

BIW PHASE III/FY-82 SHIPYARD DATA APPLICATION PROGRAM

PANEL LINE/SHOP SCHEDULING AND MANLOADING

INCENTIVE SYSTEM EVALUATION (WELDING)

TASK ES-8-12

Conducted at:

Bath Iron Works Corporation
700 Washington Street
Bath, Maine 04530

Date: 1982-1983

FINAL REPORT

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SHIPYARD DATA APPLICATION PROGRAM
PANEL LINE SCHEDULING AND MANLOADING
INCENTIVE SYSTEM BY: EVALUATION (WELDING)

Bath Iron Works Corporation
Standards Development Team

Report Documentation Page

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BIW PHASE III/FY-82 SHIPYARD DATA APPLICATION PROGRAM
FINAL REPORT

.I. Background

This project has evolved from the National Shipbuilding Research Program which is funded by the Maritime Administration, United States Department of Transportation, for the purpose of making domestic shipyards more competitive with foreign shipyards. Technical direction for this program is provided by the Ship Production Committee of the Society of Naval Architects and Marine Engineers. The Ship Production Committee is composed of several panels, two of which, Panel SP-8 on Industrial Engineering, and Panel SP-6 on Shipbuilding Standards, make up the Ship Producibility Research Program, managed by Bath Iron Works Corporation, Bath, Maine.

Industrial Engineering Panel SP-8, from which this project generates, was activated in 1978 and has been carrying out two functions. One, the development of engineered labor standards using "MOST" (Maynard Operation Sequence Technique), a relatively new work measurement system that has gained wide recognition as an efficient, accurate tool by the industrial community for work measurement, and two, generally increasing industry awareness of industrial engineering potential. Considerable standard data has been generated over the past few years under this program by the participating shipyards standards development teams. This data has generally been used to make method engineering improvements. Peterson Builders, Inc., through its scheduling

standards pilot project, was the first shipyard to use this standard data base for shop scheduling purposes. The reported favorable results of that project stimulated the follow-on scheduling standards project here at Bath Iron Works.

II. Introduction

The Phase III/FY-82 Shipyard Data Application Program for Bath Iron Works primarily involved the application of engineered labor standards in the area of shop scheduling, labor performance and data simulation in accordance with the SNAME SP-8 "Standard Data Application Guide" (June, 1981). Phase III also included the task of program data coordination for the shared computer system to ensure that maximum benefits could be received from the computer's use and also to coordinate the assigning of consultant service under the program.

The project was conducted generally in accordance with the proposal submitted by Bath Iron Works Corporation for Phase III/FY-82 Shipyard Data Application Program Task ES-8-72 in December, 1981 to the U.S. Maritime Administration. The project was carried out by the Standards Development Team from Bath Iron Works (E. Creswell, M. Cunningham, A. Evan), which had been trained in manual and computer "MOST" and basic industrial engineering practices during Phases I & II of SP-8's Standards Development Program.

This final report documents all the tasks and the procedures followed in performing those tasks as well as the benefits that can accrue from the application of engineered labor standard data.

III. Task #1, Panel Line Shop Scheduling Standards Development Project

A. Procedures for Developing Shop' Scheduling Standards

The procedures followed for developing scheduling standards were generally similar to those used by Peterson Builders, Inc. for their Pipe Shop Scheduling Standards Pilot Project; with the following exceptions. All "MOST" analyses were developed anew within the MOST Computer System instead of from previously created manual MOST data. Level time standards included only work content items with no allowance for basic personal fatigue and delay. The non-process factor calculation included a basic PFD allowance.

The procedure included the following steps:

- Determine panel line work area layout data (workplace, tools, objects, equipment, operators and carriers) and input to computer.
- Determine all necessary sub-op method steps to cover all shipfitting and welding operations at the panel line.
- Develop MOST analyses for all sub-op method steps using MOST program within MOST Computer System and input to data base.
- Develop combined sub-op groupings that can most easily be frequency counted from plans or bill of materials.
- Develop combined sub-op title sheets for shipfitting and welding operations necessary for generating hull unit standards at the panel line.
- Conduct work sampling study to determine process time and non-process time fractions.
- Calculate a non-process factor.
- Generate hull unit scheduling standards (level time x non-process factor) for sample block of work.
- Evaluate scheduling standards as a tool for predicting actual costs.

*September 1981 - April 1982

B. Panel Line Baseline Data

Type Work Performed: Steel (shell, deck, bhd. plating & framing) flat panels.

- Current Product: Navy (FFG) and Commercial (Falcon Tanker) steel flat panels.

