.
e. SP-6 and F-25. Place line items in their plans and bylaws to consider the reduction of shipbuilding process time in processing standards.

New Shipbuilding Standards Discussion

Current activities of the Panel, and in certain cases those of its individual members, indicates that new standards are in large part, not needed. Effective use of current standards and, in the standards development process, avoiding duplication of established domestic, foreign or international standards is being pursued. Project 6-94-1, "World Class Shipbuilding Standards" (NSRP 0489) and related projects report on applicable international standards, methodologies related to the development and use of standards, and use of alternatives to established standards.

The Panel has not lost sight of the need for new standards when there is no alternative. Project 6-95-3 (NSRP 0490) developed "Industry Standards for Hull Penetrations," and 6-96-1 will develop a "Ship Designers Handbook - Cross Reference of Standards." However, few of the SP-6 Panel are directly involved in the standards-making process, so expediting standards through that process is not likely. ASTM F-25 will have a revised work plan out in tne Fall of 1997 trhat will track the status of the 200 or so standards that they handle. Shipbuilders can select standards that enhance shipbuilding process times, but with little involvement in the standards-making process, have little effect on the process times of new standards or those under review.

5. Coordinate Existing Standards.

Objectives:

a. Maintain technical currency.
b. Identify all standards relevant to shipbuilding.
c. Add emphasis to the NDCP.

Specific Action Areas:

a. SP-6. Become more involved in other standards organizations.
b. SP-6. Identify (and sponsor for review) out of date standards.
c. SP-6. Require the Computerized Compendium of Standards subcontractor to include all standards relevant to shipbuilding.
d. NAVSEA. Expand the NDCP to include other standards bodies and look at equivalency of existing non-government standards or ISO standards.
e. SP-6. Establish liaison with other standards organizations.

Discussion on Coordination of Existing Standards

A point of clarification is in order. It was never intended that the SP-6 Panel would be the central coordinator of existing standards, as was inferred by some. If the communications center discussed in Initiative 1 were to be put in place, it could facilitate the coordination of shipbuilding standards related activities. Such coordination should include the efforts of SP-6, ASTM F-25 and the ISO TAG to TC-8.

If the SP-6 Panel members wish to have a positive effect on maintaining technical currency, they would have to be more involved in the standards making process. The Panel has been working on a number of projects related to identifying standards relevant to shipbuilding including an indexing database, a study of world class shipbuilding standards, methodologies for adapting foreign standards, and a soon-to-be-funded project, 6-96-1, "Ship Designers Handbook - Cross Reference of Standards."

6. Support Conversion of the U.S. Shipbuilding Industry to the Metric System.

Objectives:

a. Proceed with the FY 92 metrication project.
b. Write new standards, and updates of existing ones, using the metric system.

Specific Action Areas:

a. Require SP-6 projects that deal with any units of measure to be written metric first (U.S. Customary Units second), similar to the SNAME publication requirements, and recommend to the SPC that it require the same.
b. Implement the Presidential Executive Order that requires changeover to the metric system.
c. Implement recommendations of the FY 92 Metrication project.

Discussion of Conversion to the Metric System

The Panel proceeded with the 1992 metrication project and, although the Panel has little effect on new standards, most new or recently revised U.S. standards are written metric first anyway, with U.S. Customary units in parentheses. The specific action items have not been followed by any positive action.

7. Develop a Marketing Strategy for the Plan.

Objectives:

a. Give the Plan visibility.
b. Develop high level support.
c. Give the Standards Program an identity (Initiative #1).
d. Adopt continuing initiatives into the SP-6 Charter.

Action:

a. UMTRI, SCA or SP-6 Program Manager. Mail the Plan directly to shipyard engineering VPs, ASTM F-25 Chairman, USCG Technical Division (G-MTH) head, and other identified "key players."
b. SP-6. Conduct an implementation workshop at a Panel meeting.
c. Have an SP-6 officer or representative present the Plan at SCA, ECB and F-25 meetings.
d. NSRP Management. Take steps to develop an identity for the NSRP, such as establishing a letterhead, a singular address and phone number for communications reference (Initiative #1), and a dedicated full time administrative contact person.

Discussion on Marketing the Plan

The Plan has been used within the Panel as a reference tool for developing research projects and as a gauge to judge where the Panel is in its implementation of the Plan. The Plan was also used as a reference when the SP-6 Panel made Charter revisions in 1995. The initial distribution of the Plan was widespread and implementation workshops were effectively conducted every time it was used as a reference for other work. Presentation of the Plan at SCA, ECB, and F-25 meetings, and developing an identity for the NSRP, were lofty goals beyond that project.

8. Adopt or Convert Existing Global Standards for Domestic Use.

Objectives:

a. Provide easier domestic approval of equipment built to foreign standards.
b. Increase domestic ability to build commercial vessels for a global market.
c. Reduce the time and cost to build ships.

Action:

Short Term (one to two years)

a. Support the standards equivalency project.
b. Identify foreign shipbuilders' commercial standards that may be available for purchase.
c. Fully support the ISO TAG so that ISO standards are directly acceptable for U.S. commercial vessels.

Discussion of Global Standards

NSRP Projects 6-93-1 (NSRP 0438) and 6-94-1 (NSRP 0489) have worked on the approval of equipment built to foreign standards. Meeting the objectives of increasing the domestic ability to build commercial vessels for a global market and reducing the time and cost to build ships is an ongoing objective that should be built into all NSRP projects, as it is a major goal of the NSRP. The Panel supports the ISO TAG in principal but is not involved directly enough to affect the standards.

SURVEY ANALYSIS

The survey conducted for this Master Plan Update project was similar to the survey done for the 1992 Master Plan project. The first four pages of the survey were the same to see if there were any changes in perceptions between the last project and the update. The final four pages were used to elicit new data. The survey and the numerical results are in Appendix A.

There were no statistically significant differences in responses between the 1992 Master Plan survey and that same part of the latest survey for the update project. Participants in both surveys were from many different professional backgrounds, including small commercial builders, large military builders, government yards and design houses. There was no attempt to categorize the data, or to draw different conclusions from the results, based on the types of backgrounds groups of respondents represented. Personnel have moved around between various jobs, often between different shipyards, and the responses show that the respondents represented both their current employers and their respective backgrounds. A number of written comments made note of the differences in participants and expected results, and some of those comments are noteworthy. One respondent suggested that the results be reported according to the type of yard the respondent was representing. Individuals were supposed to respond as representatives of their respective companies, but many results show that was not the case. With only 27 respondents, separating the results was not considered practical.

There are distinct differences in the types of standards listed for comparison. Some are regulations (EPA, USCG CFRs), some from classification societies (ABS, DNV), and others are voluntary (ASTM, ANSI). However, there are shades of overlapping applicability. Coast Guard standards do not apply to foreign ships except for those cruise ships carrying passengers from U.S. ports and all foreign vessels carrying oil as cargo or fuel. Other standards are voluntary until they are invoked by ABS, NAVSEA, or the USCG as part of a requirement or regulation. The histograms in the Appendix give a comparative analysis of the 1992 survey and the 1995 survey.

The Product and Process Matrix (Appendix A-19) presented some interesting results in relating standards to the products produced in the various stages of ship production, and the many different processes used to create them. In the design process, functional and detail design were considered as influenced by standards. All the production processes except for material movement were considered as influenced by standards. On the operations side, test and inspection procedures, quality control and assurance, and the purchasing of outfitting are influenced by standards.

The evaluation of SP-6 projects by people closely related to standards was somewhat different than that presented by an independent NSRP project (NSRP 0401), although statistical information is not presented in NSRP 0401 for a full comparison. A comparison of the differences is on page A-16.

The survey respondents expressed a number of different opinions. Some indicate that the problems that SP-6 is trying to solve, for example, getting basic information about standards out to the shipyards, are still problems for some yards. A number of written comments are reproduced in the Appendix. Basically, the survey results need to be studied methodically to get a sense for the information presented.

TACTICAL PLAN

The SP-6 Tactical Plan (Appendix C) was produced as a tool for implementing the Master Plan and the Workshop. It was completed in late 1995 as an unpublished NSRP special project. It looks beyond the practical analysis performed by this report and gets into some of the philosophical problems that continue to hamper shipbuilding standards development. That plan is self explanatory and needs no additional explanation here.

CONCLUSIONS

The 1992 Standards Master Plan was fairly close to the mark in its development of initiatives needed for an effective shipbuilding standards program. It worked well with the Workshop as a working reference for the SP-6 program. As analyzed by this report and the Tactical Plan, there are still a number of unresolved issues for the shipbuilding and marine standards community to address. The future work program of the Panel, both through funded projects and small concentrated workshops within the Panel, should serve to solve most of the addressable problems. The philosophical problems identified by the Tactical Plan must be addressed on a higher level as laid out in that document.

Appendix A

1995 Shipbuilding Standards Survey and Results

SURVEY
U.S. SHIPBUILDING STANDARDS
MASTER PLAN UPDATE

In order to ensure consistent interpretations, please refer to the following definition that may be refined through the Master Plan project. Suggested modifications are welcome.

STANDARDS: Prescribed designs, processes, rules and procedures to be used in repeatable operations to ensure a predetermined level of performance, quality and safety. For the purpose of this survey these may include those designs, processes, rules and procedures developed both specifically for shipbuilding as well as those developed for industrial processes in general and adapted to shipbuilding.

1. There are many sources of standards which influence our industry. Of those listed below, please rate their applicability to shipbuilding, technical content and clarity, using the following scale:

   3 - Excellent
   2 - Satisfactory
   1 - Unsatisfactory
   NA - Not familiar with or do not use

	APPLICABILITY	TECHNICAL	CLARITY
ABS*	—	—	—
ANSI	—	—	—
ASTM	—	—	—
EPA	—	—	—
IEEE	—	—	—
MARAD	—	—	—
MILSPECS	—	—	—
NAVSEA	—	—	—
USCG CFR's	—	—	—
USCG NVIC's	—	—	—
USPHS	—	—	—
INTERNATIONAL-FOREIGN STDS			
BMT	—	—	—
DIN	—	—	—
DNV	—	—	—
GL	—	—	—
IEC	—	—	—
IMO	—	—	—
ISO	—	—	—
JIS	—	—	—

2. Are there any of the above listed standards that you generally prefer to work with?

   __ YES (Please list them) _____
   __ NO

*abbreviations are defined on last page

3. On your next ship new construction, repair, or overhaul contract, would you like to see the specifications written using:

__ More standards?
__ Less standards?

4. Assuming ship's specifications were written using more standards, in what area would you prefer to see them? Please number in order of preference, with #1 being the highest priority.

__ Quality assurance
__ Design of shipboard structure and systems
__ Procured components and materials
__ Construction processes
__ Other, please specify _____
_____

5. Standards generally evoke a wide range of opinions amongst users, some of which are listed below. Please review them and annotate them using the following scale:

4 - Strongly agree
3 - Agree
2 - Disagree
1 - Strongly disagree

U.S. SHIPBUILDING STANDARDS AS THEY ARE TODAY:

__ stifle creativity and innovation
__ reduce repetitious processes and make us more efficient
__ are something we have no control over
__ reflect state-of-the-art practices
__ don't apply to the type of work we do
__ protect us as shipbuilders
__ are developed with the shipbuilder and profitability in mind
__ recognize sufficiently the differences and similarities between commercial and Navy ships
__ support us in the international marketplace
__ create more bureaucracy than they're worth
__ are well organized and coordinated
__ are easily accessible and understandable
__ are sufficient in number and scope to meet our needs

6. Out of the above list, select the opinion you feel most strongly positive about and comment briefly upon it._____
_____
_____
_____

7. Out of the above list, select the opinion you feel most strongly negative about and comment briefly about it, including suggestions for corrective action._____
_____
_____
_____

8. The NSRP has sponsored the development of Shipbuilding Standards through the American Society for Testing and Materials (ASTM) Committee F-25, which has published a volume of some 100 specifications and practices. Does your shipyard use these standards as a regular practice?

__ YES
__ ONLY WHEN INVOKED ON A SHIP'S SPECIFICATIONS
__ NO

9. Has the selection of subject matter of the ASTM Shipbuilding Standards been appropriate to your needs?

__ YES
__ NO
__ SOMEWHAT

If you answered NO or SOMEWHAT, what subjects would you like to see more emphasis on? _____
_____
_____
_____

10. Did you find the technical content of the individual ASTM Shipbuilding Standards to be appropriate (economically producible, sufficiently detailed, using the latest materials and technology)?

__ YES
__ NO
__ SOMEWHAT

If you answered NO or SOMEWHAT, what specifically about the content would you like to see changed? _____
_____
_____
_____

11. How does your shipyard utilize standards? Please check all that apply.

__ Use them only as they apply to current contracts
__ Work with standards writing (ASTM, ASME, SAE, etc.) and regulatory (ABS, USCG, etc.) bodies in the development of industry standards
__ Maintain a library of industry standards in-house with assigned personnel to administer them
__ Have an assigned function within the shipyard for the development of company standards (which may be based upon industry standards)
__ Others _____
_____
_____
_____

12. Please indicate below the level of utility your company gains from the types of standards listed:

SOME	MUCH	NONE	
—	—	—	1. Engineering standards describing how design and engineering data is developed and displayed.
—	—	—	2. Material standards defining purchased items that are preferred.
—	—	—	3. Production standards describing methods for performing repetitive tasks.
—	—	—	4 Design standards which are drawings for items or assemblies which appear several times in a ship's design.

13. I recommend that a future program of U.S. Shipbuilding Standards might include the following concepts:

Please rate the concepts below using the following scale:

H - High priority
M - Medium priority
L - Low priority

__ An index and central repository of all approved U.S. Shipbuilding Standards
__ Development and consolidation of existing standards that have both commercial and military applications
__ Development of equivalencies, international and foreign to U.S. standards
__ Adoption of International and foreign standards to replace and/or supplement domestic standards
__ Establishment of a standards clearinghouse to coordinate and administer shipbuilding standards
__ Other (respondent's choice)_____

_____

14. Standards related reports on file at the NSRP library are listed in Appendix A. Please identify your familiarity with them and rate them regarding their value (1 = low, 5 = high).

15. The current Shipbuilding Standards Master Plan is NSRP 0360. If you are somewhat familiar with that report, please continue. Otherwise, skip to question 16.

Are you happy with the format of that report? __ YES __ NO

If no, please indicate what changes you would like to see in the updated plan.

_____
_____
_____
_____

16. Appendix B lists the Internet Home pages of a number of organizations that write or manage standards.

    Do you have access to the Internet? __ YES __ NO

    Are you familiar with any of these organizations? __ YES __ NO

    If you answered yes, please indicate which ones you are familiar with.

17. Appendix C is a matrix that relates shipbuilding products to the processes used to produce them. Please identify where you feel standards are highly influential (5), of little importance (1), or somewhere in between. Appendix D is a brief explanation of the product and process areas.

18. A "Compendium of Shipbuilding Standards" was produced (NSRP 0361) in 1992 as a relational database index to marine related standards.

    Are you familiar with that report? __ YES __ NO

    Have you used the computerized database? __ YES __ NO

    If yes, are you happy with the format of the database __ YES __ NO

    What format or fields would you like to see in the updated database?

    _____
    _____
    _____
    _____
    _____

19. Please add any additional comments here or on an additional sheet.

    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____
    _____

SUBMITTED: _____

COMPANY: _____

NAME: _____

TITLE: _____

All responses will be held in the strictest confidence by the University of Michigan. Thank you for your time and thought in completing this survey.

