NSRP/ASE Crosscut Panel Project

Develop Shipbuilding Skill Standards, Phase 2

Skill Standards, Phase 2

Deliverable 3

Final Report

September 15, 2003

Deliverable 3

Contents

1. INTRODUCTION

This is the final deliverable for the Crosscut Panel's research project entitled, "Develop Skill Standards for the Shipbuilding Industry." The project has been an ongoing effort by the Panel over the past two years to further the development and implementation of shipbuilding skill standards. Work on skill standards has been viewed as a priority for the panel, with the following expected benefits:

- Increased flexibility to exchange employees among business since skill levels will be commonly understood
- Improved communication with schools and preparing institutions regarding skills required
- Clearly defined development, education, and training pathways for businesses and individuals
- Potential for developing industry-wide training curricula and methods
- Capturing the knowledge of an aging workforce

The Skill Standards work of the Crosscut Panel was performed in two phases. Phase 1 started in May 2001, following approval by the NSRP Executive Control Board at a funding level of $55,000. Phase 2 was initiated in September 2002, following the completion of Phase 1, and builds on the progress achieved in Phase 1. Phase 2 was approved at a funding level of $45,000.

This report is intended to provide an overview of the approach and accomplishments of both project phases, and includes a summary of each of the two phases and the project deliverables. This report also includes a summary of conclusions from the research as well as recommendations for where to go next with skill standards.

2. SKILL STANDARDS, PHASE 1 & 2 OVERVIEW

The Skill Standards project was performed in two phases. Phase 1 began in May 2001 and was completed in September 2002. Phase 2 began at the conclusion of Phase 1 and completes with the submission of this final report in September 2003.

The objectives, tasks and deliverables of each phase are summarized below and a more-detailed description of the projects is included in *Appendix A*.

Skill Standards, Phase 1

Objective: To establish nationally recognized skill standards for many positions in the shipbuilding and ship repair industry.

Tasks:
1. Establish an industry group to coordinate the establishment of shipbuilding and repair as a subgroup under the National Skills Standards Board (NSSB) Manufacturing Voluntary Partnership
2. Update and expand the existing NSRP skills database
3. Develop a prototype skills assessment and certification program for shipyards
4. Develop curriculum guidance for educators based on skills standards

Deliverables:
1. Revised Skills Database
2. Report on Pilot Assessment
3. Curriculum Guidance

Skill Standards, Phase 2

Objective: To build on the skill standards progress achieved in Phase 1.

Tasks:
1. Update and expand the NSRP skills database
2. Promote industry-wide acceptance of standards
3. Prepare materials that can be used by shipyards to work with educational institutions in developing curriculum and preparing students for shipyard employment

Deliverables:
1. Model for Portable Certification
2. Industry Support Material and Revised Standards
3. Final Report

3. DELIVERABLES SUMMARY

A total of six deliverables will have been submitted at the conclusion of Phase 2 of the Skill Standards project – three for Phase 1 and three for Phase 2. The deliverables are listed in Section 2 of this report. This final report comprises the sixth and final deliverable. The five other deliverables are summarized in this section. The deliverables were submitted to the program manager, ATI, and were distributed to the Skill Standards Action Committee during the course of the project. At the conclusion of the project, the deliverables are expected to be available on the Crosscut Resource Center website: http://crc.usashipbuilding.com or by contacting Les Hansen at Lhansen119@aol.com.

Phase 1 Deliverables

Deliverable 1: Revised Skills Database.

This deliverable provided a conversion of the original skills database, created in FileMaker, into six MS Word and Excel files. One of the files is a "Read Me" file that introduces and explains the use of the other five. That document is copied below:

The National Shipbuilding Research Program
Production Skill Standards Database, Version 2

The NSRP Skill Standards database has been brought out in a version that incorporates five independent files. These are:

> NSRP Scenarios.doc
>
> NSRP Scenarios Tasks.xls
>
> NSRP Production.xls
>
> NSRP Core Processes.xls
>
> NSRP KSA List.xls

Skill Standards

Shipbuilding/ship repair is a complex business calling for skills in many production disciplines. The division of these disciplines into trades varies greatly between shipyards, such that using a trade name
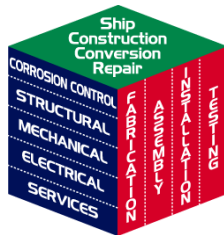

Figure 1. Functional Matrix

does not uniformly define the expected responsibilities. To make the standards compatible with the broadest spectrum of users, a functional matrix vice a trades approach is used in organizing the standards. The matrix consists of four work areas; fabrication, assembly, installation and test, and five work activities; structural, mechanical, electrical, services and corrosion control. Each of these areas and activities has application to the processes of ship construction, ship conversion and ship repair. Figure 1 is a depiction of the functional matrix.