- Work Stations:

- 1) Plate Blanket Fit Station: Fixed position semi-automatic, hydraulic/magnetic seam fitting equipment.
- 2) Plate Blanket Weld Station: First side turn second side weld operation with single or dual arc gantry mounted equipment turn with house bridge crane.
- 3) Layout Station: Manual operation performed by shipfitters anywhere on panel line.
- 4) Longitudinal Stiffener Fit Station: Gantry mounted magnetic/hydraulic fitting equipment.
- 5) Longitudinal Stiffener Weld Station: Gantry mounted automatic Doodlebug fluxcore welding equipment.
- 6) Web/Misc. Fit Station: Manual operation performed by shipfitters in traditional way.
- 7) --web/Misc. Weld Station: Semi-automatic gantry mounted fluxcore equipment.

- Work Schedule - Two shift operation with flow over to third shift for welders on a need basis.

C. Work Sampling Study

A ratio delay study was performed at BIW'S panel line work area during the period 9/28/82 through 10/7/82. The purpose of the study was to determine the current level of productive and non-productive time that existed in the work area in order to develop a realistic non-productive factor with which to adjust level time standards to actual work area conditions.

A work sampling worksheet matrix was developed that divided all worker activities into two major groupings; productive and non-productive activities. Also provided were boxes for the observed worker's trade and the time of day of the observation. This was done so that separate statistics could be developed for each trade (shipfitters, welders) being studied. Productive activities were considered to be any that contributed to getting the job done. It included both method and non-method steps. The exception to this was that all rework was considered to be non-productive. Non-productive activities were considered to be those that did not contribute to completing the job and those spent on rework. See Appendix A for sample of worksheet matrix.

Our technique was to patrol the panel line work area at random times throughout the work day and slot each observed worker into predetermined categories on the worksheet matrix. The random times covered all time segments of the first and second work shifts. The third shift was not included because it was only being worked on a part-time basis during the time of the study. A total of 1,331 observations were made, with 766 covering shipfitters and 565 covering welders. The worksheets were tabulated daily and a running account was kept of the percentages of productive and non-productive observations. Enough observations were taken so that the study results would achieve an accuracy of 95% with a 99% confidence level.

A summary report was prepared outlining the results of the work sampling study and presented to management. The non-productive elements of the study were itemized and quantified and a list of recommendations were made that (we felt) would help reduce the non-productive time at the work area.

The plan was to conduct these work sampling studies on a periodic basis, especially if any corrective actions had been taken, to insure that the non-productive factor would reflect the most current conditions at the work area.

D. Hull Unit Work Package Shop Scheduling Standard Development/
Evaluation

The first step to generating computer standards was to develop and input to the data base the basic standard data structure; that is, "MOST" analyses had to be generated for all necessary sub-operation method steps used at the panel line.

The next step was to organize the sub-operation analyses into combined sub-operation parameters that could easily be frequency counted from hull plans or bill of materials lists : and still produce work package standards with acceptable .accuracy. The importance of this step cannot be overemphasized because how well you organize your standard parameters will determine how efficient your standard development system will be.

The final step of computer standards structure development was to list the combined sub-op analyses by trade onto title sheets and input them to the computer data base. The computer was now ready to generate work package standards.* Only the standard parameters work package frequency counts as determined from plans or-work package bill of materials lists and the non-productive factor as determined by work sampling need to be input to the computer to generate work package shop scheduling... standards.

*See Appendix C for printout of computerized standards structure (MOST analysis, title sheet lists and skeleton standards) backup

The reliability of computer generated shop scheduling standards for forecasting actual expended labor hours was tested on a block of work from our Falcon Tanker Program. Twenty flat panel assemblies from six hull unit work packages that make up a girth section from the midbody of the tanker were chosen for the test. The standard parameter parts frequency counts for the chosen unit work packages was provided to us by Dept. 84 (Production Planning and Control). Hull unit scheduling standards for the test block of work for both shipfitting and welding operations were generated in the computer system time standard data base program and then compared to the actual hours expended on those units as recorded on our in-house labor tracking computer printout.

The test evaluation of computer generated shop scheduling standards on the sample block of work indicate that they were a very reliable tool for predicting actual hours. Overall, the shipfitting standards deviated less than three percent from actuals and the welding standards less than six percent. See Appendix B for results of test in graphic form.

E. Conclusions

1. The MOST Work Measurement Computer System is a sound, reliable tool for measuring actual work content of a job. It will accurately predict how long a job should take if all working time is spent productively.
2. The MOST Work Measurement Computer System data base programs allow for efficient systematic storage of work method analysis data and work package labor standards. The flexibility of the data base programs allows for rapid retrieval of data in whatever format would be most useful for maintaining and updating standards and for more efficient use of standards to control work in process.
3. Computer generated job level standards, when factored by a realistic non-process factor, will reliably predict "will cost" charges (shop scheduling standards).
4. Work sampling studies can accurately project total productive, non-productive percentages for a work area and can serve as a valuable management tool for highlighting potential problem areas that require corrective actions.
5. Manual development of work package parts frequency counts is a labor intense operation, whether for existing manual developed labor standards or for computer generated standards. Standard parameters should be designed to minimize this parts counting and still produce work package labor standards with acceptable accuracy.

