FINAL REPORT

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BENEFIT ANALYSIS OF SPC PANEL SP-8 PROJECTS

and

EVALUATION OF SPC PANEL SP-8 MANAGEMENT AND ADMINISTRATION

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Prepared by
Robinson-Page-McDonough and Associates, Inc.
Post Office Box 9
Greenland, New Hampshire 03840
(603) 436-7762

For
NATIONAL STEEL AND SHIPBUILDING COMPANY
Harbor Drive and 28th Street
Post Office Box 85278
San Diego, California 92186-5278

In Behalf Of
SNAME SPC PANEL SP-8

INDUSTRIAL ENGINEERING

Under the
NATIONAL SHIPBUILDING RESEARCH PROGRAM

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NSRP 0321 *
TITLE: The Industrial Perspective: Conference Proceedings Meeting Minutes.
AUTHOR: Ship Production Panel 8 (SP-8).
DATE: September 1989 *COST:* (Not available)

NSRP 0325 *
TITLE: Scheduling Standards Pilot Project: Companion Activity Final Report.
AUTHOR: Robert Graves and Leon McGinnis.
DATE: June 1982 *COST:* (Not available)

NSRP 0348 *
TITLE: Improved Techniques for Labor Expenditure Collection.
AUTHOR: Stan Fors, Glen Berger, Christi Burz, David Wright. and Mike Korgie of NASSCO.
DATE: June 1992 *COST:* (Not available)

NSRP 0356 *
TITLE: Feasibility Study of Small Computer Application of Multi-Trade Scheduling.
AUTHOR: National Steel and Shipbuilding Company.
DATE: July 1986 *COST:* (Not available)

PREFACE

The National Shipbuilding Research Program has been sponsored during the past 20 years by the Maritime Administration, United States Department of Transportation, and by the United States Navy toward improving productivity in shipbuilding. The Program is operated through several Panels of the SNAME Ship Production Committee. During 1988 a survey was conducted in behalf of SPC Panel SP-3 on Surface Preparation and Coatings to determine (1) the benefit value that had accrued from the research projects sponsored by that Panel during the previous 15 years, and (2) how the management and administration of the Panel itself- meetings, discussions, activities - was seen by the using community. The report of this survey (NSRP 0303, July 1989) was well received. It was therefore decided to conduct a similar survey for each of the other active SPC Panels.

The survey of SPC Panel SP-8 on Industrial Engineering is reported herein. The purpose of this survey was (1) to determine the type of project most beneficial in the past, and therefore most likely to yield the largest benefit in the future, and (2) to determine how the direction of Panel SP-8 itself might be improved.

The Task was conducted by Rodney A. Robinson, Vice President of Robinson-Page-McDonough and Associates, Inc. Personal interviews were conducted with several representative members of the shipyard Human Resources Innovation community to gain the necessary information. Conclusions and recommendations based on analysis of the findings are included in the report. The work, under NASSCO Purchase Order No. MU171117- D, began in October 1991 and was completed in October 1993.

EXECUTIVE SUMMARY

This Task has investigated the benefits derived from the projects sponsored during the past 17 years by SNAME Ship Production Committee Panel SP-8 on Industrial Engineering under the National Shipbuilding Research Program. It has found that those projects involving direct shipyard application of Industrial Engineering techniques have yielded the most value in the shipyard community. The responses from those interviewed support such projects, rather than those with minimal potential for practical shipyard implementation.

This Task has also assessed the opinion of the shipyard using community on the administration and management of Panel SP-8 itself It has found that the practices currently in effect have been well received, and should be continued with only minor improvements. It has also found, however, that there is a need for increasing the attendance and participation of shipyard and NavSea representatives in order to ensure that Panel sentiment and actions will continue to be in the direction of shipyard interests. In addition, it may be advantageous to separate commercial and military considerations during the development of potential Panel projects.

Industrial Engineering takes on additional significance as efforts unfold to prepare our shipyard community for entry into the international commercial market. The current dominance of the European shipyards in that market is well recognized. Recent visitors to several European shipyards have recounted a major reason for their success, perhaps the single most important cause of their overwhelming productivity. It is the close and effective relationship that exists among design, engineering, planning, supply, and production activities. This relationship enables an accurate determination that construction activities are fully ready to begin, and will be able to continue without interruption throughout the entire manufacturing cycle, before any work is even started! This means that production efforts will suffer no delays due to missing material, inappropriate design and engineering support, or unrealistic planning, and that there will be no changes in contract requirements in midstream. As a direct result, production momentum can be attained quickly, and be maintained during the entire build cycle, virtually eliminating the numerous costly delays during ship construction with which we are all too familiar. Industrial Engineering embraces the planning, scheduling, and production control aspects of shipyard work, whether new construction or repair. This area may well hold the key to survival of our shipyard community in the coming years. We are fortunate to have Panel SP-8 in place and able to treat these vital issues.

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BACKGROUND

General Discussion

This Project was designed: (1) to investigate the benefits that may have resulted from SPC Panel SP-8 Industrial Engineering projects carried out over the past 17 years of Panel operations; and (2) to evaluate how the management of Panel SP-8 itself is currently viewed by the using community. The aim was to focus on what type of project has been most helpful in the past, and may therefore be presumed to yield the most benefits in the future, and also to explore how the activities associated with Panel SP-8 might be improved.

This Project would consist of interviews with members of the Industrial Engineering community to gain information on these matters. The interviews would be on-site and face-to-face, to yield the most meaningful results. Analysis of findings would be published for principal consumption by SP-8 Panel Members toward their action on panel operations and projects in the future.

This project was a direct follow-on to a similar project conducted in 1989 in behalf of SPC Panel SP-3 to (1) explore the benefits that may have resulted from the projects sponsored by that Panel during the previous 15 years, and (2) to evaluate how the management of Panel SP-3 itself was seen by the using community. The report on that project (NSRP 0303, July 1989) was well received, prompting the development of this current project, which consists of the same kind of analyses for all other SPC Panels, as well as an update on the projects of Panel SP-3 since the original report. The report presented herein covers the area of SPC Panel SP-8 on Industrial Engineering.

Overview

Information on both aspects of this effort was gained through personal and anonymous interviews with 18 members of the Industrial Engineering community from 11 different shipyard locations. 15 specific and detailed responses to the questionnaire were gathered, and have been used to formulate the detailed sections of this report. The period of inteviews extended from January 1992 through May 1993.

Several questions were designed to explore both aspects of this survey. The worksheets for gathering information on the benefits of individual projects are contained in Appendix A. The worksheets associated with Panel SP-8 direction are contained in Appendix B.

A detailed discussion of the findings is presented below. Those associated with the benefit analysis of panel projects begin on this page. Those associated with panel management begin on page 34. Conclusions reached from the findings are on pages 44 and 45. The recommendations drawn from these conclusions are on page 46.

BENEFIT ANALYSIS OF PROJECTS SPONSORED BY SPC PANEL SP-8

General Discussion

This section contains information on all of the SP-8 projects investigated, including a description of each project, the pertinent information surrounding that project, and an analysis of the benefit value gained from that project to date. The NSRP Number is that assigned to each report in the NSRP Bibliography of Publications 1973-1992, published (now annually) by the University of Michigan for the National Shipbuilding Research Program. The projects investigated are those listed in this specific publication (1973-1992). The analysis portion has been drawn from the comments offered by those interviewed, and is intended to provide a general indication of how the project has been received by the shipyard industry. It also indirectly provides the feelings of those interviewed on whether that particular type of effort should be sponsored by SP-8 in the future, since those projects with the higher benefit value might better receive the more favorable consideration. Appendix A was the worksheet used during the interviews.

The display below is intended to provide a rapid visual idea of the relative benefit value that has been gained from the SP-8 sponsored projects that were investigated. While these ratings are surely subjective, they represent the general opinions of those interviewed, which constitute a good cross-section of the shipyard industry in the Industrial Engineering area. As such, these opinions reflect the overall industry attitude surrounding these projects, which should be of interest to SP-8 panel members during consideration of what projects to sponsor in the future. The number of *‘s against each project report indicates the amount of benefit gained from it to date. The more *‘s, the larger the benefit value gained.

Report No.	Benefit Value	Report *No.*	Benefit Value
NSRP 0053	*	NSRP 01 86	* *
NSRP 0055	* * * * * *	NSRP 0189	*
NSRP 0065	* * * * * *	NSRP 0199	* *
NSRP 0066	*	NSRP 0200	* * * *
NSRP 0067	*	NSRP 0201	* * * *
NSRP 0068	* * * *	NSRP 0221	* * *
NSRP 0070	* *	NSRP0222	*
NSRP 0073	* * * *	NSRP 0232	* * * * *
NSRP 0076	* * * *	NSRP 0233	*
NSRPO1O1	* * *	NSRP 0234	*
NSRP 0102	*	NSRP 0235	*
NSRP 0103	* * *	NSRP 0242	* * * * *
NSRP 0104	* * *	NSRP 0243	* *
NSRPOI1l	* * *	NSRP 0244	* * * *
NSRP0115	* * *	NSRP 0245	* * * * * *
NSRP 0120	* * *	NSRP 0247	* * * * *
NSRP 0123	* * * *	NSRP 0256	* *
NSRP 0125	* * *	NSRP 0271	*
NSRP 0136	* * * * * *	NSRP 0276	* * * * * * *
NSRP 0141	* *	NSRP 0277	* * *
NSRP 0146	*	NSRP 0278	*
NSRP 0149	*	NSRP 0279	* *
NSRP 0150	*	NSRP 0284	* * * *
NSRPO151	* *	NSRP 0304	* * * * *
NSRP 0152	* *	NSRP 0321	*
NSRP 0154	* *	NSRP 0325	*
NSRP 0157	*	NSRP 0347	* * *
NSRP 0159	*	NSRP 0348	*
NSRP 0172	*	NSRP 0356	*
NSRP 0175	*		

Detailed Discussion of Individual Projects

Each of the individual projects investigated are discussed below in the chronological order in which they were carried out. Included is: NSRP Number; Benefit Value Rating (*'s): *TITLE, AUTHOR; DA TE; COST* (where available); *ABSTRACT;* and *BENEFIT ANALYSIS.*

NOTE : Appendix C is an abbreviated listing of these same projects (NSRP Number; *TITLE; AUTHOR; DATE; COST)* arranged according to the benefit value (number of *'s) assigned to each project. highest to lowest. Appendix C is included as an aid to understanding which types of projects were found to be of most (and least) interest and value to the using community, based on user comments received during this survey.

NSRP 0053 *

TITLE: Ship Producibility as it Relates to Series Production. Volume I.

AUTHOR: Ingalls Shipbuilding. for Bath Iron Works.

DATE: January 1976 *COST:* (Not available)

ABSTRACT: This study applied industrial engineering technology to the design and construction methods of a series of standard hull forms in order to develop economic models to maximize the cost savings benefits of series production of ships. The major conclusion was that design activities be tailored to output information which best supports planning and production with a minimum of wasted effort. Extensive liasion during design with material acquisition. planning, and facility people is vital. (69 p.)

BENEFIT ANALYSIS: LOW VALUE. 20% of those interviewed were familiar with this report. but intended no application of the material. The rest had no knowledge of the report and no interest in the material.

NSRP 0055 * * * * * *

TITLE: Advanced Pipe Technology - Interim Report.

AUTHOR: Newport News Shipbuilding, for Bath Iron Works.

DATE: April 1976 *COST:* (Not available)

ABSTRCT: This study reports on the state-of-the-art piping system design and fabrication methods and installation techniques used throughout the shipbuilding and other related industries in the U.S. and foreign countries. Many of these techniques are now in common usage or are being developed currently in U.S. shipyards. (155 p.)

BENEFIT ANALYSIS: MIXED VALUE. 60% of those interviewed were familiar with this report. Two shipyards indicated that they had applied some of the material, one for pipe shop layout, and one during construction of containerships.

NSRP 0065 * * * * * *

TITLE: Advanced Pipe Technology - Executive Summary.