NSRP #	TITLE	DATE Published	FAMILIARITY (1-5)	RATING (1-5)
0042	Propulsion Plant Feasibility Study Report - Subtask I, Forecast for Propulsion Plant Standards	June 1974		
0046	Propulsion Plant Feasibility Study Report - Subtask II, Technical Analysis and Determination of Standards Candidates	January 1975		
0047	Propulsion Plant Feasibility Study Report - Subtask III, Economic Analysis of Selected Standards Candidates	February 1975		
0049	Executive Summary - Propulsion Plant Standards Feasibility Study	June 1975		
0050	Ship Producibility Task S-1 - Propulsion Plant Standards Feasibility Study	June 1975		
0052	Final Report - Propulsion Plant Standards Feasibility Study	August 1975		
0057	Standard Structural	July 1976		
0059	Executive Summary - Feasibility of Shipbuilding Standards	October 1976		
0061	Castine Report S-15 Project - Shipbuilding Standards	October 1976		
0078	A Compendium of Shipbuilding Standards - Consolidated Pilot Phase Report	October 1978		
0082	Interim Report on Subtask I - Regulatory Body and Classification Body Shipbuilding Standards	1979		
0087	Interim Report on Subtask III - Foreign Shipbuilding Standards	March 1979		
0088	A Compendium of Shipbuilding Standards - Index to Shipbuilding Regulations and Standards	April 1979		
0089	Interim Report on Subtask II - Industrial Standards in Shipbuilding Use	May 1979		
0093	A Compendium of Shipbuilding Standards - Final Report	September 1979		
0107	Weld Defect Tolerance Study	June 1980		
0108	National Shipbuilding Standards Program Status Report No. 1	June 1980		
0116	National Shipbuilding Standards Program Status Report No. 2	November 1980		

NSRP #	TITLE	DATE Published	FAMILIARITY (1-5)	RATING (1-5)
0126	Navy Weld Defect Tolerance Study	March 1981		
0133	National Shipbuilding Standards Program Status Report No. 3	November 1981		
0144	Recommended U.S. Shipbuilding Standards Program Long Range Plan - Final Report IHI Marine Technology	February 1982		
0160	Consensus QA/QC Acceptance Standards	November 1982		
0161	Jigs and Fixtures Handbook Development	August 1982		
0174	Feasibility Study for the Commercialization of U.S. Navy GENSPECS - 1982 Edition	July 1983		
0212	Computerized Application of Standards	1985		
0344	Marine Industry Standards Planning Workshop	March 1992		
0349	Balloting of Hull and Mechanical Standards	June 1992		
0354	Standard Practice for the Selection and Application of Marine Deck Coverings	July 1992		
0358	Navy Document Conversion Program Project - Pipe Flanges	May 1990		
0359	Shipyard Standards Program Development Guide	October 1992		
0360	United States Shipbuilding Standards Master Plan	October 1990		
0361	Computerized Compendium of Standards	December 1992		
0362	Providing Administrative Support to the U.S. TAGroup in its Participation on the ISO Committee on Ships and Marine Technology	December 1992		
0399	Metrication of U.S. Shipbuilding - The Challenges and the Opportunities	October, 1993		
0401	Benefit Analysis of SPC Panel SP-6 Projects and Evaluation of SPC Panel SP-6 Management and Administration	November 1993		

Internet Homepages of Organizations with Standards

American Society for Quality Control
ANSI (American National Standards Institute)
ANSI/IEEE
COS (Corporation for Open Systems International)
DISA
DOD-STD (Department of Defense Standards)
ECMA (European Computer Manufactures Association)
FED-STD (Federal Standards)
FIPS (Federal Information Processing Standards)
IEC
IEEE (Institute of Electrical and Electonic Engineers)
ISO (International Organization for Standards)
ITU(CCITT)International Telecommunications Union
JTC
MIL-HDBK (Military Handbooks)
MIL-SPEC (Military Specifications)
MIL-STD (Military Standard {below MIL-STD-2045 series})
MIL-STD (Military Standard {MIL-STD-2045 series and up})
MISCELLANEOUS (TR, SR-RG, NMF,IHO,COSE Motif)
NACSEM
NIST (National Institute of Standards and Technology
NSTISSAM
OMG (Object Management Group)
OSF (Open Software Foundation)
OHSA
RFC (Request for Comments)
STANAG (Standardization Agreement (NATO))
TIA/EIA (Telecommunications Industry/Electronic Industries Assoc.)
TSGCE (PG/6) Tri-Service Group on Comm. and Elec.
X/Open Company Ltd.

PRODUCT and PROCESS MATRIX

Interim Products	Outfitting	Hull Structure		
			Concept Preliminary	DESIGN
			Functional	
			Detailed	
			Fabrication Processes	PRODUCTION
			Joining and Assembly Processes	
			Surface Treatment and Coating	
			Material Movement	
			Testing/Inspection	OPERATIONS MANAGEMENT
			High Level Resource Planning and Scheduling	
			Production Engineering	
			Purchasing / Procurement	
			Shop Floor Resource Planning and Scheduling	
			Quality Control & Assurance	

Standards are:

Highly Influential	5
Moderately Influential	4
Somewhat Influential	3
Of Minimal Influence	2
Not Related	1

APPENDIX C (of the 95 Survey)

PRODUCT ORIENTED CATEGORIES

Structure Primary and secondary structure including shell, deck and superstructure.

Outfitting Equipment, services and systems installed in and on a ship, including piping, machinery and mechanical systems, HVAC, electrical, hull fittings.

Interim Products Outfit packages, system bundles, palletized parts, sub-assemblies, assemblies, hull block and grand block construction schemes.

FUNCTIONAL PROCESS AREAS

Conceptual/Preliminary Design The initial design stages for a new vessel, in which general characteristics and basic system requirements are defined.

Functional Design Second stage of ship design, primary structure scantlings, compartment layouts, distributed system diagrams, primary space arrangements; includes transition design in which initial design and outfitting zones are defined.

Detailed Design Detailed structural and systems design, detailed calculations, systems integration, detailed product model, and production documentation including bills of materials, fabrication and assembly level drawings, and sketches.

Fabrication Processes Part fabrication, including leveling/straightening, marking, cutting, bending and forming, machining, casting and forging.

Joining and Assembly Processes Joining and assembly, welding, mechanical joining and adhesives. Stages include subassembly, assembly, block erection and post erection installations.

Surface Treatment and Coating Includes all preparatory and finish work, pre-production priming, blasting and cleaning, residue collection and cleanup, painting, and finish painting.

Material Control All aspects of material identification, moving, kitting, palletizing, storing and disposal. Includes both hardware and software support of material handling and tracking.

Testing/Inspection Includes weld inspections, visual inspections, pipe hydro test, ventilation pressure, compartment tests, compartment completion inspections, and grounding and EMI tests.

High-Level Resource Planning and Scheduling Includes build strategy development, milestone planning, block production, test and inspection schedules, trials and delivery.

Production Engineering The interface between design and production, detailed planning, definition of work packages, product work breakdown structure, CAD / CAM interface.

Purchasing/Procurement Material ordering, procurement and supplier relations, bill of materials, vendor furnished information, and processing and tracking of purchase orders.

Shop Floor Resource Planning and Scheduling Issues not included in high level planning, includes shop floor and process lane layouts, equipment and personnel scheduling, labor and/or cost control, job statusing, machine sequencing and shop capacity planning.

Quality Control and Assurance, SQC All aspects of quality assurance from design, through production, development of dimensional tolerances, reference line systems, distortion control, dimensional data gathering, statistical process control and statistical quality control.

SHIPBUILDING STANDARDS MASTER PLAN
1992 SURVEY

	ABS			ANSI			ASTM			EPA			IEEE			MARAD		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	71	62	60	62	64	63	72	73	74	32	33	31	57	58	56	44	39	40
AVG	2.73	2.38	2.31	2.3	2.29	2.25	2.32	2.28	2.31	1.88	1.94	1.82	2.38	2.42	2.33	2	1.86	1.82
STD	0.45	0.57	0.55	0.54	0.53	0.52	0.54	0.68	0.64	0.6	0.56	0.64	0.49	0.5	0.56	0.69	0.65	0.66
#RES	26	26	26	27	28	28	31	32	32	17	17	17	24	24	24	22	21	22

	MILSP			NAVSEA			CRR			NVIC			USPHS			AVERAGE SCORES		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	65	65.5	54.5	67	64.5	58.5	65	58	44	45	38	36	32	33	33			
AVG	2.32	2.11	1.76	2.39	2.08	1.95	2.71	2.42	1.83	2.81	2.38	2.25	2.13	2.06	2.06	**2.36**	**2.20**	**2.06**
STD	0.67	0.57	0.56	0.5	0.55	0.56	0.55	0.58	0.76	0.4	0.5	0.68	0.52	0.57	0.44	**0.54**	**0.57**	**0.60**
#RES	28	31	31	28	31	30	24	24	24	16	16	16	15	16	16			

	INTERNATIONAL											
	BMT			DIN			DNV			GL		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	19	14	13	29	29	27	31	31	28	16	12	13
AVG	2.71	2.33	2.17	2.23	2.42	2.25	2.38	2.21	2	2.67	2	2.17
STD	0.49	0.52	0.41	0.6	0.51	0.45	0.65	0.43	0.39	0.52	0.63	0.41
#RES	7	6	6	13	12	12	13	14	14	6	6	6

	IEC			IMO			ISO			JIS			AVERAGE SCORES		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	21	24	22	44	33	29	42	42	41	37	32	23			
AVG	2.1	2.4	2.2	2.59	2.06	1.93	2	2	1.95	2.64	2.46	2.09	**2.42**	**2.24**	**2.09**
STD	0.57	0.52	0.42	0.51	0.57	0.59	0.63	0.63	0.59	0.5	0.66	0.54	**0.56**	**0.56**	**0.48**
#RES	10	10	10	17	16	15	21	21	21	14	13	11			

	#3		#4				#5									
	More	Less	A.	B.	C.	D.	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.
SUM	26	7	76	50	52	87	79	97	61	67	59	76	71	70	62	73
AVG	1	1	2.81	1.85	1.86	3.35	2.26	2.77	1.79	2.09	1.74	2.17	2.03	2	1.77	2.15
STD	0	0	0.96	0.91	0.89	0.94	0.74	0.88	0.91	0.73	0.62	0.71	0.71	0.77	0.69	0.78
#RES	26	7	27	27	28	26	35	35	34	32	34	35	35	35	35	34

	#5			#8			#9			#10			#11			
	K.	L.	M.	A.	B.	C.	A.	B.	C.	A.	B.	C.	A.	B.	C.	D.
SUM	68	74	73	10	13	9	11	9	11	16	8	7	17	21	13	10
AVG	1.94	2.11	2.09	1	1	1	1	1	1	1	1	1	1	1	1	1
STD	0.64	0.72	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0
#RES	35	35	35	10	13	9	11	9	11	16	8	7	17	21	13	10

	#12				#13				
	A.	B.	C.	D.	A.	B.	C.	D.	E.
SUM	73	81	66	72	92	86	93	84	80
AVG	2.21	2.45	2	2.25	2.56	2.39	2.51	2.27	2.22
STD	0.7	0.67	0.66	0.72	0.61	0.84	0.65	0.77	0.8
#RES	33	33	33	32	36	36	37	37	36

SHIPBUILDING STANDARDS MASTER PLAN UPDATE, 1995 SURVEY

QUESTION 1 TO 5 and 8 TO 13 TALLIES

QUESTION 1. DOMESTIC	ABS			ANSI			ASTM			EPA			IEEE			MARAD		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	71	64	61	48	54	51	49	54	55	20	22	19	60	60	60	39	37	37
AVG	2.84	2.56	2.44	1.92	2.16	2.13	2.04	2.25	2.29	1.54	1.57	1.46	2.61	2.61	2.61	1.86	1.85	1.95
STD	0.37	0.51	0.51	0.64	0.55	0.54	0.62	0.79	0.55	0.66	0.65	0.52	0.5	0.5	0.5	0.73	0.67	0.62
#RES	25	25	25	25	25	24	24	24	24	13	14	13	23	23	23	21	20	19
Q2 Prefer	14			3			6						6			1		

	MILSP			NAVSEA			OPR			NVIC			USPHS			AVERAGE SCORES		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	50	57	51	50	52	46	60	54	42	53	48	45	32	30	28			
AVG	2.08	2.38	2.13	2.17	2.26	2	2.73	2.35	1.83	2.65	2.4	2.25	2	1.88	1.75	2.22	2.21	2.08
STD	0.78	0.77	0.74	0.78	0.69	0.74	0.46	0.57	0.58	0.49	0.68	0.64	0.82	0.62	0.58	0.62	0.64	0.59
#RES	24	24	24	23	23	23	22	23	23	20	20	20	16	16	16			
Q2 Prefer	5			4			2			2								

QUESTION 1. INTERNATIONAL	BMT			DIN			DNV			GL		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	12	11	10	23	20	16	35	35	33	24	20	16
AVG	2	2.2	2	2.3	2.5	2	2.69	2.69	2.54	2.67	2.22	1.78
STD	0.89	0.45	0.71	0.67	0.53	0.76	0.48	0.48	0.66	0.5	0.44	0.67
#RES	6	5	5	10	8	8	13	13	13	9	9	9
Q2 Prefer				2			3			1		

	IEC			IMO			ISO			JIS			AVERAGE SCORES		
	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR	APP	TECH	CLAR
SUM	24	22	20	34	27	27	41	39	39	32	28	27			
AVG	2.67	2.44	2.22	2.43	1.93	1.93	2.05	1.95	1.95	2.67	2.55	2.45	2.43	2.31	2.11
STD	0.5	0.53	0.83	0.65	0.62	0.62	0.39	0.51	0.51	0.49	0.52	0.82	0.57	0.51	0.7
#RES	9	9	9	14	14	14	20	20	20	12	11	11			
Q2 Prefer	2			2			1			2					