- F) Recommendations on Computer MOST in Industry
1. Use of computer MOST is basically a support to manual MOST, and in areas where engineered labor standards are sought, computer MOST should be utilized.
 2. Once initial engineered labor standard data is developed, it is essential to institute periodic work sampling studies for the work area to insure that the non-process factor reflects current conditions and to identify any problem areas that need corrective action.
 3. Use of the format contained herein is judged to be a usable approach to developing scheduling standards.
 4. The approach used herein should be applicable to any other area targeted for engineered labor standards.

IV . Task #2, Welding Incentive Program Evaluation and Proposal for Improvement Project

A. BIW Existing Welding Incentive System Baseline Data

- Individual piecework incentive for welders on selected work.
- Piecework standard rates are in dollars per foot of weld based on standard hours per foot of weld times the current first class welder labor rate.
- Bonus is based on excess of earned piecework dollars over current wage rate for hours worked on piecework incentive.
- Only about 8% of total shipyard welding labor hours are covered by welding incentive system. Balance of work is performed at day rate (current wage. rate).-
- Limited group incentive by work area hull, unit work package contract system.
- Union approval required for any incentive rate change.

B. BIW Piecework Standard Rate Evaluation Study

A welding piece rate evaluation study was completed at the beginning of BIW's Phase III program. The study compared some 300 existing welding piecework rates which had been developed over the years to engineered welding standards developed using the MOST Computer System's weld program. The piecework rates were converted from dollars per foot to hours per foot so that the unit of measure would be the same as the engineered welding standards. A 15% personal fatigue and delay allowance and a 25% earning opportunity factor, i.e. bonus payout, was calculated into the engineered standards. The study indicated considerable variety in the established rates ranging from loose to tight when compared to factored MOST standards. In addition, it was found that much of the backup data for the existing rates had been lost. Based on

these findings, we recommended that a complete re-evaluation and adjustment of all BIW piecework rates, along with the development of consistent/formal backup data, be developed using the MOST Computer System where the data would be stored for ease of retrieval and update before proceeding with any program expansion. In support of this recommendation, input have been made to the weld program data base of electrode deposit rates_and method_as__developed by the Welding Engineering Department.

C. Proposals to Produce a More Productive Welding Incentitive System

Two alternative proposals for improvement to our welding incentive system were developed, both of which would involve the development of new sound engineered welding standards using the MOST Computer System.

The first proposal was to refine and expand the present piecework incentive systems. The first step would be to gain union acceptance of MOST computer generated engineered welding incentive standards and the complete adjustment of the rate structure. After adjustment of the base rates, the present piecework and area work . package contract incentive coverage would gradually be expanded over a two-year period from the present 8% to 48% coverage. This proposal projected a 30% improvement in manhours could be achieved over regular day work, which would result in over a 100,000. MH/year savings when the 48% coverage was achieved.

The second proposal was to develop a new group welding incentive system based on a relatively new concept of giving recognition and reward for actual percentage productivity gains about an established "average past performance level. The recognition and reward would be in the form of a weekly bonus payment based on a four-week running average of the productivity improvement percent and the base pay for all hours worked. All welders who charge to hull unit work would be included in the program and would receive the same percentage share in his bonus payment. Productivity gains would be measured using computer generated engineered hull unit labor time standards factored by a base period productivity factor to reflect realistic productivity levels during the base period. The base productivity factor would be developed by dividing the sum of closed hull unit engineered time standard hours for the base period by the actual hours spent on those closed units.

Both proposals were submitted to management for evaluation. Although management felt that a group plan could improve productivity, it was rejected in favor of the first proposal to revamp the existing system because it involved less of a radical change and would be easier to accomplish and less disruptive in the work force. In support of this decision, we are presently preparing material to be presented to the union that will clearly explain how engineered welding labor standards would be developed and how engineered welding standards would be used to evaluate and adjust the welding incentive rate structure so that the rates would be more consistent and more beneficial to both union welders and management.

V. Task #3, Demonstrate Benefits of MOST Computer System
For Data Simulation

The benefits that could accrue from use of the MOST Computer System data simulation capabilities was demonstrated in ^{the} following two main areas during--the Phase III program.

A. Evaluate Alternative Weld Processes for Commercial Ship
Construction

The MOST Computer System was used to do a complete synthesis of data and simulation of welding of shell erection butts for our Falcon Tanker Program with alternative welding processes. The simulations compared welding the shell butts with semi-automatic fluxcore process to welding the butts with automatic electroslag process. The simulation clearly showed that the savings in manhours using the electroslag process for the entire Falcon Tanker Program would more than offset the cost of the equipment. A printout of this simulation was used to justify the capital expenditure for the electroslag welding equipment, which has since been used successfully on our tanker program. Doing this evaluation through the MOST Computer System's data simulation capabilities rather than manually has been credited by our Cost Reduction Department with saving \$6,800. The successful implementation of more efficient welding equipment has resulted in considerably more savings.