AUTHOR: Newport News Shipbuilding, for Bath Iron Works.

DATE: April 1977 *COST:* (Not available)

ABSTRACT: Significant findings relative to piping design. fabrication. assembly, and installation are highlighted in this summary of the full technical report. (24 p.)

BENEFIT ANALYSIS: MIXED VALUE. This is the Executive Summary for NSRP 0053 above.

NSRP 0066 *

TITLE: Improved Design Process - Executive Summary and Final Report.

AUTHOR: General Dynamics/Quincy. for Bath Iron Works.

DATE: April 1977 *COST:* (Not available)

ABSTRACT: This study reports the findings of a study of the preliminary and contract design processes. Specific recommendations are made concerning simplification of each step in these processes. Simplification of the USCG, ABS, and MarAd approval process is also outlined. (200 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. None of those interviewed were familiar with this report and none expressed interested in this material.

*NSRP 0067 **

TITLE: Improved Design Process - Final Report.

AUTHOR: General Dynamics/Quincy, for Bath Iron Works.

DATE: April 1977 COST (Not available)

ABSTRACT This volume is a duplicate of NSRP 0066 (see above), but omits the Executive management summary. (170 P.)

BENEFIT ANALYSIS: LOW VALUE. None of those interviewed were familiar with this report, and none expressed interest in this material.

NSRP 0068 * * * *

TITLE: Executive Summary - Improved Planning and Production Control.

AUTHOR: Management Associates. for Bath Iron Works Corporation.

DATE: May *1977* *COST:* (Not available)

ABSTRACT: This publication highlights the value of scheduling standards in reducing the cost and time of commercial ship construction. It is an executive summary of the full technical report. (8 p.)

BENEFIT ANALYSLS: MIXED VALUE. This is the Executive Summary for NSRP 0070 below. 22% said that they were familiar with the report but intended no application of the material. Two other people said that they were not familiar with this report but would read it in the immediate future. One shipyard indicated use of this material when it was originally issued.

IINSRP 0070 * *

TITLE: Improved Planning and Production Control.

AUTHOR: Bath Iron Works Corporation.

DATE: August 1977 *COST: (Not* available)

ABSTRACT This project was the forerunner of the present Industrial Engineering (I. E.) program. It introduced the U.S. shipyards to engineered labor standards and demonstrated the application of these standards for improved planning and production control. Recommendations resulting from this study guided the early works of Panel SP-8. (134 p.)

BENEFIT ANALYSIS: LOW VALUE. 33% of those interviewed were familiar with this report. but intended no application of the material. One person said that this report "was not well received". Another said that the material was "too broad. with not enough detail". He added that the project did not have enough money to support the expanse of this effort.

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NSRP 0073 * * * *

TITLE: Shipbuilding Industrial/Production Engineering Workshop. Proceedings.

AUTHOR: American Institute of Industrial Engineers, for Bath Iron Works.

DATE: February 21-24,1978 *COST:* (Not available)

ABSTRACT: This is the report of a workshop on the application of Industrial Engineering (I. E.) in shipyards. It was at this conference that U.S. shipyards were formally introduced to the I.E. function and the benefits of the application of I.E. techniques. The conference recommended that a coordinated I.E. development effort be undertaken and Panel SP-8 was formed to provide a continuing direction of this program area. The rationale behind original panel goals and objectives is documented. (113 p.)

BENEFIT ANALYSIS: MIXED VALUE. 27% of those interviewed were familiar with this report. One shipyard representative said that it helped to expand the Industrial Engineering effort at that time. Another shipyard representative said that the material had been used as reference information during the establishment of a Production Engineering Department at his shipyard back when the report was published.

NSRP 0076 * * * *

TITLE: A Manual on Planning and Production Control for Shipyard Use.

AUTHOR: Corporate-Tech Planning. Inc., for Bath Iron Works.

DATE: June 1978 COST (Not available)

ABS7RACT: A "how to" manual for the development and application of engineered labor standards for improved planning and for production control. This publication is intended for middle-level managers and supervisors in large and medium sized shipyards. (133 p.)

BENEFIT ANALYSIS: MIXED VALUE. 27% of those interviewed were familiar with this report, but only one shipyard representative cited application of the material.

NSRP 0101 * * *

TITLE: MOST Work Management Manual - Steel/Aluminum Small Asembly-1.

AUTHOR: Bath Iron Works Corporation.

DATE: May 1980 *COST:* (Not available)

ABSTRACT: A detailed manual of practices. facilities. material flow and production methods in the Bath Iron Works Harding Plant "C-Bay" for fitting and welding in the small assembly and aluminum small assembly areas. MOST (Maynard Operation Sequence Technique) system calculations are included. (200 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. This was the first of several MOST Work Management Manuals developed under the sponsorship of SPC Panel SP-8. One shipyard cited use of this material to improve flow lines in this area. No other application was mentioned by those interviewed.

SPECIAL NOTE: The MOST Work Management Manuals were developed under the NSRP as a foundation for the extensive application of labor standards. Originally it was promoted that MOST data developed by one shipyard would be exportable to another participating shipyard. Therefore. each of the several trade/shop craft areas were assigned to one of the participating shipyards where the necessary data would be developed. and later would be shared with the other participants. An extensive library of MOST data was developed and shared. (as the NSRP reports listed and discussed below will attest). However, the application of these MOST data as labor standards did not materialize. As one shipyard representative put it, "getting to the real world from the MOST standards was not accomplished at our shipyard". Another said, "MOST standards were too low, and could not be done". The exportability of the MOST data also proved to be prohibitively cumbersome. Even with the administrative assistance of Maxi-MOST, and later Computer-MOST, the development of MOST data for application as labor standards was eventually abandoned.

NSRP 0102 *

TITLE: MOST Work Management Manual - General Operations.

AUTHOR: National Steel and Shipbuilding Co.. for Bath Iron Works.

DATE: May 1980 *COST:* (Not available)

ABSTRACT: This document is a general manual covering standard practices and policies, facilities and equipment, layout and material flow, and production methods at National steel and Shipbuilding Co. A glossary of terms is also included. (100 p.)

BENEFIT ANALYSIS LOW VALUE. Only one person interviewed was familiar with this report. and he cited no application of the material. (See Special Note on Page 8.)

NSRP 0103 * * *

TITLE: MOST Work Management Manual - Panel Line.

AUTHOR: National Steel and Shipbuilding CO., for Bath Iron Works.

DATE: May 1980 *COST:* (Not available)

ABSTRACT: A detailed manual of practices. facilities, material flow. and production methods used in the NASSCO Panel Line for the fitting and welding of plates and flat panel assemblies is given. MOST calculations are included. (109 p.)

BENEFIT ANALYSIS: LOW VALUE. One shipyard representative (other than the author) cited use of this material as reference information during the development of the first panel line at his shipyard. The rest of those interviewed had no knowledge of the report and no interest in the material. (See Special Note on Page 8.)

NSRP 0104 * * *

TITLE: MOST Work Management Manual - Steel/Aluminum Small Assembly-II.

AUTHOR: Bath Iron Works Corporation.

DATE: July 1980 *COST:* (Not available)

ABSTRACT: A detailed manual of practices. facilities, material flow, and production methods used in the Bath Iron Works' Harding Plant "B-Bay" for the fitting and welding in the steel small assembly and aluminum small assembly areas is given. MOST system calculations are included. (250 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. This was Phase II of NSRP 0101 above. The author shipyard cited major benefit from having studied the methods being applied in this area preparatory to setting the standards. where the lack of a crane operator on the 3rd shift was identified as costing several mandays of lost time on the following day shift. Such indirect value to MOST data development was common within the participating shipyards. (See Special Note on Page 8.)

NSRP 0111 * * *

TITLE: MOST Work Management Manual - General Operations.

AUTHOR: Bay Shipbuilding Corporation, for Bath Iron Works.

DATE: August 1980 *COST:* (Not available)

ABSTRACT: A general manual of practices. facilities, material flow. and production methods at Bay Shipbuilding Corp. is given. A glossary of terms is included. (150 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. Only one shipyard representative cited any attempt to apply this material. adding that they "really did not use the data because it was too difficult to apply". He went on to say that "It was difficult to get the production people to accept the MOST numbers. because they did not fit the actual conditions being encountered in production. It would take a lot of long-term exposure to get production acceptance. " (See Special Note on page 8.)

NSRP 0115 * * *

TITLE: MOST Work Management Manual - Panel Assembly in Platen Area.

AUTHOR: National Steel and Shipbuilding Co.. for Bath Iron Works.

DATE: September 1980 *COST:* (Not available)

ABS7RACT: A detailed manual of practices, facilities, material flow, and production methods used in the NASSCO platen area for layout, burning, fitting, welding and grinding of panel assemblies is given. MOST calculations are included. (300 p. approx.)

BENEFIT ANAYSIS: LOW VALUE. One shipyard representative (other than the author shipyard) cited use of this material as information. Two other interviewees were familiar with the report but intended no application of the material. The rest were unfamiliar with the report and not interested in this material. (See Special Note on Page 8.)

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NSRP 0120 * * *

TITLE: Work Management Manual - Steel Shell Assembly.

AUTHOR: Bath Iron Works Corporation.

DATE: 1980 *COST:* (Not available)

ABSIRACT: The scope of this manual includes the operations of Dept. 50 fitters and Dept. 43 welders in assembling shaped shell assemblies on reusable diaphragm post mocks and miscellaneous small mocked assemblies. (200 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. One shipyard representative said that this material had been used back when it was originally issued. at which time the “automatic butt welding capability had just arrived”. Two other interviewees were familiar with the report but intended no application of the material. The rest had no knowledge of the report and no interest in the material. (See Special Note on Page 8.)

NSRP 0123 * * * *

TITLE: MOST Work Management Manual - Pipe Fabrication Shop.

AUTHOR: Peterson Builders. Inc.. for Bath Iron Works.

DATE: January 1981 *COST:* (Not available)

ABSTRACT: A detailed manual of practices, facilities, material flow, and production methods used in the PBI pipe fabrication shop for cutting, end preparation, bending, fit-up. welding and brazing of pipe is given. MOST calculations are included. (300 p. approx.)

BENEFIT ANALYSIS: MIXED VALUE. 27% of those interview were familiar with this report. Representatives of two shipyards (other than the author) cited use of this material to improve methods and operations. but not as labor standards. (See Special Note on Page 8.)

NSRP 0125 * * *

TITLE: MOST Work Management Manual - Hull Erection.

AUTHOR: Bay Shipbuilding Corporation, for Bath Iron Works.

DATE: January 1981 *COST:* (Not available)

ABSTRACT: A detailed manual of practices. facilities. material flow. and production methods used in the Bay Shipbuilding graving dock and platen area for super-section assembly and hull erection and regulation is given. MOST calculations are included. (600 p. approx.)

BENEFIT ANALYSLS: LOW VALUE. The author shipyard representative said that this material had been useful in achieving improvements on a second hull, but through “changes m methods rather than by tightening the schedule”. (See Special Note on Page 8.)

NSRP 0136 * * * * * *

TITLE: Methods Engineering Workshop for the Shipbuilding Industry.

AUTHOR: American Institute of Industrial Engineers, for Bath Iron Works.

DATE: November 1981 *COST:* (Not available)

ABSTRACT: This document entails an Instructor's Guidesheet. a Student Manual,. and color slides developed for establishing Methods Engineering training sessions within U.S. shipyards. (180 p. approx.)

BENEFIT ANALYSIS: MIXED VALUE. Representatives of two shipyards cited use of this material. which they considered as "highly valuable". A representative from a third shipyard said that workshops such as this one should be repeated 2 or 3 times in each area of the Country so that more people can attend.

NSRP 0141 * *

TITLE: FY-82 Labor Standards Program - Pipe Fabrication and Blast and Paint Shops

AUTHOR: H. B. Maynard and Co., for Bath Iron Works.

DATE: January 1982 *COST:* (Not available)

ABS7RACT: This report is on the development. testing. and method for rapid application of an improved system for using engineered labor standards in estimating and manpower scheduling. Charts of estimating standards for a Conrac Pipe Bender. Greenlee Pipe Bender, and for mechanical pipefitting are included. (72 p.)