The Files

NSRP Scenarios.doc is a set of 38 scenarios that describe processes applicable to ship construction. Each scenario is supported by sets of tasks and Knowledge, Skills, and Abilities (KSA's) that are found in related files. The scenarios are related to the task and KSA files by a scenario number that places the scenarios in the context of the functional matrix. For instance the scenario number (SCN

Nr) Stf.01 identifies the first structural fabrication scenario.   The scenarios are useful for orienting persons not familiar with shipbuilding the activities to the nature of production work in a shipyard.

NSRP Scenarios Tasks.xls this file lists the tasks associated with each scenario and the KSA grouping that apply to the scenario. KSA groups are sets of related KSA's that are given a common KSA Series Number.   The set of KSA's are listed in a separate file to reduce redundancy because a set of KSA's frequently applies to more than one scenario or production activity.

NSRP Production.xls This is a listing of tasks and KSA set that apply to shipyard production activities for which no scenario has been prepared. Each set of tasks and KSA's is displayed under a heading that give the general purpose/product of the work. The production listing includes some work that is unique to submarine and other warship construction and repair.

NSRP Core Processes.xls The core process have been sifted from the Scenario and Production task/KSA listings They represent those tasks and KSA's that members of the NSRP Skill Standards Action Committee (SSAC) felt were important to entry level personnel in any shipyard. Core processes are given Process Numbers beginning with numbers 1 through 6. There is a supplementary list of core processes that begin with the number 7.

NSRP KSA List.xls This is a file of over 2700 KSA's applicable to production work in shipbuilding and ship repair. The KSA's are assembled into approximately 400 groups. Each group is assigned a KSA series number that relates to the series number in the several task lists. Each of the KSA's is also coded with respect to its applicability to the areas and activities shown in the "Cube"

Help
For help with the database call or e-mail Lee Walker

Phone: 540-668-6497; e-mail ss564311@aol.com

Deliverable 2: Report on Pilot Assessment and Certification Program.

This deliverable contained three sections, which are outlined below:

- Pilot Assessment Overview
    - o The 5 W's of a Pilot Assessment Program
    - o Pilot Performance Assessment Components
    - o How to Implement a Pilot Assessment Program
    - o Shipbuilding Industry Assessment Criteria

- Status of Pilot Assessment as of Panel Meeting, Sept. 2002
    - o Provided a brief summary status report from each of the three shipyards involved in the pilot assessment: Jeffboat, BIW and SENESCO

- Shipfitter Assessment Package
    - o Shipfitter Assessment Directions to Assessees
    - o Shipfitter Assessment Description and Administrator Instructions
    - o Shipfitter Assessment Mock-Up
    - o Shipfitter Assessment Checklist and Performance Indicators
    - o Shipfitter Checklist Training Action Plan

Deliverable 3:   Curriculum Guidance.

This deliverable contained two sections, which are outlined below:

- Curriculum Survey Report – 7 pages, including 4 attachments. An excerpt from the report is copied below.

  Introduction

  The objective of Task 4 of the Skill Standards Project is to "develop curriculum guidance based on skill standards". This survey was conducted as part of Task 4 to document the various processes and methods that shipyards currently use to relate to schools or other educational institutions. The intention was that the information collected in this survey would be shared with the Crosscut Panel as a basis for determining the best approach for continuing the effort to develop curriculum guidance. The information may also be useful for yards that have not yet established relationships with schools, but are considering them.

  Survey Process

  A questionnaire was developed (See *Attachment A*) and sent via e-mail to the Crosscut Panel mailing list on July 3, 2002. Responses were requested by July 22. The survey was intentionally limited to two questions for brevity and simplicity in hopes of receiving a high response rate. Additional follow-up by phone would be conducted if necessary, and respondents could reply by phone rather than writing if they desired.

  Results

  Responses were received from the following shipyards:
  - Alaska Ship and Drydock
  - BenderShip
  - Bath Iron Works
  - Jeffboat
  - NASSCO
  - SENESCO

  In addition, Kurt Doehnert of NAVSEA and Richard Payne of Norfolk Naval Shipyard coordinated responses from the following four Naval yards:
  - Norfolk
  - Pearl Harbor
  - Portsmouth
  - Puget Sound

  Survey responses are shown in *Attachment B*. The information received from the Naval yards via Richard Payne is summarized in *Attachment C*. An overview and comparison of the Naval yards' apprentice programs is included in *Attachment D*.

