OUTSIDE MACHINERY STANDARDS

FINAL REPORT 8

WORK MANAGEMENT MANUAL

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TASK ES-8-21

OUTSIDE MACHINERY STANDARDS - FINAL REPORT

THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Task ES-8-21
Data Development of Detail Standards For Outside Machinery Operations

CONDUCTED T:

Industrial Engineering Department
Ingalls Shipbuilding Division
of Litton Systems, Inc.
P.O. Box 149
Pascagoula, Mississippi 39567

December 1983 through January 1985

FOR:

Bath Iron Works Corporation
700 Washington St.
Bath, Maine 04530

The Society of Naval
Architects and Marine Engineers
Ship Production Committee
Sp-8 Panel on Industrial Engineering

The U.S. Department of Transportation
Maritime Administration

PREFACE

This project was performed as part of the National Shipbuilding Research Program, under subcontract to Bath Iron Works Corporation. Funding was provided jointly by the Maritime Administration (MarAd) and the U.S. shipbuilding industry. Administration of this project was through the Society of Naval Architects and Marine Engineers (SNAME) Sp-8 panel on Industrial Engineering. Performance of the project was by the Industrial Engineering department of Ingalls Shipbuilding.

It is noteworthy that this was the first standards development project under the National Shipbuilding Research Program funded by MarAd that involves shipboard activities.

The time standards in this project were developed using the Maynard Operation Sequence Technique (MOST). MOST is a predetermined motion time system.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

In December of 1983 Ingalls Shipbuilding assumed an active part in the Maritime Administration's Ship Producibility Research Program. At that time the Industrial Engineering department at Ingalls began to work on Task ES-8-21, the Data Development of Detail Standards for Outside Machinery Operations. The purpose of this project was twofold. First,-it was to provide the shipbuilding industry with a set of universal. standards for Outside Machinery operations. Second, it was to identify specific areas where methods improvements could be made to benefit both Ingalls and the U.S. Shipbuilding industry.

The following steps were taken to complete this project:

a. The standards data for Outside Machinery that already existed at Ingalls was reviewed. Data found to be obsolete was targeted as areas to develop MOST standards.

b. A list of jobs to be studied during the time schedule of the project was developed and the machining equipment specifications were procured.

c. The Operation Formulae Standard data was developed.

d. A standards manual format was submitted to the Sp-8 panel for approval.

e. The shipboard machining and equipment installation standards were developed.

f. The standards were validated.

g. The standards manual and final report was prepared and presented to SNAME sp-8 panel for approval.

FINDINGS, RECOMMENDATIONS, AND RESULTS

Several areas were identified for improvement during the observation of machining and equipment installation activities aboard ship. These areas include: Excessive Travel for Tools, Equalization of Tool Distribution between Tool Rooms, and Equipment Capability Verification.

Excessive Travel For Tools

It was observed that some machinists were reporting to the job sites without all of the required tools to perform the job. Numerous trips were made off the ship for additional tools.

After analyzing the problem of excessive travel for tools, the project team suggested that tool lists (see figure 1) be developed for each job. These tool lists would list all of the necessary tools required to perform each job. The machinist could then easily gather all of the tools required before going aboard ship. This would help eliminate additional trips off the ship to obtain tools because of neglect, lack of planning, or inexperience on the part of the machinist. Studies reveal **that** elimination of excessive travel for tools could potentially save $963,000 annually in labor costs.

BOAT HANDLING WINCH INSTALLATION
MACHINIST TOOLS REQUIRED

1. 6 in. Steel Scale (Rigid)
2. Drill Bits (17/32 in. & 25/32 in.
3. Hammer
4. Center Punch .
5* Portable Magnetic Base Drill
6. Scriber
7. File (for filing chocks)
8. C-Clamp
9. Ratchet (1/2 in. Drive)
10. Socket (1-1/4 in.)
11. Fixed End Wrench (1-1/4 in.)
12. Reamers (Various sizes 3/4 into 1 in.)
13. Feeler Gage .
14. Level

Figure 1. Sample Tool List

The project team presented its finding and recommendation concerning excessive travel for tools to the Outside Machinery management (general superintendent and foreman). The response to this recommendation was excellent. The General Superintendent asked his foreman to have supervisors begin to develop tool lists for jobs. The supervisors would then distribute the tool lists to employees just before they went to work on those specific jobs. Initially the supervisors did develop tool lists for a few jobs. However, as time passed, the supervisor's enthusiasm for developing tool lists gradually decreased because of the multiplicity of responsibilities in other areas.

In an effort to revive the implementation of this recommendation, the Industrial Engineering department, with the cooperation of the Production Planning department, researched and developed a means by which to print tool lists on the bill of material. This method would involve only a minimum amount of effort on the production planner's part. First, a production planner writes the bill of material as he normally does. Next, the planner would identify the descriptions of each major piece of equipment on the bill of material (examples: waste heat boiler, chill water pump, high pressure air dehydrator, air conditioning plant, etc.). Immediately after this step, the planner would match each major piece of equipment to a four-digit tool list code number. This code number would be obtained from a predeveloped matrix (see figure 2). Finally, the code number, hull, and bill of material numbers are typed into the computer by the planner. The planner would utilize the Technical Information Data Base (TIDB) Text system. The utilization of this system would produce tool lists that would be a part of the computer generated bill of material (see figure 3). Use of this system would allow the machinist to easily refer to the tool list. He could then gather tools as he is gathering the necessary materials.

ccount No.	Item Description	Tool List Code No.
2501	Air Filter	5312
2501	Bellmouth	7003
2501	Centrifugal Fan	6115
2501	Cooling Coil	9387
2501	Precipitator	2115
2501	Unit Cooler	3879
2501	Unit Heater	2265
2501	Vaneaxial Fan	0000

Figure 2. Sample Account/Item-to-Tool List Code No. Matrix

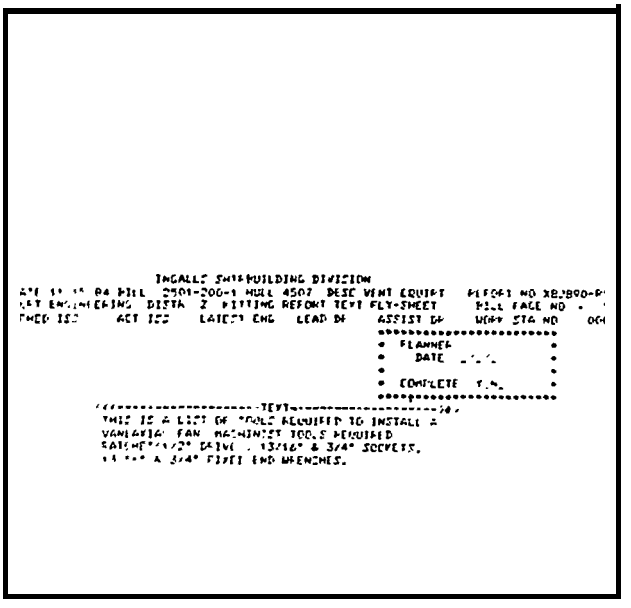

Figure 3. Printed Tool List on Bill of Material Form

During this project, 14 tool lists were developed for various outside machinery machining and installation activities (see figure 4). In order to fully implement this program, a company must develop tool lists, then tool lists must be input into the text system and code matrices must be developed for each account. An IE coordinator would be needed to perform these functions. This coordinator would also interact with both the planning department and the craft during the implementation period to ensure proper use and continued utilization of the program (see figure 5).

Five-Inch Gun Mount Facing
Main Engine Pad Face Milling -
Stern Tube Boring
Waste Heat Boiler Installation
Air Conditioning Plant Installation
Chill Water Pump Installation
H. P. Air Dehydrator Installation
Boat Handling Winch Installation
Vaneaxial Fan Installation
Sewage Pump Installation
Bridge Crane and Rails Installation
Convection Oven Installation
Hoist and Monorail Installation
Cooling Coil Installation

Figure 4. Tool Lists for Specific Jobs Developed Under Task ES-8-21

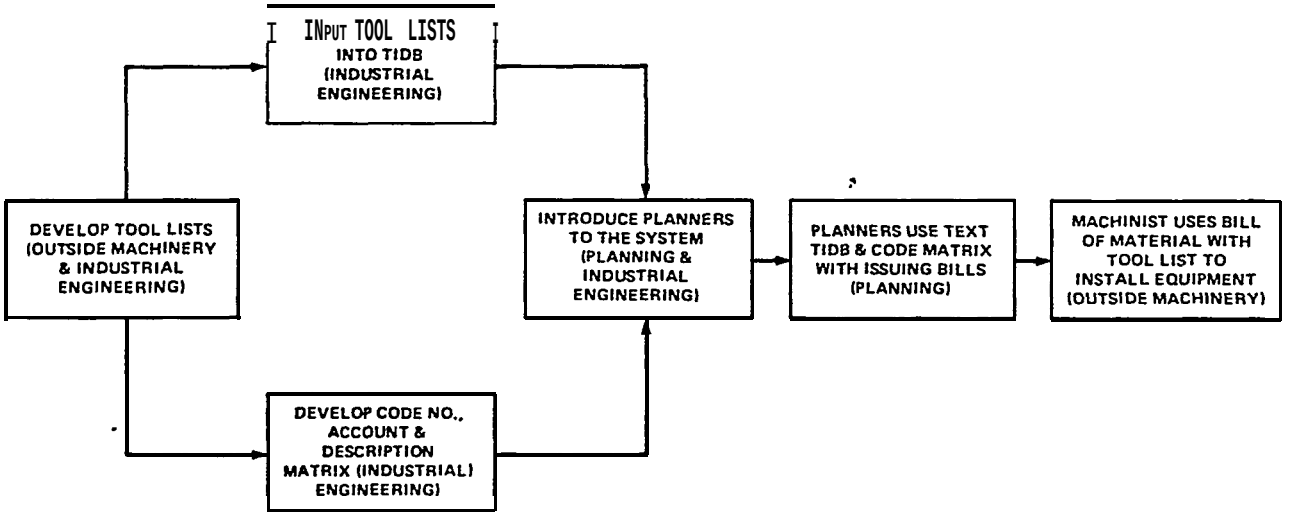

Figure 5. Tool List Program Network Diagram

Tool Rooms - Equalization of Tool Distribution

A problem identified early in the project was the subject of tool distribution between tool rooms. It was discovered that machinists in the bay areas of the shipyard had to travel to the wetdock tool room to obtain tools, although a tool room existed in the Bay 3 area (see figure 6).

There were several reasons that this condition existed. One reason was that the large variety and space requirements of Outside Machinery tools would not allow a full selection of tools to be stored in the smaller Bay 3 facility. Another reason was that the machinists in the bay area make up a small percentage of the total shipyard population in the bay area. The bay 3 tool room was purposely stocked to support hull and "pipe craftsmen who make up the majority of the workers in that area.

In response to this problem, the project team suggestd to the Outside Machinery management that some of the tools . commonly used by outside machinists be transferred from the wetdock building tool room to the Bay 3 area tool room.

After a presentation of this recommendation to Outside Machinery management, the General Superintendent of Outside Machinery requested that the tool room perform a study to determine the high usage tools for Outside Machinists. After this study was performed some of these tools were transferred to the Bay 3 tool room in June 1984. At the time of this report an expansion of the Bay 3 tool room into the paint storage facility next door was planned. This will allow even more outside machinery tools to be stored in the Bay 3 tool room. Several delay studies were performed to determine the cost of this excessive travel. These studies reveal that elimination of this excessive travel would result in an annual labor savings of $39,000.

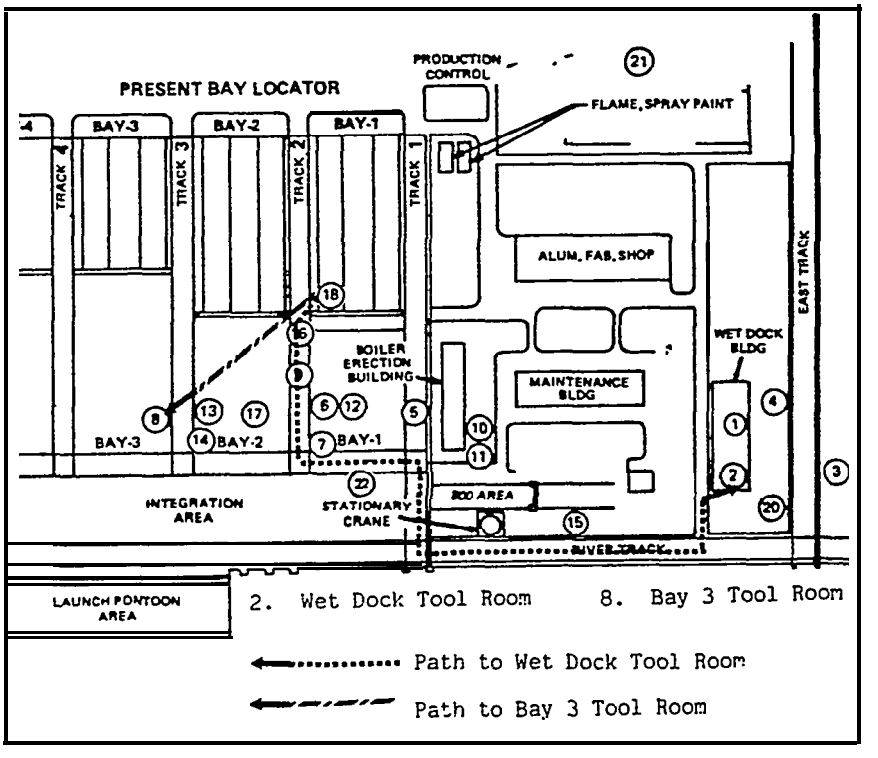

Figure 6. Wetdock Tool Room Versus Bay 3 Tool Room Travel Comparison

PROJECT ACTIVITIES

The performance of this project was divided into seven major activities. These activities were Existing Standards Data Review, Work Item Selection and Machining Equipment Specification Procurement, Operation Formulae Standards Development, Standards Manual Format Development, Application Standards Development, Standards Validation, and , Standards Manual Development.

Existing Standards Data Review

The first activity performed was a review of the existing MTM developed Outside Machinery Standards. These standards were developed from 1969 to 1971. They were based on the methods, tools, equipment, and facilities then available at Ingalls. A comparison was made to the current methods, tools , equipment, and facilities to determine if the standards were still applicable to current operations.

In reviewing the existing standards several problems were discovered. The majority of the standards were not applicable to the shipyard's current operations for the following reasons:

- The items installed or manufactured in the existing standards have changed in configuration since the standards were developed.
- Some of the standards included stop watch times where predetermined times can be developed.
- Work formerly considered Outside Machinist work is now performed by other crafts.
- The itms installed. or manufactured in the existing standards are being installed or manufactured by a different method.

In general, the majority of the Outside Machinery MTM-developed standards were not applicable to current shipyard conditions.

Work Item Selection and Machining Equipment Specifications Procurement

In order to develop a good operating plan for manning purposes, a list of items and operations to be studied during the time frame of the project had to be selected.

The next step taken was to obtain the outside machinery equipment specifications from Manufacturing Engineering. Speeds and feeds information for various materials was obtained to use in the development of process times.

Operation Formulae Standards Development

One of the objectives of this project was to produce a set of universal time standards for basic outside machinery functions. The operation formulae standards were developed to perform this function. These operations included Job Preparation, Area Travel (which applies to Ingalls only), Layout for Drilling, Drilling, and Boltup.

Standards Manual Format Development

A standards manual format was developed and submitted to the SNAME Sp-8 panel for approval. The manual format included 10 sections: Scope, Standards Manual Use, Standards Application, Operation Formulae, Layouts and Material Flow, Facilities and Equipment, Allowances, Standard Practices and Policies, Process Date, and Data Synthesis and Backup Data.

Application Standards Development

Standards were developed for 14 shipboard outside machinery jobs. Three of these jobs involved shipboard machining: Five Inch Gun Mount Facing, Main Engine Pad Face Milling, and Stem Tube Boring. Eleven of these jobs were shipboard equipment installation: Waste Heat Boiler, Air Conditioning Plant, Chill Water Pump, High Pressure Air Dehydrator, Boat Handling Winch, Vaneaxial Fan, Sewage Pump, Bridge Crane and Rails, Convection Oven, Hoist and Monorail, and Cooling Coil.

Standards Validation

The standards developed in this project were validated by reviewing and verifying the methods, tools equipment, layouts, and standard time development.

Standards Manual Development

A manual containing the instructions on how to apply the standards developed during the period of this project. This manual contains all of the supporting information and was submitted to SNAME sp-8 panel.

PROJECT SPIN-OFF

A problem occurred in the application of the drilling process time charts (see figure 7). Initially, it was difftcult to find an American Iron and Steel Institute (AISI) equivalent for the MIL-SPEC Number of various naterials. Ingalls foundation drawings identified material by its MIL-SPEC Number.

However, the tables from which the drilling process time charts were developed used AISI designations to identify materials (see figure 8). Being unable to compare the AISI equivalent number to the MIL-SPEC number would have rendered the project team incapable of using the drilling process time charts.

After a significant amount of research had taken place, a metallurgist, J. M. Earley, at the National Bureau of Standards was contacted. Working in

PROCESS TIME FOR DRILLING
ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0001	303	158	190	190	190	211	285	304
0002	273	151	182	182	182	202	273	291
0003	390	202	242	242	242	269	364	422
0004	390	202	242	242	242	269	364	388
0005	390	202	242	242	242	269	364	422
0006	0	420	420	560	504	560	672	747
0007	0	682	910	910	1024	1213	1638	1986
0008	0	910	1213	1456	1560	1618	2185	2913
0009	341	173	208	208	208	231	312	333
0010	341	165	198	198	198	220	298	317
0011	455	242	364	416	437	485	582	647
0012	390	202	242	242	242	269	364	388
0013	420	227	273	303	341	420	455	496
0014	455	390	390	445	468	520	624	693
0015	0	546	546	728	655	728	874	971

Figure 7. Sample Drilling Process Time Chart

conjunction with the metallurgist, it was determined that if the following information could be found for the material being drilled the process time charts could be utilized.

- The major class the material belongs to (Ex. Plain Carbon Steel)
- The percent of carbon content
- The Brinell hardness.

The information derived from this method has not only helped in determining AISI equivalents for the purposes of this project but for other projects in the department.

MATERIAL AND CONDITION CODE	MATERIAL	BHN HARDNESS RANGE	CONDITION	SPEED fpm	FEED inches/rev					DOC inches			HSS TOOL MATERIAL
					1/16	1/8	1/4	1/2	1/4	1	1 1/2	2	
0001	FREE MACHINING PLAIN CARBON STEELS Resulphurized B1111 B1315 B1112 1212 B1113 1213 1113 1213-Te	100 to 150	Hot Rolled or Annealed	90 to 115	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0002		150 to 200	Cold Drawn	100 to 120	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0003	Resulphurized 1132 1320 1139 1326 1315 1144 1117 1211 1118	100 to 150	Hot Rolled or Annealed	70 to 90	.001 -	.003	.005	.010	.015	.018	.020	.023	M10 M7 M1
0004		150 to 200	Cold Drawn	70 to 90	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0005		175 to 225	Hot Rolled, Normalized, Annealed or Cold Drawn	70 to 90	.001 -	.003	.005	.010	.015	.018	.020	.023	M10 M7 M1
0005	Resulphurized 1132 1141 1137 1145 1138 1146 1139 1151 1148	225 to 325	Quenched and Tempered	65	-	.002	.004	.006	.010	.012	.015	.018	M10 M7 M1
0007		325 to 375	Quenched and Tempered	40	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0005		375 to 425	Quenched and Tempered	30 to 40	-	.002	.004	.005	.007	.009	.010	.010	T15 M33
0009		100 to 150	Hot Rolled, Normalized, Annealed or Cold Drawn	80 to 105	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
D010	Leaded 12L10 12L13 12L14 12L14	150 to 200	Hot Rolled, Normalized, Annealed or Cold Drawn	80 to 110	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0011		200 to 250	Hot Rolled, Normalized, Annealed or Cold Drawn	60 to 75	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1

Figure 8. Sample Material/Condition Code Description Matrix

TASK ES-8-2 1

OUTSIDE MACHINERY

WORK MANAGEMENT MANUAL

THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Task ES-8-21
Data Development Of Detail Standards
For Outside Machinery Operations

CONDUCTED AT

Industrial Engineering Department
Ingalls Shipbuilding Division
Of Litton Systems, Inc.
P.O. Box 149
Pascagoula, Mississippi 39567

December 1983 through January 1985

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ACKNOWLEDGEMENTS

Many individuals have been helpful and supportive in the production of this manual.

The following people aided in the production of the drilling process time charts via the IBM ADRS (A Departmental Reporting System) computer system:

R. D. Howard	Industrial Engineer Sheetmetal - Joiner Division Industrial Engineering Dept. Ingalls Shipbuilding
E. H. Weissinger	Industrial Engineer Performance Analysis Division Industrial Engineering Dept. Ingalls Shipbuilding
K. E. Deangelo	Specialist Audits Division Productions Systems and Planning Ingalls Shipbuilding

The individuals who typed and aided in proof reading this manual are:

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The project team is indebted to the following people who also made contributions to the development of this manual: R. D. Harper, Section Manager of Industrial Engineering at Ingalls who provided the project team with a copy of the Machining Data Handbook; The management and employees of the Outside Machinery Department who provided the project team cooperation and resource information; J. Earley, Metallurgist at the National Bureau of Standards who provided a method of translating a Mil. Spec into an AISI (American Iron and Steel Institute) equivalent; Louis Pennell, Industrial Engineer at Ingalls who provided invaluable delay study information. Finally, the project team would like to thank God who provided the wisdom required to complete the project.

CONTENTS

This project was performed as part of the National Shipbuilding Research Program, under subcontract to Bath Iron Works Corporation. Funding was provided jointly by the Maritime Administration (MarAd) and the U. S. shipbuilding industry. Administration of this project was through the Society of Naval Architects and Marine Engineers (SNAME) SP-8 panel on Industrial Engineering. Performance of the project was by the Industrial Engineering department of Ingalls Shipbuilding.

It is note worthy that this was the first standards development project under the direction of the National Shipbuilding Research Program as funded by MarAd that involves shipboard activities.

The purpose of this manual is twofold. First, it is to provide a set of outside machinery time standards that are generally adaptable to any shipbuilder within the industry. Second, it is to provide some application examples of these standards. The operation formulae section of this manual fulfills the first provision. The standards application section fulfills the second provision. The remainder of the manual is support information to enhance the readers understanding of these two sections.

The time standards in this project were developed using the Maynard Operation Sequence Technique (MOST). MOST is a predetermine motion time system. More specifically, the Basic MOST System was used.

It is important to note that the standards developed in this manual are time-standards not application standards. A time standard by definition is the necessary time to perform a job at the 100 percent performance level including allowances for human fatigue, personal time, and unavoidable delays. An application standard is a time standard with the addition of avoidable delays and labor performance adjustments.

Utilization of this data must consider the location where the work will be performed (shipboard or shop); the type of work system the employees are functioning under (day work,measured day work or incentive) and the specific labor practices that apply at their location before determining an application standard.

The data collected for this manual was obtained from observation of work on Ticonderoga (CG 47) class cruisers under construction at Ingalls Shipbuilding.

SECTION 2 STANDARDS MANUAL USE

This section was developed to give instructions on the use and design of this standards manual. Below is an index showing how this section is constructed.

INDEX

GENERAL INFORMATION

Any properly constructed Work Management Manual is designed such that, the various parts are interactive and work together to perform a specific function. This Work Management Manual is designed in this manner. The various sections of this manual are linked together to accomplish four basic functions (see page 2-3):

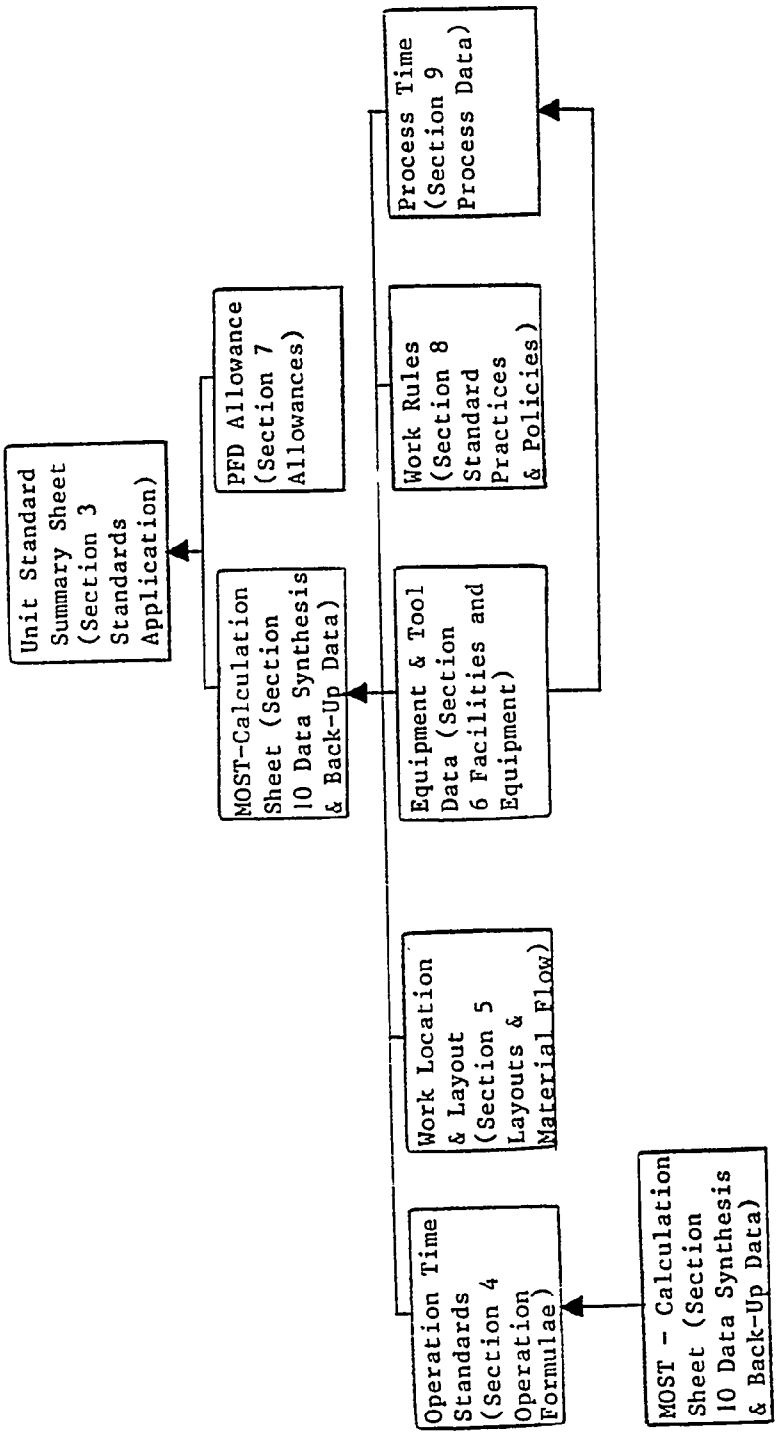
1. Explanation of purpose and operation of manual.
2. Provide Application examples.
3. Provide General Operation Standards.
4. Provide Support Data.

The interaction between the various manual sections (see page **2-4)** allows the tracing of a unit of data throughout the system, all the way from the appropriate work place layout to the time standard.

WORK MANAGEMENT MANUAL
ORGANIZATION

FUNCTION	MANUAL SECTIONS INVOLVED
EXPLANATION	Section 1 Scope; Section 2 Standards Manual Use
APPLICATION EXAMPLES	Section 3 Standards Application
GENERAL OPERATION STANDARDS	Section 4 Operation Formulae
SUPPORT DATA	Section 5 Layouts & Material Flow; Section 6 Facilities & Equipment; Section 7 Allowances; Section 8 Standard Practices; Section 9 Process Data; Section 10 Data Synthesis & Back-Up

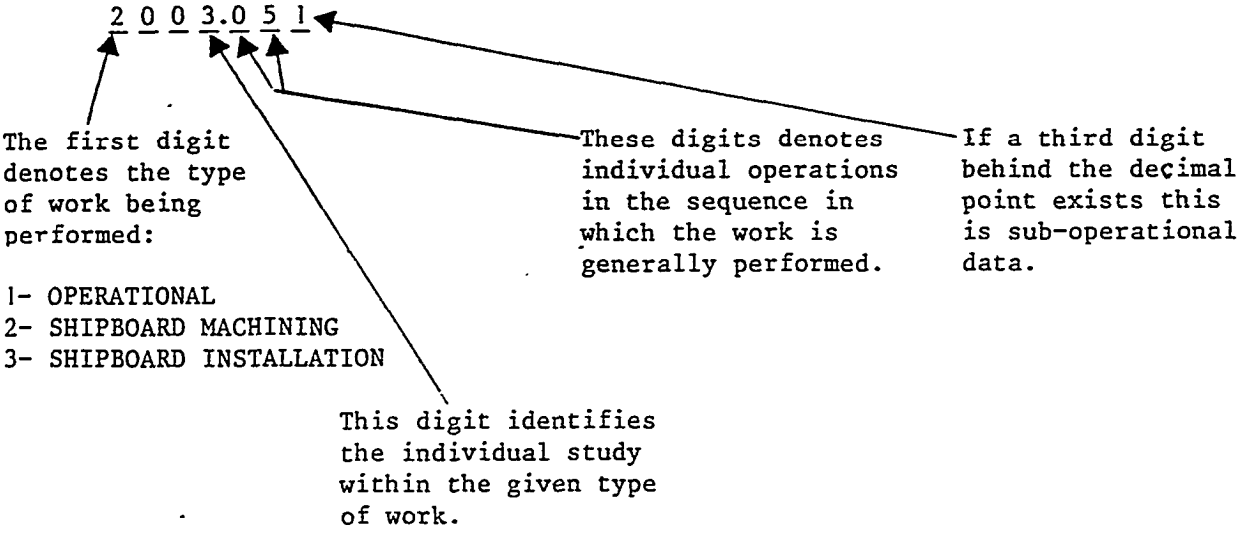
WORK MANAGEMENT MANUAL
SECTIONAL INTERRELATIONSHIP



MOST Calculation and Back-Up Data Coding System

Throughout the manual there are numbers (varying from 6 to 7 digits) called codes. These codes relate to the detail MOST calculation forms which provide the basis for the standards included in the manual. The Data Syntheses and Back-Up Section of the manual contains the MOST calculation forms in code number order (See page 10-1).

EXAMPLE:



NOTE: Because of the volume of the data, the area travel detail back-up code information was not included in the data synthesis and back-up section of the manual.

Page Numbering System

The pages in this manual are numbered using a two position numbering system.

EXAMPLE:

4-20

The first position denotes the section of the manual in which the page is located.

The second position denotes the sequential page number within the section.

In the above example the page number 4-20 is the twentieth page in section4,"--0peration Formulae.

STANDARDS APPLICATION USE

The purpose of Section 3, Standard Application, is to provide some application examples of the operational standards. The Standards Application Section also provides time standards for some common outside machinery machining operations and equipment installation examples.

The first part of Standards Application, pages 3-1 through 3-15, contains the unit standard summary sheets. The key information revealed on these sheets is:

- o The operations involved
- o The required manning
- o The operational and total standards for the job.

To learn more about the standard time development of the operations or elements refer to the appropriate code no. (see sample on page 2-8) in Section 10, Data Synthesis and Back-Up.

The second and third parts of Standard Application contain further detail. To learn more about the use of these standards refer to the Applicability Analysis for Machining Operations (p. 3-16) or Applicability Analysis for Equipment Installation (p. 3-17). To obtain a description of the equipment itself refer to the Machinery Units Descriptions (p. 3-18) or Installed Equipment Descriptions (p. 3-19 through 3-24).

UNIT STANDARD SUMMARY AND MOST CALCULATION SHEET RELATIONSHIP

1. Locate the operation code on the Unit Standard Summary Sheet. Identify the same code on the MOST calculation sheet in Section 10. (Calculation sheets are in code number order).

INGALLS Shipbuilding

MOST - calculation

CODE 3007.06
DATE 8/14/84
SIGN. TLC
PAGE 10-148

SEWAGE PUMP INSTALLATION

ACTIVITY INSTALL SELF LOCKING FASTNERS
CONDITIONS ASSEMBLY AREA

NO.	METHOD
1	RIGGER PLACE UNIT ON FOUNDATION
2	REPOSITION BOLTS (CODE 1005.03)
3	INSTALL SELF LOCKING NUTS 5/8" (CODE 1009.05)

NO.	SEQUENCE MODEL	FR	TMU
5	A_2 B G A_2 B P A_2	(4)	240
1	A B G A B P A		0
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
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	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
2	410	12	4920
3	1026	8	8208
4	1215	4	4860
			18,228

INGALLS Shipbuilding

WM - MANUAL

SEWAGE PUMP INSTALLATION

CODE
DATE 6/14/84
SIGN. TLC
PAGE 3-11

1

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3007.01	Job Preparation	27,467	1.0	27,467
3007.02	Area Travel	14,160	1.0	14,160
3007.03	Remove Temporary Mounts	15,666	1.0	15,666
3007.04	Layout & Drill Holes In Foundation	36,704	1.0	36,704
3007.05	Install Permanent Mounts	6,650	1.0	6,650
3007.06	Install Self-Locking Fasteners	18,228	1.0	18,228
			SUBTOTAL	119,875
			PFD @ 20%	23,775
			TOTAL	142,650

TOTAL UNIT STANDARD
1.43 HRS.

2

2. The standards in TMU'S on MOST calculation sheet will be the same as that under the OPERATION STANDARD IN TMU'S column on the Unit Standard Summary Sheet.

OPERATION FORMULAE USE

One of the purposes of this manual was to provide a set of outside machinery standards that are generally applicable to any shipbuilder within the industry. The operation formulae section of the manual was prepared to this end.

Section 4, Operation Formulae, provides time standards for five basic outside machinery operations. These operations are Job Preparation, Area Travel, Layout for Drilling, Drilling, and Bolt-Up.

On the first page of Section 4 is an index of code numbers and page numbers for each operation formula. Each formula except Area Travel begins with a formula applicability sheet which explains the activities that are included in the time standard. The formulae continue with charts detailing the application of the time standards.

It is important to realize that the time standards in the operation formulae section does not contain any allowances for PF & D (personal time, fatigue and unavoidable delays).

All of the standards contained in the operation formula section, except Area Travel, are applicable to any location. Area Travel is applicable only to Ingalls Shipbuilding.

SUPPORT DATA SECTIONS

The Layouts and Material Flow section of the manual (section 5) contains drawings of equipment locations aboard ship and process flow charts. See index on page 5-1.

The Facilities and Equipment section of the manual (section 6) contains tool lists for specific jobs, machining equipment specifications, and the list of required personal tools for a machinist.

The Allowances section of the manual (section 7) contains the development of the PF & D (Personal, Fatigue and Delay) factor used in this project.

The Standard Practices and Policies section of the manual (section 8) contains company operating procedures directl'y or indirectly affecting the worker.

The Process Data section of the manual (section 9) contains the derivation and application of the process times used in this manual. See the index on page 9-1.

The Data Synthesis and Back-Up section of the manual (section 10) contains the detailed MOST calculation sheets. See the index on page 10-1.

This section of the manual contains the unit standard sumMaries and information pertaining to the applicability of these standards. Below is an index showing how this section is constructed.

INDEX

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
2001.01	JOB Preparation	57,418	2.0	114,836
2001.02	Area Travel	52,124	2.0	104,248
2001.03	Set-Up Machine	2,840	2.0	5,680
2001.04	Final Position Machine	5,280	2.0	10,560
2001.05	Level Machine	13,370	2.0	26,740
2001.06	Remove Jack Tab	6,020	2.0	12,040
2001.07	Weld Machine in Place	19,540	2.0	39,080
2001.08	Operate Machine	388,397.	2.0	776,794
2001.09	Measure Progress & Verify Flatness	22,730	2.0	45,460
2001.10	Remove Machine	15,582	2.0	31,164
			SUBTOTAL	1,166,602
			PFD @ 20%	233,320
			TOTAL	1,399,922

TOTAL UNIT STANDARD

14.00 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
2002.01	Job Preparation	58,598	2.0	117,196
2002.02	Area Travel	40,742	2.0	81,484
2002.03	Align Pads on Foundation	37,600	2.0	75,200,
2002.04	Weld pads in place	88,640	2.0	177,280
2002.05	Tack Weld Tabs	18,480	2.0	36,960
2002.06	Set-Up & Position Machine	73,810	2.0	147,620
2002.07	Level Machine & Set Taper	26,400	2.0	52,800
2002.08	Weld Machine in Place	112,080	2.0	224,160
2002.09	Install & Change Cutting Tools	18,290	2.0	36,580
2002.10	Daily Machine Care	6,840	2.0	13,680
2002.11	Operate Milling Machine	293,947	2.0	587,894
2002.12	Weld Support Frame in Place	123,720	2.0	247,440
2002.13	Check Taper & Flatness	41,600	2.0	83,200
2002.14	Remove Machine & Support Frame	184,480	2.0	368,960
			SUBTOTAL	2,250,454
			PFD @ 20%	450,091
			TOTAL	2,700,545

TOTAL UNIT STANDARD

27.01 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
2003.01	Job Preparation	44,361	2.2	97,594
2003.02	Area Travel	71,704	2.2	157,749
2003.03	Install Boring Equipment	397,512	2.0	795,024
2003.04	Operate Boring Bar	705,809	2.0	1,411,618
2003.05	Prepare Machine After Each Cut	537,734	2.0	1,075,468
2003.06	Remove Boring Equipment	74,992	2.0	149,984
			SUBTOTAL	-3,687,437
			PFD @ 20%	737,487
			TOTAL	4,424,924

TOTAL UNIT STANDARD
44.25 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3001.01	Job Preparation	58,598	2.0	117,196
3001.02	Layout Pads	37,560	1.0	37,560
3001.03	Burn Pads	109,980	1.0	109,980
3001.04	Grind Pads	48,790	1.0	48,790
3001.05	Area Travel	82,404	2.0	164,808
3001.06	Layout Pad Locations	9,630	1.0	9,630
3001.07	Remove Temporary Bolts	14,606	1.0	14,606
3001.08	Tack Pads to Boiler	39,560	2.0	79,120
3001.09	Locate Boiler	25,080	2.0	50,160
3001.10	Tack Weld Pads to Deck	21,430	1.0	21,430
3001.11	Burn Pad to Boiler Weld	66,440	1.0	66,440
3001.12	Layout, Drill & SPotface Holes	117,270	2.0	234,540
3001.13	Bolt-Up With Temporary Bolts	68,766	2.0	137,532
3001.14	Bolt-Up With Permanent Bolts	136,576	3.0	409,728
			SUBTOTAL	1,501,520
			PFD @20%	300,304
			TOTAL	1,801,824

TOTAL UNIT STANDARD
18.02 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3002.01	Job Preparation	151,100	1.0	151,100
3002.02	Area Travel	64,364	1.0	64,364
3002.03	Layout & Drill Leg Stands	318,800	1.0	318,800
3002.04	Install Dummy Mounts & Leg Stands	105,496	1.0	105,496
3002.05	Check Snubber Alignment	101,664	1.0	101,664
3002.06	Install Permanent Leg Stand Bolts	121,818	1.0	121,818
3002.07	Install Resilient Mounts	61,052	1.0	61,052
3002.08	Install Snubber Cones & Liners	170,072	1.0	170,072
3002.09	Cut Out Shims	11,720	1.0	11,720
3002.10	Install Shims & Bolt Down Snubber Sockets	74,020	1.0	74,020
			SUBTOTAL	1,180,106
			PFD @ 20%	236,021
			TOTAL	1,416,127

TOTAL UNIT STANDARD
14.16 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3003.01	Job Preparation	27,467	1.0	27,467
3003.02	Area Travel	15,060.	1.0	15,060
3003.03	Remove Temporary Mounts	15,666	1.0	15,666
3003.04	Install Permanent Mounts	6,650	1.0	**6,650**
3003.05	Install Self-Locking Fasteners	18,228	1.0	18,228
			SUBTOTAL	83,071
			PFD @ 20%	**16,614**
			TOTAL	**99,685**

TOTAL UNIT STANDARD
1.00 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARDS IN TMU'S
3004.01	Job Preparation	58,301	2.0	116,602
3004.02	Area Travel	60,304	2.0	120,608
3004.03	Preparation for Burning Pads	5,860	1.0	5,860
3004.04	Burning Pads	10,660	1.0	10,660
3004.05	Grind Pads	25,860	1.0	25,860
3004.06	Drill Pads	16,130	1.0	16,130
3004.07	Layout for Drilling of Foundation	3,340	1.0	3,340
3004.08	Drill Foundation	19,080	1.0	19,080
3004.09	Tack Weld Pads	11,150	1.0	11,150
3004.10	Measure and Cut Shim Stock	6,100	1.0	6,100
3004.11	Burning-Wash-Out Tack Weld	8,680	1.0	8,680
3004.12	Install Shims & File Pads	9,070	1.0	9,070
3004.13	Install and Remove Temporary Fasteners	14,794	1.0	14,794
3004.14	Final Welding of Pads	13,370	1.0	13,370
3004.15	Install Self-Locking Fasteners	7,710	1.0	7,710
			SUBTOTAL	389,014
			PFD @ 20%	77,802
			TOTAL	466,816

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3005.01	Job Preparation	42,001	2.0	84,002
3005.02	Area Travel	59,484	2.0	118,968
3005.03	Drill Pads	27,949	1.0	27,949
3005.04	Layout for Drilling Foundations	3,350	2.0	6,700
3005.05	Drill Foundation	29,329	1.0	29,329
3005.06	Install Temporary Bolts	16,578	1.0	16,578
3005.07	Weld Pads	37,555	1.0	37,555
3005.08	Install Fitted Bolts	55,996	1.0	55,995
3005.09	File Pads	246,052	1.0	245,052
3005.10	Remove Temporary Bolts	17,768	1.0	17,768
3005.11	Install Permanent Bolts	21,865	1.0	21,865
			SUBTOTAL	662,762
			PFD @ 20%	132,552
			TOTAL	795,314

TOTAL UNIT STANDARD
7.95 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3006.01	Job Preparation	27,467	1.0	27,467
3006.02	Area Travel	12,570	1.0	12,570
3006.03	Remove Temporary Mounts	13,724	1.0	13,724
3006.04	Remove Covers and Brackets	23,418	1.0	23,418
3006.05	Install Covers and Brackets	22,828	1.0	22,828
3006.06	Install Resilient Mounts	10,240	1.0	10,240
3006.07	Belt Fan and Bracket Assembly to Resilient Mounts	6,954	1.0	6,954
			SUBTOTAL	117,201
			PFD @ 20%	23,440
			TOTAL	1,40,641

TOTAL UNIT STANDARD

1.41 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3007.01	Job Preparation	27,467	1.0	27,467
3007.02	Area Travel	14,160	1.0	74,160
3007.03	Remove Temporary Mounts	15,666	1.0	15,666
3007.04	Layout & Drill Holes In Foundation	36,704	1.0	36,704
3007.05	Install Permanent Mounts	6,650	1.0	.6,650
3007.06	Install Self-Locking Fasteners	18,228	1.0	18,228
			SUBTOTAL	118,875
			PFD @ 20%	23,775
			TOTAL	142,650

TOTAL UNIT STANDARD
1.43 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3008.01	Job Preparation	71,803	2.0	143,606
3008.02	Area Travel	37,000	2.0	74,000
3008.03	Layout Centerline	18,960	2.0	37,920
3008.04	Layout & Drill Beam	48,944	2.0	97,888
3008.05	Weld Guide Tabs in Place	10,930	2.0	21,860
3008.06	Position Rail, Layout & Measure	42,620	2.0	85,240
3008.07	Layout & Drill Rail	61,216	2.0	122,432
3008.08	Layout & Drill Pads	45,376	2.0	90,752
3008.09	Reposition Rail	87,894	2.0	175,788
3008.10	Position, Weld & Paint Pads	226,548	2.0	453,096
3008.11	Install Stops	84,700	2.0	169,400
3008.12	Install Bridge Crane	94,086	2.0	188,172
3008.13	Final Install Rail	65,280	2.0	130,560
			SUBTOTAL	1,790,714
			PFD @ 20%	358,143
			TOTAL	2,148,857

TOTAL UNIT STANDARD

21.49 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3009.01	Job Preparation	42,884	2.0	85,768
3009.02	Area Travel	18,960	2.0	37,920
3009.03	Layout & Drill Pads	27,024	1.0	27,024
3009.04	Tap & Check Pads	22,722	1.0	22,722
3009.05	Bolt Up Pads	9,250	1.0	9,250
3009.06	Weld Pads in Place	45,820	1.0	45,820
			SUBTOTAL	228,504
			PFD @ 20%	45,701
			TOTAL	274,205

TOTAL UNIT STANDARD

2.74 HRS.

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3010.01	Job Preparation	69,743	2.0	139,486
3010.02	Area Travel	26,700	2.0	53,400
3010.03	Layout Centerline	7,650	2.0	15,320
3010.04	Layout & Drill Beam	19,952	2.0	39,904
3010.05	Bolt Pivot Blocks Temporary	35,268	2.0	70,536
3010.06	Weld Guide Tabs in Place	3,510	2.0	7,020
3010.07	Position Rail, Layout & Measure	11,280	2.0	22,560
3010.08	Layout & Drill Rail	22,512	2.0	45,024
3010.09	Layout & Drill Pads	17,536	2.0	35,072
3010.10	Bolt Pivot Blocks to Rail	34,540	2.0	69,080
3010.11	Reposition Rail	24,364	2.0	48,728
3010.12	Prepare & Weld Pads	39,210	2.0	78,420
3010.13	Install Hoist	35,932	2.0	71,864
3010.14	Final Install Rail	39,570	2.0	79,140
			SUBTOTAL	775,554
			PFD @ 20%	155,110
			TOTAL	330,664

UNIT STANDARD SUMMARY

OPERATION CODE	OPERATION DESCRIPTION	OPERATION STANDARD IN TMU'S	REQUIRED MANNING	TOTAL STANDARD IN TMU'S
3011.01	Job Preparation	71,223	1.0	71,223
3011.02	Area Travel	100,514	1.0	100,514
3011.03	Collect and Classify Legs	19,220	1.0	19,220
3011.04	Layout Holes	4,180	1.0	4,180
3011.05	Drill Holes	31,980	1.0	31,980
3011.06	Bolt-Up Legs	43,986	1.0	43,986
			SUBTOTAL	271,103
			PFD @ 20%	54,220
			TOTAL	325,323

TOTAL UNIT STANDARD
3.25 HRS.

UNIT STANDARD APPLICABILITY ANALYSIS FOR MACHINING OPERATIONS

The unit standard summaries for maching (pages 3-2 through 3-4) include time to perform all of the necessary activities to completely machine these items aboard ship.

The unit standard summaries of machining operations contained in this manual do not allow for gantry crane delays, painting, rigging or avoidable delays.

These standards are devleoped at the 100% performance level using the basic MOST predetermined motion time system. To attain these standards a workman must be adapted to the work and have gained sufficient experience to enble him to perform his job with little or no supenision. The worker must also posses coordinated mental and physical qualities which enable him to proceed from one element to another without hesitation delay. The workman must maintain a high level of efficiency by his Knowledge and proper use of all tools and related equipment.

The explaintion of the theory behind the 20% personal, fatigue and un-avoidable delay allowance can be found on pages 7-1 and 7-2.

UNIT STANDARD APPLICABILITY ANALYSIS FOR EQUIPMENT INSTALLATION

The unit standard summaries for equipment installation (pages 3-5 through 3-15) include the to perform all of the necessary activities to completely Install those itms aboard ship.

The unit standard summaries for equipment installation contained in this manual do no allow time for shop preparation work, connecting piping, ventilation ducting installation, foundation installation, rigging, painting, electrical hook-up or avoidable delays.

These standards are developed at the 100% performance level using the basic MOST predetermined motion time system. To attain these standards a worlanan must be adapted to the work and have gained sufficient experience to enable him to perform his job with little or no supervision. The worker must also possess coordinated mental and-physical qualities which enable him to proceed from one element to another without hestiation or delay. The workman must maintain a high level of efficiency by his knowledge and proper use of all tools and related equipment.

The explaination of the theory behind the 20% personal, fatigue and unavoidable delay allowance can be found on pages 7-1 and 7-2.

MACHINING UNITS DESCRIPTIONS

FIVE INCH GUN MOUNT

The five inch gun Mount is the structural support ring upon which the upper portion of a five inch gun rests. The dimensions of this unit can be found on page 9-47. For the shipboard location of this unit see the figures on page 5-4 and 5-5.

MAIN ENGINE PADS

The main engine pads are used with chocks to attain proper height and angular alignment between the ship's main engine and main shafting. The dimensions of these pads can be found on page 9-51. For the shipboard location of these pads see the figures on pages 5-4,5-6 and 5-7.

STERN TUBE

The stern tube is a water tight deck penetration that contains the main propellor shafting where it emerges from the ship. It consists of a hollow cast steel cylinder. The dimensions of the stern tube can be found on page 9-43. For the shipboard location of the stern tube see page 5-4and 5-11.

INSTALLED EQUIPMENT DESCRIPTIONS

WASTE HEAT BOILER

The waste heat boiler removes excess heat generated by the ship's service generators and converts this heat for use by the hot water heating and distilling systems. For shipboard location of this unit see the figures on pages 5-4,5-6, and 5-7.

General Information

Dimensions: 180 LX73''WX84"H
Weight: 18,000 Lbs.
Installation Drawing: VLD 182017

AIR CONDITIONING PLANT

The air conditioning plant is the major component of the ships air conditioning system. It cools water it recieves. This water is then transferred throughout the ship to cooling coils. For the shipboard location of this unit see the figures on pages 5-4, 5-6, and 5-7.

General Information

Dimensions: 164" LX56''WX88" H
"Weight: 22,000 Lbs.
Installation Drawing: VLD 185078

INSTALLED EQUIPMENT DESCRIPTIONS

CHIIL WATER PUMP

The chill water pump transfers cooled water revieved from the air conditioning plant to cooling coil units throughout the ship. For the shipboard location of this pump see the figures on pages 5-4, 5-6 and 5-7.

General Information

Dimensions: 53″ L X 20″ W X 33″ H
Weight: 1,627 Lbs.
Installation Drawing: VLD 185079

HIGHPRESSURE AIR DEHYDRATOR

The high pressure air dehydrator is a unit that works in the ship's main high pressure system to remove moisture. For the shipboard location of this unit see the figures on pages 5-4, 5-6, and 5-7.

General Information

Dimension: 27″ L X 24" W X 42″ H
Weight: 650 Lbs.
Installation Drawing: VLD 185096

INSTALLED EQUIPMENT DESCRIPTIONS

BOAT HANDLING WINCH

The boat handling winch is a hoisting machine which is used primarily to lower or lift personnel carrier boats to or from the water. For the shipboard location of this unit see the figures on pages 5-4 and 5-10.

General Information

Dimensions: 44″ LX 39" HX 56″W
Weight: 6,300 Lbs.
Installation Drawing: GD 186078

VANMXIAL FAN

The vaneaxial Fan is a unit used in the ventilation system to circulate air. For the shipboard location of this unit see the figures on pages 5-4and 5-8.

General Information

Dimensions: 19″ Dia. X24″ L
Weight: 220 Lbs.
Installation Drawing: VLD 185139

INSTALLED EQUIPMENT DESCRIIPTION

SEWAGE PUMP

The sewage pump transfers sewage to a holding tank. For the shipboard location of this pump see the figures on pages 5-4 and 5-8.

General Information

Dimensions: 19″ L X 28″ W X 26″ H
Weight: 652 Lbs .
Installation Drawing: VLD 185633

BRIDGE CRANE AND RAILS

The bridge crane, located in the helicopter hanger, transports loads in support of helicopter maintenance. For the shipboard location of this unit see the figures on pages 5-4, 5-12, and 5-13.

General Information

Dimensions: 2 ton hoist mounted on a beam, 8′7"LX5"WX8″H spanning a pair of rails 32′ LX 5″ WX 8″ H
Installation Drawing: GD 186058

INSTALLED EQUIPMENT DESCRIPTIONS

CONVECTION OVEN

The convection oven is used in the galley for the preparation of food. The convection oven operates differently than the conventional free heat flowing oven. The convection oven forces the heat to circulate by the use of a fan. For the shipboard location of this unit see the figures on pages 5-4, 5-12, and 5-13.

General Information

Dimensions: 44″ L X 38″ W X 40″ H
Installation Drawing: GD 651004

HOIST AND MONORAIL

The hoist and monorail located in the helicopter hanger transports loads in support of helicopter maintenance. For the shipboard location of this unit see the figures on pages 5-4, 5-12, and 5-13.

General Information

Dimensions: 1 1/2 ton hoist mounted on a rail 28′ LX5"WX8″H
Installation Drawing: GD 186058

INSTALLED EQUIPMENT DESCRIPTIONS

COOLING COIL

A cooling coil is a ventilation system unit which is supplied with chilled water from the air conditioning plant. When the chilled water passes through this coil it cools the air immediately surrounding the coil. This chilled air is then circulated by the use of a fan. For the shipboard location of this unit see the figures on pages 5-4 and 5-9.

General Information

Dimensions: 47" LX18"WX6"H
Weight: 125 Lbs.
Installation Drawing: VLD 185200

AIR CONDITIONING PLANT INSTALLATION
MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale (Rigid)
3. Hammer
4. Center Punch
5. Hole Punch
6. Ratchet (1/2 in. Drive)
7. Sockets (7/8 in. & 1-1/2 in.)
8. Slugging Wrenches (1-5/16 in. & 2-1/4 in.)
9. "Y" Wrench (Custom Snubber Cone Fitting)
10. Portable Magnetic Base Drill
11. Drill Bits (1/8 in., 25/32 in. & 29/32 in.)
12. Scriber
13. Shears (to cut shim stock)
14. Feeler Gage
15. Allen Wrench (1/2 in.)
16. 6 in. Dykes
17. Marking Chalk
18. Hydraulic Jack

JOB PREPARATION FORMULA APPLICABILITY

The values in this formula include time to receive instructions from supervisor, read bill of material, read and secure drawing, get and put away tools,. and secure tools and parts from tool crib and warehouse.

The values are for one person per shift. These values do not include any travel time or any PFD allowance.

To use the job preparation formula, standards have to be extracted from one of the three major categories.

- Initial Job Preparation Operations

  Additional Job Preparation Operations

- Sub-Operation Activities

The initial job preparation chart gives time values for jobs of varying degrees of complexity (simple-average-complex). Initial job preparation is for the first day a job begins.

The additional job preparation chart also gives time values for jobs of varying degress of complexity. Additional job preparation is for the second and succeeding days of a job where less job preparation is generally required.

The sub-operation activities are operations which may be used to meet unique situations.

All detail data development of these operations may be found in section 10, Data Synthesis and Back-Up.

INITIAL JOB PREPARATION CODE 1001.10

CLASSIFICATION	TMU'S	APPLICATION	CODE
Simple	12050	Includes; receive instructions (3 Mins.) Read B.O.M./Simple Sketch/Get & Put away tools/Read and Sign time card.	1001.11
Average	42001	Includes; Simple Job Preparation, and additional *time for* receiving instructions (5 mins.), additional time for securing tools from tool crib, and reading an average drawing.	1001.12
Complex	65559	Includes average Job Preparation and additional time for receiving instructions (10 reins), secure parts from the warehouse and reading a complex drawing.	1001.13

NuE: The values for initial job preparation are for one (1) person per shift on the first day of the job. These values do not include any travel time *to* or from any location. For time values for travel see the area travel operation chart (code 1002.00). No PFD allowance has been added to these values.

ADDITIONAL JOB PREPARATION CODE 1001.20

CLASSIFICATION	TMU's	APPLICATION	
Simple	1180	Secure toos from too box and Put-up tools/read sign time card.	1001.21
Average	16597	Includes simple job preparation plus securing tools from tool crib.	1001.22
Complex	53152	Includes average job preparation plus securing additional materials from warehouse, also securing and reading an additional complex drawing.	1001.23

NOTE : The values for additional job preparation are for one (1) person per shift on second and succeeding days of job. These values do not include any travel to or from any location. For time ***values*** for travel see the area travel operation chart (code 1002.00). . No PFD allowance has been added to these values.

Below is a complete listing of Job Preparation Operations and Sub-Operations:

OPERATIONS:

DESCRIPTION	CODE	TMUS
Simple Initial Job Preparation	1001.11	12050
Average Initial Job Preparation	1001.12	42001
Complex Initial Job Preparation	1001.13	65559
Simple Additional Job Preparation	1001.21	1180
Average Additional Job Preparation	1001.22	16597
Complex Additional Job Preparation	1001.23	53152

SUB-OPERATIONS :

DESCRIPTION	CODE	TMUs
Get tools from tool box or put tools in tool box	1001.111	440
Secure tools from tool crib	1001.121	15417
Additional time for reading average drawing	1001.122	1.1200
Additional time for reading complex drawing	1001.131	3780
Secure parts from warehouse	1001.132	11445
Secure Material requisition form from Production Control	1001.1321	3042
Secure drawings from Repro-duction Services	1001.231	6070

All detail data, development of these operations may be found in Section 10,Data Synthesis and Back-Up under the appropriate code no.

AREA TRAVEL FORMULA DATA TABLE APPLICABILITY

The values in these formulas include the time to walk one way distances to frequently visited areas of the shipyard by outside machinists.

These values do not include any PFD allowances.

Values are for a single person.

To use the area travel formula data table, standards have to be extracted from the following categories:

- From Tool Boxes - To Work Area
- From Ship - To Support Area

Both the from tool boxes - to work area" and "from ship - to support area" charts show the starting location for the travel in the "from" column. The "to" column shows the location of the destination of the travel. This chart shows one way distance, the time value in TMU's, and the code number which relates to the travel route taken. The ship locations designated on these charts extend from the steps of the module on ground level to,or from,various areas of the shipyard. To arrive at specific areas on the ship, the additional time to get to those areas will have to be added into any complete item study.

ADDITIONAL JOB PREPARATION CODE 1001.20

CLASSIFICATION	TMU's	APPLICATION	CODE
Simple	1180	Secure tools from tool box and Put-up tools/read sign time card.	1001.21
Average	16597	Includes simple job preparation plus securing tools from tool crib.	1001.22
Complex	53152	Includes average job preparation plus securing additional materials from warehouse, also securing and reading an additional complex drawing.	1001.23

NOTE: The values for additional job preparation are for one (1) person per shift on second and succeeding days of job. These values do not include any travel to or from any location. For time values for travel see the area travel operation chart (code 1002.00). No PFD allowance has been added to these values.

FROM: TOOL BOXES

TO: WORK AREA

FROM	TO	DISTANCE ONE WAY	TMU's	CODE
7) Pre Integration Employee Tool Box	12) Module 1 Stairs	38 ft.	240	1002.11
7) Pre Integration Employee Tool Box	13) Module 2 Stairs	438 ft.	3300	1002.12
7) Pre Integration Employee Tool Box	14) Module 3 Stairs	375 ft.	2700	1002.13
7) Pre Integration Employee Tool Box	15) Module 4 Stairs (ladder)	875 ft.	6042	1002.14
7) Pre Float-Off Employee Tool Box	22) Stairs to Elev. on integrated ship	225 ft.	1520	1002.15
7) Pre Float-Off & Pre Integration Employee Tool Box	2) Tool Room Wetdock Bldg	1638 Ft.	11311	1002.16
7) Pre Float-Off & Pre Integration Employee Tool Box	16) Free Stock	263 ft.	1960	1002.17
7) Module 2 Stairs	17) AMR #1	*	2270	1002.18
7) Module 2 Stairs	18) Assy 102 Ladder	400 ft.	3000	1002.19

NOTES: Values are for one person. No. PFD allowance is included in these values.

*See Section 10 for details.