BENEFIT ANALYSIS LOW VALUE. One representative of the author shipyard said that this material was useful in improving methods. Another said that it was used in an attempt to make MOST work in an actual application. "It did. and then it ended. "

*NSRP 0146 **

TITLE: Shipyard Data Application Program Panel Line Schedule and Manloading Incentive Program.

AUTHOR:Bath Iron Corporation.

DATE: 1982 *COST:* (Not available)

ABSTRACT: The basic logic and principles of the development and use of engineered labor standard data is presented. The Maynard Operation Sequence Technique (MOST) system is described. A brief glossary of industrial engineering terminology is also included. (220 p.)

BENEFIT ANALYSIS: LOW VALUE. 20% of those interviewed were familiar with this report, but intended no application of this material. The rest had no knowledge of the report and no interest in the material. (See Special Note on Page 8.)

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*NSRP 0149 **

TITLE: MOST Work Management Manual - Blast and Coat on Platen and Drydock.

AUTH0R: Newport News Shipbuilding, for Bath Iron Works.

DATE: March 1982 *COST:* (Not available)

ABSTRACT: A detailed manual of practices, facilities. material flow, and production methods used in the Newport News North Yard Platen and 12 Drydock for grit blasting and spray painting of a commercial vessel is given. MOST calculations are included. (150 p. approx.)

BENIFIT ANALYSLS: LOW VALUE. 27% of those interviewed were familiar with this report. but only one person cited “possible use of this material as reference information”. (See Special Note on Page 8.)

NSRP 0150 *

TITLE: MOST Work Management Manual-P1ate Shop.

AUTHOR: National Steel and Shipbuilding Co., for Bath Ironworks.

DATE: March 1982 *COST:* (Not available)

ABSTRACT: A detailed manual of practices, facilities, material flow, and production methods used in the NASSCO Plate Shop for the cutting and construction of small sub-assemblies is given. MOST calculations are included for foundations, brackets, and ladders. (313 p.)

BENEFIT ANALYSIS: LOW VALUE. Only one person interviewed was familiar with this report. and he intended no application of the material. (See Special Note on Page 8.)

NSRP 0151 * *

TITLE: MOST Work Management Manual - Main Assembly. Volumes I and II.

AUTHOR: Bath Iron Works Corporation.

DATE: March 1982 *COST:* (Not available)

ABSTRACT: A detailed manual of practices. facilities. material flow. and production methods used in the Bath Iron Works Main Assembly Building for the fitting and welding of plates and flat panels is given. MOST calculations are included. [Vol. 1. 250 p.; Vol. II. 400 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. A representative of the author shipyard said that this material had been used to improve methods. No other application or interest in this material was indicated by those interviewed. (See Special Note on Page 8.)

*NSRP O152 ***

TITLE: MOST Work Management Manual - Electrical Work for Shipboard Installation. Volumes I and H.

AUTHOR: Peterson Builders, Inc., for Bath Iron Works.

DATE: April 1982 *COST:* (Not available)

ABSTRACT: A detailed manual of practices, facilities, material flow, and production methods used in the Peterson Builders electric shop, fabrication buildings and aboard ship for preparation and installation of electrical components, wires, and cables is given. MOST calculations are included. (vol. 1, 300p. approx.; Vol. II, 500p. approx.)

BENEFIT ANALYSIS: LOW VALUE. One shipyard representative (other than the author shipyard) cited use of this information as comparative information. No other interest or application was indicated by those interviewed. (See Special Note on Page 8.)

NSRP 0154 * *

TITLE: MOST Work Management Manual - Temporary Staging for Group Assembly and Aboard Ship.

AUTHOR: Bethlehem Steel Corporation. Sparrows Point, for Bath Iron Works.

DATE: April 1982 *COST:* (Not available)

ABSTRACT: A detailed manual of practices, facilities. material flow. and production methods used in the Sparrows Point ground assembly area and aboard ship for the erection and removal of temporary staging is given. MOST calculations are included. (350 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. A representative from one shipyard (other than the author) cited use of this material as reference information for a special staging need. No other application or interest in this material was expressed by those interviewed. (See Special Note on Page 8.)

NSRP 0157 *

TITLE: Scheduling Standards Pilot Project Summary Report.

AUTHOR: Corporate-Tech Planning, Inc., for Bath Iron Works Corporation.

DATE: September 1981- April 1982 COST (Not available)

ABSTRACT: This seven-month project tested the application of scheduling standards in a shipyard pipe fabrication shop. Actual hands-on data was accrued. analyzed, and applied during three separate testing periods. Results show that fabrication man-hours were reduced by about one-third. permitting the Fabrication of about fifty percent more pipe with the same number for fabricators. The key to success is the scheduling standard. developed from engineered labor standard data plus a factor to accommodate non-process considerations. The scheduling standard accurately predicts REAL work content, allowing for major improvements in work loading, planning, and scheduling from which the savings result. (95 p.)

BENEFIT ANALYSIS: LOW VALUE. 13% of those interviewed were familiar with this report. but intended no application of this material. The rest had no knowledge of the report and no interest in this material.

NSRP 0159 *

TITLE: Industrial Engineering Applications in the U.S. Shipbuilding Industry. 1982 Symposium Proceedings.

AUTHOR: Bath Iron Works Corporation.

DATE: May *1982* *COST* (Not available)

ABSTRACT: Eight papers are included in this document. These papers were presented at a 1982 symposium concerning: The work of Panel SP-8: The National Shipbuilding Industrial Base: Scheduling Standards: Applications of Labor Standards; and Flexible Automation. This represents a good cross-section of panel work underway at the time of the symposium. (194 p.)

BENEFIT ANALYSIS: LOW VALUE. This is a report on the portion of the 1982 Symposium that was handled by SP-8. It was not published in the Ship Production Journal. and so was published here. Only 20% of those interviewed were familiar with this report. and they cited no application of the material.

*NSRP 0172 **

TITLE: Work Management Manual - Material Handling for Shipyards.

AUTHOR: Bethlehem Steel Corporation, Sparrows Point, for Bath Iron Works.

DATE: July 1983 *COST:* (Not available)

ABSTRACT: The purpose of this task was to develop engineered labor standard data for material handling with mobile equipment. Types of Mobile Equipment and General Guidelines were: a fork truck with a mast containing a two prong arrangement that may be tilted forward or back and raised up or down for the purpose of picking up pallet loads of material; and a straddle carrier. a unit shaped much like an inverted channel. The lifting device consists of longitudinal angles that can pick up special pallets, bolsters, or unit loads of a standard width. AH lifts are picked up at ground level. The riding cab is elevated. (300 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. 13% of those interviewed were familiar with this report. but only one shipyard representative cited use of it within his Industrial Engineering Office several years ago as reference information. (See Special Note on Page 8.)

NSRP 0175 *

TITLE: Work Management Manual - In-Shop Blast and Paint.

AUTHOR: Peterson Builders. Inc.. for Bath Iron Works.

DATE: August 1983 *COST:* (Not available)

ABSTRACT: The scope of this manual encompasses all blast and paint activities performed in the blast and paint booth. While the data collected for this manual was procured from the ARS ‘s, special attention was given to its applicability for painting any ship. (120 p. approx.)

BENEFIT ANALYSIS: LOW VALUE. 13% of those interviewed were familiar with this report. but no application of the material was cited. (See Special Note on Page 8.)

NSRP 0186 **

TITLE: Temporary Staging for Shipyards.

AUT`HOR: Bethlehem Steel Corporation. for Bath Iron Works.

DATE: July 1983 *COST:* (Not available)

ABSTRACT: This report shows the application of the labor standards for staging developed in Phase II. The staging of the standards will be on an Integratd Tug-Barge (ITB) and will he used for the purpose of production control. (31 p.)

BENEFIT ANALYSIS.' LOW VALUE. Although 20% of those interviewed were familiar with this report, no application of the material was cited except as reference information.

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NSRP 0189 *

TITLE: Final Report Back-Up Data for Temporary Staging for Shipyards.

AUTH0R: Bethlehem Steel Corporation, for Bath Iron Works.

DATE: July 1983 *COST:* (Not available)

ABSTRACT : This manual covers the back-up data necessary for the final report on temporary staging. Areas included are: center tanks. tank staging platform. exterior shell. and pipe staging. (400 p. approx.)

BENEFIT A NALYSIS: LOW VALUE. Only 13% of those interviewed were familiar with this report. No application of the material was disclosed.

NSRP 0199 **

TITLE: A Primer on an Approach to Planning and Production Control for the Smaller Shipyard.

AUTHOR: Corporate-Tech Planning, Inc., for Bath Iron Works.

DATE: December 1983 *COST:* (Not available)

ABSTRACT: Information developed suggests that standards, particularly scheduling standards, can offer major advantages to the smaller shipyard striving to improve production performance, with only a modest investment of time and money. A 6-month pilot program conducted at one smaller shipyard provoked a throughput increase of fifty percent in a pipe fabrication shop. This throughput increase grew to 500 percent in the 18 months following the pilot program, with the same number of production workers in the shop. The success achieved during and after this pilot program. along with several appeals for assistance from the smaller shipyard community, prompted the development of this primer. (150 p.)

BENEFIT ANALYSIS: LOW VALUE. 20% of those interviewed were familiar with this report, but no application of the material was cited.

NSRP 0200 * * * *

TITLE: Ship Producibility as it Relates to Series Production: Volume II Ship Design Process.

AUTHOR: Ingalls Shipbuilding, for Bath Iron Works Corporation.

DATE: September 1975 *COST:* (Not available)

ABSTRACT: Studies were completed to investigate potential savings to be realized from design processes in the series production of 150,000 DWT crude carriers. Seven areas were studied: midship design, superstructure design, machinery room standards. structural members. ship elongation, simplified hull forms, and standardized working plans. Practical and cost considerations are discussed. (270 p. approx.)

BENEFIT ANALYSIS: MIXED VALUE. 20% of those interviewed were familiar with this report, but only one shipyard representative cited use of the material during containership construction back when the report was first issued.

NSRP 0201 * * * *

TITLE: Ship Producibility as it Relates to Series Production: volume III Ship Production Process.

AUTHOR: Ingalls Shipbuilding, for Bath Iron Works Corporation.

DATE: October 1975 *COST:* (Not available)

ABSTRACT: Studies were completed to determine cost savings in fabrication and assembly which may he realized in the series production of ships. Eight areas were studied: facility utilization. production areas and shops. work stations. production planning, material planning. cranes and heavy equipment. jigs and fixtures. and machines. Locations for significant cost savings in series production versus one off production were identified. (350 p. approx.)

BENEFIT ANALYSES: MIXED VALUE. *20%* of those interviewed wee familiar with this report. but only one shipyard representative cited use of the material during container ship construction back when the report was first issued.

NSRP 0221 * * *

TITLE: Labor Standards Application Program (Phase IV) Electrical Trade Area.

AUTH0R: Peterson Builders. Inc., for Bath Iron Works Corporation.

DATE: April 1985 *COST:* (Not available)

ABSTRACT: This report describes the development of labor standards during ship construction in the electrical trade area towards controlling production costs for both shop work and installation work aboard ship. The objective of this project was to improve planning, scheduling. production control. and worker productivity through the application of labor standards. and thereby reduce the cost of electrical work in the shop as well as electrical installation work aboard ship. (55 p.)

BENEFIT ANAYSIS: LOW VALUE. Only one shipyard representative cited use of this material as reference information. All of the others interviewed had no knowledge of the report and no interest in this material.

NSRP 0222 *

TITLE: Application of Labor Standards for Scheduling, Production Control. and Manpower Leveling.

AUTHOR: Bethlehem Steel Corporation, for Bath Iron Works.