- Approach to Developing Shipbuilding Curriculum for Schools – 2 pages
  - This section describes the 8-step process that was used by NASSCO to initiate the Waterfront Academy program.

Phase 2 Deliverables

Deliverable 1: Model for Portable Certification.

This deliverable contained two sections, which are summarized below:

- <u>Pilot Assessment Final Report</u>. The introduction to this section is copied below.

  Assessment is the second component of a skill standards system, which is based on the skill standards (the first component) that describe what workers need to do to be successful on the job. The pilot assessment was initiated during Phase 1 of the Crosscut Skill Standards project. The objective of the pilot assessment was to perform a dry run to evaluate the skills and knowledge of a certain trade based on the skill standards. Based on the assessment results, any needed training would be provided to bring workers up to standard. The pilot yards decided to use the Shipfitter trade for the assessment, since there were assessment materials available from earlier skill standards work.

  Four shipyards had originally agreed to participate in the pilot. They are:
  - Jeffboat
  - Bath Iron Works
  - SENESCO
  - Alaska Ship and Drydock (AS&D)

  Due to timing issues related to obtaining a state training grant, AS&D was not able to participate in the pilot. The other three yards did participate and the results of the pilot are summarized on the following pages (Section 1.1). The final report took the form of a survey, with the pilot yards responding to five groups of questions about the assessment in the following categories:
  - Planning
  - Assessees
  - Reactions
  - Assessment Materials
  - Final Recommendations

  Several observations can be made from the responses of the yards that participated in the pilot.
  - The pilot was successful at two of the three yards: Jeffboat and SENESCO.
  - At BIW, the pilot program was successfully developed, but implementation was prohibited by the union. Even without full implementation, there were lessons learned at BIW as shown in the final report.
  - Jeffboat was able to make significant progress in initiating the Shipfitter pilot assessment with supervisors, and plans to expand into the trades in the future
  - SENESCO successfully used the assessment tools with welders and will expand to other workers in 2003

  In addition to the Pilot Assessment Final Report, this section of the deliverable contains the following documents which were developed by Jeffboat during the pilot assessment:
  - 1.1   Jeffboat's Shipfitter General Knowledge Evaluation
  - 1.2   Jeffboat's Shipfitter Assessment Package

  The Evaluation and the Assessment Package can be used to evaluate the skills of incoming or incumbent Shipfitters.

- <u>Model for Portable Certification</u>. The introduction to this section is copied below.

  Certification is the third component of a skills standards system. It is awarded to workers who demonstrate their competence in assessments in their field of expertise. The assessment (the second component) in turn is based on the skill standards (the first component) that describe what workers need to do to be successful on the job.

  A certificate consists of statement made by an authorized individual or organization that recognizes and certifies that the individual named on the certificate has successfully demonstrated the knowledge and skills required in a specialized field. It is dated and signed and indicates the organization that issued the certificate. The certificate also has an expiration date. On the reverse side is a list of the specific skills and knowledge that the candidate has demonstrated. These skills and knowledge include the occupational/technical required by an occupation and may also include a list of academic and employability skills and knowledge.

  While the primary intent of issuing a certificate is to recognize the achievements of workers who pass assessments, a secondary but equally important reason is to provide workers with a certificate that is portable and will assist them in more easily obtaining employment. Assuming that these certifications are recognized by the shipbuilding and ship repair industry, companies hiring certified workers will be confident that with a minimum of orientation that they can put them to work and expect that certified workers will be very productive very quickly.

  To assist individuals and organizations that develop assessment programs and the resultant certification process, the National Skills Standards Board (NSSB) has set forth certification recognition criteria. This board has established guidelines that deal with civil rights laws, reliability and fairness, consistent administration, based on skill standards and the like. Another recommendation made by NSSB concerns the need to provide assessment and certification candidates with information about the assessment process. To meet that aim of ensuring fairness and to encourage success, the project created a "Shipbuilding Industry Shipfitter Certification (SISFC)" booklet. This provides background on the shipbuilding industry certification, the certification preparation materials, a description of the performance and any written assessment, and hints on how to prepare for the assessment.

  This section contains the following:
  - 2.1   Shipbuilding Industry Shipfitter Certification (SISFC) Booklet
  - 2.2   Sample Shipfitter Certificate

Deliverable 2:   Industry Support Material and Revised Standards.