B. Evaluate Alternative Insulation Material Installation Costs

In July, 1982 the Standards Development Team was asked by the cost Reduction Department to evaluate a cost reduction proposal submitted by one of the employees claiming that installation . labor costs could be significantly reduced by switching from the current insulation material being used on our FFG ship program to a proposed new material which had equal insulating qualities and was easier to install.

Two identical areas on one of the ships under construction which requires insulation was chosen for the test evaluation. One area was insulated with the currently used insulation material and the other area was insulated with the proposed new material. The complete process of installation of both materials was observed and a precise method for each was determined. An analysis of each method step was then developed using the MOST Computer System and a standard for each type of material installation was generated.

The data simulation capabilities of the MOST Computer System allowed us to make this evaluation quickly and efficiently. A printout of the simulated data confirmed the claims of the cost reduction proposal. The new material required 18% less labor to install than that required for the currently used material. The data was turned over to the Cost Reduction and Value Engineering Departments for additional evaluation of costs of new material. Ultimately, it was decided that even though labor savings were possible, the added cost of new insulation outweighed the potential savings. For this reason, the new insulation material is not being used at BIW.

VI. TASK #4, PROGRAM DATA COORDINATOR FUNCTION FOR THE SHARED MOST COMPUTER SYSTEM .

A. MOST Computer System Revised Weld Program

M. W. Cunningham, from three-man Standards Development Team, worked successfully with H. B. Maynard to develop the requirements for a new welding program which would be more feasible and adaptable to the many welding processes used in shipyards. The new weld program was released to us in October, 1982, for testing and evaluations. We completed the evaluation of the revised weld program in December of 1982 and the program was released for use by all the participating shipyards. Data submittal forms were developed and sent out to all the shipyards for submitting data for input to the new weld program. See Appendix D for data submittal forms.

B. Universal Data Development and Application

As part of our efforts to make the standard data being developed by the participating shipyards under the MarAd Program more transferable and useful by all, we have prepared an explanatory white paper that outlines the concept of universal data. The paper lists the ground rules and examples of universal data and how it could be used. We have distributed this paper to all the shipyards with the hope that it will stimulate more universal data development which will be usable by all shipyards. See Appendix E for copy of universal data development and application paper.

c. Coordination of H. B. Maynard Consultant Service for SP-8 MOST Users. Task EC-17

In January of 1983, the SP-8 Program Office made arrangements to have Mr. Louis M. Kuh (H. B. Maynard consultant) available for consultant service for the SP-8 MOST users. The Program Data Coordinator was designated to process all requests for consultant service.

Although 30 days were made available for use by the MOST user shipyards, only three days of consultant service were processed through the Program Data Coordinator.

1. NASSCO used one day 12/36/82 to review progress on FY-82 program sheetmetal shop.
2. BSC used two days, 1/31 - 2/1/83 to review data collected on material handling equipment.

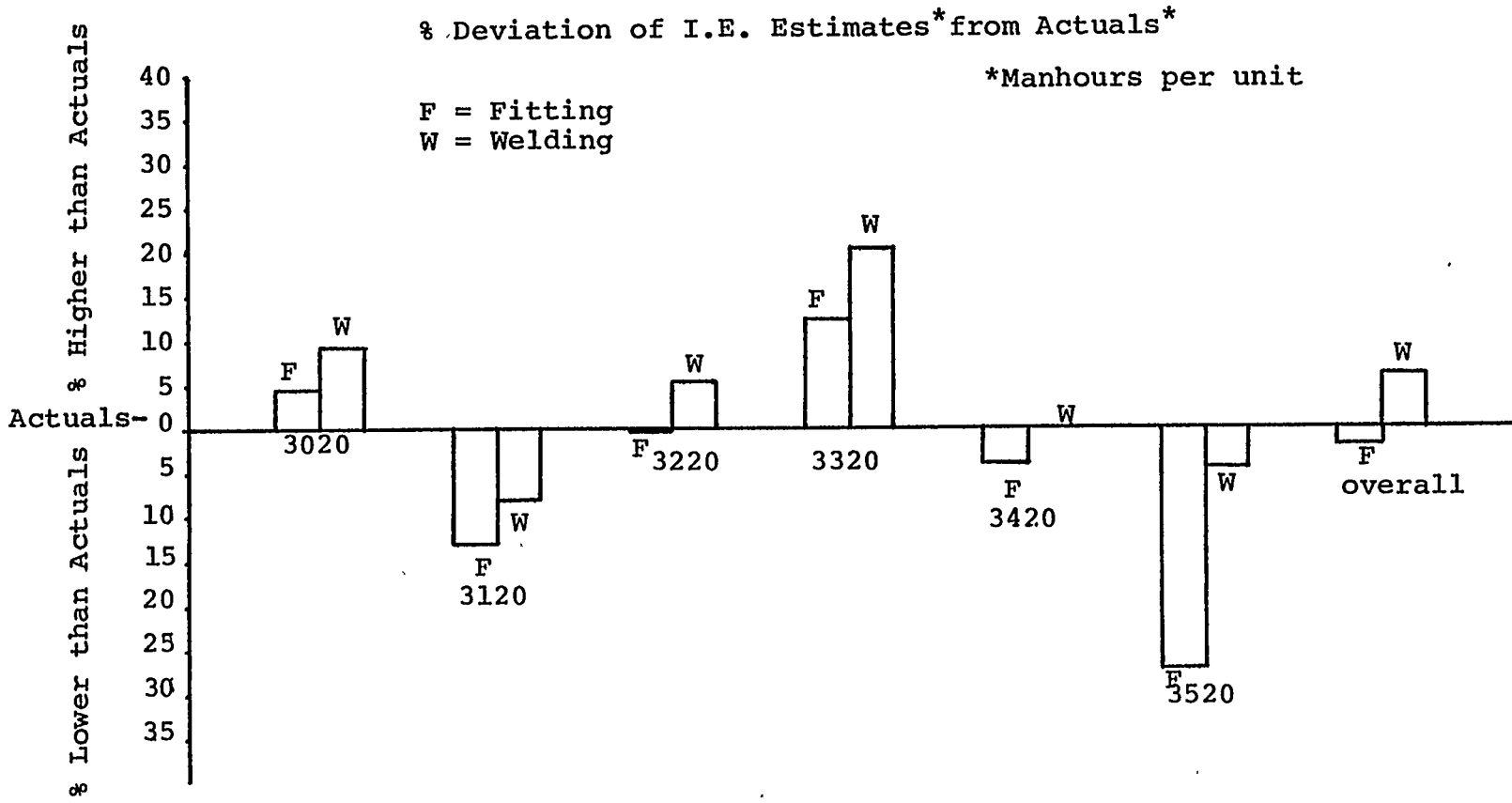
See Appenix F for consultant service reports.