DATE: December 1984 *COST:* (Not available)

ABSTRACT: This paper presents a method for developing and applying scheduling manpower models for the fitting and welding of Panel Ship/Ground Assembly standard units. The models are based on a Critical Path Method type network with activity durations expressed as a variable dependent upon the total expected effort required by a particular craft. A software package is presented which aids in the application of the developed models. This package is written in BASIC for the IBM Personal Computer or compatibles. (97 p.)

BENEFIT ANALYSIS: LOW VALUE. Although 20% of those interviewed were familiar with this report, no application of the material was cited. One person said that "we did not even try the software" at his shipyard.

NSRP 0232 * * * * *

TITLE: Work Management Manual - Sheetmetal Shop Ventilation Components (Phase III). 2 Volumes.

AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.

DATE: December 1983 *COST:* (Not available)

ABSTRACT This report is a detailed manual of standard practices and policies. facilities and equipment, layouts and material flow, and process data at NASSCO'S Facilities and Maintenance Department. MOST calculations are included. (853 p.)

BENEFIT ANALYSIS: MIXED VALUE. Representatives from four shipyards (other than the author shipyard) cited use of this material indirectly as reference information during efforts to improve their sheet metal shop activities. No direct application was indicated. however. (See Special Note on Page 8.)

NSRP 0233 *

TITLE: Methods/Labor Standards Application Program - Phase IV. Final Report.

AUTHOR: National Steel and Shipbuilding Co.. for Bath Iron Works.

DATE: January 1985 *COST:* (Not available)

ABSTRACT : This is the final report of an extensive study at NASSCO. The study centered on their Transportation Maintenance area and consisted of three phases. Phase I involved the testing of a micro-computerized Maintenance Management system (Mainsaver): Phase II involved the transfer of labor standard data across the industry; and Phase III was a manual performance rating reporting system utilizing engineered labor standards which were the result of the Phase II data transfer. (248 p.)

BENEFIT ANALYSLS: LOW VALUE. 13% of those interviewed were familiar with this report. but no application of this material was indicated.

NSRP 0234 *

TITLE: Methods/Labor Standards Application Program. Final Report.

AUTHOR: National Steel and Shipbuilding Co.. for Bath Iron Works.

DATE: January 1985 *COST:* (Not available)

ABSTRACT: This publication is an executive summary of the final report detailed in NSRP 0233. (20 P.)

BENEFIT ANALYSIS: LOW VALUE. The same 13% were familiar with this report as for NSRP 0233 above. but no application of this material was indicated.

NSRP 0235 *

TITLE: Labor Standards Application Program: B1ast and Paint Shops., Final Report.

AUTHOR: Peterson Builders. Inc., for Bath Iron Works Corp.

DATE: December 1984 *COST:* (Not available)

ABSTRACT: The objective of this project in the blasting and painting areas of ship construction was to improve planning, scheduling, production control, and worker productivity through the application of labor standards, and thereby reduce the cost of blasting/painting operations. The seven phases of the project were to: establish baseline data, validate labor standards, formalize queuing procedures, apply labor standards, examine delay time, redefine application procedures, and evaluate cost effectiveness. (53 P.)

BENEFIT ANALYSIS: **LOW VALUE.** 13% of those interviewed were familiar with this report, but only one shipyard representative cited use of the material as reference information.

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NSRP 0242 ★★★★★

TITLE: **Engineered Labor Standards in the Manufacture of Sheetmetal Case Good Items.**

AUTHOR: Bath Iron Works Corporation.

DATE: August 1984 *COST:* (Not available)

ABSTRACT: This report focuses on evaluating MOST developed labor standards for shop control/scheduling and determining machine/work center capacity. The primary objectives of the project were to apply engineered labor standards: 1) to determine machine efficiencies in order to balance machine loading; 2) as a base for shop floor control procedures to facilitate shop loading, manning, scheduling; and 3) to evaluate make/buy comparisons for sheetmetal case good items. (35 p.)

BENEFIT ANALYSIS: **MIXED VALUE.** Only the author shipyard cited use of this material for racks, shelving, etc. where "it forced improvements in how the work was done".

NSRP 0243 * *

TITLE: Outside Machinery Standards - Final Report and Work Management Manual.

AUTHOR: Ingails Shipbuilding for Bath Iron Works Corporation.

DATE: January 1985 *COST:* (Not available)

ABSTRACT: The purpose of this project was twofold: to provide the shipbuilding industry with a set of universal standards for Outside Machinery operations, and to identify specific areas where methods improvements could be made to benefit both Ingalls and the U.S. shipbuilding industry. The time standards were developd using MOST. The data collectd was obtained from observation of work on Ticonderoga (CG 47) class cruisers under construction at Ingalls Shipbuilding. (338 p.)

BENEFIT ANALYSIS: LOW VALUE. Only the author shipyard indicated use of this material. and that was as comparative reference information. (See Special Note on Page 8.)

NSRP 0244 * * * *

TITLE: Tool List Program Feasibility Study.

AUTHOR: Ingalls Shipbuilding for Bath Iron Works Corporation.

DATE: April 1985 *COST:* (Not available)

ABSTRACT: This study is the result of a fourteen week feasibility study on a tool identification list program for outside machinery operations. The purpose of the study was to reduce excess labor costs incurred because of workers having to go off ship to acquire additional tools. A system was developed to provide a worker with a complete summary of both tools and material required to complete a given job. *(73* p.)

BENEFIT ANALYSIS: MIXED VALUE. Representatives from three shipyards (other than the author shipyard) cited use of this material as reference information. One said that the report prompted his ship yard “to kit tools better. since the competition was already doing it”. The author shipyard eventually installed a system based on this material. but not immediately after the report was completed. The system saved twice the cost of its installation.

NSRP 0245 * * * * * *

TITLE: Methods Engineering Workshop for the Shipbuilding Industry.

AUTH0R: Institute of Industrial Engineers.

DATE: September 1985 *COST:* $31,554.

ABSTRACT: (This report is a revision of NSRP 0136.) The thrust of the workshop is to train shipyard personnel in the techniques of methods improvement with the ultimate goal of improving manufacturing productivity in the shipyards. The 104 page manual contained therein has been designed as both a student reference manual and an instructor guidebook. (221 p.) (Project identified as EC-23 and 8-84-3.)

BENEFIT ANALYSIS: MIXED VALUE. 33% of those interviewed were familiar with this report. Representatives from two shipyards were "high on this one". The workshops were well received by those in attendance.

NSRP 0247 * * * * *

TITLE: Problem Solving and Training Guide for Shipyard Industrial Engineers.

AUTHOR: Corporate Tech Planning, Inc.

DATE: June1986 *COST:* (Not available)

ABSTRACT: This guide is to assist Industrial Engineering Department employees in solving shipyard problems more effectively. The guide does this by organizing or codifying information so that a shipyard problem may readily be related to a source of assistance. These assistance are: several indexes, a bibliography. a training guide. a curriculum. and a list of schools. (117 p.)

BENEFIT ANALYSLS: MIXED VALUE. 33% of those interviewed were familiar with this report. Representatives from two shipyards cited use of this material during training activities. particularly for new Industrial Engineers.

NSRP 0256 **

TITLE: Computer-Assisted Methodology for the Determination of the Optimal Number and Location of Tool Sheds.

AUTHOR: University of Washington. for Bath Iron Works Corporation.

DATE: July 1986 *COST:* (Not available)

ABSTRACT: This report is of a project to provide computer assistance for choosing optimal locations for toolrooms in shipyards. The tool used to accomplish this task is a computer program entitled Computer-Assisted Toolroom Design (CATD). It is executed on the IBM PC with an 8087 co-processor chip. Its operation and maintenance are outlined in the user and technical manual enclosed in the report. By determining optimal toolroom locations, the user gains an insight into the system and the improvements and cost reductions that are made possible by varying the location. (128 p.)

BENEFIT ANALYSIS: LOW VALUE. 47% of those interviewed were familiar with this report but "low" on its value. Serious "bugs" existed in the software. frustrating attempts by several shipyards to apply the material. One person said "this was not money well spent". No satisfied users were found among those interviewed, although one shipyard representative said that his Industrial Engineering Office had used this material to "improve shipyard acceptance" of the general idea of this methodology.

NSRP 0271 *

TITLE: Quality Defects Measurement and Control System.

AUTHOR: Bath Iron Works Corporation/Marinette Marine Corporation.

DATE: March 1987 COST: (Not available)

ABSTRACT: This is the final report of a project which called for the development of a computer software package that would be universal for use in any size shipyard. The program was designed to aid in reducing defects and material discrepancies by identifying significant error causes in both rework and material discrepancies, and monitoring results of corrective action taken. The software package chosen for this program was Revelation by Cosmo. Users are required to purchase their own run-time version of Revelation. (90 P.)

BENEFIT ANALYSIS: LOW VALUE. 33% of those interviewed were familiar with this report, but no application of this material was cited. One shipyard representative said that his people "resisted having anyone track their performance".

NSRP 0276 * * * * * * *

TITLE: Basic Principles of Industrial Engineering.

AUTHOR: Standards International. Inc.

DATE: October 1987 *COST:* (Not available)

ABSTRACT: This report on the basic principles of industrial engineering is divided into three parts. The first part discusses the benefits, function and techniques used by industrial engineering. The second part on operational questions for industrial engineers discusses problem recognition and identification, work sampling and operational analysis. The third section is on the importance of communication and how it is accomplished effectively. (188 p.)

BENEFIT ANALYSIS: HIGH VALUE. 53% of those interviewed were familiar with this report. Representatives from three shipyards cited application of this material during training activities. The three video tapes that came with the report were "shown several times" in two shipyards. This report received the highest benefit value of all SP-8 reports investigated.

NSRP 0277 * * *

TITLE: Improved Planning and Shop Loading in Shipyard Production Shops.

AUTHOR: Robinson-Page-McDonough and Associates, Inc.

DATE: September 1987 COST: $100,000.

ABSTRACT: Planning and scheduling work in a shipyard production shop requires a prediction of how much real time will be consumed by a worker (or workers) in accomplishing a work package. The process constitutes one of the more difficult tasks in shipbuilding because the prediction element is so uncertain in practice. This report discusses two ways to improve the quality of the prediction. which in turn will improve the usability of the planning and scheduling determinations: scheduling standard data coupled with a current non-process factor unique to a shipyard. and a statistically-based prediction formula developed from current performance data measured in a shipyard. (61 p.) (Project identified as EC-21 and 8-84- 1.)

BENEFIT ANALYSIS: LOW VALUE. 33% of those interviewed were familiar with this report. Although one shipyard representative said that his shipyard was reviewing the report right now, and another shipyard representative praised the quality of the material, no instances of application were revealed.

NSRP 0278 *

TITLE: Developing Scheduling Standards Using Regression Analysis: An Application Guide

A UTHOR: Robert J. Graves. University of Massachusetts. and Leon F. McGinnis. Georgia Institute of Technology.

DATE: June 1987 *COST:* (Not available)

ABSTRACT: This application guide presents a step-by-step introduction to the development of scheduling standards using regression analysis. The presentation employs an example taken from a shipyard sheet metal shop and discusses the issues and procedures in constructing scheduling standards from work order-level data on actual fabrication times. The methods described have been applied in three different shipyard shops. and in each case have produced scheduling standards with a prediction accuracy of at least 10 percent when applied to a set of work orders representing roughly a manweek of work. The cost to establish scheduling standards using these methods compares very favorably to the cost for other techniques. especially if engineered labor standards or measured labor standards must be available for those other methods. (48 p.)

BENEFIT ANALYSIS: LOW VALUE. 20% of those interviewed were familiar with this report, but no instances of application were cited. One person said that he "did not like it", but declined to elaborate any further.

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*NSRP 0279 * **

TITLE: Analysis of Current Manpower Estimating and Control Procedures.

AUTHOR: Robinson-Page-McDonough and Associates. Inc.

DATE: July 1987 *COST:* (Not available)

ABSTRACT: This report discusses the current situation in shipyards in regard to procedures for estimating and controlling manpower the largest and most expensive resource in this industry. (Results are grouped by shipyard size.) A survey taken ***of*** shipyard managers suggests that the main concern in shipyards is for improving the capability for planning and scheduling work. and for controlling the productive process. (34 P.) (project identified as EC-25 and 8-84-5.)