This deliverable consists of two parts. One is a report on curriculum materials that can be developed by using the various skill standards-related products developed during previous skill standards projects. The other is a revision of the skill standards to provide a format that is user-friendlier for schools or other entities not familiar with shipbuilding.

- <u>Industry Support Material</u>. The introduction to this part is copied below.

   The shipbuilding and ship repair industry support materials in this report are representative of materials that can be developed by using the various skill standards-related products developed under NSRP auspices starting with NSRP project 9-96 1 &2 *Assist U.S. Shipyards to Develop and Maintain Skilled Trades Workers*, and continuing through this project (Skill Standards for the Industry, Phase 2). The entire set of NSRP Skill Standards materials provide a framework that can be used by shipyards, individually and collectively, in developing a description and approach for coordinated training programs. A subset of the materials presented here as an example of the way the materials may form the basis for establishing working programs with local public educational institutions.

- <u>Revised Standards</u>. The revised standards are comprised of three volumes. Volume 1 contains an introduction to the entire set of volumes, which is copied below.

   Overview
   The Shipyard production competencies in this report are an updated and reformatted version of a set of competencies developed under a previous NSRP project.[1] The competency information that was previously packaged in an interactive database has been translated to a more accessible MS Word document. Two additional positions have been added, Planner-Estimator, and Scheduler. The Knowledge, Skills and Abilities (KSA's) have been augmented with KSA's for the new positions and with additional non-technical work place skills. This report is in four sections corresponding to separate electronic files. For convenience in handling, the sections have been bound in three volumes
   <u>Volume One</u>

       1.   Production Skill Standards

   <u>Volume Two</u>

       2.   New Positions and KSA's
       3.   Production Core Competencies

   <u>Volume Three</u>

       4.   Production Knowledge, Skills and Abilities

   Production Skill Standards
   There are thirty-eight scenario based skill standards. The each standard has five parts:

   - <u>Scenario.</u> The scenario describes a process and provides the context needed to understand the application of the production KSA's.
   - <u>Shipyard Trades.</u> These are examples of production trades that might apply to workers participating in the work described in the scenario. Trade names vary widely throughout the industry and these examples should not be viewed as limiting.
   - <u>Conventional Industry Standards</u>. Conventional industry standards contain accuracy or production requirements that serve as performance criteria.

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[1] NSRP project 9-96 1 and 2, Assist U.S. Shipyards to Develop and Maintain Skilled Trades Workers

- • <u>Key Tasks.</u> The key tasks are selected from task list identified and validated by trainers in he industry. Only tasks considered as the most important and frequently performed are included.
- • <u>Knowledge, Skills and Abilities (KSA's)</u> Both technical and foundation KSA's are that are relevant to the scenario are listed.

The scenario format was chosen for the standards to place the tasks and KSA's into a context that would facilitate an understanding of shipyard work by persons or organization unfamiliar with ship production and ship repair. Specific audiences targeted by this format were public education institutions and persons who are considering employment careers in shipyard production. Placing the standards in context can help instructors unfamiliar with shipyard production work to better understand the requirements and construct instructional strategies. For perspective members of the workforce, the scenarios provide a window on the challenges and opportunities available in ship construction and repair.

New Positions

Descriptions in the form of task listings and KSA's were constructed for production planning-estimating and the production scheduling. The descriptions are based on materials provided by shipyards participating in the Skill Standards Action Committee. Most of the applicable KSA's are drawn from previously defined groups. Three groups were added specifically for these new functions.

Seven KSA groups were added that address workplace skills. These were selected from existing workplace competency listings and adapted to reflect the shipyard environment. There are a total of 78 new KSA's. The new groups are:

<u>Planning–Estimating and Scheduling</u>

Production Processes

Planning and Scheduling Computing

Scheduling Production Activities

<u>Workplace Skills</u>

Analysis

Database operations

Desktop computing

Problem Solving

Reading

Verbal Communications

Written Communication

Production Core Competencies

The NSRP Skill Standards Action Committee, acting through participating member shipyards, selected two subsets of production worker competencies from the extensive listing developed in NSRP Project 9-96-1&2. One set was the primary set for development of a prototype assessment and certification system. The second set was set of specialty areas that were of continuing interest to some of participating shipyards.

The Primary Competency list was selected for its broad applicability across shipyards regardless of the industry segment being served by the yard. The list was also thought to be appropriate for use in working with public educational institutions to develop community based training support for the industry.