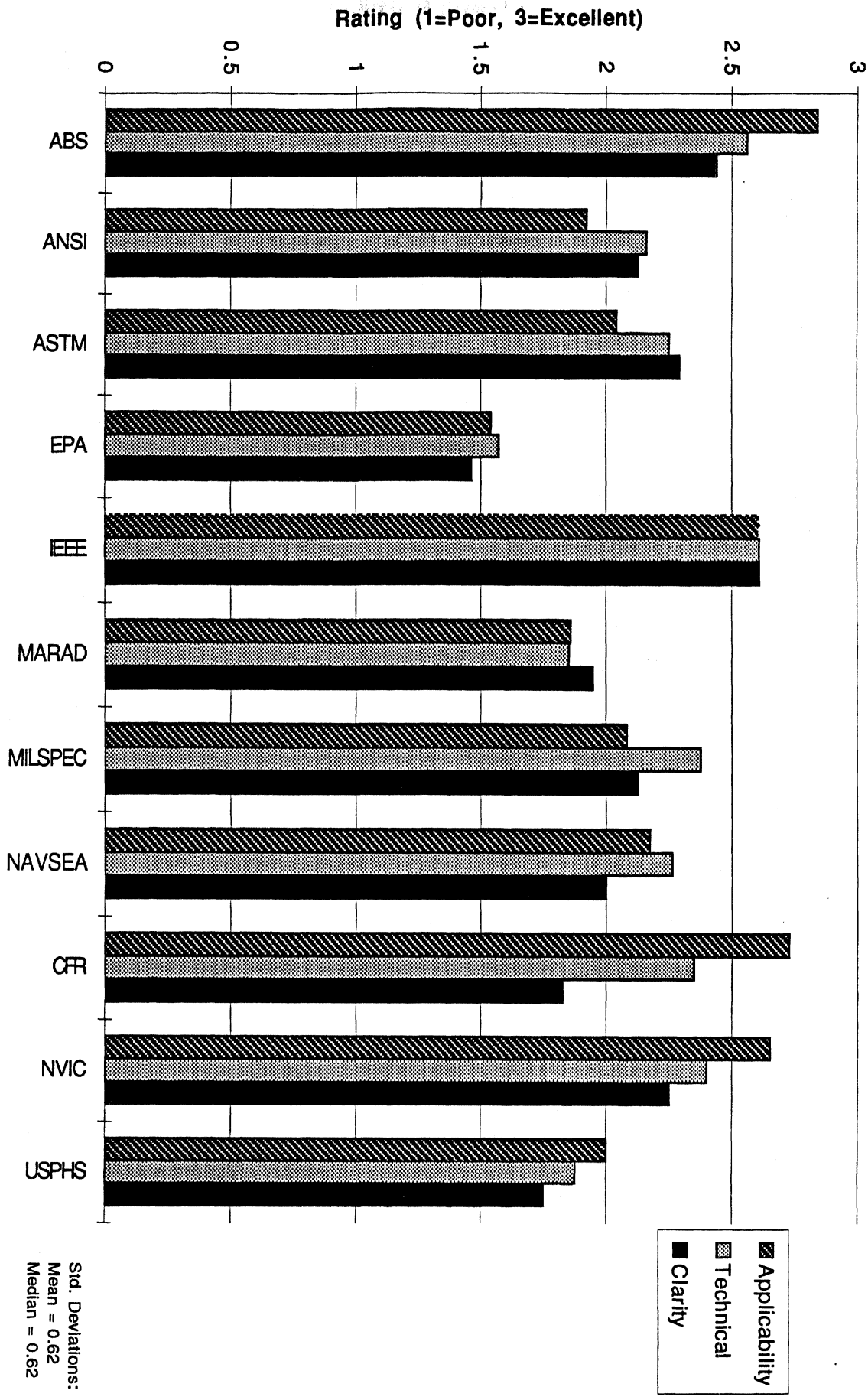
	#3		#4				#5									
	More	Less	A.	B.	C.	D.	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.
SUM	17	6	66	35	42	63	61	75	55	52	48	59	51	47	51	64
AVG	1	1	3.14	1.75	1.83	3	2.26	2.78	2.04	1.93	1.78	2.19	1.89	1.74	1.89	2.37
STD	0	0	1.15	0.85	0.89	1.1	0.59	0.75	0.76	0.68	0.8	0.79	0.58	0.71	0.7	0.84
#RES	17	6	21	20	23	21	27	27	27	27	27	27	27	27	27	27

	#5			#8			#9			#10			#11			
	K.	L.	M.	A.	B.	C.	A.	B.	C.	A.	B.	C.	A.	B.	C.	D.
SUM	49	58	53	5	7	8	6	4	12	9	5	6	9	9	15	11
AVG	1.81	2.15	1.96	1	1	1	1	1	1	1	1	1	1	1	1	1
STD	0.62	0.66	0.85	0	0	0	0	0	0	0	0	0	0	0	0	0
#RES	27	27	27	5	7	8	6	4	12	9	5	6	9	9	15	11

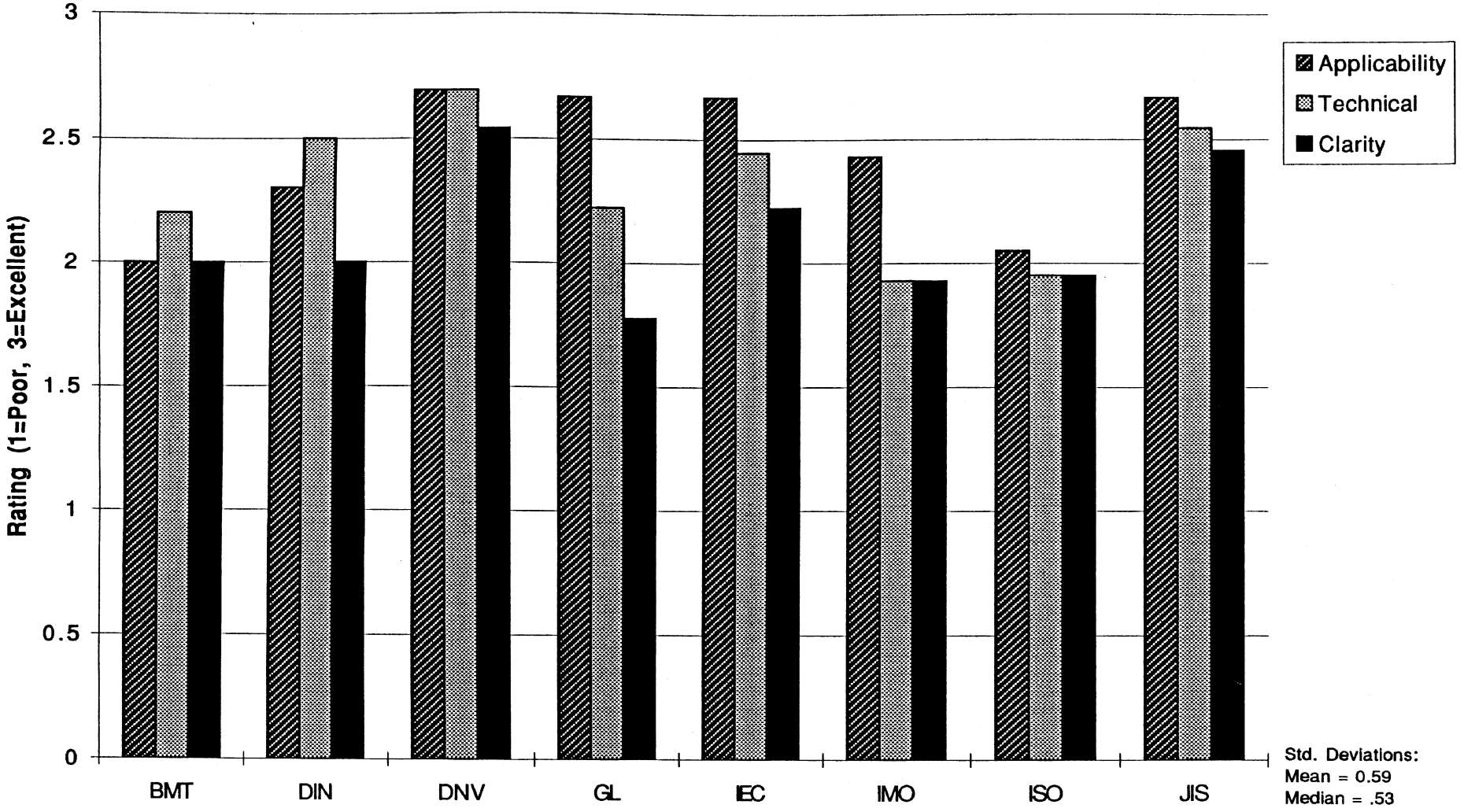
	#12				#13				
	A.	B.	C.	D.	A.	B.	C.	D.	E.
SUM	57	58	49	57	71	56	68	62	61
AVG	2.38	2.42	2.13	2.38	2.73	2.15	2.62	2.3	2.35
STD	0.49	0.65	0.69	0.58	0.67	0.88	0.57	0.72	0.69
#RES	24	24	23	24	26	26	26	27	26

THESE RESULTS RELATE DIRECTLY TO THE NUMBERED QUESTIONS IN THE SURVEY. FOR QUESTION 1, THE CATEGORIES ARE APPLICABILITY, TECHNICAL CONTENT, AND CLARITY. THE SUMS ARE THE SUM OF THE GRADED RESPONSES OF ALL THE RESPONDENTS. THE AVERAGE (AVG) IS THE SUM DIVIDED BY THE NUMBER OF RESPONDENTS (#RES), AND THE STD IS THE STANDARD DEVIATION OF THE DATA. Q2 PREFER IS THE FREQUENCY AN ORGANIZATION WAS LISTED IN QUESTION 2 "YES" LINE.

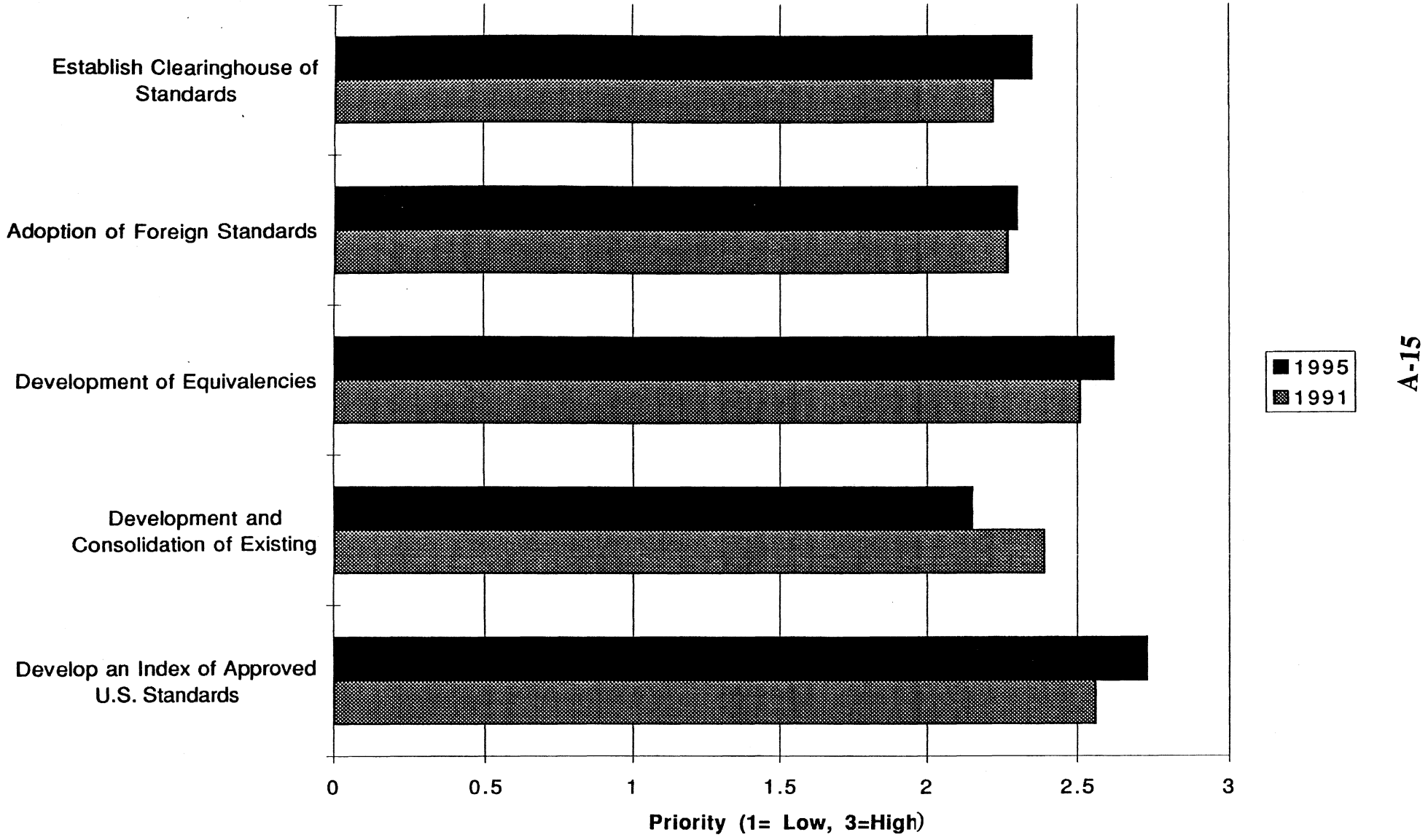
Ratings of Domestic Standards Organizations



Ratings of International Standards Organizations



13. Recommendations for a Future Standards Program



QUESTION 14 TALLIES

WITH COMPARISON TO NSRP 0401 "BENEFIT VALUES"

NSRP #	OO42			OO46			OO47			OO49			OO50			OO52		
	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401
SUM	29	17		31	22		28	16		26	11		31	20		26	12	
AVG	1.38	1.89	1	1.48	2.20	1	1.33	1.78	1	1.24	1.57	1	1.48	2.22	1	1.24	1.71	1
STD	0.67	0.93		0.81	1.32		0.66	0.83		0.62	0.79		0.81	1.39		0.62	0.95	
#RES	21	9		21	10		21	9		21	7		21	9		21	7	
%RES	0.78	0.33		0.78	0.37		0.78	0.33		0.78	0.26		0.78	0.33		0.78	0.26	

NSRP #	OO57			OO59			OO61			OO78			OO82			OO87		
	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401
SUM	26	9		29	11		21	6		27	11		22	6		22	4	
AVG	1.30	1.80	5	1.45	1.83	2	1.17	2.00	2	1.35	1.83	2	1.16	1.50	2	1.16	1.33	2
STD	0.57	1.30		0.89	1.17		0.71	1.73		0.81	0.75		0.50	0.58		0.50	0.58	
#RES	20	5		20	6		18	3		20	6		19	4		19	3	
%RES	0.74	0.19		0.74	0.22		0.67	0.11		0.74	0.22		0.70	0.15		0.70	0.11	

NSRP #	OO88			OO89			OO93			O107			O108			O116		
	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401
SUM	28	11		21	4		28	11		28	18		25	8		25	8	
AVG	1.40	1.83	1	1.11	1.33	1	1.33	1.83	1	1.40	2.57	4	1.32	1.60	1	1.32	1.60	1
STD	0.88	0.75		0.46	0.58		0.80	0.75		0.82	1.51		0.82	0.89		0.82	0.89	
#RES	20	6		19	3		21	6		20	7		19	5		19	5	
%RES	0.74	0.22		0.70	0.11		0.78	0.22		0.74	0.26		0.70	0.19		0.70	0.19	

NSRP #	O126			O133			O144			O160			O161			O174		
	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401
SUM	28	15		27	10		33	16		23	8		21	7		27	10	
AVG	1.40	2.50	4	1.42	2.00	1	1.65	2.00	1	1.28	2.00	1	1.17	1.75		1.35	2.00	1
STD	0.99	1.64		1.02	1.00		1.09	1.07		0.96	1.15		0.51	0.96		0.93	1.41	
#RES	20	6		19	5		20	8		18	4		18	4		20	5	
%RES	0.74	0.22		0.70	0.19		0.74	0.30		0.67	0.15		0.67	0.15		0.74	0.19	

NSRP #	O212			O344			O349			O354			O358		O359	
	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	O401	Fam.	Rating	Fam.	Rating
SUM	24	8		38	20		21	3		49	32		30	14	37	19
AVG	1.20	1.60	4	1.81	2.86	5	1.24	1.00	1	2.23	3.20	1	1.58	2.80	1.85	2.38
STD	0.70	0.89		1.44	1.46		0.97	0.00		1.34	1.48		1.17	1.30	1.57	1.77
#RES	20	5		21	7		17	3		22	10		19	5	20	8
%RES	0.74	0.19		0.78	0.26		0.63	0.11		0.81	0.37		0.70	0.19	0.74	0.30

NSRP #	O360		O361		O362		O399		O401	
	Fam.	Rating	Fam.	Rating	Fam.	Rating	Fam.	Rating	Fam.	Rating
SUM	48	31	54	39	54	29	69	54	56	34
AVG	2.18	2.82	2.45	3.00	2.57	2.23	3.14	3.38	2.67	2.62
STD	1.40	1.25	1.68	1.35	1.54	1.09	1.61	1.26	1.62	1.19
#RES	22	11	22	13	21	13	22	16	21	13
%RES	0.81	0.41	0.81	0.48	0.78	0.48	0.81	0.59	0.78	0.48

Fam. is the respondent's familiarity with the report . Rating is the respondent's opinion as to the usefulness of the reports. SUM is the summation of all scores for that criteria for that report. AVG is the SUM divided by the #RES (number of respondents that entered a value for that report). STD is one standard deviation for the data for that criteria. %RES is the number of respondents that entered a value divided by the total number of respondents to the survey.
NSRP 0401 only covered up to SP-6 NSRP 0354