APPENDIX A

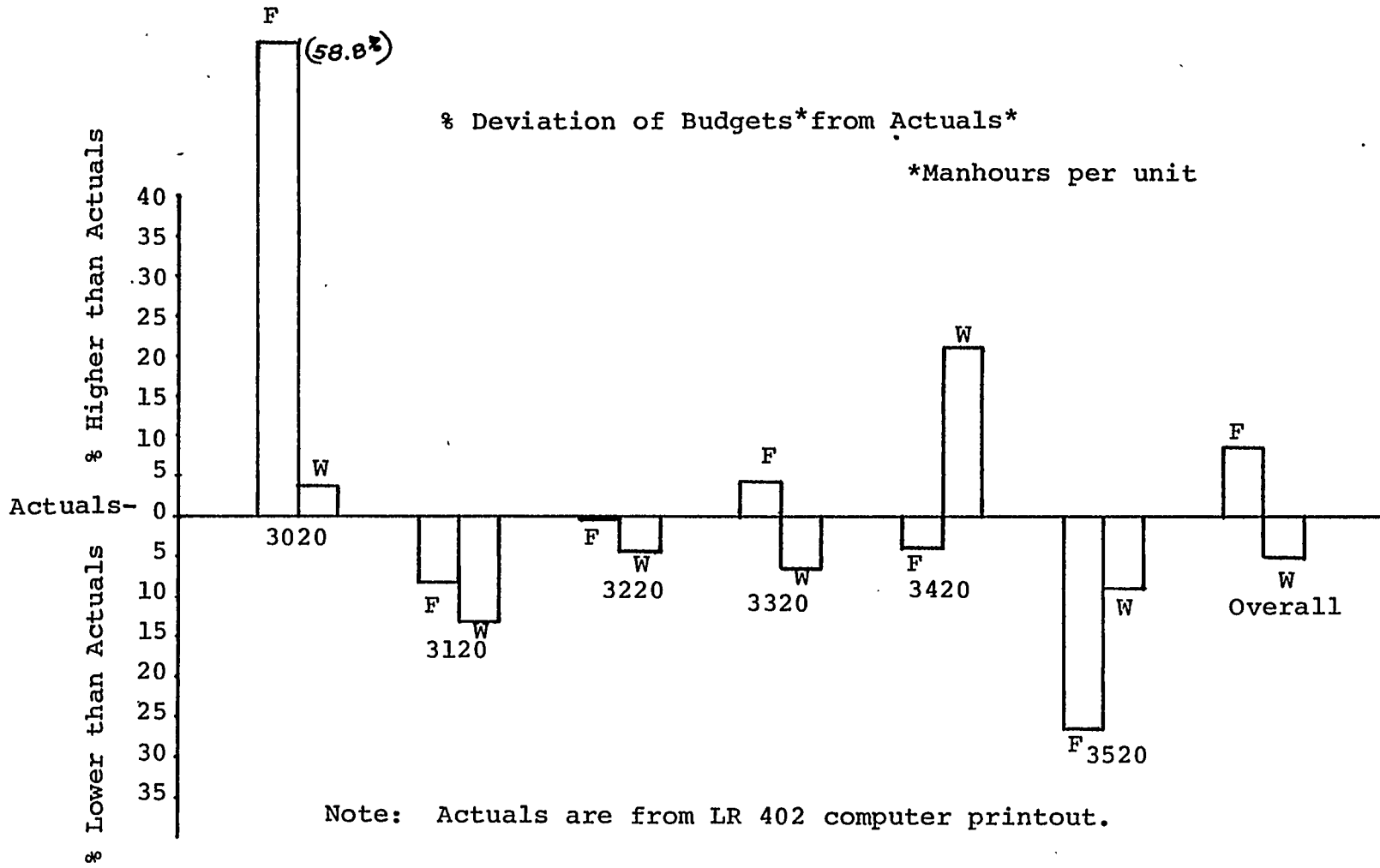
WORK SAMPLING FORM

APPENDIX B

PANEL LINE I.E. STANDARDS EVALUATION



% Deviation of Budgets*from Actuals*
 *Manhours per unit



Note: Actuals are from LR 402 computer printout.

GIRTH SECTION
FITTING

LOC	DETAIL UNIT/FART	HULL	COST CLASS	ISSUE NO.	RATE M H R	DATE
127	3021 -STBD.	404	PANEL LINE	3	70.346	17-NOV-82
129	3021+FORT	404	PANEL LINE	3	70.646	17-NOV-82
131	3022-CENTERLINE	404	PANEL LINE	2	192.073	17-NOV-82
133	3121-STBD,	404	PANEL LINE	2	20.592	17-NOV-82
135	3121-PORT	404	PANEL LINE	2	20.592	17-NOV-82
137	3122-STBD	404	PANEL LINE	2	158.267	17-NOV-82
139	3122-FORT	404	PANEL LINE	2	158.267	17-NOV-82
141	3221-STBD,	404	PANEL LINE	1	21.619	05-NOV-82
143	3221-FORT	404	PANEL LINE	1	21.619	05-NOV-82
143	3222-STBD,	404	PANEL LINE	3	157.130	17-NOV-82
147	3222-FORT	404	PANEL LINE	3	157.130	17-NOV-82
149	3321-STBD.	404	PANEL LINE	1	4.071	08-NOV-82
151	3321-PORT	404	PANEL LINE	1	4.071	08-NOV-82
153	3322-STBD,	404	PANEL LINE	1	4.071	08-NOV-82
155	3322-FORT	404	PANEL LINE	1	4.071	08-NOV-82
157	3323-STBD	404	PANEL LINE	2	118.772	17-NOV-82
139	3323-FORT	404	PANEL LINE	2	118.772	17-NOV-82
141	3324-CENTERLINE	404	PANEL LINE	2	174.670	17-NOV-82
163	3420-CENTERLINE	404	PANEL LINE	3	147.383	17-NOV-82
163	3520-CENTERLINE	404	PANEL LINE	2	103.708	17-NOV-82

Total ^{MAN} HOURS for search : 1728,569