BENEFIT ANALYSJS: LOW VALUE. 33% of those interviewed were familiar with this report, but no instances of application were cited.

NSRP 0284 * * * *

TITLE: Feasibility Study of the Application of Operations Research Methods to Solve Complex Shop Scheduling Problems.

AUTHOR: Peterson Builders, Inc.

DATE: December 1987 *COST:* (Not available)

ABSTRACT: This project was performed to determine the feasibility of solving complex shop scheduling difficulties with Operation Research (OR) techniques. The operations research approach begins by carefully observing and formulating the problem. The nature of the problem is then summarized in a model which is assumed to sufficiently represent the real situation. Any conclusions obtained from the model are therefore assumed to be valid for the real situation. This model is then modified and confirmed with appropriate experimentation. This report details the dificulties encountered in attempting to schedule a shop with complicated variables, and the lessons learned. (23 p.)

BENEFIT ANALYSIS: MIXED VALUE. 27% of those interviewed were familiar with this report. but comments surrounding application of the material were not favorable. One person said that the report was “too theoretical and academic, and not for practical application”. He added that the “real answer is to have an intelligent person go look at the problem”, and resolve it that way. Another person said that he had looked at it but that it was “hard to see how to apply it”. A third person cited use of this material as reference information for his MBA term project.

NSRP 0304 * * * * *

TITLE: Optimal Use of Industrial Engineering Techniques in Shipyards.

AUTHOR: National Steel and Shipbuilding Company.

DATE: August 1989 *COST:* (Not available)

ABSTRACT: This task has investigated the nature and extent of Industrial Engineering activities currently being carried out within the shipyard community. The task was designed to identify the specific IE techniques being applied in the shipyards relative to the present spectrum of possibilities. That is, if the available techniques are not being applied, then ways to place more emphasis on their implementation would be addressed. (36 p.)

BENEFIT ANALYSIS: MIXED VALUE. 40% of those interviewed were familiar with this report. Representatives from two shipyards (other than the author shipyard) indicated use of this material, with one indicating probable application again in the future.

NSRP 0321 *

TITLE: The Industrial Perspective: Conference Proceedings Meeting Minutes.

AUTHOR: Ship Production Panel 8 (SP-8).

DATE: September 1989 *COST:* (Not available)

ABSTRACT: This volume contains proceedings and meeting minutes of the SP-8 Industrial Engineering Conference held in Arlington. VA. Issues addressed are global competitiveness. the U.S. industrial base. productivity, product innovation, customer needs. continuous improvement. quality, innovation, future markets and marketing, and the role of the industrial engineering. Presentations provided represent the Navy, the industry, the SCA, the SPC, and MARAD. (183 p.).

BENEFIT ANALYSIS: LOW VALUE. 13% of those interviewed were familiar with this report. but no application of the material was cited. The rest of those interviewed had no knowledge of the report and no interest in this material.

NSRP 0325 *

TITLE: Scheduling Standards Pilot Project: Companion Activity Final Report.

AUTHOR: Robert Graves and Leon McGinnis.

DATE: June 1982 *COST:* (Not available)

ABSTRACT: This pilot project has investigated the use of engineered labor standards, specifically the MOST system. to establish standards useful for shop loading and scheduling. The key element in the investigation is the development of the non-process factors. The present report describes the data. procedures, and results of this project. (38 P.)

BENEFIT ANALYSIS: LOW VALUE. Only one person interviewed was familiar with this report, and he indicated no application of the material.

NSRP 0347 * * *

TITLE: Implementation Guide for Approaching Shop Floor Control.

AUTHORS: Gary Higgins. John Jessup, and K. Diedrick Of PBI.

DATE: June 1992 *COST:* (Not available)

ABSTRACT: This project develops a detailed implementation guide documenting an approach to integrated Shop Floor Control (SFC) for shipyards. The impetus for the project was the Ship Production Committee Panel Eight (SP-8) Industrial Engineering recognition that the basic elements of SFC exist in all shipyards however, most have not effectively integrated all these elements into a well structured production monitoring and control system. The panel further recognized that since the shipbuilding job shop environment revolves around the assembly of a single product, it is difficult to bring in "off the shelf" production control software that will speak to shipbuilding's unique needs. This project report provides the guidelines for identifying the information requirements necessary to monitor and control production activity in a shipyard. (80p.)

BENEFIT ANALYSIS: LOW VALUE. 33% of those interviewed were familiar with this report, but no application of the material was indicated except as reference information by representatives of two shipyards.

NSRP 0348 *

TITLE: Improved Techniques for Labor Expenditure Collection.

AUTHOR: Stan Fors, Glen Berger, Christi Burz, David Wright, and Mike Korgie of **NASSCO.**

DATE: June 1992 *COST:* (Not available)

ABSTRACT: This report is an investigation and analysis the U. S. Shipyard labor expenditure systems and procedures, whose purpose is to identify thosE areas which could potentially benefit by improvement in accuracy, and or cost effectiveness, of the time collection process. The primary deliverable is the definition of those requirements and system features that should be supported in order to provide an optimum approach to labor expenditure collection for a U. S. shipyard. The National Steel and Shipbuilding Company (NASSCO) was used as a model assumed to be representative of the shipbuilding and ship repair industry. Sophisticated procedures more adaptable to a shipyard environment are also recommended. (54p.)

BENEFITANALYSIS: LOW VALUE. Only one person interviewed was familiar with this report. He indicated that his shipyard "had lots of bar coding before this report came out".

NSRP 0356 *

TITLE: Feasibility Study of Small Computer Application of Multi-Trade Scheduling.

AUTHOR: National Steel and Shipbuilding Company.

DATE: July 1986 *COST:* (Not available)

ABSTRACT: This feasibility study is based upon highly developed systems for ship construction and ship repair, utilizing mainframe hardware and software. These systems are based on yard wide Master Schedules and are oriented to individual ship requirements, therefore leaving interfacing of multiship scheduling to department level solutions. (24p.)

BENEFIT ANALYSIS: LOW VALUE. Only two people interviewed were familiar with this report. and no application of the material was cited. One of them. who was from the author shipyard. said that he was not aware that his shipyard had done this project. even though it was done in an area where he works regularly!

MANAGEMENT OF SPC PANEL SP-8 ACTIVITIES

General Discussion

This section describes the opinions of those interviewed relative to the administration of SPC Panel SP-8 meetings, including such things as the use of pre-planned agenda, the actual format for a meeting, who should attend, how often a meeting should be held and under what circumstances (e.g., during the same time frame as the meeting of another SPC Panel, or an NSRP Symposium), what matters should/should not be discussed, how meeting minutes should be handled, and similar considerations that bear on the mechanics of the panel meeting itself. It also describes the thoughts of those interviewed on how the NSRP can be of more assistance to them, what projects should be prosecuted, and in general what message they would like to have transmitted back to Panel SP-8.

The discussions that produced these opinions were open and serious. Each person interviewed was anxious to offer a position on the matter at hand. Some diffuculty was encountered in locating people who were knowledgeable of the earlier reports sponsored by SP-8. Those currently holding shipyard positions in Industrial Engineering areas, who were interviewed first, simply were not aware of the early reports and could not offer an opinion on them. A few additional intemiews were therefore selectively arranged with individuals who were involved in SP-8 matters several years ago, in order to supplement the information gained from those currently serving in Industrial Engineering positions. The total group of persons interviewed constitute the core of Panel SP-8 as it is known today, and so their feelings are surely important to the future well-being of the Panel and its activities.

On the following page is a matrix showing SPC Panel SP-8 Meeting Attendees for the 10 most recent meetings. This matrix reveals which shipyards and other activities have been supporting SP-8 by having a representative in attendance at these meetings. The date and location of each meeting is indicated, along with the company affiliation of those in attendance. Note that 55% of these companies have had a representative at three at more of these meetings.

Attendee Affiliation / Date - Location	Nov '90 - Charleston, SC	Mar '91 - New Orleans, LA	Jun '91 - Newport News, VA	Sep '91 - San Diego, CA	Nov '91 - Dallas, TX	Feb '92 - Pascagoula, MS	Jun '92 - Bremerton, WA	Nov '92 - Vallejo, CA	Mar '93 - Newport News, VA	Jun '93 - San Diego, CA
Amega Engineering, Inc.				X						
Atlantic Marine/Alabama Shipyard										X
Bath Iron Works		X	X	X	X			X		
BMS and Associates	X	X	X	X	X	X	X	X	X	X
Bruce Payne Consulants		X								
Charleston NSY	X	X	X	X	X	X	X	X	X	X
Desert Consulting Associates										X
Digital Equipment Corp.						X	X	X	X	
DTRC (NSWC - Carderock)		X	X	X		X		X		X
Ingalls Shibuilding Div.				X	X	X	X	X	X	X
International Paint										X
JJG Associates			X						X	
Mare Island NSY	X		X		X	X	X	X	X	X
Maritime Administration, U. S. DoT			X	X						
Master Marine Inc.						X				
McDermott Shipyard								X		
NASSCO	X	X	X	X	X	X	X	X	X	X
NavSea	X	X	X	X			X			
Newport News Shipbuilding	X	X	X	X	X	X	X	X	X	X
Norfolk NSY							X			
Pearl Harbor NSY			X				X			
Penn State U.			X		X	X				
Peterson Builders, Inc.	X	X	X	X	X	X	X	X	X	X
Philadelphia NSY			X	X	X	X	X	X	X	
Port of Portland, OR										X
Portsmouth NSY		X	X			X	X			X
Pro-Link, Ltd.								X		
Puget Sound NSY							X			
R-P-M and Associates, Inc.		X	X			X	X	X	X	X
SMC Management Services			X							
U. Michigan			X	X			X	X	X	
U. Washington				X			X	X		
U.S.C.G. Shipyard			X	X	X		X	X		

Detailed Discussion of Findings

The responses are summarized under the headings of each question, following the order and language of the worksheet, Appendix B, that was used during the interviews.

PANEL MEETINGS AND ADMINISTRATION

How often do you attend?

40% of those interviewed attended all of the meetings. 5O% of those interviewed attended 1 or 2 meetings each year. One interviewee had never attended a meeting.

Do/should others in your Company attend?

73% of those responding to this question said that others should attend the meetings. The rest favored their solo attendance.

Are the meetings of value to you?

All of those responding to this question answered in the affirmative. Networking was the benefit cited most often.

How can the meetings be improved? In particular,

Increase/decrease number of meeting days?

66% felt that the present meeting arrangement of 2 days should be continued. 2 interviewees would add one day, while 1 other interviewee would add 1/2 day. It is interesting to find no hint that meeting duration's should be shortened.

Continue/change meeting format?

While 40% said that no changes were needed, and 40% voiced no opinion, there were three specific comments on this matter, as follows:

1. Add a facilitator to guide the meeting discussions.
2. Separate brainstorming into commercial and military segments.
3. Add more technical material.

Continue/change content of meeting?

Responses to this question indicated satisfaction with the present meeting content, although two specific suggestions for improvement were made, as follows:

1. Make project progress reports less cumbersome.
2. Add more tours, and more technical material.

Broaden/restrict who should attend?

Those interviewed cited the present mix of attendees at panel meetings as satisfactory, but five specific comments were offered, as follows:

1. More shipyard representation (from 5 people).
2. More NavSea representatives.
3. Less consultants (from 2 people).
4. Less academics.
5. More representatives of Industrial Engineering societies.

What should be added to the agenda?

Four specific suggestions were made in response to this question, as follows:

1. More on project status.
2. More discussions of technical material.
3. Add 1/2 day for a special presentation.
4. Publish the agenda sooner.

What should be dropped from the agenda?

Four specific suggestions were made here, as follows:

1. Interim project progress reports should be dropped.
2. Shorter reports are needed.
3. Business discussions should be dropped.
4. Useless issues should be avoided.

Should meetings be held in conjunction with other organizations?