Question 15, 16, and 18 Tallies

	15. Master Plan Familiar?		18. NSRP 0361 Database					
			Familiar with Report?		Used the Database?		Happy with Format?	
	Yes	No	Yes	No	Yes	No	Yes	No
SUM	9	0	15	12	5	21	3	2
% RES	33.3%		55.6%	44.4%	18.5%	77.8%	11.1%	7.4%

	16			
	Access to Internet?		Familiar with Organizations?	
	Yes	No	Yes	No
SUM	16	11	25	2
% RES	59.3%	40.7%	92.6%	7.4%

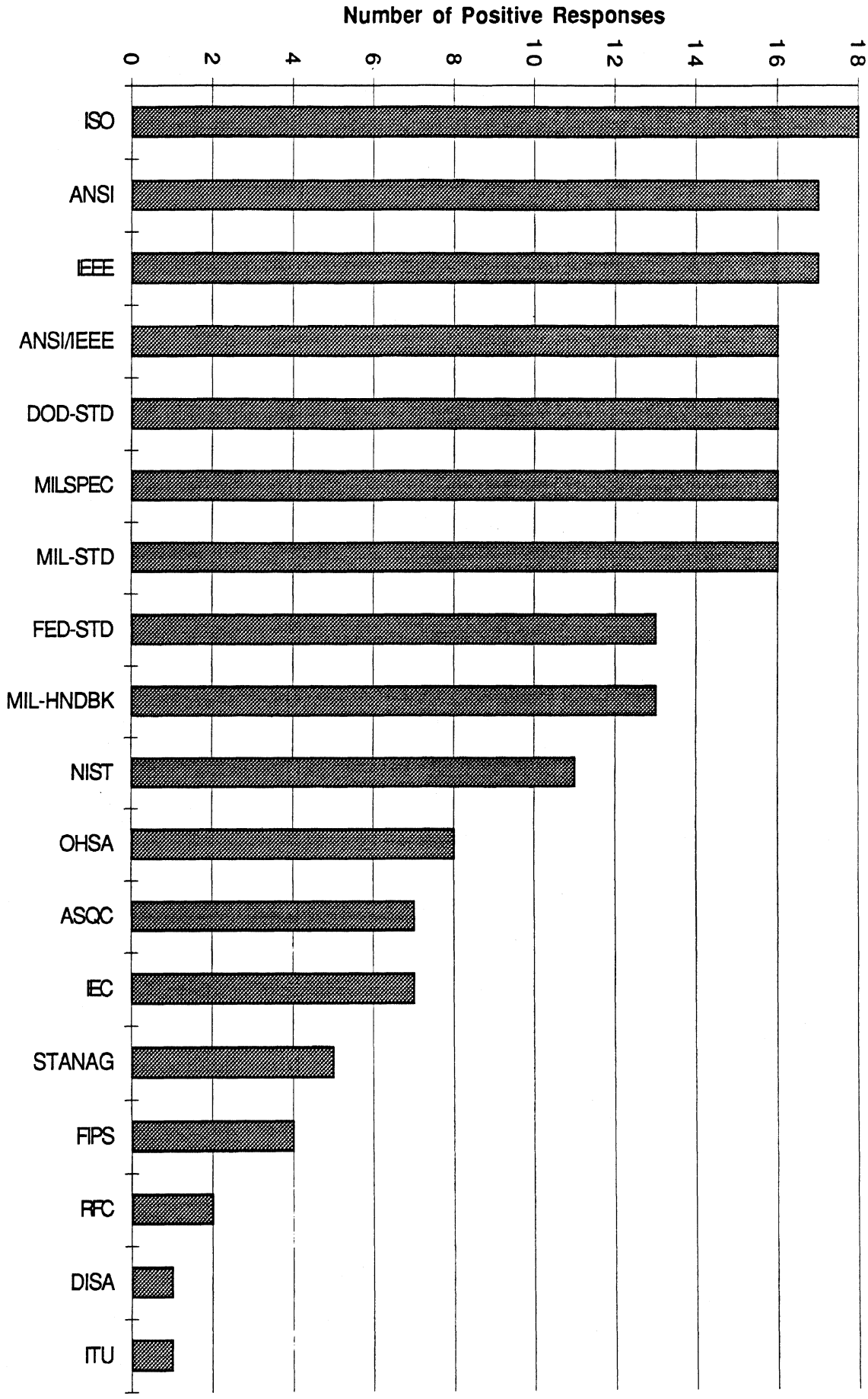
	Familiarity with Internet Sites							
	ASQC	ANSI	ANSI/IEE	COS	DISA	DOD-STD	ECMA	FED-STD
SUM	7	17	16	0	1	16	0	13
% RES	25.9%	63.0%	59.3%	0.0%	3.7%	59.3%	0.0%	48.1%

	Familiarity with Internet Sites							
	FIPS	IEC	IEEE	ISO	ITU	JTC	MIL-HNDBK	MIL-SPEC
SUM	4	7	17	18	1	0	13	16
% RES	14.8%	25.9%	63.0%	66.7%	3.7%	0.0%	48.1%	59.3%

	Familiarity with Internet Sites							
	MIL-STD (all)	MISC	NACSEM	NIST	NSTISSAM	OMG	OSF	OSHA
SUM	16	0	0	11	0	0	0	8
% RES	59.3%	0.0%	0.0%	40.7%	0.0%	0.0%	0.0%	29.6%

	Familiarity with Internet Sites				
	RFC	STANAG	TIA	TSGCE	X/OPEN
SUM	2	5	0	0	0
% RES	7.4%	18.5%	0.0%	0.0%	0.0%

16 Familiarity with Standards Organizations



17. PRODUCT and PROCESS MATRIX SURVEY RESULTS

Interim Products	Outfitting	Hull Structure		
2.7	3.0	3.3	Conceptual /Preliminary	DESIGN
3.5	3.8	4.0	Functional	
4.1	4.4	4.2	Detailed	
3.4	3.7	3.8	Fabrication Processes	PRODUCTION
3.8	4.0	4.0	Joining and Assembly Processes	
3.4	3.7	4.1	Surface Treatment and Coating	
2.0	2.0	1.9	Material Movement	
3.8	4.5	4.3	Testing/Inspection	
2.8	2.8	2.6	High Level Resource Planning and Scheduling	OPERATIONS MANAGEMENT
3.1	3.2	3.1	Production Engineering	
3.5	4.0	3.5	Purchasing / Procurement	
2.6	2.6	2.5	Shop Floor Resource Planning and Scheduling	
4.1	4.3	4.3	Quality Control & Assurance	

Standards are:

Highly Influential	5
Moderately Influential	4
Somewhat Influential	3
Of Minimal Influence	2
Not Related	1

QUESTION 6 WRITTEN RESPONSES

The bullets below are written responses related to the list of opinions in Question 5. Underlined words are keys to the opinion to which the comments are related if indicated by the comments.

Question 6 - Comment on the opinion you feel most strongly about.

- Improved efficiency is critical to the success of U.S. shipbuilding.
- Standards are a useful shorthand for communicating with customers - make us more efficient.
- Reduce repetitious processes , a good standard will allow a process to do several similar but unrelated activities with less setup and people.
- Standardization at the component or [for] entry level parts, are essential to reducing costs and providing competitive products - don't confuse this with regulation.
- Standards are a necessary evil and in need of reform. Less of [them] and more universal [application is needed]. One set for both public and private.
- Create more bureaucracy. Standards tend to add cost for unknown or unforeseen interpretations due to unfamiliarity at working levels.
- As standards are revised, the orientation to common satisfactory products for mature technology is a great savings. Standards for developmental items must be performance/first principle oriented.
- The U.S. shipbuilding industry HAS NO STANDARDS. The standards currently in use have been imposed by NAVSEA, USCG and others. [Lack of] Participation by shipbuilders in the process of developing a core base of marine standards verges on criminal negligence.
- Reduce repetitious processes - [especially] piping component ratings and acceptance. Having reorganized standards eliminates the ongoing, boring acceptance process. It also allows making designs where confidence in acceptance is justified.
- Standards, recent and currently under development, are helpful to profitability.
- Standards do not generally reflect state of the art practices because the establishment of a standard takes so long is it sometimes out of date before it's published.
- Using standards helps guide designers and shipbuilders in producing products which are most in line with our customer's expectation. They create problems when our customers do not understand products that are equal to or better than the products defined by the standard.
- Standards are a key in reducing labor hours and minimizing material cost.
- Support us in international market.
- Most standards are milspec based and therefore create more bureaucracy than they're worth.
- Standardization should be pursued more vigorously where it can reduce costs when weighed on a total (ship) life cycle basis, but should permit flexibility.
- They provide a common, objective standard for evaluating work performed.
- Standards reflect considerable accumulated experience and lessons learned, thus making it unnecessary to "reinvent the wheel" (reduce repetitious processes) in many processes.
- Certainly reduce repetitious processes and make us more efficient.
- The problem for commercial shipbuilding is not a lack of standards, but a consolidated, agreed to, one of a kind listing of standards that all [builders] utilize for consistency, cost and time efficiency.
- Are easily accessible and understandable. With IHS databases it is much easier to identify and obtain copies of standards than before.

QUESTION 7 WRITTEN RESPONSES

Question 7 - Comment on the opinion you feel most strongly negative about.

- Standards need to be better codified
- The standards we use and commonly encounter do apply to the work we're doing. However, there are **many** standards - remaining aware of those which are new (or new to us, or revised) is a continuous issue.
- Standards **do** apply to the type of work we're doing, commercial or military.
- Developed with shipbuilder in mind - shipyards have developed a set of their [own] standards but are not shared in a way to capture a market which all yards can benefit.
- Regulatory standards tend to over specify and over regulate design solutions [stifle creativity] negating the opportunity to find innovative and creative solutions.
- We have too many standards that are often not really required.
- Reflect state of the art. Many standards take so long to familiarize [with] that technology has passed us by. Foreign standards tend to be flexible enough to allow for new products.
- Standards are useless unless hinged on the process. U.S. shipbuilding process is inefficient so using even the best standards would not change profits upwards.
- The "tower of babal" of standards in the u.s. is a severe problem for industry international competitiveness, commercial/navy integration and a severe hindrance to cost effectiveness.
- Standards are not well organized or coordinated.
- Support us in the international market. Very few of our standards support us in this market. We often use ul and no one knows how this compares with iec. More flexibility is possible with internationally with electrical equipment in hazardous areas.
- The u.s. standards effort is not well organized. Our industry has to somehow pick one organization and support it.
- Standards create bureaucracy unless they are clear, accepted and generally applied; otherwise, regulation and application become bureaucratic.
- Standards do not provide protection.
- The industry has a proliferation of standards but no control over their content or organization.
- Are sufficient in number.
- Milspec [based] standards are not competitive for the international market.
- Standards should not be inflexible to the point that they inhibit creativity.
- Too many and too diverse - need consolidation and organization into logical arrays.
- Standards can lag state of the art because of slow approval/change processes to change standards compared with relatively quick change in the state of the art in certain [other] industry segments.
- Standards used by most u.s. yards are military which are generally very non-producible and out of date. Need to continue and strengthen adoption of commercial standards.
- Shipbuilding standards are applicable and are ignored at our peril.
- We as an industry need to have control of what standards we should utilize, identify them and then utilize them as a marketing tool to compete internationally.
- Most standards are not well organized and coordinated.

OTHER WRITTEN COMMENTS

4. Assuming ship's specifications were written using more standards, in what area would you prefer to see them?

- Other - Performance of Equipment - but more so of ship systems.
- I wish SNAME T&R bulletins were maintained
- Partnering per Associated General Contractors of America.

9. What [ASTM] subjects would you like to see more emphasis on?

- Construction practices
- We need equivalent material and process control specifications to allow satisfactory replacement of outdated MilSpecs.
- Shipboard automation, electrical cables, fire protection including structural.
- Standards that actually support shipbuilding and enhance profitability.
- More conversion or acceptance of international standards. When based on international standards, state differences and similarities [to the international standards]. Have annexes that suggest sample user options of supply requirements, i.e. Navy, USCG, ABS, commercial, etc.
- High cost complex equipment and controls for electrical and propulsion plant.
- While the subject matter has been appropriate, the standards generally do not reflect equipment that is available in the market.
- More standard practices as opposed to hard and fast standards.
- Limit is not [the] standards, but application of those to military contracts.
- Subjects and items identified by SP-6.

10. Did you find the technical content of the ASTM Shipbuilding Standards to be appropriate?

- There is some fear that during conversion of MilSpecs, military requirements will be embedded which may not be applicable to commercial applications.
- ASTM standards poorly communicate information because of continuous references to other standards. ASTM standards are also subject to the whims of producers of components that are not concerned with the economic constraints placed on shipbuilders.
- The learning curve is difficult - there should be a summary and intent available somewhere. For example, the new piping component standards are treacherous (MABs, Victaulic couplings, etc.)
- The standards often lag behind the commercial work place and can inhibit adoption of more cost effective products and processes. The modification process needs to be faster.
- Inefficient methods and materials specified, no room for shipbuilder to make producibility adjustments.
- Performance and interface standards are not emphasized enough.
- They are not designed to compete with JIS, etc. Major drivers need to be simplicity, cost, producibility. ASTM places too much emphasis on number of standards produced than the usefulness of its standards.

OTHER WRITTEN COMMENTS

11. How does your shipyard utilize standards? Other.

- To identify alternative approaches.
- We constantly perform equivalencies for regulatory acceptance and plan approval.
- Use standards as they apply, even if not specifically called out for a specific design or analysis task.
- International influence.

13. I recommend that a future program of U.S. Shipbuilding standards include: Other

- Develop a program to replace MilSpecs
- Agreements for copyright restrictions to be eased for on-line promulgation of viewing and using standards.
- Establishment of equivalency is less important than the acceptance of foreign standards regulating authorities.
- Identification of approved ABS and USCG equipment/systems and vendors which can be used as standards.
- Develop overall industry metrics vis-à-vis concurrent engineering plus global benchmarks.

15. Changes you would like to see in the updated Standards Master Plan.

- Strongly address the need for coordinated standards development process between all parties.
- Separate Navy-combatant, Navy-noncombatant, and pure commercial.
- For commercial you should coordinate with [SP-6 project 6-94-1]
- Address shipyard needs for organization, formal approach within the company

18. What format or fields would you like to see in the updated database?

- I don't think SWBS numbers are of much help. The database would be more helpful if it had abstracts. I also like the format of the database Perinorm index - it shows related standards.
- Subject/ key word searching, Applicability to Navy, commercial, etc.
- This should be an interactive internet homepage with hypertext retrieval of applicable standards. See the CFR server as an example.

19. Additional Comments.

- Having worked as an engineering manager and naval architect, I am shocked at the number of standards listed with which I am unfamiliar. Is this uncommon? Am I out of touch? We organize our standards by the publishing body. Is this "Compendium of Shipbuilding Standards" available on disk? How can we become aware of multi-source standards which may apply to a given specified need?
- Things are moving too fast to release periodic reports and databases. Use of interactive internet homepages with hypertext retrieval of applicable standards is the only way I see out of this.
- In order to maintain current with standards, I spend $25K for subscriptions to CD-ROM's, paper and microfiche and have a full time administrator. This is an awesome burden for a single naval architecture firm.

19. Additional Comments. (cont'd)

- I think an effort should be made to understand the basic international standards and work program first - IEC, ISO, IMO. Then focus on major area standards DIN, JIS.
- Due to the large gaps in the inventory of Canadian standards, Canadian companies have become adept at using standards from any international source which has a reputation in the industry. The availability, although helpful, is not essential in the international market for commercial ships. The critical factor is one of repute and acceptance by owners and regulatory authorities. National political attitudes may require national standards to be available.
- As a long time member of NSRP SPC SNAME Panel SP-4 on Design/Production Integration, I appreciate the vital necessity and desirability of good standards. Keep up the good work!