OPERATION TITLE: AREA TRAVEL

INGALLS SHIPBUILDING DIVISION

FROM: SHIP

TO: SUPPORT AREA

FROM	TO	DISTANCE ONE WAY	TMU ' S	CODE
12 Module 1 Stairs	8 Tool Rm Bay 3	525 ft.	3627	1002.201
12 "	9 Repro Track 2	188 ft.	1310	1002.202
12 "	5 Supv. Office Trk 1	388 ft.	2450	1002.203
12 "	2 Tool Room Wet Dock Bldg	1375 ft.	9494	1002.204
12 "	10 Production Control	638 ft.	4406	1002.205
12 "	21 Warehouse 301	2600 ft.	17952	1002.206
13'module 2 Stairs	8 Tool Room Bay 3	156 ft.	1130	1002.207
13 "	9 Repro Track 2	388 ft.	2700	1002.208
13 "	5 Supv. Office Track 1	875 ft.	6040	1002.209
13 "	2 Tool Room Wet Dock Bldg	1775 ft.	12256	1002.210
13 1,	10 Production Control	1050 ft.	7250	1002.211
13 "	21 Warehouse 301	2838 ft.	19595	1002.212

NOTES : Values for one person. No PFD allowance is included in these values.

FROM: SHIP

TO: SUPPORT AREA
(continued)

FROM	TO	DISTANCE ONE WAY	TMU 's	CODE
14 Module 3	8 Tool Room Bay 3	75 ft.	540	1002.213
14 "	9 Repro Track 2	575 ft.	3970	1002.214
14 "	5 Supv. Office Trk 1	775 ft.	5353	1002.215
14 "	2 Tool Room Wet Dock Bldg	1688 ft.	11656	1002.216
14 "	10 Production Control Office	975 ft.	6732	1002.217
14 "	21 Warehouse 301	2938 ft.	20285	1002.218
15 Module 4	4 Repro wet Dock Area	938 ft.	6478	1002.220
15 "	5 Supv Office Trk 1	613 ft.	4234	1002.221
15 "	2 Tool Room Wet Dock Bldg	750 ft.	5175	1002.222
15 "	20 Prod. Control Office	400 ft.	3000	1002.223
15 "	21 301 Warehouse	2338 ft.	16144	1002.224

NOTES : Values are for one person. No PFD allowance is included in these values.

FROM: SHIP

TO: SUPPORT AREA
(continued)

FROM	TO	DISTANCE ONE WAY	TMU'S	CODE
22 Integrated Ship	8 Tool Room Bay 3	675 ft.	4663	1002.225
2 2 "	9 Repro Track 2	500 ft.	3455	1002.226
2 2 "	5 Supv Office Track 1	375 ft.	2700	1002.227
2 2 "	2 Tool Room Wet Dock Bldg	1219 ft.	8418	1002.228
2 2 "	11 Production" Control Office	363 ft.	2700	1002.229
2 2 "	21 Warehouse 301	2475 ft.	17087	1002.230
3 Ship in Wet Dock Area	4 Repro Wet Dock Area	325 ft.	2450	1002.231
3 "	1 Supv Office Wet Dock Bldg	275 ft.	1960	1002.232
3 "	20 Prod. Control Office Wetdock Bldg.	338 ft.	2450	1002.233
3 "	2 Tool Room Wet Dock Bldg	400 ft.	3000	1002.234
3 "	21 Warehouse 301	1813 ft.	12517	1002.235

NOTES : Values are for one person. No PFD allowance is included in these values.

LAYOUT FOR DRILLING FORMULA APPLICABILITY

The values in this formula include time to layout holes for drilling with or without a template. Manufacture template values include time to fabricate a template..

To use the layout for drilling formula table, standards have to be extracted based on the following type of layouts:

- Without Template
- With Template
- Manufacture Template

The "without template" category includes measuring the necessary dimensions to locate a hole, center punching the hole and marking that hole for future reference.

The "with template" category includes using a manufactured template, placing the template in position, center punching the hole and marking that hole for future reference. The "with template" category also includes the use of an equipment's base as a template.

The "manufacture template" includes the time to manufacture a template using template paper.

NOTE : Values do not include travel or bending motions between hole locations. No PFD allowance is included. Values are for 1 person.

LAYOUT FOR DRILLING FORMULA DATA TABLE

LAYOUT	STANDARD IN TMU'S	CODE
WITHOUT TEMPLATE	1390 (Per Hole)	1003.10
WITH TEMPLATE	323 (Per Hole)	]003.20
MANUFACTURE TEMPLATE	1236 (Per Hole)	1003.30

NOTE : No PFD allowance included. Values are for 1 person.

DRILLING FORMULA APPLICABILITY

The values in this formula include time to set-up an electric hand drill or a magnetic base drill. The application of these standards is on a per hole, per job, or as required basis as noted.

DRILLING FORMULA DATA

OPERATION DESCRIPTION	SUB-OPERATIONS	TMU ' S	CODE
SET-UP WITH MAGNETIC BASE DRILL	Position Drill (per hole)	740	1004.11
	Use Safety Chain (per hole)	940	1004.12
	Plug in Extension Cord (per job)	2960″	1004.13
	Change Drill Bit (per job *or* as req'd)	2400	1004.14
	Hand Feed Drill Bit To and From Work Piece (per hole)	530	1004.15
SET-UP WITH ELECTRIC HAND DRILL	Plug in Extension Cord (per job)	2960	1004.13
	Change Drill Bit (per job or as req'd)	2400	1004.14
	Hand Feed Drill Bit to and From Work Piece (per hole)	110	1004.21
PROCESS TIME	Process time is determined by depth, material, brinell hardness, and diameter of the hole drilled	See Process Time charts for appro-priate value	See page 9-24

NOTE : No PFD allowance included. Values are for one person.

BOLT-UP FORMULA APPLICABILITY

The values in this formula include time to install a bolt in a non-threaded hole and assemble up to two washers and one nut to hold machinery.

The operations covered in this formula can be performed in all areas of the shipyard, shops and shipboard.

The tools involved include the use of two fixed wrenches or a fixed wrench and ratchet.

To use the Bolt-Up Formula data table, standards have to be extracted from the category section. Three major categories exist:

- Set-Up
- Position Bolt
- Turn Bolt

The set-up category differentiates between two fixed wrenches and a fixed wrench and ratchet. The standards are applied on a per job basis and includes removing the tools and materials from a tool bag at the work sight and putting materials and tools back in tool bag when the job is complete. The position bolt category includes placement of the bolt with washer in the hole and use of a hammer for tight holes. The *standards are* applied on *a* per bolt basis. This standard can be used for the removal of bolts. The turn bolt category differentiates between the use of a ratchet or fixed wrench and between plain nuts and bolts and elastic stop nuts and bolts. The charts mentioned under the standards *column are* identified by the Code Number which identifies its location in the data sythesis section.

A major portion of this analysis is based on the assembly of bolts. However, this is expanded to include the removal of belts. Removing a bolt can be less or more than the assembly. In some cases, a bolt can be loosened and "run out" rather easily. In other cases the loosening can involve considerable time, or the "run out" can be difficult. Therefore, for all practical purposes, the assembly and removal of bolts is set-up as one classification.

BOLT-UP FORMULA DATA TABLE

OPERATION DESCRIPTION	CATEGORY			CODE	TMU's
INSTALL BOLOT TO NON-THREADED HOLE AND ASSEMBLE NUT AND WASHER	SET-UP	FIXED WRENCH (Apply Per Job)		1005.01	860
		RATCHET (Apply Per Job)		1005.02	970
	POSITION BOLT (Apply Per Bolt)			1005.03	410
	TURN BOLT	RATCHET & FIXED WRENCH (APPlY Per Bolt)	PLAIN NUTS & BOLTS	1 005•04	See Page 6-18
			ELASTI-STOP NUTS & BOLTS	1005.05	See Page 6-19
		TWO FIXED WRENCHES (Apply Per Bolt)	PLAIN NUTS & BOLTS	1005.06	See Page 6-20
			ELASTI-STOP NUTS & BOLTS	1005.07	See Page 6-21

NOTE : NO PFD ALLOWANCE INCLUDED. Values are for 1 person.

Turn Bolt with ratchet for plain nuts and bolts

BOLT DIAMETER IN INCHES	STD IN TMUs
1/8	160
1/4	320
1/2	559
5/8	708
3/4	838
7/8	987
1	1117
1 1/2	1676

NOTES : No PFD Allowance included. Values are for one person.

OPERATION TITLE: BOLT-UP

Turn bolt with ratchet for elasti-stop nuts and bolts

BOLT DIAMETER IN INCHES	STD. IN TMU's
l/8	240
1/4	420
1/2	810
5/8	1026
3/4	1215
7/8	1431
1	1620
1 1/2	2430

NOTES : No PFD Allowance included. Values are for one person.

Turn bolt with fixed wrench for plain nuts and bolts

BOLT DIAMETER IN INCHES	STD. IN TMU'S
1/8	740
1/4	540
1/2	953
5 /8	1207
3/4	1429
7/8	1688
1	1906
1/2	2859

NOTES : No PFD Allowance included. Values are for one person.

Turn bolt with fixed wrench for elasti-stop nuts and bolts

: up to two washers and one nut to hold

d in this formula can be performed in
shipboard.

lude the use of two fixed wrenches or

rmula data table, standards have to be
ee major categories exist:

p

ion Bolt

Bolt

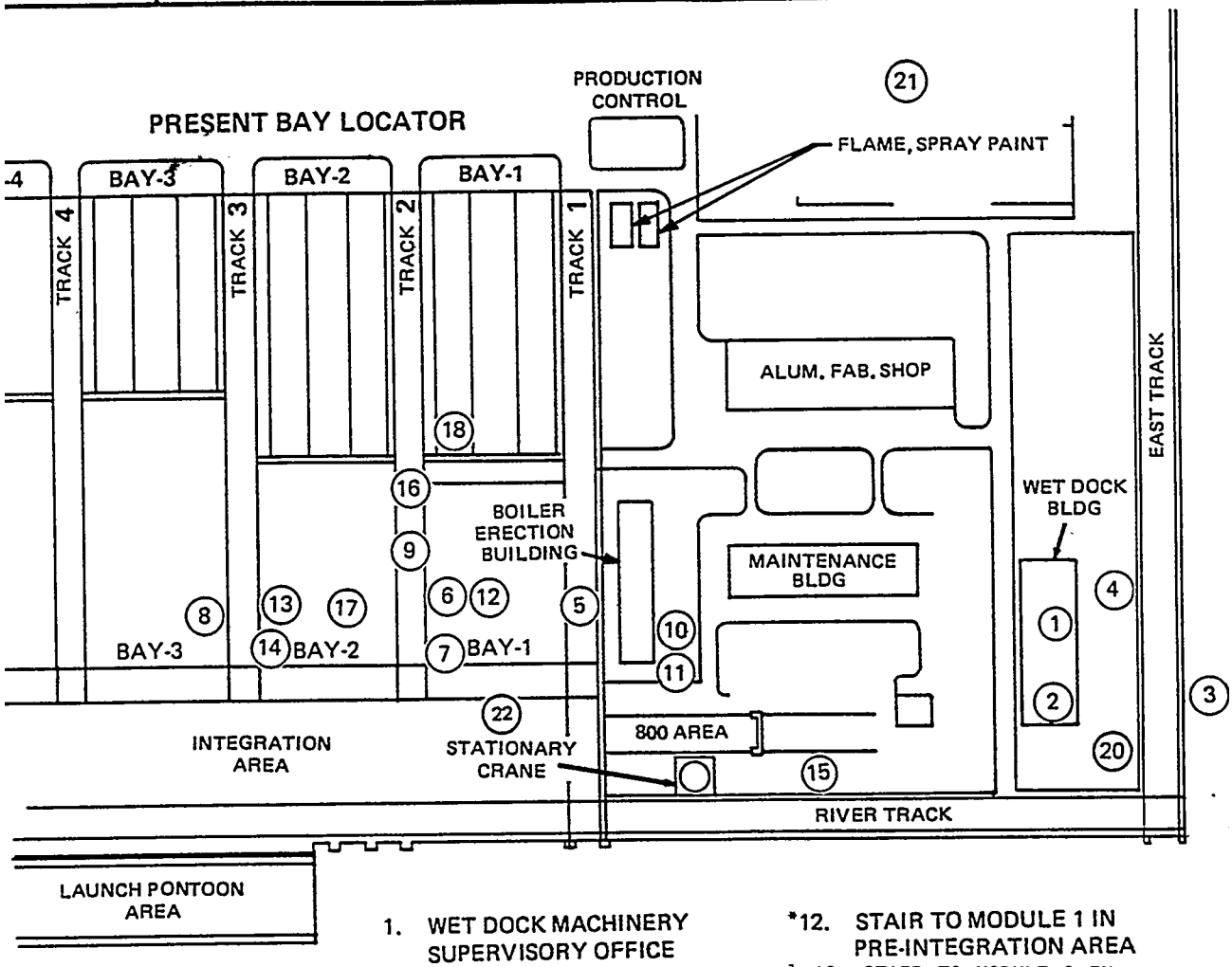
1	3240
1/2	4860

NOTES : No PFD Allowance included. Values are for one person.

It Layouts and Material Flow" shows the overall sectional layout for each item as installed on board ship. Also, it details the typical process sequences to machine or to install pieces of equipment.

INDEX

INDEX (CONTINUED)

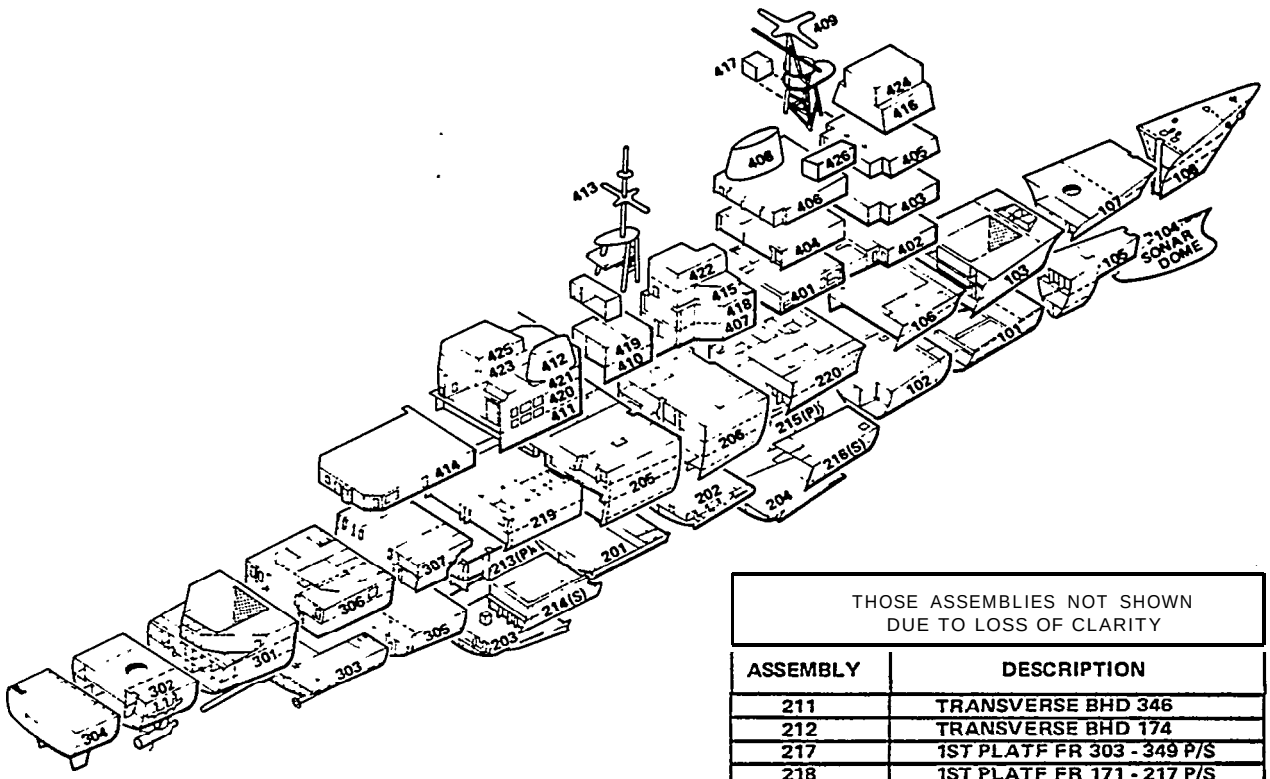


1. WET DOCK MACHINERY SUPERVISORY OFFICE
2. WET DOCK TOOL ROOM
3. STAIRS TO MAIN DECK INWETDOCK AREA
4. REPROGRAPHIC SERVICES IN WET DOCK AREA
5. PRE-INTEGRATION SUPERVISION OFFICE
6. PRE-FLOAT-OFF SUPERVISION OFFICE
7. PRE-FLOAT-OFF & PRE-INTEGRATION EMPLOYEE TOOL BOXES
8. BAY 3 TOOL ROOM
9. REPROGRAPHICS SERVICES BAY 2
10. PRODUCTION CONTROL PRE-INTEGRATION
11. PRODUCTION CONTROL PRE-FLOAT-OFF

*12. STAIR TO MODULE 1 IN PRE-INTEGRATION AREA
l 13. STAIR TO MODULE 2 IN PRE-INTEGRATION AREA
l 14. STAIR TO MODULE3 IN PRE-INTEGRATION AREA
15. LADDER TO MODULE 4 IN PRE4NTEGRATION AREA
16. FREE STOCK IN PRE-FLOAT-OFF AREA
17. AMR NO. 1
18. ASSY. 102
19. NOT USED
20. PRODUCTION CONTROL POST FLOAT-OFF
21. 301 WAREHOUSE
*22. STAIRS TO ELEVATOR FOR INTEGRATED SHIP

l (MAJOR WORKPLACE)

CG 47 CLASS SHIP EQUIPMENT LOCATOR



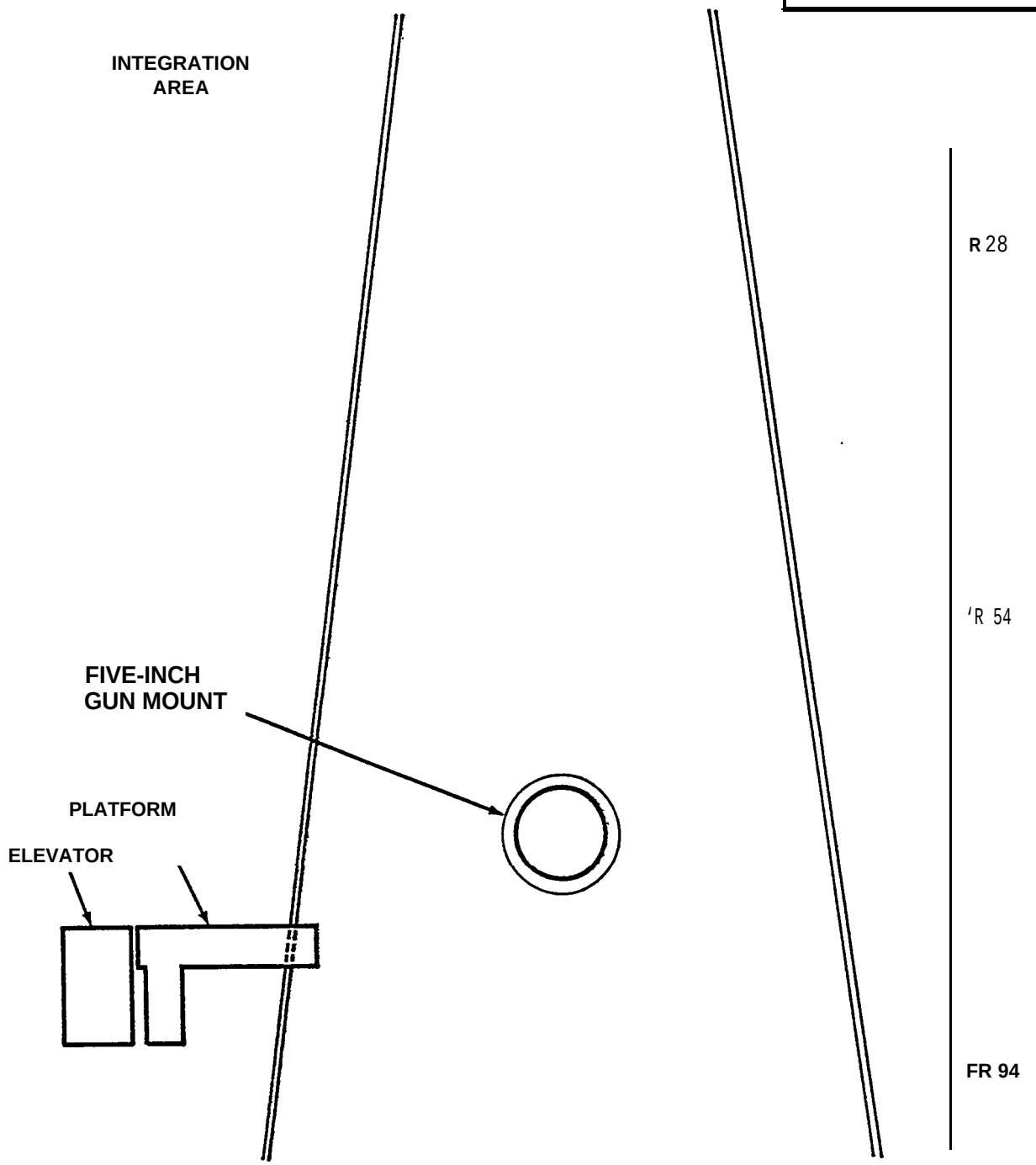
THOSE ASSEMBLIES NOT SHOWN DUE TO LOSS OF CLARITY	
ASSEMBLY	**DESCRIPTION**
211	TRANSVERSE BHD 346
212	TRANSVERSE BHD 174
217	1ST PLATF FR 303 - 349 P/S
218	1ST PLATF FR 171 - 217 P/S
221	BILGE KEEL FR 212 - 346 P/S
222	15'-0" FLAT FR 300 - 346
223	15'-0" FLAT FR 174 - 220

EQUIPMENT DESCRIPTION	EQUIPMENT LOCATION
CONVECTION OVEN	ASSEMBLY 205, MAIN DECK
BRIDGE CRANE AND RAILS	ASSEMBLY 421,03 LEVEL
HOIST AND MONORAIL	ASSEMBLY 421,03 LEVEL
STERN TUBE	ASSEMBLY 303, STARBOARD - INTERBOTTOM
BOAT HANDLING WINCH	ASSEMBLY 419, PORT -02 LEVEL
COOLING COIL	ASSEMBLY 306, PORT - MAIN DECK
VANEAXIAL FAN	ASSEMBLY 102, 2ND PLATFORM
SEWAGE PUMP	ASSEMBLY 102, 3RD PLATFORM
FIVE INCH GUN MOUNT	ASSEMBLY 107,01 LEVEL
WASTE HEAT BOILER	ASSEMBLY 216, 1ST PLATFORM
A. C. PLANT	ASSEMBLY 206, 2ND PLATFORM
CHILL WATER PUMP	ASSEMBLY 206, 2ND PLATFORM
H.P. AIR DEHYDRATOR	ASSEMBLY 206, 2ND PLATFORM
MAIN ENGINE PADS	ASSEMBLY 204, 3RD PLATFORM

TOP VIEW OF O1 LEVEL
FORWARD - WEATHER DECK

LEGEND

SCALE: 1" = 12.5'
SUBJECT: FORWARD FIVE INCH GUN MOUNT

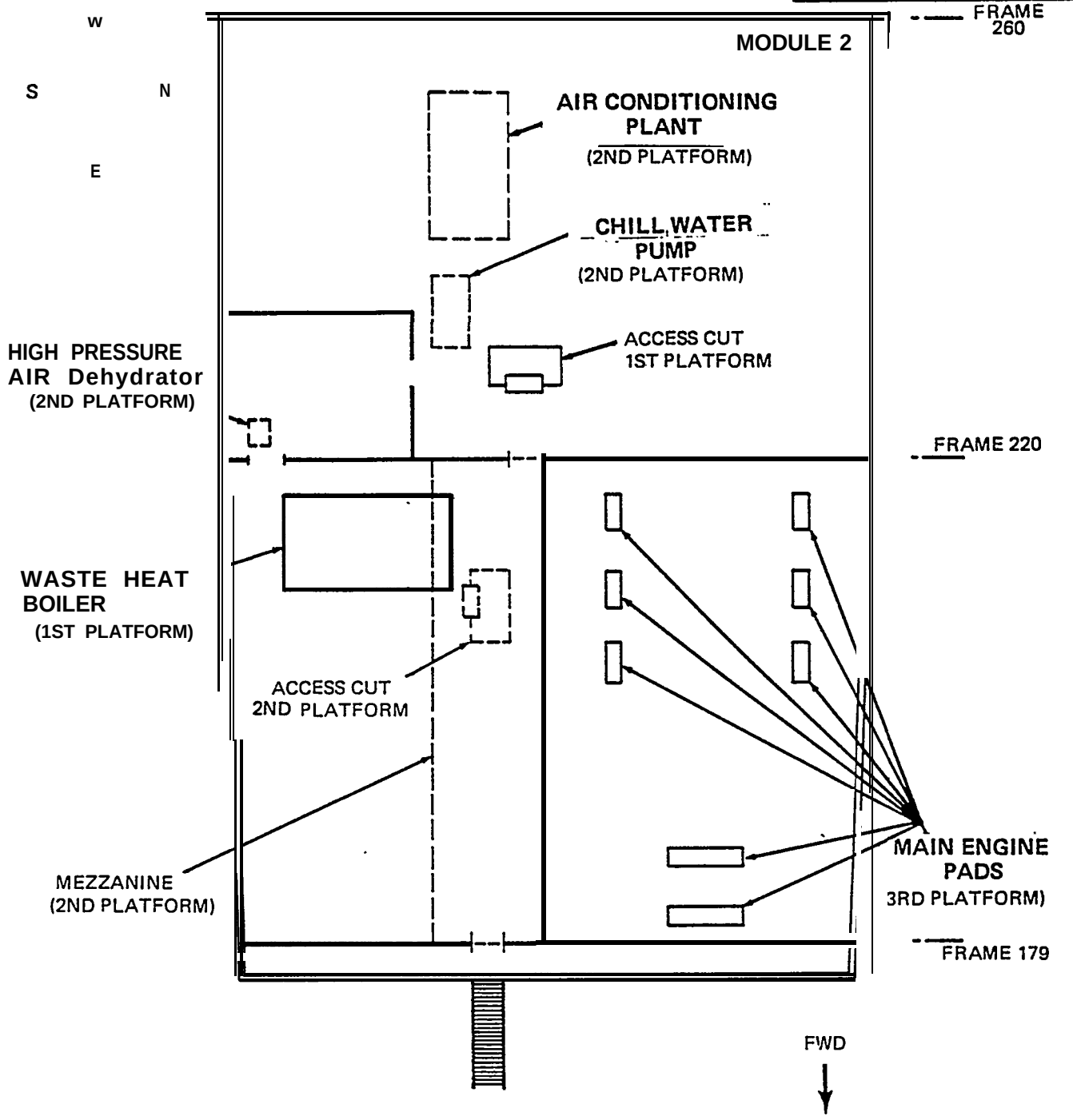


TOP VIEW OF MODULE 2

SCALE 1" = 12.5'

LEGEND

SUBJECT:
MAIN ENGINE PADS
AIR CONDITIONING PLANT
CHILL WATER PUMP
HIGH PRESSURE AIR DRYEI
WASTE HEAT BOILER



SIDE VIEW OF MODULE 2

SCALE: 1" = 12.5'

SUBJECT MAIN ENG. PAD: H.P. AIR DRYER, CHILL WATER PUMP, A.C. PLANT WASTE HEAT BOILER

ACCESS CUT

WASTE HEAT BOILER

CHILL WATER PUMP

C. Inboard Area Layouts

1. Top View of 01 level - Forward Weather Deck 5-5

a. Five Inch Gun

2. Top View of Module 2 5-6

a. Waste Heat Boiler

b. A. C. Plant

c. Chill Water Pump

d. H. P. Air Dehydrator

e. Main Engine Pads

MAIN DECK

1ST PLATFORM

2ND PLATFORM

3RD PLATFORM

INTER BOTTOM

HIG
AIR

MODULE 2
FRAME 174, LOOKING AFT

TOP VIEW OF ASSEMBLY 102

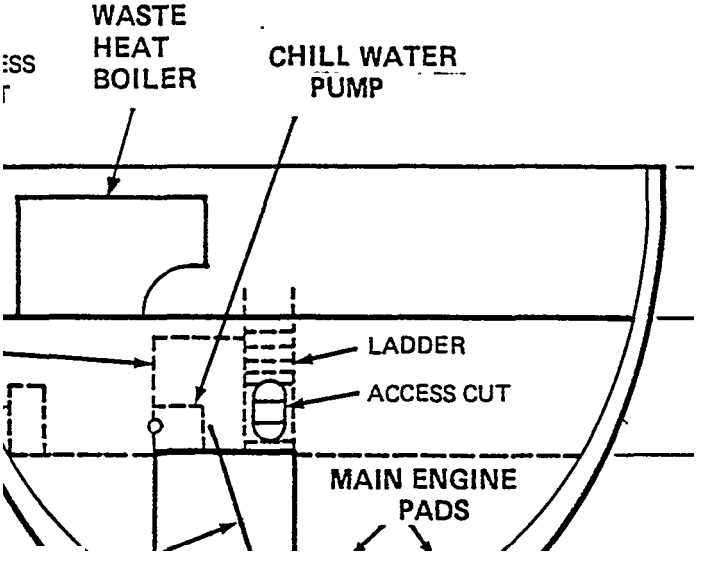
LEGEND
E
S

H.P. AIR DRYER, CHILL
WATER PUMP. A.C. PLANT.
WASTE
SEWAGE PUMP

VANEAXIAL
FAN
2ND PLATFORM

SEWAGE
PUMP
3RD PLATFORM

ACCESS
CUT
2ND PLATFORM



FR 146

FR 162

LADDER
2ND PLATFORM
TO GROUND

TRACK 2

BAY 2

TOP VIEW OF ASSEMBLY 306

LEGEND

E

N S

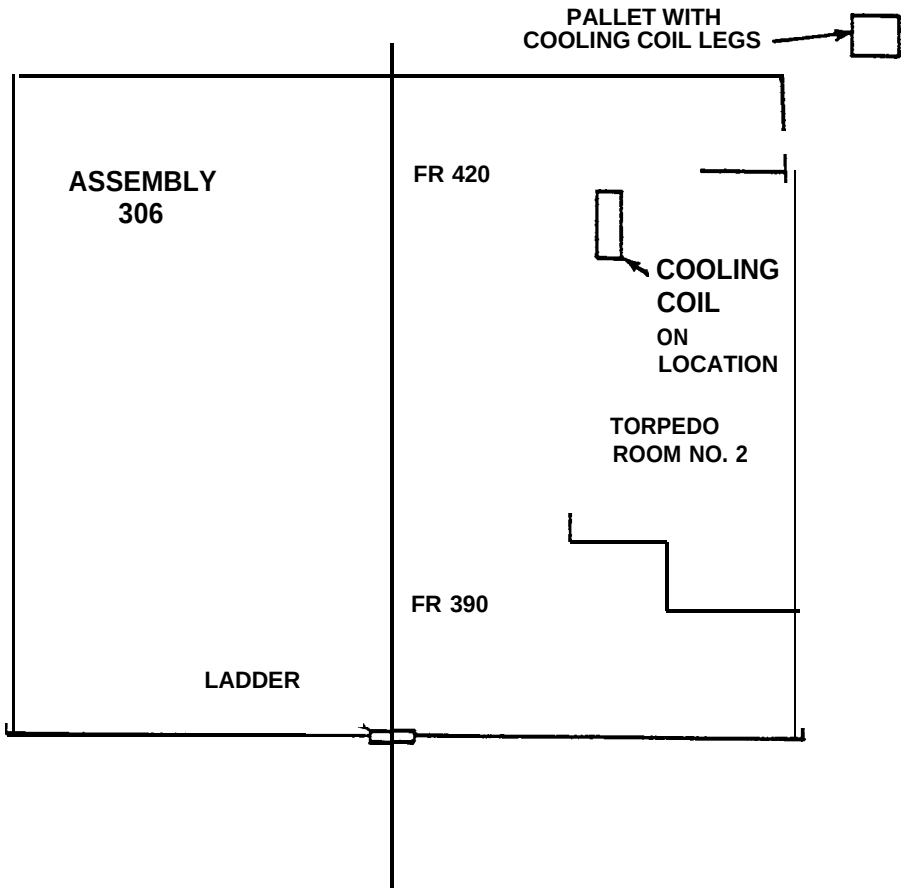
W

SCALE: 1" = 12.5'

SUBJECT: COOLING COIL

BAY 1

TRACK 2



BAY 2

TOP VIEW OF ASSEMBLY 419

LEGEND

N

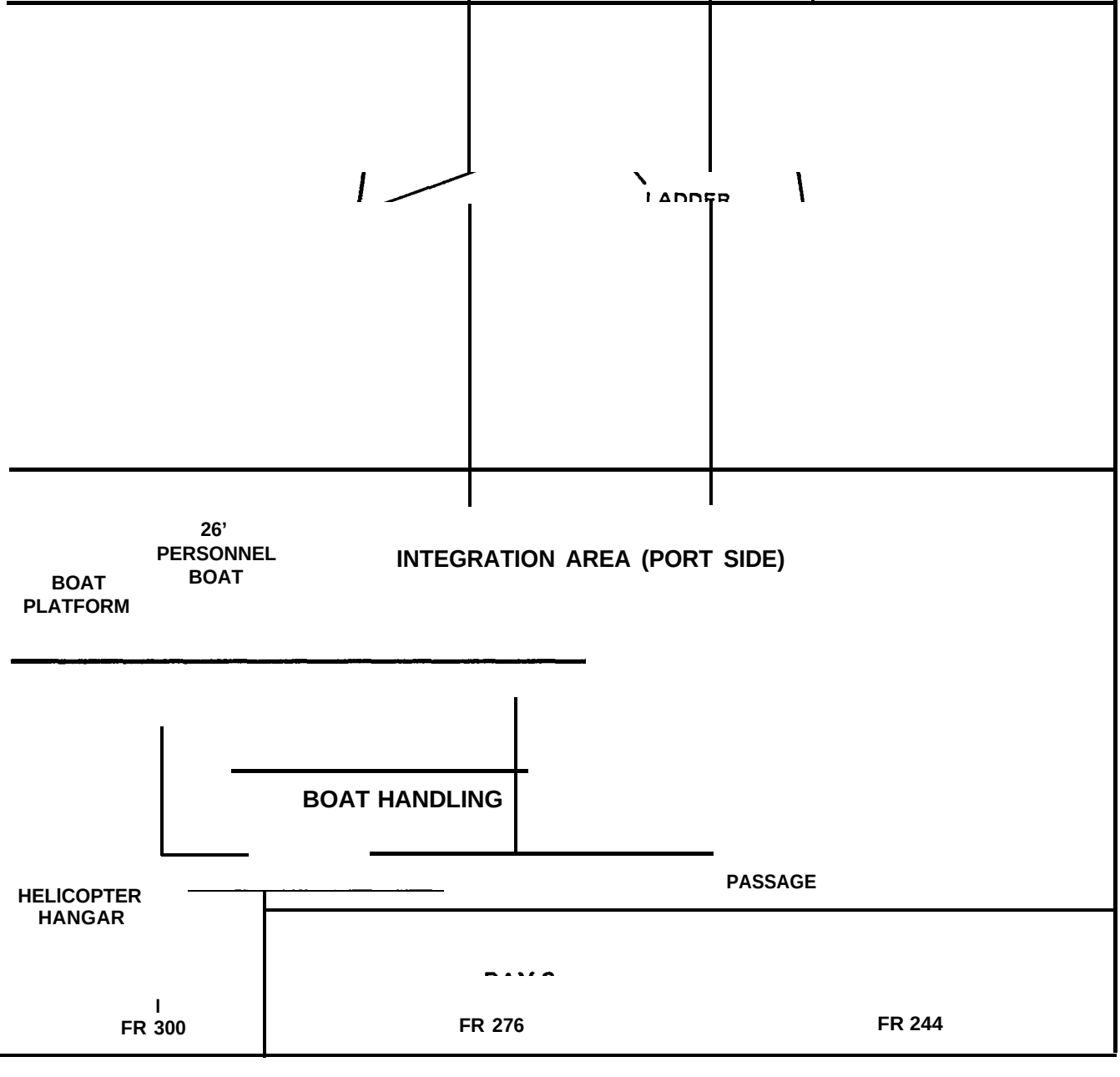
W E

+

S

SCALE: 1“ = 12.5’

SUBJECT: BOAT HANDLING WINCH



UNDERSIDE VIEW OF ASSEMBLY 303

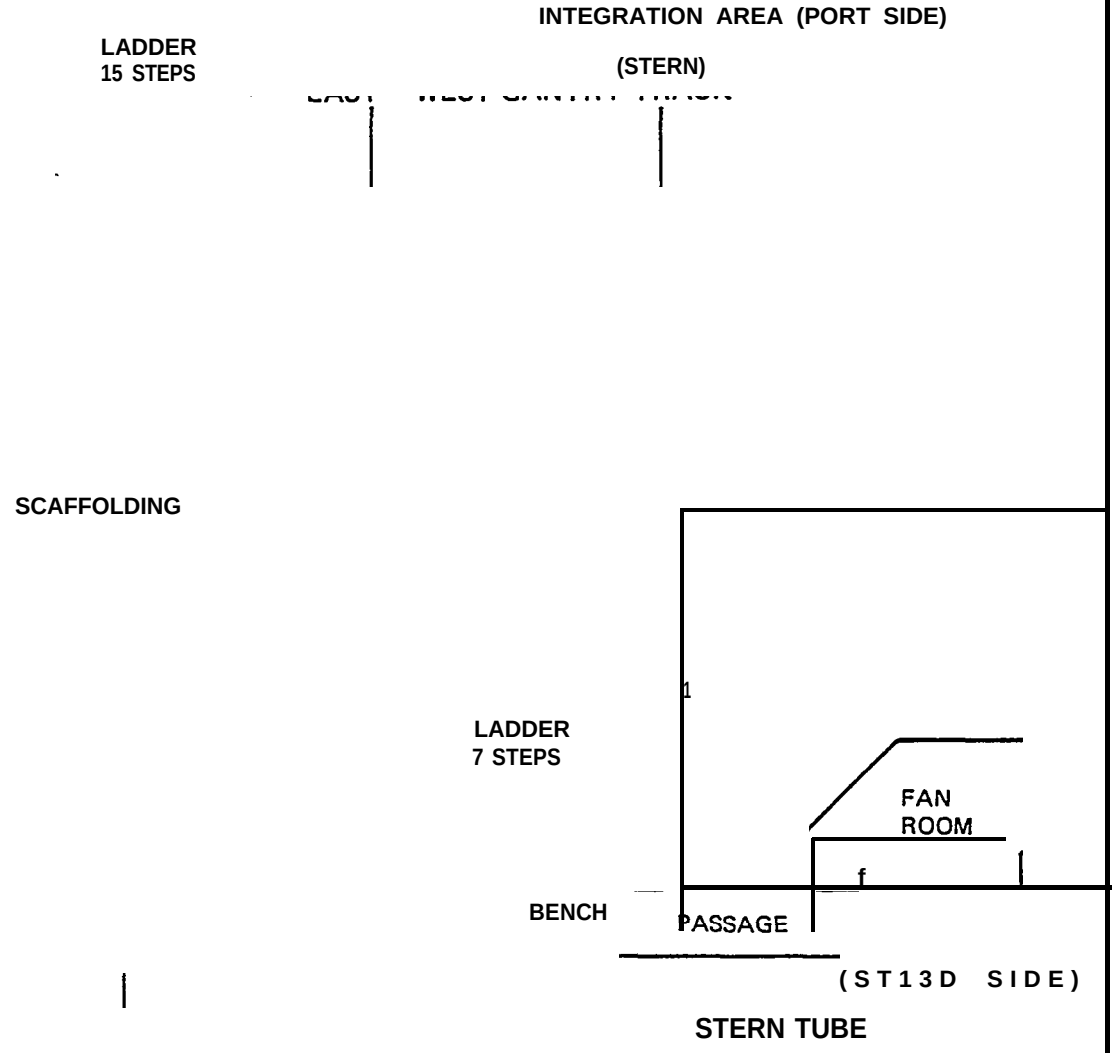
LEGEND

W ◄—┼—► E

SCALE 1“ = 12.5’

SUBJECT: STERN TUBE

EAST – WEST GANTRY TRACK



FR 452 FR 434 414 406 398 390 374

INGALLS Shipbuilding

WM - MANUAL

CODE

DATE 9-26.84

SIGN. TLC

'AGE 5-12

SECTION 5 LAYOUTS AND MATERIAL FLOW

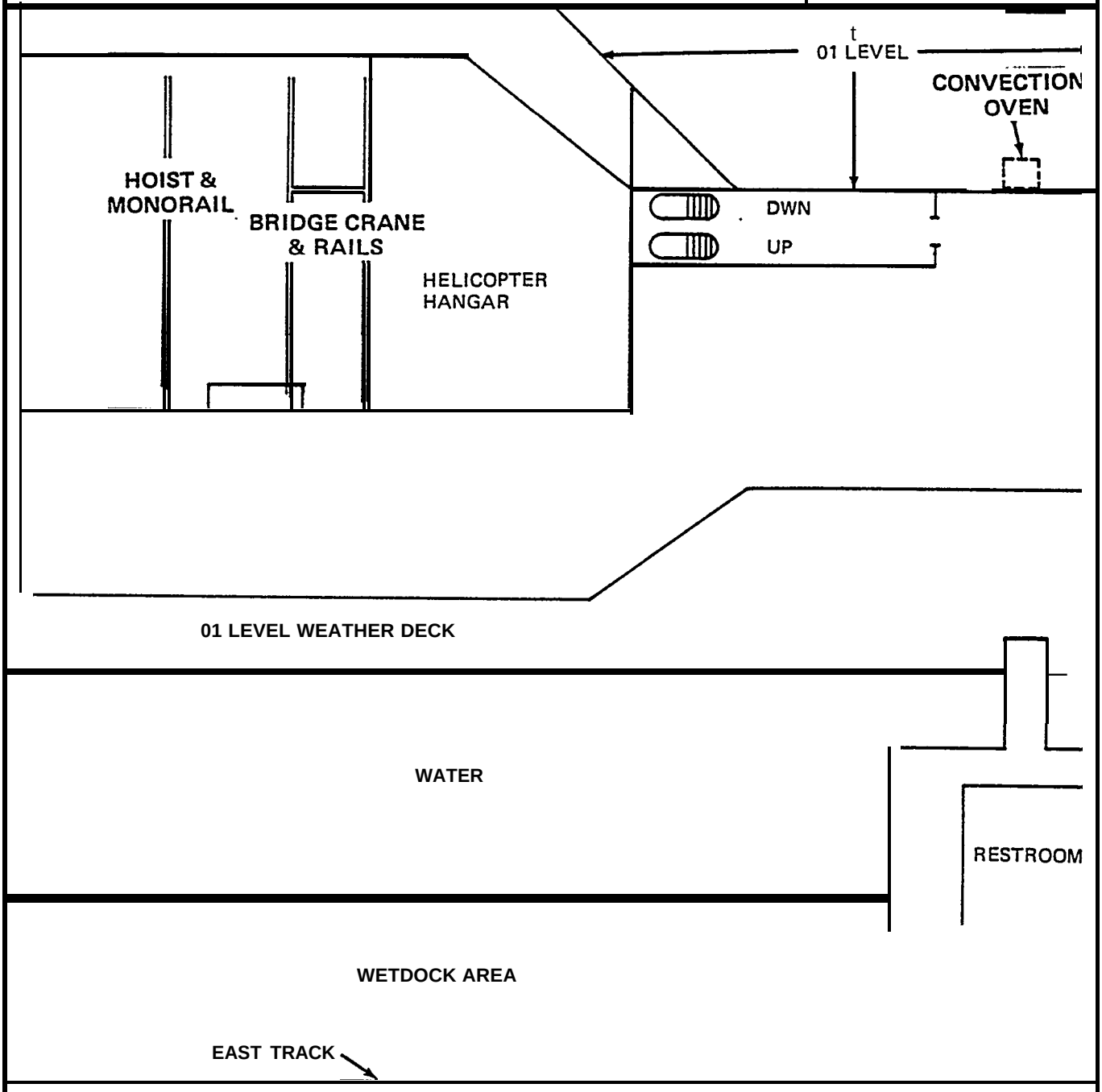
TOP VIEW OF GALLEY AND HELICOPTER HANGAR AREAS

EAST PASCAGOULA RIVER

LEGEND N~ s

SCALE: 1" = 12.5'

SUBJECT:
BRIDGE CRANE & RAILS,
HOIST & MONORAIL,
CONVECTION OVEN



SIDE VIEW OF GALLEY AND HELICOPTER HANGER AREAS

LEGEND

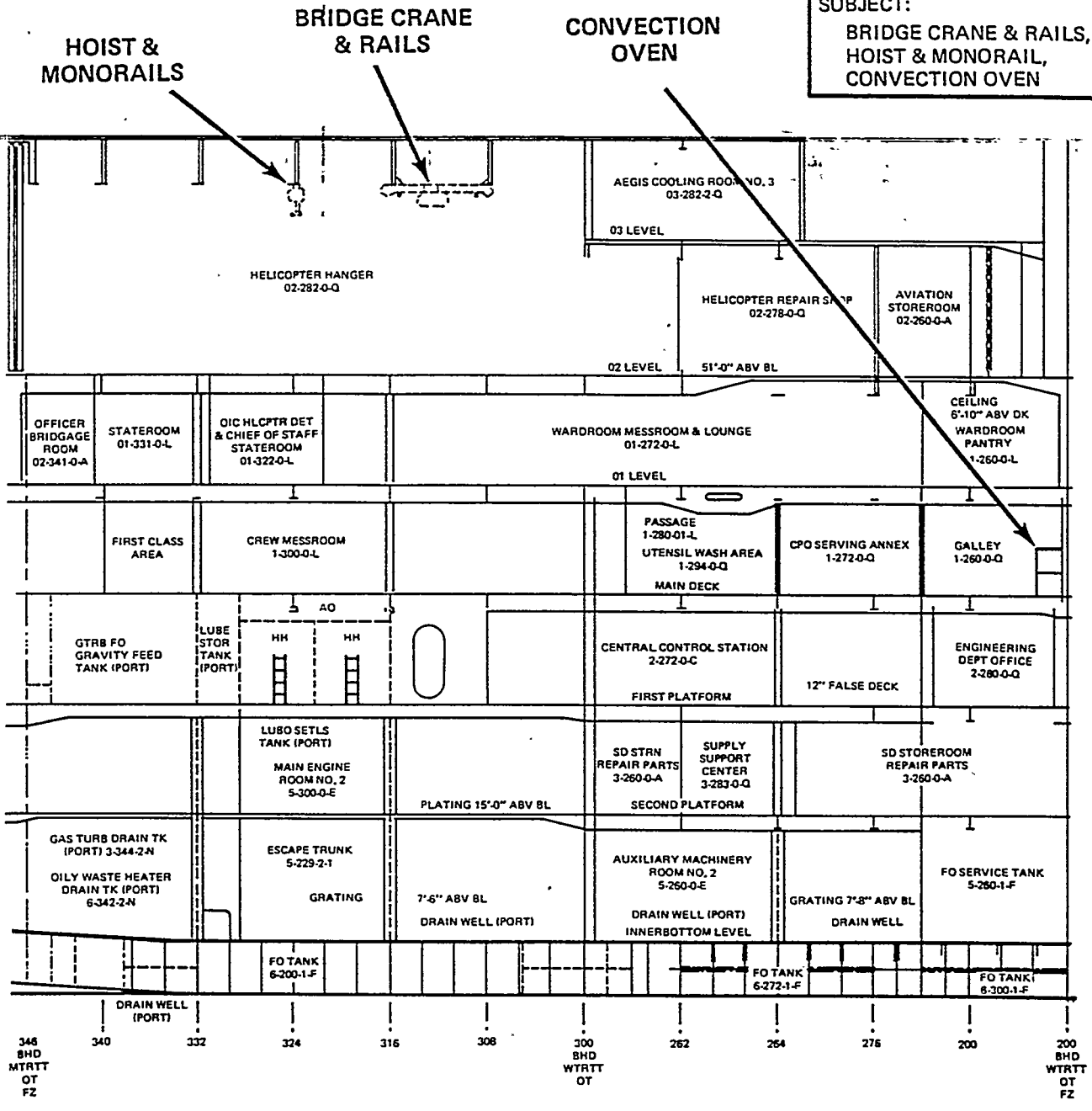
N ⟷ S

AFT ⟷ FWD

SCALE: 1" = 12.5'

SUBJECT:

BRIDGE CRANE & RAILS, HOIST & MONORAIL, CONVECTION OVEN



AT SHIP'S CENTER LINE, LOOKING PORT

UNDERSIDE VIEW OF ASSEMBLY 303

LEGEND

W ⟷ E

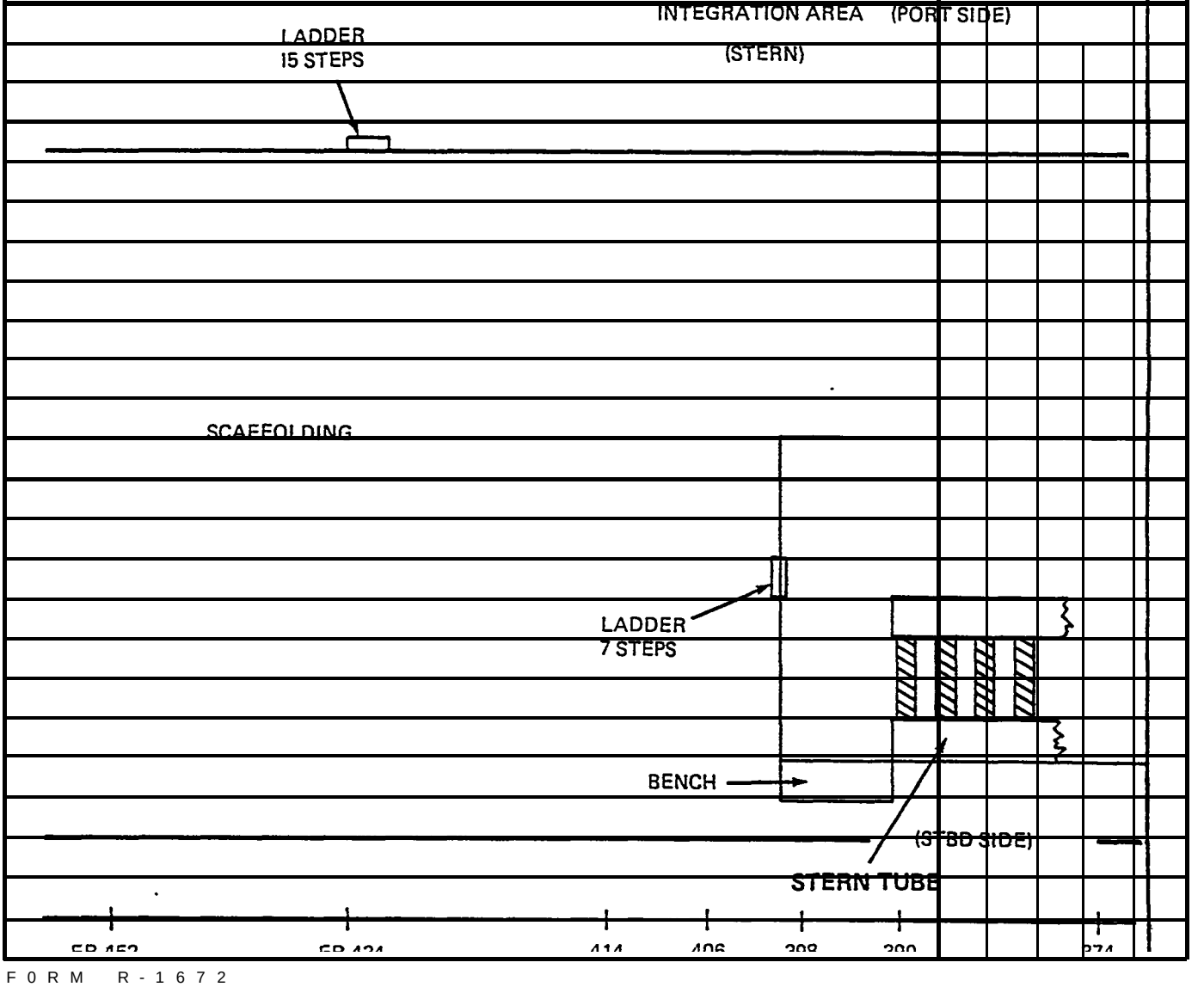
SCALE 1" = 12.5'
SUBJECT: STERN TUBE

ACTIVITY

I

EAST - WEST GANTRY TRACK

DELAY STORAGE



PROCESS FLOW CHART

ACTIVITY EQUIPMENT INSTALLATION (TYPICAL)
CHART BEGINS IN WAREHOUSE
CHART ENDS ON SHIP

OPERATION ○
INSPECTION □
TRANSPORT ⇨
DELAY D
STORAGE ▽

	DESCRIPTION	SYMBOL
1	Stored in Warehouse	○ □ ⇨ D ▽
2	Transport to Machinery Assembly Shop (Truck)	○ □ ⇨ D ▽
3	Inspect	○ ■ ⇨ D ▽
4	Prepare for Installation (As Necessary)	● □ ⇨ D ▽
5	Transport to Material Holding Area (Truck)	○ □ ⇨ D ▽
6	Wait for Crane	○ □ ⇨ D ▽
7	Transport on Board (Crane)	○ □ ⇨ D ▽
8	Wait for Machinist and Rigger	○ □ ⇨ D ▽
9	Position Unit (Chain fall)	○ □ ⇨ D ▽
10	Temporary Bolt	● □ ⇨ D ▽
11	Take Sizes Liners/Chocks	● □ ⇨ D ▽
12	Unbolt	● □ ⇨ D ▽
13	Remove Unit (ChainFall)	○ □ ⇨ D ▽
14	Place Liners/Chocks	● □ ⇨ D ▽
15	Reposition Unit (Chainfall)	○ □ ⇨ D ▽
16	Temporary Bolt	● □ ⇨ D ▽
17	Wait for Welder	○ □ ⇨ D ▽
18	Weld	● □ ⇨ D ▽
19	Unbolt	● □ ⇨ D ▽
20	Wait for Painter	○ □ ⇨ D ▽
21	Paint	● □ ⇨ D ▽
22	Permanent Bolt-Up	● □ ⇨ D ▽
23	Inspect Installation	○ ■ ⇨ D ▽
		○ □ ⇨ D ▽

:ESS

PORTABLE MILLING MACHINE BY MASTER MANUFACTURING COMPANY MODEL RPTM-6

SPECIFICATIONS :

Machining Head Power	- 5 H.P.
Vertical Feed	- 10 inches of travel
Transverse Feed	- 14 inches of travel @ 1-11/16 to 16-3/8 IPM
Longitudinal Feed	- 122 inches of travel @ 4-40 IPM
Weight	- 4380 lbs.

PORTABLE BORING MACHINE BY MULTIPLE BORING MACHINE COMPANY

SPECIFICATIONS :

BAR DIAMETER	- 4 inches
BAR LENGTH	- 8 feet
SPEED	-o to l0 PRM
FEED RATE	- 0.1 to 0.2 inches per minute
WEIGHT (Boring Bar Only)	- 1150 lbs.

PORTABLE MAGNETIC DRILL PRESS BY BLACK AND DECKER MODEL 741

SPECIFICATIONS :

DRILLING CAPACITY	- Up to 1-1/4 inch diameter
REAMING CAPACITY	- Up to 1 inch diameter
TAPPING CAPACITY	- Up to 1 inch diameter
NO LOAD SPEED	- 250 & 500 RPM
RATED LOAD SPEED	- 175 & 315 RPM
DRILL LENGTH STROKES	- 15 inches
WEIGHT	- 101 lbs.
HEIGHT	- 31 inches
LENGTH	- 18-7/8 inches
WIDTH	- 4-13/16 inches

OUTSIDE MACHINIST PERSONAL TOOL LIST

First Year - Tools required by 2nd pay period upon reporting to work:

Tool Box
Ball Pein Hammer - 12 oz.
8′ - Steel Tape
10″ Channel Lock Pliers
12″ crescent Wrench
Screw Drivers - Assorted Sizes (straight & phillips)
6″ Steel Scale (rigid)
Center Punch
Scriber (with magnet)

Second Year - Tools required at start of 2000 work hours.

6″ dykes
6″ Crescent Wrench
1/2″ Drive 12 point Socket set - 7/16″ to 1-1/4″
Hacksaw Frame
10" Vise Grips
Alleri Wrench set - 1/16″ to 3/8″
Feeler Gauges - .001 to .032

Third Year Tools required at start of 4000 work hours.

Wrench set Open End & Box End 3/8″ to 1-1/4″
6″ Needle Nose Pliers
4″ & 8″ Inside Calipers
4″ & 6″ Outside Calipers
3/8″ Drive set (optional)
6" & 12″ Dividers
Machinist Combination Square
Torpedo Level

It is understood that the apprentice may periodically purchase tools not listed above in order to perform his duty.

A First Class Machinist should have all of the above tools upon entry into the shipyard.

TOOL LISTS FOR SPECIFIC JOBS

FIVE INCH GUN MOUNT FACING

MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel *Scale* (Rigid)
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Socket (1 in.)
7. Slugging Wrench (1-1/2 in.)
8. Allen Wrench (1/4 in.)
9. Feeler Gage
10. Carbide Cutting Tool

MAIN ENGINE PADS FACE MILLING

MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel *Scale*
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Socket (3/4 in.)
7. Allen Wrench (]/4 in.)
8. Chalkline
9. Taper level
10. Carbide Single Point Cutting Tools
11. 10 ft. Straight Edge
12. Hydraulic Jack

STERN TUBE BORING

MACHINIST TOOLS REQUIRED

1. Ratchet (1/2 in. Drive)
2. Socket Set (7/16 in. to 1-1/4 in.)
3. Fixed End Wrench Set (3/8 in. to 1-1/4 in.)
4. Hammer
5. File
6. Allen Wrench Set (1/16 in. to 3/8 in.)
7. 6 in. Steel Scale (Rigid)
8. Screw Driver (Flat)
9. ID Micrometer
10. Portable Surface Grinder
11. Chip Puller Rake
12. Feeler Gage
13. Carbide Cutting Tools

WASTE HEAT BOILER INSTALATION

MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. Hammer
3. Center Punch
4. Scriber
5. Drill Bit (1-5/16 in.)
6. Drill Bit (25/32 in.)
7. Drill Bit (17/64 in.)
8. Portable Magnetic Base Drill
9. Fly Cutter Tool
10. Feeler Gage
11. Fixed End Wrenches (1-7/8 in.)
12. Hydraulic Jack

AIR CONDITIONING PLANT INSTALLATION
MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale (Rigid)
3. Hammer
4. Center Punch
5. Hole Punch
6. Ratchet (1/2 in. Drive)
7. Sockets (7/8 in. & 1-1/2 in.)
8. Slugging Wrenches (1-5/16 in. & 2-1/4 in.)
9. "Y" Wrench (Custom Snubber Cone Fitting)
10. Portable Magnetic Base Drill
11. Drill Bits (1/8 in., 25/32 in. & 29/32 in.)
12. Scriber
13. Shears (to cut shim stock)
14. Feeler Gage
15. Allen Wrench (1/2 in.)
16. 6 in. Dykes
17. Marking Chalk
18. Hydraulic Jack

CHILL WATER PUMP INSTALLATION

MACHINIST TOOLS REQUIRED

1. Socket (1-1/8 in. & 13/16 in.)
2. Ratchet (1/2 in. Drive)
3. Fixed End Wrenches (1-1/8 in. & 13/16 in.)

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION
MACHINIST TOOL REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale (Rigid)
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Socket (1-1/8 in.)
7. Fixed End Wrench (1-1/8 in.)
8. Portable Magnetic Base Drill
9. Feeler Gage
10. Scriber
11. Drill Bits (1/8 in. & 25/32 in.)
12. File (for filing chocks)

BOAT HANDLING WINCH INSTALLATION

MACHINIST TOOLS REQUIRED

1. 6 in. Steel Scale (Rigid)
2. Drill Bits (]7/32 in. & 25/32 in.)
3. Hammer
4. Center Punch
5. Portable Magnetic Base Drill
6. Scriber
7. File (for filing chocks)
8. c-clamp
9. Ratchet (1/2 in. Drive)
10. Socket (1-1/4 in.)
11. Fixed End Wrench (1-1/4 in.)
12. Reamers (Various sizes 3/4 in. to 1 in.)
13. Feeler Gage
14. Level

VANEAXIAL FAN INSTALLATION

MACHINIST TOOLS REQUIRED

1. Ratchet (1/2 in. Drive)
2. Sockets (13/16 in. & 3/4 in.)
3. Fixed End Wrenches (13/16 in. & 3/4 in.)

SEWAGE PUMP INSTALLATION
MACHINIST TOOLS REQUIRED

1. Ratchet (1/2 in. Drive)
2. Sockets (13/16 in. & 1-1/8 in.)
3. Fixed End Wrenches (13/16 in. & 1-1/8 in.)
4. Portable Magnetic Base Drill
5. Drill Bits (21/32 in., 25/32 in. & 17/64 in.)