Knowledge, Skills and Abilities
The KSA listing from NSRP project 9-96-1&2 had some 2400 KSA's organized into approximately 400 groups by subject. Ten new groups with 78 new KSA's have augmented these groups.

Deliverable 3:   Final Report (this document).

4. CONCLUSIONS AND RECOMMENDATIONS

Several conclusions can be drawn from and recommendations made based on the two-phase work done on skill standards as described in this report.

Conclusions

- The skill standards work of the past two years (Skill Standards, Phase 1 & 2), as well as the earlier work of the Crosscut Panel, has made significant strides toward implementing shipbuilding skill standards.
- While the pilot assessment started in Phase 1 and concluded in Phase 2 was successful, particularly at Jeffboat, a larger assessment program – involving more trades – is needed.
- Although the funding for skill standards development has ended, interest in this area by the Crosscut Panel and guests has not waned as was evidenced by the discussions that were held at the recent Panel meeting at BIW in August. The session ended with discussion in four areas: Questions, Issues, Potential Actions, and Desired Outcomes. These will be the focus of attention of the Panel at future meetings.

Recommendations

Many of the recommendations below are based on discussion at the August 2003 Crosscut Panel meeting in Bath, ME, following the final presentation of the Skill Standards project. The discussion focused on "where to go next with skill standards."

Questions:
- What is our vision or desired end state? Our objective(s)?
- How can we move the existing skill standards materials to a real use of product? (theoretical vs. real)
- How do we incentivize this (use of skill standards and credentials)?
- What do we need to do to get to accepted skill standards?
- What is our ROI/ benefit argument?
- How is this (skill standards and credentialing) going to benefit a given yard?
- Is ABS the appropriate classification society for this effort?
- Which government "One Yard" working group is the best home for the industry's skill standards and credentialing effort?
- What will it take for the Navy to accept the certification?
- How do we get commercial shipbuilding workers available for Navy exchange?
- Is there a role for NIST in the skill standards effort?

Issues:

- Might need 2 or 3 levels of certification for a skill; start with the basics before getting multi levels
- The acceptance of the training backing up a credential
- Trust of credential
- Not an independent evaluator granting certification
    - No discussion about how certification granted (have shipyards go to yards to validate training?)
    - Don't have Navy OK for certification

Potential Actions:

- Make skill standards materials readily available to all the community
- Have the Navy review the skill standards
- Go to ASTM, have the standards put online, and get comments
- Use ASTM to check drafts
- Get a classification society (e.g., ABS) to agree to results of the skill standards implementation
- Do a pilot
    - Do a pilot and get agreement with a meaningful number and type of shipyards
    - Expand the shipfitter pilot
    - Get yards not involved to do a pilot
    - Each yard that does a pilot gets the results of others doing pilot (e.g. chain letter)
    - Send out one pilot's results and get feedback
- Formulate a proposed path for skill standards and credentialing in a white paper and shop it to people who could help and people who could help fund
- Develop a flow chart depicting the activities of shipyards to integrate skill standards into the "One Yard" concept (a draft flow chart is shown in *Appendix B*)

Desired Outcomes:

- Navy is comfortable taking a worker from a private yard
- Have the necessary tool to market skills for the industry
- Shipyards have assessment tools for internal use

APPENDIX A: Project Abstracts

Develop Skill Standards for the Industry:
Phase 1

Proposer Identification: Crosscut Initiatives Panel

Concept Description: A previous NSRP project funded in 1996 developed a limited set of industry skill standards. A database that covers manufacturing crafts, in a format that applies to a wide variety of shipyards, was developed and distributed to the industry. This effort will expand and update the current database and work toward affiliating the industry with national efforts in skill standards.

Project Goals and Objectives: To establish nationally recognized skill standards for many positions in the shipbuilding and ship repair industry.

Methods and Procedures Required for Accomplishing Goals and Objectives: An 10-member industry group, comprised of Crosscut Panel chair, team leader appointed from the Panel, 2-3 representatives from ECB member yards and additional members from public and private yards, will be established to coordinate the effort and to represent the industry in the national forum. This board will establish shipbuilding and repair as a sub-group under the National Skills Standards Board (NSSB) Manufacturing Voluntary Partnership.

The following will be accomplished to support project goals:
1. Update and expand the existing NSRP skills database
    - update current information on craft positions
    - develop new standards for emerging positions (photogrammetry, etc.)
    - develop new standards for professional positions
    - improve user access and interface
2. Develop a prototype skills assessment and certification program for shipyards
    - pilot program
    - review, revise, extend
    - implement
3. Develop curriculum guidance based on skills standards for the following:
    - apprenticeships, high schools, vocational secondary schools, technical and community colleges
    - colleges and universities

Previous and Current Related Work: NSRP Project 9-96 created the existing skills database. This proposed project will enhance the current NSRP ASE Virtual Resource Center Project by providing extensive job information for the Education Exchange service (used by students and educators).