NAVSEA 03W16
2531 Jefferson Davis Hwy
Arlington, VA 22242-5160
26 Nov 1995

University of Michigan
Transportation Research Institute
Attn: A. W. Horsman
Senior Engineering Research Associate
Marine System Division
2901 Baxter Road
Ann Arbor, MI 48109-2150

Subj: SHIPBUILDING STANDARDS SURVEY

I have decided that it would be inappropriate for me to answer the shipbuilding standards survey forwarded by your letter of 19 October 1995 for the following reasons:

(a) The survey is obviously aimed at shipbuilders
(b) The survey fails to list many of the organizations which develop standards suitable for use in the shipbuilding industry.
(c) The survey is poorly constructed and to provide answers without qualification can result in misleading results

However, I will make a few comments regarding the survey and U.S. Shipbuilding Standards.

1. **Sources of Standards.**

Organizations other than those listed develop standards which are applicable to ships and ship systems. For example, American Society of Mechanical Engineers, National Fluid Power Association, National Fire Protection Association, SAE. The listing of foreign standards is similarly listed. As a minimum, the survey should have provided space to write in organizations not listed.

ANSI does not develop standards. Standards developed by other organizations are submitted by other organizations for consideration for adoption by ANSI as U. S. national standards.

While NAVSEA develops specification and standards they are issued as Federal Specifications and Standards, Military Specifications and Standards and as Commercial Item Descriptions. The only one of these listed on the survey is "MILSPECS". Metric documents have designated as DoD Specifications and Standards. Many of the NAVSEA developed specifications and standards have been coordinated with other DoD and government agencies.

The survey asks one to list the applicability, technical content and clarity of standards produced by the listing organization.

Applicability: I see little sense in rating applicability. Obviously, ABS, MARAD and USCG documents will have a high rate of applicability. On the

other hand Military Specifications cover many applications other than ships. However, many organizations issue documents that applicable to the shipbuilding industry. The industry must identify the applicable documents. This survey is not constructed to do that.

Technical Content and Clarity: Again, every organization issues excellent and poor standards. Of the military specifications under the cognizance of NAVSEA are some of the best and some of the worst specifications that have been issued. I can also make the same statement about standards issued by a number of industry organizations. Some organizations have many committees preparing document and some committees do a much better job than other committees within the same organization. Some organizations have better controls than others to make sure that all opinions are considered and properly resolved.

2. **Preference.** The survey asks if there are any of the above standards that one generally prefers to work with. As chairman of the SAE Ship Systems and Equipment Committee, I naturally have some bias for documents under the cognizance of that committee. However, within the Committee we reference documents prepared by other organizations when we feel that they are technically superior to similar SAE documents. I select documents for use based on their technical content, not the issuing organization.

3. **More or less standards?** While this question is directed toward shipyard personnel, I will reply. In order to lower shipbuilding costs, we need more standardization. For components we need standardized configurations to ensure interchangeability and promote competition. However, more important than the number of standards is the quality of standards. Invoking poor standards can increase costs and hinder product improvement. Good standards where they exist should be invoked.

4. **Preferred areas for more standards.** My personal preference is for more system and component standards but that may be a personal bias since those are areas I normally work with.

5. **Comments on various opinions:**

4 Strongly agree 3-Agree 2-Disagree 1-Strongly disagree

U.S. Shipbuilding Standards as they are today:

___ **stifle creativity and innovation** Poor standards will have this result. Good standards should have minimum impact.

_3_ **reduce repetitious processes and make us more efficient**

_1_ **are something we have no control over**

_2_ **reflect state of the are practices** Unfortunately, many of the standards are obsolete. In general, the development and revision of standards is a slow process. Good specifications will reflect the state of the art.

_1_ **don't apply to the type of work we do**

_2_ **protect us as shipbuilders**

_2_ **are developed with the shipbuilder and profitability in mind**

_2_ **recognize sufficiently the differences and similarities between commercial and Navy ships**

___ **support us in the international market place**

___ **create more bureaucracy than they're worth**

_2_ **are well organized and coordinated** - Unfortunately, many standards are not well organized and coordinated. Many military specifications fall in this category in spite of a framework that exists to ensure that they are properly organized and coordinated. NAVSEA has not done a good job in following DoD requirements for specification organization and coordination. I know of examples where changes have been made on the suggestion of one company with a proprietary interest without any coordination or review.

_3_ **are easily accessible and understandable** With IHS databases it is much easier to identify and obtain copies of standards than it once was. It will be even easier in the future.

Most standards are understandable. Of course there are exceptions.

_2_ **are sufficient in number and scope to meet our needs** There are a large number of standards available but there are many more that are needed. Also there are many that should be cancelled. I have seen standards organizations retain standards that 90 to 95% of the committee members think should be cancelled because one or two people objected. Interface standards that ensure interchangeability are often lacking and the most difficult to develop.

6 & 7. Comment on the opinions you fell most strongly positive and negative about. Since I expressed an opinion about a number of comment I will skip these questions.

8., 9. & 10. These questions about ASTM Shipbuilding Standards are specifically addressed to shipyards. Briefly, I'll address the general subject. I don't generally invoke ASTM shipbuilding standards. In general, I have not been impressed with their quality. In some cases, ASTM has taken on work to convert a military specification to an ASTM specification without anyone on the committee with expertise in the subject of the specification. The result is garbage in - garbage out. In the area of fluid power systems and components the standards have not been appropriate to my needs. ASTM Committee F-25 should not undertake projects unless they have several experts in the project subject developing the standard.

11. How do I utilize standards?

_X_ I invoke them in shipbuilding and overhaul specifications both in a mandatory manner and for guidance

_X_ I have worked with ASME, ASTM, SAE, National Fluid Power Association, ANSI, USA Technical Advisory Groups to ISO in the development and review of standards. I have served as a U.S. technical expert at ISO meetings. I prepare and review military standards. I review approximately 200 standards per year.

_X_ I do maintain files of various military, industry and ISO standards which are used by engineers within the same Division.

_X_ I do have an assigned function to develop standards for fasteners and hydraulic components.

12. N/A

13. Future Program of U.S. Shipbuilding Standards

a. The first item deals with the concept of and index and repository of all approved U.S. Shipbuilding Standards. The question does not address who would develop the index and approve the standards. With current computer bases it is easy to search for standards on a particular subject. Many different

organizations write standards which may be applicable to the shipbuilding industry. Currently, the technology exists to make them readily available to everyone without the need for a central repository. The problems which must be resolved have to do with payment/compensation for obtaining the standards. I believe that efforts to develop an index of applicable/approved standards is not a worthwhile project. Indexes take years to develop and are obsolete before they are issued. With current data bases, I can in 5 minutes identify all the potential standards of interest for a particular subject. This concept rates low priority in my thinking.

b. **The second item deals with the development and consolidation of existing standards that have both commercial and military applications.** The government has recognized the need for greater use of industry standards and minimizing the use of "military standards". Use of common standards is of a benefit to both the industry and the military. In some cases, military specifications have been able to achieve greater standardization in configuration/interface standards than industry standards where configuration standardization becomes just too hard to achieve. Within industry, we often have more than one organization working on similar standards unlike many foreign countries with only a single national standards body. ANSI is the U.S. body that governs which industry standards become National Standards. There needs to be greater cooperation between standards bodies to eliminate duplicate efforts. In general, this concept deserves a higher priority rating.

c. **Development of equivalencies, international and foreign to U.S. Standards.** I am not sure what is meant by this concept. We need to work with other countries to develop international standards. There is not a need to develop U.S. standards based on foreign standards. If we agree with the foreign standard, make it an international standard. If we then issue an equivalent U.S. standard that is satisfactory. On the other hand, if we don't agree with a foreign standard, we should develop our own national standard and the work for its adoption as an international standard.

d. **Adoption of International and foreign standards to replace and/or supplement domestic standards.** Discussion immediately above applies. I rate as medium priority.

e. **Establishment of a standards clearinghouse to coordinate and administer shipbuilding standards.** There may be some sort of a role for an organization that provides some coordination of standards for the shipbuilding industry. However, there are already established organizations which already have a partial role in this area. These are the U.S. Technical Advisory Committees to various ISO Technical Committees. With the large number of organizations developing standards which are used in shipbuilding, I would be reluctant to establish another organization whose value is questionable. I rate this as low priority.

14. & 15. Insufficient familiarity to rate.

16. **Internet Familiarity.**

I have access to internet and am familiar with many of the organizations although the survey indicates some unfamiliarity with the orgainzations and their relationships.

ANSI/IEEE is not an organization. Standards which have been developed by an industry standards organization and adopted as a National standard have been identified with an ANSI number or by ANSI/standards organization designation. The current practice is now to retain the initial standard number of the developing organization.

While there are home pages for various federal and military standards these are not the names of the organizations developing the standards. It is believed that other organizations not listed also have home pages.

17. **Influence of Standards on Various Shipbuilding Products.** I'll leave this for the shipbuilders to answer.

18. **Familiarity with "Compendium of Shipbuilding Standards"** Unfamiliar with document.

19. **Additional Comments.**

a. Standards development. I feel that shipbuilders do not participate in the development of standards to the degree that they should. This work often get low priority. Only when the standard is invoked on them do they review it carefully. Unfortunately, standards development is often a slow process. Many shipyard managers do not feel that they can support attendance at meetings of standardization groups which meet several times a year. At the same time, many of the groups are not effective in producing good and timely standards. For the most part, the standards are produced by volunteers with other priorities. Therefore, the non-government standard bodies have to offer benefits to attendees and develop standards in an effective manner.

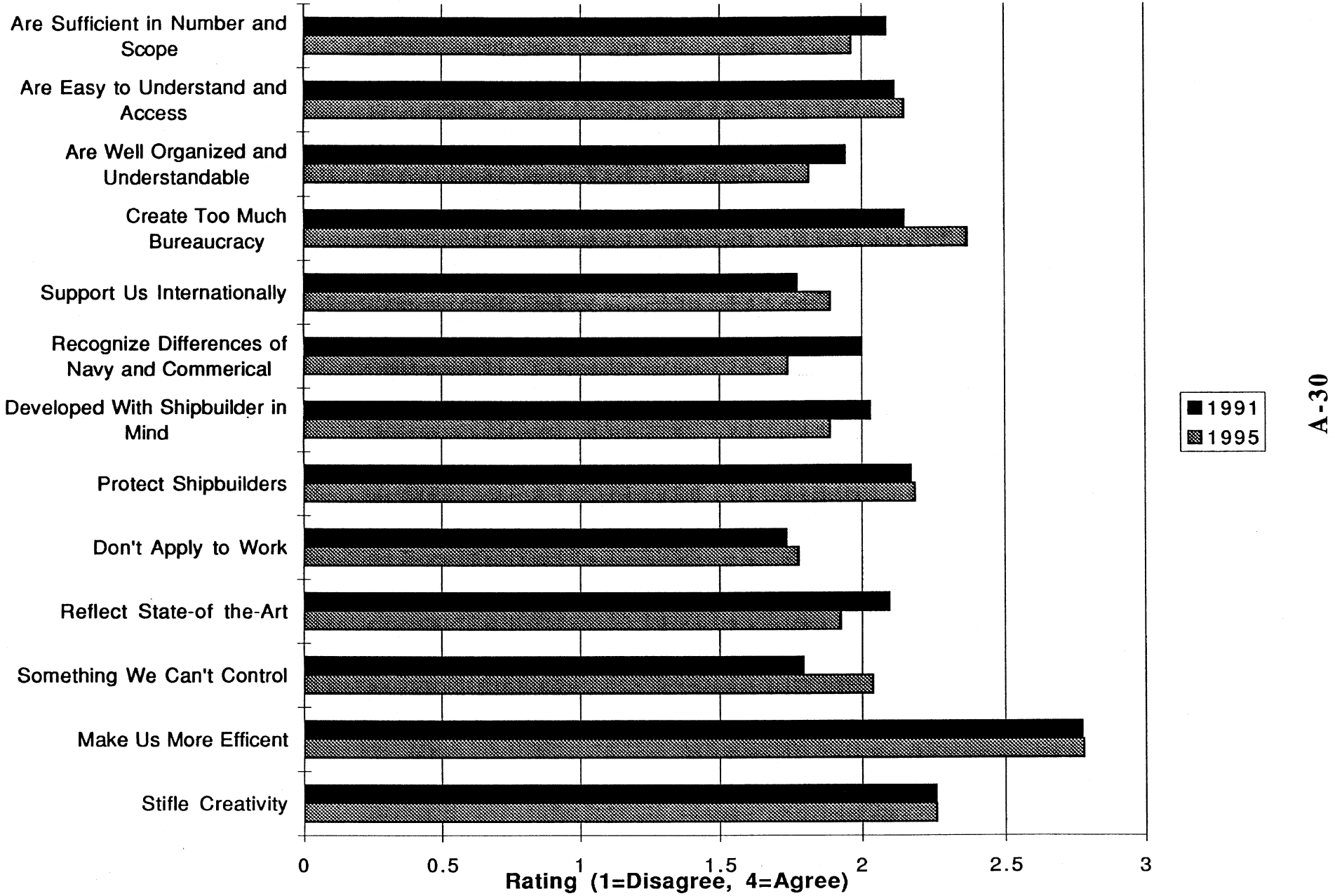
b. My comments. The comments herein do not necessarily reflect those of my employer, NAVSEA nor those of the SAE Ship Systems and Equipment Committee which I chair. This reply was compiled on my own time and reflects my personnel opinions. These comments do not have to be held in confidence and may be shared with others if you wish. You may follow this survey up with a telephone interview if you wish.

Sincerely,

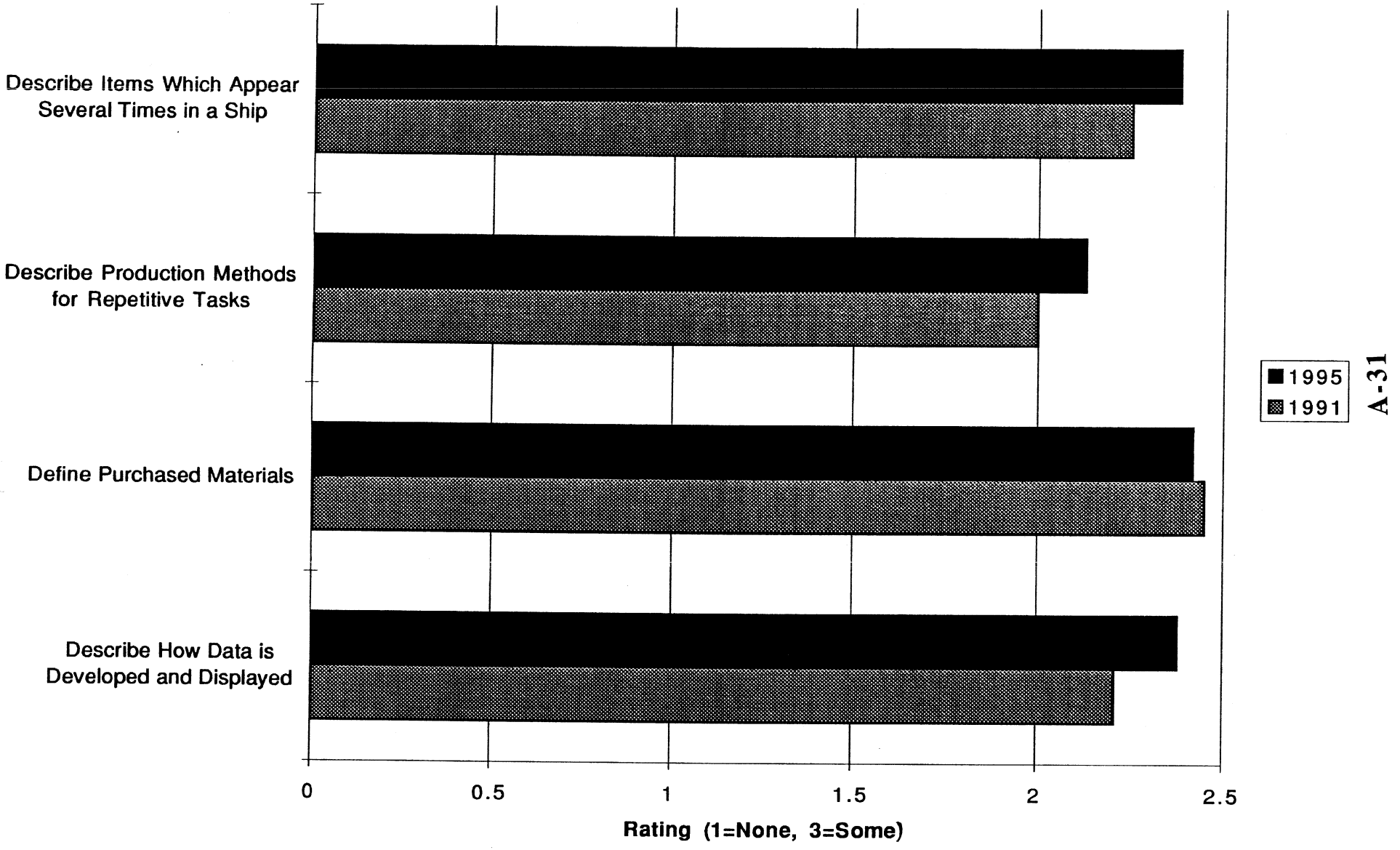
Wayne K. Wilcox

Company: NAVSEA
Title: Head, Fastener and Hydraulic Component Standardization
Phone: (703)-602-1596 X116

5 Review of Standards



12 Level of Utility From Types of Standards



Appendix B

Internet Standards Sites and Information

APPENDIX B

STANDARDS INTERNET SITES

Following is an abbreviated listing of some standards related internet sites. Starting on the second page is an expanded listing for the sites with interesting statements of purpose, procedures and links to searches and ordering information.