All of those responding to this question said that holding a meeting in conjunction with other SPC Panels, or during the same time frame as a related technical/NSRP symposium, would be worthwhile, and would assist some potential attendees in their efforts to obtain approval of the associated travel expenses.

Are meeting minutes of value to you?

All of those responding to this question answered "Yes". One person did not receive the minutes, and declined to respond.

How can the NSRP be of more assistance to your company?

This question prompted a series of comments which reflect some serious difficulties with the NSRP in general. These comments also illustrate concerns on the part of those inteviewed for the future of the NSRP and the shipyard industry. These comments are summarized below:

- It is tough to get people to the meetings. Perhaps there is some way to "subsidize" the travel costs. We need to demonstrate to senior management how valuable the NSRP can be to their shipyard.

- Have shipyard people attend meetings regularly so as to maximize the benefits. So far. attendance has been tied to project performance. We need to concentrate on the implementation of good ideas.

- We may get some money from ARPA (Advanced Research Projects Agency), but we really need it to build commercial ships. We have lost our ability to do it. The Government could give some money to the shipyards to make them more able to compete - a one-time assist. We should not use all of this money for technical research. We need the money to do the work, not just to study it.

- We need more working through the projects, rather than just being told about the projects. We are not shown a real product to feel and understand.

- We need projects to be selected, and then the time to get them completed. Right now solutions come 5 to 7 years later, and are weak at best. We need quicker and better solutions to our ordinary problems. SP-8 must face the timeliness issue.

- More frequent communications, such as the NSRP Newsletter on a monthly vice quarterly basis, can help. Include a paper on a subject of interest to the general shipyard community. Provide not only NSRP awareness on a regular basis, but a good message. Include something for everybody in the shipyard community with each issue. We could use a "Panel-a Month" approach. This would be predictable, and would satisfy everyone on an annual basis.

- Shorten the project cycle.

- Larger shipyards with an in-house publication capability are already aware of the NSRP. The smaller shipyards without work are the ones to reach. We must align our meeting locations and expenses to suit the present financial situation.

- Points of competitiveness are inflamed right now. Shipyards may have trouble getting along because of it. We need deliberate treatment of this area. We need to back out of the politics, and go more for performing studies.

- Make the research output applicable without enormous expense to the users. We need to deliberately consider application during our projects, and include ideas and procedures in the final reports.

- Concentrate in the implementation of ideas and improvements. If you can't implement it, why do it! Each project should have a 3 or 4 person committee to follow it along and ensure that application will result.

- We need more aggressive recruitment of other Panel members. I would also like my Commanding Officer to be on the ECB.

- We need more on repair work, like material handling, productivity improvements, etc.

What Projects would you like to see carried out?

60% of those interviewed had specific comments on this question, as follows:

- We are covered OK now, but our present projects might get too broad. We might need less theory, and more practical material in a narrower area.

- IE's need to get involved in environmental issues, and fast. We need a quick reaction group. Environmental issues are directing our lives right now. Costs are being driven out of sight by environmental requirements. We need awareness now, and not in a few years. We (SP-8) need to reach out to people who can provide technology solutions right now. SP-1 and SP-8 should get together. For example, grit blasting and recovery systems from the drydock floor need to be controlled.

- PCB issues are of concern. We do not know where we will run into problems. Decommissioning ships is a problem area because linings and paints have PCB's laced through them. Cutting the material into 6-inch ribbons is not enough because the heat liberates the PCB's. This area needs attention.

- State and Federal environmental requirements may conflict, or cover an area differently. We need to get the regulators to settle down and provide consistent rules. The impact is severe when different rules are applied.

- We need to feed our projects back to our customers (shipyards and universities) and see how they feel about specific ideas. Customer orientation is vital to hitting the target of usefulness.

- Shop floor control issues have a bigger payoff. Perhaps we need a survey of the state-of-the-art. Perhaps we need an industry-wide meeting to consider this area.

- A project to treat the financial aspects of facilities justifications, and the associated capital investments issues.

- We need to study the IE role in shipyards. In this Country we do not have it going. We need to find out what the rest of the world shipyards are doing, and how we can get caught up in it. IE' s should be promoting the future well-being of Industrial Engineering in the shipyard community.

- We need to get on with C02 blasting. This area has not found a home. It could be SP-8.

Do you have on-going NSRP Projects?

Only one shipyard representative answered this question in the affirmative.

What problem areas would you like to see investigated?

This question was quite similar to the earlier one that asked "What Projects would you like to see carried out?", but prompted a few rather different responses, as follows:

- How to move toward commercialization, metrics, and the international market.

- Labor standards are not being used properly. Our planners and estimators take several standards from different sources (engineered, estimated, etc.) and roll them into a composite standard. This loses the basis of each constituent standard. Compliance is now in the 1% range, which is much less that the 20% we had earlier. Now we beat on production to meet the money allowance, but we have no reference for trade performance.

- We should meet with our shipyard customers face to face, and ask them what we (the NSRP) can do for them.

- TQM/TQL is the current fashion. It might need some application assistance.

- Find out why U. S. shipyards do not compete internationally.

- Cost management needs to be investigated. The Naval Shipyards all have information on high cost areas, scheduling problems, delays, etc., but not the tools to correct the problem areas. We need to find out how to analyze for reducing costs and improving schedules, ways to take action and follow up on it. This is Industrial Engineering. We are now looking at the heart of the problem.

What message would you like transmitted to this Panel?

This question was added to the list so that the people being interviewed could have a direct voice back to the panel, anonymously, on any point that they might wish to raise. Some comments were favorable, and some not so favorable. There were not many comments offered in the SP-8 area, except for the distress of several people at not being able to attend more meetings. Only one other comment was offered, as follows:

- \Ve need more information on home runs that people have made, and more technical information exchanges. The projects that we were doing at PBI were good, but now there is no similar activity that addresses processes in shipyards.

PROJECT REPORTS AND NSRP INFORMATION

Do you receive adequate information on NSRP Project Reports?

67% of those interviewed answered "Yes", with only two people answering "No".

Do you get the "Yellow Book" NSRP Bibliography of Publications?

Here 67% answered "Yes", and 2 people answered "No". These two said that they had access to this document, even though they did not have their own personal copy.

Have you ever ordered a Report from the NSRP Library?

1/3 of those responding to this question said "Yes", and 2/3 said "No". One person complained about the cost aspect, which was a burden just because of its presence - and not the money value involved. It is clear that the procedure for obtaining project reports and training materials from the NSRP Library is working satisfactorily.

Is the NSRP Newsletter of value to you?

Only six out of 15 interviewees answered this question in the affirmative. Three answered in the negative. Most of these people saw the Newsletter only when it was routed to them by someone else. 50% of those interviewed asked to have their names added to the mailing list for the Newsletter, which is a favorable indication that they feel the Newsletter has the potential of being useful to them. Most of the comments surrounding the Newsletter contents were that the **items** in it were old news when the Newsletter was received. Several people thought that the Newsletter needed a regular feature article on a subject of timely and broad interest to the shipyard community, so as to attract a regular readership. Several felt that a much wider distribution was necessary in order for the Newsletter to be effective.

How can NSRP information be communicated more effectively?

Since it was apparent at the beginning of this Project that communications were a major weakness of the NSRP, this question was added to explore with those interviewed how improvements might be made. Responses to this question were as follows:

- Computerize the Bibliography for key word search and number identification.

- Have one group in the shipyard as the prime focus for NSRP matters, and then let that group communicate to the others in the shipyard.

- We need more emphasis on getting the reports to those who need them. We need a section in each report on how the information will get to the people in the shipyard who will be using it, and how they should go about the application process. If necessary we should reduce the number of projects done by the Panels and have those fewer projects done more effectively from the standpoint of application and implementation. We don't want to produce just "wall decorations".

- The problem is not with the NSRP. The problem lies in getting a broader acceptance by shipyard upper management in NSRP activities and involvements. At best we have mixed emotion by upper management for NSRP matters. If we had top level support, we would have a different ballgame. Therefore we need to gear our communications toward upper management. We need to get to the point where we hear "You go!", rather than "Please may I?" We need to convince the top of the value of the NSRP.

- I was in the shipyard for several years before I heard about the NSRP. The people in the shipyards who work with the NSRP need to spread that news around within their own shipyard, through minutes, reports, comments, etc. This information should be sent to those people who might benefit from it.

- We should present NSRP information in the SNAME Newsletter, and include it in regional SNAME meetings as well as the one in New York City. We should make a pitch at these events. This would reach many customers, suppliers, and operators. We could reach 50 to 75 people at one time, and can target that audience with appropriate information.

- We need to find out what reports are being ordered from the library as an indication of their usefulness. We should automate the library. We should program the computer to provide a user-interest report periodically.

- MANTECH is using an article based on a specific project which they send directly to shipyard newspapers. The NSRP Newsletter people should do the same thing. There could be a lead-in about NSRP in general, followed by an article below it. This way every mechanic will get it, opening new vistas to the NSRP. We should include phone numbers of NSRP contacts.

- We should automate the NSRP Library.

- The NSRP Library should publish a short list of reports issued during the past 12 months, with a complete Bibliography issued separately.

- The key to improved communications is increased participation. Communications will improve as interest improves. People will be "looking" for the information if the subject matter is of interest to them. If it isn't, who cares! International community information would be interesting. Give people a reason to want it, and they will go get it.

- To communicate you need a "hook". Tell them what we can do for them, what their direct advantage will be for listening. The note on the NSRP Newsletter shows the meeting dates, but so what! We need a hook up front, something to tell the reader what is in it for him. Do a selling job. Consider the target audience, and tell them what they will get out of reading on.

- The hourly employees are the strength of the shipyard. We address all of our material to salaried employees. We don't think in tune with our hourly people. We might learn from them.

- Perhaps we need a "Communications Panel" that focuses on communications. public relations, management, etc. SP-9 is not really aligned with our needs. We could hire a PR person to set up a solution for us to follow. If you have a leak, you call a Plumber. We should use professional PR talent to fix our PR problem.

Would you prefer to have a single point of contact within your company for information on meetings, availability of NSRP reports on projects, and other NSRP matters?

This question was included on the list to suggest the idea of a single point of contact to those who have not as yet tried it. It would also provide some feedback from those who have attempted this idea in their shipyard. Responses were all favorable, except for one person who thought it was unnecessary.

What person in your company would best serve as this point of contact?

This follow-up question prompted responses about equally divided between the Industrial Engineering group, and the NSRP Program Manager or Panel Chairperson. One person suggested that the Librarian would be a good choice.

CONCLUSIONS FROM THE FINDINGS

Analysis of the responses offered by those interviewed suggests the following conclusions on matters of interest to SPC Panel SP-8.

Those Associated with the Benefits derived from Project Reports

1. The projects yielding them benefit value were those treating Industrial Engineering issues with direct shipyard application.

2. The MOST Work Management Manual labor standard data development projects have yielded low value in the shipyard community.

Those Associated with the Suitability of Panel Meeting Administration

3. The present administration of Panel Meetings is quite satisfactory, and should be continued with only minor adjustments.

4. Several specific points are pertinent:

A. Meetings of 2 day's duration, three to four times per year, at varying locations, are favored. Meeting duration's might be lengthened by 1/2 to 1 day, but should not be shortened.

B. The present meeting format and content have been satisfactory and should be continued. However, there might be a need for:

- Adding a facilitator to guide meeting discussions;
- Separating brainstorming into commercial and military segments;
- Adding more technical material;
- Making project progress reports less cumbersome.

C. The present mix of attendees is satisfactory However, the addition of more shipyard people and NavSea representatives would ensure that the balance of attendee sentiment and actions will continue to be in the direction of shipyard interests.

D. Meeting agenda might be improved by providing for:

- More technical issues;
- Ž More special presentations on technical topics;
- Ž Less time for progress reports and ordinary business;
- Earlier publication of the agendas.

E. A meeting in conjunction with another SPC Panel or a technical symposium would assist some attendees in justifyilng their attendance and obtaining travel approval.