BRIDGE CRANE AND RAILS INSTALLATION

MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Sockets (]5/16 in., 7/16 in. & 3/4 in.)
7. Portable Electric Hand Drill
8. Drill Bits (1/8 in., 17/64 in., 21/32 in., & 25/32 in.)

scriber

10. Allen Wrenches (3/8 in. & 5/16 in")
11. Chalkline

CONVECTION OVEN

MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale (Rigid)
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Socket (3/4 in.)
7. Drill bits (1/8 in. & 9/16 in.)
8. Taps (for 1/2-13 UNC 2A)

HOIST AND MONORAIL INSTALLATION
MACHINIST TOOLS REQUIRED

1. 8 ft. Steel Tape
2. 6 in. Steel Scale
3. Hammer
4. Center Punch
5. Ratchet (1/2 in. Drive)
6. Socket (3/4 in.)
7. Portable Electric Hand Drill
8. Drill Bits (1/8 in. &]7/32 in.)
9. Scriber
10. Allen Wrench (5/16 in.)
11. Chalkline

COOLING COIL INSTALLATION

MACHINIST TOOLS REQUIRED

1. Hammer
2. Center Punch
3. Scriber
4. Drill Bits (13/64 in. & 19/32 in.)
5. 3/4 in. Socket
6. Ratchet (1/2 in. Drive)

PERSONAL FATIGUE AND DELAY FACTOR

The PFD (Personal, Fatigue and Delay) Factor for Outside Machinery Shipboard items is twenty percent (20%). The development of this factor is as follows:

ALLOWANCE	VALUE (%)
Personal Delays	5
Basic Fatigue	4
Additional Fatigue:	
Noise Level (Intermittent -Loud)	2
Unavoidable Delays	9
Avoidable Delays	0
Total	20%

The preceding percentages were developed using information from the following sources:

- o Handbook of Industrial Engineering, pages 4.4.18 thru 4.4.22, copyright 1982.
- 0 The experience of Ingalls Shipbuilding Industrial Engineering Staff.

The definitions of these delay allowances are as follows:

- PERSONAL DELAY - The time required for an employee to take care of all personal needs such as trips to drinking fountain and rest room.

- BASIC FATIGUE - A reduction in the employee's capacity to perform work. The basic fatigue factor (4%) includes those influences that are common to all types of work.

- ADDITIONAL FATIGUE - A reduction in the employee's capacity to perform work caused by factors such as use of muscular force, poor lighting, atmospheric conditions, noise level, mental strain and monotony.

- UNAVOIDABLE DELAY - This delay includes legitimate interruptions in the work cycle caused by other employees, material irregularities, and machine interference.

- AVOIDABLE DELAY - This delay includes interruptions which are not allowed and can be controlled by good supervision. Examples of this delay would include visiting with other employees for personal reasons, smoking, eating a sandwich, reading non-work related material, etc.

8.01 CARE OF EQUIPMENT

The operator assigned to the particular work station is responsible for the lubrication, minor maintenance, and cleanliness of the equipment at the work station and for the cleanliness of the area in and around the work station.

8.02 QUALITY ASSURANCE AND INSPECTION

1. General Responsibilities

A. The Vice President of Quality Assurance is responsible for the development and maintenance of a Quality Assurance Program responsive to the requirements of each contract. The Quality Assurance Program requirements as defined by the Quality Assurance organization will be incorporated into company policies, standard procedures, drawings and technical specifications, as appropriate, by each organization responsible for deliverable end items.

B. The Quality Assurance organization is responsible for assuring quality requirements are invoked on suppliers as well as on Ingalls organizations producing an end item, for measuring the effectiveness of the Quality Assurance Program, and for assuring appropriate corrective action is taken by the organization responsible for departure from quality requirements.

C. Each member of management is responsible to accomplish work in accordance with governing contractual drawings and specifications, approved technical specifications, drawing and other Ingalls documents issued for material and equipment acquisition, to define a process, or test a deliverable product.

2. Specific Responsibilities

Inspectors - Qualified personnel who have been selected and authorized to perform inspection tasks. This is a term used throughout all Quality Assurance (QA) procedures and Quality Work Instructions (QWI's) to include personnel who have been assigned either limited or full inspection responsibility. This includes inspectors within, or designated inspectors outside the QA organization. The use of the term "inspector" is to be construed to mean "within the authority and responsibility authorized by the Vice President, Quality Assurance".

8.02 QUALITY ASSURANCE AND INSPECTION (Continued)

Quality Assurance inspectors or personnel within the QA organization who are authorized to perform specified inspection functions are:

a. Quality Assurance Inspectors (QAI)
b. Quality Engineering & Systems Personnel (QE&S)
c. Quality Assurance Receipt Inspectors (QARI)
d. Quality Assurance Supplier Control Field Representative (QFR)
e. Quality Assurance Preventive Maintenance Surveillance Inspectors (QAPMS)

Responsibilities - Building adequate quality into the product is the primary responsibility of craft supervision. It is the responsibility of Quality Assurance and the designated inspection agencies.to inspect early in the process and at critical points to assure that the process is under control and that the product at the various stages meets quality and technical workmanship established by drawings, Manufacturing Standard Processes, as well as those requirements verified to be in accordance with the practices and instructions embodied in applicable QWI's, Standard Procedures (SP's) and Departmental Operating Instructions (DOI's).

Determination of the level of quality required to meet contractual requirements is the responsibility of QA. QAI has the responsibility for the application of the quality requirements embodied in the drawings, MSP's and QWI's to the product. The resolution of problems arising from instances of the customer applying a higher level of quality than that required by QA shall be through the Material Review System; specifically, the resolution of such problems has been delegated to Quality Assurance (Quality Engineering and System). The inspection process shall be audited, system data shall be analyzed for trends and recurring quality problems shall be investigated. Corrective action commitments shall be obtained by QE&S.

Inspection - The task performed by an authorized inspector to the requirements of the governing Ingalls drawings defining the product, its assembly or its installation, and to Manufacturing Standard Processes (MSP's) of the current issue, utilizing the applicable Quality Work Instructions (QWI) for the specific discipline or type of inspection. The scope of the inspection shall be defined-by the governing work authorization, supplemented as necessary by the releasing craft or (Production Control) to define the boundaries or extent of the work released for inspection.

8.02 QUALITY ASSURANCE AND INSPECTION (Continued)

In-Process Inspection - Inspections which are performed during the manufacturing cycle in efforts to prevent defects from being built into the final product, and to inspect those attributes which will be inaccessible at final inspection. In-process inspections will be conducted by Quality Assurance Inspection (QAI) on a continuing basis, documented on the IR, prepared as an Inprocess Inspection Report (IPIR).

Completion Inspection (or Installation Inspection) - Inspection for completion of all work required by applicable bill to the requirements of the current governing drawings and/or MSP's, using the applicable QWI. This is the only inspection which will be documented on the IR prepared as an Installation Inspection Report (IIR). The boundaries of the inspection will be defined in the Remarks Section of the described IIR. In those cases such as hull installation, where the craft requests a partial completion inspection in order to permit other crafts to proceed in the area, the boundaries are to be documented on the Craft Systems Release (CSR) form by the craft supervisor and initialed by the Boat Foreman or the Ship Superintendent. It is to be noted that the work on any specific work authorization may include "assist" craft as well as the lead craft. The QAI inspector for the lead discipline is responsible for assuring that an inspection is made to the "assist" craft attributes. All of the inspections shall be documented on the one IIR.

Nonconformances - When nonconformances are detected, the inspector initiates and Nonconformance Report (NCR) to document a complete description of the nonconformance, including its location and probable cause, except for those deficiencies considered to be anomalies. For CG 47 Class Ships, additional reporting procedures for processing Test Problem Reports (TPR's) are required.

8.03 MATERIAL "HANDLING AND REQUISITIONING

Planned Material

A planned material requirement is material that is specified by Eningeering drawing and identified to a planned group bill in the Technical Information Data Base (TIDB).

Warehouse Requisition forms for selected material, are computer generated from the Warehouse Requisition System, when material for specific group bills is requested.

Other material, identified on planned group bills, but not coded for computer generation, is requisitioned by Material Support using a manually prepared Material Requisition form.

OPERATION TITLE: AREA TRAVEL

FROM: SHIP

TO: SUPPORT AREA

FROM	TO	DISTANCE ONE WAY	TMU's	CODE
12 Module 1 Stairs	8 Tool Rm Bay 3	525 ft.	3627	1002.201
12 "	9 Repro Track 2	188 ft.	1310	1002.202
12 "	5 Supv. Office Trk 1	388 ft.	2450	1002.203
12 "	2 Tool Room Wet Dock Bldg	1375 ft.	9494	1002.204
12 "	10 Production Control	638 ft.	4406	1002.205
12 "	21 Warehouse 301	2600 ft.	17952	1002.206
13 Module 2 Stairs	8 Tool Room Bay 3	156 ft.	1130	1002.207
13 "	9 Repro Track 2	388 ft.	2700	1002.208
13 "	5 Supv. Office Track 1	875 ft.	6040	1002.209
13 "	2 Tool Room Wet Dock Bldg	1775 ft.	12256	1002.210
13 "	10 Production Control	1050 ft.	7250	1002.211
13 "	21 Warehouse 301	2838 ft.	19595	1002.212

NOTES: Values for one person. No PFD allowance is included in these value

8.07 TIME AND PRODUCTION REPORTING

The supervisor fills out a daily time card for each employee charging the appropriate number of hours to the hull, account, and berth number.

8.08 SET-UP AND TEAR DOWN

Set-up and tear down of a machine is the responsibility of the operator assigned to the work station. After each use the machine is restored to its original condition.

8.09 SUPERVISORY RESPONSIBILITY

To plan, organize, and supervise the activities of workmen on surface ships in accordance with established policies, procedures, practices, agreements between Company and represented employees.

To assign craftsmen to perform the preplanned and scheduled work according to drawings and specifications, satisfying the requirements of allowed work standards, acceptance tests, quality standards of workmanship, scheduled completion dates, and budgeted manpower allotments.

To be the primary liason between the Company and the represented employees, communicating the Company objectives to the workers, and keeping the Company informed of general attitudes of employees.

8.10 OUTSIDE MACHINIST DUTIES AND RESPONSIBILITIES

I. OCCUPATIONAL SUMMARY:

Performs the installation, alignment and repair of machinery aboard ship.

II. DUTIES AND RESPONSIBILITIES:

Works from drawings, various technical manuals and engineering documents in accordance with recognized and accepted trade practices.

Uses all standard tools such as machinist hand tools and precision measuring devices such as micrometers, dial indicators and calipers.

8.10 OUTSIDE MACHINIST DUTIES AND RESPONSIBILITIES (Continued)

Installs according to specification; auxiliary machinery, main propulsion equipment, ordnance, elevators, conveyors, mast antennas, windows, signal devices, boilers, and related equipment, shop machinery, galley equipment, laundry equipment, vent fans, coolers, pumps, motors, compressors, distillers, generators, sea valves, reach rods, refrigeration units and air conditioning units, stern tubes, rudders, and propellers. Also operates portable milling and boring machines.

Installs various deck machinery such as windlasses, capstans, winches and boat handling gear.

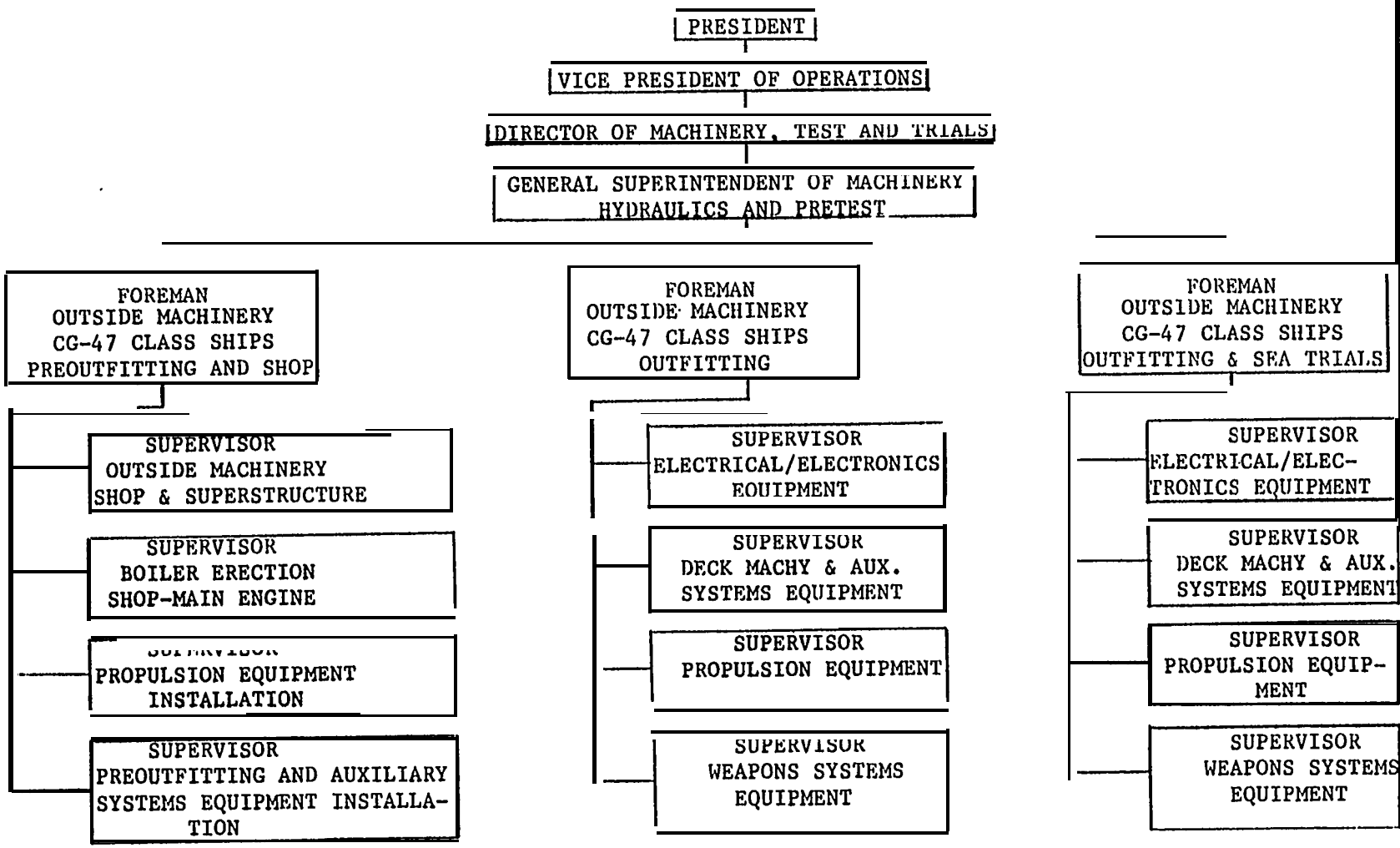
Mounts electronic consoles and various electrical control panels.

Assists in various operational tests on installed machinery and equipment.

The duties described herein cover major duties required. However, this does not exclude the requirement of performing related and other duties as directed by supervision.

FORM R-1457

ORGANIZATION CHART



Included in this section is the detail information for the derivation of the process times for machining operations used in this manual. Below is an index showing how this section is constructed.

INDEX

DRILLING PROCESS TIME

How to use this section to determine process times.

In order to use this section of the manual to determine drilling process times, a three step procedure must be followed.

- First, the material and condition code must be determined for the material which is being drilled. This is done by following the procedure outlined on page 9-3.

- Second, the process time (for drilling a one inch deep hole) at the given hole diameter for the appropriate material and condition code can be determined from the process time charts pages 9-25 through 9-38.

- Third, the process time for the appropriate hole depth (including lead time) must be determined by the procedure outlined on page 9-24.

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

This section shows the four digit material and condition code (pages 9-4 thru 9-23). It also describes the material in terms of the AISI (American Iron and Steel Institute) number or other material designation, the Brinell hardness, and a description of the processing the material has undergone (ex. quenching, annealing, cold drawing, hot rolling etc.)

Considerable time and attention has been given to the problem of finding commercial equivalent materials to specific military specification (Mil-spec) numbers. After researching this problem extensively and collaborating with a metallurgist at the National Bureau of Standards it was determined that three characteristics of a material could be used to select the material and condition code from a mil-spec. The systematic method of selection is as follows:

- The first step is to determine the major class of the material (ex. Plain Carbon Steel, Alloy Steel, Aluminum, Copper etc.).

- The second step is to determine the carbon content for steels only. (Note the last two digits of an AISI number denote the carbon content. For example: 1010 steel has .1% carbon content).

- The third step is to determine the Brinell hardness which is affected by the processing method (Quenching, Annealing, Cold Rolling etc. Note: If only the tensile strength is known, then thE Brinell hardness can be approximated for steels by dividing the tensile strength in psi by 500.

The determination of these values will point to a specific material and condition code.

NOTE: The material and condition code description matrix was taken from "Machining Data Handbook", Metcut Research Associates Inc., (June 1966) p. 221-240.

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution / NOMINAL HOLE DIAMETER - Inches 1/16	1/8	1/4	1/2	1/4	1	1-1/2	2	HSS TOOL MATERIAL
0001	FREE MACHINING PLAIN CARBON STEELS Resulphurized B1111 1119 B1112 1212 B1113 1213 1113 1213+Te	100 to 150	Hot Rolled or Annealed	90 115	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0002		150 to 200	Cold Drawn	100 120	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0003	Resulphurized 1108 1120 1109 1126 1115 1144 1117 1211 1118	100 to 150	Hot Rolled or Annealed	70 90	.001 -	.003	.005	.010	.015	.018	.020	.023	M10 M7 M1
0004		150 to 200	Cold Drawn	70 90	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0005		175 to 225	Hot Rolled, Normalized, Annealed or Cold Drawn	70 90	.001 -	.003	.005	.010	.015	.018	.020	.023	M10 M7 M1
0006	Resulphurized 1132 1141 1137 1145 1138 1146 1139 1151 1140	275 to 325	Quenched and Tempered	65	-	.002	.004	.006	.010	.012	.015	.018	M10 M7 M1
0007		325 to 375	Quenched and Tempered	30	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0008		375 to 425	Quenched and Tempered	30	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0009	Leaded 16L18 12L13 16L28 12L14	100 to 150	Hot Rolled, Normalized, Annealed or Cold Drawn	80 105	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0010		150 to 200	Hot Rolled, Normalized, Annealed or Cold Drawn	80 110	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0011		200 to 250	Hot Rolled, Normalized, Annealed or Cold Drawn	60 75	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0012	PLAIN CARBON STEELS 1006 1016 1022 1008 1017 1023 1009 1018 1024 1010 1019 1025 1012 1020 1026 1015 1021	85 to 125	Hot Rolled, Normalized, Annealed or Cold Drawn	70 to 90	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0013		125 to 175	Hot Rolled, Normalized, Annealed or Cold Drawn	65 to 80	.001 -	.003	.005	.009	.012	.013	.018	.022	M10 M7 M1
0014		175 to 225	Hot Rolled, Normalized, Annealed or Cold Drawn	60 to 70	.001 -	.002	.004	.007	.010	.012	.015	.018	M10 M7 M1
0015		225 to 275	Annealed or Cold Drawn	50	-	.002	.004	.006	.010	.012	.015	.018	M10 M7 M1
0016	1027 1052 1038 1055 1033 1060 1034 1062 1035 1064 1036 1065 1037 1066 1038 1070 1039 1074 1040 1078 1041 1080 1042 1084 1043 1095 1045 1086 1046 1090 1049 1095 1050	125 to 175	Hot Rolled, Normalized, Annealed or Cold Drawn	65 to 80	.001 -	.003	.004	.010	.012	.013	.018	.022	M10 M7 M1
0017		175 to 225	Hot Rolled, Normalized, Annealed or Cold Drawn	55 to 70	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0018		225 to 275	Hot Rolled, Normalized, Annealed, Cold Drawn or Quenched and Tempered	55	-	.002	.003	.006	.009	.010	.014	.016	M10 M7 M1
0019		275 to 325	Hot Rolled, Normalized, Annealed or Quenched and Tempered	45	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0020		325 to 375	Quenched and Tempered	40	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0021		375 to 425	Quenched and Tempered	30	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0022	FREE MACHINING ALLOY STEELS Resulphurized 3140 4150 4140 8640	150 to 200	Hot Rolled, Normalized, Annealed or Cold Drawn	65 to 80	.001	.003	.005	.009	.012	.013	.018	.022	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0023	FREE MACHINING ALLOY STEELS (cont.)	200 to 250	Hot Rolled, Normalized, Annealed or Cold Drawn	60 to 75	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0024		275 to 325	Quenched and Tempered	50	-	.002	.003	.006	.009	.010	.014	.016	M10 M7 M1
0025	Resulphurized 3140 4150 4140 8640	325 to 375	Quenched and Tempered	35	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0026		375 to 425	Quenched and Tempered	25	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0027		45R_C to 48R_C	Quenched and Tempered	20	-	.0005	.001	.002	.002	.003	.003	.004	T15 M33
0028		150 to 200	Hot Rolled, Normalized, Annealed or Cold Drawn	70 to 90	.001 -	.003	.005	.010	.015	.018	.020	.025	M10 M7 M1
0029		200 to 250	Hot Rolled, Normalized, Annealed or Cold Drawn	65 to 80	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0030	Leaded 41L30 51L32 41L40 86L20 41L47 86L40 41L50 52L100 43L47	275 to 325	Quenched and Tempered	60	-	.002	.004	.006	.010	.012	.015	.018	M10 M7 M1
0031		325 to 375	Quenched and Tempered	40	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0032		375 to 425	Quenched and Tempered	25	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0033		45R_C to 48R_C	Quenched and Tempered	20	-	.0005	.001	.002	.002	.003	.003	.004	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0034	ALLOY STEELS	125 to 175	Hot Rolled, Annealed or Cold Drawn	60 to 75	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0035	1320 4128 8120 2317 4317 8317 2512 4320 8325 2515 4608 8415 2517 4615 8115 3115 4617 8615 3120 4620 8617 3125 4621 8620 3310 4720 8622 3316 4815 8625 4012 4817 8627 4017 4820 8720 4023 5015 8822 4024 5028 9310 4027 5024 9315 4028 5120 94B15 4118 6118 94B17 4125	175 to 225	Hot Rolled, Annealed or Cold Drawn	65	-	.002	.004	.006	.010	.012	.015	.018	M10 M7 M1
0036		225 to 275	Hot Rolled, Normalized, Annealed or Cold Drawn	55	-	.002	.003	.005	.008	.010	.012	.015	M10 M7 M1
0037		275 to 325	Hot Rolled, Normalized, Cold Drawn or Quenched and Tempered	50	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0038		325 to 375	Normalized or Quenched and Tempered	40	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0039		375 to 425	Quenched and Tempered	30	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0040	1330 4337 6280 1332 4340 6270 1335 4640 8290 1340 50B40 8342 1345 50B44 8302 2330 5046 6440 2335 50B46 8475 2340 50B50 81B45 2345 50B60 8630 3130 5075 8637 3135 5080 8640 3140 5130 8642 3141 5132 8645 3145 5135 86B45 3150 5140 8650 4030 5145 8655 4032 5147 8660 4037 5150 8740 4042 5155 8742 4047 5160 9255 4063 51B60 9260 4130 50B08 9262 4135 51B00 94B30 4137 52100 94B40 4140 6145 9445 4142 6150 9840 4145 6180 9845 4147 6240 9850 4150 6250	175 to 225	Hot Rolled, Normalized, Annealed or Cold Drawn	60	-	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0041		225 to 275	Normalized, Cold Drawn or Quenched and Tempered	50	-	.002	.003	.006	.008	.010	.012	.015	M10 M7 M1
0042		275 to 325	Normalized or Quenched and Tempered	45	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0043		325 to 375	Normalized or Quenched and Tempered	35	-	.002	.003	.006	.008	.009	.010	.011	T15 M33
0044		375 to 425	Quenched and Tempered	25	-	.002	.003	.005	.007	.009	.010	.010	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches For Revolution — NOM HOLE DIAMETER - Inches								MSS TOOL MATERIAL
								1/2	3/4	I	1-1/2	2	
0045	ALLOT STEELS (cant.) 330 4337 8255 1332 4340 8270 1335 4640 6218 1340 50B40 6342 (SEE PAGE 224 for COMPLETE MATERIAL LIST)	15R$_c$ to 48R$_c$	Quenched and Tempered	20				.002	.002	.003	.003	.004	T15 M33
0046		48R$_c$ to 50R$_c$	Quenched and TemperEd	20				.002	.002	.003	.003	.004	T15 M33
0047		50R$_c$ to 52R$_c$	Quenched and Tempered	15				.002	.002	.003	.003	.004	T15 M33
0048	NITRIDING STEELS Nitralloy 125M Nitralloy 135G Nitralloy 135M Nitralloy N Nitralloy 230	200 to 250	Annealed	50				.003	.008	.010	.011	.013	M10 M7 M1
0049		300 to 350	Normalized or Quenched and Tempered	35				.006	.008	.009	.010	.011	T15 M33
0050	ARMOR PLATE MIL-A-1260 (GRD)	250 to 320	Quenched and Tempered	25				.003	.005	.006	.007	.008	T15 M33
0051	ULTRA-HIGH STRENGTH STEELS D6AC HX-2 4340	200 to 250	Annealed	55				.005	.008	.010	.011	.013	M10 M7 M1
0052		250 to 300	Normalized	50				.006	.008	.009	.010	.011	M10 M7 M1
0053		35R$_c$ to 48R$_c$	Quenched and Tempered	20				.003	.003	.004	.005	.005	T15 M33
0054		48R$_c$ to 50R$_c$	Quenched and Tempered	20			00	.002	.002	.003	.003	.004	T15 M33
0055		50R$_c$ to 52R$_c$	Quenched and Tcmpered	15				.002	.002	.003	.003	.004	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches								TOOL MATERIAL
					1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	
0056	ULTRA-HIGH STRENGTH STEELS (cont.)	200 to 250	Annealed	50	-	.002	.003	.005	.008	.010	.011	.013	M10 M7 M1
0057		250 to 300	Normalized	45	-	.002	.003	.006	.008	.009	.010	.011	M10 M7 M1
0058	H11 H13	43R_c to 48R_c	Quenched and Tempered	20	-	.001	.002	.003	.003	.004	.005	.005	T15 M33
0059		48R_c to 50R_c	Quenched and Tempered	15	-	.0005	.001	.002	.002	.003	.003	.004	T15 M33
0060		50R_c to 52R_c	Quenched and Tempered	10	-	.0005	.001	.002	.002	.003	.003	.004	T15 M33
0061	Maraging Steels 18% Ni, Grade 200 18% Ni, Grade 250 18% Ni, Grade 300	275 to 325	Annealed	45	-	.002	.003	.005	.008	.009	.011	.013	T15 M33
0062		50R_c to 52R_c	Quenched and Tempered	30	-	.001	.002	.003	.003	.004	.005	.005	T15 M33
0063	Maraging Steels 25% Ni	175 to 225	Annealed	50	-	.002	.003	.006	.009	.010	.014	.016	T15 M33
0064		50R_c to 52R_c	Quenched and Tempered	20	-	.001	.002	.003	.003	.004	.005	.005	T15 M33
0065	HP9-4-25	325 to 375	Annealed	35	-	.002	.003	.005	.007	.008	.009	.010	T15 M33
0066		43R_c to 48R_c	Quenched and Tempered	30	-	.002	.003	.005	.007	.008	.009	.010	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MklMllL	NEED Kss 4nlk .	Cmllrlw	$fmo ,m	FEED - Inches Per Revolution Mmlulllmollzma- Indm VII	I/l	1/4	1/3	3/4	I	1-1/2	1	H low lltrnlll
0067	ULIRI-IIICI Slmnczll SKtl$(eont-) W4-4-4S n	325 to 375	*Annealed*	30	-	.002	.003	.005	.007	.008	.009	.010	T15 M?
0068	100L slmls Hlcn sptod Ml mt la m 11 11 us 12	Z00 to Z50	*Asmea2ed*	40	-	.002	.003	.005	.008	.003	.011	.013	M1'0' M7 M
0069	Mlga p6 S3 class I g: :4 M4 m g-a 14 Ml z3 % M4z 11	225 to 275	Annealed	30	-	. Ooz	.003	.005'	.008	.010	.011	.013	M10 Mi hll .
0070	mlh SPS94 m ~j$,$ z m MS tla D	Z25 to Z75	Annea3sd	Zo	-	.001	. Ooz	.004	.005	.006	.007	.008	Ml M7 Ml
0071	Hat lolk RIO 1114 Hl 1 H11 11r2 Kt19 1113 D	150 to 200	AnneAm3	55	-	. Ooz	.003	.006	.009	.011	.014	.016	Mi M;- M1
0072		Z00 to Z50	*Anneal ad*	*45*	-	*.002*	.003	.005	.008	.010	.011	.013	MI M7 M
0073	No! Wk Ilzl 1123 MII H21 H24 M42 H2Z Nzs M45 c 1	150 to Z00	Annealed	40	-	.002	.003	.005	.008	.009	.011	.013	*M h.* M7 M
0074		Z00 to Z50	*Anneal cd*	30 8	-	. 002	.003	.005	.008	.010	.011	.013	M10 M" M
0075	IPal mrk H18 H14 M1 1 H1S 1112 Ml 1113 q	3Z5 to 375	Quenched and Tempered	*35*	-	. 002	.003	.005	.007	.008	.009	.010	Tl M,
0076		4aRc to soR=	C3umxhad and Tcmpere d	15	-	.0005	.001	. 002	. 002	.003	.003	.004	T M33
0077		50Rc to 5ZXc	Quanched and Tampere d	10	.	.0005	.001	.Ooz	.Ooz	.003	.003	. ooi	Tl> M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution / NOMINAL HOLE DIAMETER - Inches 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0078	TOOL STEELS (cont.) Cold Work: A7, A9, D1, D5, D2, D7, D3	200 to 250	Annealed	25	-	.001	.002	.004	.005	.006	.007	.008	T15 M33
0079	Cold Work: A2, A6, O2, A3, A8, O6, A4, A10, O7, A5, O1	200 to 250	Annealed	40	-	.002	.003	.005	.008	.010	.011	.013	M10 M7 M1
0080	Shock Resisting: S1, S5, S2, S6, S4, S7	175 to 225	Annealed	50	-	.002	.003	.005	.009	.011	.014	.016	M10 M7 M1
0081	Mold: P1, P4, P2, P5, P3, P6	100 to 150	Annealed	65	-	.002	.004	.007	.010	.012	.015	.018	M10 M7 M1
0082	Mold: P20, P21	150 to 200	Annealed	55	-	.002	.003	.006	.009	.011	.014	.016	M10 M7 M1
0083	Special Purpose: L1, L3, L7, L2, L6	150 to 200	Annealed	55	-	.002	.003	.006	.009	.011	.014	.016	M10 M7 M1
0084	Special Purpose: F1, F2, F3	200 to 250	Annealed	45	-	.002	.003	.005	.008	.010	.011	.013	M10 M7 M1
0085	Water Hardening: W1, W4, W2, W5	150 to 250	Annealed	85	-	.002	.004	.007	.010	.012	.015	.018	M10 M7 M1
0086	CAST STEELS Carbon: 1020, 1025	120 to 150	Annealed or Normalized	65 80	.001 -	.003	.005	.009	.012	.013	.018	.022	M10 M7 M1
0087	Carbon: 1030, 1050, 1040, 1070, 1045	125 to 175	Annealed	60 75	.001 -	.003	.005	.009	.012	.013	.018	.022	M10 M7 M1
0088		175 to 225	Normalized	50 65	.001 -	.002	.004	.007	.010	.012	.015	.018	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches								HSS TOOL MATERIAL
					1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	
0089	CAST STEELS (cont.) Carbon 1030 1050 1040 1070 1045	250 to 300	Quenched and Tempered	40	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0090	Low Alloy 1320 4820 2320 5120 2325 8420 3125 8620 4020 9520 4120 9525	150 to 200	Annealed	50 65	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0091		175 to 225	Normalized	45 55	.001 -	.002	.003	.006	.009	.010	.014	.016	M10 M7 M1
0092		250 to 300	Quenched and Tempered	45	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0093	Low Alloy 1330 4340 1340 4640 1345 5130 2330 5140 2345 8630 3130 86B30 3140 8430 4030 8435 4040 8440 4050 8630 4130 86B30 4140 8640 4330 9530 4335	175 to 225	Annealed	45 55	.001 -	.002	.003	.006	.009	.010	.014	.016	M10 M7 M1
0094		175 to 250	Normalized	45	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0095		250 to 300	Quenched and Tempered	40	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0096		300 to 350	Quenched and Tempered	35	-	.002	.003	.006	.008	.009	.010	.011	M10 M7 M1
0097		350 to 400	Quenched and Tempered	25	-	.002	.003	.005	.007	.009	.010	.010	T15 M33
0098	Corrosion Resistant CF-16F(303) CM-7M	140 to 170	Annealed	45 55	.001 -	.003	.004	.007	.010	.012	.015	.018	M10 M7 M1
0099	Corrosion Resistant CA-15(410) CA-40(420) CB-30(431) CC-50(440)	175 to 225	Normalized and Tempered	45	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
	CAST STEELS (cont.)												
0100	Corrosion Resistant CF-3(304L) CF-12M(316) CF-3M(316L) CF-20(302) CF-8(304) CG-8M(317) CF-8C(347) CN-20(309) CF-8M(316) CK-20(310)	140 to 190	Annealed	35	-	.002	.003	.006	.008	.009	.010	.011	M10 M7 M1
0101	Heat Resistant HA HU HC(446) HW HH(327) HX HT(330)	160 to 210	As Cast	40	-	.002	.003	.005	.008	.009	.011	.013	M10 M7 M1
0102	Heat Resistant HE(312) HK(310) HF(302B) XL HP(309) HW HI	160 to 210	As Cast	35	-	.002	.003	.006	.008	.009	.010	.011	M10 M7 M1
0103	GRAY IRONS												
0104	ASTM Classes 20 and 25 (Ferritic)	110 to 140	Annealed	80	.001								M10 M7, M1
				140	-	.003	.006	.010	.012	.014	.018	.022	
				230		.003	.006	.010	.012	.014	.018	.022	C2 Carbide
0105	ASTM Class 30 (Pearlitic - Ferritic)	150 to 190	As Cast	75	.001								M10 M7, M1
0106				95	-	.003	.005	.008	.010	.012	.014	.015	
				195		.003	.005	.008	.010	.012	.014	.015	C2 Carbide
0107	ASTM Classes 35 and 40 (Pearlitic)	190 to 220	As Cast	65	.001								M10 M7, M1
0108				85	-	.003	.005	.008	.010	.012	.014	.015	
				180		.003	.005	.008	.010	.012	.014	.015	C2 Carbide
0109	ASTM Classes 45 and 50 (Pearlitic + Free Carbides)	220 to 260	As Cast	55	.001								M10 M7, M1
0110				70	-	.002	.004	.006	.008	.010	.012	.014	
				160		.002	.004	.006	.008	.010	.012	.014	C2 Carbide
0111	ASTM Classes 55, 60 & 80+ (Pearlitic and Acicular + Free Carbides)	250 to 320	As Cast or Quenched and Tempered	45	-	.001	.003	.005	.007	.009	.012	.012	M10 M7, M1
0112				95	-	.001	.003	.005	.007	.009	.012	.012	C2 Carbide
	DUCTILE IRONS												
0113	Ferritic 80-48-18 65-45-12	140 to 190	Annealed	80	.001								M10 M7 M1
				100	-	.003	.005	.008	.010	.012	.014	.015	
0114	Ferritic - Pearlitic 80-55-06	190 to 225	As Cast	60	-	.002	.004	.006	.008	.010	.012	.015	M10 M7 M1
0115		225 to 260	As Cast	45	-	.002	.003	.006	.008	.010	.012	.012	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0116	DUCTILE IRONS (cont.) Pearlitic - Martensitic 100-70-03	240 to 300	Normalized and Tempered	40	-	.002	.003	.006	.008	.010	.012	.012	M10 M7 M1
0117	Martensitic 120-90-02	270 to 330	Quenched and Tempered	25	-	.001	.002	.004	.005	.006	.007	.008	M10 M7 M1
0118	MALLEABLE IRONS Ferritic 32510 35018	110 to 160	Malleablized	120 1.7*	-	.002	.004	.007	.010	.012	.015	.018	M10 M7 M1
0119	Pearlitic 45007 48004 45010 50007	160 to 220	Malleablized and Heat Treated	90 2.0*	-	.002	.004	.006	.008	.010	.015	.015	M10 M7 M1
0120		200 to 240	Malleablized and Heat Treated	75 1.5*	-	.002	.004	.006	.008	.010	.015	.015	M10 M7 M1
0121	Pearlitic 53004 60003	200 to 255	Malleablized and Heat Treated	80 1.3*	-	.002	.004	.006	.008	.010	.015	.015	M10 M7 M1
0122	Pearlitic 80002	240 to 280	Malleablized and Heat Treated	70 1.1*	-	.002	.004	.006	.008	.010	.015	.015	M10 M7 M1
0123	FREE MACHINING STAINLESS STEELS Ferritic 430F 430F(Se)	135 to 185	Annealed	100 140	.001 -	.003	.005	.010	.014	.018	.020	.025	M10 M7 M1
0124	Austenitic 303 303FF 303Se 347F(Se)	135 to 185	Annealed	80 100	.001 -	.003	.005	.010	.014	.018	.020	.025	M10 M7 M1
0125		225 to 275	Cold Drawn	70 90	.001 -	.003	.005	.010	.014	.018	.020	.025	M10 M7 M1
0126	Martensitic 418 418F	135 to 185	Annealed	100 140	.001 -	.003	.005	.010	.014	.018	.020	.025	M10 M7 M1

*If casting skin is removed multiply speed by this factor.

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0127	FREE MACHINING STAINLESS STEELS (cont.)	185 to 240	Annealed or Cold Drawn	100 to 130	.001 -	.003	.005	.010	.014	.018	.020	.025	M10 M7 M1
0128	Martensitic: 416, 416F	275 to 325	Quenched and Tempered	50 to 65	.001 -	.002	.004	.006	.008	.010	.014	.018	M10 M7 M1
0129		375 to 425	Quenched and Tempered	40	-	.001	.002	.004	.006	.008	.009	.010	T15 M33
0130	STAINLESS STEELS — Ferritic: 405, 430, 446, 430, 442, 499, 434, 443, 502	135 to 185	Annealed	60	-	.002	.003	.005	.008	.010	.014	.018	M10 M7 M1
0131	Austenitic: 201, 202, 301, 302, 304, 304L, 305, 321, 347, 348	135 to 185	Annealed	50	-	.002	.003	.005	.009	.010	.013	.016	M10 M7 M1
0132		225 to 275	Cold Drawn	45	-	.002	.003	.005	.008	.011	.013	.016	M10 M7 M1
0133	Austenitic: 302B, 309, 309S, 310, 310S, 314, 316, 316L, 317, 318, 329, 330	135 to 185	Annealed	45	-	.002	.003	.005	.008	.011	.013	.016	M10 M7 M1
0134		135 to 185	Annealed	55 to 70	.001 -	.003	.004	.006	.008	.010	.014	.018	M10 M7 M1
0135	Martensitic: 403, 410, 420, 501	175 to 225	Annealed	60	-	.002	.003	.006	.008	.011	.011	.018	M10 M7 M1
0136		275 to 325	Quenched and Tempered	50	-	.002	.003	.005	.008	.011	.013	.016	M10 M7 M1
0137		375 to 425	Quenched and Tempered	40	-	.001	.002	.004	.006	.008	.009	.010	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches								HSS TOOL MATERIAL
					1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	
0138	STAINLESS STEELS (cont.)	225 to 275	Annealed	50	-	.002	.003	.005	.008	.011	.013	.016	M10 M7 M1
0139	Martensitic 414 422 431	275 to 325	Quenched and Tempered	45	-	.002	.003	.005	.008	.011	.013	.016	M10 M7 M1
0140		375 to 425	Quenched and Tempered	40	-	.001	.002	.004	.006	.008	.009	.010	T15 M33
0141		225 to 275	Annealed	40	-	.002	.003	.005	.007	.010	.012	.013	M10 M7 M1
0142	Martensitic 416 440B 440A 440C	275 to 325	Quenched and Tempered	35	-	.001	.002	.004	.005	.006	.008	.009	M10 M7 M1
0143		375 to 425	Quenched and Tempered	25	-	.001	.002	.003	.004	.005	.006	.007	T15 M33
0144		48Rc to 52Rc	Quenched and Tempered	20	-	.0005	.001	.002	.002	.003	.003	.004	T15 M33
0145	PRECIPITATION HARDENING STAINLESS STEELS	150 to 200	Annealed	45	-	.002	.003	.005	.008	.010	.012	.015	M10 M7 M1
0146	17-4PH 17-7PH PH15-7Mo AM350 AM355 AM359	275 to 325	Hardened	40	-	.001	.003	.005	.008	.008	.010	.012	M10 M7 M1
0147		325 to 375	Hardened	30	-	.001	.003	.004	.005	.007	.010	.012	T15 M33
0148		375 to 440	Hardened	20	-	.001	.002	.003	.004	.005	.006	.007	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0149	TITANIUM ALLOYS Commercially Pure 99.5	110 to 170	Annealed	80 100	.0005 -	.0005	.002	.006	.007	.008	.010	.013	M10 M7 M1
0150	Commercially Pure 99.2 99.0 0.15 to 0.20 Pd	140 to 200	Annealed	65 80	.0005 -	.0008	.003	.006	.007	.008	.010	.013	M10 M7 M1
0151	Commercially Pure 99.0 99.5	200 to 275	Annealed	40 50	.001 -	.002	.005	.006	.007	.008	.010	.013	M10 M7 M1
0152	Alpha & Alpha-Beta Alloys 2Fe-2Cr-2Mo 5Al-2.5Sn 5Al-2.5Sn (low O) 7Al-2Cb-1Ta 4Al-3Mo-1V	300 to 340	Annealed	40	-	.002	.005	.006	.007	.008	.010	.011	M10 M7 M1
0153	Alpha & Alpha-Beta Alloys 7Al-12Zr 6Al-4V 4Al-4Mn	310 to 350	Annealed	30	-	.002	.005	.006	.007	.008	.009	.010	M10 M7 M1
0154	Alpha & Alpha-Beta Alloys 7Al-4Mo 6Al-1Mo-1V 5Al-1.25Fe-2.25Cr 5Al-1.5Fe-1.4Cr-1.2Mo 6Al-6V-2Sn-1(Fe,Cu)	320 to 370	Annealed	20	-	.002	.005	.006	.007	.008	.009	.010	M10 M7 M1
0155	Alpha & Alpha-Beta Alloys 1Al-8V-5Fe	320 to 380	Annealed	15	-	.002	.004	.005	.006	.007	.008	.009	T15 M33
0156	Alpha & Alpha-Beta Alloys 6Al-4V 4Al-4Mn	350 to 400	Solution Treated and Aged	25	-	.001	.002	.004	.005	.006	.007	.008	T15 M33
0157	Alpha & Alpha-Beta Alloys 2Fe-2Cr-2Mo 5Al-1.25Fe-2.25Cr 6Al-6V-2Sn-1(Fe,Cu) 5Al-1.5Fe-1.4Cr-1.2Mo 7Al-4Mo and 4Al-3Mo-1V	375 to 420	Solution Treated and Aged	20	-	.001	.002	.003	.004	.004	.005	.005	T15 M33
0158	Alpha & Alpha-Beta Alloys 1Al-8V-5Fe	375 to 440	Solution Treated and Aged	15	-	.0005	.001	.0015	.0015	.002	.002	.003	T15 M33
0159	Beta Alloys 3Al-13V-11Cr	310 to 350	Solution Treated	20	-	.001	.003	.004	.005	.006	.007	.008	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches								HSS TOOL MATERIAL
					1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	
0160	TITANIUM ALLOYS (cont.) Beta Alloys 3Al-13V-11Cr	375 to 440	Solution Treated and Aged	15	-	.0005	.001	.0015	.0015	.002	.002	.003	T15 M33
0161	Alpha & Alpha-Beta Alloys 2.5Al-16V 3Al-2.5V	150 to 200	Solution Treated	55 70	.001 -	.002	.005	.006	.008	.009	.010	.012	M10 M7 M1
0162		200 to 260	Annealed	50	-	.002	.005	.006	.008	.009	.010	.012	M10 M7 M1
0163	HIGH TEMPERATURE ALLOYS Nickel Base - Wrought INCONEL 721 (INCONEL M) INCONEL 722 (INCONEL V) INCONEL X-750 (INCONEL X) INCONEL 751 (INCONEL 1550) INCONEL 700 UDIMET 500 INCONEL 702 UDIMET 700 INCONEL 718 UNITEMP 1753 INCONEL 901 WASPALOY NIMONIC 75 RENE' 41 NIMONIC 80 RENE' 87 NIMONIC 90 M252 NIMONIC 95	200 to 300	Annealed or Solution Treated	20	-	.001	.001	.003	.005	.007	.010	.010	T15 M33
0164		300 to 400	Solution Treated and Aged	15	-	.001	.001	.003	.006	.007	.010	.010	T15 M33
0165	Nickel Base - Wrought HASTELLOY B HASTELLOY X INCOLOY 804 INCONEL 600 (INCONEL) INCONEL 804 (INCONEL 800) REFRACTALOY 26	140 to 220	Annealed	30	-	.002	.004	.006	.007	.010	.012	.012	T15 M33
0166		280 to 310	Cold Drawn	20	-	.001	.002	.003	.005	.007	.010	.010	T15 M33
0167	Nickel Base - Cast NIMONIC 75 HASTELLOY B NIMONIC 80 HASTELLOY C NIMONIC 90 INCONEL 713C NIMONIC 95 MAR-M200 NIMONIC 100 GMR235 UDIMET 500 UDIMET 700 M252 B1900 IN-100	250 to 350	As Cast	10	-	.001	.001	.002	.004	.006	.007	.008	T15 M33
0168	Cobalt Base - Wrought HAYNES ALLOY 25 L-605 L-1650 S-816 V-36	180 to 230	Solution Treated	25	-	.002	.004	.006	.007	.010	.012	.012	T15 M33
0169		270 to 320	Solution Treated and Aged	15	-	.001	.002	.003	.005	.007	.010	.010	T15 M33
0170	Cobalt Base - Cast HAYNES ALLOY 30 WI-52 HAYNES STELLITE 6 HAYNES STELLITE 21 HAYNES STELLITE 31 MAR-M302 MAR-M322	220 to 290	As Cast	10	-	.001	.001	.002	.004	.006	.007	.008	T15 M33

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

4TERIAL AND
ONDITION CODE

MATERIAL	HARD-NESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
HIGH TEMPERATURE ALLOYS (cont.) — Iron Base - Wrought: INCOLOY 800 19-25-6; INCOLOY 801 19-9 DL; INCOLOY 805 A-286; DISCALOY V545; N155 V-57	180 to 230	Solution Treated	20	-	.002	.004	.006	.007	.010	.012	.012	T15 M33
0171 / 0172	250 to 320	Solution Treated and Aged	15	-	.002	.004	.006	.007	.010	.012	.012	T15 M33
0173 Nickel Base - Wrought: 78 Nickel	180 to 200	As Rolled	50	-	.002	.004	.007	.009	.010	.012	.012	M10 M7 M1
REFRACTORY ALLOYS* — Tungsten Alloys: Tungsten, 85% density	180 to 200	Pressed and Sintered										
Tungsten Alloys: Tungsten, 93% density	290 to 320	Pressed and Sintered										
Tungsten Alloys: Tungsten, 98% density	290 to 320	Forged										
Tungsten Alloys: Tungsten, 99% density	290 to 320	Arc Cast										
Tungsten Alloys: Tungsten - 2 Thoria	260 to 320	Pressed and Sintered										
Tungsten Alloys: W-15Mo	260 to 320	As Cast										
Tungsten Alloys: W-10Ag, Gyromet, Mallory 2000	290 to 320	Pressed and Sintered										
0174 Molybdenum Alloys: Mo-5Ti, Mo-30W, TZM, TZC	220 to 290	Stress Relieved	75 100	.001 -	.003	.005	.007	-	-	-	-	T15 M33

Tungsten Drilling Recommendation

Since tungsten is very brittle, there is a tendency for chipping to occur as the drill enters and leaves the workpiece. Solid carbide drills must be used since tool wear is very rapid. In order to minimize the tendency of the tungsten to chip at the edges of the hole, it is suggested that the workpiece be heated to 400°-600°F before drilling. The following machining conditions are suggested:

Drill: 118°/90° notched point, 10° clearance
Drill material: C-2 Carbide
Cutting speed: 200 ft./min.
Feed: .002 in./rev. for a 1/8" dia. drill
Lubricant: Molybdenum disulfide (MoS_2) powder in air stream

Drilling by Electrical Discharge Machining (EDM) should also be considered as an alternative, especially for fragile parts.

*Due to the brittleness of refractory alloys, cracking, chipping, flaking and breakout tend to occur, particularly on the edges of the machined surfaces.

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0175	REFRACTORY ALLOYS* (cont.) — Columbium Alloys: Cb-752, D-31, D-43	170 to 225	Stress Relieved	50 to 75	.001 -	.003	.005	.007	-	-	-	-	T15 M33
0176	Tantalum Alloys: Ta-10W	200 to 250	Stress Relieved	50 to 50	.001 -	.002	.002	.004	-	-	-	-	T15 M33
0177	NICKEL ALLOYS — NICKEL 200 ("A" NICKEL), NICKEL 201 (LOW CARBON NI), NICKEL 205 ("A" NICKEL), NICKEL 211 ("D" NICKEL), NICKEL 212 ("E" NICKEL), NICKEL 233 (330 NICKEL), NICKEL 204 NICKEL 220, NICKEL 225 NICKEL 230	80 to 170	Annealed or Cold Drawn	65	-	.002	.003	.006	.008	.015	.018	.020	M10 M7 M1
0178	MONEL 400 (MONEL), MONEL 401 MONEL 402, MONEL 403 MONEL 404, MONEL 501 GRAPHITIZED (K MONEL)	115 to 240	Annealed or Cold Drawn	50	-	.002	.003	.006	.008	.010	.012	.015	M10 M7 M1
0179	PERMANICKEL 300 (PERMANICKEL), DURANICKEL 301 (DURANICKEL), NI-SPAN-C 902 (NI-SPAN-C), MONEL K-500 (K MONEL)	150 to 320	Solution Treated	25	-	.002	.003	.006	.008	.010	.012	.015	T15 M33
0180		330 to 360	Aged	10	-	.001	.002	.003	.005	.007	.009	.011	T15 M33
0181	Nitinol Alloys: 55Ni-45Ti	210 to 230	Wrought	20	-	.001	.001	.002	.003	.004	.004	.005	T15 M33
0182	Nitinol Alloys: 56Ni-44Ti	300 to 340	Annealed	15	-	.001	.001	.002	.003	.004	.004	.005	T15 M33
0183		48R_c to 52R_c	Quenched	10	-	.001	.001	.002	.003	.003	.004	.005	T15 M33
0184	Nitinol Alloys: 60Ni-40Ti	290 to 320	Annealed	10	-	.001	.001	.002	.003	.003	.004	.005	T15 M33
0185	ALUMINUM ALLOYS — Non-Heat Treated Cast: 13 112 212 368; 43 113 A214 380; 85 C113 B214 384; 108 132 218 A612; A108 138 319	40 to 100 500kg	As Cast	140 to 300	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1

*Due to the brittleness of refractory alloys, cracking, chipping, flaking and breakout tend to occur, particularly on the edges of the machined surfaces.

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches: 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0186	ALUMINUM ALLOYS (cont.) Heat Treated Cast 40E 142 319 172 195 355 A132 B195 356 B132 220 750	70 to 125 500kg	Solution Treated and Aged	140 250	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1
0187	Cold Drawn Wrought 1060 5005 5086 5454 1100 5052 5154 5456 3003 5056 5254 5652 3004 5083 5357 5956	30 to 80 500kg	Cold Drawn	140 250	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1
0188	Heat Treated Wrought 2011 2025 6061 8463 2014 2117 6062 7075 2017 2218 6063 7078 2018 4032 6151 7178 2024 6053 6262	75 to 150 500kg	Solution Treated and Aged	140 250	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1
0189	MAGNESIUM ALLOYS Cast Alloys AM100A AZ81A EK41A ZE41A AZ31B AZ91A EZ33A ZK42 AZ31C AZ91B HK31A ZM02A AZ61A AZ91C HZ32A ZE51A AZ63A AZ92A K1A ZK61A AZ80A EK30A	40 to 90 500kg	As Cast, Annealed or Solution Treated and Aged	140 330	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1
0190	Wrought Alloys A3A AZ61A HK31A TA54A AZ31A AZ63 HM21A ZE10A AZ31B AZ63A HM31A ZK20A AZ31C AZ80A M1A ZK21A AZ40A AZ92 PE ZK60A AZ60A EZ33A	40 to 90 500kg	Annealed, Cold Drawn, Solution Treated and Aged	140 300	.001 -	.003	.007	.012	.016	.020	.025	.030	M10 M7 M1
0191	COPPER ALLOYS 314 LEADED COMM. BRONZE 332 HIGH LEADED BRASS 348 MEDIUM LEADED BRASS 342 & 353 HIGH PB BRASS 356 EXTRA HIGH PB BRASS 360 FREE CUTTING BRASS 370 FREE CUTTING MUNTZ 377 FORGING BRASS 385 ARCHITECTURAL BRONZE 485 LEADED NAVAL BRASS 544 FREE CUT.PHOS BRONZE	20R_B to 70R_B	Annealed	140 175	.001 -	.003 -	.004	.008	.012	.018	.020	.022	M10 M7 M1
0192		60R_B to 100R_B	Cold Drawn	140 200	.001 -	.003 -	.004	.008	.012	.018	.020	.022	M10 M7 M1
0193	220 JEWELRY BRONZE 230 RED BRASS 240 LOW BRASS 260 CARTRIDGE BRASS 70% 268 YELLOW BRASS 280 MUNTZ METAL 335 LOW LEADED BRASS 365 368 PD MUNTZ METAL 443-445 INHIB. ADMIRALTY 464 467 NAVAL BRASS 651 LOW SILICON BRONZE 655 HIGH SILICON BRONZE 675 MANGANESE BRONZE 687 ALUMINUM BRASS 770 NICKEL SILVER 790 LEADED NICKEL SILVER	20R_B to 70R_B	Annealed	100 120	.001 -	.003	.006	.010	.010	.015	.015	.020	M10 M7 M1
0194		60R_B to 100R_B	Cold Drawn	120 140	.001 -	.003	.006	.010	.010	.015	.015	.020	M10 M7 M1
0195	102 OXYGEN FREE COPPER 110 ELECTROLYTIC TOUGH PITCH COPPER 122 PHOS. DEOXIDIZED CU 170, 172 & 175 BE-CU 210 GILDING, 95% 220 COMMERCIAL BRONZE 502 PHOS BRONZE 1.25% 510 PHOSPHOR BRONZE 5% 521 PHOSPHOR BRONZE 8% 524 PHOSPHOR BRONZE 10% 614 ALUMINUM BRONZE 706 COPPER NICKEL 10% 715 COPPER NICKEL 30% 745, 752, 756 & 757 NI-AS	20R_B to 70R_B	Annealed	50 60	.001 -	.003	.004	.008	.010	.012	.015	.020	M10 M7 M1
0196		60R_B to 100R_B	Cold Drawn	60 75	.001 -	.003	.004	.008	.010	.012	.015	.020	M10 M7 M1

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution — NOMINAL HOLE DIAMETER - Inches								HSS TOOL MATERIAL
					1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	
0197	ZINC ALLOYS SAE 903 SAE 925	80 to 100	Die Cast	225	.002	.003	.007	.012	.016	.018	.020	.025	M10 M7 M1
0198	URANIUM	$55R_A$ to $57R_A$	As Cast or As Rolled	350	.001	.002	.003	.004	.005	.005	.005	.005	20%TaC 72%WC 8%Co
0199	ZIRCONIUM	140 to 280	Rolled, Extruded or Forged	50	.002	.003	.004	.005	.008	.010	.012	.015	M10 M7 M1
0200	MANGANESE CDC #720 CDC #772 CDC #788	140 to 220	Hot Rolled, Extruded or Forged	50	.0015	.003	.005	.007	.009	.012	.014	.016	M10 M7 M1
0201	THERMOPLASTICS POLYETHYLENE POLYPROPYLENE TFE-FLUOROCARBON BUTYRATES	$31R_R$ to $116R_R$	Extruded, Molded or Cast	100	.005	.010	.012	.015	.018	.020	.025	.030	M10 M7 M1
0202	HIGH-IMPACT STYRENE ACRYLONITRILE-BUTADIENE-STYRENE MODIFIED ACRYLIC	$83R_R$ to $107R_R$	Extruded, Molded or Cast	100	.002	.004	.005	.006	.006	.008	.008	.010	M10 M7 M1
0203	NYLON ACETALS POLYCARBONATE	$79R_M$ to $100R_M$	Molded	100	.002	.005	.006	.008	.010	.012	.015	.015	M10 M7 M1
0204	ACRYLICS	$80R_M$ to $103R_M$	Extruded, Molded or Cast	100	.002	.005	.006	.008	.010	.012	.015	.015	M10 M7 M1
0205	POLYSTYRENES	$70R_M$ to $95R_M$	Molded or Extruded	200	.001	.002	.003	.004	.005	.006	.007	.008	M10 M7 M1
0206	THERMOSETTING PLASTICS SOFT GRADES	$50R_M$ to $93R_M$	Cast, Molded or Filled	150	.003	.005	.006	.008	.010	.012	.015	.015	M10 M7 M1
0207	HARD GRADES	$100R_M$ to $119R_M$	Cast, Molded or Filled	100	.002	.005	.006	.008	.010	.012	.015	.015	M10 M7 M1

*Special carbide composition for machining Uranium

MATERIAL AND CONDITION CODE DESCRIPTION MATRIX

MATERIAL AND CONDITION CODE	MATERIAL	HARDNESS BHN	CONDITION	SPEED fpm	FEED - Inches Per Revolution / NOMINAL HOLE DIAMETER - Inches 1/16	1/8	1/4	1/2	3/4	1	1-1/2	2	HSS TOOL MATERIAL
0208	REINFORCED PLASTICS SILICA FIBER REINFORCED PHENOLIC RESIN (REFRASIL)	55* to 75	Molded	25	.003	.007	.015	.020	.025	.030	.030	.030	M10 M7 M1
0209		55* to 75	Molded	300	.003	.007	.015	.020	.025	.030	.030	.030	C-2 Carbide

*Barcol Hardness.