Deliverables and Benefits: Updated shipbuilding industry skills database in easily accessible format, Skills Assessment and Certification Program for Shipyards (including a pilot), Curriculum

Guidance for educational institutions and a knowledgeable board of industry professionals, well connected with others in related industries.

<u>Project Benefits</u>
- Increased flexibility to exchange employees among business since skill levels will be commonly understood
- Improved communication with schools and preparing institutions regarding skills required
- Clearly defined development, education, and training pathways for businesses and individuals
- Potential for developing industry-wide training curricula and methods
- Capturing the knowledge of an aging workforce

Technology Transfer Approach: The products of this effort will be distributed to the industry physically (probably through CDs), electronically (through the Virtual Resource Center), and face-to-face at panel meetings and similar events. Each board member will be expected to partner with 1-2 other shipyards not represented on the board. This will result in broader representation and effective transfer of results.

Expected Duration: May 2001- Sept 2002

Expected Cost: $56 K (Industry Cost Share: 800 labor hours of panel members)

Develop Skill Standards for the Industry: Phase 2

Proposer Identification: Crosscut Initiatives Panel; Lead: Don Bewley (volunteer); Many participating yards

Concept Description: A Crosscut/NSRP project funded in early 2001 (Phase 1) began, in earnest, the process of developing skill standards for shipbuilding and repair. That project built on the efforts of NSRP project 9-96 (completed in 1998), which initiated the skill standards work. This effort will continue the Phase 1 work to establish nationally recognized standards, particularly focusing on implementation and documentation.

Project Goals and Objectives: To build on the progress with skill standards from Phase 1 for the shipbuilding and ship repair industry.

Methods and Procedures Required for Accomplishing Goals and Objectives: The industry board established in Phase 1 (SSAC) will continue to function as an oversight committee, adding members as necessary. Coordination with NSSB and MSSC, if they are funded and functioning, will also continue in Phase 2.

The following will be accomplished to support project goals:

1. Update and expand the NSRP skills database
   - update information that has changed since last review; develop any required new standards
   - demonstrate the customization of skills data for individual yards
2. Develop industry-wide acceptance of standards
   - document pilot project results and verify metrics for success
   - develop model for portable certification for review by shipbuilding industry
   - work with shipyards not directly involved in the project to encourage endorsement of shipbuilding skill standards and certification
3. Prepare materials that can be used by shipyards to work with educational institutions in developing curriculum and preparing students for shipyard employment

Previous and Current Related Work: Skills Standards work is an iterative process with regular updates and increasing involvement of shipyards, schools and other organizations. The accomplishments of Phase 1 were revising the skills database, identifying new positions for standards, initiating a pilot assessment and certification program, and beginning a dialogue with schools. In addition, we built a relationship with national skills organizations and the public shipyards. The progress achieved during Phase 1 is important to the industry because widely accepted skills standards shorten the time to hire and train employees. Phase 2 leverages the skill standards effort with a different focus: 1) technology transfer of the standards and related pilot assessment and certification program, 2) obtaining the involvement and endorsement of additional shipyards and 3) preparing materials to use with schools. The ROI for skills standards will be seen in accurate and rapid preparation of skilled employees.

Deliverables and Benefits:

Deliverables

- Updated and expanded shipbuilding industry skills database, including demonstrations
- Report on the results and success of the pilot assessment program, including metrics
- A model portable certification document for national application
- Curriculum guidance for educational institutions with partnering shipyards

Project Benefits

- Increased flexibility to exchange employees among business since skill levels will be commonly understood
- Improved communication with schools and preparing institutions regarding skills required
- Clearly defined development, education, and training pathways for businesses and individuals
- Potential for developing industry-wide training curricula and methods
- Capturing the knowledge of an aging workforce

Technology Transfer Approach: The products of this effort will be distributed to the industry through CDs, electronically (through the Crosscut Resource Center), and face-to-face at panel meetings and similar events. A paper on the skill standards work will be part of the 2002 Ship Production Symposium.

Expected Duration: Sept 2002 -- Aug 2003

Funding: $45 K (Industry Cost Share: minimum of 200 labor hours of panel members)

APPENDIX B: Skill Standards Flow Chart