Number of standards for search: 20

Standards locator number ?

FITTING

I.E. EST.	1728.56	
ACTUAL	1774.0	97.4%
BUDGET	1906.0	
ACTUAL	1774.0	= 107,4%

DIRTH SECTION
WELDING

LOC #	DETAIL UNIT/PANEL	Qty.	UNIT CLASS	ISSUE No.	RATE MHR	DATE
128	3021-STBD.	404	PANEL LINE	3	82.505	17-NOV-82
130	3021-PORT	404	PANEL LINE	3	82.505	17-NOV-82
132	3022-CENTERLINE	404	PANEL LINE	2	234.221	17-NOV-82
134	3121-STBD.	404	PANEL LINE	2	19.360	17-NOV-82
136	3121-PORT	404	PANEL LINE	2	19.360	17-NOV-82
138	3122-STBD.	404	PANEL LINE	2	175.240	17-NOV-82
140	3122-PORT	404	PANEL LINE	2	175.240	17-NOV-82
142	3221-STBD.	404	PANEL LINE	1	20.104	05-NOV-82
144	3221-PORT	404	PANEL LINE	1	20.104	05-NOV-82
146	3222-STBD.	404	PANEL LINE	3	177.360	17-NOV-82
148	3222-PORT	404	PANEL LINE	3	177.360	17-NOV-82
150	3321-STBD.	404	PANEL LINE	1	1.955	03-NOV-82
152	3321-PORT	404	PANEL LINE	1	1.955	03-NOV-82
154	3322-STBD.	404	PANEL LINE	1	1.955	03-NOV-82
156	3322-PORT	404	PANEL LINE	1	1.955	03-NOV-82
158	3323-STBD.	404	PANEL LINE	2	172.563	17-NOV-82
160	3323-PORT	404	PANEL LINE	2	172.563	17-NOV-82
162	3324-CENTERLINE	404	PANEL LINE	2	226.058	17-NOV-82
164	3420-CENTERLINE	404	PANEL LINE	3	124.212	17-NOV-82
166	3520-CENTERLINE	404	PANEL LINE	1	100.272	07-NOV-82

Total ~~hrs~~^{man} for search : 1988.846

Number of standards for search: 20

Standards locator number ?