TOP VIEW OF ASSEMBLY 102

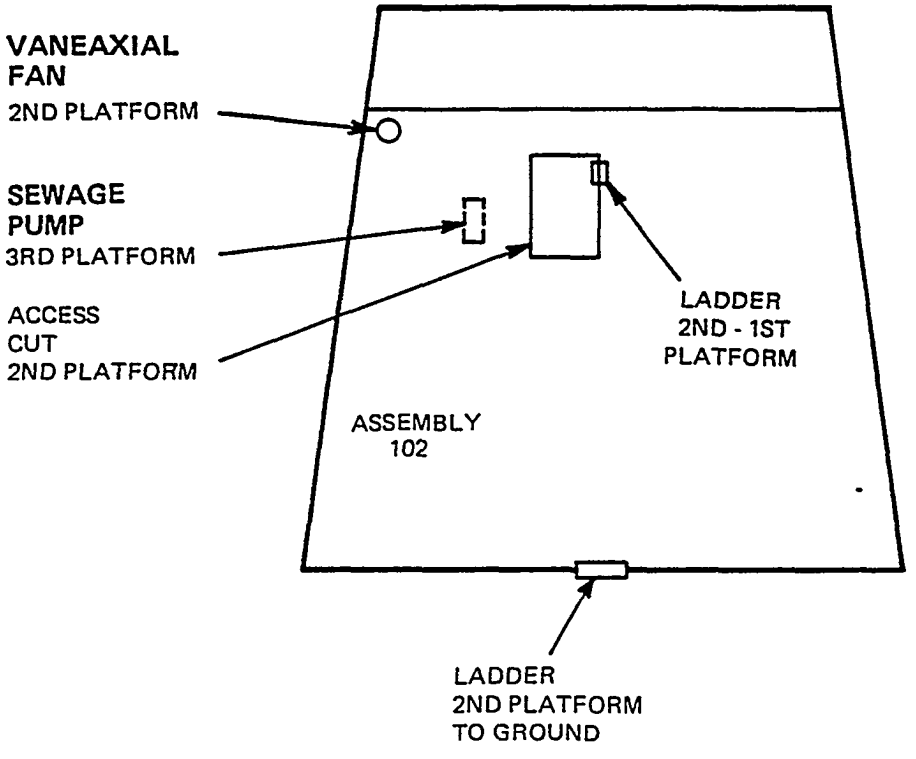
LEGEND

E
N S
W

SCALE: 1" = 12.5'

SUBJECT: VANEAXIAL FAN SEWAGE PUMP

BAY 1



TRACK 2

BAY 2

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

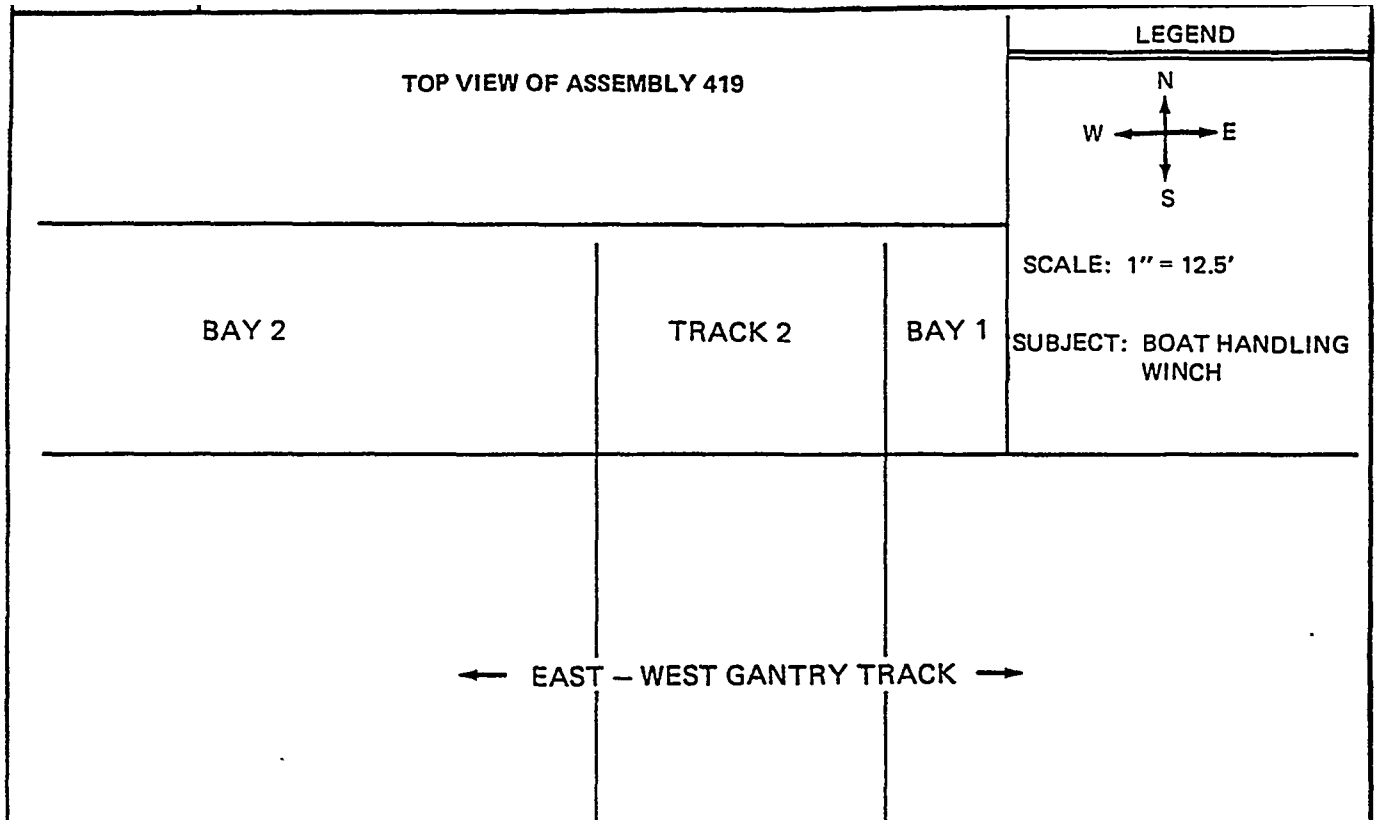
MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0001	303	158	190	190	190	211	285	304
0002	273	151	182	182	182	202	273	291
0003	390	202	242	242	242	269	364	422
0004	390	202	242	242	242	269	364	388
0005	390	202	242	242	242	269	364	422
0006	0	420	420	560	504	560	672	747
0007	0	682	910	910	1024	1213	1638	1986
0008	0	910	1213	1456	1560	1618	2185	2913
0009	341	173	208	208	208	231	312	333
0010	341	165	198	198	198	220	298	317
0011	455	242	364	416	437	485	582	647
0012	390	202	242	242	242	269	364	388
0013	420	227	273	303	341	420	455	496
0014	455	390	390	445	468	520	624	693
0015	0	546	546	728	655	728	874	971

PROCESS TIME FOR DRILLING
ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0016	420	227	341	273	341	420	455	496
0017	496	260	390	445	468	520	624	693
0018	0	496	662	662	662	794	851	993
0019	0	606	809	971	910	1079	1324	1494
0020	0	682	910	910	1024	1213	1638	1986
0021	0	910	1213	1456	1560	1618	2185	2913
0022	420	227	273	304	341	420	455	496
0023	364	242	364	416	437	485	582	647
0024	0	546	728	728	728	874	936	1092
0025	0	780	1040	1040	1170	1387	1872	2270
0026	0	1092	1456	1748	1872	1942	2622	3496
0027	0	5462	5462	5462	8193	7283	10925	10925
0028	390	202	242	242	242	269	364	388
0029	420	227	341	390	409	455	546	606
0030	0	455	455	606	546	606	728	809

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S



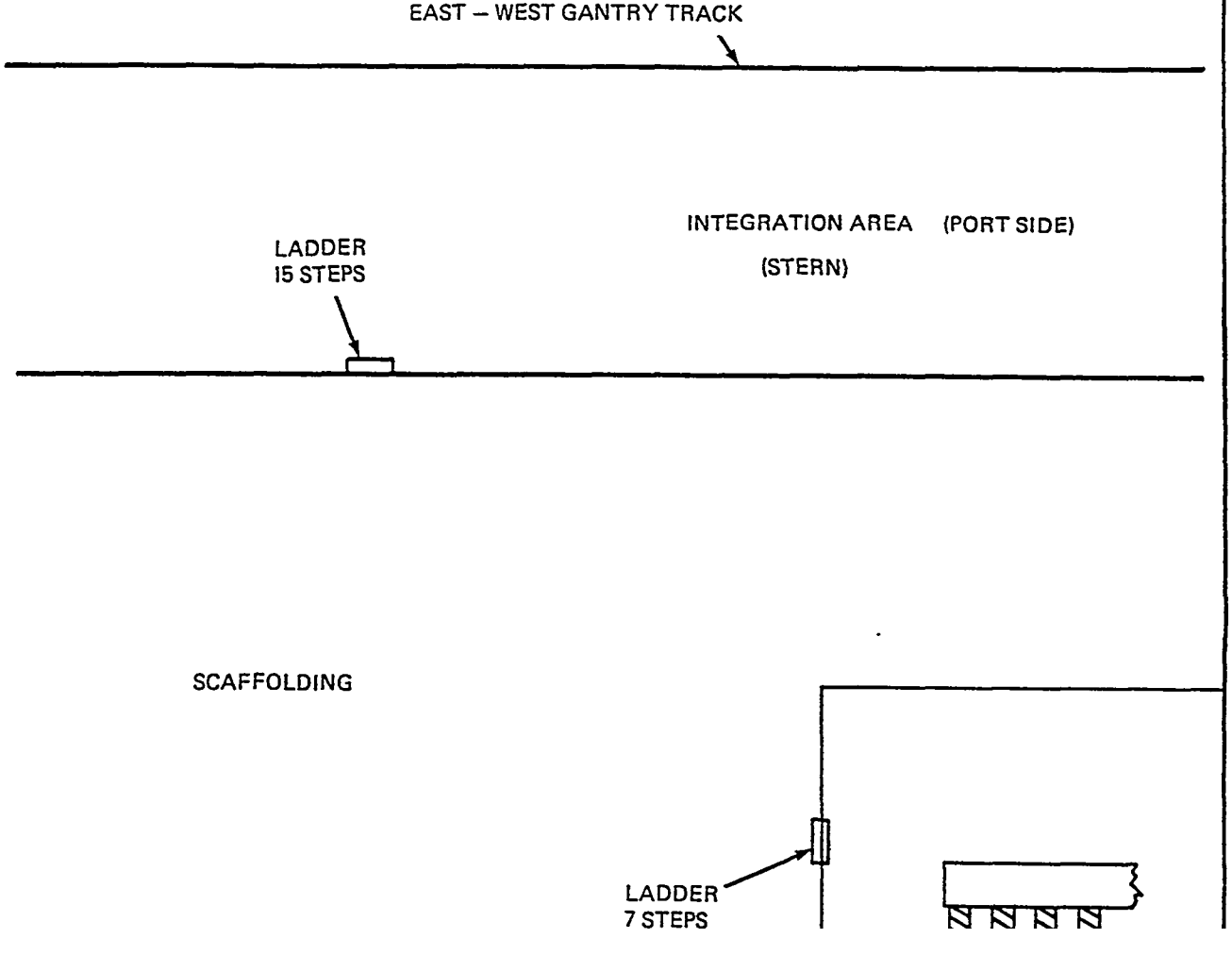
UNDERSIDE VIEW OF ASSEMBLY 303

LEGEND

W ⟷ E

SCALE 1" = 12.5'

SUBJECT: STERN TUBE



PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0061	0	606	809	971	910	1079	1324	1494
0062	0	1820	1820	2427	3641	3641	4370	5826
0063	0	546	728	728	728	874	936	1092
0064	0	2731	2731	3641	5462	5462	6555	8740
0065	0	780	1040	1248	1337	1560	2081	2497
0066	0	910	1213	1456	1560	1820	2427	2913
0067	0	910	1213	1456	1560	1820	2427	2913
0068	0	682	910	1092	1024	1213	1489	1680
0069	0	910	1213	1456	1365	1456	1986	2241
0070	0	2731	2731	2731	3277	3641	4682	5462
0071	0	496	662	662	662	722	851	993
0072	0	606	809	971	910	971	1324	1494
0073	0	682	910	1092	1024	1213	1489	1680
0074	0	910	1213	1456	1365	1456	1986	2241
0075	0	780	1040	1248	1337	1560	2081	2497

PROCESS FLOW CHART

ACTIVITY MACHINING OPERATION (TYPICAL)
CHART BEGINS MACHINERY SHOP
CHART ENDS MACHINERY SHOP

OPERATION ○
INSPECTION □
TRANSPORT ⇨
DELAY D
STORAGE ▽

	DESCRIPTION	SYMBOL
1	Stored in Shop	○ □ ⇨ D ▽
2	Transport to Assembly (Truck)	○ □ ⇨ D ▽
3	Wait for Crane	○ □ ⇨ D ▽
4	Place Aboard Ship (Crane)	○ □ ⇨ D ▽
5	Wait for Welder	○ □ ⇨ D ▽
6	Weld Machine in Place	○ □ ⇨ D ▽
7	Set up for Machining	○ □ ⇨ D ▽
8	Perform Machining Operation	○ □ ⇨ D ▽
9	Inspect Machining	○ □ ⇨ D ▽
10	Disassemble Machinery	○ □ ⇨ D ▽
11	Burn Off Welds	○ □ ⇨ D ▽
12	Wait for Crane	○ □ ⇨ D ▽
13	Place on Platen (Crane)	○ □ ⇨ D ▽
14	Wait for Truck	○ □ ⇨ D ▽
15	Transport to Shop (Truck)	○ □ ⇨ D ▽
16	Store In Shop	○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽
		○ □ ⇨ D ▽

INDEX

PROCESS TIME FOR DRILLING
ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0106	0	93	112	140	168	186	240	298
0107	420	214	257	321	385	428	550	685
0108	0	101	121	151	182	202	260	323
0109	496	390	390	520	585	624	780	891
0110	0	170	170	227	256	273	341	390
0111	0	1213	809	971	1040	1079	1213	1618
0112	0	575	383	460	492	511	575	766
0113	341	182	218	273	327	364	468	582
0114	0	455	455	606	682	728	910	971
0115	0	606	809	809	910	971	1213	1618
0116	0	682	910	910	1024	1092	1365	1820
0117	0	2185	2185	2185	2622	2913	3745	4370
0118	0	227	227	260	273	303	364	404
0119	0	303	303	404	455	485	485	647
0120	0	364	364	485	546	582	582	776

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0121	0	341	341	455	512	546	546	728
0122	0	390	390	520	585	624	624	832
0123	273	130	156	156	167	173	234	249
0124	341	182	218	218	234	242	327	349
0125	390	202	242	242	260	269	364	388
0126	273	130	156	156	167	173	234	249
0127	273	140	168	168	180	186	252	268
0128	546	420	420	560	630	672	720	747
0129	0	1365	1365	1365	1365	1365	1820	2185
0130	0	455	606	606	682	728	780	809
0131	0	546	728	874	728	874	1008	1092
0132	0	606	809	971	910	882	1120	1213
0133	0	606	809	971	910	882	1120	1213
0134	496	260	390	520	585	624	668	693
0135	0	455	606	606	682	662	780	809

PROCESS TIME FOR DRILLING
ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0136	0	546	728	874	819	794	1008	1092
0137	0	1365	1365	1365	1365	1365	1820	2185
0138	0	546	728	874	819	794	1008	1092
0139	0	606	809	971	910	882	1120	1213
0140	0	1365	1365	1365	1365	1365	1820	2185
0141	0	682	910	1092	910	1092	1365	1680
0142	0	1560	1560	2081	1872	2081	2341	2774
0143	0	2185	2185	2913	3277	3496	4370	4994
0144	0	5462	5462	5462	8193	7283	10925	10925
0145	0	606	909	971	910	971	1213	1294
0146	0	1365	910	1092	1024	1365	1638	1820
0147	0	1820	1213	1820	2185	2081	2185	2427
0148	0	2731	2731	3641	4096	4370	5462	6242
0149	682	1092	546	364	468	546	655	672
0150	840	853	455	455	585	682	819	840

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0151	682	546	437	728	936	1092	1311	1344
0152	0	682	546	971	1170	1365	1638	1986
0153	0	910	728	1213	1560	1820	2427	2913
0154	0	1365	1092	1820	2341	2731	3641	4370
0155	0	1820	1820	2913	3641	4161	5462	6474
0156	0	2185	2185	2185	2622	2913	3745	4370
0157	0	2731	2731	3641	4096	5462	6555	8740
0158	0	7283	7283	9711	14566	14566	21850	19422
0159	0	2731	1820	2731	3277	3641	4682	5462
0160	0	7283	7283	9711	14566	14566	21850	19422
0161	496	390	312	520	585	693	936	1040
0162	0	546	437	728	819	971	1311	1456
0163	0	2731	5462	3641	3277	3121	3277	4370
0164	0	3641	7283	4855	3641	4161	4370	5826
0165	0	910	910	1213	1560	1456	1820	2427

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0166	0	2731	2731	3641	3277	3121	3277	4370
0167	0	5462	10925	10925	8193	7283	9364	10925
0168	0	1092	1092	1456	1872	1748	2185	2913
0169	0	3641	3641	4855	4370	4161	4370	5826
0170	0	5462	10925	10925	8193	7283	9364	10925
0171	0	1365	1365	1820	2341	2185	2731	3641
0172	0	1820	1820	2427	3121	2913	3641	4855
0173	0	546	546	624	728	874	1092	1456
0174	364	182	218	312	0	0	0	0
0175	546	243	291	416	0	0	0	0
0176	546	546	1092	1092	0	0	0	0
0177	0	420	560	560	630	448	560	672
0178	0	546	728	728	819	874	1092	1165
0179	0	1093	1456	1456	1638	1748	2185	2330
0180	0	5463	5462	7283	6555	6242	7283	7945

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0181	0	2731	5462	5462	5462	5462	8193	8740
0182	0	3642	7283	7283	7283	7283	10925	11653
0183	0	5463	10925	10925	10925	14566	16387	17480
0184	0	5463	10925	10925	10925	14566	16387	17480
0185	195	61	52	60	68	72	87	97
0186	195	72	62	73	82	87	104	116
0187	195	72	62	73	82	87	104	116
0188	195	72	62	73	82	87	104	116
0189	195	55	47	55	62	66	79	88
0190	195	60	52	61	68	72	87	97
0191	195	130	156	156	156	138	187	227
0192	195	130	137	137	137	121	163	198
0193	273	151	152	182	273	242	364	364
0194	227	130	130	156	234	208	312	312
0195	546	303	455	455	546	606	728	728

PROCESS TIME FOR DRILLING

ONE INCH DEPTH HOLES IN TMU'S

MAT'L & COND. CODE	1/16" DIA. HOLE	1/8" DIA. HOLE	1/4" DIA. HOLE	1/2" DIA. HOLE	3/4" DIA. HOLE	1" DIA. HOLE	1-1/2" DIA. HOLE	2" DIA. HOLE
0196	455	242	364	364	437	485	582	582
0197	61	81	69	80	91	107	145	155
0198	78	78	104	156	187	249	374	499
0199	273	364	546	874	819	874	1092	1165
0200	364	364	437	624	728	728	936	1092
0201	55	55	91	145	182	218	262	291
0202	137	137	218	364	546	546	819	874
0203	137	109	182	273	327	364	437	582
0204	137	109	182	273	327	364	437	582
0205	137	137	182	273	327	364	468	546
0206	61	73	121	182	218	242	291	388
0207	137	109	182	273	327	364	437	582
0208	364	312	291	437	524	582	874	1165
0209	30	26	24	364	43	48	72	97
....	0	0	0	0	0	0	0	0

INGALLS Shipbuilding

MOST - calculation

DRILLING

CODE 1004.21
DATE 2/6/84
SIGN. TLC
PAGE 10-24

ACTIVITY HAND FEED DRILL BIT TO AND FROM WORKPIECE (ELECTRIC HAND DRILL)

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	PLACE DRILL TO WORKPIECE
2	PUSH BUTTON
3	REMOVE DRILL FROM WORKPIECE

NO.	SEQUENCE MODEL	FR	TMU
1	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
3	$A_0 B_0 G_0 A_1 B_0 P_1 A_0$		20
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
2	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		30
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 110

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1005.01
DATE 2/15/84
SIGN. TLC
PAGE 10-25

BOLT-UP

ACTIVITY SET-UP WITH FIXED WRENCH

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET BAG OF BOLTS	1	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
		2	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		6
2	GET BAG OF NUTS	3	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	2	12
		4	$A_1 B_0 G_3 A_1 B_0 P_0 A_0$		50
3	GET WRENCHES	5	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	4	16
		6	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		6
4	GET HAMMER	7	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
		8	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		6
5	COLLECT ALL OF THE ABOVE ITEMS	9	$A_1 B_0 G_1 A_1 B_0 P_0 A_0$		3
		10	$A_0 B_0 G_0 (A_1 B_0 P_3) A_0$	(5)	200
6	PICK-UP BAG OF BOLTS		A B G A B P A		
			A B G A B P A		
7	PICK-UP BAG OF NUTS		A B G A B P A		
			A B G A B P A		
8	PICK-UP WRENCHES		A B G A B P A		
			A B G A B P A		
9	PICK-UP HAMMER		A B G A B P A		
			A B G A B P A		
10	PUT ALL TOOLS AND MATERIALS ABOVE IN TOOL BAG		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 860

FORM R-1458

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1004.14
DATE 2/6/84
SIGN. TLC
PAGE 10-22

DRILLING

ACTIVITY CHANGE DRILL BIT

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	OPEN CHUCK (25 TURNS)	2	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$		80
		7	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$		40
2	PLACE DRILL BIT IN CHUCK		A B G A B P A		
			A B G A B P A		
3	CLOSE CHUCK (3 TURNS)		A B G A B P A		
			A B G A B P A		
4	TIGHTEN CHUCK (5 TAPS)		A B G A B P A		
			A B G A B P A		
5	LOOSEN CHUCK (5 TAPS)		A B G A B P A		
			A B G A B P A		
6	OPEN CHUCK (3 TURNS)		A B G A B P A		
			A B G A B P A		
7	PLACE DRILL BIT IN BAG		A B G A B P A		
			A B G A B P A		
8	CLOSE CHUCK (25 TURNS)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_3 A_1 B_0 P_3 (L_{54}) A_0 B_0 P_0 A_0$	(1.5)	950
		3	$A_1 B_0 G_1 A_0 B_0 P_0 F_6 A_0 B_0 P_0 A_0$		80
		4	$A_1 B_0 G_3 A_1 B_0 P_1 F_6 A_1 B_0 P_1 A_0$		140
		5	$A_1 B_0 G_3 A_1 B_0 P_1 F_6 A_1 B_0 P_1 A_0$		140
		6	$A_1 B_0 G_1 A_0 B_0 P_0 F_6 A_1 B_0 P_1 A_0$		100
		8	$A_1 B_0 G_3 A_0 B_0 P_0 (F_{54}) A_1 B_0 P_1 A_0$	(1.5)	870
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 2400

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

DRILLING

CODE 1004.15
DATE 2/6/84
SIGN. TLC
PAGE 10-23

ACTIVITY HAND FEED DRILL BIT TO AND FROM WORK PIECE (MAGNETIC BASE)

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	FOWARD FEED DRILL BIT
2	PUSH BUTTON (ACTIVATE MOTOR)
3	RETRACT DRILL BIT
4	PUSH BUTTON (STOP MOTOR)

NO.	SEQUENCE MODEL	FR	TMU
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
1	A_1 B_0 G_1 M_3 X_0 I_0 A_0	4	20
2	A_1 B_0 G_1 M_1 X_0 I_0 A_1		40
3	A_1 B_0 G_1 M_3 X_0 I_0 A_0	5	25
4	A_1 B_0 G_1 M_1 X_0 I_0 A_1		40
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 530

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1004.12
DATE 2/6/84
SIGN. TLC
PAGE 10-20

DRILLING

ACTIVITY USE SAFETY CHAIN (MAGNETIC BASE DRILL)

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET CHAIN (10' LONG)	1	$A_1\ B_6\ G_1\ A_1\ B_0\ P_0\ A_0$		90
		2	$A_1\ B_0\ G_3\ (A_1)\ B_0\ P_0\ A_0$	(3)	70
2	UNWIND CHAIN (3 UNWINDS)	3	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0)$	(3)2	360
		5	$A_0\ B_0\ G_0\ A_6\ B_0\ P_0\ A_6$		120
3	PLACE CHAIN THROUGH DRILL HANDLE HOLE & PART OF SHIP		A B G A B P A		
			A B G A B P A		
4	PULL CHAIN THROUGH DRILL HANDLE HOLE & PART OF SHIP		A B G A B P A		
			A B G A B P A		
5	WALK TO AND FROM AREA USED TO SECURE DRILL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		4	$(A_1\ B_0\ G_1\ M_3\ X_0\ I_0\ A_0)$	(3)2	300
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 940

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

DRILLING

CODE 1004.13
DATE 2/6/84
SIGN. TLC
PAGE 10-21

ACTIVITY PLUG IN EXTENSION CORD

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TM
1	UNWIND DRILL CORD (6ft.)	1	A_1 B_6 G_3 (A_1) B_0 P_0 A_0	(4)	14
		2	A_1 B_0 G_1 A_1 B_0 P_0 A_0		3
2	GET EXTENSION CORD	3	A_1 B_0 G_3 (A_1) B_0 P_0 A_0	(16)	2
		4	A_1 B_0 G_1 A_1 B_0 P_3 A_0		6
3	UNWIND EXTENSION CORD (50ft.)	5	A_1 B_0 G_1 A_{42} B_6 P_3 A_{42}		95
		8	A_1 B_0 G_3 (A_1) B_0 P_6 A_0	(17)	2
4	PLUG DRILL CORD INTO EXTENSION CORD	9	A_0 B_0 G_0 A_1 B_0 P_1 A_0		2
		10	A_1 B_0 G_1 A_0 B_0 P_0 A_1		3
5	PLUG EXTENSION INTO OUTLET (WALK 56 ft. and RETURN)	11	A_1 B_0 G_3 (A_1) B_0 P_6 A_0	(5)	1
		12	A_0 B_0 G_0 A_1 B_0 P_1 A_0		1
6	UNPLUG EXTENSION CORD		A B G A B P A		
			A B G A B P A		
7	UNPLUG DRILL CORD FROM EXTENSION CORD		A B G A B P A		
			A B G A B P A		
8	WIND UP EXTENSION CORD		A B G A B P A		
			A B G A B P A		
9	ASIDE EXTENSION CORD		A B G A B P A		
			A B G A B P A		
10	GET DRILL CORD	6	A_{42} B_6 G_3 M_3 X_0 I_0 A_{42}		
		7	A_1 B_6 G_3 M_3 X_0 I_0 A_0		15
11	WIND UP CORD		A B G M X I A		
			A B G M X I A		
12	ASIDE DRILL CORD		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 2960

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1003.30
DATE 1/30/84
SIGN. TLC
PAGE 10-18

LAYOUT FOR DRILLING

ACTIVITY MANUFACTURE TEMPLATE

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	MEASURE TEMPLATE MATERIAL
2	CUT TEMPLATE MATERIAL[A]
3	PLACE TEMPLATE ON EQUIPMENT
4	DRAW IN HOLES (4 HOLES)
5	CUT OUT HOLES (4 HOLES)
6	MEASURE LOCATION OF FIRST HOLE (2 DIMENSION)
A	THE CUT IN TEMPLATE ASSUMES SISSORS ARE USED. A 2/3" CUT WITH A 68" PERIMETER YIELDING 102 CUTS ⇒ C_{54} WITH A FREQUENCY OF (3.12)
	REFERENCE DRAWING GD185721

NO.	SEQUENCE MODEL	FR	TMU
3	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$		40
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_3\ B_0\ G_3\ A_0\ B_6\ (P_1\ A_1\ M_{32})\ A_1\ B_0\ P_3\ A_0$	(2)	84.0
2	$A_3\ B_6\ G_3\ A_3\ B_6\ P_1\ (C_{54})\ A_3\ B_6\ P_1\ A_0$	(3.12)	1985
4	$A_1\ B_0\ G_3\ A_0\ B_6\ (P_1\ A_1\ R_3)\ A_3\ B_0\ P_1\ A_0$	(4)	340
5	$A_1\ B_6\ G_3\ A_0\ B_0\ (P_1\ A_1\ C_{46})\ A_1\ B_0\ P_1\ A_2$	(4)	870
6	$A_1\ B_0\ G_3\ A_0\ B_6\ (P_1\ A_1\ M_{32})\ A_3\ B_0\ P_3\ A_3$	(2)	870
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	4 HOLES TOTAL		4945
	STD PER HOLE		1236

TIME = 1236

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

DRILLING

CODE 1004.11
DATE 2/6/84
SIGN. TLC
PAGE 10-19

ACTIVITY POSITION DRILL (MAGNETIC BASE DRILL)

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TI
1	MOVE DRILL INTO POSITION		A B G A B P A		
			A B G A B P A		
2	RUN DRILL BIT DOWN & UP		A B G A B P A		
			A B G A B P A		
3	FINAL ADJUSTMENT OF DRILL LOCATION		A B G A B P A		
			A B G A B P A		
4	TURN ON AND OFF MAGNET		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	A_3 B_6 (G_3 M_3) X_0 I_0 A_0	(2)	2
		2	(A_1 B_0 G_1 M_3 X_0 I_0 A_0)	(4)2	40
		3	A_1 B_0 G_3 M_3 X_0 I_0 A_0		7
		4	A_1 B_0 G_1 M_1 X_0 I_0 A_0	2	
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = I 740

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

1003.10

DATE 1/30/89

SIGN. TLC

PAGE 10-16

LAYOUT FOR DRILLING

ACTIVITY WITH OUT TEMPLATE

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET MARKER	1	$A_1\ B_0\ G_3\ A_1\ B_0\ P_0\ A_0$		50
		2	$A_1\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$		80
2	REMOVE CAP FROM MARKER	7	$A_1\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$		80
		8	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$		40
3	MEASURE DIMENSIONS		A B G A B P A		
			A B G A B P A		
4	MAKE MARKS		A B G A B P A		
			A B G A B P A		
5	CENTER PUNCH HOLE		A B G A B P A		
			A B G A B P A		
6	CIRCLE HOLE WITH MARKER		A B G A B P A		
			A B G A B P A		
7	PUT CAP ON MARKER		A B G A B P A		
			A B G A B P A		
8	ASIDE MARKER		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1\ B_0 G_3\ A_0 B_0 (P_1 A_1 M_{32}) A_1\ B_0\ P_3\ A_0$	(2)	760
		4	$A_0 B_0 G_0\ A_0\ B_0 (P_1 A_1 R_3)\ A_1\ B_0 P_1\ A_0$	(2)	120
		5	$A_1 B_0 G_3 A_1 B_0 P_3\ F_6\ A_1 B_0 P_1\ A_0$		160
		6	$A_1 B_0 G_1 A_1 B_0 P_1\ R_6\ A_0 B_0 P_0 A_0$		100
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 1390

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

1003.20

DATE 1/30/84

SIGN. TLC

PAGE 10-17

LAYOUT FOR DRILLING

ACTIVITY WITH TEMPLATE

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE TEMPLATE ON FOUNDATION	1	$A_0\ B_0\ G_0\ A_3\ B_6\ P_3\ A_0$		1
		3	$A_3\ B_6\ G_3\ A_0\ B_0\ P_0\ A_3$		1
2	CENTER PUNCH HOLES-(4 HOLES)	4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$		80
		6	$A_1\ B_0\ G_3\ A_1\ B_0\ P_3\ A_3$		1
3	GET MARKER	7	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		
			A B G A B P A		
4	UN CAP MARKER		A B G A B P A		
			A B G A B P A		
5	MARK HOLES-(4 HOLES)		A B G A B P A		
			A B G A B P A		
6	CAP MARKER		A B G A B P A		
			A B G A B P A		
7	PUT-UP MARKER		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_3\ B_6\ G_3\ A_3\ B_6\ (P_1, A_1, F_6)\ A_1\ B_0\ P_1\ A_0$	(4)	5
		5	$A_0\ B_0\ G_0\ A_0\ B_6\ (P_1, A_1, R_3)\ A_0\ B_0\ P_0\ A_0$	(4)	260
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
	REFERENCE DRAWING 60185721		A B G A B P A B P A		
			A B G A B P A B P A		
			4 HOLES TOTAL		1290
			STD. PER HOLE		32.

TIME =

INGALLS Shipbuilding

MOST - calculation

CODE 1001.231
DATE 1/13/84
SIGN. TLC
PAGE 10-14

JOB PREPARATION

ACTIVITY SECURE DRAWINGS FROM REPRODUCTION SERVICES

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FILL OUT RSR FORM (1 WORD)	6	$A_1 B_0 G_1 A_1 B_0 P_0 A_0$		30
			A B G A B P A		
2	FILL OUT RSR FORM (21 DIGITS)		A B G A B P A		
			A B G A B P A		
3	FILL OUT RSR FORM (1 SIGNATURE)		A B G A B P A		
			A B G A B P A		
4	FILL OUT RSR FORM (2 DATES)		A B G A B P A		
			A B G A B P A		
5	WAIT FOR DRAWING (3 MINS)		A B G A B P A		
			A B G A B P A		
6	RECIEVE DRAWING		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_3 A_1 B_0 P_1 R_6 A_1 B_0 P_1 A_0$		140
		2	$A_0 B_0 G_0 A_0 B_0 P_0 R_{42} A_0 B_0 P_0 A_0$		420
		3	$A_0 B_0 G_0 A_0 B_0 P_0 R_{16} A_0 B_0 P_0 A_0$		160
		4	$A_0 B_0 G_0 A_0 B_0 B_0 R_{16} A_0 B_0 B_0 A_0$	2	320
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		5			5000

TIME = 6070

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 100218
DATE 1/18/84
SIGN. TLC
PAGE 10-15

AREA TRAVEL

ACTIVITY TRAVEL FROM MODULE 2 STAIRS TO AMR #1

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	TRAVEL UP 24 STAIR STEPS	1	A_{42} B_0 G_0 A_0 B_0 P_0 A_0		42
		2	A_0 B_{42} G_0 A_0 B_0 P_0 A_0		42
2	THROUGH MANHOLE	3	A_{32} B_0 G_0 A_0 B_0 P_0 A_0		320
		6	A_0 B_{42} G_0 A_0 B_0 P_0 A_0		420
3	16 STEPS THRU ENGINE ROOM NO. 1	7	A_{42} B_0 G_0 A_0 B_0 P_0 A_0		42
			A B G A B P A		
4	GET ON AND OFF LADDER		A B G A B P A		
			A B G A B P A		
5	UP LADDER 10 RUNGS		A B G A B P A		
			A B G A B P A		
6	THROUGH MAN HOLE		A B G A B P A		
			A B G A B P A		
7	21 STEPS TO WORK AREA		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		4	A_0 B_{16} G_0 M_0 X_0 I_0 A_0		160
		5	A_1 B_0 G_1 M_3 X_0 I_0 A_0	10	500
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 2660

FORM R-1458 FORM R-1453

INGALLS Shipbuilding

MSET = calculation

1001.22

DATE 1/13/84

SIGN. TLC

PAGE 10-12

JOB PREPARTION

ACTIVITY AVERAGE ADDITIONAL JOB PREPARATION

CONDITIONS ALL SHIPYARD AREAS

ELEMENT NO.	ELEMENT	NO.	SEQUENCE MODEL	TP	TMU
1	AVERAGE ADDITIONAL JOB PREPARATION (CODE 1001.21)		A B G A B P A		
2	SECURE TOOLS FROM TOOL CRIB (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			1180
		2			4417

TIME = 16597

FORM R-1-58

INGALLS Shipbuilding

MOST - calculation

CODE 1001.23
DATE 1/13/84
SIGN. TLC
PAGE 10-13

JOB PREPARATION

ACTIVITY COMPLEX ADDITIONAL JOB PREPARATION

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	AVERAGE ADDITIONAL JOB PREPARATION (CODE 1001.22)	5	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	3	12?
			A B G A B P A		
2	SECURE PARTS FROM WAREHOUSE (CODE 1001.132)		A B G A B P A		
			A B G A B P A		
3	SECURE DRAWINGS FROM REPRODUCTION SERVICES (CODE 1001.231)		A B G A B P A		
			A B G A B P A		
4	READ AN ADDITIONAL COMPLEX DRAWING		A B G A B P A		
			A B G A B P A		
5	TURN PAGES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		4	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	(188.5)	189.
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			16597
		2			11445
		3			607

TIME = 53,157

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.1321
DATE 1/13/84
SIGN. TLC
PAGE 10-10

JOB PREPARATION

ACTIVITY SECURE MATERIAL REQUISITION FORM FROM PRODUCTION CONTROL

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	READ 9 WORDS FROM BILL
2	WRITE 15 WORDS ON REQUISITION
3	WRITE 49 DIGITS ON REQUISITION
4	WRITE 2 DATES ON REQUISITION
5	WRITE 1 SIGNATURE
6	READ 33 NOS FROM BILL
7	CRAFT EMPLOYEE RECIEVES REQUISITION FROM PRODUCTION CONTROL EMPLOYEE

NO.	SEQUENCE MODEL	FR	TMU
7	$A_1 B_0 G_1 A_1 B_0 P_0 A_0$		30
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_1 B_0 G_1 A_1 B_0 P_0 \overline{T_{10}}$ $A_1 B_0 P_1 A_0$		150
2	$A_1 B_0 G_1 A_1 B_0 P_1 (R_{50})$ $A_1 B_0 P_0 A_0$	(2.1)	1,134
3	$A_0 B_0 G_0 A_0 B_0 P_0 (R_{57})$ $A_0 B_0 P_0 A_0$	(1.7)	918
4	$A_0 B_0 G_0 A_0 B_0 P_0 (R_{16})$ $A_0 B_0 P_0 A_0$	(1.4)	320
5	$A_0 B_0 G_0 A_0 B_0 P_0 R_{16}$ $A_0 B_0 P_0 A_0$		160
6	$A_1 B_0 G_0 A_0 B_0 P_0 (\overline{T_{10}})$ $A_1 B_0 P_0 A_0$	2.3	230
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 3042

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.21
DATE 1/13/84
SIGN. TLC
PAGE 10-11

JOB PREPARATION

ACTIVITY SIMPLE ADDITIONAL JOB PREPARATION

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET AND PUT-UP TOOLS (CODE 1001.111)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	READ TIME CARD		A B G A B P A		
			A B G A B P A		
3	SIGN TIME CARD		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_1 B_0 G_1 A_1 B_0 P_0$ T_3 $A_1 B_0 P_1 A_0$		8
		3	$A_1 B_0 G_1 A_1 B_0 P_1$ R_{16} $A_1 B_0 P_1 A_0$		220
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	440	2	880

TIME = 1180

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

1001.131

DATE 1/13/84

SIGN. TLC

PAGE 10-3

JOB PREPARATION

ACTIVITY ADDITIONAL TIME FOR READING COMPLEX DRAWING

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	EP	TMU
1	TURN PAGE (3 PAGE DRAWING)	1	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	3	120
		4	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	2	80
2	READ COMPLEX DRAWING (6)(18)(0C) (2262 WORDS AND DIGITS)		A B G A B P A		
			A B G A B P A		
3	READ AVERAGE DRAWING		A B G A B P A		
			A B G A B P A		
4	TURN PAGE-AVERAGE DRAWING		A B G A B P A		
			A B G A B P A		
5	DIFFERENCE BETWEEN COMPLEX AND AVERAGE DRAWING READING		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	1188.5	18920
		3	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	1150.9	15160
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		5	[(No.1) + (No.2)] - [(No.3 + (No.4)]		3780

TIME = 3780

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

JOB PREPARATION

CODE 1001.132
DATE 1/13/84
SIGN. TLC
PAGE 10-4

ACTIVITY SECURE PARTS FROM WARE HOUSE

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SECURE MATERIAL REQUISITION FORM FROM PRODUCTION CONTROL (CODE 1001.132)	2	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_1$		30
		4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$		4
2	SUBMIT REQUISITION TO WAREHOUSE EMPLOYEE		A B G A B P A		
			A B G A B P A		
3	WAIT (5MINS)		A B G A B P A		
			A B G A B P A		
4	RECIEVE PARTS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			3042
		3			8372

TIME = 11445

INGALLS Shipbuilding

MOST - calculation

CODE 1001.122
DATE 1/13/84
SIGN. TLC
PAGE 10-6

JOB PREPARATION

ACTIVITY ADDITIONAL TIME FOR READING AVERAGE DRAWING

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	READ AVERAGE DRAWING (1811 WORDS AND DIGITS) (GD 185286)
2	TURN PAGE
3	READ SIMPLE DRAWING
4	DIFFERENCE BETWEEN AVERAGE AND SIMPLE DRAWING READING

NO.	SEQUENCE MODEL	FR	TMU
2	$A_1 B_0 G_1 A_1 B_0 P_1 A$	2	80
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	150.9	15170
3	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	39.8	4050
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
4	(NO.1) – (NO.3)		11120

TIME = 11,200

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.13
DATE 1/13/84
SIGN. TLC
PAGE 10-7

JOB PREPARATION

ACTIVITY: COMPLEX INITIAL JOB PREPARATION

CONDITIONS: ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	AVERAGE JOB PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
2	RECIEVE INSTRUCTIONS (5 MINS. ADDITIONAL)		A B G A B P A		
			A B G A B P A		
3	ADDITIONAL TIME FOR READING COMPLEX DRAWING (CODE 1001.131)		A B G A B P A		
			A B G A B P A		
4	SECURE PARTS FROM WAREHOUSE (CODE 1001.132)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			42001
		2			8333
		3			37
		4			11443
TIME =					65,559

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.12
DATE 1/13/84
SIGN. TLC
PAGE 10-4

JOB PREPARATION

ACTIVITY AVERAGE INITIAL JOB PREPARATION

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SIMPLE JOB PREPARATION (CODE 1001.11)		A B G A B P A		
			A B G A B P A		
2	RECIEVE INSTRUCTIONS (2 MINS. ADDITIONAL)		A B G A B P A		
			A B G A B P A		
3	SECURE TOOLS FROM TOOL CRIB (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
4	ADDITIONAL TIME FOR READING AVERAGE DRAWING (CODE 1001.122)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			12050
		2			3334
		3			15417
		4			11200

TIME = 42,001

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.121
DATE 1/13/84
SIGN. TLC
PAGE 10-5

JOB PREPARATION

ACTIVITY SECURE TOOLS FROM TOOL CRIB

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		3	$A_1 B_0 G_1 A_1 B_0 P_0 A_0$		22
1	SIGN TOOL LOAN FORM		A B G A B P A		
2	WAIT (9.1 MINS.)		A B G A B P A		
3	GET TOOLS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_1 A_1 B_0 P_1 R_{16} A_1 B_0 P_1 A_0$		27
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2			15167

TIME = 15417

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 1001.11
DATE 1/13/84
SIGN. TLC
PAGE 10-2

JOB PREPARATION

ACTIVITY SIMPLE INITIAL JOB PREPARATION

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1.	RECIEVE INSTRUCTIONS (3 MINS.)		A B G A B P A		
			A B G A B P A		
2.	READ BILL OF MATERIAL (2501-218-1) (210 WORDS AND DIGITS)		A B G A B P A		
			A B G A B P A		
3.	READ SIMPLE SKETCH (GD185202) (478 WORDS AND DIGITS)		A B G A B P A		
			A B G A B P A		
4.	GET TOOLS FROM TOOL BOX (CODE 1001.111)		A B G A B P A		
			A B G A B P A		
5.	PUT TOOLS IN TOOL BOX (CODE 1001.111)		A B G A B P A		
			A B G A B P A		
6.	READ TIME CARD		A B G A B P A		
			A B G A B P A		
7.	SIGN TIME CARD		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	(17.5)	1820
		3	$A_1 B_0 G_1 A_1 B_0 P_0 (T_{10}) A_1 B_0 P_3 A_0$	(39.8)	4050
		6	$A_1 B_0 G_1 A_1 B_0 P_0 T_3 A_1 B_0 P_1 A$		80
		7	$A_1 B_2 G_1 A_1 B_0 P_1 R_{16} A_1 B_0 P_1 A_0$		220
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			5000
		4			440
		5			440

TIME= 12050

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

ODE 1001.111
DATE 1/13/84
SIGN. TLC
PAGE 10-3

JOB PREPARATION

ACTIVITY GET TOOLS FROM TOOL BOX OR PUT TOOLS IN TOOL BOX

CONDITIONS ALL SHIP YARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE KEY IN LOCK	1	A_{16} B_0 G_3 A_1 B_0 P_3 A_0		2.2
		4	A_1 B_0 G_3 A_1 B_0 P_1 A_0		6
2	TURN KEY AND REMOVE LOCK	5	A_0 B_0 G_0 A_1 B_0 P_1 A_0		20
		8	A_0 B_0 G_0 A_1 B_0 P_1 A_0		20
3	OPEN AND CLOSE DOOR		A B G A B P A		
			A B G A B P A		
4	GET TOOL BAG AND PLACE ON SHOULDER (OR PLACE IN LOCKER)		A B G A B P A		
			A B G A B P A		
5	PLACE LOCK IN POSITION		A B G A B P A		
			A B G A B P A		
6	CLOSE LOCK		A B G A B P A		
			A B G A B P A		
7	REMOVE KEY FROM LOCK		A B G A B P A		
			A B G A B P A		
8	PLACE KEY IN POCKET		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	A_0 B_0 G_0 M_1 X_0 I_0 A_1		20
		3	A_1 B_0 G_1 M_3 X_0 I_0 A_0		5
		6	A_0 B_0 G_0 M_1 X_0 I_0 A_0		1
		7	A_1 B_0 G_1 M_1 X_0 I_0 A_0		30
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 440

FORM R-1458

FORM R-1458

FACE MILLING
PROCESS TIME FORMULA DERIVATION

OPERATION	FORMULA	SYMBOLS
GIVEN : $t=L/fm$[1]	$t= L/fro$	Dm=Dia. of milling cutter (inches) fm= feed rate (in/min.) ft= feed rate (in/tooth
SUBSTITUTE: $fm = ft \times T \times RPM$[1]	$t= L/(ft \times T \times RPM)$	K= Minute to TMU conversion factor (TMU~ per rein) L= Length of cut (inches)
SUBSTITUTE: $RPM= Vc/.262\ Dml$	$t = (.262 \times Dmx\ L)/"$ (ft x T.x Vc)	n= Number of cuts P= Process time (TMU's) RPM= Spindle Speed (rev/min.)
MULTIPLY: Include frequency factor (n)	$t= (.262xnxDmxL)/$ (ft x T X Vc)	t= Process time (min.) T= No. of teeth in milling cutter
SUBSTITUTE: $t = P/K$	$P=(.262x\ Kxnx\ DmxL)\ /(ftxTxVc)$	
SUBSTITUTE: $K = 1667$	$P= (.262 \times 1667 \times nxDmx\ L)/(ftx\ TxVC)$	
MULTIPLY: $1667 \times .262 = 437$	$P= (437 \times n \times Dmx\ L)/(ft \times T \times Vc)$	

[1] "Machining Data Handbook," Metcut Research Associates Inc. (1966) p. 507.

This section contains all of the detailed MOST standard calculation forms which are the foundation for the unit and operation standards. The standards are listed in code number order. Below is an Index showing how this section is constructed .

INDEX

MAIN ENGINE PADS
FACE MILLING PROCESS TIME CALCULATIONS
(CONTINUED)

MAIN ENGINE PADS MACHINING PHYSICAL CHARACTERISTICS:

WIDTH OF PADS (INCHES	
PAD #l - 19 3/4	PAD#5 - 15
PAD #2 - 19 3/4	PAD #6 - 15
PAD#3 - 15	PAD#7 - 15
PAD #4 - 15	PAD #8 - 15

(L) LENGTH OF CUT* (INCHES)	
PAD #1 - 69.5	PAD #5--6125″5″
PAD #2 - 69.5	PAD #6 -75.0
PAD #3 -75.0	PAD #7 - 37.0
PAD #4 - 38.0	PAD #8 - 68.125

NO. OF ROUGH AND FINISH CUTS REQ'D	
PAD #l - 10R+3F	PAD #5 - 7R+2F
PAD #2 - 10R+3F	PAD #6 - 7R+2F
PAD #3 - 7R+2F	PAD #7 - 7R+2F
PAD #4 - 7R+2F	PAD #8 - 7R+2F

AVG. DEPTH OF MATERIAL REMOVED (INCHES)	
PAD #l - .383	PAD #5 - .398
PAD #2 - .383	PAD #6 - .398
PAD #3 - .398	PAD #7 - .398
PAD #4 - .398	PAD #8 - .398

(Dm) DIAMETER OF CUTTER
- 8.0 inches

(T) NO. OF TEETH IN CUTTER
- 16 teeth

FACE MILLING FORMULA**:

$$P = (437 \times n \times Dm \times L)/(ft \times T \times Vc)$$

VARIABLES	
Dm	represents diameterof milling cutter in inches.
ft	represents feed rate in inches/tooth
L	represents length of cut in inches
n	represents number of cuts
T	represents number of teeth in cutter
V_c	represents cutting speed in feet/rein.

*NOTE : Includes cutter overrun.

**See page 9-53 of this manual.

MAIN ENGINE PADS
FACE MILLING PROCESS TIME CALCULATIONS
(CONTINUED)

CALCULATIONS:

	ROUGH CUTS PADS #1-2
FORMULA	P= (437 xnxDmx L)/(ft :i T x Vc)
SUBSTITUTION	P= (437 X 10x8x 139)/(.014x 16 X *530)*
PROCESS TIME	P= 40,932 TMU'S

	ROUGH CUTS PADS #3-8
FORMULA	P= (437 x n xDmx L)/(ft x T x Vc)
SUBSTITUTION	P= (437 *x7 x8x* 361.25)/(.014 x 16x 530)
PROCESS TIME	P= 74,465 TMU'S

	FINISH CUTS PADS #l-2
FORMULA	P= (437 x n x Dmx L)/(ft x T x Vc)
SUBSTITUTION	P= (437x3x8x 139)/(.012x 16 x705)
PROCESS TIME	P= 10,770 TMU'S

	FINISH CUTS PADS #3-8
FORMULA	P= (437 x nxDmx L)/(ft x T x Vc)
SUBSTITUTION	P= (437 X 2 x 8 x 361.25)/(.012 x 16 x 705)
PROCESS TIME	P= 18,660 TMU'S

PROCESS TIME:

	TOTAL ROUGH CUTS IN TMU'S	TOTAL FINISH CUTS IN TMU'S	TOTAL PROCESS TIME REQUIRED AT RECOMMENDED CONDITIONS IN TMU'S
TOTAL FOR ONE ENGINE ROOM'S MAIN ENGINE PADS	*115,397*	*29,430*	144,827

FACING PROCESS TIME

FORMULA DERIVATION

OPERATION	FORMULA	SYMBOL
Given: t= L/fml	t = L/fm	Dt=Dia. of workpiece(inches fm=feed rate (in/min.)
Substitute: fm= fr x RPM[1]	t=L/(fr x RPM)	fr=feed rate(in/rev.) K=Minute to TMU conversion factor (TMU's/Min.) L=Length of cut (inches) n=Number of cuts
Substitute: RPM=Vc/.262 Dt[1]	t=(.262 x Dt x L)/(fr x Vc)	P=Process time (TMU'S) RPM=Spindle speed (rev./min t=Process time (minutes) Vc=Cutting Speed (ft./min.)
Multiply: Include frequency factor (n)	t=(.262 x n xDt x L)/(frx VC)	
Substitute: t =P/K	P=(.262 x K xn xDt x L)/(frx Vc)	
Substitute: K = 1667	P= *(.262x* 1667xn xDtxL)/(frxVc)	
Multiply: 1667 x .262 = 437	P .= (437 xnxDtx L)/(frxVc)	

[1]"Machining Data Handbook", Metcut Research Associates Inc., (June 1966) p. 507

MAIN ENGINE PADS

FACE MILLING PROCESS TIME CALCULATIONS

MATERIAL INFORMATION:

GIVEN

Description: - MIL-S-22698 Grade D class P
Type: - Plain Carbon Steel

EQUIVALENT

AISI NO. - 1018 Plain Carbon Steel
Carbon Content - .18%
Hardness - 128 BHN

RECOMMENDED SPEEDS AND FEEDS INFORMATION[5]

TYPE CUT	DEPTH OF CUT	FEED (IPT) ft	SPEED (FPM) Vc	TOOLING	CUTTING FLUID
ROUGH CUT	.150	.014	530	C-6 Carbide	Shell Dromus Oil B (Light duty soluble oil)
FINISH CUT	.025	.012	705	c-7 Carbide	Shell Dromus Oil B (Light duty soluble oil)

[5]"Machining Data Handbook", Metcut Research Associates Inc., (June, 1966) p. 113.

FIVE INCH GUN MOUNT

FACING PROCESS TIME CALCULATIONS
(CONTINUED)

Five Inch Gun Mount Machining Physical Characteristics:

(L) Length of Cut (Inches)
Total -7.75

Depth of Material. Removed (Inches)
Total - 0.50

(Dt) Work Piece Dimension (Inches)
Diameter - 95.9

Facing Formula.*

$$P = (437 \times n \times Dt \times L)/(fr \times Vc)$$

VARIABLES

Dt represents diameter of workpiece

fr represents feedrate in inches per revolution.

L represents length of cut in inches

n represents number of cuts

P represents process time in tmu's.

Vc represents cutting speed in feet per minute.

*See page 9-49 of this manual..

FIVE INCH GUN MOUNT

FACING PROCESS TIME CALCULATIONS
(CONTINUED)

CALCULATIONS:

ROUGH CUTS (3)

FORMULA	P = (437 x n x Dt x L)/ (fr x Vc)
SUBSTITUTION	P= (437x3x95.9x7.75)/(.015 x 380)
PROCESS TIME	P= 170,942 TMU'S

FINISH CUTS (2)

FORMULA	P= (437 x n x Dt x L)/(fr x Vc)
SUBSTITUTION	P= (437x2x95:9x7.75)/(.007 x 450)
PROCESS TIME	P= 206,215 TMU'S

PROCESS TIME:

	THREE ROUGH CUTS @ .150" DEPTH IN TMU ' S	TWO FINISH CUTS @ .025" DEPTHS IN Tmu's	TOTAL PROCESS TIME REQUIRED AT RECOMMENDED CONDITIONS IN TMU'S
Total. for One Five Inch Gun Mount	170,942	206,215	377,157

BORING PROCESS TIME FORMULA DERIVATION

OPERATION	FORMULA	SYMBOLS
Given $t = L/fm$[1]	$t = L/fm$	Dt = Dia. of workpiece (in) fm = feedrate (in/min.) fr = feedrate (in/rev.) K = Min.to TMU conversion factor (TMU's/MIN.) L = Length of cut (inches) n = Number of cuts P = Process time (TMU's) RPM = Spindle Speed (Rev./min.) t = Process time (minutes) Vc = Cutting Speed (ft./min
Substitute: $fm = fr \times RPM$[1]	$t = L/(fr \times RPM)$	
Substitute: $RPM = Vc/.262\ Dt$[1]	$t = (.262 \times Dt \times L)/(fr \times Vc)$	
Multiply: Include Frequency Factor (n)	$t = (.262 \times n \times Dt \times L)/(fr \times Vc)$	
Substitute: $t = P/k$	$P = (.262 \times K \times n \times Dt \times L)/(fr \times Vc)$	
Substitute: $K = 1667$	$P = (.262 \times 1667 \times n \times Dt \times L)/(fr \times Vc)$	
Multiply: $1667 \times .262 = 437$	$P = (437 \times n \times Dt \times L)/(fr \times Vc)$	

[1] "Machining Data Handbook," Metcut Research Associates Inc. (June 1966) p. 507.

FIVE INCH GUN MOUNT
FACING PROCESS TIME CALCULATIONS

MATERIAL INFORMATION:

GIVEN

Description - MIL-S-24113A Grade N Class U
Type - Plain Carbon Steel

EQUIVALENT

AISI NO - 1018 Plain Carbon Steel
Carbon Content - 0.18%
Hardness - 161 BHN

RECOMMENDED SPEEDS FEEDS INFORMATION:[4]

TYPE CUT	DEPTH OF CUT (In Inches)	FEED (IPR) fr	SPEED (FPM) Vc	TOOLING	CUTTING FLUID
ROUGH CUT	.150	.015	380	C-6 Carbide	Shell Dromus Oil B (Light Duty soluble Oil)
FINISH CUT	.025	.007	450	C-7 Carbide	" Shell Dromus Oil B (Light Duty Soluble Oil)

[4]"Machining Data Handbook", Metcut Research Associates Inc., (June 1966) P.4.

STERN TUBE
BORING PROCESS TIME CALCULATIONS
(CONTINUED)

STERN TUBE PHYSICAL CHARACTERISTICS:

DEPTH OF MATERIAL REMOVED
ALL LANDS - 0.50 INCHES

(Dt) WORK PIECE DIAMETER
- 52 INCHES

(L) LENGTH OF CUT (INCHES)

First Land* -	4.50
Second Land -	3.75
Third Land -	3.75
Fourth Land -	4.75
Total	16.75

BORING FORMULA**

$$P = (437 \times n \times Dt \times L)/(fr \times Vc$$

VARIABLES

Dt represents dia. of workpiece in inches
fr represents feedrate in in./rev.
L represents length of cut in inches
n represents number of cuts
P represents process time in tmu's
Vc represents cutting speed in feet/rein.

*A land is a surface upon which supports the main shaft bearing.

** See page 9-45 of this manual.

STERN TUBE
BORING PROCESS TIME CALCULATION
(CONTINUED)

CALCULATIONS:

ROUGH CUTS	
FORMULA	P = (437 xnxDtx L)/(frx Vc)
SUBSTITUTION	P = (437 x4 X 52 X 16.75)/(0.012 X 295)
PROCESS TIME	P = 430,088 TMU'S

FINISH CUTS	
FORMULA	P = (437 x n xDt x L)/(frx Vc)
SUBSTITUTION	P = (437x2x52x 16.75)/(.009x310)
PROCESS TIME	P = 272,851 TMU's

PROCESS TIME:

	Four Rough cuts @ .10" Depth in TMU's	Two Finish Cuts @ .05" Depth In TMU's	Total Process Time Required At Recommended Conditions in TMU'S
Total for one Stern Tube	430,088	272,851	702,939

```
WIN702,84.024,07:49:59,WIN702.TOMMY.FORT

00000100 C
00000200 C   THIS PROGRAM WILL CALCULATE PROCESS TIMES FOR DRILLING ONE INCH
00000300 C   DEPTH IN T.M.U.'S
00000400          REAL DD,FR,VC,TIME
00000500             INTEGER COUNT
00000600      10  READ(1,20) COUNT,DD,FR,VC
00000700      20  FORMAT(I1,1X,F6.4,1X,F5.4,1X,F5.1)
00000800      30  IF(COUNT.EQ.0) GO TO 80
00000900      40  TIME = (437.0*DD)/(FR*VC)
00001000      50  WRITE(2,60) DD,FR,VC,TIME
00001100      60  FORMAT(F6.4,1X,F5.4,1X,F5.1,1X,F10.1)
00001200      70  GO TO 10
00001300      80  STOP
00001400          END
```

STERN TUBE
BORING PROCESS TIME CALCULATIONS

MATERIAL INFORMATION:

GIVEN

DESCRIPTION - MIL-S-23008B or 15083B
TYPE - STEEL CASTING

EQUIVALENT

AISI NO. - 1320 Cast Steel, Low Alloy
Carbon Content - 0.20%
Hardness - 190 BHN

RECOMMENDED SPEEDS AND FEEDS INFORMATION

TYPE CUT	DEPTH OF CUT (INCHES)	FEED (IPR) fr	SPEED (FPM) Vc	TOOLING	CUTTING FLUID
ROUGH CUT	0.100	0.012	295	C-7 CARBIDE	Shell Dromus Oil E (Chemical Coolant Type)
FINISH CUT	0.050	0.009	310	C-7 CARBIDE	Shell Dromus Oil E (Chemical Coolant Type)

[3] "Machining Data Handbook", Metcut Research Associates Inc., (June 1966) p.55.