ANSI American National Standards Institute http://www.ansi.org

ASTM American Society for Testing and Materials http://www.astm.org/

ASTM F-25 Ships and Marine Technology http://www.astm.org/COMMIT/f-25.htm

IEC International Electrotechnical Commission http://www.iec.ch/

ISO International Organization for Standardization http://www.iso.ch/

ISO TC 8 Ships and Marine Technology http://www.iso.ch/meme/TC8.html

From the ISO home page there are links to the national standards organizations of many of the member countries:

Australia Standards Australia (SAA) http://www.standards.com.au/~sicsaa/

Canada Standards Council of Canada (SCC) http://www.scc.ca/indexe.html

Finland Finnish Standards Association (SFS) http://www.sfs.fi/

Germany Deutsches Institut für Normung (DIN) http://www.din.de/frames/Welcome.html

Ireland National Standards Authority of Ireland (NSAI) http://www.nsai.ie/

Italy Ente Nazionale Italiano di Unificazione (UNI) http://www.unicei.it/

Japan Japanese Industrial Standards Committee (JISC)
http://www.hike.te.chiba-u.ac.jp/ikeda/JIS/index.html

Malaysia Department of Standards Malaysia (DSM)
no web site at printing, send mail to: central@dsm4.gov.my (SIRIM)

Netherlands Nederlands Normalisatie-instituut (NNI) http://www.nni.nl/

Norway Norges Standardiseringsforbund (NSF) http://www.standard.no/

Slovenia Standards and Metrology Institute (SMIS) http://www.usm.mzt.si/

Defense Standardization Program (DSP) http://www.acq.osd.mil/es/std/stdhome.html

ANSI American National Standards Institute
http://www.ansi.org

This site has been designed to provide the Institute's members and customers with convenient access to information on the ANSI Federation and the latest national and international standards-related activities. ANSI Online also offers links to a number of our member's web sites and to other key national and international organizations.

The American National Standards Institute is a private-sector, non-profit, membership organization.

American National Standards Institute
11 West 42nd Street
New York, New York 10036

Telephone: 212 642 4900
Fax: 212-398 0023

Feature Articles:
- An Introduction to the American National Standards Institute
- Standardization: A management tool for building success

IEC International Electrotechnical Commission
http://www.iec.ch/

The International Electrotechnical Commission is the international standards and conformity assessment body for all fields of electrotechnology.

The IEC Mission:
The mission of the International Electrotechnical Commission (IEC) is to promote, through its members, international co-operation on all questions of standardization and related matters, such as the assessment of conformity to standards, in the fields of electricity, electronics and related technologies. It therefore provides a forum for the preparation and implementation of consensus-based voluntary international standards, facilitating international trade in its field and helping to meet expectations for an improved quality of life.

There are additional sections dealing with:
General Information: IEC mission, membership, structure, operations, etc.
News: Selected new publications and general news releases, events
Sales and Enquiries: Order standards and other documents; customer enquiries
Search: Search the IEC databases for specific information
Download Area: Documents available on-line
Webmaster: Feedback and support

Through the search link you can search for key words or IEC standards numbers. An abstract and pricing information is provided for each standard.

ISO International Organization for Standardization http://www.iso.ch/

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from some 100 countries, one from each country. ISO is a non-governmental organization established in 1947. The mission of ISO is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity. ISO's work results in international agreements which are published as International Standards.

ISO Feature Articles:

- International standardization : What does it achieve ?
- Introduction to ISO
- ISO technical committees
- ISO structure
- ISO meeting calendar
- ISO members worldwide
- ISO Catalogue
- ISO 9000 News Service
- What's new at ISO?

From the technical committees title you can easily get to TC-8.

TC 8 Ships and Marine Technology http://www.iso.ch/meme/TC8.html

Secretariat: NNI (Mr. J. van Elk)
Chairman: Capt. C.H. Piersall (USA) until (2000)
Scope:

Standardization of design, construction, structural elements, outfitting parts, equipment, methods and technology, and marine environmental matters, used in shipbuilding and the operation of ships, comprising sea-going ships, vessels for inland navigation, offshore structures, ship-to-shore interface and all other marine structures subject to IMO requirements.

Excluded:

- electrical and electronic equipment on board ships and marine structures (which are in IEC / TC 18 and IEC /TC 80);
- internal combustion engines (ISO / TC 70);
- offshore structures for petroleum and natural gas industries, including procedures for assessment of the site specific application of mobile offshore drilling and accommodation units for the petroleum and natural gas industry (ISO / TC 67 / SC 7);
- steel and aluminum structures (ISO / TC 167);
- equipment and construction details of recreational craft and other small craft (not being lifeboats and lifesaving equipment) less than 24 metres in overall length (ISO / TC 188);
- sea bed mining;
- equipment which is not specific for use on board ships and marine structures (e.g. pipes, steel wire ropes, etc.) and falling within the scope of particular ISO technical committees with which a regular mutual liaison must be maintained.

ISO TC 8 (cont'd)

Total number of ISO standards and DIS related to TC-8 and its SCs: 156
Participating countries: 21
Observer countries: 27

Last plenary meeting: October / octobre 1996
Liaison: ISO/TC 108
Liaison: IEC/TC 18

The convener can be reached through: NNI

TC-8 Subcommittees:
- TC 8 / SC 1 Lifesaving and fire protection
- TC 8 / SC 2 Marine environment protection
- TC 8 / SC 3 Piping and machinery
- TC 8 / SC 4 Outfitting and deck machinery
- TC 8 / SC 5 Ships' bridge layout
- TC 8 / SC 6 Navigation
- TC 8 / SC 7 Inland navigation vessels
- TC 8 / SC 8 Structures
- TC 8 / SC 9 General requirements
- TC 8 / SC 10 Computer applications

Through the ISO Catalogue you can search for standards through ID numbers or keywords. Selection of a particular standard number yields information on the title, number of pages, the responsible committee and a list of applicable key words.

From the ISO home page there are links to the national standards organizations of many of the member countries:

Australia

Standards Australia (SAA) http://www.standards.com.au/~sicsaa/

In Australia, most standards are published by Standards Australia, an independent, not for profit organisation whose principal role is to prepare standards through an open process of consultation and consensus in which all interested parties are invited to participate. Standards Australia is recognized by the Commonwealth Government as the peak standards writing body in Australia. To discover more about the organisation you can explore the following topics :

- All about Standards Australia
- Creating Technical Standards
- The wide variety of Australian Standards
- How to Contact Standards Australia
- How we all benefit from Australian Standards
- International and Foreign Standards
- Key Statistics
- Focus on Customer Services
- Standards Australia OnLine

Standards Australia
PO Box 1055
Strathfield NSW 2135

Sales Phone: + 61 2 9746 4600
Sales Fax: + 61 2 9746 3333
Information Centre phone (02) 9746 4748, Fax - 4765

Canada

Standards Council of Canada (SCC) http://www.scc.ca/indexe.html

The Standards Council of Canada (SCC) is a federal Crown corporation whose mandate is to promote efficient and effective voluntary standardization in Canada in order to advance the national economy, support sustainable development, benefit the health safety and welfare of workers and the public, assist and protect consumers, facilitate domestic and international trade and further international cooperation in relation to standardization.

Located in Ottawa, the SCC has a staff of approximately 70, and a governing Council of 15 members. The SCC's activities are carried out within the context of the National Standards System, a federation of organizations providing standardization services to the Canadian public. The SCC is manager of the System.

Other areas within the SCC web site are:

- About the Standards Council
- The National Standards System
- What's New and Calendar of Events!
- Library
- ISO 9000 & ISO 14000 Series of Standards
- International Standardization Organizations Gateways to other Standards

Communications Division
Standards Council of Canada
45 O'Connor Street, Suite 1200
Ottawa, Ontario K1P 6N7

Phone (613) 238-3222
Fax (613) 995-4564

Finland

Finnish Standards Association (SFS) http://www.sfs.fi/

Standardization is voluntary co-operation to find solutions that can be applied repeatedly to problems, especially in the spheres of science, technology and economics. Standardization is carried out at international, regional, national and company levels. The Finnish Standards Association SFS is an independent, non-profit making organization co-operating with trade federations and industry, research institutes, labour market organizations, consumer organizations and governmental and local authorities. Members of SFS include professional, commercial and industrial organizations, and the state of Finland represented by the ministries.

Finnish Standards Association SFS
Maistraatinportti 2
FIN-00240 HELSINKI
FINLAND

Tel. int. +358 9 149 9331
Telefax int. +358 9 146 4925

Germany

Deutsches Institut für Normung (DIN) http://www.din.de/frames/Welcome.html

What is DIN?
The ten principles of standardization
Costs and benefits of standardization
Standardization in Europe
International standardization

What is DIN?

DIN, the German Institute for Standardization, is a registered association with its head office in Berlin. It is not a government agency. The work of standardization as undertaken by DIN is a service in the field of science and technology that is provided for the entire community. The results of standardization benefit the whole of the national economy. DIN serves as the round table around which gather representatives from the manufacturing industries, consumer organizations, commerce, the trades, service industries, science, technical inspectorates, government, in short anyone with an interest in standardization, in order to determine the state of the art and to record it in the form of German Standards. DIN Standards are technical rules that promote rationalization, quality assurance, safety, and environmental protection as well as improving communication between industry, technology, science, government and the public domain. In DIN, standards work is carried out by 40,500 external experts serving as voluntary delegates in 4,400 committees. Published standards are reviewed for continuing relevance every five years, at least.

Definitions

"Standardization is the single, specific solution to a recurring task within the scope of the given scientific, technical and economic possibilities."
Otto Kienzle, co-founder of DIN

"Standardization is the systematic process by which tangible or intangible objects are reduced to a desired degree of uniformity by the joint efforts of the interested parties for the benefit of the entire community. "
DIN 820 Part 1

Ireland

National Standards Authority of Ireland (NSAI) http://www.nsai.ie/

National Standards Authority of Ireland NSAI,
Glasnevin
Dublin 9, Ireland.

Tel +353 1 8073800
Fax +353 1 8073838

Italy

Ente Nazionale Italiano di Unificazione (UNI) http://www.unicei.it/

Italian National Standards Body
MILANO (head quarters) Tel. (02) 700241
Via Battistotti Sassi, 11/B Fax (02) 70105992
20133 Milano

Japan

Japanese Industrial Standards Committee (JISC)
http://www.hike.te.chiba-u.ac.jp/ikeda/JIS/index.html

Outlook of Industrial Standardization in Japan
- What is JIS?
- JIS Marking System
- Approval of JIS Marking for Foreign Factories
- Quality Systems Registration Scheme in Japan
- International Standardization Activities of Japan

Publications of JIS

Standards published in English (search engine). You can search for standards through ID numbers or keywords. Selection of a particular standard number yields information on the title, number of pages and a list of applicable key words.

Standards Department (Secretariat of JISC)
Agency of Industrial Science and Technology
Ministry of International Trade and Industry
1-3-1 Kasumigaseki,
Chiyoda-ku, Tokyo 100, Japan

Phone: + 81 3 3501-2096
Fax: + 81 3 3580-8637

Japanese Standards Association (JSA)
4-1-24 Akasaka
Minato-ku, Tokyo 107, Japan

Phone: (03)3583-8001
Fax: (03)3586-2014

Malaysia

Department of Standards Malaysia (DSM)
no web site at printing, send mail to: central@dsm4.gov.my

The Standards and Industrial Research Institute of Malaysia (SIRIM) was corporatised into the Department of Standards Malaysia.

As stipulated in the Standards Act, the roles and functions of the Department will be to foster and promote standards and standardisation of specifications as a means of advancing the national economy, benefiting the health, safety and welfare of the public, assisting and protecting consumers, promoting industrial efficiency and development, facilitating domestic and international trade and furthering international cooperation in relation to standards.

The Standards Department will also be responsible for the accreditation activities such as for laboratories, certification agencies and personnel. Thus, the present functions of the Malaysian Accreditation Council or will be integrated into the functions of the Department. Through its accreditation functions, the Department will ensure the credibility of test certificates as well as certificates of conformity issued by testing and certification agencies operating in Malaysia, thus facilitating trade and eliminating technical barriers to trade.

Malaysia (cont'd)

In international standardisation, the Department will act as the central focus and coordination point for Malaysia's involvement and participation in regional and international bodies related to standardisation e.g. International Organisation for Standardisation (ISO), International Electrotechnical Commission (IEC) and the ASEAN Consultative Committee on Standards and Quality (ACCSQ).

The Department will act as the official representative of the country and will be responsible for ensuring that any standards or standardisation programme initiated at any international or regional forum will not become barriers to Malaysia's global trade.

Department of Standards Malaysia
21st Floor, Wisma MPSA
Persiaran Perbandaran
40675 Shah Alam
Selangor Darul Ehsan

Tel: (603) 559 80 33
Fax: (603) 559 24 97

Netherlands

Nederlands Normalisatie-instituut (NNI) http://www.nni.nl/
[Web site under development, some parts in English, includes search engine]

Nederlands Normalisatie-instituut
Kalfjeslaan 2
P.O. Box 5059
NL-2600 GB Delft

Telephone:+ 31 15 2 69 03 90
Telefax:+ 31 15 2 69 01 90
Telegram:normalisatie delft
Telex:3 81 44 nni nl

Norway

Norges Standardiseringsforbund (NSF) http://www.standard.no/
[no english version available]

Slovenia

Standards and Metrology Institute (SMIS) http://www.usm.mzt.si/

Standards and Metrology Institute of the Republic of Slovenia
Kotnikova 6
SI-1000 Ljubljana
Slovenia

Tel: +386 61 178 30 00
Fax: +386 61 178 31 96

ASTM American Society for Testing and Materials
http://www.astm.org/

ASTM has developed and published 10,000 technical standards, which are used by industries worldwide. ASTM members develop the standards within the ASTM consensus process. Technical publications, training courses, and Statistical Quality Assurance Programs are other ASTM products; ASTM services include the ASTM Institute for Standards Research.