WELDING

I.E. EST,	1988.846	
	-----	105.4%
ACTUAL	1887.0	
BUDGET	1788.0	
	-----	= 94.8%
ACTUAL	1887.0	

APPENDIX C

COMPUTERIZED STANDARDS BACKUP DATA

BIW PANEL LINE WORK AREA

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INTRODUCTION

This volume is a compilation of all the analyses developed for the Panel Line area, Both shipfitting and welding are thoroughly covered by this document, The work methods were documented and the best or most Practical methods are included here, After all the manual methods were identified, they were analyzed using an engineered work measurement system (MOST), These analyses (SUBOPERATIONS) become the basic building blocks of a labor standard, The suboperations reflect individual method steps, but can be combined to describe larger, multi step, operations,

The suboperations and combined suboperations which are pertinent to a specific work area are then consolidated on a titlesheet, The titlesheet is merely a list of the analyses developed for a specific work area,

After the titlesheet has been prepared, the analyst must Quantify the work content of the units scheduled to be built at that work area, Frequencies may then be applied to the analyses on the titlesheet and a level time standard calculated, Typically frequencies are applied on a per foot, per piece, per shift, or per unit basis,

The level time standard is devoid of allowances, Personal, fatigue and delay allowances may be added to create a real world standard suitable for use as a scheduling or budgeting tool, The allowance factor should be determined by some sort of work sampling such as a ratio delay study,

The standards developed in this manner are realistic and accurate measures of work, They can be reliably used for scheduling, budgeting, or line balancing, but should be modified before being used in an incentive system. These standards are backed by carefully developed suboperational data that provides traceability for the standard, Also the standards can be Quickly and easily updated to reflect actual changes in work methods or to simulate a Proposed change and Quantify the impact of such a change, A very important side benefit of this approach is that it forces you to look closely at the existing work methods, document them, and offer recommendations for improving them.

COMPUTERIZED STANDARD BACKUP DATA

SHIPFITTING OPERATIONS

Pages 2 - 109

SECTION 1
SHIPFITTING

1.1 MANUAL METHODS BACKUP

14. MOVE 2 TON WITH BOLT % CLIP AT GENERAL SHIFFIT [25]
 PER OCCURANCE OFG: 4 15-JUN-81
 5 / 8 FITTING BOLT ON MILD STEEL PLATE
 FITTER BEGINS AT JOB

1 PICKUP CLIP WITH BEND		
	A6 B6 G1 A1 BO FO AO	1.00 140.
2 MOVE BOLT TO CLIP AT SELF AND INSERT SIMO 1 2 3		
	<A1 EO G1 >A1)B0 P1 AI	1.00 30.
3 FASTEN NUT AT BOLT 3 SPINS COMPLEX USING FINGERS		
	AI BO G1 AI BO P3 F6 AO BO FO AO	1.00 120.
4 HOLL+PLACE ASSEMBLED BOLT % CLIP TO JOB WITH BEND		
	AO BO GO A6 B6 P3 AO	1.00 150.
5 GET+FUSH TACK-LEAD AT CLIP AND BOLT FOR TACKING PROCESS SIMO 1 2 3 F		
	<AI BO G3 >M1 X42 IO AO	2.00 S60 .
6 HOLD+MOVE TACK-LEAD TO JOB		
	AO BO GO AI BO P1 AO	1. 0]0 20.
7 FASTEN NUT AT BOLT 10 ARM-STROKES USING WRENCH AND RETURN TO TOOLS		
	A6 BO G1 A6 BO P3 F54 A6 BO F1 AO	1.00 770 .

TOTAL TMU 2090.