DRILLING PROCESS TIME

FORMULA DERIVATION

OPERATION	FORMULA
Given $T = L/fm$[1]	$T = L/fm$
Substitute $fm = fr \times RPM$[1]	$T = L/(fr \times RPM)$
Substitute: $RPM = Vc/.262\ Dd$[1]	$T = (.262 \times Dd \times L)/(fr \times Vc)$
Substitue: $L = 1$	$T = (.262 \times Dd \times 1)/(fr \times Vc)$
Substitute: $T = P/K$	$P = (.262 \times K \times Dd)/(fr \times Vc)$
Substitute: $K = 1667$	$P = (.262 \times 1667 \times Dd)/(fr \times Vc)$
Multiply: $1667 \times .262 = 437$	$P = (437 \times Dd)/(fr \times Vc)$

SYMBOLS

Dd = Dia. of drill (in.
fm = feedrate (in./min.
fr = feedrate (in/rev.)
K = Minute to TMU conversion factor (TMU /min.)
L = Length of cut (in.)
P = Process time (TMU's
RPM = Spindle speed (re min.)
T = Process time (min.)
Vc = Cutting Speed (ft./ Min)

[1] "Machining Data Handbook", Metcut Research Associates Inc. (June 1966) p. 507

DRILLING PROCESS TIME COMPUTER PROGRAM

The process time values contained in the process time charts (pages 9-25 through 9-38) were derived using a computer program to calculate the time values in TMU's. The recommended speeds and feeds for the various materials were taken from the Machining Data Handbook.[2] The computer program (on page 9-41) then calculated process time values for the charts. The process time values were transferred as data into the ADRS (A Departmental Reporting System by IBM) Graphics Computer Program. The process time charts were then produced from the ADRS Graphics Computer Program.

[2] "Machining Data Handbook," Metcut Research Associates Inc., (June 1966) p. 221-240.

INGALLS Shipbuilding

MOST - calculation

1005.02

DATE 2/15/84

SIGN. TLC

PAGE 10-26

BOLT-UP

ACTIVITY SET-UP WITH RATCHET

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET BAG OF BOLTS	1	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
		2	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
2	GET BAG OF NUTS	3	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
		4	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	2	120
3	GET HAMMER	5	$A_1 B_0 G_3 A_1 B_0 P_0 A_0$		50
		6	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
4	GET WRENCHES	7	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	4	160
		8	$A_1 B_0 G_3 A_1 B_0 P_0 A_0$		50
5	GET SOCKET	9	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
		10	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
6	ASSEMBLE SOCKET TO RATCHET	11	$A_1 B_0 G_1 A_1 B_0 P_0 A_0$		30
		12	$A_0 B_0 G_0 (A_1 B_0 P_3) A_0$	5	200
7	COLLECT ALL ITEMS ABOVE		A B G A B P A		
			A B G A B P A		
8	PICK-UP SOCKET & RATCHET & DISASM		A B G A B P A		
			A B G A B P A		
9	PICK-UP WRENCH		A B G A B P A		
			A B G A B P A		
10	PICK-UP HAMMER		A B G M X I A		
			A B G M X I A		
11	PICK-UP BAG OF NUTS		A B G M X I A		
			A B G M X I A		
12	PUT ALL OF THE ABOVE TOOLS AND MATERIALS INTO A TOOL BAG		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME

970

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

L CODE 1005.03
DATE 2/15/84
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PAGE 10-27

BOLT-UP

ACTIVITY POSITION BOLT (OR REMOVE BOLT)

CONDITIONS ALL SHIPYARD AREAS

NO.	METHOD
1	TAP BOLT THROUGH HOLE
2	PLACE WASHER ON BOLT
3	GET AND PLACE NUT
4	GET AND PLACE RATCHET AND MOVE TO NEXT BOLT HOLE WITHIN REACH

NO.	SEQUENCE MODEL	FR	TMU
2	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
3	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$		81
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$(A_1 B_0 G_3 A_1 B_0 P_1) F_6$ $A_1 B_0 P_1 A_0$	(2)	200
4	$A_1 B_0 G_1 A_1 B_0 P_3$ $A_1 B_0 P_3 A_0$		70
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 410

INGALLS Shipbuilding

MOST - calculation

CODE 2003.064
DATE 6/29/84
SIGN. TI
PAGE 10-78

STERN TUBE BORING

ACTIVITY REMOVE AFT SUPPORT

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_3 B_0 G_1 A_3 B_0 P_3 A_3$		130
1	GET TORCH LINES, REPLACE	3	$A_1 B_0 G_1 A_1 B_0 P_3 A_1$	5	350
		4	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
2	CONNECT & DISCONNECT LINES	6	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
		11	$A_0 B_0 G_0 A_1 B_0 P_3 A_0$	3	120
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES	12	$A_0 B_0 G_0 A_1 B_0 P_1 A_0$		20
		14	$A_3 B_{16} G_3 A_0 B_0 P_0 A_0$		220
4	PLACE GOGGLES	15	$A_3 B_{16} G_3 A_0 B_0 P_0 A_0$		220
		19	$A_3 B_0 G_0 A_0 B_0 P_0 A_3$		60
5	OPEN & CLOSE VALVES	22	A B G A B P A		0
			A B G A B P A		
6	GET & RETURN STRIKER		A B G A B P A		
			A B G A B P A		
7	LIGHT TORCH		A B G A B P A		
			A B G A B P A		
8	ADJUST FLAME		A B G A B P A		
			A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
		5	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	(2)2	120
10	RAISE GOGGLES	7	$A_1 B_0 G_0 M_1 X_0 I_0 A_0$		20
		8	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		30
11	POSITION TORCH	9	$A_1 B_0 G_1 M_1 X_0 I_1 A_0$	3	120
		10	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	3	90
12	ASIDE TORCH	13	$A_3 B_{16} G_1 M_1 (X_{32}) I_0 A_0$	(12)3	1250
	3 @ .2125 MIN/INCH		A B G M X I A		
13	BURN - TOP & BOTTOM FIXTURES		A B G M X I A		
		2	$A_0 B_0 G_0 A_0 B_0 (P_1 A_1 F_{54}) A_1 B_0 P_1 A_1$	(2)2	2300
14	CLIMB ON TOP FIXTURE		A B G A B P A B P A		
			A B G A B P A B P A		
15	CLIMB OFF TOP FIXTURE		A B G A B P A B P A		
			A B G A B P A B P A		
16	SET-UP TO UNBOLT CODE 1005.02		A B G A B P A B P A		
			A B G A B P A B P A		
17	UNBOLT (CODE 1005.04 - 3/4" BOLT)		A B G A B P A B P A		
			A B G A B P A B P A		
18	REMOVE BOLT (CODE 1005.03)		A B G A B P A B P A		
			A B G A B P A B P A		
19	WALK TO & FROM BOTTOM FIXTURE		A B G A B P A B P A		
			A B G A B P A B P A		
20	UNBOLT (CODE 1005.04) - 3/4" BOLT		A B G A B P A B P A		
		16	970		970
		17	838	2	1676
21	REMOVE BOLT (CODE 1005.03)	18	410	2	820
		20	838	4	3352
22	RIGGERS REMOVE AFT SUPPORT	21	410	4	1640
TIME =					24,528

FORM R-1458

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DATE 6/29/84

SIGN. TLC

PAGE 10-79

STERN TUBE BORING

ACTIVITY REMOVE FORWARD SUPPORT & BORING BAR

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR
1	GET TORCH LINES, REPLACE	1	$A_3\ B_{24/32}\ G_0\ A_{24/32}\ B_0\ P_0\ A_3$	
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5
2	CONNECT & DISCONNECT LINES	4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$	
		6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES	11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$	4
		12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$	
4	PLACE GOGGLES	17	A B G A B P A	
			A B G A B P A	
5	OPEN & CLOSE VALVES		A B G A B P A	
			A B G A B P A	
6	GET & RETURN STRIKER		A B G A B P A	
			A B G A B P A	
7	LIGHT TORCH		A B G A B P A	
			A B G A B P A	
8	ADJUST FLAME		A B G A B P A	
			A B G A B P A	
9	LOWER GOGGLES		A B G A B P A	
			A B G A B P A	
10	RAISE GOGGLES	5	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	(2)2
		7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$	
11	POSITION TORCH	8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	
		9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	4
12	ASIDE TORCH	10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	4
		13	$A_1\ B_0\ G_1\ M_1\ X_{16}\ I_0\ A_0$	4
13	BURN 1½" TACK@4PLACES @ .2125 MIN/IN		A B G M X I A	
			A B G M X I A	
14	SET-UP TO UNBOLT (CODE 1005.02)	2	$A_0\ B_0\ G_0\ A_0\ B_0\ (F_1\ A_1\ F_{54})^n\ B_0\ P_1\ A_1$	(2)2
			A B G A B P A R P A	
15	UN BOLT SPYDER (CODE 1005.04) -3/4" BOLT		A B G A B P A B P A	
			A B G A B P A B P A	
16	REMOVE BOLTS (CODE 1005.03)		A B G A B P A B P A	
			A B G A B P A B P A	
17	RIGGERS REMOVE SPYDER & BORING BAR		A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	-
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
		14	970	
		15	838	4
		16	410	4

TIME = 11,

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MOST - calculation

CODE 2003.062
DATE 6/29/84
SIGN. TLC
PAGE 10-76

STERN TUBE BORING

ACTIVITY REMOVE FEED MECHANISM

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SAME AS INSTALLATION CODE 2003.035		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1			24,579

TIME = 24,579

INGALLS Shipbuilding

MOST - calculation

CODE 2003.06

DATE 6/29/84

SIGN. TLC

PAGE 10-77

STERN TUBE BORING

ACTIVITY REMOVE BORING BAR DRIVE PULLEY

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	SET-UP TO UNBOLT (CODE 1005.01)
2	TURN BOLT (CODE 1005.04) - 3/8" BOLTS
3	REMOVE BOLT (CODE 1005.03)
4	REMOVE PULLEY (65 STRIKES)
5	GET AND ASIDE KEYWAY
6	TRAVEL TO SHAFT & RETURN TO BENCH

NO.	SEQUENCE MODEL	FR	
5	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		
6	$A_3 B_0 G_0 A_3 B_0 P_0 A_3$		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
4	$A_1 B_0 G_1 A_1 B_6 P_1 (L_{c4}) A_1 B_0 P_3 A_0$	(2.41)	1
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	860		
2	953	4	3
3	410	4	1

TIME = 7,90

INGALLS Shipbuilding

MOST - calculation

CODE 2003.058
DATE 6/29/84
SIGN. TLC
PAGE 10-72

STERN TUBE BORING

ACTIVITY ADJUST TOOL CUT (DEPTH)

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	SET UP TO UNBOLT CODE 1005.02
2	UN BOLT & BOLT-UP TOOL (3/4") CODE 1005.04
3	REMOVE BOLT & REPLACE CODE 1005.03
4	ADJUST TOOL DEPTH

NO.	SEQUENCE MODEL	FR	TMU
4	A_1 B_0 G_1 A_1 B_0 P_3 A_0	24	1440
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A.		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	970	24	23,280
2	838	48	40224
3	410	48	19680

TIME = 84L24

INGALLS Shipbuilding

MOST - calculation

CODE 2003.0
DATE 6/29/84
SIGN. TLC
PAGE 10-75

STERN TUBE BORING

ACTIVITY REMOVE ELECTRIC MOTOR

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	GET TORCH LINES, REPLACE
2	CONNECT & DISCONNECT LINES
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES
4	PLACE GOGGLES
5	OPEN & CLOSE VALVES
6	GET & RETURN STRIKER
7	LIGHT TORCH
8	ADJUST FLAME
9	LOWER GOGGLES
10	RAISE GOGGLES
11	POSITION TORCH
12	ASIDE TORCH
13	(.2125 HRS/INCH) BURN BRACES & SUPPORT PLATES
14	REMOVE PULLEY GUARD
15	REMOVE NAILS (8 NAILS)
16	REMOVE PULLEY BELT
17	RIGGERS REMOVE MOTOR

NO.	SEQUENCE MODEL	FR
1	$A_3\ B_0\ G_1\ A_3\ B_0\ P_3\ A_3$	
3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5
4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$	
6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	
11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$	5
12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$	
14	$A_1\ B_0\ G_3\ A_3\ B_0\ P_1\ A_3$	
16	$A_3\ B_0\ G_3\ A_3\ B_0\ P_1\ A_3$	
17	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
5	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	(2)2
7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$	
8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	
9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	5
10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	5
13	$A_1\ B_0\ G_1\ M_1\ X_{32}\ I_0\ A_1$	5
15	$A_1\ B_0\ G_1\ M_1\ X_{10}\ I_0\ A_1$	8
	A B G M X I A	
2	$A_0\ B_0\ G_0\ A_0\ B_0$ (R $A_1\ F_{54}$) $P_1\ B_0\ P_1\ A_1$	(2)2
	A B G A B P A R P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	—
	A B G A B P A B P A	—
	A B G A B P A B P A	
	A B G A B P A B P A	--
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	

TIME = 68

INGALLS Shipbuilding

MOST - calculation

CODE 2003.056
DATE 6/29/84
SIGN. TLC
PAGE 10-70

STERN TUBE BORING

ACTIVITY USE FEELER GAGES TO DETERMINE NEXT DEPTH OF CUT - FINISH CUT ONLY

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SELECT & USE FEELER GAGE		A B G A B P A		
2	MARK LOCATION OF DEPTH		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_3 B_0 G_1 A_3 B_0 P_1 M_{24} A_3 B_0 P_1 A_3$	8	3120
		2	$A_1 B_0 G_1 A_1 B_0 P_1 R_3 A_1 B_0 P_1 A_0$	8	720
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 3840

INGALLS Shipbuilding

MOST - calculation

CODE 2003.0

DATE 6/29/84

SIGN. TLC

PAGE 10-71

STERN TUBE BORING

ACTIVITY CHANGE TOOL

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	SET-UP TO UNBOLT CODE 1005.02
2	UNBOLT TOOL & BOLT-UP TOOL (3/4") CODE 1005.04
3	REMOVE BOLT & REPLACE CODE 1005.03
4	REMOVE TOOL & REPLACE TOOL
5	TRAVEL

NO.	SEQUENCE MODEL	FR
4	A_1 B_0 G_1 A_1 B_0 P_1 A_0	2(7x2)
5	A_3 B_0 G_0 A_0 B_0 P_0 A_3	7x2
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
1	970	7 6
2	838	7x2 11
3	410	7x2 5

TIME = 26,2

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2003.054
DATE 6/29/84
SIGN. TLC
PAGE 10-68

STERN TUBE BORING

ACTIVITY FEED TOOL TO AND FROM LAND SURFACES

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	WALK TO BORING BAR	1	$A_3 B_0 G_0 A_0 B_0 P_0 A_0$	5	150
		5	$A_1 B_0 G_3 A_1 B_6 P_1 A_0$	2X5	1200
2	SET-UP TO UN-BOLT CODE 1005.01		A B G A B P A		
			A B G A B P A		
3	TURN BOLT (½" BOLTS) CODE 1005.06		A B G A B P A		
			A B G A B P A		
4	REMOVE BOLT & REPLACE BOLT CODE 1005.03		A B G A B P A		
			A B G A B P A		
5	REMOVE GEAR & REPLACE GEAR		A B G A B P A		
			A B G A B P A		
6	SLIDE #2 GEAR IN POSITION		A B G A B P A		
			A B G A B P A		
7	LOCK GEAR IN POSITION		A B G A B P A		
			A B G A B P A		
8	FEED TOOL TO LAND #1		A B G A B P A		
			A B G A B P A		
9	FEED FROM LAND 1 TO LAND 2		A B G A B P A		
			A B G A B P A		
10	FEED FROM LAND 2 TO LAND 3	6	$A_1 B_0 G_3 M_3 X_0 I_0 A_0$	2X5	700
		7	$A_0 B_0 G_0 M_1 X_0 I_0 A_0$	2X5	100
11	FEED FROM LAND 3 TO LAND 4		A B G M X I A		
			A B G M X I A		
12	FEED FROM LAND 4 TO LAND 1		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		8	$A_3 B_0 G_1 A_3 B_0 P_3 (F_{S4}) A_1 B_0 P_0 A_3$	(2.2)	1328
		9	$A_3 B_0 G_1 A_3 B_0 P_3 (F_{S4}) A_1 B_0 P_0 A_3$	(2.2)6	7968
		10	$A_3 B_0 G_1 A_3 B_0 P_3 (F_{S4}) A_1 B_0 P_0 A_3$	(2.2)6	7968
		11	$A_3 B_0 G_1 A_3 B_0 P_3 (F_{S4}) A_1 B_0 P_0 A_3$	(2.2)6	7968
		12	$A_3 B_0 G_1 A_3 B_0 P_3 (F_{S4}) A_1 B_0 P_0 A_3$	(2.2)6	34,536
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	860	5	4300
		3	953	5X2	9530
		4	410	5X2	4100

TIME = 79,848

INGALLS Shipbuilding

MOST - calculation

CODE 2003.05

DATE 6/29/84

SIGN. TLC

PAGE 10-69

STERN TUBE BORING

ACTIVITY: MEASURE AND EVALUATE ID - FINISH CUT

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR
1	OPEN MICROMETER CASE	3	$(A_1 B_0 G_1) A_3 B_0 P_1 A_0$	(2)
		10	$(A_1 B_0 G_1) A_3 B_0 P_1 A_0$	(2)
2	ASSEMBLE MICROMETER		A B G A B P A	
			A B G A B P A	
3	GET WRENCH AND ALIGNMENT ENGINEERS DIMENSION PAPER FROM BENCH		A B G A B P A	
			A B G A B P A	
4	MEASURE ID WITH MICROMETER (MEASURE 4 RADII (4 TIMES) X 5 S MK. SITE X 19 OCCUR.		A B G A B P A	
			A B G A B P A	
5	READ ALIGNMENT ENGINEERS DIMENSIONS		A B G A B P A	
			A B G A B P A	
6	RECORD MICROMETER DIMENSIONS		A B G A B P A	
			A B G A B P A	
7	RECORD ALIGNMENT ENGINEERS DIMENSIONS		A B G A B P A	
			A B G A B P A	
8	CALCULATE DIFFERENCE BETWEEN ENGINEERS AND ACTUAL DIMENSIONS		A B G A B P A	
			A B G A B P A	
9	ADJUST SET SCREWS ON BORING BAR		A B G A B P A	
			A B G A B P A	
10	TAKE WRENCH, ALIGN ENG. DIM. PAPER AND MIC. TO BENCH	1	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$	
		8	$A_0 B_0 G_0 M_0 X_{32} I_0 A_0$	32
11	DISASSEMBLE MICROMETER & PLACE IN CASE	12	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$	
			A B G M X I A	
12	PUT MICROMETER IN CASE		A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
		2	$A_1 B_0 G_3 A_1 B_0 P_3 F_{10} A_0 B_0 P_0 A_0$	2
		4	$A_1 B_0 G_3 A_1 B_0 P_3 (M_{54}) A_1 B_0 P_1 A_0$	(5.5)32
		5	$A_1 B_0 G_1 A_1 B_0 P_0 T_{10} A_1 B_0 P_1 A_0$	32
		6	$A_1 B_0 G_3 A_1 B_0 P_1 R_6 A_1 B_0 P_3 A_0$	32
		7	$A_0 B_0 G_0 A_0 B_0 P_1 R_6 A_0 B_0 P_0 A_0$	32
		9	$A_1 B_0 G_1 A_1 B_0 P_3 F_{16} A_1 B_0 P_1 A_0$	32
		11	$A_1 B_0 G_3 A_1 B_0 P_0 F_{10} A_1 B_0 P_3 A_0$	2
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	

TIME =

INGALLS Shipbuilding

MOST - calculation

CODE 2003.052
DATE 6/29/84
SIGN. TLC
PAGE 10-66

STERN TUBE BORING

ACTIVITY REMOVE CHIPS

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	GET CHIP PULLER
2	PLACE CHIP PULLER IN STERN TUBES
3	PULL CHIPS OUT OF STERN TUBES
4	PUSH CHIPS OFF SCAFFOLD
5	PUT CHIP PULLER ASIDE

NO.	SEQUENCE MODEL	FR	TMU
1	$A_1 B_0 G_1 A_3 B_0 P_0 A_0$	24	1200
2	$A_0 B_0 G_0 (A_1 B_0 P_3) A_0$	(10)24	9600
5	$A_0 B_0 G_0 A_3 B_0 P_3 A_0$	24	1440
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
3	$A_0 B_0 G_0 (M_3) X_0 I_0 A_0$	(10)24	7200
4	$(A_1 B_0 G_1 M_3 X_0 I_0 A_0)$	(10)24	12000
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 31,440

INGALLS Shipbuilding

MOST - calculation

CODE 2003.05

DATE 6/29/84

SIGN. TLC

PAGE 10-67

STERN TUBE BORING

ACTIVITY GRIND ROUGH EDGES ON STERN TUBE

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	HOOK-UP AND UN-HOOK AIR LINES (TRAVEL 147.5')
2	ASCEND AND DESCEND LADDER
3	GET ON AND OFF LADDER
4	HOOK-UP AND UNHOOK GRINDER TO AIR LINE
5	GRIND LANDS (326"/2 EDGES/ LAND)
6	ROLL-UP LINES AND UN-ROLL LINES (APPROX. 202.5')

NO.	SEQUENCE MODEL	FR
6	$A_1 B_0 G_3 (A_1) B P_1 A_0$	2
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
1	$A_{113} B_6 G_1 M_3 X_0 I_0 A_{113}$	2
2	$(A_1 B_0 G_1 M_3) X_0 I_0 A_0$	(22)4
3	$A_0 B_{16} G_0 M_0 X_0 I_0 A_0$	8
4	$A_1 B_0 G_3 M_3 X_0 I_0 A_0$	2
5	$A_3 B_{32} G_1 M_1 (X_6) I_0 A_3$	(326)4
	A B G M X I A	
	A B G M X I A	
	A B G M X I A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	

TIME = 93,2

PREPARE MACHINE AFTER EACH CUT SUB-OPERATION SUMMARY

CODE	DESCRIPTION	TOTAL TMU'S
2003.051	Burn Off Target Markers	29,120
2003.052	Remove Chips	31,440
2003.053	Grind Rough Edges on Stern Tube	93,200
2003.054	Feed Tool to and from Land Surface	79,848
2003.055	Measure and Evaluate ID-Finish Cut	130,260
2003.056	Use Feeler Gages to Determine Next Depth of Cut-Finish Cut Only	3,840
2003.057	Change Tool	26,222
2003.058	Adjust Tool Cut (Depth)	84,624
2003.059	Sharpen Tools	59,180
		537,734

INGALLS Shipbuilding

MOST - calculation

CODE 2003.05
DATE 6/29/84
SIGN. TLC
PAGE 10-65

STERN TUBE BORING

ACTIVITY BURN OFF TARGET MARKERS

CONDITIONS INTEGRATION AREA

NO.	METHOD
1	PLACE GLOVES, REMOVE GLOVES AND GOGGLES
2	PLACE GOGGLES
3	OPEN AND CLOSE VALVES
4	GET AND RETURN STRIKER
5	LIGHT TORCH
6	ADJUST FLAME
7	LOWER GOGGLES
8	RAISE GOGGLES
9	POSITION TORCH
10	ASIDE TORCH
11	CLIMB INTO STERN TUBE CASTING
12	BURN TARGETS (1" SQUARE) (.85 MIN/TARGET)

NO.	SEQUENCE MODEL	FR
1	(A1 B0 G1 A1 B0 P3 A1)	(5) 4
2	A1 B0 G3 A1 B0 P1 A0	4
4	A1 B0 G1 A1 B0 P3 A1	4
9	A0 B0 G0 A1 B0 P3 A0	16
10	A0 B0 G0 A1 B0 P0 A0	16
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
	A B G A B P A	
3	A1 B0 G1 M1 X0 I0 A0	(4) 4
5	A1 B0 G0 M1 X0 I0 A0	4
6	(A1 B0 G1 M1 X0 I0 A0)	(2) 4
7	A1 B0 G1 M1 X0 I1 A0	16
8	A1 B0 G1 M1 X0 I0 A0	16
11	(A3 B32 G0 M0 X0 I0 A3)	(4) 2
12	A1 B0 G1 M1 X131 I0 A0	16
	A B G M X I A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	
	A B G A B P A B P A	

TIME =

INGALLS Shipbuilding

MOST - calculation

CODE 2003.037
DATE 6/29/84
SIGN. TLC
PAGE 10-62

STEKN TUBE BORING

ACTIVITY MEASURE ID AND ADJUST BORING BAR TO OPTICAL CENTER

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	OPEN MICROMETER CASE	3	$(A_1 B_0 G_1) A_3 B_0 P_1 A_0$	(2)	80
		10	$(A_1 B_0 G_1) A_3 B_0 P_1 A_0$	(2)	80
2	ASSEMBLE MICROMETER		A B G A B P A		
			A B G A B P A		
3	GET WRENCH AND ALIGNMENT ENGINEERS DIMENSION PAPER FROM BENCH		A B G A B P A		
			A B G A B P A		
4	MEASURE ID WITH MICROMETER (MEASURE 4 RADII (4 TIMES) X 5 MK. SIZE X 19 OCCUR.		A B G A B P A		
			A B G A B P A		
5	READ ALIGNMENT ENGINEERS DIMENSIONS		A B G A B P A		
			A B G A B P A		
6	RECORD MICROMETER DIMENSIONS		A B G A B P A		
			A B G A B P A		
7	RECORD ALIGNMENT ENGINEERS DIMENSIONS		A B G A B P A		
			A B G A B P A		
8	CALCULATE DIFFERENCE BETWEEN ENGINEERS AND ACTUAL DIMENSIONS		A B G A B P A		
			A B G A B P A		
9	ADJUST SET SCREWS ON BORING BAR		A B G A B P A		
			A B G A B P A		
10	TAKE WRENCH, ALIGN ENG. DIM. PAPER AND MIC. TO BENCH	1	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$		50
		8	$A_0 B_0 G_0 M_0 X_{32} I_0 A_0$	76	24320
11	DISASSEMBLE MICROMETER & PLACE IN CASE	12	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$		50
			A B G M X I A		
12	PUT MICROMETER IN CASE		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_1 B_0 G_3 A_1 B_0 P_3 F_{10} A_0 B_0 P_0 A_0$	2	360
		4	$A_1 B_0 G_3 A_1 B_0 P_0 (M_{54}) A_1 B_0 P_1 A_0$	(5.5)%	235,600
		5	$A_1 B_0 G_1 A_1 B_0 P_0 T_{10} A_1 B_0 P_1 A_0$	76	11,400
		6	$A_1 B_0 G_3 A_1 B_0 P_1 R_6 A_1 B_0 P_3 A_0$	76	12,160
		7	$A_0 B_0 G_0 A_0 B_0 P_1 R_6 A_0 B_0 P_0 A_0$	76	5320
		9	$A_1 B_0 G_1 A_1 B_0 P_3 F_{16} A_1 B_0 P_1 A_0$	76	18240
		11	$A_1 B_0 G_3 A_0 B_0 P_0 F_{10} A_1 B_0 P_3 A_0$	2	360
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME 308,020

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2003.04
DATE 6/29/84
SIGN. TLC
PAGE 10-63

STERN TUBE BORING

ACTIVITY OPERATE BORING BAR

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	TURN BORING BAR MOTOR ON AND OFF	5	A B G A B P A		-0-
			A B G A B P A		
2	BORING PROCESS TIME (SEE PAGE 9-44)		A B G A B P A		
			A B G A B P A		
3	REMOVE AND REPLACE OIL CAP		A B G A B P A		
			A B G A B P A		
4	INSPECT OIL LEVEL		A B G A B P A		
			A B G A B P A		
5	FILL OIL RESERVOIR		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	A_3 B_0 G_1 M_1 X_0 I_0 A_0	48	2400
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	A_1 B_0 G_3 A_1 B_0 P_3 L_{10} A_1 B_0 P_1 A_0	2	400
		4	A_1 B_0 G_1 A_1 B_0 P_1 T_1 A_1 B_0 P_1 A_0		70
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	702,939		702,939

TIME = 705,809

FORM R-1458

INGALLS Shipbuilding

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PAGE 10-60

STERN TUBE BORING

ACTIVITY INSTALL FEED CONTROL MECHANISM

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET GEAR HOUSING, BOLTS, AND WRENCH AND PLACE NEAR STERN TUBE	1	$(A_1\ B_0\ G_3)\ A_3\ B_6\ P_1\ A_0$	(3)	220
		2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
2	PLACE GEAR HOUSING ON BORING BAR	3	$A_0\ B_6\ G_0\ A_0\ B_0\ P_0\ A_0$	6	360
		6	$A_3\ B_0\ (G_3)\ A_3\ B_6\ P_1\ A_0$	(4)	250
3	BEND AND ARISE	7	$A_1\ B_0\ G_1\ A_1\ B_6\ P_6\ A_1$	3	480
		10	$A_3\ B_6\ (G_3)\ A_3\ B_6\ P_1\ A_0$	(3)	220
4	POSITION BOLTS (CODE 1005.03)	11	$A_1\ B_6\ G_1\ A_1\ B_0\ P_3\ A_0$	2	240
		15	$A_1\ B_6\ G_1\ A_1\ B_0\ P_3\ A_0$	2	240
5	BOLT-UP - ½" BOLTS (CODE 1005.06)	18	$A_1\ B_0\ G_3\ A_3\ B_0\ P_1\ A_0$		80
			A B G A B P A		
6	GET GEARS AND BOLTS AND PLACE NEAR BORING BAR		A B G A B P A		
			A B G A B P A		
7	PLACE GEARS IN POSITION IN GEAR HOUSING		A B G A B P A		
			A B G A B P A		
8	POSITION BOLTS		A B G A B P A		
			A B G A B P A		
9	BOLT-UP - ½" BOLTS (CODE 1005.06)		A B G A B P A		
			A B G A B P A		
10	GET GEARWORM PLATES, HAMMER, AND BOLTS PLACE ITEMS NEAR BORING BAR		A B G M X I A		
			A B G M X I A		
11	PLACE PLATES IN POSITION ON BORING BAR		A B G M X I A		
			A B G M X I A		
12	FIT PLATES IN POSITION - TAP 25 TIMES WITH HAMMER		A B G M X I A		
			A B G M X I A		
13	POSITION BOLTS		A B G M X I A		
			A B G M X I A		
14	BOLT-UP - 1" BOLTS (CODE 1005.04)	12	$A_1\ B_6\ G_1\ A_1\ B_0\ P_1\ F_{32}\ A_1\ B_6\ P_1\ A_0$	2	1000
			A B G A B P A B P A		
15	INSTALL EXTERNAL PLATES		A B G A B P A B P A		
			A B G A B P A B P A		
16	POSITION BOLTS		A B G A B P A B P A		
			A B G A B P A B P A		
17	BOLT-UP - 1" BOLTS (CODE 1005.04)		A B G A B P A B P A		
			A B G A B P A B P A		
18	RETURN TOOLS TO BENCH		A B G A B P A B P A		
			A B G A B P A B P A		
		4	410	6	2460
		5	953	6	5718
		8	410	3	1230
		9	953	3	2859
		13	410	2	820
		14	1117	2	2234
		16	410	4	1640
		17	1117	4	4468
TIME =					24,579

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

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SIGN. TLC
PAGE 10 - 31

STERN TUBE BORING

ACTIVITY INSTALL ELECTRIC MOTOR

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
1	RIGGER PLACE MOTOR IN POSITION	1	A B G A B P A		-0-
		2	$A_1 B_0 G_1 A_3 B_6 P_3 A_3$		140
2	PLACE BELT ON BORING BAR PULLEY	3	$A_1 B_0 G_3 A_3 B_6 P_3 A_3$		19
		6	$A_1 B_0 G_1 A_3 B_0 P_3 A_3$		110
3	PLACE BELT ON MOTOR'S PULLEY	7	$A_0 B_0 G_0 A_3 B_0 P_3 A_1$	5	350
			A B G A B P A		
4	NAIL MOTOR DOWN - 8 NAILS @ 1"L		A B G A B P A		
			A B G A B P A		
5	NAIL BRACES DOWN - 4 NAILS @ 1"L		A B G A B P A		
			A B G A B P A		
6	INSTALL GUARD ON PULLEY		A B G A B P A		
			A B G A B P A		
7	PLACE WELDING ROD TO WORK		A B G A B P A		
			A B G A B P A		
8	OPEN AND CLOSE SHIELD		A B G A B P A		
			A B G A B P A		
9	WELD BRACES AND SUPPORT PLATES 3" TACK WELD @ 5 PLACES @ (.14 MIN/INCH)		A B G A B P A		
			A B G A B P A		
10	PLUG IN MOTOR & UNPLUG MOTOR (CODE 1004.13)	8	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	10	30
		9	$A_1 B_0 G_1 M_1 X_{67} I_0 A_1$	5	3550
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		4	$A_1 B_0 G_3 A_3 B_6 (P_1 A_1 F_{42}) A_3 B_0 P_1 A_0$	(8)	360
		5	$A_3 B_0 G_3 A_3 B_0 (P_1 A_1 F_{42}) A_3 B_0 P_1 A_0$	(4)	180
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		10	2960		296

TIME = 13,180

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2003.033
DATE 6/29/84
SIGN. TLC
PAGE 10-58

STERN TUBE BORING

ACTIVITY INSTALL AFT. BORING BAR SUPPORT

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS POSITION BOTTOM & TOP FIXTURES & GEARBOX.	1	A B G A B P A		-0-
		2	A_3 B_{16} G_3 A_3 B_{16} P_1 A_3		450
2	MACHINISTS GET ON AND OFF TOP FIXTURE.	6	A_0 B_6 G_0 A_0 B_0 P_0 A_0		60
		9	A B G A B P A		-0-
3	SET-UP TO BOLT-UP TOP FIXTURE TO GEARBOX (CODE 1005.02)	13	A_3 B_{16} G_3 A_3 B_{16} P_1 A_3		450
		15	A_0 B_0 G_0 A_1 B_0 P_5 A_1	6	300
4	POSITION BOLT IN TOP FIXTURE (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	BOLT-UP TOP FIXTURE TO GEARBOX (CODE 1005.04) — 3/4" BOLT		A B G A B P A		
			A B G A B P A		
6	MOVE INTO POSITION FOR BOTTOM FIXTURE		A B G A B P A		
			A B G A B P A		
7	POSITION BOLT IN BOTTOM FIXTURE (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
8	BOLT-UP BOTTOM FIXTURE TO GEARBOX (CODE 1005.04) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
9	RIGGER POSITIONS GEARBOX AND FIXTURE ASSEMBLY TO STERN TUBE		A B G A B P A		
			A B G A B P A		
10	TACK WELD TOP FIXTURE TO STERN TUBE 1 tack weld @ 1" (.14min/inch @ 5/16" fillet weld)	10	A_3 (B_{16}) G_1 M_1 X_{24} I_0 A_3	(2)	640
		11	(A_3 B_2 G_1 M_1 X_{24} I_0) A_3	(2)	610
11	TACK WELD BOTTOM FIXTURE TO STERN TUBE 2 tack welds @ 1" (.14min/inch @ 5/16" fillet weld)	12	(A_3 B_0 G_1 M_1 X_{270} I_0) A_3	(2)	5530
		14	A_3 B_0 G_1 M_1 X_{270} I_0 A_3		2780
12	WELD BOTTOM FIXTURE COMPLETE 2 @ 1' (.14min/inch @ 5/16" fillet weld)	16	A_1 B_0 G_1 M_1 X_0 I_0 A_0	12	360
			A B G M X I A		
13	WELDER GET ON AND OFF TOP FIXTURE		A B G M X I A		
			A B G M X I A		
14	WELD TOP FIXTURE COMPLETE 1 @ 1' (.14min/inch @ 5/16" fillet weld)		A B G A B P A B P A		
			A B G A B P A B P A		
15	PLACE WELDING ROD TO WORK		A B G A B P A B P A		
			A B G A B P A B P A		
16	OPEN AND CLOSE SHIELD - WELDER		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	970		970
		4	410	2	820
		5	838	2	1676
		7	410	4	1640
		8	838	4	3352

TIME = 19,638

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

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SIGN. TLC
PAGE 10-57

STERN TUBE BORING

ACTIVITY INSTALL BORING BAR DRIVE PULLEY

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET KEYWAY, PULLEY, HAMMER, AND FILE. PLACE ITEMS DOWN NEAR SHAFT	1	$(A_1 B_0 G_3) A_3 B_6 P_1 A_0$	(4)	260
		4	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		60
2	FILE KEYWAY (80 TIMES)	6	$A_3 B_0 G_0 A_3 B_0 P_0 A_0$		6
		11	$A_1 B_0 G_3 A_3 B_0 P_0 A_0$		70
3	TAP KEYWAY (40 TIMES) TO PULLEY		A B G A B P A		
			A B G A B P A		
4	PLACE PULLEY AND KEYWAY ASSEMBLY TO SHAFT		A B G A B P A		
			A B G A B P A		
5	STRIKE PULLEY ONTO SHAFT (65 STRIKES)		A B G A B P A		
			A B G A B P A		
6	WALK TO BENCH AND RETURN		A B G A B P A		
			A B G A B P A		
7	SET-UP TO BOLT-UP (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
8	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
9	BOLT-UP BOLT (CODE 1005.06)-3/8" BOLT		A B G A B P A		
			A B G A B P A		
10	ROTATE PULLEY (20 TIMES) (ARM REPOSITION STROKES)		A B G M X I A		
		2	$A_1 B_0 G_1 (M_1) X_0 I_0 A_0$	(80)	820
11	RETURN TOOLS TO BENCH		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1 B_0 G_1 A_1 B_0 P_1 F_{S4} A_1 B_0 P_1 A_0$		600
		5	$A_1 B_0 G_1 A_1 B_0 P_1 (F_{S4}) A_1 B_0 P_1 A_0$	(2.4)	136
		10	$A_1 B_0 G_3 A_0 B_0 P_0 F_3 A_0 B_0 P_0 A_1$	20	160
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		7	860		860
		8	410	4	1640
		9	953	4	3812

TIME = 11,143

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

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DATE 6/29/84
SIGN. TLC
PAGE 10-56

STERN TUBE BORING

ACTIVITY INSTALL BORING BAR

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS PLACE FORWARD SUPPORT IN STERN TUBE	1	A B G A B P A		0
2	RIGGERS INSERT BORING BAR INTO STERN TUBE	2	A B G A B P A		0
3	SET-UP TO UNBOLT FORWARD SUPPORT BOLTS (CODE 1005.01)	7	A B G A B P A		0
4	UN-BOLT FORWARD SUPPORT BOLTS (CODE 1005.06) 3/4"		A B G A B P A		
5	REMOVE FORWARD SUPPORT BOLTS (CODE 1005.03)		A B G A B P A		
6	MACHINIST GETS INTO AND OUT OF STERN TUBE		A B G A B P A		
7	RIGGER SLIDES BORING BAR INTO FORWARD SUPPORT		A B G A B P A		
8	POSITION BOLT TO BOLT-UP FORWARD SUPPORT (CODE 1005.03)		A B G A B P A		
9	BOLT-UP FORWARD SUPPORT BOLTS (CODE 1005.06)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		6	A_3 $B_{24,72}$ G_0 M_0 X_0 I_0 A_D	2	1180
			A_0 B G_0 M_0 X_0 I_0 A_D		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860		860
		4	1429	4	5716
		5	410	4	1640
		8	410	4	1640
		9	1429	4	5716

TIME = 16,752

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

STERN TUBE BORING

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DATE 6/29/84
SIGN. TLC
PAGE 10-57

ACTIVITY FINAL POSITIONING OF FORWARD SUPPORT

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MACHINIST GETS INTO AND OUT OF STERN TUBE	1	$A_3\ B_{24}{}^{32}G_0\ A_0\ B_{24}{}^{32}P_0\ A_3$		1180
2	PLACE NUTS IN POSITIONS	2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	4	24
		4	$A_3\ B_{24}{}^{32}G_0\ A_0\ B_{24}{}^{32}P_0\ A_3$		1100
3	FEED FORWARD SUPPORT LEGS INTO NUTS - 4 TURN - WRIST REPOS.	5	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_1$	4	200
4	COMBINATION WELDER GETS INTO AND OUT OF STERN TUBE		A B G A B P A		
5	POSITION WELDING ROD		A B G A B P A		
6	RAISE AND LOWER SHIELD		A B G A B P A		
7	WELD NUTS - 1/2" LENGTH OF WELD @ .14 MIN./INCH @ 5/16" WELD		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		7	$A_1\ B_0\ G_1\ M_1\ X_{10}\ I_0\ A_0$	4	520
		6	$(A_1\ B_0\ G_1\ M_1\ X_2\ I_0\ A_0)$	(4)2	240
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ F_{10}\ A_0\ B_0\ P_0\ A_0$	4	64
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 4,200

FORM R-1458

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PAGE 10-54

STERN TUBE BORING

ACTIVITY AREA TRAVEL - TOOL BOX TO STERN TUBE CASTING & RETURN

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	WALK FROM TOOL BOX TO PLATFORM 325' AND RETURN	1	A_0 B_0 G_0 A_{245} B_0 P_0 A_{245}		4900
		4	A_0 B_0 G_0 A_{54} B_0 P_0 A_{54}		1080
2	CLIMB BOTH SETS OF STAIRS (15 AND 7 STEPS)		A B G A B P A		
			A B G A B P A		
3	GET ON AND OFF LADDERS (2 LADDERS)		A B G A B P A		
			A B G A B P A		
4	WALK ON SCAFFOLD (81')		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	(A_1 B_0 G_1 M_3 X_0 I_0 A_0)	(22)2	2200
		3	(A_0 B_{16} G_0 M_0 X_0 I_0 A_0)	(2)2	640
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 8,820

FORM R-1458

INSTALL BORING EQUIPMENT SUB-OPERATION SUMMARY

CODE	DESCRIPTION	TOTAL TMU'S
2003.031	Install Boring Bar	16,752
2003.032	Final Positioning of Forward Boring Bar Support	4,200
2003.033	Install Aft. Boring Bar Support	19,638
2003.034	Install Boring Bar Drive Pulley	11,143
2003.035	Install Feed Control Mechanism	24,579
2003.036	Install Electric Motor	13,180
2003.037	Measure ID and adjust Boring Bar to Optical Center	308,020
		397,512

FORM R-1457

INGALLS Shipbuilding

MOST - calculation

CODE 2003.01
DATE 6/29/84
SIGN. TLC
PAGE 10-52

STERN TUBE BORING

ACTIVITY JOB PREPARATION

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	INITIAL AVERAGE JOB PREPARATION CODE 1001.12		A B G A B P A		
			A B G A B P A		
2	ADDITIONAL SIMPLE JOB PREPARATION CODE 1001.21		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42001		42001
		2	1180	2	2360

TIME = 44,361

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

STERN TUBE CASTING

CODE 2003.02
DATE 6/29/84
SIGN. TLC
PAGE 10-53

ACTIVITY AREA TRAVEL

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM: TOOL BOX TO: STERN TUBE CASTING AND RETURN (CODE 2003.02)		A B G A B P A		
2	FROM: TOOL BOX TO: WETDOCK TOOL ROOM AND RETURN (CODE 1002.16)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	8820	3	26,460
		2	11,311	4	45,244
TIME =					71,704

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.13
DATE 8-6-84
SIGN. FWM
PAGE 10-50

MAIN ENGINE PADS FACE MILLING

ACTIVITY: CHECK TAPER & FLATNESS

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_3\ B_{32}\ G_3\ A_3\ B_0\ P_1\ A_0$	8	3360
1	GET STRAIGHT EDGE, & RETURN IT	2	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3)\ A_0$	(12) 8	5760
		3	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3)\ A_0$	(24) 8	11,520
2	PLACE STRAIGHT EDGE		A B G A B P A		
			A B G A B P A		
3	PLACE FEELER GAUGE		A B G A B P A		
			A B G A B P A		
4	SLIDE GAUGE ALONG EDGE		A B G A B P A		
			A B G A B P A		
5	CHECK TAPER WITH LEVEL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		4	$A_0\ B_0\ G_0\ (M_3)\ X_0\ I_0\ A_0$	(24) 8	5760
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
		5	$A_3\ B_{32}\ G_3\ A_0\ B_6\ (P_1\ A_1\ M_{10})\ A_1\ B_0\ P_1\ A_0$	(12) 8	15200
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 41,600

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.14
DATE 8-6-84
SIGN. FWM
PAGE 10-51

MAIN ENGINE PADSFACE MILLING

ACTIVITY: REMOVE MACHINE & SUPPORT FRAME

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$(A_3\ B_6\ G_3\ A_{1/6}\ B_0\ P_6\ A_{1/6})$	(2)2	2000
1	GET TORCH LINES OR REPLACE	3	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1)$	(5)8	2800
		4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$	8	480
2	CONNECT OR DISCONNECT LINES	6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	8	480
		11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$	8	320
3	PLACE GLOVES, REMOVE GLOVES OR GOGGLES	12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$	8	160
			A B G A B P A		
4	PLACE GOGGLES		A B G A B P A		
			A B G A B P A		
5	OPEN & CLOSE VALVES		A B G A B P A		
			A B G A B P A		
6	GET & RETURN STRIKER		A B G A B P A		
			A B G A B P A		
7	LIGHT TORCH		A B G A B P A		
			A B G A B P A		
8	ADJUST FLAME		A B G A B P A		
			A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
		5	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(2)16	960
10	RAISE GOGGLES	7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$	8	160
		8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	8	240
11	POSITION TORCH	9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	8	320
		10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	8	240
12	ASIDE TORCH		A B G M X I A		
			A B G M X I A		
13	BURN ALL TACK WELDS		A B G M X I A		
		2	$A_0\ B_0\ G_0\ A_0\ B_0\ (P_1\ A_1\ F_{34})\ A_1\ B_0\ P_1\ A_1$	(2)4	4600
	LOOSE		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		13	810	212	171,720

TIME = 184,480

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.11
DATE 8-6-84
SIGN. FWM
PAGE 10-45

MAIN ENGINE PADS FACE MILLING

ACTIVITY: OPERATE MILLING MACHINE

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		8	(A1 B0 G1 A1 B0 P1 A0)	(2)8	640
1	ENGAGE SPINDLE, SET FEEDS, STOP		A B G A B P A		
			A B G A B P A		
2	FEED HEAD ACROSS		A B G A B P A		
			A B G A B P A		
3	FEED HEAD ALONG		A B G A B P A		
			A B G A B P A		
4	ADJUST HEAD EACH CUT		A B G A B P A		
			A B G A B P A		
5	ADJUST HEAD EACH ROUGH PASS		A B G A B P A		
			A B G A B P A		
6	ADJUST HEAD EACH FINISH PASS		A B G A B P A		
			A B G A B P A		
7	TOTAL PROCESS TIME		A B G A B P A		
			A B G A B P A		
	ALL PADS		A B G A B P A		
			A B G A B P A		
8	GET SPRAY CAN		A B G A B P A		
			A B G A B P A		
		1	(A1 B0 G1 M1) X0 I0 A0	(6)80	14,400
9	SHAKE CAN	2	A1 B0 G1 M1 X32 I0 A0	80	28,000
		3	A1 B0 G1 M1 X24 I0 A0	80	21,600
10	SPRAY ROUGH CUT LINES	9	A0 B0 G0 M0 (X173) I0 A0	(2)8	27,680
		10	A1 B0 G1 M1 X131 I0 A0	8	10,720
11	SPRAY PAD AFTER MACHINING	11	A1 B0 G1 M1 X330 I0 A0	8	26,640
			A B G M X I A		
			A B G M X I A		
		4	A0 B0 G0 A1 B0 P1 F54 A0 B0 P0 A0	18	10,080
		5	A0 B0 G0 A1 B0 P1 F16 A0 B0 P0 A0	44	7920
		6	A0 B0 G0 A1 B0 P1 F6 A0 B0 P0 A0	18	1440
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		7	144,827		144,827

TIME = 293,947

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.12
DATE 8-6-84
SIGN. FWM
PAGE 10-47

MAIN ENGINE PADS FACE MILLING

ACTIVITY WELD SUPPORT FRAME IN PLACE

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	GET FRAMEWORK PIECES LANDED	4	(A6 B6 G3 A1 B0 P1 A0)	(3)2	1020
		5	A1 B0 G1 A1 B0 P3 A0	2	120
	ON SHIP	6	(A1 B0 G1 A1 B0 P3 A1)	(2)2	280
		7	(A1 B0 G1 A1 B0 P1 A0)	(2)2	160
2	MEASURE FOR POSITION	8	(A1 B0 G1 A1 B0 P3 A0)	(16)2	1920
		9	(A1 B0 G1 A1 B0 P3 A0)	(16)2	1920
3	MARK MEASUREMENT	14	(A1 B0 G1 A1 B0 P1 A0)	(3)2	240
		15	A1 B0 G3 A6 B6 P1 A0	2	340
4	GET WELDING EQUIPMENT & PIECES		A B G A B P A		
			A B G A B P A		
5	PLACE SHIELD		A B G A B P A		
			A B G A B P A		
6	PLACE GLOVES		A B G A B P A		
			A B G A B P A		
7	GET OR ASIDE WHIP		A B G A B P A		
			A B G A B P A		
8	INSERT WELDING ROD		A B G A B P A		
		10	(A1 B0 G1 M1) X0 I0 A0	(32)2	1920
9	PLACE PIECE	11	(A3 B0 G1 M0 X330) I0 A0	(8)2	53440
		12	(A3 B6 G1 M0 X330) 0 A0	(8)2	54400
10	CLOSE OR OPEN SHIELD	13	A0 B0 (G1 M1) X0 I0 A0	(16)2	640
			A B G M X I A		
11	TACK WELD CHANNEL TO FDN		A B G M X I A		
			A B G M X I A		
12	TACK WELD ANGLE TO CHANNEL		A B G M X I A		
		2	A1 B0 G1 A3 B0 (P1 A1 M32) A1 B0 P1 A0	(8)2	5580
	& DECK	3	A1 B0 G1 A3 B0 (P1 A1 R3) A1 B0 P1 A0	(16)2	1740
			A B G A B P A B P A		
13	RELEASE SPENT RODS		A B G A B P A B P A		
			A B G A B P A B P A		
14	REMOVE SHIELD & GLOVES		A B G A B P A B P A		
			A B G A B P A B P A		
15	RETURN WELDING EQUIPMENT		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 123,720

FORM R-1458

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002. 09
DATE 8-6-84
SIGN. FWM
PAGE 10-46

MAIN ENGINE PADS FACE MILLING

ACTIVITY: INSTALL & CHANGE CUTTING TOOLS

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_1 B_0 G_3 A_6 B_3 P_1 A_0$	4	560
	INSTALL-REMOVE CUTTING TOOLS	3	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	4	320
		6	$A_1 B_0 G_3 A_1 B_0 P_6 A_1$	16	1920
1	COLLECT TOOLS	7	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	16	960
		8	$A_1 B_0 G_3 A_6 B_3 P_1 A_0$	2	280
2	LOOSEN OR TIGHTEN COVER WING NUTS	10	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	2	160
			A B G A B P A		
3	REMOVE OR REPLACE COVER		A B G A B P A		
			A B G A B P A		
4	HAND TURN PULLEY TO ROTATE HEAD		A B G A B P A		
			A B G A B P A		
5	LOOSEN OR TIGHTEN SET SCREWS		A B G A B P A		
			A B G A B P A		
6	INSTALL TOOL INSERT		A B G A B P A		
			A B G A B P A		
7	REMOVE TOOL INSERT		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
	ROTATE TOOLS		A B G M X I A		
			A B G M X I A		
8	COLLECT TOOLS		A B G M X I A		
			A B G M X I A		
9	LOOSEN OR TIGHTEN COVER WING NUTS		A B G M X I A		
			A B G M X I A		
10	REMOVE OR REPLACE COVER		A B G M X I A		
		2	$(A_1 B_0 G_1 A_0 B_0 P_0 F_6) A_0 B_0 P_0 A_0$	(2)4	640
11	HAND TURN PULLEY TO ROTATE HEAD	4	$(A_0 B_0 G_0 A_1 B_0 R F_{10}) A_0 B_0 P_0 A_0$	(8)2	1920
		5	$A_1 B_0 G_1 A_0 B_0 P_3 A_1 F_6 A_1 B_0 R A_0$	(16)2	3280
12	MARK FIRST TOOL WITH CHALK	9	$(A_1 B_0 G_1 A_0 B_0 P_0 F_6) A_0 B_0 P_0 A_0$	(2)2	320
		11	$A_0 B_0 G_0 A_1 B_0 R F_{10} A_0 B_0 P_0 A_0$	8	960
13	LOOSEN OR TIGHTEN SET SCREWS	12	$A_1 B_0 G_3 A_1 B_0 P_1 R_1 A_1 B_0 R A_0$		90
		13	$A_1 B_0 G_1 A_0 B_0 P_3 A_1 F_6 A_1 B_0 P_1 A_0$	32	4480
14	REMOVE TOOL INSERT & INSPECT	14	$A_1 B_0 G_1 A_0 B_0 P_0 T_3 A_0 B_0 P_0 A_0$	16	800
		15	$A_0 B_0 G_0 A_0 B_0 P_0 S_3 A_1 B_0 P_6 A_0$	16	1600
15	CLEAN & REPLACE TOOL INSERT		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 18290

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.10
DATE 8-6-84
SIGN. FWM
PAGE 10-47

MAIN ENGINE PADS FACE MILLING

ACTIVITY: DAILY MACHINE CARE

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		3	$A_1\ B_0\ G_3\ A_6\ B_6\ P_3\ A_0$	2	380
1	THROW POWER LEVER ON & OFF	4	$A_6\ B_6\ G_3\ A_6\ B_0\ P_6\ A_0$	2	540
		7	$(A_6\ B_6\ G_3\ A_6\ B_0\ P_6\ A_0)$	(2)2	108
2	PULL COVER OFF OF MACHINE	8	$A_3\ B_0\ G_1\ A_{10}\ B_0\ P_1\ A_0$	2	300
			A B G A B P A		
3	BUNCH UP & LAY ASIDE		A B G A B P A		
			A B G A B P A		
4	PICK UP COVER, PLACE ONE END		A B G A B P A		
			A B G A B P A		
5	PULL OVER MACHINE		A B G A B P A		
			A B G A B P A		
6	ADJUST ALL AROUND		A B G A B P A		
			A B G A B P A		
7	PLACE & REMOVE COVER FOR		A B G A B P A		
			A B G A B P A		
	BREAKER BOX		A B G A B P A		
			A B G A B P A		
8	GET OIL CAN & MOVE ALONG WAYS		A B G A B P A		
		1	$(A_6\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(2)12	1920
9	OIL WAYS	2	$A_6\ B_0\ G_3\ M_{10}\ X_0\ I_0\ A_0$	2	380
		5	$A_1\ B_0\ G_3\ M_{10}\ X_0\ I_0\ A_0$	2	280
10	BRUSH AWAY CHIPS	6	$(A_3\ B_0\ G_3\ M_3)\ X_0\ I_0\ A_0$	(4)2	720
		9	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(8)2	480
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		10	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ S_{32}\ A_1\ B_0\ P_1\ A_0$	2	760
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 6840

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.07
DATE 8-6-84
SIGN. FWM
PAGE 10-44

MAIN ENGINE PADS FACE MILLING

ACTIVITY LEVEL MACHINE & SET TAPER

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	PLACE LEVEL TO CHECK & RECHECK		A B G A B P A		
			A B G A B P A		
2	ADJUST 2 SCREWS AT LOW END		A B G A B P A		
	WHILE WATCHING LEVEL		A B G A B P A		
			A B G A B P A		
3	PLACE LEVEL ON FDN & ADJUST		A B G A B P A		
	TO READ ANGLE		A B G A B P A		
			A B G A B P A		
4	RESET LEVEL TO MACHINE		A B G A B P A		
	TAPER & PLACE IT.		A B G A B P A		
			A B G A B P A		
5	ADJUST SCREW AT EACH END		A B G A B P A		
	WATCHING LEVEL		A B G A B P A		
			A B G M X I A		
6	ADJUST INTERMEDIATE SCREWS		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_1 A_0 B_6 (P_1 A_1 M_{10}) A_1 B_0 P_1 A_0$	(2) 24	8160
		2	$A_1 B_0 G_3 A_0 B_6 (P_3 A_4 L_{16}) A_1 B_0 P_1 A_0$	(2) 6	3120
		3	$A_1 B_6 G_1 A_1 B_6 P_1 M_{10} A_0 B_0 P_0 A_0$	6	1560
		4	$A_1 B_0 G_1 A_0 B_0 P_0 M_{10} A_1 B_6 P_1 A_0$	6	1200
		5	$A_1 B_0 G_3 A_0 B_6 P_3 A_6 L_{16} A_0 B_0 P_0 A_0$	(2) 6	3960
		6	$A_0 B_0 G_0 A_0 B_6 (P_3 A_3 L_{16}) A_1 B_0 P_1 A_0$	(6) 6	8400
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 26,400

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.08
DATE 8-6-84
SIGN. FWM
PAGE 10-45

MAIN ENGINE PADS FACE MILLING

ACTIVITY: WELD MACHINE IN PLACE

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_6\ B_6\ G_3\ A_1\ B_0\ P_1\ A_0$	6	1020
1	GET WELDING EQUIP	2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	6	360
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	6	36(
2	PLACE SHIELD	4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	6	24C
		5	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0)$	(12)6	4320
3	PLACE GLOVES	6	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0)$	(6)6	144(
		10	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	6	24-
4	GET & ASIDE WHIP	13	$A_1\ B_0\ G_3\ A_6\ B_6\ P_1\ A_0$	6	1020
			A B G A B P A		
5	INSERT WELDING ROD		A B G A B P A		
			A B G A B P A		
6	PLACE TAB		A B G A B P A		
			A B G A B P A		
7	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
8	WELD TAB TOP & BOTTOM		A B G A B P A		
			A B G A B P A		
9	RELEASE SPENT ROD		A B G A B P A		
		7	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(6)6	108(
10	REMOVE SHIELD & GLOVES	8	$(A_1\ B_6\ G_1\ M_0\ X_{1/3})\ I_0\ A_0$	(12)6	8712(
		9	$A_0\ B_0(G_1\ M_1)\ X_0\ I_0\ A_0$	(12)6	1440
11	CLEAN WELD		A B G M X I A		
			A B G M X I A		
12	RE CHECK W/ LEVEL		A B G M X I A		
			A B G M X I A		
13	RETURN WELDING EQUIP		A B G M X I A		
		11	$A_1\ B_0\ G_1\ A_0(B_6\ P_1\ A_1\ F_2)\ A_1\ B_0\ P_1\ A_0$	(12)6	10320
		12	$A_1\ B_0\ G_1\ A_0(B_6\ P_1\ A_1\ M_6)\ A_1\ B_0\ P_1\ A_0$	(2)6	312(
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 112,080

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.05
DATE 8-6-84
SIGN. FWM
PAGE 10-42

MAIN ENGINE PADS FACE MILLING

ACTIVITY TACK WELD TABS FOR MACHINE POSITIONING

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		3	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	6	360
1	MEASURE FROM PAD FOR TABS	4	$(A_1 B_0 G_1 A_1 B_0 P_3 A_1)$	(2)6	840
		5	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	(2)6	480
2	MARK DISTANCE	6	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	6	360
		7	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	(2)6	480
3	PLACE SHIELD	11	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	(3)6	720
			A B G A B P A		
4	PLACE GLOVES		A B G A B P A		
			A B G A B P A		
5	GET & ASIDE WHIP		A B G A B P A		
			A B G A B P A		
6	INSERT WELDING ROD		A B G A B P A		
			A B G A B P A		
7	PLACE TAB		A B G A B P A		
			A B G A B P A		
8	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
9	WELD TAB TO DECK		A B G A B P A		
		8	$(A_1 B_0 G_1 M_1) X_0 I_0 A_0$	(2)6	360
10	RELEASE SPENT ROD	9	$(A_1 B_6 G_1 M_0 X_{67}) I_0 A_0$	(2)6	9000
		10	$A_0 B_0 G_1 M_1 X_0 I_0 A_0$	6	120
11	REMOVE SHIELD & GLOVES		A B G M X I A		
			A B G M X I A		
12	CLEAN WELD		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_1 A_0 P_6 P_1 A_3 M_6 A_1 B_0 P_1 A_0$	(2)6	3360
		2	$A_1 B_0 G_1 A_0 (B_0 P_1 R_1) A_1 B_0 P_1 A_0$	(2)6	480
		12	$A_1 B_0 G_1 A_0 (B_6 P_1 A_1 F_6) A_1 B_0 P_1 A_0$	(2)6	1920
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 18,480

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.06
DATE 8-6-84
SIGN. FWM
PAGE 10-43