Each of the underlined items has links to additional information.

Behind every volume of the Annual Book of ASTM Standards stands a rigorous due process system of checks and balances that has ensured the integrity of ASTM standards for over 95 years. This system is known as the voluntary consensus system, and it is practiced by over 35,000 members on our 132 standards-writing committees. In all our standards work, everyone who has an interest in a standard can have a say in its development. Producers, users, ultimate consumers, and general interest representatives of government and academia volunteer their time and efforts because standards affect their livelihood--and their lives.

Through the search link you can search for ASTM standards by key word, standard number, or by different categories. An extensive abstract and pricing information is provided for each standard. You can order the standard directly from the screen by providing address and billing information. The ASTM Headquarters Staff Directory gives phone and email directions to all the staff members. F-25's contact is Teresa Cendrowska at 610-832-9718; email: tcendrow@astm.org.

ASTM
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

Phone: (610) 832-9585
Fax: (610) 832-9555

ASTM F-25 Ships and Marine Technology
http://www.astm.org/COMMIT/f-25.htm

Committee F-25 on Ships and Marine Technology
Contact: Teresa J. Cendrowska (610) 832-9718
Future Meetings & Symposia
Subcommittees
Committee News

Sponsoring Subcommittees
F25.01 Structures
F25.02 Insulation/Processes
F25.03 Outfitting
F25.05 Computer Applications
F25.06 Marine Environmental Protection
F25.07 General Requirements
F25.10 Electrical
F25.11 Machinery
F25.13 Piping Systems
F25.80 International Standards
F25.91 Planning

Defense Standardization Program (DSP)
http://www.acq.osd.mil/es/std/stdhome.html

There are many links to various areas of defense standards programs. Each of the bullets below leads directly to a news item placed there on the date indicated (The web site was updated to June 18, 1997 at the time of printing for this Standards Master Plan Update report). Pointing to the underlined (highlighted in blue on their web page) phrases automatically connects the user with that item.

What's New?

- The newly issued Policy Memo 97-5, Superseding Specifications and Standards With Handbooks, warns about the use of language which suggests that a handbook supersedes a canceled specification or standard. (11 Jun 97)

- Download a draft copy of the newly revised SD-5, Market Research for Commercial Acquisition. (15 May 97)

- The deadline is fast approaching for completing your registration to the ADPA/NSIA Technical Information Division's 36th Annual Symposium. (4 Jun 97)

The Parts Standardization and Management Committee (PSMC) is a joint industry and government committee consisting of experts from the parts management, standardization, engineering and logistics communities. Read about this group in the Press Release below or visit the PSMC Webpage for more details. ... ... (14 May 97)

If you are a DOD employee and participate on one or more non-Government standards (NGS) bodies, you are encouraged to register your participation in the on-line SD-11 database. Like most directories, the information in SD-11 changes continually. With your cooperation, this electronic directory can be a useful resource for anyone interested in the development of voluntary standards or in the NGS bodies that create such standards. Although registration is voluntary, we strongly encourage all DOD employees on NGS Technical Committees to populate the directory and to spread the word to co-workers who may not have discovered our Web site. Although all are welcome to view the data regarding NGS bodies available within the electronic directory, only DOD employees should register their participation. ... (30 May 97)

- The DSIC has chartered the Communicating Requirements Working Group to ensure that DoD promotes a consistent approach to stating requirements. (4 Jun 97)

- The Office of Management and Budget (OMB) has published a proposed revision to OMB Circular A-119. There is a 60-day period for public comments (7 Jan 97)

- The USD(A&T) gave the Keynote Address to the Joint Conference on Standards Reform on November 13, 1996, on the subject of Institutionalizing Standards Reform ... (30 Dec 96)

- A highlight of the World Standards Day dinner on October 16, 1996, was the USD(A&T)'s speech on Embracing World Class Standards. (1 Nov 96)

Defense Standardization Program (cont'd)

Document Improvement Actions

- Check the status of actions to implement Defense Standards Improvement Council (DSIC) decisions to improve selected MIL-SPECs and MIL-STD. (18 Jun 97)

- AIA has established an Early Warning Project Group to anticipate and react to potential DoD cancellation
of MilSpecs required by the aerospace industry. (5 Dec 96)
Review the draft MIL-HDBK-470A on maintainability. (9 Oct 96)

Frequently Asked Questions (FAQs) about MILSPEC reform. (20 Feb 97)

The Standardization Library has the following resources: (11 Jun 97)

- Selected Military Standards
- Policy & Guidance Memos (11 Jun 97)
- Exempted Documents (4 Jun 97)
- Standardization Publications (SD's, special reports, & speeches) (15 May 97)
- Newsletters - to include the following current issues: (4 Jun 97)

The Standardization Newsletter ..... May '97 (updated 4 Jun 97)
The RMS Newsletter ..... April '97
HFAC Highlights ..... February '97

Key Points of Contact (POCs) for the Defense Standardization Program

Departmental Standardization Offices (DepSOs) (19 Feb 97)
Standards Improvement Executives (SIEs) (29 May 97)
OSD Standardization Program Division (12 Mar 97)
RMS Partnership POCs (17 Apr 97)

Need to obtain a current military specification, standard, or other DOD standardization document? Then visit the DODSSP Web page and review their catalog of products ... (31 Jan 97)

Other Web sites related to standardization and acquisition reform ... (17 Jun 97)

Training and educational opportunities (14 May 97)

ADPA/NSIA training
ANSI training courses
BRTRC performance specification seminars
DAU training courses
Meetings and conferences (2 Jun 97)

Appendix C

SP-6 Tactical Plan

3-5 YEAR TACTICAL PLAN
FOR THE
MARINE INDUSTRY STANDARDS PANEL, SP-6

Prepared for:
Newport News Shipbuilding
Program Manager for
National Shipbuilding Research Program (NSRP)
Panel SP-6: Marine Industry Standards

By:

NATIONAL STEEL & SHIPBUILDING COMPANY
P.O. BOX 85278
HARBOR DRIVE & 28TH STREET
SAN DIEGO, CA 92186-5278

SP-6 TACTICAL PLAN
EXECUTIVE SUMMARY

The Executive Control Board of the Ship Production Committee requested the SP-6 Panel chairman to coordinate development of a tactical plan to support implementation of the updated United States Shipbuilding Standards Master Plan. The Tactical Plan will be a 3 - 5 year guideline for the Panel's use when identifying project abstract ideas, during project development and to oversee project accomplishment.

The SP-6 Panel will utilize the vision statements and goal statements from the Kansas City workshop and the primary and secondary initiatives from the U.S. Shipbuilding Standards Master Plan as guidelines for development of projects and initiatives to accomplish the following objectives in a 3 year time frame starting with the FY97 program. **The SP-6 Panel cannot accomplish these objectives on its own**. The assistance of the ECB, SNAME, MARAD, MARITECH, ASTM and other national level organizations is required if positive steps are to be made in the coordination of shipbuilding standards to benefit and support global competitiveness.

1.) Firmly establish a national shipbuilding standards program that embodies the following as a minimum;

A.) Establishing national shipbuilding standards.
1.) These standards must include recognized and approved equivalency information and cross referencing endorsed by the appropriate standards bodies..
2.) Develop a method to "fast track" the process of national and international acceptance.

B.) Establish a national shipbuilding standards entity.
1.) Any organization expected to centralize shipbuilding standards activities must focus on coordinating information and resources available from NMREC, GCRMTC, UMTRI and others. The Industry needs a strong, proactive presence to focus efforts, supply quick responses to inquiries and develop a base of knowledge and expertise. Of utmost importance is access to marine industry information about standards, standards initiatives and technological innovations that pertain to shipbuilding. This information should be available in an electronic format such as NSNET.
2.) Provide services for national, foreign and international shipbuilding standards that supplies technical cross referencing and equivalency information along with certified expertise in consultative services as requested/needed.
3.) Develop and distribute a periodic publication (quarterly is recommended) that highlights national and international standards activities, encourages dialogue and informs the industry on what is happening in a very public forum

C.) Supply visible and vocal support for existing standards developing bodies and organizations through funding and coordinated undertakings.

D.) Provide clear support for international standards activities in the form of expeditious funding .

2.) Resolve the perception and identity problems of the SP-6 Panel by enlisting the assistance of the ECB, MARAD, ASTM and others in developing clearly defined roles and responsibilities for national and international standards players.

3.) Pursue alternate sources of funding for SP-6 initiatives with groups like GCRMTC, ASA & others.

The following objectives can be accomplished by the focused efforts of SP-6 Panel members and will be guidelines for the near term focus of the SP-6 Panel's project proposals.

4.) Establish a formal program to identify emerging issues and areas that require standards be developed to benefit shipbuilding directly.
A.) Promote the expansion of identification and development of shipbuilding process, procedure and test standards by the appropriate standards bodies.

B.) Establish a process for the industry to use to identify, have the appropriate standards body develop, and implement consensus shipbuilding outfit, fabrication and installation standards.

3 - 5 YEAR TACTICAL PLAN
FOR THE
MARINE INDUSTRY STANDARDS PANEL, SP-6

The Executive Control Board of the Ship Production Committee requested the SP-6 Panel chairman to coordinate development of a tactical plan to support implementation of the updated United States Shipbuilding Standards Master Plan. The Tactical Plan will be a 3 - 5 year guideline for the Panel's use when identifying project abstract ideas, during project development and to oversee project accomplishment.

BACKGROUND

A United States Shipbuilding Standards Master Plan was developed for the Maritime Administration, through Panel SP-6, and was published in November, 1992. Input for the Plan came from a number of sources; surveys, interviews, workshops and an iterative editing process to include the views and opinions of key persons and organizations involved in the processes of developing, managing and using standards in marine related industries. The Plan was developed to help organize a U.S. shipbuilding standards program to assist in achieving global competitiveness for the U.S. shipbuilding and ship repair industry. There are eight primary initiatives identified in the Plan as necessary to develop and maintain a viable National Shipbuilding Standards Program. They are:

1.) Establish a communications center for shipbuilding standards.
2.) Become more involved in international standards.
3.) Gain more domestic involvement in the shipbuilding standards community.
4.) Refine the process for identifying and developing new shipbuilding standards.
5.) Coordinate existing standards.
6.) Convert the U.S. shipbuilding industry to the metric system.
7.) Develop a marketing strategy for the Plan.
8.) Adopt or convert existing global standards for domestic use.

A planning workshop conducted by the SP-6 Panel in March of 1992 at Kansas City, MO. resulted in the participants developing three separate products. The first product was identification of the ten most important strategic advantages of an industry level ship and marine technology standardization program. They are listed below:

1.) Reduced time from concept to delivery of ships to our customers.
2.) Increased customer satisfaction - confidence.
3.) Increased supplier base.
4.) Improved industry profitability through - savings, cost avoidance & cost reduction.
5.) Increased productivity.
6.) Increased interchangeability of equipment.

7.) Improved communications.
8.) Reduced risk.
9.) Improved quality of products and management processes. (Ability to meet ISO 9000 requirements)
10.) Increased international awareness

These served as the first input toward the second product, development of a vision statement for a U.S. ship and marine technology standardization effort. The vision statement read as follows:

OUR SHIP AND MARINE TECHNOLOGY STANDARDIZATION PROGRAM SHALL SUPPORT INDUSTRY GLOBALIZATION. IT WILL:

- Be a cooperative effort between standards setting bodies and standards users where participants will have well understood and effectively coordinated roles.

- Be recognized as an important element in global competitiveness by top level industry decision makers.

- Be guided by a vision communicated by user representative bodies including the SCA and the ECB of the NSRP.

- Be supported by joint funding from government and industry with government providing seed/catalyst funds and industry providing resource pooling.

- Support expedition of the internationalization of U.S. standards and the nationalization of foreign standards resulting in;
  1.) Matching foreign standards with domestic counterparts.
  2.) The rapid adoption of appropriate international and foreign standards.

- Maintain/increase support for U.S. representation in international standardization/standards programs.

- Commit to the full conversion to metric measurement and standards.

The third product was consensus development of nine goal statements important for implementation of the vision. The nine goal statements were focused on a five year time horizon. They are:

Goal 1

Develop a process for communication of standards and standardization for ships and marine standardization to:
- Shipyard top management
- Industry top management

- Other industrial leagues
- The world market
- Working level yard managers

Goal 2

Implement a communications system to:
- Disseminate information on proposed and new standardization actions
- Serve as a sounding board for proposed new initiatives
- Communicate industry's consensus position on proposed national and international standards and processes

Goal 3

Promote the national ship and marine technology standards program by:
- Enlisting greater yard participation through the development and implementation of a marketing plan
- Reaching over 90% participation of the SCA member yards in the development process within 5 years
- Increasing the awareness of the ship and marine technology standards program in the international market place
- Establishing a network of members at all shipbuilders and allied industries to support product marketing through the use of standards

Goal 4

Establish a firm structure between standards organizations and advisory groups with well defined roles and relationships which will;
- Identify, prioritize and manage initiatives which are responsible to the needs and goals of the NSRP
- Accelerate the standards development process
- Place emphasis on adopting and developing international standards

Goal 5

Use SI as the standard of weights and measures in the U.S. shipbuilding industry within 3 - 5 years for design, manufacturing and purchasing; and information and documentation

Goal 6

Establish a source of standards from all international sources within two years

Goal 7

Evaluate ISO and other foreign standards to identify equivalency to U.S. standards in 4 years

Goal 8

Research, develop and implement a plan to budget and to obtain funds from nontraditional government and trade association sources (e.g. DOD, DOT, DOE).

Goal 9

Increase volunteers from shipyards.

- To support ASTM F-25
- To support SP-6 through the promotion of joint utilization of professionals on SP-6 & ASTM F-25
- To support ISO TC-8, subcommittees, and working groups
- To identify other standards bodies relevant to the industry and achieve representation on those bodies

The U.S. Shipbuilding Standards Master Plan in conjunction with the Kansas City planning workshop set the framework for creating a well organized, consensus shipbuilding standards program. Three years have passed and only a small percentage of the recommended actions, goals and initiatives set forth in those two documents have been successfully accomplished.

Those items on which some action has been taken are:

- Establishment by MARAD of the National Maritime Resource and Education Center (NMREC) to fulfill the need for a communication center for shipbuilding standards (initiative #1 & goal #2)

- SP-6 undertook project N6-92-2 "Introduction of Metrication into U.S. Shipbuilding" to address use of SI as the standard of weights and measures (initiative #6 & goal # 5) (the project included a final report, an industry workshop, and industry training modules supported with video presentations)

- SP-6 undertook project N6-93-1 "Evaluation of Foreign and International Standards for Acceptability in U.S. Flag Applications" and follow on projects N6-94-1 " World Class Shipbuilding Standards" and N6-95-4 "Standards Development and Maintenance" to support the evaluation of ISO and other foreign standards to identify equivalency (initiative #5 & #8, goal #7)

- SP-6 was successful in obtaining funding from the Mid-Term Sealift program for projects N6-92-1, N6-93-2, N6-94-1, & N6-94-3 (a total of $560+ K) (goal #8)

- SP-6 was instrumental in supporting and gaining the supply of funding for U.S. representation on the ISO TC-8 committee (initiative #2 & goal #9).

All in all, this is no small set of accomplishments, but much still remains to be done.

ANALYSIS

At the SP-6 panel's most recent meeting on June 27 & 28 in Groton, CT the members in attendance were requested to review and validate the initiatives of the Master Plan and the Strategic Advantages, Vision Statement and Goal Statements from the Kansas City workshop. The results of the review and the discussions that it generated resulted in the following:

The primary initiatives remaining from the U.S. Shipbuilding Standards Master Plan, in no particular order, are:

1.) Gain more shipyard employee involvement in national shipbuilding standards bodies, organizations and their processes.