Those associated with the Administration of Project Reports and Information

5. Improvement is needed in making project reports available to the shipyard people who need them, and who are in a position to apply the findings.

6. The NSRP Bibliography of Publications has been available to those who need it.

7. The procedure for obtaining project reports and training materials from the NSRP Library has been working satisfactorily.

8. Distribution of the NSRP Newsletter is too narrow and restricted. A feature article of broad shipyard interest is needed on a regular basis to spark a dedicated readership.

9. A single point of contact within a shipyard for obtaining information on NSRP matters would be helpful.

Those associated with NSRP matters in general

10. Panel meetings geared to various locations, and at minimum expense to the attendees. would allow more people to attend.

11. The funding cycle for projects has been too long and uncertain.

12. Better internal shipyard communications on NSRP matters are needed.

13. The NSRP Library should be computerized and automated in order to support more rapid retrieval of research information.

14. In summary, SPC Panel SP-8 is active, supported by a good group of shipyards, and has been effective in providing meaningful contributions to the National Shipbuilding Research Program in behalf of the shipyard industry in general, and the Industrial Engineering community in particular.

RECOMMENDATIONS FROM THE CONCLUSIONS

The following recommendations have been drawn from the conclusions.

Those Associated with Panel Projects

1. The voting members of Panel SP-8 should continue to weigh the potential for implementation of each proposed project, and to temper their decisions accordingly. Studies offering little practical application in shipyard production or operations areas should have other redeeming features of major proportions before they are supported.

Those Associated with Panel Meeting Administration

2. The present practices for Panel meetings should be continued, with only minor adjustments (see page 44 under Conclusions for a discussion of several pertinent points).

Those Associated with the Administration of Project Reports and Information

3. The distribution of project reports to shipyard people who are in a position to apply the findings should be studied and improved.

4. Extension of the NSRP Newsletter to a broader distribution, and the introduction of timely feature articles of interest to most readers, should be supported.

5. The idea of establishing of a single point of contact within each shipyard for NSRP information should be developed and implemented.

Those Associated with NSRP Matters in General

6. Panel meeting locations and expenses should be in line with maximizing attendance.

7. Steps to shorten and stabilize the finding cycle for projects should be supported.

8. Actions to computerize and automate the NSRP Library should be supported.

APPENDIX A

Project Benefit Analysis Worksheet

SPC Panel SP-8

SP-8 PROJECTS LISTING

NSRP		KEY	*REMARKS*
0053	Ship Producibility as it Relates to Series Production Vol I 1976		
0055	Advanced Pipe Technology - Interim Report 1976		
0065	Advanced Pipe Technology - Executive Summary 1977		
0066	Improved Design Process - Executive Summary and Final Report 1977		
0067	Improved Design Process - Final Report (w/o Exec Sum) 1977		
0068	Executive Summary - Improved Planning and Production Control 1977		
0070	Improved Planning and Production Control 1977		
0073	Shipbuilding Industrial/Production Engineering Workshop - Proceedings 1978		

NSRP	KEY	*REMARKS*

0076 A Manual on Planning and Production Control for Shipyard Use
1978

0101 MOST WMM - (BIW)
Steel/Aluminum Small Assembly - I
1980

0102 MOST WMM - (NASSCO)
General Operations
1980

0103 MOST WMM - (NASSCO)
Panel Line
1980

0104 MOST WMM - (BIW)
Steel/Aluminum Small Assembly - II
1980

0111 MOST WMM - (Bay Ship)
General Operations
1980

0115 MOST WMM - (NASSCO)
Panel Assembly in Platen Area
1980

0120 MOST WMM - (BM
Steel Shell Assembly
1980

NSRP	KEY	REMARKS
0123 MOST WMM - (PBI) Pipe Fabrication Shop 1981		
0125 MOST WMM - (Bay Ship) Hull Erection 1981		
0136 Methods Engineering Workshop for the Shipbuilding Industry 1981		
0141 FY-82 Labor Standards Program - Pipe Fabrication and Blast and Paint Shops 1982		
0146 Shipyard Data Application Program Panel Line Schedule and Manloading Incentive Program 1982		
0149 MOST WMM - (NNEWS) Blast and Coat on Platen and Drydock 1982		
0150 MOST WMM - (NASSCO) Plate Shop 1982		
0151 MOST WMM - (BIW) Main Assembly, Vol I and II 1982		

NSRP	KEY	REMARKS
0152	MOST WMM - (PBI) Electrical Work for Shipboard Installation, Vol I and II 1982	
0154	MOST WMM - (Beth SP) Temporary Staging for Group Assembly and Aboard Ship 1982	
0157	Scheduling Standards Pilot Project Summary Report 1982	
0159	Industrial Engineering Applications in the U.S. Shipbuilding Industry, 1982 Symposium Proceedings 1982	
0172	MOST WMM - (Beth SP) Material Handling for Shipyards 1983	
0175	MOST WMM - (PBI) In-Shop Blast and Paint 1983	
0186	Temporary Staging for Shipyards 1983	
0189	Final Report Back-Up Data for Temporary Staging in Shipyards 1983	

NSRP		KEY	**REMARKS**
0199	A Primer on an Approach to Planning and Production Control for the Smaller Shipyard 1983		
0200	Ship Producibility as it Relates to Series Production: Vol II Ship Design Process 1975		
0201	Ship Producibility as it Relates to Series Production: Vol III Ship Production Process 1975		
0221	Labor Standards Application Program (Phase IV) Electrical Trade Area (PBI) 1985		
0222	Application of Labor Standards for Scheduling, Production Control, and Manpower Leveling (Beth SP) 1984		
0232	MOST WMM - (NASSCO) Sheetmetal Shop Ventilation Components (Phase III), 2 Vols 1983		
0233	Methods/Labor Standards Application Program - Phase IV, Final Report (NASSCO) 1985		
0234	Methods/Labor Standards Application Program, Final Report (NASSCO) 1985		

NSRP		KEY	*REMARKS*
0235	Labor Standards Application Program: Blast and Paint Shops - Final Report (PBI) 1984		
0242	Engineered Labor Standards in the Manufacture of Sheetmetal Case Good Items (BIW) 1984		
0243	Outside Machinery Standards - Final Report and WMM (ISD) 1985		
0244	Tool List Program Feasibility Study 1985		
0245	Methods Engineering Workshop for the Shipbuilding Industry 1985		
0247	Problem Solving and Training Guide for Shipyard Industrial Engineers 1986		
0256	Computer-Assisted Methodology for the Determination of the Optimal Number and Location of Tool Sheds 1986		
0271	Quality Defects Measurement and Control System 1987		

NSRP	KEY	REMARKS

0276 Basic Principles of Industrial Engineering
1987

0277 Improved Planning and Shop Loading in Shipyard Production Shops
1987

0278 Developing Scheduling Standards using Regression Analysis: An Application Guide
1987

0279 Analysis of Current Manpower Estimating and Control Procedures
1987

0284 Feasibility Study of the Application of Operations Research Methods to Solve Complex Shop Scheduling Problems
1987

0304 Optimal Use of Industrial Engineering Techniques in Shipyards
1989

0321 The Industrial Perspective: Conference Proceedings Meeting Minutes
1989

0305 Simulation Models for Development of Optimal Material Handling Phase I, Storage and Distribution
Sep 1989
(Not in 1992 Bibliography)

NSRP	KEY	*REMARKS*
0325 Scheduling Standards Pilot Project Companion Activity Final Report Jun 1982		
0328 Methods Improvement Workshop for the Shipbuilding Industry Sep 1990		
0347 Implementation Guide for Approaching Shop Floor Control Jun 1992		
0348 Improved Techniques for Labor Expenditure Collection Jun 1992		
0356 Feasibility Study of Small Computer Application of Multi-Trade Scheduling Jun 1986		

KEY	RATING DESCRIPTION
0	No knowledge/no interest
1	Interested; will look at information
2	Have information; considering it
3	Have studied information; no application intended
4	Information looks useful; application planned
5	Applied once; no further application seen
6	Have applied on limited scale; may apply again
7	Have applied substantially; information useful
8	Constant application on-going; information valuable
9	Need more information; wider application

RATING SYSTEM FOR NSRP PROJECTS EVALUATION

APPENDIX B

SPC Panel Meeting
Management and Administration

Questionnaire/Worksheet

NATIONAL SHIPBUILDING RESEARCH PROGRAM

\+ + +

PROJECT BENEFIT ANALYSIS

and

EVALUATION OF PANEL MEETINGS AND ADMINISTRATION

\+ + +

INTERVIEW QUESTIONNAIRE

Date _____

Shipyard Coded Identity _____

(Note: Shipyard identity will not be revealed in the published report.)

Shipyard/Company Name _____

Location/Address _____

_____

Persons Contacted			
Position/Title			
Mailing Address			
Telephone			
Panel Interest			

Shipyard/Company Size (#) _____ Production workers (#) _____

Ship Types _____

_____

New Construction (Y/N) _____ Repair (Y/N) _____ Union (Y/N) _____

current Workload Size _____

_____

Remarks _____

_____

_____

_____

_____

QUESTIONNAIRE

Panel SP-_____

Name_____ Company_____ **Date**_____

PANEL MEETINGS AND ADMINISTRATION

How often do you attend _____

Do/should others in your Company attend _____

Are the meetings of value to you _____

How can the meetings be improved _____

Increase/decrease number of meeting days _____

Continue/change meeting format _____

Continue/change content of meeting _____

Broaden/restrict who can attend _____

What should be added to the agenda _____

What should be dropped from the agenda _____

Should meeting be held in conjunction with other organizations _____

Are meeting minutes of value to you _____

How can the NSRP be of more assistance to your company _____

What Projects would you like to see carried out _____

Do you have on-going NSRP Projects (identify) _____

What would you like to see investigated - problem areas _____

What message would you like transmitted to this Panel _____

PROJECT REPORTS AND NSRP INFORMATION

Do you receive adequate information on NSRP Project Reports _____

Do you get the 'Yellow Book' NSRP Bibliography of Publications

Have you ever ordered a Report from the NSRP Library _____

Is the NSRP Newsletter of value to you _____

How can NSRP information be communicated more effectively _____

Would you prefer to have a single point of contact within your company for information on meetings, availability of NSRP reports on projects, and other NSRP matters? _____

What person in your company would serve best as this point of contact?

APPENDIX C

SPC Panel SP-8 Projects Listing based on Benefits Evaluation

APPENDIX C

SPC Panel SP-8 Projects Listing based on Benefits Evaluation

This is an abbreviated listing of SPC Panel SP-8 projects, based on the benefit value (number of *'s) assigned to each project, highest to lowest. This listing is included as an aid to understanding which types of projects were found to be of most (and least) interest and value to the using community, based on the user comments received during this survey.

NSRP 0276 * * * * * * *
TITLE: Basic Principles of Industrial Engineering.
AUTHOR: Standards international, Inc.
DATE: October 1987 *COST:* (Not available)

NSRP 0055 * * * * * *
TITLE: Advanced Pipe Technology - Interim Report.
AUTHOR: Newport News Shipbuilding, for Bath Iron Works.
DATE: April 1976 *COST:* (Not available)

NSRP 0065 * * * * * *
TITLE: Advanced Pipe Technology - Executive Summary.
AUTHOR: Newport News Shipbuilding, for Bath Iron Works.
DATE: April 1977 *COST:* (Not available)

NSRP 0136 * * . * * * *
TITLE: Methods Engineering Workshop for the Shipbuilding Industry.
AUTHOR: American Institute of Industrial Engineers, for Bath Iron Works.
DATE: November 1981 *COST:* (Not available)

NSRP 0245 * * * * * *
TITLE: Methods Engineering Workshop for the Shipbuilding Industry.
AUTHOR: Institute of industrial Entgineers.
DATE: September 1985 *COST:* $31,554.