MAIN ENGINE PADSFACE MILLING

ACTIVITY: SET UP & POSITION MACHINE

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
		2	A B G A B P A		0
1	TIGHTEN & LOOSEN CABLES	5	A B G A B P A		0
		7	A_1 B_0 G_3 A_{10} B_0 P_3 A_1	6	108
2	LAND MACHINE ON FDN	8	A_1 B_0 G_3 A_{96} B_0 P_3 A_{96}		1990
		9	A_6 B_0 G_3 A_6 B_0 P_3 A_1	6	114
3	ATTACH CABLES TO BREAKER BOX		A B G A B P A		
			A B G A B P A		
4	UNBOLT & REPLACE BOLTS		A B G A B P A		
			A B G A B P A		
5	MOVE BREAKER BOX		A B G A B P A		
			A B G A B P A		
6	DETACH CABLES		A B G A B P A		
			A B G A B P A		
7	CONNECT BREAKER BOX TO		A B G A B P A		
			A B G A B P A		
	EXTENSION		A B G A B P A		
			A B G A B P A		
8	PLUG EXTENSION INTO POWER		A B G A B P A		
			A B G M X I A		
9	CONNECT MOTOR LINE TO BREAKER		A B G M X I A		
			A B G M X I A		
	BOX		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	A_3 B_0 G_1 A_1 B_0 P_1 L_{16} A_0 B_0 P_0 A_0	(4) 12	10,560
		3	A_3 B_0 G_1 A_1 B_0 P_1 L_{16} A_0 B_0 P_0 A_0	(4) 6	5,28
		4	A_1 B_0 G_1 A_0 B_0 P_3 A_1 L_{96} A_1 B_0 P_1 A_0	(4) 12	48,4
		6	A_3 B_0 G_1 A_1 B_0 P_1 L_{16} A_0 B_0 P_0 A_0	(4) 6	5280
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 73,810

FORM R–1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.03
DATE 8-6-84
SIGN. FWM
PAGE 10-40

MAIN ENGINE PADS FACE MILLING

ACTIVITY: ALIGN PADS ON FOUNDATION

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	WAIT FOR PADS TO LAND ON SHIP	2	A B G A B P A		0
		3	$A_1 B_0 G_3 A_6 B_0 P_1 A_0$	8	880
2	WAIT FOR ALIGN ENGR TO SHOOT	8	$A_1 B_0 G_1 A_1 B_0 P_6 A_0$	8	720
		11	$(A_1 B_0 G_3 A_1 B_0 P_1 A_0)$	(2)8	960
	LINES.	12	$A_0 B_0 G_0 A_1 B_6 P_6 A_0$	8	1040
			A B G A B P A		
3	COLLECT TOOLS & ASIDE		A B G A B P A		
			A B G A B P A		
4	WIPE OFF FDN		A B G A B P A		
			A B G A B P A		
5	MEASURE FROM ALIGN MARKS		A B G A B P A		
			A B G A B P A		
6	MARK MEASUREMENTS		A B G A B P A		
			A B G A B P A		
7	PULL OUT CHALKLINE		A B G A B P A		
			A B G A B P A		
8	PLACE CHALKLINE		A B G A B P A		
		7	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$	8	400
9	SNAP CHALKLINE	9	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	8	240
		10	$A_1 B_0 G_1 M_{54} X_0 I_0 A_0$	8	4480
10	REWIND CHALKLINE	15	$A_3 B_6 G_3 M_6 X_0 I_0 A_0$	8	1440
		17	$A_3 B_6 G_3 M_6 X_0 I_0 A_0$	8	1440
11	GET & RETURN HAMMER & PUNCH		A B G M X I A		
			A B G M X I A		
12	PLACE PUNCH ON MARKS		A B G M X I A		
		4	$A_1 B_0 G_1 A_6 B_6 P_1 S_{42} A_1 B_0 P_1 A_0$	8	4720
13	CENTER PUNCH MARKS	5	$A_1 B_0 G_1 A_0 (B_6 P_1 A_6 M_{32}) A_1 B_0 P_1 A_0$	(2)8	7520
		6	$A_1 B_0 G_1 A_0 (B_6 P_1 A_6 R_1) A_1 B_0 P_1 A_0$	(2)8	2560
14	INSPECT MARKS	13	$A_0 B_0 G_0 A_0 B_6 (P_1 A_1 F_6) A_0 B_0 P_0 A_0$	(7)8	4480
		14	$A_0 B_0 G_0 A_0 B_0 P_0 (T_1) A_0 B_0 P_0 A_0$	(7)8	560
15	STAND PAD ON EDGE & MOVE	16	$A_1 B_0 G_1 A_6 B_6 P_1 S_{42} A_1 B_0 P_1 A_0$	8	4720
		18	$A_1 B_0 G_3 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0$	8	1440
16	WIPE FDN		A B G A B P A B P A		
			A B G A B P A B P A		
17	LAY PAD DOWN & SLIDE		A B G A B P A B P A		
			A B G A B P A B P A		
18	TAP PAD WITH HAMMER TO		A B G A B P A B P A		
			A B G A B P A B P A		
	ALIGN		A B G A B P A B P A		

TIME = 37,600

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.04
DATE 8-6-84
SIGN. EWM
PAGE 12-41

MAIN ENGINE PADS FACE MILLING

ACTIVITY: WELD PADS IN PLACE

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_6\ B_6\ G_3\ A_1\ B_0\ P_1\ A_0$	8	1360
1	GET WELDING EQUIP	2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	8	480
		3	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1)$	(2)8	112
2	PLACE SHIELD	4	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0)$	(2)8	640
		5	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0)$	(4)8	1920
3	PLACE GLOVES	9	$(A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0)$	(3)8	960
		11	$A_1\ B_0\ G_3\ A_6\ B_6\ P_1\ A_0$	8	1360
4	GET & ASIDE WHIP	12	A B G A B P A		0
			A B G A B P A		
5	INSERT WELDING ROD		A B G A B P A		
			A B G A B P A		
6	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
7	TACK WELD PAD TO FDN		A B G A B P A		
			A B G A B P A		
8	RELEASE SPENT RODS		A B G A B P A		
			A B G A B P A		
9	REMOVE SHIELD & GLOVES		A B G A B P A		
		6	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(8)8	1920
10	CLEAN WELDS	7	$(A_3\ B_6\ G_1\ M_0\ X_{96})\ I_0\ A_0$	(8)8	67,840
		8	$A_0\ B_0\ (G_1\ M_1)\ X_0\ I_0\ A_0$	(4)8	640
11	RETURN WELDING EQUIP		A B G M X I A		
			A B G M X I A		
12	WELD OUT PADS		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		10	$A_1\ B_0\ G_1\ A_0\ (B_6\ P_3\ A_3\ F_6)\ A_0\ B_0\ P_0\ A_0$	(8)8	10,400
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 88,640

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.01
DATE 8-6-84
SIGN. FWM
PAGE 10-35

MAIN ENGINE PADSFACE MILLING

ACTIVITY JOB PREPARATION

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	AVERAGE INITIAL JOB		A B G A B P A		
	PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	SIMPLE ADDITIONAL JOB		A B G A B P A		
	PREPARATION (CODE 1001.21)		A B G A B P A		
			A B G A B P A		
3	RETURN TOOLS TO TOOL		A B G A B P A		
	CRIB (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42,001	1	42,001
		2	1180	1	1180
		3	15,417	1	15,417

TIME = 58.598

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2002.02
DATE 8-6-84
SIGN. FWM
PAGE 10-39

MAIN ENGINE PADS FACE MILLING

ACTIVITY: AREA TRAVEL

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM TOOL BOX TO MODULE 2 STAIRS OR RETURN (CODE 1002.12)	1	3300	4	13,200
2	FROM TOOL BOX TO TOOL ROOM OR RETURN (CODE 1002.16)	2	11311	2	22,622
3	FROM MODULE 2 STAIRS TO E.R. #1 OR RETURN (47 STEPS)	3	810	4	3240
4	TRAVEL IN E.R. #1, TO EACH FDN (24 STEPS)	4	420	4	1680

A B G A B P A

A B G M X I A

A B G A B P A B P A

TIME = 40,742

INGALLS Shipbuilding

MOST - calculation

CODE 2001.09
DATE 5/2/84
SIGN. FWM
PAGE 10-36

FIVE INCH GUN MOUNT FACING

ACTIVITY: MEASURE PROGRESS (BETWEEN PASSES) & VERIFY FLATNESS (AT COMPLETION)

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		2	A B G A B P A		0
1	MEASURE THICKNESS OF FLANGE.	4	$A_1 B_0 G_3 A_1 B_0 P_3 A_1$	2	180
		5	$A_1 B_0 G_3 A_1 B_6 P_3 A_0$	2	280
2	RIGGER GET 10 FT. STRAIGHT	7	$A_1 B_6 G_3 A_3 B_6 P_6 A_0$	2	500
		9	$A_1 B_6 G_3 A_3 B_6 P_6 A_0$	2	500
	EDGE ON BOARD IN BOX.	10	$A_1 B_0 G_1 (A_1 B_0 P_3 A_1)$	(8)20	8400
		11	$A_1 B_0 G_3 A_1 B_0 P_6 A_0$	19	2090
3	UNFASTEN & FASTEN SCREWS IN		A B G A B P A		
			A B G A B P A		
	BOX TOP.		A B G A B P A		
			A B G A B P A		
4	PUT & RETRIEVE SCREWS IN BOX		A B G A B P A		
			A B G A B P A		
5	REMOVE & REPLACE BOX TOP		A B G A B P A		
			A B G A B P A		
6	WIPE STRAIGHT EDGE SURFACES		A B G A B P A		
			A B G A B P A		
	CLEAN		A B G A B P A		
			A B G M X I A		
7	TURN STRAIGHT EDGE OVER		A B G M X I A		
			A B G M X I A		
8	WIPE FOUNDATION SURFACE CLEAN		A B G M X I A		
			A B G M X I A		
9	PLACE STRAIGHT EDGE ON FOUNDATION		A B G M X I A		
			A B G M X I A		
	& REPLACE IN CRATE.		A B G M X I A		
		1	$A_1 B_0 G_1 (A_0 B_6 P_3 M_{16}) A_1 B_0 P_1 A_0$	(4) 5	7200
10	INSERT FEELER GUAGE UNDER	3	$A_1 B_0 G_3 A_0 B_0 (P_3 A_1 L_{62}) A_1 B_0 P_1 A_0$	(4) 2	1720
		6	$A_1 B_0 G_1 A_1 B_0 P_1 S_{32} A_1 B_0 P_1 A_0$	2	760
	STRAIGHT EDGE. (.005 GO/NO-GO)	8	$A_0 B_0 G_0 A_3 B_6 P_1 S_{96} A_3 B_0 P_1 A_0$		1100
			A B G A B P A B P A		
11	MOVE STRAIGHT EDGE AROUND		A B G A B P A B P A		
			A B G A B P A B P A		
	CIRCLE.		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 22,730

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

FIVE INCH GUN MOUNT FACING

CODE 2001.10
DATE 5/2/84
SIGN. FWM
PAGE 10-37

ACTIVITY: REMOVE MACHINE FROM DECK & REMOVE STRIKER BY BURNING

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET TORCH LINES, REPLACE	1	$A_3\ B_6\ G_3\ A_{32}\ B_0\ P_6\ A_{32}$	2	1640
2	CONNECT & DISCONNECT LINES	3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	35
3	PLACES GLOVES, REMOVE GLOVES & GOGGLES	4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		6
4	RACE GOGGLES	6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
5	OPEN & CLOSE VALVES	11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$		40
6	GET & RETURN STRIKER	12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		20
7	LIGHT TORCH	14	A B G A B P A		0
8	ADJUST FLAME		A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
10	RAISE GOGGLES		A B G A B P A		
11	POSITION TORCH		A B G A B P A		
12	ASIDE TORCH		A B G A B P A		
13	BURN		A B G A B P A		
14	RIGGER GET MACHINE OFF BOARD		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		5	$(A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0)$	(2)2	120
		7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$		20
		8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		30
		9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	5	200
		10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	5	150
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_0\ B_0\ G_0\ A_0\ B_0\ (P_1\ A_1\ F_{54})\ A_1\ B_0\ P_1\ A_1$	(2)2	2305
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		13			10,592

TIME = 15,582

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

FIVE INCH GUN MOUNT FACING

CODE 2001.07
DATE 5/2/84
SIGN. FWM
PAGE 10-34

ACTIVITY WELD MACHINE IN PLACE WITH TABS & WELD FEED STRIKER PLATE

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET WELDING WHIP & RODS	1	$A_3\ B_6\ G_1\ A_1\ B_0\ P_1\ A_0$		120
		2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	7	420
2	INSERT WELDING RODS	3	$A_{10}\ B_6\ G_3\ (A_1\ B_0\ P_3)\ A_0$	(3)4	1240
		4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
3	PLACE TABS	5	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		60
		6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	350
4	PLACE STRIKER PLATE	11	$A_1\ B_0\ G_1\ A_3\ B_6\ P_1\ A_0$		120
			A B G A B P A		
5	PLACE SHIELD		A B G A B P A		
			A B G A B P A		
6	PLACE GLOVES, REMOVE GLOVES & SHIELD		A B G A B P A		
			A B G A B P A		
7	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
8	WELD TABS & PLATE (19SEC EACH)		A B G A B P A		
			A B G A B P A		
9	INSPECT WELD		A B G A B P A		
		7	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	26	780
10	RELEASE SPENT RODS	8	$A_1\ B_6\ G_1\ M_0\ X_{54}\ I_0\ A_0$	26	16120
		10	$A_0\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	7	140
11	ASIDE WHIP & RODS		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		9	$A_0\ B_0\ G_0\ A_0\ B_0\ P_0\ T_1\ A_0\ B_0\ P_0\ A_0$	13	130
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 19,540

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.08
DATE 5/2/84
SIGN. FWM
PAGE 10-33

FIVE INCH GUN MOUNT FACING

ACTIVITY: OPERATE MACHINE

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
		2	$A_1 B_0 G_3 A_1 B_0 P_6 A_1$	5	600
1	HAND CRANK HEAD TO START	5	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	5	40(
		10	$A_1 B_0 G_3 A_1 B_0 P_3 A_1$	5	45(
	POSITION		A B G A B P A		
			A B G A B P A		
2	PLACE TOOL		A B G A B P A		
			A B G A B P A		
3	TIGHTEN OR LOOSEN HOLDING		A B G A B P A		
			A B G A B P A		
	SCREW		A B G A B P A		
			A B G A B P A		
4	TURN POWER ON OR OFF		A B G A B P A		
			A B G A B P A		
5	GET & ASIDE CONTROLLER		A B G A B P A		
			A B G A B P A		
6	PUSH CONTROLLER BUTTON		A B G A B P A		
			A B G A B P A		
7	MACHINE FOUNDATION		A B G A B P A		
		4	$(A_1 B_0 G_1 M_3 X_0 I_0 A_0)$	(2)5	50
8	ADJUST TOOL HEIGHT	6	$(A_1 B_0 G_1 M_1 X_0 I_0 A_0)$	(2)5	300
		8	$A_0 B_0 G_0 M_3 X_0 I_0 A_1$	5	20(
9	LOOSEN THEN TIGHTEN SCREW		A B G M X I A		
			A B G M X I A		
10	REMOVE TOOL		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_0 B_0 G_0 A_1 B_0 P_1 F_{121} A_0 B_0 P_0 A_0$	5	665
		3	$A_1 B_0 G_3 A_1 B_6 P_3 A_1 F_{10} A_1 B_0 P_1 A_0$	2	54
		9	$A_1 B_0 G_3 A_0 B_6 (P_3 A_1 F_{10}) A_1 B_0 P_1 A_0$	(2)4	1600
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		7	MACHINING PROCESS TIME		377,1 7
			(5 PASSES AT RECOMMENDED		
			FEEDS & SPEEDS)		

TIME = 388,397

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.05
DATE 5/2/84
SIGN. FWM
PAGE 10-32

FIVE INCH GUN MOUNT FACING

ACTIVITY: LEVEL MACHINE

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	LOOSEN ALL 8 LEVELER HOLD DOWN BOLTS.	3	$A_1\ B_0\ G_3\ A_1\ B_0\ P_6\ A_1$	2	240
		7	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$	4	240
		9	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	3	120
2	ROUGHLY ADJUST ALL 4 LEVELING SCREWS.		A B G A B P A		
3	PLACE POINTER TOOL & REMOVE		A B G A B P A		
4	TIGHTEN SET SCREW. & LOOSEN		A B G A B P A		
5	CRANK HEAD INTO POSITION.		A B G A B P A		
6	ROTATE TO EACH ALIGN MARK		A B G A B P A		
7	GET & ASIDE RULE		A B G A B P A		
8	MEASURE AT EACH ALIGN MARK	6	$A_1\ B_0\ G_1\ M_3\ X_{10}\ I_0\ A_0$	16	2400
9	GET & ASIDE WRENCH		A B G M X I A		
10	FINE ADJUST LEVEL SCREW PAIRS		A B G M X I A		
11	RESET POINTER TOOL		A B G M X I A		
12	TIGHTEN ALL 8 HOLD DOWN BOLTS	1	$A_1\ B_0\ G_3\ A_{10}\ B\ (P_3\ A_1\ L_8)\ A_1\ B_0\ P_1\ A_0$	(8)	1020
		2	$A_0\ B_0\ G_0\ A_0\ B\ (P_3\ A_1\ F_{10})\ A_0\ B_0\ P_0\ A_0$	(4)	560
		4	$A_1\ B_0\ G_3\ A_1\ B_6\ P_3\ F_{10}\ A_1\ B_0\ P_1\ A_0$		260
		5	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ F_{10}\ A_0\ B_0\ P_0\ A_0$		120
		8	$A_0\ B_0\ G_0\ A_{10}\ B_6\ P_1\ M_{16}\ A_0\ B_0\ P_0\ A_0$	16	5250
		10	$A_0\ B_0\ G_0\ A_{20}\ B_0\ P_3\ F_6\ A_0\ B_0\ P_0\ A_0$	6	1740
		11	$A_1\ B_0\ G_3\ A_1\ B_3\ P_3\ (F_{10})\ A_1\ B_3\ P_1\ A_1$	(2)	370
		12	$A_1\ B_0\ G_3\ A_{10}\ B\ (P_3\ A_1\ F_3)\ A_1\ B_0\ P_1\ A_0$	(8)	1020
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 13,370

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.06
DATE 5-2-84
SIGN. FWM
PAGE 10-33

FIVE INCH GUN MOUNT FACING

ACTIVITY: REMOVE JACK TAB BY BURNING

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A_3 B_6 G_3 A_{32} B_0 P_6 A_{32}	2	1640
1	GET TORCH LINES, REPLACE	3	A_1 B_0 G_1 A_1 B_0 P_3 A_1	5	35
		4	A_1 B_0 G_3 A_1 B_0 P_1 A_0		60
2	CONNECT & DISCONNECT LINES	6	A_1 B_0 G_1 A_1 B_0 P_3 A_0		60
		11	A_0 B_0 G_0 A_1 B_0 P_3 A_0		40
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES	12	A_0 B_0 G_0 A_1 B_0 P_1 A_0		20
			A B G A B P A		
4	PLACE GOGGLES		A B G A B P A		
			A B G A B P A		
5	OPEN & CLOSE VALVES		A B G A B P A		
			A B G A B P A		
6	GET & RETURN STRIKER		A B G A B P A		
			A B G A B P A		
7	LIGHT TORCH		A B G A B P A		
			A B G A B P A		
8	ADJUST FLAME		A B G A B P A		
			A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
		5	(A_1 B_0 G_1 M_1 X_0 I_0 A_0)	(2)2	120
10	RAISE GOGGLES	7	A_1 B_0 G_0 M_1 X_0 I_0 A_0		20
		8	A_1 B_0 G_1 M_1 X_0 I_0 A_0		30
11	POSITION TORCH	9	A_1 B_0 G_1 M_1 X_0 I_1 A_0		40
		10	A_1 B_0 G_1 M_1 X_0 I_0 A_0		30
12	ASIDE TORCH		A B G M X I A		
			A B G M X I A		
13	BURN (45 SEC)		A B G M X I A		
		2	A_0 B_0 G_0 A_0 B_0 (P_1 A_1 F_{31}) A_1 B_0 P_1 A_1	(2)2	230
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		13	1310		1310

TIME = 6020

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.03
DATE 5/2/84
SIGN. FWM
PAGE 10-30

FIVE INCH GUN MOUNT FACING

ACTIVITY: SET UP MACHINE

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$	2	120
1	GET & RETURN HAMMER & PUNCH	2	$A_0\ B_0\ G_0\ A_{10}\ B_6\ P_6\ A_0$	4	880
		5	A B G A B P A		0
2	PLACE PUNCH AT ALIGNMENT MARKS	7	A B G A B P A		0
		8	$A_3\ B_0\ G_3\ A_{16}\ B_6\ P_3\ A_{16}$		470
3	CENTERPUNCH MARKS	9	A B G A B P A		0
		12	A B G A B P A		0
4	INSPECT PUNCH MARKS		A B G A B P A		
			A B G A B P A		
5	RIGGER GET MACHINE ON BOARD		A B G A B P A		
			A B G A B P A		
6	INSPECT ALIGNMENT		A B G A B P A		
			A B G A B P A		
7	RIGGER ADJUST & PLACE UNIT		A B G A B P A		
			A B G A B P A		
8	PLUG IN MACHINE & RETURN		A B G A B P A		
			A B G A B P A		
9	GUARD RAIL INSTALLED		A B G A B P A		
			A B G M X I A		
10	REMOVE & REPLACE OIL CAP		A B G M X I A		
			A B G M X I A		
11	INSPECT OIL LEVEL		A B G M X I A		
			A B G M X I A		
12	FILL OIL RESERVOIR		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_0B_0G_0A_0B_0(P_1A_1F_6)A_1B_0P_1A_0$	(4)	340
		4	$A_0B_0G_0A_0B_0P_0\ T_1\ A_0B_0P_0A_0$	4	40
		6	$A_0B_0G_0A_0B_0P\ A_{10}\ T_3\ A_0B_0P_0A_0$	4	520
		10	$A_1B_0G_3A_1B_0P_3\ L_{10}\ A_1B_0P_1A_0$	2	400
		11	$A_1B_0G_1A_1B_0P_1\ T_1\ A_1B_0P_1A_0$		70
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 2840

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.04
DATE 5/2/84
SIGN. FWM
PAGE 10-31

FIVE INCH GUN MOUNT FACING

ACTIVITY: FINAL POSITION MACHINE USING JACK

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MEASURE FOR CENTER & CHECK	2	$A_1 B_6 G_1 A_0 B_0 P_0 A_0$		80
		3	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		6
2	GET WELDING WHIP & RODS	4	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$		4
		9	$A_{24} B_6 G_1 A_{24} B_6 P_3 A_0$		640
3	INSERT WELDING ROD	12	$A_0 B_0 G_0 A_{24} B_6 P_1 A_{24}$		550
			A B G A B P A		
4	PLACE JACKING TAB		A B G A B P A		
			A B G A B P A		
5	CLOSE SHIELD		A B G A B P A		
			A B G A B P A		
6	WELD TAB TO DECK		A B G A B P A		
			A B G A B P A		
7	OPEN SHIELD		A B G A B P A		
			A B G A B P A		
8	INSPECT WELD & ASIDE WHIP		A B G A B P A		
			A B G A B P A		
9	PLACE JACK		A B G A B P A		
			A B G A B P A		
10	OPERATE JACK WITH HANDLE	5	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		30
		6	$A_1 B_6 G_0 M_1 X_{54} I_0 A_0$		620
11	RELEASE JACK	7	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		31
			A B G M X I A		
12	RETURN JACK		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_3 A_0 (B_6 P_1 A_{10} M_6)_3 B_0 P_1 A_0$	(8)	270
		8	$A_0 B_0 G_0 A_0 B_0 P_0$ T $A_1 B_0 P_1 A_0$		3
		10	$A_1 B_0 G_1 A_1 B_0 P_3$ F24 $A_1 B_0 P_1 A_0$		320
		11	$A_1 B_0 G_1 A_1 B_6 P_3$ L6 $A_0 B_0 P_0 A_0$		180
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A.B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 5280

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.01
DATE 5/2/84
SIGN. FWM
PAGE 10-28

FIVE INCH GUN MOUNT FACING

ACTIVITY JOB PREPARATION

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	INITIAL AVERAGE JOB PREPARATION		A B G A B P A		
			A B G A B P A		
	(CODE 1001.12)		A B G A B P A		
			A B G A B P A		
2	RETURN TOOLS TO TOOL CRIB		A B G A B P A		
			A B G A B P A		
	(CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42,001		42,001
		2	15,417		15,417

TIME = 57,418

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 2001.02
DATE 5/2/84
SIGN. FWM
PAGE 10-29

FIVE INCH GUN MOUNT FACING

ACTIVITY: AREA TRAVEL

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
			A B G A B P A		
1	FROM TOOL BOX TO WET DOCK		A B G A B P A		
			A B G A B P A		
	TOOL RM & RETURN (CODE 1002.16)		A B G A B P A		
			A B G A B P A		
2	FROM TOOL BOX TO ELEVATOR FOR		A B G A B P A		
			A B G A B P A		
	INTEGRATED SHIP & RETURN		A B G A B P A		
			A B G A B P A		
	(CODE 1002.15)		A B G A B P A		
			A B G A B P A		
3	WAIT FOR ELEVATOR		A B G A B P A		
			A B G A B P A		
4	WALK ONTO, RIDE, & WALK OFF OF		A B G A B P A		
			A B G A B P A		
	ELEVATOR		A B G A B P A		
			A B G A B P A		
5	SWING OPEN OR CLOSE OUTER DOORS		A B G A B P A		
		3	A_0 B_0 G_0 M_0 X 5 4 I_0 A_0	2	1080
6	SLIDE OPEN OR CLOSE INNER DOOR	4	A_{10} B_0 G_0 M_0 X 5 4 I_0 A_{10}	2	1480
		5	A_1 B_0 G_1 M_3 X_0 I_0 A_0	8	400
7	FROM ELEVATOR TO FWD 5 INCH	6	A_1 B_0 G_1 M_3 X_0 I_0 A_0	8	400
		7	A_{24} B_0 G_0 M_0 X_0 I_0 A_0	2	480
	GUN FOUNDATION & RETURN		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	11,311	4	45,2
		2	1520	2	3040

TIME = 52,124

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.01
DATE 7/2/84
SIGN. TLC
PAGE 10-80

WASTE HEAT BOILER INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	INITIAL AVERAGE JOB PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
2	RETURN TOOLS TO TOOL CRIB (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
3	SIMPLE ADDITIONAL JOB PREPARATION (CODE 1001.21)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42001		42001
		2	15417		15417
		3	1180		1180

TIME = 58,598

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

WASTE HEAT BOILER INSTALLATION

CODE 3001.02
DATE 7/2/84
SIGN. TLC
PAGE 10-81

ACTIVITY LAYOUT PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MEASURE LAYOUT LINES		A B G A B P A		
			A B G A B P A		
2	DRAW LAYOUT LINES		A B G A B P A		
			A B G A B P A		
3	PUNCH LAYOUT HOLES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1B_0G_3A_0B_0(P_1A_1M_{32})A_1B_0P_1A_0$	(42)	14,340
		2	$A_1B_0G_3A_0B_0(P_1A_1R_3)A_1B_0P_1A_0$	(42)	2,16
		3	$A_1B_0G_3A_0B_0(P_1A_1F_3)A_1B_0P_1A_0$	(420)	21,000
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 37,560

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.03
DATE 7/2/84
SIGN. TLC
PAGE 10-82

WASTE HEAT BOILER INSTALLATION

ACTIVITY BURN PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_{32}\ B_6\ G_3\ A_{32}\ B_0\ P_1\ A_{32}$		1060
1	GET TORCH LINES, REPLACE	3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	350
		4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		60
2	CONNECT & DISCONNECT LINES	6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
		11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$	6	240
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES	12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		20
4	PLACE GOGGLES		A B G A B P A		
			A B G A B P A		
5	OPEN & CLOSE VALVES		A B G A B P A		
			A B G A B P A		
6	GET & RETURN STRIKER		A B G A B P A		
			A B G A B P A		
7	LIGHT TORCH		A B G A B P A		
			A B G A B P A		
8	ADJUST FLAME		A B G A B P A		
			A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
		5	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(2)2	120
10	RAISE GOGGLES	7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$		20
		8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		30
11	POSITION TORCH	9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	6	240
		10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	6	180
12	ASIDE TORCH	13	$A_0\ B_0\ G_0\ M_0\ X_{54}\ I_0\ A_0$	195	105300
			A B G M X I A		
13	BURN (.32 MIN/INCH @ 3 SIDES @ 195")		A B G M X I A		
		2	$A_0\ B_0\ G_0\ A_0\ B_0\ (P_1\ A_1\ F_{54})\ P_1\ B_0\ P_1\ A_1$	(2)2	2300
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 109,980

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

WASTE HEAT BOILER INSTALLATION

CODE 3001.04
DATE 7/2/84
SIGN. TLC
PAGE 10-83

ACTIVITY GRIND PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE CHOCKS IN WATER	3	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$		60
		5	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	6	48
2	WAIT FOR CHOCK TO COOL	7	$A_1 B_0 G_3 A_0 B_0 P_0 A_0$		41
			A B G A B P A		
3	GET CHOCKS		A B G A B P A		
			A B G A B P A		
4	TURN ON GRINDER		A B G A B P A		
			A B G A B P A		
5	PLACE PART TO GRINDER		A B G A B P A		
			A B G A B P A		
6	TURN GRINDER OFF		A B G A B P A		
			A B G A B P A		
7	COLLECT PADS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	$A_0 B_0 G_0 M_0 X_{173} I_0 A_0$		173
		4	$A_{24} B_0 G_1 M_0 (X_{730})_0 A_{24}$	13.8	46,030
		6	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		30
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_1 A_1 B_0 P_1 G_1 A_1 B_0 P_1 A_0$	6	420
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 48,790

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.05
DATE 7/2/84
SIGN. TLC
PAGE 10-84

WASTE HEAT BOILER INSTALLATION

ACTIVITY AREA TRAVEL

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM: TOOL BOX		A B G A B P A		
	TO: WETDOCK TOOL ROOM		A B G A B P A		
	& RETURN (CODE 1002.16)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	FROM: TOOL BOX		A B G A B P A		
	TO: FREE STOCK		A B G A B P A		
	& RETURN (CODE 1002.17)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	FROM: TOOL BOX		A B G A B P A		
	TO: MODULE 2 STAIRS		A B G A B P A		
	& RETURN (CODE 1002.12)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
4	FROM: MODULE 2 STAIRS		A B G M X I A		
	TO: AMR NO. 1		A B G M X I A		
	& RETURN (CODE 1002.18)		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
5	RETURN TOOLS TO TOOL		A B G A B P A B P A		
	ROOM IN WETDOCK BLDG.		A B G A B P A B P A		
	& RETURN TO TOOL BOX		A B G A B P A B P A		
	(CODE 1002.16)		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
6	FROM: AMR NO. 1		A B G A B P A B P A		
	TO: ENGINE ROOM NO. 1		A B G A B P A B P A		
	& RETURN (CODE 3001.051)		A B G A B P A B P A		
			A B G A B P A B P A		
		1	11311	2	22,622
		2	1960	2	3920
		3	3300	4	13,200
		4	2270	4	9,080
		5	11311	2	22,622
		6	5480	2	10960
TIME =					82404

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

WASTE HEAT BOILER INSTALLATION

CODE 300 1.051
DATE 7/2/84
SIGN. TLC
PAGE 10-85

ACTIVITY TRAVEL FROM AMR#1 TO ENGINE ROOM NO. 1 & RETURN

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	CLIMB LADDER	2	$A_0\ B_0\ G_0\ A_{32}\ B_{32}\ P_0\ A_0$	2	1280
			A B G A B P A		
2	THROUGH MANHOLE		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	$(A_1\ B_{16}\ G_1\ M_3)\ X_0\ I_0\ A_0$	10)2	420
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 5480

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.06
DATE 7/2/84
SIGN. TLC
PAGE 10-86

WASTE HEAT BOILER INSTALLATION

ACTIVITY LAYOUT PAD LOCATIONS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MEASURE PAD LOCATIONS		A B G A B P A		
2	MARK PAD LOCATIONS		A B G A B P A		
3	PUNCH HOLE LOCATIONS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_6 G_3 A_{12} B_6 P_1 A_{10} M_{31} A_{10} B_6 P_1 A_0$	(14)	7230
		2	$A_1 B_0 G_3 A_1 B_0 P_1 (R_3) A_1 B_0 P_1 A_0$	(2)6	840
		3	$A_1 B_0 G_3 A_1 B_0 P_3 F_6 A_1 B_0 P_1 A_0$	6	1560
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 9,630

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.07
DATE 7/2/84
SIGN. TLC
PAGE 10-87

WASTE HEAT BOILER INSTALLATION

ACTIVITY REMOVE TEMPORARY BOLTS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GANTRY L.O.S. BOILER	1	A B G A B P A		0
		5	A_0 B_0 G_0 A_3 B_6 P_3 A_0		12
2	SET-UP TO UNBOLT (CODE 1005.01)	6	A_0 B_0 G_0 A_6 B_6 P_3 A_0		15
		7	A_0 B_0 G_0 A_3 B_6 P_3 A_0		120
3	UNBOLT 4 BOLTS (CODE 1005.06) - 1¼" BOLTS	8	A_0 B_0 G_0 A_6 B_6 P_3 A_0		15
		9	A_0 B_0 G_0 A_6 B_6 P_1 A_0		13
4	REMOVE 4 BOLTS (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	WALK TO 1ST LOCATION		A B G A B P A		
			A B G A B P A		
6	WALK TO LOCATION #3		A B G A B P A		
			A B G A B P A		
7	WALK TO LOCATION #4		A B G A B P A		
			A B G A B P A		
8	WALK TO LOCATION #6		A B G A B P A		
			A B G A B P A		
9	WALK TO TOOL BAG		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	860		86
		3	2859	4	11,436
		4	410	4	164

TIME = 14,606

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.08
DATE 7/2/84
SIGN. TLC
PAGE 10-88

WASTE HEAT BOILER INSTALLATION

ACTIVITY TACK PADS TO BOILER

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GANTRY CRANE POSITIONS BOILER ON SIDE	1	A B G A B P A		0
		2	A_1 B_6 G_3 A_3 (B_{10}) P_3 A_3	(2)3	1,170
2	POSITION CHOCKS AT LOCATION 1, 2, 3	3	A_1 B_6 G_3 A_3 B_0 P_3 A_3	3	570
		4	A_3 B_0 G_1 (A_3) B_{10} P_0 A_0	(12)	500
3	POSITION CHOCKS AT LOCATION 4, 5, 6	10	A_0 B_0 G_0 A_0 B_0 (P_3) A_0	(12)	360
		5	A_1 B_0 G_3 $(A_3$ B_6 $P_3)$ A_3	(12)	1,510
4	POSITION WELDING ROD AT LOCATION 1, 2, 3	8	A B G A B P A		0
			A B G A B P A		
5	POSITION WELDING ROD AT LOCATION 4, 5, 6		A B G A B P A		
			A B G A B P A		
6	TACK WELD (.143 MIN./IN. @ 3"/TACK @ 24 PLACES).		A B G A B P A		
			A B G A B P A		
7	CHANGE ROD		A B G A B P A		
			A B G A B P A		
8	GANTRY CRANE POSITIONS BOILER IN UPRIGHT POSITION		A B G A B P A		
			A B G A B P A		
9	CHECK GAP WITH FEELER GAGE		A B G A B P A		
			A B G A B P A		
10	FINAL POSITIONING IN NO.4	6	A_1 B_0 G_1 M_1 (X_{24}) I_0 A_0	(3)24	18,000
		11	A_2 B_{10+6} G_0 M_0 X_0 I_0 A	3	480
11	ADDITIONAL BODY MOTIONS IN NO.6	7	A_1 B_0 G_3 M_3 X_0 I_0 A_0	6	420
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		9	A_1 B_6 G_3 A_0 $(B_6$ P_1 A_3 $M_{24})$ A_6 B_6 P_1 A_0	(48)	16,550
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 39,560

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.09
DATE 7/2/84
SIGN. TLC
PAGE 10-89

WASTE HEAT BOILER INSTALLATION

ACTIVITY LOCATE BOILER

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GANTRY LOCATES BOILER IN APPROXIMATE LOCATION	1	A B G A B P A		0
		2	$(A_1 B_6 G_1 A_3 B_6 P_3) A_6$	(8)	1,66
2	GET AND PLACE HYDRAULIC JACK	3	$(A_1 B_6 G_1 A_3 B_6 P_3) A_6$	(8)	1,66
		5	$A_1 B_6 G_1 A_1 B_0 P_3 A_0$	8	960
3	PLACE STOP FIXTURE	10	$A_3 B_6 G_3 A_1 B_0 P_1 A_0$	8	1,12
			A B G A B P A		
4	WELD STOP FIXTURE		A B G A B P A		
			A B G A B P A		
5	REPOSITION HYDRAULIC JACK		A B G A B P A		
			A B G A B P A		
6	PUMP JACK 13 TIMES TO MOVE BOILER (APPROX. ⅛" - ¼")		A B G A B P A		
			A B G A B P A		
7	USE STRAIGHT EDGE TO CHECK STRAIGHTNESS		A B G A B P A		
			A B G A B P A		
8	MEASURE TO CHECK DIMENSIONS OF BOILER LOCATION		A B G A B P A		
			A B G A B P A		
9	BURN OUT WELD STOP FIXTURE (0.107 MIN./IN. 1/4" WELD - 2 INCH/SIDE)		A B G A B P A		
			A B G A B P A		
10	REMOVE WELD STOP FIXTURE AND REMOVE HYDRAULIC JACK	4	$(A_3 B_6 G_1 M_1 X_{67}) I_0 A_6$	(8)	6,360
		6	$(A_1 B_0 G_3 M_1 X_0 I_0 A_1)$	(13) 8	6,240
		9	$A_3 B_6 G_1 M_1 (X_{16}) I_0 A_1$	(2) 3	3,52
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		7	$A_3 B_0 G_3 A_0 (B_6 P_1 A_3 M_{10}) A_6 B_0 P_1 A_0$	(4)	93
		8	$A_1 B_6 G_3 A_0 (B_6 P_1 A_3 M_{12}) A_6 B_0 P_1 A_0$	(6)	2,69
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 25,080

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

WASTE HEAT BOILER INSTALLATION

CODE 3001.10
DATE 7/2/84
SIGN. TLC
PAGE 10-90

ACTIVITY TACK WELD PADS TO DECK

CONDITIONS MODULE AREA

NO.	METHOD
1	POSITION ROD
2	TACK WELD (.143 MIN/IN @ 3"/TACK @ 24 PLACES
3	CHANGE RODS
4	GANTRY CRANE REMOVES BOILER
5	PRODUCTION WELDER WELDS PADS COMPLETE

NO.	SEQUENCE MODEL	FR	TMU
1	$A_3 B_6 G_1 (A_3 B_6 P_3) A_3$	(24)	3010
4	A B G A B P A		0
5	A B G A B P A		0
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
2	$A_1 B_0 G_1 M_1 (X_{24}) I_0 A_0$	(3)24	18,000
3	$A_1 B_0 G_3 M_3 X_0 I_0 A_0$	6	420
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 21,430

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.11
DATE 7/2/84
SIGN. TLC
PAGE 10-91

WASTE HEAT BOILER INSTALLATION

ACTIVITY: BURN PAD TO BOILER WELD

CONDITIONS: MODULE AREA

NO.	METHOD
1	GET TORCH LINES, REPLACE
2	CONNECT & DISCONNECT LINES
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES
4	PLACE GOGGLES
5	OPEN & CLOSE VALVES
6	GET & RETURN STRIKER
7	LIGHT TORCH
8	ADJUST FLAME
9	LOWER GOGGLES
10	RAISE GOGGLES
11	POSITION TORCH
12	ASIDE TORCH
13	BURN (.463 MIN/INCH @ 3"/TACK @ 24 TACKS

NO.	SEQUENCE MODEL	FR	
1	$A_3\ B_0\ G_3\ A_3\ B_0\ P_0\ A_3$		12
3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	5
4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		3
6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		6
11	$A_0\ B_0\ G_0\ A_3\ B_6\ P_3\ A_0$	24	2
12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
5	$(A_1\ B_0\ G_1\ M_1)X_0\ I_0\ A_0$	(2)2	1
7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$		2
8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		
9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	24	9
10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	24	72
13	$A_1\ B_0\ G_0\ M_0\ (X_{81})\ I_0\ A_1$	(3)24	58
	A B G M X I A		
	A B G M X I A		
2	$A_0\ B_0\ G_0\ A_0\ B_0(M_1\ A_1\ F_{54})A_1\ B_0\ P_1\ A_1$	(2)2	23
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 66,440

FORM B-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.12
DATE 7/2/84
SIGN. TLC
PAGE 10-92

WASTE HEAT BOILER INSTALLATION

ACTIVITY LAYOUT, DRILL & SPOTFACE HOLES

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	LAYOUT HOLES (CODE 1003.20)	2	A_0 B_0 G_0 (A_3 B_6 B_6) A_6	(6)5	3000
			A B G A B P A		
2	TRAVEL		A B G A B P A		
			A B G A B P A		
3	POSITION DRILL (CODE 1004.11)		A B G A B P A		
			A B G A B P A		
4	PLUG IN EXTENSION CORD (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
5	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
6	HAND FEED DRILL BIT (CODE 1004.15)		A B G A B P A		
			A B G A B P A		
7	DRILLING PROCESS TIME 1/4" HOLE MATERIAL CODE 0013 -1" DEPTH		A B G A B P A		
			A B G A B P A		
8	DRILLING PROCESS TIME 3/4" HOLE MATERIAL CODE 0013 -1" DEPTH		A B G A B P A		
			A B G A B P A		
9	DRILLING PROCESS TIME 15/16" HOLE MATERIAL CODE 0013 -1" DEPTH		A B G A B P A		
			A B G A B P A		
10	SPOT FACING (FACE MILLING) PROCESS TIME - .015" DEPTH		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	323	14	4522
		3	740	56	41,440
		4	2960		2960
		5	2400	4	9,600
		6	530	56	29,680
		7	293	14	4102
		8	418	14	5,852
		9	637	14	8,918
		10	514	14	7,196
TIME =					117,270

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.13
DATE 7/2/84
SIGN. TLC
PAGE 10-93

WASTE HEAT BOILER INSTALLATION

ACTIVITY BOLT-UP WITH TEMPORARY BOLTS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PAINTER PAINTS FOUNDATION	1	A B G A B P A		0
		2	A B G A B P A		0
2	GANTRY MOVE BOILER ONTO FOUNDATION	5	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	14	1,120
		8	$A_3 B_6 G_0 (A_3 B_6 P_0) A_6$	(14)	1,410
3	SET-UP TO BOLT-UP (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	PLACE .006" SHIM		A B G A B P A		
			A B G A B P A		
6	BOLT-UP (CODE 1005.06) - 1 5/16" BOLT		A B G A B P A		
			A B G A B P A		
7	CHECK PADS WITH FEELER GAGE		A B G A B P A		
			A B G A B P A		
8	TRAVEL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		7	$A_3 B_6 G_3 A_0 (B_6 P_1 A_3 M_{24}) A_6 B_6 P_3 A_0$	(24)	8,430
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860	14	12,040
		4	410	14	5,740
		6	2859	14	40,026

TIME = 68,766

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3001.14
DATE 7/2/84
SIGN. TLC
PAGE 10-94

WASTE HEAT BOILER INSTALLATION

ACTIVITY BOLT-UP WITH PERMANENT BOLTS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	UNBOLT TEMPORARY BOLTS (CODE 1005.06)-1 5/16" BOLTS	4	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$	14	1120
		7	$A_0 B_0 G_0 A_1 B_0 P_3 A_1$	14	700
2	REMOVE TEMPORARY BOLTS (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
3	POSITION PERMANENT BOLTS (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	INSTALL SHIMS		A B G A B P A		
			A B G A B P A		
5	BOLT-UP WITH PERMANENT BOLTS (CODE 1005.07)-1 5/16" BOLTS		A B G A B P A		
			A B G A B P A		
6	CHECK PADS WITH FEELER GAGES		A B G A B P A		
			A B G A B P A		
7	TACK WELD PERMANENT BOLTS .98"/BOLT @ .21 MIN/INCH		A B G A B P A		
			A B G A B P A		
8	REMOVE SHIMS WITH PLIERS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		7	$(A_3 B_0 G_1 M_1 X_{32} I_0) A_6$	(14)	5240
		7	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	14	420
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	$A_3 B_6 G_3 A_0 B_6 P_1 A_3 M_{24} / A_6 B_6 P_3 A_0$	(24)	8430
		8	$A_3 B_0 G_3 A_1 B_0 P_3 A_1) A_6 B_0 P_1 A$	(14)	1120
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	2859	14	40026
		2	410	14	5,740
		3	410	14	5,740
		5	4860	14	68,040
TIME =					136,576

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3002.01
DATE 5-15-84
SIGN. FWM
PAGE 10-95

AIR CONDITIONING PLANT INSTALLATION

ACTIVITY: JOB PREPARATION

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	AVE. INITIAL JOB PREPARATION		A B G A B P A		
			A B G A B P A		
	(CODE 1001.12)		A B G A B P A		
			A B G A B P A		
2	OBTAIN OR RETURN TOOLS		A B G A B P A		
			A B G A B P A		
	FREE STOCK OR TOOL CRIB		A B G A B P A		
			A B G A B P A		
	(CODE 1001.121)		A B G A B P A		
			A B G A B P A		
3	AVE. ADDITIONAL JOB		A B G A B P A		
			A B G A B P A		
	PREPARATION (CODE 1001.22)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42001		42,00
		2	15417	6	92,502
		3	16597		16,597

TIME = 151,100

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALCATION

CODE 3002.02
DATE 5-15-84
SIGN. F WM
PAGE 10-96

ACTIVITY AREA TRAVEL

CONDITIONS ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	FROM TOOL BOX TO WETDOCK		A B G A B P A		
			A B G A B P A		
	TOOL RM & RETURN (CODE 1002.16)		A B G A B P A		
			A B G A B P A		
2	FROM TOOL BOX TO FREE STOCK		A B G A B P A		
			A B G A B P A		
	& RETURN (CODE 1002.17)		A B G A B P A		
			A B G A B P A		
3	FROM TOOL BOX TO AMR #1		A B G A B P A		
			A B G A B P A		
	ON MODULE 2 & RETURN		A B G A B P A		
			A B G A B P A		
	(CODE 1002.18)		A B G A B P A		
			A B G A B P A		
4	FROM TOOL BOX TO BAY 1		A B G A B P A		
			A B G A B P A		
	LOCATION OF A/C PLANT (488 FT)		A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	11,311	4	45,244
		2	1960	4	7840
		3	2270	2	4540
		4	3370	2	6740

TIME = 64,364

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.03
DATE 5-15-84
SIGN. FWM
PAGE 10-97

ACTIVITY LAYOUT & DRILL LEG STANDS

CONDITIONS ASSEMBLY & MODULE AREA

NO.	METHOD
1	LAYOUT TO DRILL WITHOUT TEMPLATE (CODE 1003.10)
2	POSITION DRILL (CODE 1004.11)
3	PLUG IN EXTENSION (CODE 1004.13)
4	CHANGE DRILL BIT (CODE 1004.14)
5	HANDFEED DRILL BIT TO & FROM WORKPIECE (CODE 1004.15)
6	PROCESS TIME TO DRILL 1/8" DIA. HOLE (MAT'L. & COND. CODE 0013 @ 1/2" DEPTH)
7	PROCESS TIME TO DRILL 25/32" DIA HOLE (MAT'L. & COND. CODE 0013 @ 1/2" DEPTH)
8	PROCESS TIME TO DRILL 29/32" DIA HOLE (MATL. & COND. CODE 0013 @ 1/2" DEPTH)
9	MOVE WITH EQUIP TO EACH LEG STAND TO LAYOUT & TO DRILL

NO.	SEQUENCE MODEL	FR	TML
9	$A_0\ B_0\ G_0\ (A_6)\ B_0\ P_0\ A_0$	(6)4	1440
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	1390	68	94,52
2	740	136	100,64
3	2960		2960
4	2400	8	19.2
5	530	136	72,08
6	122	68	8296
7	250	32	800
8	324	36	11,66

TIME = 318,800

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.04
DATE 5-15-84
SIGN. FWM
PAGE 10-98

ACTIVITY: INSTALL DUMMY MOUNTS & LEG STANDS

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		4	A1 B0 G1 A1 B0 P3 A0	12	720
1	SET UP TO BOLT (CODE 1005.02)	9	A1 B0 G3 A6 B0 P3 A0	12	1560
			A B G A B P A		
2	LOOSEN THEN TIGHTEN 1½" BOLT		A B G A B P A		
			A B G A B P A		
	(CODE 1005.04)		A B G A B P A		
			A B G A B P A		
3	REMOVE THEN POSITION BOLT		A B G A B P A		
			A B G A B P A		
	(CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	REMOVE & REPLACE MOUNTS		A B G A B P A		
			A B G A B P A		
5	POSITION LEG STANDS		A B G A B P A		
			A B G A B P A		
6	SET UP TO BOLT (CODE 1005.02.)		A B G A B P A		
			A B G A B P A		
7	POSITION BOLT (CODE 1005.03)		A B G A B P A		
		5	A3 B0 G3 M3 X0 I6 A0	6	900
8	TURN 7/8" BOLT (CODE 1005.04)		A B G M X I A		
			A B G M X I A		
9	MOVE WITH EQUIP TO EACH		A B G M X I A		
			A B G M X I A		
	LEG STAND.		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	970		970
		2	1676	24	40,244
		3	410	24	9840
		6	970		970
		7	410	36	14,760
		8	987	36	35,532

TIME = 105,496

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3002.05
DATE 5-15-84
SIGN. FWM
PAGE 10-99

AIR CONDITIONING PLANT INSTALLATION

ACTIVITY: CHECK SNUBBER ALIGNMENT

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE SNUBBER CONES IN SOCKETS	1	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	8	320
		2	$A_1 B_0 G_3 A_1 B_0 P_3 A_1$	8	720
2	PLACE ON LEG STANDS	9	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	8	320
		10	$A_0 B_0 G_0 (A_6) B_0 P_0 A_0$	(6)5	1800
3	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION & REMOVE BOLT FOR CONE		A B G A B P A		
			A B G A B P A		
	(CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	TIGHTEN & LOOSEN 1 1/2" BOLT		A B G A B P A		
			A B G A B P A		
	(CODE 1005.06)		A B G A B P A		
			A B G A B P A		
6	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
7	POSITION & REMOVE BOLT FOR SOCKET		A B G A B P A		
			A B G M X I A		
	(CODE 1005.03)		A B G M X I A		
			A B G M X I A		
8	PLACE ALLEN WRENCH, TIGHTEN &		A B G M X I A		
	LOOSEN (MINIMAL TO CHECK)		A B G M X I A		
			A B G M X I A		
9	REMOVE ASSEMBLIES FROM		A B G M X I A		
		8	$A_1 B_0 G_1 A_0 B (P_3 A_1 F_{24}) A_1 B_0 P_1 A_0$	(8)8	18,240
	LEG STANDS		A B G A B P A B P A		
			A B G A B P A B P A		
10	MOVE WITH EQUIP TO EACH		A B G A B P A B P A		
			A B G A B P A B P A		
	LEG STAND		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860		860
		4	410	16	6,560
		5	2859	16	45744
		6	860		860
		7	410	64	26,240
TIME =					101,664

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.06
DATE 5-15-84
SIGN. FWM
PAGE 10-100

ACTIVITY: INSTALL PERMANENT LEG STAND BOLTS & RAISE UNIT

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	PLACE PLANT ON MODULE	2	A B G A B P A		0
		6	$A_{16} B_6 G_3 A_{16} B_6 P_6 A_0$	2	1060
2	WELD LEG STANDS IN PLACE	9	$A_1 B_6 G_3 A_{16} B_6 P_1 A_{16}$	2	980
		12	$A_0 B_0 G_0 (A_6 B_0 P_0 A_0$	(6)3	1080
3	SET UP TO BOLT (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
4	LOOSEN 7/8" BOLT		A B G A B P A		
			A B G A B P A		
	(CODE 1005.04)		A B G A B P A		
			A B G A B P A		
5	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
6	GET HYDRAULIC JACKS & HANDLES.		A B G A B P A		
			A B G A B P A		
	& PLACE UNDER PLANT		A B G A B P A		
			A B G A B P A		
7	PLACE HANDLE & JACK UNIT UP		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
8	JACK UNIT DOWN & ASIDE HANDLE		A B G M X I A		
			A B G M X I A		
9	REMOVE JACKS		A B G M X I A		
			A B G M X I A		
10	POSITION BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
11	TIGHTEN 7/8" BOLT (CODE 1005.05)		A B G M X I A		
		7	$A_1 B_0 G_1 A_1 B_0 P_3 F_{24} A_0 B_0 P_0 A_0$	2	600
12	MOVE WITH EQUIP TO EACH	8	$A_1 B_0 G_1 A_0 B_0 P_0 F_{24} A_1 B_0 P_1 A_0$	2	560
			A B G A B P A B P A		
	LEG STAND		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	970		970
		4	987	36	35,532
		5	410	36	14,760
		10	410	36	14,760
		11	1431	36	51,516

TIME = 121,818

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3002.07
DATE 5-15-84
SIGN. FWM
PAGE 10-101

AIR CONDITIONING PLANT INSTALLATION

ACTIVITY INSTALL RESILIENT MOUNTS (WHILE UNIT JACKED UP)

CONDITIONS ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		4	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	12	720
1	SETUP TO BOLT (CODE 1005.01)	7	$A_0 B_0 G_0 (A_6) B_0 P_0 A_0$	(6)	360
2	LOOSEN 1½" BOLT (CODE 1005.04)		A B G A B P A		
			A B G A B P A		
3	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	REMOVE & REPLACE MOUNTS		A B G A B P A		
			A B G A B P A		
5	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
6	TIGHTEN 1½" BOLT (CODE 1005.05)		A B G A B P A		
			A B G A B P A		
7	MOVE WITH EQUIP TO EACH LEG STAND		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	860		860
		2	1676	12	20,112
		3	410	12	4920
		5	410	12	4920
		6	2430	12	29160

TIME = 61,052

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.08
DATE 5-15-84
SIGN. FWM
PAGE 10-102

ACTIVITY: INSTALL SNUBBER CONES & LINERS

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE SNUBBER CONES IN SOCKETS	1	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	8	320
		2	$A_1 B_0 G_3 A_1 B_0 P_3 A_1$	8	720
		8	$A_1 B_6 G_3 A_1 B_0 P_3 A_0$	8	1120
2	PLACE ON LEG STANDS	17	$A_0 B_0 G_0 (A_6) B_0 P_0 A_0$	(6)5	1800
			A B G A B P A		
3	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION BOLT FOR CONE		A B G A B P A		
			A B G A B P A		
	(CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	TIGHTEN 1½" BOLT (CODE 1005.06)		A B G A B P A		
			A B G A B P A		
6	MEASURE VERT. GAP - CONE TO SOCKET		A B G A B P A		
			A B G A B P A		
7	MARK MEASUREMENT ON LEG STAND		A B G A B P A		
			A B G A B P A		
8	DISTRIBUTE LINERS FOR EACH SNUBBER		A B G A B P A		
		9	$A_1 B_0 G_3 (M_1 X_0 I_{16}) A_0$	(3)8	4400
9	ALIGN HOLES IN LINERS	10	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	8	240
		11	$A_0 B_0 G_0 (M_1 X_0 I_{16}) A_0$	(8)	1360
10	LIFT SOCKET		A B G M X I A		
			A B G M X I A		
11	ALIGN LINER SET WITH BOLT HOLES		A B G M X I A		
			A B G M X I A		
12	SET UP TO BOLT (CODE 1005.01)		A B G M X I A		
		6	$A_1 B_0 G_1 A_0 B_0 (P_1 A_6 M_{16}) A_1 B_0 P_1 A_0$	(8)	1880
13	POSITION & REMOVE BOLT FOR SOCKET	7	$A_1 B_0 G_1 A_0 B_0 (P_1 A_1 R_{10}) A_1 B_0 P_1 A_0$	(8)	1000
		14	$A_1 B_0 G_1 A_0 B_0 (P_3 A_1 F_{152}) A_1 B_0 P_1 A_0$	(8)8	100,160
	(CODE 1005.03)	15	$A_1 B_0 G_1 A_0 B_0 (P_1 A_6 M_{24}) A_1 B_0 P_1 A_0$	(8)	2520
		16	$A_1 B_0 G_1 A_0 B_0 (P_1 A_1 R_3) A_1 B_0 P_1 A_0$	(8)	440
14	PLACE ALLEN WRENCH, TIGHTEN &		A B G A B P A B P A		
			A B G A B P A B P A		
	LOOSEN		A B G A B P A B P A		
			A B G A B P A B P A		
15	CHECK FOR ⅛" VERT. GAP		A B G A B P A B P A		
			A B G A B P A B P A		
16	MARK PLACES REQUIRE SHIMS		A B G A B P A B P A		
		3	860		860
17	MOVE WITH EQUIP TO EACH	4	410	8	3280
	LEG STAND	5	2859	8	22872
		12	860		860
		13	410	64	26,240
TIME =					170,072

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.09
DATE 5-15-84
SIGN. FWM
PAGE 10-103

ACTIVITY: CUT OUT SHIMS

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_{10}\ B_6\ G_1\ A_{10}\ B_0\ P_3\ A_0$	2	600
1	PLACE BOARD & ASIDE	2	$A_3\ B_6\ G_3\ A_3\ B_0\ P_1\ A_0$	2	320
		5	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	8	320
2	PUT TOOLS ON BOARD & ASIDE	7	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	4	160
		10	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	12	480
3	UNWRAP SHIM STOCK	14	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
		15	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	16	640
4	UNROLL SHIM STOCK	16	$A_1\ B_0\ G_1\ (A_1\ B_0\ P_6)\ A_0$	(4)	300
		17	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$		40
5	PLACE SNUBBER SOCKET ON STOCK	19	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$	8	160
			A B G A B P A		
6	SCRIBE OUTLINE & HOLES ON STOCK		A B G A B P A		
			A B G A B P A		
7	REMOVE SNUBBER		A B G A B P A		
			A B G A B P A		
8	CUT STOCK		A B G A B P A		
			A B G A B P A		
9	CUT OUT OUTLINE		A B G A B P A		
		4	$A_1\ B_0\ G_1\ M_3\ X_0\ I_0\ A_0$	4	200
10	ASIDE SHIMS & SCRAP	11	$A_1\ B_0\ G_1\ M_3\ X_0\ I_0\ A_0$		50
		13	$A_1\ B_0\ G_1\ M_3\ X_0\ I_0\ A_0$		50
11	UNROLL TAPE		A B G M X I A		
			A B G M X I A		
12	CUT TAPE		A B G M X I A		
			A B G M X I A		
13	RE ROLL SHIM STOCK		A B G M X I A		
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ C_3\ A_1\ B_0\ P_1\ A_0$		90
14	TAPE SHIM STOCK ROLL & ASIDE	6	$A_1\ B_0\ G_1\ A_1\ B_0\ (P_1\ R_3)\ A_1\ B_0\ P_1\ A_0$	(5)8	2000
		8	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ C_6\ A_1\ B_0\ P_1\ A_0$	4	480
15	PLACE SHIM & ASIDE	9	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ C_{16}\ A_0\ B_0\ P_0\ A_0$	8	1440
		12	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ C_3\ A_1\ B_0\ P_1\ A_0$		90
16	GET PUNCH & PLACE	18	$A_1\ B_0\ G_1\ A_1\ B_0\ (P_1\ F_6)\ A_0\ B_0\ P_0\ A_0$	(4)8	2480
		20	$A_0\ B_0\ G_0\ A_0\ B_0\ P_0\ F_{16}\ A_0\ B_0\ P_0\ A_0$	8	1280
17	GET & ASIDE HAMMER	21	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ C_6\ A_1\ B_0\ P_1\ A_0$	4	480
			A B G A B P A B P A		
18	HAMMER PUNCH		A B G A B P A B P A		
			A B G A B P A B P A		
19	ASIDE PUNCH		A B G A B P A B P A		
			A B G A B P A B P A		
20	HAMMER SHIM FLAT		A B G A B P A B P A		
21	CUT SHIMS IN HALF				