2.) Refine the process for identifying new shipbuilding standards that need to be developed.

3.) Coordinate existing national and international standards.

4.) Adopt or convert existing global standards for domestic use.

Secondary initiatives for consideration by the panel should include:

A.) Establish a recognizable organization to supply information on and about standards, standardization, national and international initiatives that is easily accessible and sensitive to the needs and desires of the shipbuilding industry. (This may end up as the NMREC, but SP-6 Panel members continue to have great concern as to whether the needs and desires of shipbuilders will be met by this organization and must see more positive movement in that direction before they are comfortable.)

B.) Become more involved in the international shipbuilding standards community through ISO TC-8 and the U.S. TAG, either directly or by interface with representatives.

C.) Continue to promote the conversion of the U.S. shipbuilding industry to SI weights and measures.

The strategic advantages from the Kansas City workshop remain applicable and basically unchanged.

The original Vision Statements describe lofty ideals that remain worthy of accomplishment, however, they also detail some reasons why SP-6 and industry's efforts to establish

viable global standards have not been more completely realized. Listed below are vision statements and explanations/descriptions of problems that have been encountered when attempting to accomplish implementation.

"Be a cooperative effort between standard setting bodies and standards users where participants will have well understood and effectively coordinated roles."

This has been one of the traditional problems encountered by SP-6. How exactly do the NSRP, NMREC, GCRMTC, ASTM F-25, ISO TAG /TC-8, SNAME T&R and other industry and standards organizations cooperate? Do all of the described players understand their roles? Is there any place where the definition of these roles is held? And the ultimate question that needs to be answered; who is in charge of the effective coordination of those roles to best benefit the U.S. shipbuilding industry? A set of candidate descriptions of the roles and responsibilities of the major players in the U.S. shipbuilding standards arena follows:

The Society of Naval Architects and Marine Engineers (SNAME) Technical & Research Program: SNAME is a technical society that was organized to advance the art, science and practice of naval architecture, shipbuilding and marine engineering, commercial and governmental, in all of their branches and of the allied arts and sciences and to promote the professional integrity of its members. The T&R program's role in national and international shipbuilding standards is to provide technical knowledge and expertise in the form of papers, reports or when tasked or requested by standards developing bodies.

National Shipbuilding Research Program (NSRP): The Ship Production Committee (SPC) of the Society of Naval Architects and Marine Engineers (SNAME) was chosen by MARAD to provide strategic direction to the National Shipbuilding Research Program (NSRP). The NSRP was formed in 1970 as a result of amendments to the 1936 Merchant Marine Act to assist shipbuilders in developing plans for the economic construction of vessels. It provides a forum for representatives of the marine industry and government to meet in a collaborative environment so technical problems can be discussed and resolution actions can be recommended. The NSRP mission is to "assist the U.S. shipbuilding and repair industry in achieving and maintaining global competitiveness with respect to quality, time, cost, and customer satisfaction.

SP-6 Marine Industry Standards Panel: The SP-6 Panel's role is to coordinate and rationalize the process and set the agenda for development of marine industry standards beneficial to shipbuilders. The SP-6 Panel does not write, develop, publish or distribute standards. Some of the products of SP-6 projects are intended to be submitted to standards developing bodies for consideration and acceptance into the process if deemed worthy.

American Society for Testing and Materials (ASTM) Committee F-25: The ships and ships equipment committee is a technical product and procurement standards developing, publishing and distributing organization. As such it consists of representatives from equipment manufacturers, shipbuilders, regulatory bodies, ship owners/operators and government agencies. Its role is to identify, accomplish development and chaperone through the national and now international acceptance and approval process technical standards for components and raw materials used in shipbuilding and marine industry applications.

ISO Technical Advisory Group /Technical Committee - 8 (ISO TAG/TC-8): The role of the TAG and TC-8 is to ensure that U.S. marine industry interests are represented and protected in the process of developing and implementing internationally accepted standards. As such the TAG is responsible for representing the viewpoints of multiple organizations that represent the U.S. marine community. TC-8 is where the actual work of developing, technical review, balloting and acceptance of international standards takes place. It is vital that the TAG and TC-8 receive the support of the U.S. marine community.

National Maritime Resource & Education Center (NMREC): The role of the NMREC as described by MARAD is to "assist the U.S. shipbuilding and allied industries in improving their competitiveness in the international commercial market. The NMREC will be a major information source and a facilitator within the Government for the maritime industry by providing expertise, information and reference material on commercial shipbuilding. It will acquire and maintain marine standards, develop and conduct seminars and workshops and provide other information to assist the industry."

Gulf Coast Region Maritime Technology Center (GCRMTC): The role of the GCRMTC is to "enhance international competitiveness of U.S. shipbuilding industry through cooperation with U.S. Navy, maritime industry, academic and private research centers." The objectives are to " become a valued asset to US shipbuilding industry and be responsive to the needs of shipyards and shipyard suppliers throughout US."

Some of these descriptions and roles are unclear and nebulous. Clearly there is also some duplication of efforts. Clarification of these roles and clear definition is required to stop ongoing "turf wars" and get all the player's shoulders on the wheel pushing in the same direction. To accomplish that it is recommended that the following representatives, as a minimum, be gathered for the distinct purpose of hashing out these definitions to come to a consensus on roles and responsibilities for each organization:

- SNAME T&R - T. Mackey
- NSRP - E. Mortimer
- SP-6 - S Laskey
- ASTM F-25 - H. Hime
- ISO TC-8 - C. Piersall

- NMREC - J. Byrne
- GCRMTC - J. Crisp

"Be recognized as an important element in global competitiveness by top level industry decision makers."

U.S. Shipbuilding standards have been an area of neglect by shipbuilders, government and standards developing and publishing bodies. The current scenario of scrambling to become proficient in international and foreign standards interpretation to establish U.S. adoption or development of globally acceptable standards highlights the scope of neglect. If top level industry decision makers have identified "standards" as an important element in global competitiveness, the subject has not been supported with appropriate visible commitment in the form of funding and resources. SP-6 has developed project abstracts for review, approval and funding by the ECB that were; supportive of established goals and objectives, IAW the NSRP mission and, if accomplished, would have enhanced global competitiveness. These projects were rejected without comment. This sends a confusing and negative message to panel members as they attempt to plan for accomplishing short term and long range objectives.

"Be guided by a vision communicated by user representative bodies including the ASA, SCA, and the ECB of the NSRP."

The SP-6 FY96 program was carefully selected and tailored to meet the NSRP mission and the goals and objectives from the 1992 standards planning workshop and the U.S. Shipbuilding Standards Master Plan. These goals and objectives have been held up to the scrutiny of the SP-6 panel, the ECB and other representatives of shipbuilding and related industries. No strident objections were voiced. In the absence of significant objections to these goals and objectives, implied approval was taken for granted. But, only two of five projects were approved for funding. If a new vision and direction is desired, it needs to be clearly stated, defined and communicated so the SP-6 panel can react accordingly. And, once the vision is communicated, it must be shared. This includes buy-in and visible commitment.

"Support expedition of the internationalization of U.S. shipbuilding standards and nationalization of foreign standards resulting in:

1.) Matching foreign standards with domestic counterparts.

2.) The rapid adoption of appropriate international and foreign standards."

SP-6 has supported this statement with projects that have been finished, are on-going and which have follow-on projects approved. However, The initial project to conduct equivalency reviews of foreign standards, N6-93-1, still has no deliverable due to lack

of agreement on the methodology to be used in the equivalency analysis process. The *rapid* is underlined because this statement from 1993 is still valid, but no rapid (fast-track) method has surfaced for the industry to accomplish adoption, adaptation or conversion of appropriate international or foreign standards.

This area also addresses a continuing major problem for equivalency reviews and adoption of foreign and international standards. The lack of movement by the marine industry, particularly manufacturers and suppliers, to the SI system of weights and measures. U.S. ship designers can develop vessel designs using SI, but if materials and components are not available in SI, any competitive edge gained will be lost.

"Maintain and encourage increasing support for U.S. representation in international standardization/standards programs."

SP-6 directly supported this statement by funneling in excess of $125,000 to the ISO TAG & TC-8 efforts. Recognition of this contribution would be welcomed.

There are many correlations between the vision statements and the 9 goals that resulted from the Kansas City workshop. The 9 goals remain basically unchanged, are still applicable and every attempt should be made to accomplish them.

CONCLUSIONS

National Shipbuilding Standards

To rectify the problems previously described, the SP-6 Panel must establish guidelines for use in it's annual project abstract identification and assignment activities. The main thrust of the Tactical Plan and of the U.S. Shipbuilding Standards Master Plan must be re-establishing a cohesive and effective national shipbuilding standards program. The concept of establishing such a program was recommended in Castine, ME in 1976 when SP-6 and ASTM F-25 were created as the principal partners to develop a U.S. marine industry standards program. Coordination and rationalization of national and international shipbuilding standards into a set of globally acceptable and economically sensible national shipbuilding standards for the U.S. shipbuilding and repair industry has become an absolute necessity. There is no single organization, other than SP-6, that has the shipbuilders best interests at heart in the national and international standards arena. But, without the visible commitment and support of every shipyards top level management, and the industry's trade association leaders, the SP-6 Panel cannot identify and supply the tools that have been requested and must be developed to assist in securing global competitiveness. It is the responsibility of the SP-6 Panel and the ECB of the SPC to develop the means to communicate the importance and benefits to be gained from a centralized standards activity for the shipbuilding industry that operates at a national and international level. Developing the ability to identify, determine equivalency, cross reference and adopt, adapt or convert international and foreign standards into information usable by the U.S. shipbuilding industry is crucial to successful globalization.

Resolve the Roles and Responsibilities of all Major Shipbuilding Standards Players

The most important single issue that must be addressed by SP-6 to move its agenda forward will be to resolve any current or ongoing disputes, misunderstandings or differences pertaining to the make-up, organization, agenda and objectives of the SP-6 Panel, and, exactly who the Panel represents. In this time of uncertainty and challenge, those who have an interest in the health and longevity of the U. S. shipbuilding industry should be working together to accomplish a common goal. SP-6 is not the "voice" of marine industry standards. However, SP-6 is the representative body for the majority of shipbuilding and ship repair concerns pertaining to "standards". This is supported by the continuing attendance at SP-6 meetings by 7 to 10 shipyard representatives. At the last SP-6 meeting there were 13 SNAME members present out of 18 attendees and two ASTM members. A review of ASTM F-25's membership roster lists 225 individuals and includes two shipbuilders who also participate in SP-6 This is a situation that requires attention if SP-6 and shipbuilding management wish to participate in the standards development process. The SP-6 Panel is tasked with identifying activities within the national and international standards arena that are viewed as being beneficial to shipbuilding to support, accomplish and implement into our industry. The panel must also be vigilant in identifying shipbuilding needs in areas that do not yet have appropriate standards developed and concentrate on getting those standards developed.

Stabilize Funding

The second most important issue that must be addressed is to establish a stable and expeditious funding mechanism for SP-6 projects. Previous year's backlog of projects that have been approved but not funded by the NSRP program office that are still relevant are a continuing source of aggravation to the Panel chairs and Program managers. Once projects have been reviewed and approved by the ECB, award should follow in a short time to the successful bidder (s). Arbitrary release of awards should not be allowed. The simple fact that FY95 project awards have not occurred by July of 1995 indicates there is a problem with the NSRP's funding mechanism that requires fixing. The SP-6 Panel has obtained funding from areas other than the NSRP to undertake projects recently. The mid-term sealift program is an example of outside funding sources that can be successfully utilized to meet Panel objectives. The Panel chairman has also opened a dialogue with the industry's newest trade association, the American Shipbuilders Association (ASA), in an effort to establish a mutually beneficial relationship. Unless there is an indication from the ECB that funding will be made available for projects that are supportive of the tactical plan and the U.S. Shipbuilding Standards Master Plan, as well as the NSRP's mission, then SP-6 must aggressively pursue alternate methods and sources for revenue.

Focus on Beneficial Areas

The third most important issue is the identification of the type of standards that shipbuilders require but which have not yet been developed. Product and procurement standards

abound, as do the bodies and organizations that develop them. These are available for adoption, adaptation, conversion and use as needed. A gigantic body of subjects remain for which there are little if any guidelines and standards, let alone consensus standards. There are a smattering of procedure, process and test type standards that currently exist or are in development. Should, or will, ASTM F-25 address these particular areas for investigation, development and supply of suitable shipbuilding standards? Whether that occurs or not, expansion of the effort to establish formal methods for developing consensus standards for those subject areas deserves SP-6 consideration. Promotion of projects that support identification and make recommendations for development of standards for procedure, process and test subjects will be an SP-6 objective. Another emerging area that SP-6 should investigate is installation and outfit standards. If you visit a number of foreign-built ships classed within the same classification society rules, you start to see a number of similar installations that might as well be considered as "standard". These installations share common traits; they are simple, producible, meet safety requirements and are low cost. They contribute to lower labor costs to construct ships for our foreign competitors. The U.S. shipbuilding industry should take advantage of such information and assimilate it into any national standards development effort.

SUMMARY

The SP-6 Panel will utilize the vision statements and goal statements from the Kansas City workshop and the primary and secondary initiatives from the U.S. Shipbuilding Standards Master Plan as identified herein as guidelines for development of projects and initiatives to accomplish the four following objectives in a 3 year time frame starting with the FY97 program. **The SP-6 Panel cannot accomplish these objectives on its own**. The assistance of the ECB, SNAME, MARAD, MARITECH, ASTM and other national level organizations is required if positive steps are to be made in the coordination of shipbuilding standards to benefit and support global competitiveness.

1.) Firmly establish a national shipbuilding standards program that embodies the following as a minimum:

A.) Establishing national shipbuilding standards.

1.) These standards must include recognized and approved equivalency information and cross referencing endorsed by the appropriate standards bodies.

2.) Develop a method to "fast track" the process of national and international acceptance.

B.) Establish a national shipbuilding standards entity.

1.) Any organization expected to centralize shipbuilding standards activities should focus on coordinating information and resources available from NMREC, GCRMTC, UMTRI and others. The Industry needs a strong, proactive presence to focus efforts, supply quick responses to inquiries and develop a base of knowledge and expertise. Of utmost importance

is access to marine industry information about standards, standards initiatives and technological innovations that pertain to shipbuilding. This information should be available in an electronic format such as NSNET.

2.) Provide services for national, foreign and international shipbuilding standards that supplies technical cross referencing and equivalency information along with certified expertise in consultative services as requested/needed.

3.) Develop and distribute a periodic publication (quarterly is recommended) that highlights national and international standards activities, encourages dialogue and informs the industry on what is happening in a very public forum

C.) Supply visible and vocal support for existing standards developing bodies and organizations through funding and coordinated undertakings.

D.) Provide clear support for international standards activities in the form of expeditious funding .

2.) Resolve the perception and identity problems of the SP-6 Panel by enlisting the assistance of the ECB, MARAD, ASTM and others in developing clearly defined roles and responsibilities for national and international standards players.

3.) Pursue alternate sources of funding for SP-6 initiatives with groups like GCRMTC, ASA & others.

The following objectives can be accomplished by the focused efforts of SP-6 Panel members and will be guidelines for the near term focus of the SP-6 Panel's project proposals.

4.) Establish a formal program to identify emerging issues and areas that require standards be developed to benefit shipbuilding directly.

A.) Promote the expansion of identification and development of shipbuilding process, procedure and test standards by the appropriate standards bodies.

B.) Establish a process for the industry to use to identify, have the appropriate standards body develop, and implement consensus shipbuilding outfit, fabrication and installation standards.