NSRP 0232 * * * * *
TITLE: Work Management Manual - SheetmetaI Shop Ventilation Components (Phase III). 2 Volumes.
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: December 1983 *COST:* (Not available)

NSRP 0242 * * * * *
TITLE: Engineered Labor Standards in the Manufacture of Sheetmetal Case Good Items.
AUTHOR: Bath Iron Works Corporation.
DATE: August 1984 *COST:* (Not available)

NSRP 0247 * * * * *
TITLE: Problem Solving and Training Guide for Shipyard Industrial Engineers.
AUTHOR: Corporate Tech Planning, Inc.
DATE: June 1986 *COST:* (Not available)

NSRP 0304 * * * * *
TITLE: Optimal Use of Industrial Engineering Techniques in Shipyards.
A UTHOR: National Steal and Shipbuilding Company.
DATE: August 1989 *COST:* (Not available)

NSRP 0068 * * * *
TITLE: Executive Summary - Improved Planning and Production Control.
AUTHOR: Management Associates, for Bath Iron Works Corporation.
DATE: May 1977 *COST:* (Not available)

NSRP 0073 * * * *
TITLE: Shipbuilding Industrial/Production Engineering Workshop. Proceedings.
AUTHOR: American Institute of Industrial Engineers, for Bath Iron Works.
DATE: February 21-24, 1978 *COST:* (Not available)

NSRP 0076 * * * *
TITLE: A Manual on Planning and Production Control for Shipyard Use.
AUTHOR: Corporate-Tech Planning, Inc., for Bath Iron Works.
DATE: June 1978 *COST:* (Not available)

NSRP 0123 * * * *
TITLE: MOST Work Management Manual - Pipe Fabrication Shop.
AUTHOR: Peterson Builders. Inc., for Bath Iron Works.
DATE: January 1981 *COST:* (Not available)

NSRP 0200 * * * *
TITLE: Ship Producibility as it Relates to Series Production: Volume II Ship Design Process.
AUTHOR: Ingalls Shipbuilding, for Bath Iron Works Corporation.
DATE: September 1975 *COST:* (Not available)

NSRP 0201 * * * *
TITLE: Ship Producibility as it Relates to Series Production: Volume III Ship Production Process.
AUTHOR: Ingalls Shipbuilding, for Bath Iron Works Corporation.
DATE: October 1975 *COST:* (Not available)

NSRP 0244 * * * *
TITLE: Tool List Program Feasibility Study.
AUTHOR: Ingalls Shipbuilding for Bath Iron Works Corporation.
DATE: April 1985 *COST:* (Not available)

NSRP 0284 * * * *
TITLE: Feasibility Study of the Application of Operations Research Methods to Solve Complex Shop Scheduling Problems.
AUTH0R: Peterson Builders, Inc.
DATE: December 1987 *COST:* (Not available)

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NSRP 0101 * * *
TITLE: MOST Work Management Manual - Steel/Aluminum Small Assembly-1.
AUTHOR: Bath Iron Works Corporation.
DATE: May 1980 *COST:* (Not available)

NSRP 0103 * * *
TITLE: MOST Work Management Manual - Panel Line.
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: May 1980 *COST:* (Not available)

NSRP 0104 * * *
TITLE: MOST Work Management Manual - Steel/Aluminum Small Assembly-II
AUTHOR: Bath Iron Works Corporation.
DATE: July 1980, *COST:* (Not available)

NSRP 0111 * * *
TITLE: MOST Work Management Manual - General Operations.
AUTHOR: Bay Shipbuilding Corporation. for Bath Iron Works.
DATE: August 1980 *COST:* (Not available)

NSRP 0115 * * *
TITLE: MOST Work Management Manual - Panel Assembly in Platen Area.
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: September 1980 *COST:* (Not available)

NSRP 0120 ★★★
TITLE: **Work Management Manual - Steel Shell Assembly.**
AUTHOR: Bath Iron Works Corporation.
DATE: 1980 *COST:* (Not available)

NSRP 0125 ★★★
TITLE: **MOST Work Management Manual - Hull Erection.**
AUTHOR: Bay Shipbuilding Corporation, for Bath Iron Works.
DATE: January 1981 *COST:* (Not available)

NSRP 0221 ★★★
TITLE: **Labor Standards Application Program (Phase IV) Electrical Trade Area.**
AUTHOR: Peterson Builders, Inc., for Bath Iron Works Corporation.
DATE: April 1985 *COST:* (Not available)

NSRP 0277 ★★★
TITLE: **Improved Planning and Shop Loading in Shipyard Production Shops.**
AUTHOR: Robinson-Page-McDonough and Associates, Inc.
DATE: September 1987 COST: $100,000.

NSRP 0347 ★★★
TITLE: **Implementation Guide for Approaching Shop Floor Control.**
AUTHORS: Gary Higgins, John Jessup, and K. Diedrick of PBI.
DATE: June 1992 *COST:* (Not available)

NSRP 0347 ★★★
TITLE: **Implementation Guide for Approaching Shop Floor Control.**
AUTHORS: Gary Higgins, John Jessup, and K. Diedrick of PBI.
DATE: June 1992 *COST:* (Not available)

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NSRP 0070 ★★
TITLE: **Improved Planning and Production Control.**
AUTHOR: Bath Iron Works Corporation.
DATE: August 1977 *COST:* (Not available)

NSRP 0141 ★★
TITLE: **FY-82 Labor Standards Program - Pipe Fabrication and Blast and Paint Shops**
AUTHOR: H. B. Maynard and Co., for Bath Iron Works.
DATE: January 1982 *COST:* (Not available)

NSRP 0151 ★★
TITLE: **MOST Work Management Manual - Main Assembly. Volumes I and II.**
AUTHOR: Bath Iron Works Corporation.
DATE: March 1982 *COST:* (Not available)

NSRP 0152 **
TITLE: MOST Work Management Manual - Electrical Work for Shipboard Installation. Volumes I and II.
AUTHOR: Peterson Builders, Inc.. for Bath Iron Works.
DATE: April 1982 *COST:* (Not available)

NSRP 0154 * *
TITLE: MOST Work Management Manual - Temporary Staging for Group Assembly and Aboard Ship.
AUTHOR: Bethlehem Steel Corporation, Sparrows Point, for Bath Iron Works.
DATE: April 1982 *COST:* (Not available)

NSRP 0186 * *
TITLE: Temporary Staging for Shipyards.
AUTHOR: Bethlehem Steel Corporation, for Bath Iron Works.
DATE: July 1983 *COST:* (Not available)

NSRP 0199 * *
TITLE: A Primer on an Approach to Planning and Production Control for the Smaller Shipyard.
AUTH0R: Corporate-Tech Planning, Inc., for Bath Iron Works.
DATE: December 1983 *COST:* (Not available)

NSRP 0243 * *
TITLE: Outside Machinery Standards - Final Report and Work Management Manual.
AUTHOR: Ingalls Shipbuilding for Bath Iron Works Corporation.
DATE: January 1985 *COST:* (Not available)

NSRP 0256 * *
TITLE: Computer-Assisted Methodology for the Determination of the Optimal Number and Location of Tool Sheds.
AUTHOR: University of Washington, for Bath Iron Works Corporation.
DATE: July 1986 *COST:* (Not available)

NSRP 0279 * *
TITLE: Analysis of Current Manpower Estimating and Control Procedures.
AUTHOR: Robinson-Page-McDonough and Associates. Inc.
DATE: July 1987 *COST:* (Not available)

NSRP 0053 *
TITLE: Ship Producibility as it Relates to Series Production. Volume I.
AUTHOR: Ingalls Shipbuilding, for Bath Iron Works.
DATE: January 1976 *COST:* (Not available)

NSRP 0066 *
TITLE: Improved Design Process - Executive Summary and Final Report.
AUTHOR: General Dynamics/Quincy, for Bath Iron Works.
DATE: April 1977 *COST:* (Not available)

NSRP 0067 *
TITLE: Improved Design Process - Final Report.
AUTHOR: General Dynamics/Quincy, for Bath Iron Works.
DATE: April 1977 *COST:* (Not available)

NSRP 0102 *
TITLE: MOST Work Management Manual - General Operations.
AUTHOR: National Steel and Shipbuilding Co.. for Bath Iron Works.
DATE: May 1980 *COST:* (Not available)

NSRP 0146 *
TITLE: Shipyard Data Application Program PaneI Line Schedule and Manloading Incentive Program.
AUTHOR: Bath Iron Works Corporation.
DATE: 1982 *COST:* (Not available)

NSRP 0149 *
TITLE: MOST Work Management Manual - Blast and Coat on Platen and Drydock.
AUTHOR: Newport News Shipbuilding, for Bath Iron Works.
DATE: March 1982 *COST:* (Not available)

NSRP 0150 *
TITLE: MOST Work Management Manual - Plate Shop.
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: March 1982 *COST:* (Not available)

*NSRP 0157 **
TITLE: Scheduling Standards Pilot Project Summary Report.
AUTHOR: Corporate-Tech Planning, inc.. for Bath Iron Works Corporation.
DATE: September 1981 - April 1982 *COST:* (Not available)

NSRP **0159 ***
TITLE: Industrial Engineering Applications in the U.S. Shipbuilding Industry, 1982 Symposium Proceedings.
AUTHOR: Bath Iron Works Corporation.
DATE: May 1982 *COST:* (Not available)

NSRP 0172 ★
TITLE: **Work Management Manual - Material Handling for Shipyards.**
AUTHOR: Bethlehem Steel Corporation, Sparrows Point, for Bath Iron Works.
DATE: July 1983 *COST:* (Not available)

NSRP 0175 ★
TITLE: **Work Management Manual - In-Shop Blast and Paint.**
AUTHOR: Peterson Builders, Inc., for Bath Iron Works.
DATE: August 1983 *COST:* (Not available)

NSRP 0189 ★
TITLE: **Final Report Back-Up Data for Temporary Staging for Shipyards.**
AUTHOR: Bethlehem Steel Corporation, for Bath Iron Works.
DATE: July 1983 *COST:* (Not available)

NSRP 0222 ★
TITLE: **Application of Labor Standards for Scheduling, Production Control. and Manpower Leveling.**
AUTHOR: Bethlehem Steel Corporation, for Bath Iron Works.
DATE: December 1984 *COST:* (Not available)

NSRP 0233 ★
TITLE: **Methods/Labor Standards Application Program - Phase IV. Final Report.**
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: January 1985 *COST:* (Not available)

NSRP 0234 ★
TITLE: **Methods/Labor Standards Application Program. Final Report.**
AUTHOR: National Steel and Shipbuilding Co., for Bath Iron Works.
DATE: January 1985 *COST:* (Not available)

NSRP 0235 ★
TITLE: **Labor Standards Application Program: Blast and Paint Shops. Final Report.**
AUTHOR: Peterson Builders, Inc., for Bath Iron Works Corp.
DATE: December 1984 *COST:* (Not available)

NSRP 0271 ★
TITLE: **Quality Defects Measurement and Control System.**
AUTHOR: Bath Iron Works Corporation/Marinette Marine Corporation.
DATE: March 1987 *COST:* (Not available)

NSRP 0278 ★
TITLE: **Developing Scheduling Standards Using Regression Analysis: An Application Guide**
AUTHOR: Robert J. Graves, University of Massachusetts, and Leon F. McGinnis, Georgia Institute of Technology.
DATE: June 1987 *COST:* (Not available)

NSRP 0321 *
TITLE: The Industrial Perspective: Conference Proceedings Meeting Minutes.
AUTHOR: Ship Production Panel 8 (SP-8).
DATE: September 1989 *COST:* (Not available)

NSRP 0325 *
TITLE: Scheduling Standards Pilot Project: Companion Activity Final Report.
AUTHOR: Robert Graves and Leon McGinnis.
DATE: June 1982 *COST:* (Not available)

*NSRP 0348 **
TITLE: Improved Techniques for Labor Expenditure Collection.
AUTHOR: Stan Fors. Glen Berger. Christi Burz, David Wrigh,. and Mike Korgie of NASSCO.
DATE: June 1992 *COST:* (Not available)

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TITLE: Feasibility Study of Small Computer Application of Multi-Trade Scheduling.
AUTHOR: National Steel anD Shipbuilding Company.
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