TIME = 11,720

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

AIR CONDITIONING PLANT INSTALLATION

CODE 3002.10
DATE 5-15-84
SIGN. FWM
PAGE 10-104

ACTIVITY: INSTALL SHIMS & BOLT DOWN SNUBBER SOCKETS

CONDITIONS: ASSEMBLY & MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$		40
1	LIFT SOCKET	9	$A_1 B_0 G_1 A_1 B_0 P_6 A_0$	32	2880
		11	A B G A B P A		0
2	PLACE SHIM IN ALIGN TO LEG		A B G A B P A		
			A B G A B P A		
	STAND HOLES		A B G A B P A		
			A B G A B P A		
3	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	PLACE ALLEN WRENCH,		A B G A B P A		
			A B G A B P A		
	TIGHTEN SCREW		A B G A B P A		
			A B G A B P A		
6	CHECK FOR 1/8" VERT. GAP		A B G A B P A		
			A B G A B P A		
7	GET & ASIDE PLIERS		A B G A B P A		
		1	$A_6 B_0 G_1 M_1 X_0 I_0 A_0$	8	640
8	GET & CUT WIRE	2	$A_1 B_0 G_1 M_1 X_0 I_{16} A_0$	8	1520
			A B G M X I A		
9	PLACE WIRE THRU SCREWHEADS		A B G M X I A		
			A B G M X I A		
10	GATHER ENDS & TWIST		A B G M X I A		
			A B G M X I A		
11	PAINT LINERS		A B G M X I A		
		5	$A_1 B_0 G_1 A_1 B_0 P_3 A_1 F_{152} A_1 B_0 P_1 A_0$	(4) 8	50,320
		6	$A_1 B_0 G_1 A_0 B_0 P_1 A_6 M_{24} A_1 B_0 P_1 A_0$	(8)	2520
		8	$A_1 B_0 G_1 A_1 B_0 P_1 C_3 A_1 B_0 P_1 A_0$	(4) 4	840
		10	$A_0 B_0 G_0 A_0 B_0 P_1 A_1 C_6 A_0 B_0 P_0 A_0$	16	1280
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860		860
		4	410	32	13,120

TIME = 74,020

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CHILL WATER PUMP INSTALLATION

CODE 3003.01
DATE 4/27/84
SIGN. TLC
PAGE 10-105

ACTIVITY JOB PREPARATION

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SIMPLE INITIAL JOB PREPARATION (CODE 1001.11)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	OBTAIN BOLTS FROM FREE STOCK (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	12050		12,05
		2	15417		15,417

TIME = 27,467

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CHILL WATER PUMP INSTALLATION

CODE 3003.02
DATE 4/27/84
SIGN. TLC
PAGE 10-106

ACTIVITY AREA TRAVEL

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM: TOOL BOX		A B G A B P A		
	TO: FREE STOCK		A B G A B P A		
	& RETURN (CODE 1002.17)		A B G A B P A		
2	FROM: TOOL BOX		A B G A B P A		
	TO: MODULE 2 STAIRS		A B G A B P A		
	& RETURN (CODE 1002.12)		A B G A B P A		
3	FROM: MODULE 2 STAIRS		A B G A B P A		
	TO: AMR NO. 1		A B G A B P A		
	& RETURN (CODE 1002.18)		A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	1960	2	3920
		2	3300	2	6600
		3	2270	2	4540

TIME = 15060

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CHILL WATER PUMP INSTALLATION

CODE 3003.03
DATE 4/27/84
SIGN. TLC
PAGE 10-107

ACTIVITY REMOVE TEMPORARY MOUNTS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS LAND CHILL WATER	1	A B G A B P A		0
		2	A B G A B P A		0
	PUMP AND FOUNDATION ASSEM-	8	A_1 B_6 G_1 A_1 B_0 P_1 A_3	4	52
	BLY ON LOCATION	9	A_3 B_6 G_0 (A_3) B_0 P_0 A_3	(4)	240
			A B G A B P A		
			A B G A B P A		
2	NOT USED		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	SET-UP TO REMOVE TEMPORARY		A B G A B P A		
	BOLTS (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
4	LOOSEN BOLT-4@3/4"		A B G A B P A		
	(CODE 1005.04)		A B G A B P A		
			A B G A B P A		
5	REMOVE BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
6	LOOSEN BOLT-8@5/8"		A B G M X I A		
	(CODE 1005.04)		A B G M X I A		
			A B G M X I A		
7	REMOVE BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
8	REMOVE TEMPORARY MOUNTS		A B G A B P A B P A		
			A B G A B P A B P A		
9	TRAVEL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	970		970
		4	838	4	335
		5	410	4	1,640
		6	708	8	5,664
		7	410	8	3,280

TIME = 15,666

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CHILL WATER PUMP INSTALLATION

CODE 3003.04
DATE 4/27/84
SIGN. TLC
PAGE 10-108

ACTIVITY INSTALL PERMANENT MOUNTS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS REMOVE PUMP	1	A B G A B P A		0
		2	A B G A B P A		0
	FROM FOUNDATION	3	A B G A B P A		0
		5	A_1 B_6 G_1 A_1 B_0 P_1 A_3	4	520
2	PRODUCTION WELDER WELDS	8	A_3 B_6 G_0 (A_3) B_0 P_0 A_3	(4)	240
			A B G A B P A		
	COMPLETE FOUNDATION		A B G A B P A		
			A B G A B P A		
3	PAINTER PAINTS FOUNDATION		A B G A B P A		
			A B G A B P A		
4	SET-UP FOR BOLTING		A B G A B P A		
			A B G A B P A		
	(CODE 1005.02)		A B G A B P A		
			A B G A B P A		
5	PLACE RESILENT MOUNT IN		A B G A B P A		
			A B G A B P A		
	POSITION		A B G A B P A		
			A B G A B P A		
6	POSITION BOLT-5/8"		A B G M X I A		
			A B G M X I A		
	(CODE 1005.03)		A B G M X I A		
			A B G M X I A		
7	POSITION BOLT-3/4"		A B G M X I A		
			A B G M X I A		
	(CODE 1005.03)		A B G M X I A		
			A B G M X I A		
8	TRAVEL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		4	970		970
		6	410	8	3,280
		7	410	4	1,640

TIME = 6,650

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CHILL WATER PUMP INSTALLATION

CODE 3003.05
DATE 4/27/84
SIGN. TLC
PAGE 10-109

ACTIVITY INSTALL SELF LOCKING FASTNERS

CONDITIONS SUB-ASSEMBLY AND MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
1	RIGGER PLACE UNIT ON FOUNDATION	5	A_3 B_6 $G_d(A_2)$ B_0 P_0 A_3	(4)	240
		1	A B G A B P A		0
			A B G A B P A		
			A B G A B P A		
2	REPOSITION BOLTS (CODE 1005 .03)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	INSTALL SELF LOCKING NUTS 5/8" (CODE 1005.05)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
4	INSTALL SELF LKG. NUTS 3/4" (CODE 1005.05)		A B G A B P A		
			A B G A B P A		
5	MOVE BETWEEN BOLTING LOCATIONS		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	410	12	492
		3	1026	8	8208
		4	1215	4	4860

TIME = 18,228

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.01
DATE 4/19/84
SIGN. TLC
PAGE 10-110

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SIMPLE JOB PREPARATION		A B G A B P A		
	(CODE 1001.11)		A B G A B P A		
2	OBTAIN TOOLS FROM TOOL CRIB		A B G A B P A		
	& FREE STOCK		A B G A B P A		
	(CODE 1001.121)		A B G A B P A		
3	RETURN TOOLS TO TOOL		A B G A B P A		
	CRIB (SAME AS NO. 2)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	12050		12,050
		2	15,417	2	30,834
		3	15,417		15,417

TIME = 58,301

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

CODE 3004.02
DATE 4/19/84
SIGN. TLC
PAGE 10-111

ACTIVITY AREA TRAVEL

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM: TOOL BOX		A B G A B P A		
	TO: WET DOCK TOOL ROOM		A B G A B P A		
	& RETURN (CODE 1002.16)		A B G A B P A		
2	FROM: TOOL BOX		A B G A B P A		
	TO: FREE STOCK		A B G A B P A		
	& RETURN (CODE 1002.17)		A B G A B P A		
3	FROM: TOOL BOX		A B G A B P A		
	TO : MODULE 2 STAIRS		A B G A B P A		
	& RETURN (CODE 1002.12)		A B G A B P A		
4	FROM: MODULE 2 STAIRS		A B G M X I A		
	TO : AMR NO. 1		A B G M X I A		
	& RETURN (CODE 1002.18)		A B G M X I A		
5	RETURN TOOLS TO TOOL-		A B G M X I A		
	ROOM IN WET DOCK BLDG.		A B G A B P A B P A		
	& RETURN TOOL TOOL BOX		A B G A B P A B P A		
	(CODE 1002.16)		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	11311	2	22622
		2	1960	2	392
		3	3300	2	6600
		4	2270	2	4540
		5	11311	2	22622

TIME = 60,304

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.03
DATE 4/19/84
SIGN. TLC
PAGE 10-112

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY PREPARATION FOR BURNING PADS

CONDITIONS .MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MEASURE LAYOUT LINES		A B G A B P A		
2	DRAW LAYOUT LINES		A B G A B P A		
3	PUNCH HOLES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_3 A_0 B_0 (P_1 A_1 M_{32}) A_1 B_0 P_1 A_0$	(12)	4,140
		2	$A_1 B_0 G_3 A_0 B_0 (P_1 A_1 R_3) A_1 B_0 P_1 A_0$	(12)	660
		3	$A_1 B_0 G_3 A_0 B_0 (P_1 A_1 F_3) A_1 B_0 P_1 A_0$	(20)	1,060
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 5,860

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.04
DATE 4/19/84
SIGN. TLC
PAGE 10-113

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY BURNING PADS

CONDITIONS MODULE AREA

NO.	METHOD
1	GET TORCH LINES, REPLACE
2	CONNECT & DISCONNECT LINES
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES
4	PLACE GOGGLES
5	OPEN & CLOSE VALVES
6	GET & RETURN STRIKER
7	LIGHT TORCH
8	ADJUST FLAME
9	LOWER GOGGLES
10	RAISE GOGGLES
11	POSITION TORCH
12	ASIDE TORCH
13	BURN

NO.	SEQUENCE MODEL	FR	TM
1	$A_{32}\ B_6\ G_3\ A_{32}\ B_0\ P_6\ A_{32}$		111C
3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	3.7C
4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		(C
6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		6C
11	$A_0\ B_0\ G_0\ A_1\ B_0\ P_3\ A_0$		4'
12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		2
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
5	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(2)2	1:
7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$		20
8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		3C
9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$		4
10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		30
13	$A_0\ B_0\ G_0\ M_0\ X_{54}\ I_0\ A_0$	12	64 80
	A B G M X I A		
	A B G M X I A		
2	$A_0\ B_0\ G_0\ A_0\ B_0(P_1\ A_1\ F_{54})\ A_1\ B_0\ P_1\ A_1$	(2)2	2300
	A B G A B P A R P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P. A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	SUBTOTAL ELEMENTS 2--12		30
	ITEM No. 1		1110
	ITEM No. 13		6480

TIME = 10,660

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.05
DATE 4/19/84
SIGN. TLC
PAGE 10-114

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY GRIND PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE CHOCKS IN WATER	3	$A_1\ B_0\ G_3\ A_1\ B_0\ P_0\ A_0$		50
		5	$A_1\ B_0\ G_3\ A_1\ B_0\ P_3\ A_0$	4	320
2	WAIT UNTIL IT COOLS		A B G A B P A		
			A B G A B P A		
3	GET CHOCKS		A B G A B P A		
			A B G A B P A		
4	TURN ON GRINDER		A B G A B P A		
			A B G A B P A		
5	PLACE PART TO GRINDER		A B G A B P A		
			A B G A B P A		
6	TURN GRINDER OFF		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	$A_0\ B_0\ G_0\ M_0\ X_{173}\ I_0\ A_0$		1730
		4	$A_{24}\ B_0\ G_1\ M_0\ (X_{330})\ I_0\ A_{24}$	(6.95%)	23,450
		6	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		30
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ C_1\ A_1\ B_0\ P_1\ A_0$	4	280
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 25,860

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.06
DATE 4/19/84
SIGN. TLC
PAGE 10-115

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY DRILL PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TM
1	ALIGN RULE		A B G A B P A		
			A B G A B P A		
2	DRAW DIAGONAL LINES		A B G A B P A		
			A B G A B P A		
3	CENTER PUNCH HOLES		A B G A B P A		
			A B G A B P A		
4	PUT CHOCK IN JIG		A B G A B P A		
			A B G A B P A		
5	CHANGE DRILL BIT		A B G A B P A		
			A B G A B P A		
	(CODE 1004.14)		A B G A B P A		
			A B G A B P A		
6	HAND FEED DRILL TO AND FROM		A B G A B P A		
			A B G A B P A		
	WORKPIECE (CODE 1004.15)		A B G A B P A		
			A B G A B P A		
7	PROCESS TIME FOR DRILL		A B G A B P A		
			A B G A B P A		
	1/8" PILOT HOLE. (MAT'L AND COND.	1	$A_1 B_0 G_3 M_0 X_0 (I_3 A_1)$	(8)	3
			A B G M X I A		
	CODE 0013 @ 1/4" DEPTH.)		A B G M X I A		
			A B G M X I A		
8	PROCESS TIME FOR DRILL		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
	25/32" HOLE. (MAT'L AND COND.	2	$A_1 B_0 G_3 A_0 B_0 (P_1 A_1 R_3) A_1 B_0 P_1 A_0$	(8)	4
	CODE 0013 @ 1/4" DEPTH)	3	$A_1 B_0 G_3 A_1 B_0 (P_1 A_1 F_4) A_1 B_0 P_1 A_0$	(4)	3
		4	$A_1 B_0 G_1 A_1 B_0 R_3 F_{54} A_1 B_0 P_1 A_0$	8	4,9
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		5	2400	2	4
		6	530	8	42
		7	65	4	2
		8	165	4	6
TIME =					16,130

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.07
DATE 4/19/84
SIGN. TLC
PAGE 10-116

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY LAYOUT FOR DRILLING OF FOUNDATION

CONDITIONS .MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGER LAND EQUIPT ON FDN	1	A B G A B P A		0
		6	A B G A B P A		0
2	MEASURE HOLE LOCATIONS		A B G A B P A		
			A B G A B P A		
3	MAKE HOLE LOCATION MARKS		A B G A B P A		
			A B G A B P A		
4	ALIGN FDN TO MARKS		A B G A B P A		
			A B G A B P A		
5	SCRIBE HOLES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
6	RIGGER REMOVE EQUIPT. FROM FDN.		A B G A B P A		
			A B G A B P A		
7	LOCATE CENTER OF HOLE		A B G A B P A		
			A B G A B P A		
8	CENTER PUNCH HOLES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		4	$A_1 B_0 G_3 M_3 X_0 I_1 A_1$	2	180
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		2	$A_1 B_6 G_3 A_1 B_6 (P_1 A_3 M_{3i}) A_1 B_0 P_1 A_0$	(4)	1630
		3	$A_1 B_0 G_3 A_0 B_0 (P_1 A_3 R_3) A_1 B_0 P_1 A_0$	(4)	340
		5	$A_1 B_6 G_3 A_1 B_6 (P_3 A_3 R_3) A_1 B_0 P_1 A_0$	(4)	550
		7	$A_0 B_0 G_0 A_0 B_0 (P_0 A_0 T_1) A_0 B_0 P_0 A_0$	(4)	40
		8	$A_1 B_6 G_3 A_1 B_6 (P_1 A_3 F_6) A_1 B_0 P_1 A_1$	(4)	600
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 3,340

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

CODE 3004.08
DATE 4/19/84
SIGN. TLC
PAGE 10-117

ACTIVITY DRILL FOUNDATION

CONDITIONS MODULE AREA

NO.	METHOD
1	POSITION DRILL (CODE 1004.11)
2	PLUG IN EXTENSION CORD (CODE 1004.13)
3	CHANGE DRILL BIT (CODE 1004.14)
4	HAND FEED DRILL BIT TO AND FROM WORKPIECE (CODE 1004.15)
5	PROCESS TIME FOR DRILL 1/8" HOLE (MAT'L AND COND. CODE 0013 @ 1/4" DEPTH)
6	PROCESS TIME FOR DRILL 25/32" HOLE (MAT'L AND COND. CODE 0013 @ 1/4" DEPTH)
7	TRAVEL BETWEEN HOLES

NO.	SEQUENCE MODEL	FR	TI
7	$A_3\ B_6\ G_0\ (A_3)\ B_0\ P_0\ A_3$	(4)	24
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	740	8	5.92
2	2960		2.5
3	2400	2	4.
4	530	8	424
5	65	4	2
6	165	4	6

TIME = 19,080

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.09
DATE 4/19/84
SIGN. TLC
PAGE 10-118

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY TACK WELD PADS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET WELDING WHIP	2	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$		80
		3	$A_3 B_0 G_0 (A_1 B_6 P_3) A_0$	(4)4	1720
2	INSERT ROD	8	A B G A B P A		0
			A B G A B P A		
3	PLACE ROD ON PAD		A B G A B P A		
			A B G A B P A		
4	CLOSE SHIELD		A B G A B P A		
			A B G A B P A		
5	TACK WELD PAD		A B G A B P A		
			A B G A B P A		
6	OPEN SHIELD		A B G A B P A		
			A B G A B P A		
7	INSPECT WELD AND ASIDE WHIP		A B G A B P A		
			A B G A B P A		
8	RIGGERS PLACE EQUIPTON FON		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	$A_1 B_6 G_1 M_1 X_0 I_0 A_0$		90
		4	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	16	480
		5	$(A_1 B_6 G_0 M_1 X_{42}) I_0 A_3$	(4)4	8120
		6	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	16	480
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		7	$A_0 B_0 G_0 A_0 B_0 P_0 (T_1) A_1 B_0 P_1 A_0$	(16)	180
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 11,150

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.10
DATE 4/19/84
SIGN. TLC
PAGE 10-119

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY MEASURE AND CUT SHIM STOCK

CONDITIONS MODULE AREA

NO.	METHOD
1	GET FEELER GAGE
2	USE AND ASIDE FEELER GAGE
3	GET SHIM STOCK
4	MEASURE SHIM STOCK
5	CUT SHIM STOCK
6	RIGGERS REMOVE EQUIPT OFF FOUNDATION

NO.	SEQUENCE MODEL	FR	TM
3	$A_1 B_6 G_3 A_1 B_0 P_1 A_0$		12
6	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_1 B_0 G_3 A_0 B_0 P_0 \quad A_0 B_0 P_0 A_0$		4
2	$A_0 B_0 G_0 A_3 B_6 (P_1 A_1 M_{24}) A_1 B_0 P_1 A_0$	(3)4	3
4	$A_1 B_6 G_3 A_1 B_0 (P_1 A_1 M_{32}) A_1 B_0 P_1 A_0$	(2)	8
5	$A_1 B_6 G_3 A_1 B_0 (P_1 A_1 C_{18}) A_1 B_0 P_1 A_0$	(12)	157
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 6,100

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.11
DATE 4/19/84
SIGN. TLC
PAGE 10-120

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY: BURNING - WASH OUT TACK WELD ON PADS

CONDITIONS: MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET TORCH LINES, REPLACE	1	$A_{81}\ B_6\ G_3\ A_{81}\ B_0\ P_6\ A_{81}$		2580
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	5	350
2	CONNECT & DISCONNECT LINES	4	$A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0$		60
		6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
3	PLACE GLOVES, REMOVE GLOVES & GOGGLES	11	$A_0\ B_0\ G_0\ A_3\ B_0\ P_3\ A_0$	4	240
		12	$A_0\ B_0\ G_0\ A_1\ B_0\ P_1\ A_0$		20
4	PLACE GOGGLES		A B G A B P A		
			A B G A B P A		
5	OPEN & CLOSE VALVES		A B G A B P A		
			A B G A B P A		
6	GET & RETURN STRIKER		A B G A B P A		
			A B G A B P A		
7	LIGHT TORCH		A B G A B P A		
			A B G A B P A		
8	ADJUST FLAME		A B G A B P A		
			A B G A B P A		
9	LOWER GOGGLES		A B G A B P A		
			A B G A B P A		
10	RAISE GOGGLES	5	$(A_1\ B_0\ G_1\ M_1)\ X_0\ I_0\ A_0$	(2)2	120
		7	$A_1\ B_0\ G_0\ M_1\ X_0\ I_0\ A_0$		20
11	POSITION TORCH	8	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$		30
		9	$A_1\ B_0\ G_1\ M_1\ X_0\ I_1\ A_0$	4	160
12	ABIDE TORCH	10	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	4	120
		13	$A_0\ B_0\ G_0\ M_0\ X_{13}\ I_0\ A_0$	2	2620
13	BURN OUT TACK WELD .2125 HRS/INCH		A B G M X I A		
			A B G M X I A		
		2	$A_0\ B_0\ G_0\ A_0\ B_0\ (P_1\ A_1\ F_{54})\ A_1\ B_0\ P_1\ A_1$	(2)2	2300
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			SUBTOTAL ELEMENTS 2-12		3070
			ITEM NO. 1		2580
			ITEM NO. 13		2620

TIME = 8,680

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.12
DATE 4/19/84
SIGN. TLC
PAGE 10-121

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY INSTALL SHIMS AND FILE PADS

CONDITIONS MODULE AREA

NO.	METHOD
1	KNOCK LOOSE PADS WITH HAMMER
2	DRAW IN HOLE SIZE ON SHIM
3	KNOCK HOLE IN SHIM WITH PUNCH
4	INSTALL SHIMS (2 CORNERS)
5	PLACE PAD ON TOP OF SHIM
6	TACK WELD PADS
7	GET AND PLACE FILE
8	FILE PADS (2 CORNERS)

NO.	SEQUENCE MODEL	FR	TMU
4	$A_1\ B_0\ G_3\ (A_3\ B_6\ P_3)\ A_0$	(2)	280
5	$A_3\ B_0\ G_1\ A_1\ B_6\ P_6\ A_0$	2	340
7	$A_1\ B_0\ G_3\ (A_3\ B_6\ P_3)\ A_0$	(2)	28
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
6	$(A_1\ B_6\ G_0\ M_1\ X_{42})_0\ A_3$	(4)2	406
8	$A_0\ B_0\ G_0\ (M_3)\ X_0\ I_0\ A_3$	(55)2	3,360
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_1\ B_0\ G_3\ A_1\ B_0\ (P_1\ A_3\ L_6)\ A_1\ B_0\ P_1\ A_0$	(2)	270
2	$A_1\ B_0\ G_3\ A_1\ B_0\ (P_3\ A_1\ R_3)\ A_1\ B_0\ P_1\ A_0$	(2)	210
3	$A_1\ B_0\ G_3\ A_1\ B_0\ (P_3\ A_7\ L_6)\ A_1\ B_0\ P_1\ A$	(2)	270
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 9,070

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.13
DATE 4/19/84
SIGN. TLC
PAGE 10-122

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

ACTIVITY INSTALL AND REMOVE TEMPORARY FASTNERS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGER PLACE EQUIPT. ON FDN.	1	A B G A B P A		0
		9	A B G A B P A		0
2	SET-UP FOR BOLT-UP (CODE	10	A_3 B_6 G_0 (A_3) B_0 P_0 A_3	(4)	240
			A B G A B P A		
	(1005.02)		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE		A B G A B P A		
			A B G A B P A		
	1005.03)		A B G A B P A		
			A B G A B P A		
4	TURN BOLT (CODE		A B G A B P A		
			A B G A B P A		
	1005.04) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
5	GET FEELER GAGES		A B G A B P A		
			A B G A B P A		
6	USE AND ASIDE GAGES		A B G A B P A		
			A B G A B P A		
7	UNBOLT - TURN BOLT (CODE		A B G M X I A		
			A B G M X I A		
	1005.04) - 3/4" BOLT		A B G M X I A		
			A B G M X I A		
8	REMOVE BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
9	RIGGER REMOVE EQUIPT FROM		A B G M X I A		
			A B G M X I A		
	FOUNDATION	5	A_1 B_0 G_3 A_0 B_0 P_0 A_0 B_0 P_0 A_0		40
		6	A_0 B_0 G_0 A_3 B_6 (P_1 A_1 M_{34}) A_1 B_0 P_1 A_0	(3)4	3560
10	TRAVEL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	970		970
		3	410	4	1,640
		4	838	4	3352
		7	838	4	3352
		8	410	4	1,640

TIME = 14,794

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3004.14
DATE 4/19/84
SIGN. TLC
PAGE 10-123

HIGH PRESSURE AIR DE HYDRATOR INSTALLATION

ACTIVITY FINAL WELDING OF CHOCKS

CONDITIONS MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET WELDING WHIP	2	$A_1 B_0 G_3 A_1 B_0 P_3 A_0$		80
		3	$A_3 B_0 G_0 (A_1 B_6 P_3) A_0$	(4)4	172
2	INSERT ROD	8	A B G A B P A		
			A B G A B P A		
3	PLACE ROD ON CHOCK		A B G A B P A		
			A B G A B P A		
4	CLOSE SHIELD		A B G A B P A		
			A B G A B P A		
5	WELD CHOCK		A B G A B P A		
			A B G A B P A		
6	OPEN SHIELD		A B G A B P A		
			A B G A B P A		
7	INSPECT WELD AND ASIDE WHIP		A B G A B P A		
			A B G A B P A		
8	PAINTER PAINTS FOUNDATION		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	$A_1 B_6 G_1 M_1 X_0 I_0 A_0$		90
		4	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	16	480
		5	$(A_1 B_6 G_0 M_1 X_{54}) I_0 A_3$	(4)4	1004
		6	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	16	480
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		7	$A_0 B_0 G_0 A_0 B_0 P_0 T_1 A_1 B_0 P_1 A_0$	(16)	480
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 13,370

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HIGH PRESSURE AIR DEHYDRATOR INSTALLATION

CODE 3004.15
DATE 4/19/84
SIGN. TLC
PAGE 10-124

ACTIVITY INSTALL SELF LOCKING FASTNERS

CONDITIONS SUB-ASSEMBLY AND MODULE AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	RIGGER PLACE EQUIPT ON FDN.	5	$A_3 B_6 G_0 (A_3) B_0 P_0 A_3$	(4)	240
			A B G A B P A		
2	BOLT-UP-SET-UP (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005.03)		A B G A B P A		
4	TURN BOLT (CODE 1005.05) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
5	TRAVEL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	970		970
		3	410	4	1640
		4	1215	4	4860

TIME = 7710

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3005.01
DATE 6/26/84
SIGN. TLC
PAGE 10-125

BOAT HANDLING WINCH INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	INITIAL AVERAGE JOB PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42001		42001

TIME = 42,001

FORM R—1458

INGALLS Shipbuilding

MOST - calculation

CODE 3005.02
DATE 6/26/84
SIGN. TLC
PAGE 10-126

BOAT HANDLING WINCH INSTALLATION

ACTIVITY: AREA TRAVEL

CONDITIONS: INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM TOOL BOX TO WET DOCK TOOL RM & RETURN (CODE 1002.16)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	FROM TOOL BOX TO ELEVATOR FOR INTEGRATED SHIP & RETURN (CODE 1002.15)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	WAIT FOR ELEVATOR		A B G A B P A		
4	WALK ONTO, RIDE, & WALK OFF OF ELEVATOR		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
5	SWING OPEN OR CLOSE OUTER DOORS		A B G A B P A		
			A B G A B P A		
		3	A_0 B_0 G_0 M_0 $X_{5/1}$ I_0 A_0	2	1080
6	SLIDE OPEN OR CLOSE INNER DOOR	4	A_{10} B_0 G_0 M_0 $X_{5/1}$ I_0 A_{10}	2	1480
		5	A_1 B_0 G_1 M_3 X_0 I_0 A_0	8	400
7	WALK TO BOAT PLATFORM ON 02 LEVEL AND RETURN	6	A_1 B_0 G_1 M_3 X_0 I_0 A_0	8	400
		7	A_{196} B_0 G_0 M_0 X_0 I_0 A_0	2	3920
			A B G M X I A		
			A B G M X I A		
8	FROM: TOOL BOX TO: FREE STOCK & RETURN (CODE 1002.17)		A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	11,311	4	45,244
		2	1520	2	3040
		8	1960	2	3920

TIME = 59,484

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3005.03
DATE 6/26/84
SIGN. TLC
PAGE 10-127

BOAT HANDLING WINCH INSTALLATION

ACTIVITY DRILL PADS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	ALIGN RULE		A B G A B P A		
			A B G A B P A		
2	DRAW DIAGONAL LINES		A B G A B P A		
			A B G A B P A.		
3	CENTER PUNCH HOLES		A B G A B P A		
			A B G A B P A		
4	PUT CHOCK IN JIG		A B G A B P A		
			A B G A B P A		
5	CHANGE DRILL BIT		A B G A B P A		
			A B G A B P A		
	(CODE 1004.14)		A B G A B P A		
			A B G A B P A		
6	HAND FEED DRILL TO AND FROM		A B G A B P A		
			A B G A B P A		
	WORKPIECE (CODE 1004.15)		A B G A B P A		
			A B G A B P A		
7	PROCESS TIME FOR DRILL		A B G A B P A		
			A B G A B P A		
	1/4" PILOT HOLE. (MAT'L AND COND.	1	$A_1 B_0 G_3 M_0 X_0 (I_3 A_1)$	(22)	920
			A B G M X I A		
	CODE 0187 @ 1/4" DEPTH.)		A B G M X I A		
			A B G M X I A		
8	PROCESS TIME FOR DRILL		A B G M X I A		
			A B G M X I A		
	3/4" HOLE. (MAT'L AND COND.		A B G M X I A		
			A B G M X I A		
	CODE 0187 @ 1/4" DEPTH)	2	$A_1 B_0 G_3 A_0 B_0 (P_1 A_1 R_3) A_1 B_0 P_1 A_0$	(22)	1160
		3	$A_1 B_0 G_3 A_1 B_0 (P_1 A_1 F_6) A_1 B_0 P_1 A_0$	(11)	950
		4	$A_1 B_0 G_1 A_1 B_0 R_3 F_{S4} A_1 B_0 P_1 A_0$	22	1364
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		5	2400	2	4,801
		6	530	11	5830
		7	20	11	220
		8	39	11	429
TIME =					27,949

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

BOAT HANDLING WINCH INSTALLATION

CODE 3005.04
DATE 6/26/84
SIGN. TLC
PAGE 10-128

ACTIVITY LAYOUT FOR DRILLING FOUNDATION

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	PLACE FDN AGAINST WINCH	1	$A_3 B_6 G_3 A_3 B_0 P_3 A_0$		180
		6	$A_3 B_0 G_3 A_3 B_6 P_1 A_0$		160
2	ALIGN FDN.		A B G A B P A		
3	HOLD FDN. WITH C-CLAMP -22 WT.		A B G A B P A		
4	SCRIBE HOLES		A B G A B P A		
5	REMOVE C-CLAMP		A B G A B P A		
6	ASIDE FDN.		A B G A B P A		
7	CENTER PUNCH HOLES		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	$A_1 B_0 G_1 M_1 X_0 I_{16} A_0$		190
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1 B_0 G_1 A_1 B_0 P_1 F_{42} A_0 B_0 P_0 A_0$		460
		4	$A_1 B_0 G_3 A_0 B_0 (P_1 A_3 R_3) A_1 B_0 P_1 A_0$	(11)	830
		5	$A_1 B_0 G_1 A_1 B_0 P_1 L_{42} A_1 B_0 P_1 A$		480
		7	$A_3 B_6 G_3 A_0 B_6 (P_1 A_2 F_3) A_3 B_6 P_1 A_0$	(11)	1050
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 3,350

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

BOAT HANDLING WINCH INSTALLATION

CODE 3005.05
DATE 6/26/84
SIGN. TLC
PAGE 10-129

ACTIVITY DRILL FOUNDATION

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	POSITION DRILL (CODE 1004.11)	7	A_3 B_6 G_1 (A_3 B_6 P_0) A_3	(11)	1,120
2	PLUG IN EXTENSION CORD (CODE 1004.13)		A B G A B P A		
3	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
4	HAND FEED DRILL BIT (CODE 1004.15)		A B G A B P A		
5	PROCESS TIME - DRILL 1/4" PILOT HOLE (MAT'L CODE 0187) - 1 1/4" DEPTH		A B G A B P A		
6	PROCESS TIME - DRILL 3/4" HOLE (MATL CODE 0187) - 1 1/4" DEPTH		A B G A B P A		
7	TRAVEL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	740	11	8,140
		2	2960		2,960
		3	2400	2	4,800
		4	530	22	11,660
		5	20	11	220
		6	39	11	429
TIME =					29,329

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3005.06
DATE 6/26/84
SIGN. TLC
PAGE 10-130

BOAT HANDLING WINCH INSTALLATION

ACTIVITY INSTALL TEMPORARY BOLTS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SET-UP TO BOLT-UP (CODE 1005.02)	2	$A_1 B_0 G_1 A_1 B_0 P_3 A_1$	11	770
		5	$A_3 B_6 G_0 (A_3 B_6 P_0) A_3$	11	1,110
2	PLACE PADS ON FOUNDATION		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	BOLT-UP (CODE 1005.04) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
5	TRAVEL		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	970		970
		3	410	11	4510
		4	838	11	9218

TIME = 16,578

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3005.0

DATE 6/26/84

SIGN. TLC

PAGE 10-131

BOAT HANDLING WINCH INSTALLATION

ACTIVITY WELD PADS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	T
1	PLACE WELDING MASK	1	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$		
		2	$A_3 B_0 G_1 A_3 B_0 P_0 A_3$		
2	GET WELDING WHIP	5	$A_0 B_0 G_0 (A_1 B_0 P_3) A_0$	(4) 11	
		6	$A_0 B_0 G_0 A_1 B_0 P_1 A_0$		
3	FEED WIRE		A B G A B P A		
			A B G A B P A		
4	RAISE & LOWER MASK		A B G A B P A		
			A B G A B P A		
5	POSITION WHIP		A B G A B P A		
			A B G A B P A		
6	ASIDE WHIP		A B G A B P A		
			A B G A B P A		
7	WELD (9 SECS PER SIDE) (3"X3" ALUM)		A B G A B P A		
			A B G A B P A		
8	INSPECT WELD		A B G A B P A		
			A B G A B P A		
9	WAIT FOR WELD TO COOL (10 MIN)		A B G A B P A		
			A B G A B P A		
		3	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		
		4	$(A_1 B_0 G_1 M_1 X_0 I_0 A_0)$	(2) 44	
		7	$(A_1 B_0 G_1 M_1 X_{24} I_0 A_1)$	(4) 11	12
		9	$A_0 B_0 G_0 M_0 X_{330} I_0 A_0$	5.05	16
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		8	$A_0 B_0 G_0 A_0 B_0 P_0 (\overline{T_3}) A_0 B_0 P_0 A_0$	(4) 11	
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 37,55

INGALLS Shipbuilding

MOST - calculation

CODE 3005.08
DATE 6/26/84
SIGN. TLC
PAGE 10-132

BOAT HANDLING WINCH INSTALLATION

ACTIVITY INSTALL FITTED BOLTS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SETUP TO UN BOLT (CODE 1005.02)	4	$A_3 B_6 G_3 A_3 B_0 P_6 A_0$		210
			A B G A B P A		
2	UNBOLT & BOLT-UP (CODE 1005.04) 3/4" BOLT		A B G A B P A		
			A B G A B P A		
3	REMOVE & INSTALL BOLTS (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	PLACE FOUNDATION AGAINST WINCH		A B G A B P A		
			A B G A B P A		
5	PLUG IN EXTENSION CORD (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
6	CHANGE REAMER (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
7	HAND FEED REAM TO & FROM WORK (CODE 1004.21)		A B G A B P A		
			A B G A B P A		
8	REAM HOLES (12.33 SECS/HOLE)		A B G A B P A		
			A B G A B P A		
9	TAP BOLTS		A B G A B P A		
			A B G A B P A		
		8	$A_1 B_0 G_1 M_1 X_{32} I_0 A_0$	11	3,850
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		9	$A_3 B_6 G_1 A_3 B_8 (P_1 A_3 F_{16}) A_3 B_6 P_1 A_3$	(21)	4,460
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	970		970
		2	838	32	26,816
		3	410	32	13,120
		5	2960		2,960
		6	2400		2,400
		7	110	11	1,210

TIME = 55,996

INGALLS Shipbuilding

MOST - calculation

CODE 3005.09
DATE 6/26/84
SIGN. TLC
PAGE 10-133

BOAT HANDLING WINCH INSTALLATION

ACTIVITY FILE PADS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR
1	CHECK PADS WITH FEELER GAGE	5	$A_1 B_0 G_3 A_3 B_6 P_1 A_3$	2
		6	$A_3 B_6 G_1 (A_3 B_6 P_3 A_0)$	(5)4
2	UNBOLT (CODE 1005.04)-3/4" BOLT	8	$A_3 B_6 G_3 A_3 B_0 P_3 A_0$	2
			A B G A B P A	
3	REMOVE BOLTS (CODE 1005.03)		A B G A B P A	
			A B G A B P A	
4	TAP BOLTS (16 TAPS)		A B G A B P A	
			A B G A B P A	
5	ASIDE FOUNDATION		A B G A B P A	
			A B G A B P A	
6	USE LEVEL		A B G A B P A	
			A B G A B P A	
7	FILE PADS		A B G A B P A	
			A B G A B P A	
8	PLACE FOUNDATION TO EQUIPMENT		A B G A B P A	
			A B G A B P A	
9	POSITION BOLTS (CODE 1005.03)		A B G A B P A	
			A B G A B P A	
10	TAP BOLTS	7	$A_3 B_6 G_3 (M_3 X_0 I_0 A_3)$	(1126)2 1
			A B G M X I A	
11	BOLT-UP (CODE 1005.04) 3/4" BOLT		A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
		1	$A_3 B_6 G_3 A_0 B_6 (P_1 A_3 H_{24}) A_3 B_6 P_1 A_0$	(11)8 2
		4	$A_1 B_0 G_1 A_1 B_0 (P_1 A_1 L_{46}) A_1 B_0 P_1 A_0$	(11)2
		6	$A_0 B_0 G_0 A_0 B_0 P_0 (T_3) A_0 B_0 P_0 A_0$	20
		10	$A_1 B_0 G_1 A_1 B_0 (P_1 A_1 L_{46}) A_1 B_0 P_1 A_0$	(11)2
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
		2	(838)	(11)2 1
		3	(410)	(11)2
		9	(410)	(11)2
		11	(838)	(11)2

TIME = 246,0

INGALLS Shipbuilding

MOST - calculation

CODE 3005.10
DATE 6/26/84
SIGN. TLC
PAGE 10-134

BOAT HANDLING WINCH INSTALLATION

ACTIVITY REMOVE TEMPORARY BOLTS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GANTRY LANDS WINCH AND FOUNDATION ASSEMBLY IN POSITION	1	A B G A B P A		0
		2	A B G A B P A		0
2	SHIP FITTER TACK WELDS WINCH INTO POSITION	3	A B G A B P A		0
		8	A B G A B P A		0
3	PRODUCTION WELDER FINISH WELDS FOUNDATION	9	A B G A B P A		0
		10	A B G A B P A		0
4	SET-UP TO UNBOLT (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
5	UNBOLT BOLTS (CODE 1005.04) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
6	TAP BOLT (INCUDES TRAVEL)		A B G A B P A		
			A B G A B P A		
7	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
8	GANTRY REMOVES WINCH		A B G A B P A		
			A B G A B P A		
9	PAINTER PAINTS FOUNDATION		A B G A B P A		
			A B G A B P A		
10	GANTRY REPLACES WINCH		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	$A_3 B_6 G_3 A_0 (B_6 P_1 A_3 L_{16}) A_3 B_6 P_0 A_0$	(11)	3,070
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		4	970		970
		5	838	11	9218
		7	410	11	4510

TIME = 17,768

INGALLS Shipbuilding

MOST - calculation

CODE 3005.11
DATE 6/26/84
SIGN. TLC
PAGE 10-135

BOAT HANDLING WINCH INSTALLATION

ACTIVITY INSTALL PERMANENT BOLTS

CONDITIONS INTEGRATION AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	
1	SET-UP TO BOLT-UP (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
2	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
3	TAP BOLT (INCLUDES TRAVEL)		A B G A B P A		
			A B G A B P A		
4	BOLT-UP (CODE 1005.05) - 3/4" BOLT		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_3B_6G_3A_0(B_6P_1A_3F_4)A_3B_0P_1A_0$	(11)	3
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	970		
		2	410	11	4
		4	1215	11	13

TIME = 21,8

INGALLS Shipbuilding

MOST - calculation

CODE 3006.01
DATE 5/9/84
SIGN. TLC
PAGE 10-136

VANEAXIAL FAN INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SIMPLE INITIAL JOB PREPARATION (CODE 1001.11)		A B G A B P A		
			A B G A B P A		
2	OBTAIN BOLTS FROM FREE STOCK (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	12050		12,050
		2	15417		15,417

TIME = 27,467

INGALLS Shipbuilding

MOST - calculation

CODE 3006.02
DATE 5/9/84
SIGN. TLC
PAGE 10-137

VANEAXIAL FAN INSTALLATION

ACTIVITY AREAL TRAVEL

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR
1	FROM TOOL BOX TO ASSEMBLY 102 LADDER (CODE 1002.19) & RETURN	3	$A_0 B_0 G_0 A_{24} B_0 P_1 A_{24}$	
			A B G A B P A	
2	FROM ASSY. 102 LADDER TO 2ND PLATFORM DECKEDGE & RETURN		A B G A B P A	
			A B G A B P A	
3	FROM 2ND PLATFORM DECK EDGE TO SIDE SHELL & RETURN		A B G A B P A	
			A B G A B P A	
4	FROM TOOL ROOM TO FREE STOCK & RETURN (CODE 1002.17)		A B G A B P A	
			A B G A B P A	
5	BODY MOTIONS FOR ELEMENT NO. 2		A B G A B P A	
			A B G A B P A	
			A B G A B P A	
			A B G A B P A	
			A B G A B P A	
			A B G A B P A	
			A B G A B P A	
			A B G A B P A	
		5	$A_0 B_{16} G_0 M_0 X_0 I_0 A_0$	
		2	$(A_1 B_0 G_1 M_3) X_0 I_0 A_0$	(20) 2
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
		1	3000	2
		4	1960	2

TIME = 12,5

FORM B-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3006.03
DATE 5/9/84
SIGN. TLC
PAGE 10-138

VANEAXIAL FAN INSTALLATION

ACTIVITY REMOVE TEMPORARY MOUNTS

CONDITIONS ASSEMBLY AREA

NO.	METHOD
1	SET-UP TO BOLT UP
	CODE 1005.02
2.0	TURN BOLT (CODE 1005.04) - 1/2" BOLT
2.1	TURN BOLT (CODE 1005.04) - 5/8" BOLT
3	REMOVE BOLT (CODE 1005.03)
4	MOVE FROM TOOL BAG TO 1ST
	1st MOUNT
5	MOVE FROM 1ST MOUNT
	TO 2ND MOUNT
6	MOVE FROM 2ND MOUNT
	TO 3RD MOUNT
7	MOVE FROM 3RD MOUNT TO
	4th MOUNT
8	MOVE FROM 4th MOUNT TO
	TOOL BAG
9	RIGGERS REMOVE FAN FROM
	FOUNDATION
10	REMOVE TEMPORARY MOUNTS

NO.	SEQUENCE MODEL	FR	TMU
4	A_0 B_0 G_0 A_3 B_0 P_0 A_0	3	90
5	A_0 B_0 G_0 A_3 B_0 P_0 A_0	3	90
6	A_0 B_0 G_0 A_3 B_0 P_0 A_0	3	90
7	A_0 B_0 G_0 A_3 B_0 P_0 A_0	3	90
8	A_0 B_0 G_0 A_3 B_0 B_0 A_0	3	90
9	A_0 B_0 G_0 A_0 B_0 P_0 A_0		0
10	A_0 B_0 G_1 A_0 B_0 P_1 A_0	4	80
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	970		970
2.0	559	8	4472
2.1	708	4	2832
3	410	12	4,920

TIME = 13,724

FORM B-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3006.04
DATE 5/9/84
SIGN. TLC
PAGE 10-139

VANEAXIAL FAN INSTALLATION

ACTIVITY REMOVE COVERS AND BRACKETS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	
1	SET-UP TO BOLT-UP (CODE 1005.01)	4	A_0 B_0 G_0 A_3 B_0 P_0 A_0		
		6	A_3 B_6 G_3 A_3 B_0 P_3 A_0		
2	TURN BOLT (CODE 1005.06) - ½" BOLTS	7	A_3 B_6 G_3 A_3 B_0 P_0 A		
		10	A_3 B_0 G_3 A_3 B_0 P_1 A_0	3	
3	REMOVE BOLT (CODE 1005.03)	11	A B G A B P A		
		5	A_0 B_0 G_0 A_3 B_0 P_0 A_0		
4	MOVE FROM TOOL BAG TO MOUNT NO. 1	8	A_0 B_0 G_0 A_3 B_0 P_0 A_0		
		9	A_0 B_0 G_0 A_0 B_0 P_0 A_3		
5	MOVE FROM MOUNT NO. 1 TO MOUNT NO. 2		A B G A B P A		
			A B G A B P A		
6	TURN FAN UPSIDE DOWN		A B G A B P A		
			A B G A B P A		
7	MOVE FROM MOUNT NO. 2 TO MOUNT NO. 3		A B G A B P A		
			A B G A B P A		
8	MOVE FROM MOUNT NO. 3 TO MOUNT NO. 4		A B G A B P A		
			A B G A B P A		
9	MOVE FROM MOUNT NO. 4 TO TOOL BAG		A B G A B P A		
			A B G A B P A		
10	TAKE BRACKETS & COVERS TO TOOL BAG		A B G M X I A		
			A B G M X I A		
11	PAINTER PAINTS BRACKETS AND FOUNDATION		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	860		
		2	953	16	15
		3	410	16	6

TIME = 23,418

INGALLS Shipbuilding

MOST - calculation

CODE 3006.05
DATE 5/9/84
SIGN. TLC
PAGE 10-140

VANEAXIAL FAN INSTALLATION

ACTIVITY INSTALL COVERS AND BRACKETS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET BRACKETS & COVERS	1	A_3 B_0 G_3 A_3 B_0 P_3 A_0	3	360
		2	A_1 B_0 G_1 A_1 B_0 P_3 A_0	6	360
2	PLACE BRACKETS & COVERS IN POSITION	5	A_0 B_0 G_0 A_3 B_0 P_0 A_0		30
		6	A_3 B_6 G_3 A_3 B_0 P_3 A_0		180
3	POSITION BOLT (CODE 1005.03)	7	A_0 B_0 G_0 A_3 B_0 P_0 A_0		30
		8	A_0 B_0 G_0 A_3 B_0 P_0 A_0		30
4	TURN BOLT (CODE 1005.06) - ½" BOLT	9	A_0 B_0 G_0 A_0 B_0 P_0 A_3		30
			A B G A B P A		
5	TRAVEL FROM MOUNT NO. 1 TO MOUNT NO. 2		A B G A B P A		
			A B G A B P A		
6	TURN FAN UPSIDE DOWN		A B G A B P A		
			A B G A B P A		
7	TRAVEL FROM MOUNT NO. 2 TO MOUNT NO. 3		A B G A B P A		
			A B G A B P A		
8	TRAVEL FROM MOUNT NO. 3 TO MOUNT NO. 4		A B G A B P A		
			A B G A B P A		
9	TRAVEL FROM MOUNT NO. 4 TO TOOL BAG AREA		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	410	16	6560
		4	953	16	15,248

TIME = 22,828

INGALLS Shipbuilding

MOST - calculation

CODE 3006.06
DATE 5/9/84
SIGN. TLC
PAGE 10-141

VANEAXIAL FAN INSTALLATION

ACTIVITY INSTALL RESILIENT MOUNTS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM TOOL BAG TO POSITION NO.1 & RETURN	1	A_0 B_0 G_0 A_3 B_6 P_0 A_3		120
2	FROM TOOL BAG TO POSITION NO.2 & RETURN	2	A_0 B_0 G_0 A_3 B_6 P_0 A_3		120
3	FROM TOOL BAG TO POSITION NO.3 & RETURN	3	A_0 B_0 G_0 A_3 B_6 P_0 A_3		120
4	FROM TOOL BAG TO POSITION NO.4 & RETURN	4	A_0 B_0 G_0 A_3 B_6 P_0 A_3		120
5	POSITION BOLT (CODE 1005.03)		A B G A_3 B P A		
6	BOLT-UP (CODE 1005.05) - 1/2" BOLT		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		5	410	8	3280
		6	810	8	6480

TIME = 10,240

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3006.07
DATE 5/9/84
SIGN. TLC
PAGE 10-142

VANEAXIAL FAN INSTALLATION

ACTIVITY BOLT FAN AND BRACKET ASSEMBLY TO RESILIENT MOUNTS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS PLACE FAN AND BRACKET ASSEMBLY ON RESILIENT MOUNTS	1	A B G A B P A		0
		5	$A_3 B_0 G_0 (A_9 B_6 P_0) A_3$	(2)	240
2	SET-UP TO BOLT-UP (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	TURN BOLT (CODE 1005.05) - 5/8" BOLTS		A B G A B P A		
			A B G A B P A		
5	MOVE TO ALL BOLTING LOCATIONS		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	970		970
		3	410	4	1640
		4	1026	4	4104

TIME = 6,954

INGALLS Shipbuilding

MOST - calculation

CODE 3007,01

DATE 6/14/84

SIGN. TLC

PAGE 10-143

SEWAGE PUMP INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS ASSEMBLY AREA

NO.	METHOD	No.	SEQUENCE MODEL	FR	TMU
1	SIMPLE INITIAL JOB PREPARATION (CODE 1001.11)		A B G A B P A		
2	OBTAIN BOLTS FROM FREE STOCK (CODE 1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A R G A E P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	12050		12, 050
		2	15 417		15,417

TIME = 27, 467

FORM R–1458

INGALLS Shipbuilding

MOST - calculation

CODE 3007.02
DATE 6/14/84
SIGN. TLC
PAGE 10-144

SEWAGE PUMP INSTALLATION

ACTIVITY AREAL TRAVEL

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM TOOL BOX TO ASSEMBLY 102 LADDER (CODE 1002.19) & RETURN	3	$A_0 B_0 G_0 A_{24} B_0 P_0 A_{24}$		480
		5	$A_6 B_0 G_0 A_6 B_0 P_0 A_0$		120
2	FROM ASSY. 102 LADDER TO 2ND PLATFORM DECKEDGE & RETURN		A B G A B P A		
			A B G A B P A		
3	FROM DECK EDGE TO PUMP ROOM NO. 1 LADDER & RETURN		A B G A B P A		
			A B G A B P A		
4	DESCEND LADDER & ASCEND LADDER		A B G A B P A		
			A B G A B P A		
5	FROM LADDER TO FOUNDATION & RETURN		A B G A B P A		
			A B G A B P A		
6	FROM TOOL BOX TO FREE STOCK (CODE 1002.17)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		2	$A_0 B_{16} G_0 M_0 X_0 I_0 A_0$	2	320
		2	$(A_1 B_0 G_1 M_3) X_0 I_0 A_0$	(20)2	2,000
		4	$A_0 B_{16} G_0 M_0 X_0 I_0 A_0$	2	320
		4	$(A_1 B_0 G_1 M_3) X_0 I_0 A_0$	(10)2	1,000
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	3000	2	6,000
		6	1960	2	3,920

TIME = 14,160

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

SEWAGE PUMP INSTALLATION

CODE 3007.03
DATE 4/27/84
SIGN. TLC
PAGE 10-145

ACTIVITY REMOVE TEMPORARY MOUNTS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGERS LAND SEWAGE	1	A B G A B P A		
		2	A B G A B P A		
	PUMP AND FOUNDATION ASSEM-	8	A_1 B_6 G_1 A_1 B_0 P_1 A_3	4	52
		9	A_3 B_6 G_0 (A_3) B_0 P_0 A_3	(4)	24
	BLY ON LOCATION		A B G A B P A		
2	NOT USED		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	SET-UP TO REMOVE TEMPORARY		A B G A B P A		
			A B G A B P A		
	BOLTS (CODE 1005.02)		A B G A B P A		
4	LOOSEN BOLT-4@3/4"		A B G A B P A		
			A B G A B P A		
	(CODE 1005.04)		A B G A B P A		
5	REMOVE BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
6	LOOSEN BOLT-8@5/8"		A B G M X I A		
			A B G M X I A		
	(CODE 1005.04)		A B G M X I A		
			A B G M X I A		
7	REMOVE BOLT (CODE 1005.03)		A B G M X I A		
			A B G M X I A		
8	REMOVE TEMPORARY MOUNTS		A B G A B P A B P A		
9	TRAVEL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	970		97
		4	838	4	3,352
		5	410	4	1,640
		6	708	8	5,66
		7	410	8	3,28

TIME = 15,666

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

SEWAGE PUMP INSTALLATION

CODE 3007.04
DATE 6/14/84
SIGN. TLC
PAGE 10-146

ACTIVITY: LAYOUT & DRILL HOLES IN FOUNDATION

CONDITIONS: ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	MANUFACTURE TEMPLATE (CODE 1003.30)		A B G A B P A		
			A B G A B P A		
2	LAYOUT EACH HOLE (CODE 1003.20)		A B G A B P A		
			A B G A B P A		
3	POSITION DRILL (CODE 1004.11)		A B G A B P A		
			A B G A B P A		
4	USE SAFETY CHAIN (CODE 1004.12)		A B G A B P A		
			A B G A B P A		
5	PLUG IN EXTENSION CORD (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
6	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
7	HAND FEED DRILL BIT TO & FROM WORK (CODE 1004.15)		A B G A B P A		
			A B G A B P A		
8	PROCESS TIME MATERIAL CODE 0013 (5/8" DIA @ 1/4" DEPTH)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		8	149	8	1 192
			1236	8	9,888
		2	323	8	2, 584
		3	740	8	5,920
		4	940	8	7, 520
		5	2960		2 960
		6	2400		2,400
		7	530	8	4,240

TIME = 36,704

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3007.05
DATE 6/14/84
SIGN. TLC
PAGE 10-147

SEWAGE PUMP INSTALLATION

ACTIVITY INSTALL PERMANENT MOUNTS

CONDITIONS ASSEMBLY AREA

NO.	METHOD
1	RIGGERS REMOVE PUMP
	FROM FOUNDATION
2	NOT USED
3	PAINTER PAINTS FOUNDATION
4	SET-UP FOR BOLTING
	(CODE 1005.02)
5	PLACE RESILENT MOUNT IN
	POSITION
6	POSITION BOLT-5/8".
	(CODE 1005.03)
7	POSITION BOLT-3/4"
	(CODE 1005.03)
8	TRAVEL

NO.	SEQUENCE MODEL	FR	TMU
1	A B G A B P A		
2	A B G A B P A		
3	A B G A B P A		
5	A_1 B_6 G_1 A_1 B_0 P_1 A_3	4	53
8	A_3 B_6 G_0 (A_3) B_0 P_0 A_3	(4)	2
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
4	970		9
6	410	8	3,28
7	410	4	1,640

TIME = 6,650

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

3007.06

DATE 6/14/84

SIGN. TLC

PAGE 10-148

SEWAGE PUMP INSTALLATION

ACTIVITY INSTALL SELF LOCKING FASTNERS

CONDITIONS .ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	RIGGER PLACE UNIT ON	5	$A_3\ B_6\ G_d(A_3)\ B_0\ P_0\ A_3$	(4)	240
		1	A B G A B P A		0
	FOUNDATION		A B G A B P A		
			A B G A B P A		
2	REPOSITION BOLTS		A B G A B P A		
			A B G A B P A		
	(CODE 105.03)		A B G A B P A		
			A B G A B P A		
3	INSTALL SELF LOCKING		A B G A B P A		
			A B G A B P A		
	NuTS 5/8" (CODE 1005.05)		A B G A B P A		
			A B G A B P A		
4	**INSTALL SELF LK. NuTS ¾"(1005.05)**		A B G A B P A		
			A B G A B P A		
5	MOVE BETWEEN BOLTING		A B G A B P A		
			A B G A B P A		
	LOCATIONS		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A R P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	410	1 2	4920
		3	1026	8	8208
		4	1215	4	4860

TIME = 18,228

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008 .01

DATE 8-24-84

SIGN. F WM

PAGE 10-149

BRIDGE CRANE AND RAILS INSTA LLATION

ACTIVITY JOB PREPARATION

CONDITIONS WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TML
			A B G A B P A		
1	AVERAGE INITIAL JOB		A B G A B P A		
			A B G A B P A		
	PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
2	AVERAGE ADDITIONAL JOB *		A B G A B P A		
			A B G A B P A		
	PREPARATION (CODE 1001.22)		A R G A B P A		
			A B G A B P A		
3	GET OR RETURN TOOLS TO		A B G A B P A		
			A B G A B P A		
	TOOL BOX (CODE 1001. 111)		A B G A B P A		
			A B G A B P A		
4	SECURE PARTS FROM		A B G A B P A		
			A B G A B P A		
	WAREHOUSE (CODE 1001.132)		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42 001		42,0
		2	16,597		16,597
			440	4	17
		4	11,445		11,4

TIME = 71, 803

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.02

DATE 8-24-84

SIGN. F WM

PAGE 10-150

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY: AREA TRAVEL

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	FROM TOOL BOX TO TOOL ROOM		A B G A B P A		
	OR RETURN (450FT)		A B G A B P A		
			A B G A B P A		
2	FROM TOOL BOX TO STAIRS,		A B G A B P A		
	01 LEVEL MIDSHIPS (350 FT)		A B G A B P A		
			A B G A B P A		
3	FROM STAIRS TO SCAFFOLDING		A B G A B P A		
	ABOVE HANGER DECK OR		A B G A B P A		
	RETURN (388 FT)		A B G A B P A		
			A B G A B P A		
4	FROM STAIRS TO FREE STOCK		A B G A B P A		
	OR RETURN (300 FT)		A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A R P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	3300	2	6600
		2	2450	4	9800
		3	2700	6	16,200
		4	2200	2	4400

TIME = 37,000

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.
DATE 8-24-
SIGN. FWM
PAGE 10-151

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY LAYOUT CENTERLINE

CONDITIONS WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR
		4	$A_1\ B_0\ G_1\ A_{16}\ B_{32}\ P_6\ A_0$	2
1	MEASURE FROM ENDS OF BEAM	7	$(A_1\ B_0\ G_3\ A_1\ B_0\ P_1\ A_0)$	(2)2
		8	$A_3\ B_{24}\ G_0\ (A_1\ B_0\ P_6)\ A_0$	(4)12
2	MARK MEASUREMENTS		A B G A B P A	
			A B G A B P A	
3	PULL OUT CHALKLINE		A B G A B P A	
			A B G A B P A	
4	PLACE CHALKLINE		A B G A B P A	
			A B G A B P A	
5	SNAP CHALKLINE		A B G A B P A	
			A B G A B P A	
6	REWIND CHALKLINE		A B G A B P A	
			A B G A B P A	
7	GET & RETURN HAMMER & PUNCH		A B G A B P A	
			A B G A B P A	
8	PLACE PUNCH ON MARKS		A B G A B P A	
			A B G A B P A	
9	CENTER PUNCH MARKS		A B G A B P A	
		3	$(A_1\ B_0\ G_1\ M_3)\ X_0\ I_0\ A_0$	(12)2
10	INSPECT MARKS	5	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	2
		6	$A_1\ B_0\ G_1\ M_{1/3}\ X_0\ I_0\ A_0$	2
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
			A B G M X I A	
		1	$A_1\ B_0 G_1\ A_0 (B_{32} P_1 A_6 M_{32}) A_1\ B_0 P_1\ A_0$	(2)2
		2	$A_1\ B_0 G_1\ A_0 (B_0 P_1\ A_1 R_1) A_1\ B_0 P_1\ A_0$	(2)2
		9	$A_0 B_0 G_0 A_0 B_0 (P_1 A_1 F_6) A_0 B_0 P_0 A_0$	(4)12
		10	$A_0 B_0 G_0 A_0 B_0 P_0 (T_1)\ A_0 B_0 P_0 A_0$	(4)12
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	
			A B G A B P A B P A	

TIME = 18,9

INGALLS Shipbuilding

MOST - calculation

BRIDGE CRANE AND RAILS INSTALLATION

CODE 3008.04
DATE 8-24-84
SIGN. FWM
PAGE 10-152

ACTIVITY: LAYOUT & DRILL BEAM

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	A_0 B_0 G_0 $A_{1/6}$ B_{32} P_0 A_0	4	1920
1	LAYOUT TO DRILL WITH TEMPLATE		A B G A B P A		
			A B G A B P A		
	(CODE 1003.20)		A B G A B P A		
			A B G A B P A		
2	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
3	CHANGE DRILL BITS (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
4	HANDFEED DRILL BIT TO & FROM		A B G A B P A		
			A B G A B P A		
	WORKPIECE (CODE 1004.21)		A B G A B P A		
			A B G A B P A		
5	PROCESS TIME TO DRILL 1/8" DIA.		A B G A B P A		
			A B G A B P A		
	HOLE (MAT'L & CONDITION CODE		A B G A B P A		
			A B G A B P A		
	0187 @ 1" DEPTH)		A B G A B P A		
			A B G M X I A		
6	PROCESS TIME TO DRILL 21/32"		A B G M X I A		
			A B G M X I A		
	DIA. HOLE (MAT'L & CONDITION		A B G M X I A		
			A B G M X I A		
	CODE 0187 @ 1" DEPTH)		A B G M X I A		
			A B G M X I A		
7	MOVE WITH EQUIP TO EACH		A B G A B P A B P A		
			A B G A B P A B P A		
	LOCATION		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	323	48	15,504
		2	2960		2960
		3	2400	4	9600
		4	110	96	10560
		5	75	48	3600
		6	100	48	4800

TIME = 48,944

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008. 05
DATE 8-24-84
SIGN. F W I M

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY: WELD GUIDE TABS IN PLACE

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		3	$A_6\ B_6\ G_3\ A_6\ B_{16}\ P_1\ A_0$		380
1	MEASURE FROM PIVOT BLOCKS	4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		6
		5	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	2	14
2	MARK PLACEMENT FOR TABS	6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	4	160
		9	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	3	12
3	GET WELDING EQUIP	10	$A_1\ B_0\ G_3\ A_6\ B_{16}\ P_1\ A_0$		27
			A B G A B P A		
4	PLACE SHIELD		A B G A B P A		
			A B G A B P A		
5	PLACE GLOVES		A B G A B P A		
			A B G A B P A		
6	GET & ASIDE HANDLE		A B G A B P A		
			A B G A B P A		
7	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
8	WELD TAB TO BEAM		A B G A B P A		
			A B G A B P A		
9	REMOVE SHIELD & GLOVES		A B G A B P A		
		7	$(A_1\ B_0\ G_1\ M_1)X_0\ I_0\ A_0$	(2)8	48
10	RETURN WELDING EQUIP	8	$(A_1\ B_0\ G_1\ M_1\ X_{67})I_0\ A_0$	(2)4	5600
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1\ B_0\ G_3\ A_0(B_{16}\ P_1\ A_6\ M_{16})A_1\ B_0\ P_1\ A_0$	(4)2	324
		2	$A_1\ B_0\ G_1\ A_0(B_0\ P_1\ A_1\ R_3)A_1\ B_0\ P_1\ A_0$	(4)2	48
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P AB P A		
			A B G A B P A B P A		

TIME = 10,930

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

3008.06

DATE 8-24-84

SIGN. FWM

PAGE 10-154

BRIDGECANE AND RAILS INSTALLATION

ACTIVITY: POSITION RAIL. LAYOUT & MEASURE

CONDITIONS: **WETDOCK AREA**

NO.	METHOOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A A B P A		
1	RIGGER HANG CHAIN FAILS	4	$(A_1 B_0 G_3 A_1 B_0 P_6 A_0$	(2)4	880
		9	$A_1 B_0 G_3 (A_1 B_0 P_3 A_1)$	(2)4	560
2	SLIDE RAIL ALONG PLATFORM		A B G A B P A		
			A B G A B P A		
3	PICK UP ONE END		A B G A B P A		
			A B G A B P A		
4	PLACE SLINGS UNDER RAIL		A B G A B P A		
			A B G A B P A		
5	LIFT WITH CHAIN FALL		A B G A B P A		
			A B G A B P A		
6	ROLL RAIL OVER		A B G A B P A		
			A B G A B P A		
7	LIFT RAIL TO POSITION		A B G A B P A		
			A B G A B P A		
8	ADJUST LENGTH WISE		A B G A B P A		
			A B G A B P A		
9	PLACE WEDGES		A B G A B P A		
		2	$A_1 B_{24} G_3 M_6 X_0 I_0 A_0$	4	1360
10	DRIVE WEDGES	3	$(A_1 B_{16} G_3 M_3) X_0 I_0 A_0$	(2)4	1840
		5	$A_3 B_{32} (G_1 M_3) X_0 I_0 A_0$	(30)4	6200
11	MEASURE POSITION	6	$A_3 B_6 G_3 M_3 X_0 I_0 A_0$	4	600
		7	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(10)4	1720
12	PULL TIGHT	8	$(A_3 B_6 G_3 M_3 X_0 I_6 A_0)$	(2)4	1680
		12	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(2)4	440
13	MARK HOLES ON RAILS	17	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(40)4	6520
		10	$(A_1 B_0 G_3 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0)$	(4)4	2880
14	MEASURE FOR PAD THICKNESS	11	$A_1 B_0 G_1 A_1 B_0 P_1 M_{16} A_1 B_0 P_1 A_0$	2	440
		13	$A_1 B_0 G_1 A_0 (B_{16} P_1 A_6 P_{24}) A_1 B_0 P_1 A_0$	(3)4	5800
15	RECORD THICKNESS	14	$A_1 B_0 G_1 A_0 (B_{16} P_1 A_6 M_{32}) A_1 B_0 P_1 A_0$	(3)4	6760
		15	$A_1 B_0 G_3 A_1 B_0 (P_1 M_{10}) A_1 B_0 P_1 A_0$	(3)4	1600
16	MEASURE DISTANCE BETWEEN RAILS	16	$A_1 B_0 G_1 A_0 (B_{16} P_1 A_6 M_{32}) A_1 B_0 P_1 A_0$	(6)	3340
			A B G A B P A B P A		
17	LOWER RAIL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 42,620

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.07

DATE 8-24-84

SIGN. FWM

PAGE 10-155

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY LAYOUT & DRILL RAIL

CONDITIONS WETDOCK AREA

NO.	METHOD
1	LAYOUT TO DRILL WITH TEMPLATE (CODE 1003.20)
2	PLUG IN EXTENSION (CODE 1004.13)
3	CHANGE DRILL BIT (CODE 1004.14)
4	HANDFEED DRILL BIT TO & FROM WORKPIECE (CODE 1004.21)
5	PROCESS TIME TO DRILL 1/8" DIA HOLE (MAT'L & COND CODE 0013 @ 1/2" DEPTH)
6	PROCESS TIME TO DRILL ¾"DIA HOLE (MAT'L & COND CODE 0013 @ ½" DEPTH)
7	MOVE WITH EQUIP TO EACH LOCATION

NO.	SEQUENCE MODEL	FR	TMU
7	A_0 B_0 G_0 A_{16} B_{32} P_0 A_0	4	1920
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B p A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
1	(323)	(24)2	15,504
2	2960	2	592
3	(2400)	(2)2	9600
4	(110)	(48)2	10,560
5	(122)	(24)2	585
6	(247)	(24)2	11,856

TIME = 61,217

FORM **R-1458**

INGALLS Shipbuilding

MOST - calculation

CODE 3008.084
DATE 8-24-84
SIGN. F W M
PAGE 10-156

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY: LAYOUT & DRILL PADS

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	LAYOUT TO DRILL WITH TEMPLATE		A B G A B P A		
	(CODE 1003.20)		A B G A B P A		
			A B G A B P A		
2	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
3	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
4	HANDFEED DRILL BIT TO & FROM		A B G A B P A		
	WORK PIECE (CODE 1004.21)		A B G A B P A		
			A B G A B P A		
5	PROCESS TIME TO DRILL 1/8" DIA		A B G A B P A		
	HOLE (MAT'L & COND CODE 0187		A B G A B P A		
	@ 3/8" DEPTH)		A B G A B P A		
			A B G A B P A		
6	PROCESS TIME TO DRILL 3/4" DIA		A B G M X I A		
	HOLE (MAT'L & COND CODE 0187		A B G M X I A		
	@ 3/8" DEPTH)		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	(323)	(24)2	15,504
		2	2960	2	5920
		3	(2400)	(2)2	9600
			))	(48)2	10,560
		5	(30)	(24)2	1440
		6	(49)	(24)2	2352

TIME = 45,376

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.09
DATE 8-24-84
SIGN. FWM

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY
REPOSITION RAIL

CONDITIONS
WETDOCK AREA

NO.	METHOD
1	LIFT WITH CHAINFALL
2	ROLL RAIL OVER
3	LIFT RAIL TO POSITION
4	ADJUST LENGTHWISE
5	PLACE WEDGES
6	DRIVE WEDGES
7	MEASURE POSITION
8	PLACE PADS
9	SET UP TO BOLT (CODE 1005.02)
10	POSITION BOLT (CODE 1005.03)
11	PULL TIGHT
12	TURN BOLT 5/8" (CODE 1005.04)
13	RELEASE WEDGES
14	RETRIEVE WEDGES
15	MEASURE FOR LEVEL & SPACING

NO.	SEQUENCE MODEL	FR	TML
5	$(A_1 B_0 G_3 A_1 B_0 P_3 A_1)$	(2)4	720
8	$A_1 B_0 G_1 A_1 B_0 P_6 A_0$	12	108
14	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	(2)4	360
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
1	$A_3 B_{32} (G_1 M_3) X_0 I_0 A_0$	(30)4	6200
2	$A_3 B_6 G_3 M_3 X_0 I_0 A_0$	4	600
3	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(10)4	172
4	$(A_3 B_6 G_3 M_3 X_0 I_6) A_0$	(2)4	1680
11	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(2)4	440
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
6	$(A_1 B_0 G_3 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0)$	(4)4	288
7	$(A_1 B_0 G_1 A_1 B_{10} P_1 M_{16} A_1 B_0 P_1 A_0)$	(2)4	256
13	$A_1 B_0 G_1 A_1 B_0 (P_1 F_{10}) A_1 B_0 P_1 A_0$	(2)4	1080
15	$A_1 B_0 G_1 A_0 (B_6 P_1 A_3 M_3) A_1 B_0 P_1 A_0$	(11)3	13.98
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
9	970		970
10	(410)	(2)24	19,680
12	(708)	(2)24	33,984

TIME = 87,894

INGALLS Shipbuilding

MOST - calculation

CODE 3008.10
DATE 8-24-84
SIGN. FWM
PAGE 10-158

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY POSITION, WELD, & PAINT

CONDITIONS WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	$A_{81}\ B_6\ G_1\ A_{81}\ B_0\ P_1\ A_0$	2	3400
1	SET UP TO UNBOLT RAIL	14	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	6	240
		11	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	2	120
	(CODE 1005.02)	12	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	4	280
		15	$A_6\ B_6\ G_3\ A_6\ B_{16}\ P_1\ A_0$		380
2	TURN BOLT 5/8" (CODE 1005.04)	16	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	2	80
		18	$A_1\ B_0\ G_3\ A_6\ B_{16}\ P_1\ A_0$		270
3	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	LOWER RAIL		A B G A B P A		
			A B G A B P A		
5	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
6	TURN BOLT 5/8" (CODE 1005.04)		A B G A B P A		
			A B G A B P A		
7	BORROW OR RETURN AIR LINE		A B G A B P A		
			A B G A B P A		
8	ATTACH OR DETACH GRINDER		A B G A B P A		
		4	$A_3\ B_{32}(G_1\ M_3)\ X_0\ I_0\ A_0$	(40)4	7800
9	GRIND OFF TABS	9	$(A_1\ B_0\ G_1\ M_1\ X_{173}\ I_0\ A_0)$	(2)4	14,080
		10	$A_1\ B_0\ G_1\ M_1\ X_{300}\ I_0\ A_0$	12	36,360
10	GRIND WELD PREP	13	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	64	1920
		17	$A_1\ B_0\ G_1\ M_1\ (X_{173})\ I_0\ A_0$	(52)12	52,680
11	PLACE SHIELD GRIND OR WELD		A B G M X I A		
			A B G M X I A		
12	PLACE GLOVES GRIND OR WELD		A B G M X I A		
		8	$A_3\ B_6\ G_1\ A_3\ B_0\ P_3\ F_{16}\ A_0\ B_0\ P_0\ A_0$	2	640
13	OPEN OR CLOSE SHIELD		A B G A B P A B P A		
			A B G A B P A B P A		
	GRIND OR WELD		A B G A B P A B P A		
			A B G A B P A B P A		
14	REMOVE SHIELD OR GLOVES		A B G A B P A B P A		
			A B G A B P A B P A		
	GRIND OR WELD		A B G A B P A B P A		
			A B G A B P A B P A		
15	GET WELDING EQUIP		A B G A B P A B P A		
			A B G A B P A B P A		
16	GET & ASIDE HANDLE		A B G A B P A B P A		
			A B G A B P A B P A		
17	WELD PADS	1	970	1	970
		2	(708)	(2)24	33,984
18	RETURN WELDING EQUIP	3	(410)	(2)24	19,680
		5	(410)	(2)24	19,680
		6	(708)	(2)24	33,984

TIME = 226,548

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.11
DATE 8-24-84
SIGN. FWM
PAGE 10-159

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY INSTALL STOPS

CONDITIONS WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		4	A B G A B P A		0
1	SET UP TO UNBOLT (CODE 1005.02)	13	A_0 B_0 G_0 A_{16} B_{32} P_0 A_0	8	384
2	TURN BOLT 5/8" (CODE 1005.04)		A B G A B P A		
3	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
4	SERVICE PAINTER PAINT PADS		A B G A B P A		
5	LAYOUT TO DRILL WITHOUT TEMPLATE (CODE 1003.10)		A B G A B P A		
6	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
7	CHANGE DRILL BITS (CODE 1004.14)		A B G A B P A		
8	HANDFEED DRILL BIT TO 5" FROM WORKPIECE (CODE 1004.21)		A B G M X I A		
9	PROCESS TIME TO DRILL 1/4" DIA HOLE (MAT'L & CONDITION CODE 0013 @ 1/2" DEPTH)		A B G M X I A		
10	SET UP TO BOLT STOP (CODE 1005.02)		A B G A B P A B P A		
11	POSITION BOLT (CODE 1005.03)		A B G A B P A B P A		
12	TURN BOLT 1/4" (CODE 1005.05)		A B G A B P A B P A		
13	MOVE WITH EQUIP TO EACH LOCATION		A B G A B P A B P A		
		1	970	.	97
		2	(708)	(2)24	33,984
		3	(410)	(2)24	19,68
		5	1390	8	11 12
		6	2960		2960
		7	2400		2400
		8	110	8	88
		9	157	8	1256
		10	970		970
		11	410	8	328
		12	420	8	3360

TIME = 84,70

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

BRIDGE CRANE AND RAILS INSTALLATION

CODE 3008.12
DATE 8-24-84
SIGN. FWM
PAGE 10-160

ACTIVITY: INSTALL BRIDGE CRANE

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	A B G A B P A		0
1	RAISE RAIL	8	A B G A B P A		0
		11	A B G A B P A		0
2	ADJUST LENGTHWISE	16	A B G A B P A		0
		12	A_1 B_0 G_1 A_1 B_0 P_6 A_1	2	200
3	SET UP TO BOLT (CODE 1005.01)	13	A_1 B_0 G_1 A_1 B_0 P_3 A_0	2	120
		14	A_1 B_0 G_1 A_1 B_0 P_3 A_1	2	140
4	POSITION BOLT (CODE 1005.03)	16	A B G A B P A		0
		20	A_0 B_0 G_0 A_{16} B_{32} P_0 A_0	4	1920
5	TURN BOLT 5/8" (CODE 1005.07)		A B G A B P A		
			A B G A B P A		
6	MEASURE FOR LEVEL & SPACING		A B G A B P A		
			A B G A B P A		
7	CARPENTERS OPEN SCAFFOLDING		A B G A B P A		
			A B G A B P A		
8	RIGGERS POSITION BRIDGE CRANE		A B G A B P A		
			A B G A B P A		
9	ROTATE COGS TO ALIGN		A B G A B P A		
		1	A_3 B_{32} (G_1 M_3) X_0 I_0 A_0	(40)2	3900
10	PUSH BRIDGE ONTO RAILS	2	A_3 B_6 G_3 M_3 X_0 I_3 A_0	2	360
		9	A_1 B_0 G_1 M_1 X_0 I_1 A_0	2	80
11	RIGGERS POSITION CROSS RAIL	10	A_1 B_0 G_3 M_3 X_0 I_0 A_0		70
			A B G M X I A		
12	INSERT HINGE PINS		A B G M X I A		
			A B G M X I A		
13	PLACE WASHERS		A B G M X I A		
		6	A_1 B_0 G_1 A_2 (B_6 P_1 A_3 M_{32}) A_1 B_0 P_1 A_0	(15)	6340
14	INSERT COTTER PINS	15	A_1 B_0 G_3 A_1 (B_0 P_3 C_6) A_1 B_0 P_1 A_0	(4)	430
			A B G A B P A B P A		
15	BEND ENDS		A B G A B P A B P A		
			A B G A B P A B P A		
16	RIGGERS POSITION HOIST		A B G A B P A B P A		
			A B G A B P A B P A		
17	SET UP TO BOLT (CODE 1005.02)		A B G A B P A B P A		
			A B G A B P A B P A		
18	POSITION BOLTS (CODE 1005.03)		A B G A B P A B P A		
			A B G A B P A B P A		
19	TURN BOLT 1/2" (CODE 1005.05)		A B G A B P A B P A		
		3	860		860
20	MOVE WITH EQUIP TO EACH	4	(410)	(2)14	11,480
		5	(2052)	(2)14	57,456
	LOCATION	17	970		970
		18	410	8	3280
		19	810	8	6480

TIME = 94,086

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3008.13
DATE 8-24-84
SIGN. FWM
PAGE 10-161

BRIDGE CRANE AND RAILS INSTALLATION

ACTIVITY FINAL INSTALL RAIL

CONDITIONS WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TM
		7	A_1 B_0 G_1 A_1 B_0 P_3 A_0	6	360
1	RAISE RAIL	9	A_0 B_0 G_0 $A/6$ B_{32} P_0 A_0	8	38
			A B G A B P A		
2	ADJUST LENGTHWISE		A B G A B P A		
			A B G A B P A		
3	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	TURN BOLT 5/8" (CODE 1005.07)		A B G A B P A		
			A B G A B P A		
6	MEASURE FOR LEVEL & SPACING		A B G A B P A		
			A B G A B P A		
7	PLACE LINKS & RIVETS		A B G A B P A		
			A B G A B P A		
8	HAMMER RIVETS		A B G A B P A		
			A B G A B P A		
9	MOVE WITH EQUIP TO EACH		A B G A B P A		
		1	A_3 B_{32} (G_1 M_3) X_0 I_0 A_0	(40)2	3[illegible]
	LOCATION	2	A_3 B_6 G_3 M_3 X_0 I_3 A_0	2	36
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	A_1 B_0 G_1 A_0 (B_6 P_1 A_3 M_{32}) A_1 B_0 P_1 A_0	(15)	63
		8	A_1 B_0 G_3 A_0 (B_3 P_1 A_1 F_3) A_1 B_0 P_1 A_0	(4)	3
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860		8
		4	(410)	(2)10	820
		5	(2052)	(2)10	41,

TIME = 65,28

FORM R-1458

INGALLS
Shipbuilding

MOST - calculation

CONVECTION OVEN INSTALLATION

CODE 3009.01
DATE 8-27-84
SIGN. FWM
PAGE 10-162

ACTIVITY JOB PREPARATION

CONDITIONS WET DOCK AREA

NO.	METHOD	No.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	SIMPLE INITIAL JOB PREPARATION		A B G A B P A		
			A B G A B P A		
	(CODE 1001.11)		A B G A B P A		
			A B G A B P A		
2	SECURE TOOLS FROM TOOL CRIB		A B G A B P A		
			A B G A B P A		
	OR RETURN (CODE1001.121)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A E G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	12 050		12050
		2	15 417	2	130834

TIME = 42884

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3009.02
DATE 8-27-84
SIGN. F W M
PAGE 10-163

CONVECTION OVEN INSTALLATION

ACTIVITY: AREA TRAVEL

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	FROM TOOL BOX TO AFT STAIRS		A B G A B P A		
			A B G A B P A		
	OR RETURN (29.3 FT)		A B G A B P A		
			A B G A B P A		
2	FROM AFT STAIRS TO TOOL		A B G A B P A		
			A B G A B P A		
	OR RETURN (700 FT)		A B G A B P A		
			A B G A B P A		
3	FROM TOOL BOX TO GALLEY		A B G A B P A		
			A B G A B P A		
	OR RETURN (325 FT)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X i A		
			A B G M X I A		
			A B G M X I A		
			A B G M x I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A R P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			2200	2	44
		2	483	2	966
		3	2450	2	49

TIME = 18,960

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CONVECTION OVEN INSTALLATION

CODE 3009.03
DATE 8-27-84
SIGN. EWM
PAGE 10-164

ACTIVITY: LAYOUT & DRILL PADS

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		6	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	8(2)	640
1	LAYOUT TO DRILL WITHOUT		A B G A B P A		
	TEMPLATE (CODE 1003.10)		A B G A B P A		
2	PLUG IN EXTENSION CORD		A B G A B P A		
	(CODE 1004.13)		A B G A B P A		
3	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
4	HAND FEED DRILL BIT TO & FROM		A B G A B P A		
	WORK PIECE (CODE 1004.15)		A B G A B P A		
5	OPEN VISE		A B G A B P A		
6	PLACE OR REMOVE PAD IN VISE		A B G A B P A		
		5	$A_1 B_0 G_1 M_{54} X_0 I_0 A_0$		560
7	TIGHTEN OR LOOSEN VISE	7	$(A_1 B_0 G_1 M_6) X_0 I_0 A_0$	8(2)	1280
			A B G M X I A		
8	PROCESS TIME TO DRILL 1/8" DIA		A B G M X I A		
	HOLE (MAT'L & CONDITION CODE		A B G M X I A		
	0132 @ 1" DEPTH)		A B G M X I A		
			A B G M X I A		
9	PROCESS TIME TO DRILL 9/16" DIA		A B G A B P A B P A		
	HOLE (MAT'L & CONDITION CODE		A B G A B P A B P A		
	0132 @ 1" DEPTH)		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	1390	4	5560
		2	2960		2960
		3	2400	2	4800
		4	530	8	4240
		8	629	4	2516
		9	1117	4	4468

TIME = 27,024

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3009.04

DATE 8-27-84

SIGN. F W M

CONVECTION OVEN INSTALLATION

ACTIVITY: TAP & CHECK PADS

CONDITIONS: WETDOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	2	120
1	GET TOOLS & EQUIP	2	$(A_1 B_0 G_1 A_1 B_0 P_1 A_0)$	(4)2	320
		4	$(A_1 B_0 G_1 A_1 B_0 P_3 A_0)$	(3)4	72
2	PLACE OR REMOVE PAD IN VISE		A B G A B P A		
			A B G A B P A		
3	TIGHTEN OR LOOSEN VISE		A B G A B P A		
			A B G A B P A		
4	APPLY CUTTING FLUID		A B G A B P A		
			A B G A B P A		
5	INSERT TAP		A B G A B P A		
			A B G A B P A		
6	CHASE THREADS		A B G A B P A		
			A B G A B P A		
7	WIPE CLEAN		A B G A B P A		
			A B G A B P A		
8	SET UP TO BOLT (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
9	POSITION OR REMOVE BOLT		A B G A B P A		
	(CODE 1005.03)	3	$(A_1 B_0 G_1 M_6) X_0 I_0 A_0$	(4)2	640
			A B G M X I A		
10	TURN ½" BOLT (CODE 1005.04)		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		5	$(A_1 B_0 G_1 A_1 B_0 P_3 F_{67} A_1 B_0 P_1 A_0)$	(3)4	9000
		6	$A_1 B_0 G_1 A_1 B_0 P_3 F_{32} A_1 B_0 P_1 A_0$	4	160
		7	$A_1 B_0 G_1 A_0 B_0 (P_1 A_1 S_{16}) A_1 B_0 P_1 A_0$	(2)4	160
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		-
			A B G A B P A B P A		-
			A B G A B P A B P A		-
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		8	970		970
		9	410	(2)4	3280
		10	559	(2)4	447
TIME =					22,722

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3009.05
DATE 8-27-84
SIGN. FWM
PAGE 10-166

CONVECTION OVEN INSTALLATION

ACTIVITY: BOLT UP PADS

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	WAIT FOR RIGGERS TO TURN	5	A B G A B P A		0
			A B G A B P A		
	OVEN OVER ON SIDE		A B G A B P A		
			A B G A B P A		
2	SET UP TO BOLT (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	TURN 1/2" BOLT (CODE 1005.05)		A B G A B P A		
			A B G A B P A		
5	WAIT FOR RIGGERS TO RIGHT		A B G A B P A		
			A B G A B P A		
	& POSITION OVEN		A B G A B P A		
			A B G A B P A		
6	MEASURE FOR ALIGNMENT		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	$A_1 B_0 G_1 A_0 (B_6 P_1 A_3 M_{32}) A_1 B_0 P_1 A_0$	(8)	3400
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	970		970
		3	410	4	1640
		4	810	4	3240

TIME = 9,250

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CONVECTION OVEN INSTALLATION

CODE 30009.06
DATE 8-27-84
SIGN. FWM
PAGE 10-167

ACTIVITY: WELD PADS IN *PLACE*

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_6\ B_6\ G_3\ A_1\ B_0\ P_1\ A_0$		170
1	GET WELDING EQUIP	2	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
		3	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	2	14
2	PLACE SHIELD	4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$		40
		5	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	16	960
3	PLACE GLOVES	10	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	3	120
		12	$A_1\ B_0\ G_3\ A_6\ B_6\ P_1\ A_0$		170
4	GET & ASIDE WHIP		A B G A B P A		
			A B G A B P A		
5	INSERT WELDING ROD		A B G A B P A		
			A B G A B P A		
6	CLOSE & OPEN SHIELD		A B G A B P A		
			A B G A B P A		
7	TACK WELD PADS		A B G A B P A		
			A B G A B P A		
8	WELD PADS DOWN		A B G A B P A		
			A B G A B P A		
9.	RELEASE SPENT RODS		A B G A B P A		
		6	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	64	192
10	REMOVE SHIELD & GLOVES	7	$(A_3\ B_6\ G_1\ M_0\ X_{57})\ I_0\ A_0$	(4) 4	10,240
		9	$A_0\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	16	32
11	CLEAN WELDS		A B G M X I A		
			A B G M X I A		
12	RETURN WELDING EQUIP		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		11	$A_1\ B_0\ G_1\ A_0\ (B_6\ P_1\ A_3\ F_{10})\ A_0\ B_0\ P_0\ A_0$	(16)	3220
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		–
			A B G A B P A B P A		–
			A B G. A B P A B P A		–
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B· P A		
			A B G A B P A B P A		
		8	PROCESS TIME 17.0 MIN.		28,46

TIME = 45,820

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HOIST AND MONORAIL INSTALLATION

CODE 3010.01
DATE 8-8-84
SIGN. FWM
PAGE 10-168

ACTIVITY: JOB PREPARATION

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	AVERAGE INITIAL JOB PREPARATION (CODE 1001.12)		A B G A B P A		
2	GET OR RETURN TOOLS TO TOOL BOX (CODE 1001.111)		A B G A B P A		
3	SECURE PARTS FROM WAREHOUSE (CODE 1001.132)		A B G A B P A		
4	RETURN TOOLS TO TOOL CRIB (CODE 1001.121)		A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42,001		42,001
		2	440	2	880
		3	11,445		11,445
		4	15,417		15,417

TIME = 69,743

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.02
DATE 8 - 8 - 84
SIGN. F W M
PAGE 10-169

HOIST AND MONORAIL INSTALLATION

ACTIVITY
AREA TRAVEL

CONDITIONS
WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	FROM TOOL BOX TO TOOL		A B G A B P A		
	ROOM OR RETURN (450 FT)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	FROM TOOL BOX TO STAIRS,		A B G A B P A		
	01 LEVEL MIDSHIPS (350 FT)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
3	FROM STAIRS TO SCAFFOLDING		A B G A B P A		
	ABOVE HANGER DECK OR		A B G A B P A		
	RETURN (388 FT)		A B G A B P A		
			A B G A B P A		
	FROM STAIRS TO FREE STOCK		A B G A B P A		
	OR RETURN (300 FT)		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	3300	2	660
			2450	2	490
		2	2700	4	10.80
		4	2200	2	4.40
					26,70

TIME =

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.03
DATE 8-8-84
SIGN. F. W. M.
PAGE 10-170

HOIST AND MONORAIL INSTALLATION

ACTIVITY: LAYOUT CENTERLINE

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		4	$A_1 B_0 G_1 A_{16} B_{32} P_6 A_0$		560
1	MEASURE FROM ENDS OF BEAM	7	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	2	120
		8	$A_3 B_{24} G_0 (A_1 B_0 P_6) A_0$	(4)4	2200
2	MARK MEASUREMENTS		A B G A B P A		
			A B G A B P A		
3	PULL OUT CHALKLINE		A B G A B P A		
			A B G A B P A		
4	PLACE CHALKLINE		A B G A B P A		
			A B G A B P A		
5	SNAP CHALKLINE		A B G A B P A		
			A B G A B P A		
6	REWIND CHALKLINE		A B G A B P A		
			A B G A B P A		
7	GET & RETURN HAMMER & PUNCH		A B G A B P A		
			A B G A B P A		
8	PLACE PUNCH ON MARKS		A B G A B P A		
			A B G A B P A		
9	CENTER PUNCH MARKS		A B G A B P A		
		3	$A_1 B_0 G_1 M_3 X_0 I_0 A_0$	12	600
10	INSPECT MARKS	5	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$		30
		6	$A_1 B_0 G_1 M_{113} X_0 I_0 A_0$		1150
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		1	$A_1 B_0 G_1 A_0 (B_{32} P_1 A_6 M_{32}) A_1 B_0 P_1 A_0$	(2)	1460
		2	$A_1 B_0 G_1 A_0 (B_0 P_1 A_1 R_1) A_1 B_0 P_1 A_0$	(2)	100
		9	$A_0 B_0 G_0 A_1 B_0 P_1 F_6 A_0 B_0 P_0 A_0$	16	1280
		10	$A_0 B_0 G_0 A_0 B_0 P_0 T_1 A_0 B_0 P_0 A_0$	16	160
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 7,660

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HOIST AND MONORAIL INSTALLATION

CODE 3010.04
DATE 8-8-84
SIGN. F. W. M.
PAGE 10-171

ACTIVITY LAYOUT & DRILL BEAM

CONDITIONS WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	$A_0\ B_0\ G_0\ A_{16}\ B_{32}\ P_0\ A_0$	2	960
1	LAYOUT TO DRILL WITH TEMPLATE		A B G A B P A		
	(CODE 1003.20)		A B G A B P A		
			A B G A B P A		
2	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
3	CHANGE DRILL BITS (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
4	HANDFEED DRILL BIT TO & FROM		A B G A B P A		
	WORKPIECE (CODE 1004.21)		A B G A B P A		
			A B G A B P A		
5	PROCESS TIME TO DRILL 1/8" DIA		A B G A B P A		
	HOLE (MAT'L & CONDITION CODE		A B G A B P A		
	0187 @ 1" DEPTH)		A B G A B P A		
			A B G M X I A		
6	PROCESS TIME TO DRILL 17/32" DIA		A B G M X I A		
	HOLE (MAT'L & COND CODE		A B G M X I A		
	0187 @ 1" DEPTH)		A B G M X I A		
			A B G M X I A		
7	MOVE WITH EQUIP TO EACH		A B G M X I A		
	LOCATION		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	323	16	5168
		2	2960		296
		3	2400	2	480
		4	110	32	3520
		5	75	16	120
		6	84	16	134
TIME =					19,952

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.05

DATE 8-8-84

SIGN. FWM

PAGE 10-172

HOIST AND MONORAIL INSTALLATION

ACTIVITY: **BOLT PIVOT BLOCKS-TEMPORARY**

CONDITIONS: WET DOCK **AREA**

NO.	METHOD	No.	SEQUENCE MODEL	FR	TMU
		1	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	4	240
1	**PLACE PIVOT** BLOCKS	5	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	4	160
		6	$A_0 B_0 G_0 A_{16} B_{32} P_0 A_0$	4	1920
2	**SET UP- BOLT OR UNBOLT (CODE 1005.02)**		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	TURN BOLT (½") (code 1005.04)		A B G A B P A		
			A B G A B P A		
5	***REMOVE*** **PIVOT BLOCKS**		A B G A B P A		
			A B G A B P A		
6	**MOVE WITH EQUIP TO EACH**		A B G A B P A		
	LOCATION		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	970	2	1940
		3	(410)	16 2	13,120
		4	(559)	16 2	17,888

TIME = **35,268**

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.06

DATE 8-8-84

SIGN. FWM

HOIST AND MONORAIL INSTALLATION

ACTIVITY: WELD GUIDE TABS IN PLACE

CONDITIONS: WET DOCK AREA

NO.	METHOD
1	MEASURE FROM PIVOT BLOCKS
2	MARK PLACEMENT FOR TABS
3	GET WELDING EQUIP
4	PLACE SHIELD
5	PLACE GLOVES
6	GET & ASIDE HANDLE
7	CLOSE & OPEN SHIELD
8	WELD TAB TO BEAM
9	REMOVE SHIELD & GLOVES
10	RETURN WELDING EQUIP

NO.	SEQUENCE MODEL	FR	TMU
3	$A_6\ B_6\ G_3\ A_6\ B_{16}\ P_1\ A_0$		380
4	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$		60
5	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	2	140
6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$		40
9	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	3	120
10	$A_1\ B_0\ G_3\ A_6\ B_{16}\ P_1\ A_0$		270
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
	A B G A B P A		
7	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	4	120
8	$A_1\ B_0\ G_1\ M_1\ X_{C7}\ I_0\ A_0$	2	1400
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
	A B G M X I A		
1	$A_1\ B_0\ G_3\ A_0\ (B_{16}\ P_1\ A_6\ M_{16})\ A_1\ B_0\ P_1\ A_0$	(2)	840
2	$A_1\ B_0\ G_1\ A_0\ (B_0\ P_1\ A_1\ R_3)\ A_1\ B_0\ P_1\ A_0$	(2)	140
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		
	A B G A B P A B P A		

TIME = 3,510

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.07
DATE 8-8-84
SIGN. FWM
PAGE 10-174

HOIST AND MONORAIL INSTALLATION

ACTIVITY: POSITION RAIL, LAYOUT & MEASURE

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	A B G A B P A		0
1	RIGGER HANG CHAIN FALLS	4	$A_1 B_0 G_3 A_1 B_0 P_6 A_0$	2	220
		9	$A_1 B_0 G_3 (A_1 B_0 P_3 A_1)$	(2)	140
2	SLIDE RAIL ALONG PLATFORM		A B G A B P A		
			A B G A B P A		
3	PICK UP ONE END		A B G A B P A		
			A B G A B P A		
4	PLACE SLINGS UNDER RAIL		A B G A B P A		
			A B G A B P A		
5	LIFT WITH CHAIN FALL		A B G A B P A		
			A B G A B P A		
6	ROLL RAIL OVER		A B G A B P A		
			A B G A B P A		
7	LIFT RAIL TO POSITION		A B G A B P A		
			A B G A B P A		
8	ADJUST LENGTHWISE		A B G A B P A		
			A B G A B P A		
9	PLACE WEDGES		A B G A B P A		
		2	$A_1 B_{24} G_3 M_6 X_0 I_0 A_0$		340
10	DRIVE WEDGES	3	$A_1 B_{16} G_3 M_3 X_0 I_0 A_0$	2	460
		5	$A_3 B_{32} (G_1 M_3) X_0 I_0 A_0$	(30)	1550
11	MEASURE POSITION	6	$A_3 B_6 G_3 M_3 X_0 I_0 A_0$		150
		7	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(10)	430
12	PULL TIGHT	8	$A_3 B_6 G_3 M_3 X_0 I_6 A_0$	2	420
		12	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(2)	110
13	MARK HOLES & EDGES OF PIVOT	16	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(40)	1630
		10	$A_1 B_0 G_3 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0$	4	720
	BLOCKS ON RAIL	11	$A_1 B_0 G_1 A_1 B_0 P_1 M_{16} A_1 B_0 P_1 A_0$	2	440
		13	$A_1 B_0 G_1 A_0 (B_{16} P_1 A_6 R_{24}) A_1 B_0 P_1 A_0$	(4)	1920
14	MEASURE FOR PAD THICKNESS	14	$A_1 B_0 G_1 A_0 (B_{16} P_1 A_6 M_{32}) A_1 B_0 P_1 A_0$	(4)	2240
		15	$A_1 B_0 G_3 A_1 B_0 (P_1 M_{10}) A_1 B_0 P_1 A_0$	(4)	510
15	WRITE DOWN THICKNESS		A B G A B P A B P A		
			A B G A B P A B P A		
16	LOWER RAIL		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 11,280

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.08
DATE 8-8-84
SIGN. F WM
PAGE 10-175

HOIST AND MONORAIL INSTALLATION

ACTIVITY: LAYOUT & DRILL RAIL

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		7	A_0 B_0 G_0 A_{16} B_{32} P_0 A_0	2	960
	LAYOUT TO DRILL WITH TEMPLATE		A B G A B P A		
			A B G A B P A		
	(CODE 1003.20)		A B G A B P A		
			A B G A B P A		
2	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
3	CHANGE DRILL BIT (CODE 1004,14)		A B G A B P A		
			A B G A B P A		
4	HANDFEED DRILL BIT TO & FROM		A B G A B P A		
			A B G A B P A		
	WORK PIECE (CODE 104.21)		A B G A B P A		
			A B G A B P A		
5	PROCESS TIME TO DRILL 1/8"DIA		A B G A B P A		
			A B G A B P A		
	HOLE (MAT'L & COND CODE 0013		A B G A B P A		
			A B G A B P A		
	@ ½ DEPTH)		A B G M X I A		
			A B G M X I A		
6	PROCESS TIME TO DRILL ½"DIA		A B G M X I A		
			A B G M X I A		
	HOLE (MAT'L & COND CODE		A B G M X I A		
			A B G M x I A		
	0013 @ ½" DEPTH		A B G M X I A		
			A B G M X I A		
7	MOVE WITH EQUIP TO EACH		A B G A B P A B P A		
			A B G A B P A B P A		
	LOCATION		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	323	16	5168
		2	2960		296
		3	2400	2	480
		4	10	32	3520
		5	122	16	195
		6	197	16	315

TIME = 22,512

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HOIST AND MONORAIL INSTALLATION

CODE 30/0.09

DATE 8-8-84

SIGN. F W M

PAGE 10-176

ACTIVITY: LAYOUT & DRILL PADS

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	LAYOUT TO DRILL WITH TEMPLATE		A B G A B P A		
	(CODE 1003.20)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	PLUG IN EXTENSION (CODE 1004.13)		A B G A B P A		
			A B G A B P A		
3	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
			A B G A B P A		
4	HANDFEED DRILL BIT TO & FROM		A B G A B P A		
	WORKPIECE (CODE 1004.21)		A B G A B P A		
			A B G A B P A		
5	PROCESS TIME TO DRILL 1/8" DIA		A B G A B P . A		
	HOLE (MAT'L & COND CODE		A B G A B P A		
			A B G A B P A		
	0187 @ 3/8" DEPTH)		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
6	PROCESS TIME TO DRILL 1/2" DIA		A B G M X I A		
			A B G M X I A		
	HOLE (MAT'L & COND. CODE		A B G M X I A		
			A B G M X I A		
	0187 @ 3/8" DEPTH)		A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	323	16	5168
		2	2960		2960
		3	2400	2	4800
		4	110	32	3520
		5	30	16	480
		6	38	16	608
			TIME=		17,536

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

30/0.10

DATE 8-8-84

SIGN. F W M

PAGE 10-177

HOIST AND **MONORAIL** INSTALLATION

ACTIVITY

BOLT PIVOT BLOCKS TO RAIL

CONDITIONS

WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	T M U
		1	A 1 B 0 G 1 A 1 B 0 P 3 A 0	4	240
1	PLACE PIVOT BLOCK ON RAIL	5	A 0 B 0 G 0 A 16 B 32 P 0 A 0	2	960
			A B G A B P A		
2	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
3	POSITION BOLT (CODE 1005. **03)**		A B G A B P A		
			A B G A B P A		
4	TURN THE BOLT (½") (CODE 1005.07)		**A B G A B P A**		
			A B G A B P A		
5	MOVE WITH EQUIP TO **EACH**		**A B G A B P A**		
			A B G A B P A		
	LOCATION		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		2	860		860
		3	410	16	6560
		4	1 6	6	25,920

TIME = 34,540

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

3010.11

DATE 8-8-84

SIGN. F W M

PAGE 10-178

HOIST AND MONORAIL INSTALLATION

ACTIVITY: REPOSITION RAIL

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		5	$A_1 B_0 G_3 A_1 B_0 P_3 A_1$	2	180
1	LIFT WITH CHAIN FALL	8	$A_1 B_0 G_1 A_1 B_0 P_6 A_0$	4	360
		14	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	2	80
2	ROLL RAIL OVER		A B G A B P A		
			A B G A B P A		
3	LIFT RAIL TO POSITION		A B G A B P A		
			A B G A B P A		
4	ADJUST LENGTHWISE		A B G A B P A		
			A B G A B P A		
5	PLACE WEDGES		A B G A B P A		
			A B G A B P A		
6	DRIVE WEDGES		A B G A B P A		
			A B G A B P A		
7	MEASURE POSITION		A B G A B P A		
			A B G A B P A		
8	PLACE PADS		A B G A B P A		
			A B G A B P A		
9	SET UP TO BOLT (CODE 1005.02)		A B G A B P A		
		1	$A_3 B_{32} (G_1 M_3) X_0 I_0 A_0$	(30)	1550
10	POSITION BOLT (CODE 1005.03)	2	$A_3 B_6 G_3 M_3 X_0 I_0 A_0$		150
		3	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(10)	430
11	PULL TIGHT	4	$A_3 B_6 G_3 M_3 X_0 I_6 A_0$	2	420
		11	$A_3 B_0 (G_1 M_3) X_0 I_0 A_0$	(2)	110
12	TURN BOLT 1/2" (CODE 1005.04)		A B G M X I A		
			A B G M X I A		
13	RELEASE WEDGES		A B G M X I A		
		6	$A_1 B_0 G_3 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0$	4	720
14	RETRIEVE WEDGES	7	$A_1 B_0 G_1 A_1 B_{10} P_1 M_{16} A_1 B_0 P_1 A_0$	2	640
		13	$A_1 B_0 G_1 A_1 B_0 P_1 F_{10} A_1 B_0 P_1 A_0$	(2)	270
15	MEASURE FOR LEVEL	15	$A_1 B_0 G_1 A_0 (B_6 P_1 A_3 M_{32}) A_1 B_0 P_1 A_0$	(7)	2980
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		9	970		970
		10	410	16	6560
		12	559	16	8944

TIME = 24,364

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.12
DATE 8-8-84
SIGN. FWM
PAGE 10-179

HOIST AND MONORAIL INSTALLATION

ACTIVITY: PREPARE & WELD PADS

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_{81}\ B_6\ G_1\ A_{81}\ B_0\ P_1\ A_0$	2	3400
1	BORROW OR RETURN AIR LINE	5	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_0$	2	120
		6	$A_1\ B_0\ G_1\ A_1\ B_0\ P_3\ A_1$	4	280
2	ATTACH OR DETACH GRINDER	8	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	6	240
		9	$A_6\ B_6\ G_3\ A_6\ B_{16}\ P_1\ A_0$		380
3	GRIND OFF TABS	10	$A_1\ B_0\ G_1\ A_1\ B_0\ P_1\ A_0$	2	80
		12	$A_1\ B_0\ G_3\ A_6\ B_{16}\ P_1\ A_0$		270
4	GRIND WELD PREP		A B G A B P A		
			A B G A B P A		
5	PLACE SHIELD GRIND OR WELD		A B G A B P A		
			A B G A B P A		
6	PLACE GLOVES GRIND OR WELD		A B G A B P A		
			A B G A B P A		
7	OPEN OR CLOSE SHIELD		A B G A B P A		
			A B G A B P A		
	GRIND OR WELD		A B G A B P A		
			A B G A B P A		
8	REMOVE SHIELD OR GLOVES		A B G A B P A		
		3	$A_1\ B_0\ G_1\ M_1\ X_{173}\ I_0\ A_0$	2	3520
	GRIND OR WELD	4	$A_1\ B_0\ G_1\ M_1\ X_{300}\ I_0\ A_0$	4	12120
		7	$A_1\ B_0\ G_1\ M_1\ X_0\ I_0\ A_0$	20	600
9	GET WELDING EQUIP	11	$A_1\ B_0\ G_1\ M_1\ (X_{173})\ I_0\ A_0$	(2.52)+	17560
			A B G M X I A		
10	GET & ASIDE HANDLE		A B G M X I A		
			A B G M X I A		
11	WELD PADS		A B G M X I A		
		2	$A_3\ B_6\ G_1\ A_3\ B_0\ P_3\ F_{16}\ A_0\ B_0\ P_0\ A_0$	2	640
12	RETURN WELDING EQUIP		A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 39,210

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3010.13
DATE 8-8-84
SIGN. FWM
PAGE 10-180

HOIST AND MONORAIL INSTALLATION

ACTIVITY: INSTALL HOIST

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		5	A B G A B P A		0
1	SET UP TO UNBOLT (CODE 1005.02)	6	A B G A B P A		0
		17	A_0 B_0 G_0 A_{16} B_{32} P_0 A_0	4	1920
2	TURN BOLT 1/2" (CODE 1005.04)		A B G A B P A		
			A B G A B P A		
3	REMOVE BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
4	LOWER RAIL		A B G A B P A		
			A B G A B P A		
5	SERVICE PAINTER PAINT PADS		A B G A B P A		
			A B G A B P A		
6	RIGGERS POSITION HOIST		A B G A B P A		
			A B G A B P A		
7	ROTATE COG TO ALIGN		A B G A B P A		
			A B G A B P A		
8	PUSH HOIST ONTO RAIL		A B G A B P A		
			A B G A B P A		
9	LAYOUT TO DRILL WITHOUT		A B G A B P A		
		4	A_3 B_{32} (G_1 M_3) X_0 I_0 A_0	(20)	1150
	TEMPLATE (CODE 1003.10)	7	A_1 B_0 G_1 M_1 X_0 I_1 A_0		40
		8	A_1 B_0 G_3 M_3 X_0 I_0 A_0		70
10	PLUG IN EXTENSION (CODE 1004.13)		A B G M X I A		
			A B G M X I A		
11	CHANGE DRILL BITS (CODE 1004.14)		A B G M X I A		
			A B G M X I A		
12	HANDFEED DRILL BIT TO & FROM		A B G M X I A		
			A B G A B P A B P A		
	WORKPIECE (CODE 1004.21)		A B G A B P A B P A		
			A B G A B P A B P A		
13	PROCESS TIME TO DRILL 1/4" DIA		A B G A B P A B P A		
			A B G A B P A B P A		
	HOLE (MAT'L & CONDITION CODE		A B G A B P A B P A		
			A B G A B P A B P A		
	0013 @ 1/2" DEPTH)	1	970		970
		2	559	16	8944
14	SET UP TO BOLT STOP (CODE 1005.02)	3	410	16	6560
		9	1390	4	5560
15	POSITION BOLT (CODE 1005.03)	10	2960		2960
		11	2400		2400
16	TURN BOLT 1/4" (CODE 1005.05)	12	110	4	440
		13	157	4	628
		14	970		970
17	MOVE WITH EQUIP TO EACH	15	410	4	1640
	LOCATION	16	420	4	1680
TIME =					35,932

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

HOIST AND MONORAIL INSTALLATION

CODE 3010.1
DATE 8-8-84
SIGN. FWM
PAGE 10-181

ACTIVITY: FINAL INSTALL RAIL

CONDITIONS: WET DOCK AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	
		7	$A_0\ B_0\ G_0\ A_{16}\ B_{32}\ P_0\ A_0$	4	1
1	RAISE RAIL		A B G A B P A		
			A B G A B P A		
2	ADJUST LENGTHWISE		A B G A B P A		
			A B G A B P A		
3	SET UP TO BOLT (CODE 1005.01)		A B G A B P A		
			A B G A B P A		
4	POSITION BOLT (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
5	TURN BOLT 1/2" (CODE 1005.07)		A B G A B P A		
			A B G A B P A		
6	MEASURE FOR LEVEL		A B G A B P A		
7	MOVE WITH EQUIP TO EACH		A B G A B P A		
			A B G A B P A		
	LOCATION		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
		1	$A_3\ B_{32}\ (G_1\ M_3)\ X_0\ I_0\ A_0$	(20)	1
		2	$A_3\ B_6\ G_3\ M_3\ X_0\ I_3\ A_0$		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	$A_1\ B_0\ G_1\ A_0\ (B_6\ P_1\ A_3\ M_{32})\ A_1\ B_0\ P_1\ A_0$	(7)	2
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		3	860		
		4	410	16	6
		5	1620	16	2

TIME = 39.

INGALLS Shipbuilding

MOST - calculation

CODE 3011.01
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-182

COOLING COIL INSTALLATION

ACTIVITY JOB PREPARATION

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
			A B G A B P A		
1	AVERAGE INITIAL JOB		A B G A B P A		
	PREPARATION (CODE 1001.12)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
2	SECURE PARTS FROM WAREHOUSE		A B G A B P A		
	(CODE 1001.132)		A B G A B P A		
			A B G A B P A		
3	RETURN TOOLS TO TOOL CRIB		A B G A B P A		
	(CODE 1001.121)		A B G A B P A		
			A B G A B P A		
4	SIMPLE ADDITIONAL JOB		A B G A B P A		
	PREPARATION (CODE 1001.21)		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
		1	42001	1	42001
		2	11,445	1	11,445
		3	15417	1	15417
		4	1180	2	2360
TIME =					71,223

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011 .02
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-193

COOLING COIL INSTALLATION

ACTIVITY AREA TRAVEL

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	FROM TOOL BOX TO MATERIAL PILE (800 FT.)	1	A B G A B P A	3	16560
2	FROM MATERIAL PILE TO ASSEMBLY 306 LADDER (125 FT)	2	A B G A B P A	3	2880
3	UP LADDER & INTO COMPARTMENT OR RETURN (45 STEPS)	3	A B G A B P A	4	3240
4	FROM ASSEMBLY 306 LADDER TO DRILL PRESS (965 FT)	4	A B G A B P A	1	6660
5	FROM DRILL PRESS TO FREE STOCK (125 FT)	5	A B G A B P A	1	960
6	FROM FREE STOCK TO ASSEMBLY 306 LADDER (840 FT)	6	A B G M X I A	1	5800
7	FROM ASSEMBLY 306 LADDER TO TOOL BOX (925 FT)	7	A B G A B P A B P A	3	19170
8	FROM TOOL BOX TO TOOL ROOM OR RETURN (CODE 1002.16)	8	A B G A B P A B P A	4	45,244

TIME = 100,514

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011.03
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-184

COOLING COIL INSTALLATION

ACTIVITY COLLECT & CLASSIFY LEGS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	SHOULDER AND UNSHOULDER TOOL BAG	1	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	2	80
		2	$A_0 B_6 G_0 A_0 B_0 P_0 A_0$		60
2	BEND AND ARISE	4	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	3	180
3	SEPARATE PIECES		A B G A B P A		
4	PUT LEG SETS IN TOOL BAG		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1 B_0 G_3 A_0 B_0 P_0 T_{10} A_1 B_0 P_3 A_0$	105	18,900
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 19,220

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011.04
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-195

COOLING COIL INSTALLATION

ACTIVITY LAY OUT HOLES ON LEGS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
1	GET LEGS OUT OF BAG IN SETS	1	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	3	180
		2	$A_1 B_6 G_3 A_3 B_6 P_1 A_0$		200
2	POSITION COIL	3	$A_1 B_0 G_3 A_3 B_0 P_1 A_0$	6	480
		4	$A_1 B_0 G_1 A_3 B_6 P_3 A_0$	6	840
3	DISTRIBUTE LEGS	5	$A_1 B_0 G_1 A_1 B_0 P_6 A_0$	6	540
		7	$A_0 B_0 G_0 A_1 B_0 P_3 A_0$	6	240
4	PLACE SPACER & MOVE TO EACH LEG	8	$A_3 B_6 G_3 A_1 B_0 P_1 A_0$	6	840
		9	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	2	80
5	POSITION LEG		A B G A B P A		
			A B G A B P A		
6	SCRIBE HOLES		A B G A B P A		
			A B G A B P A		
7	ASIDE LEG TO CENTER PILE		A B G A B P A		
			A B G A B P A		
8	COLLECT LEGS & PLACE IN BAG		A B G A B P A		
			A B G A B P A		
9	SHOULDER AND UNSHOULDER BAG		A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		6	$A_1 B_0 G_1 A_1 B_0 (P_1 A_0 R_3) A_1 B_0 P_1 A_0$	(2)6	780
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 4,180

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011.05
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-186

COOLING COIL INSTALLATION

ACTIVITY: DRILL HOLES ON LEGS

CONDITIONS: ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		1	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$	2	80
1	SHOULDER OR UNSHOULDER TOOL BAG	2	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	5	300
		3	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	12	720
2	GET LEG SETS & TOOLS	4	$A_1 B_0 G_1 A_1 B_0 P_1 A_0$		40
		6	$A_{67} B_0 G_3 A_{67} B_0 P_3 A_1$	2	2820
	OUT OF BAG	9	$(A_1 B_0 G_3) A_1 B_0 P_6 A_0$	(2)6	900
		11	$A_0 B_0 G_0 A_1 B_0 P_3 A_0$	6	240
3	POSITION OR ASIDE EACH LEG		A B G A B P A		
			A B G A B P A		
4	GET & ASIDE HAMMER		A B G A B P A		
			A B G A B P A		
5	GET PUNCH & PUNCH EACH LEG		A B G A B P A		
			A B G A B P A		
6	GET CHUCK & PLACE OR RETURN		A B G A B P A		
			A B G A B P A		
7	TIGHTEN CHUCK IN HOLDER		A B G A B P A		
			A B G A B P A		
8	CHANGE DRILL BIT (CODE 1004.14)		A B G A B P A		
		13	$A_1 B_0 G_1 M_3 X_0 I_3 A_0$	24	1920
9	SELECT PAIR OF LEGS	14	$A_1 B_0 G_1 M_1 X_0 I_0 A_0$	2	60
			A B G M X I A		
10	OPEN AND CLOSE VISE		A B G M X I A		
			A B G M X I A		
11	PLACE LEGS IN VISE		A B G M X I A		
			A B G M X I A		
12	HAND FEED DRILL BIT & SWITCH		A B G M X I A		
		5	$A_1 B_0 G_1 A_1 B_0 (P_3 A_0 F_3) A_1 B_0 P_1 A_0$	(6)6	2460
	ON & OFF (CODE 1004.21)	7	$A_1 B_0 G_1 A_0 B_0 P_0 F_{10} A_0 B_0 P_0 A_0$		120
		10	$A_1 B_0 G_1 A_0 B_0 P_0 F_{10} A_0 B_0 P_0 A_0$	12	1440
13	POSITION WORKPIECE		A B G A B P A B P A		
			A B G A B P A B P A		
14	SELECT SPEED		A B G A B P A B P A		
			A B G A B P A B P A		
15	PROCESS TIME TO DRILL 3/16" DIA		A B G A B P A B P A		
			A B G A B P A B P A		
	HOLE (MAT'L & COND. CODE 0013		A B G A B P A B P A		
			A B G A B P A B P A		
	@ 3/16" DEPTH)		A B G A B P A B P A		
			A B G A B P A B P A		
16	PROCESS TIME TO DRILL 9/16" DIA		A B G A B P A B P A		
			A B G A B P A B P A		
	HOLE (MAT'L & COND CODE	8	2400	2	4800
		12	530	24	12,720
	0013 @ 3/16" DEPTH)	15	67	12	804
		16	108	12	1,296

TIME = *(CONTINUED ON NEXT PAGE)

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011.05
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-187

COOLING COIL INSTALLATION

ACTIVITY DRILL HOLES ON LEGS

CONDITIONS ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
		17	$A_1 B_0 G_1 A_1 B_0 P_3 A_0$	12	720
17	REMOVE LEGS FROM VICE	20	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	5	.300
			A B G A B P A		
	& RESTACK IN SETS		A B G A B P A		
			A B G A B P A		
18	LOOSEN CHUCK		A B G A B P A		
			A B G A B P A		
19	TAP UNTIL RELEASED		A B G A B P A		
			A B G A B P A		
20	PUT LEG SETS & TOOLS		A B G A B P A		
			A B G A B P A		
	INTO BAG		A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		18	$A_1 B_0 G_1 A_0 B_0 P_0$ F10 $A_0 B_0 P_0 A_0$		120
		19	$A_1 B_0 G_1 A_1 B_0 P_1$ F6 $A_1 B_0 P_1 A_0$		120
			A B G A B P A B P A		
			A B G A B P A B P A.		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		

TIME = 31,980

FORM R-1458

INGALLS Shipbuilding

MOST - calculation

CODE 3011.06
DATE 8/9/84
SIGN. FWM/TLC
PAGE 10-188

Cooling Coil Installation

ACTIVITY Bolt Up Legs

CONDITIONS · ASSEMBLY AREA

NO.	METHOD	NO.	SEQUENCE MODEL	FR	TMU
*1	SHOULDER AND UNSHOULDER TOOL BAG	1	$A_1 B_6 G_1 A_1 B_0 P_1 A_0$	6	600
		2	$A_1 B_0 G_3 A_1 B_0 P_1 A_0$	3	180
2	GET LEG SETS	4	$A_1 B_0 G_1 A_3 B_0 P_0 A_2$	18	900
			A B G A B P A		
	OUT OF BAG		A B G A B P A		
			A B G A B P A		
3	MATCH LEG FIND NUMBERS		A B G A B P A		
			A B G A B P A		
*4	MOVE BETWEEN BOLTING LOCATIONS		A B G A B P A		
			A B G A B P A		
*5	SET UP TO BOLT (CODE 1005.02)		A B G A B P A		
			A B G A B P A		
*6	POSITION BOLTS (CODE 1005.03)		A B G A B P A		
			A B G A B P A		
*7	TURN BOLTS (½") (CODE 1005.04)		A B G A B P A		
			A B G A B P A		
*8	TURN BOLTS (½") (CODE 1005.05)		A B G A B P A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
			A B G M X I A		
		3	$A_1 B_0 G_1 A_0 B_0 P_0 A_1 T_{12} A_3 B_6 P_1 A_0$	6	1500
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
			A B G A B P A B P A		
*	NOTE - ALSO INCLUDED IS REMOVING TEMPORARY BOLTS AFTER LEGS ARE		A B G A B P A B P A		
			A B G A B P A B P A		
	WELDED TO THE OVERHEAD AND BOLT-UP WITH SELF LOCKING BOLTS		A B G A B P A B P A		
			A B G A B P A B P A		
	AFTER THE LEGS HAVE BEEN PAINTED.		A B G A B P A B P A		
			A B G A B P A B P A		
		5	970	3	2,910
		6	(410)	(12)3	14,760
		7	(559)	(12)2	13,416
		8	(810)	(12)	9720
TIME =					43,986

FORM R-1458