SHIPFITTING

10 MEASURE COLLAR USING PROFILE-GAUGE (=SQUARE) AT FRAME-LINE AND ASIDE TO TOOL TRAY PF 3 (456 7)F1/4			
A3 B6 G1 (A3 BO P1 M10)AI BO P1 AO (3)	0.25		135.
11 MARK (=SCRIBE) AT COLLAR 1 DIGIT USING MARKER AND ASIDE TO FITTER P F 3 (4 5 6 7) F 1 / 4			
AI RO G1 (AI BO P1 R3)AI BO F1 AO (3)	0.25		48.
12 FULL AND GUIDE TORCH AT BURN-25-PLT PROCESS +3 CUTS F 3 / 4			
A32 B6 G1 M1 X42 I3 AO	0.75		638.
13 FASTEN COLLAR 15 TAPS USING SLAG HAMMER AND ASIDE TO TOOLTRAY			
A67 B6 G1 A3 BO PO F16 AI BO P1 AO	1.00		950.
14 CLOSE+PLACE COLLAR TO CUT-OUT IN FRAME-LINE F 1 / 4			
AO BO G1 A3 B6 P3 AO	0.25		33.
15 GET+PICKUP TACK-LEAD TO COLLAR			
A3 BO G3 A3 B6 PO AO	1.00		150.
16 HOLD+PUSH TACK-LEAD PROCESS F 4			
AO BO GO M1 X42 IO AO	4.00		1720.
17 INSPECT 3 POINTS			
AO BO GO AO BO PO T3 AO BO PO AO	1.00		30.
18 FASTEN COLLAR 3 STRIKES USING HAMMER AND ASIDE			
A1 BO G1 AI BO PO F6 A1 BO P1 AO	1.00		110.
19 HOLD+PUSH TACK-LEAD PROCESS F 4			
AO BO GO M1 X42 IO AO	4.00		1720.
20 HOLD+MOVE TACK-LEAD TO JOB			
AO BO GO A3 BO P1 AO	1.00		40+
21 MARK AT COLLAR 3 DIGITS USING MARKER AND ASIDE TO FITTER			
AI BO G1 A3 B6 P1 R10 AI BO P1 AO	1.00		240.
		TOTAL TMU	6942.

SHIPFITTING

76. INSTALL NON-TIGHT COLLAR ON BOTTOM SHELL AT LOWER UNIT ASSEMBLY SHOP
SHIPFIT

PER EACH OFG: 2 16-JUL-81
FITTER BEGINS AT TOOLBOX

1	MOVE TOOL TRAY TO FRAME-LINE F 1 / 64		
	- AI BO G1 A67 B6 P1 AO	0.02	12.
2	GET+PICKUP 5 COLLARS TO JOB F 1 / 5		
	A24 BO G3 A24 B6 PO AO	0.20	114.
3	HOLD+TOSS EACH COLLAR TO FRAME-LINE WITHOUT BEND		
	AO BO GO A3 BO PO AO	1.00	30.
4	MOVE COLLAR WITH BEND TO WEB-FRAME AT FRAME-LINE AND HOLD		
	AI B6 G1 AI BO P1 AO	1.00	1.00
5	FASTEN COLLAR 15 TAPS USING SLAG HAMMER AND ASIDE TO TOOL TRAY		
	AI BO G1 AI BO PO F16 AI BO P1 AO	1.00	210.
6	CLOSE+PLACE COLLAR TO CUT-OUT IN FRAME-LINE		
	AO BO G1 AI BO P3 AO	1.00	50.
7	GET+PICKUP TACK-LEAD TO COLLAR		
	A3 B6 G3 A3 B6 PO AO	1.00	210.
8	HOLD+PUSH TACK-LEAD PROCESS F 4		
	AO BO GO M1 X42 IO AO	4.00	1720.
9	INSPECT 3 POINTS		
	AO BO GO AO BO PO T3 AO BO PO AO	1.00	30.
10	FASTEN COLLAR 3 STRIKES USING HAMMER AND ASIDE		
	AI BO G1 AI BO PO F6 AI BO P1 AO	1.00	110.
11	HOLD+MOVE TACK-LEAD TO JOB		
	AO BO GO A3 B6 P1 AO	1.00	100.
12	MARK AT COLLAR 3 DIGITS USING MARKER AND ASIDE TO FITTER		
	AI BO G1 A3 B6 P1 R10 AI BO P1 AO	1.00	240.

TOTAL TMU 2926.

SHIPFITTING

114. MAKE UP STIFFENER TIE-BUTT ON BOTTOM SHELL WITH BOLT-ON GOOSENECK,
 JACK, LUGALL AT LOWER UNIT ASSEMBLY

PER EACH OFG: 3 31-AUG-81

FREQ, JACK = 1 -----FREQ. LUGALL = 1 ,
 X FOR TEE BAR OR BUILT-UP WEBS.

FITTER BEGINS AT TOOLBOX

1 MOVE TOOL TRAY TO BUTT F 1 / 16

AI BO GI A67 B6 P1 AO 0.06 48.

2 GET+MOVE BOLT-ON GOOSENECK JIG TO TIE BUTT F 1 / 16

A173B0 G3 A173B6 P1 AO 0.06 223.

3 MEASURE TEE BAR BUTT USING PROFILE-GAUGE (= SQUARE) AND ASIDE TO
 TOOLTRAY

AI BO G1 A1 BO P1 M1O AI BO P1 AO 1.00 160.

4 LOOSEN 4 BOLTS AT GOOSENECK JIG 6 SPINS USING FINGERS F 2

AI BO G1 AO BO (P1 AI L10)AO BO PO AO (4) 2.00 1000.

5 HOLD+PLACE GOOSENECK JIG ON TO TEE BAR AT TIE BUTT

AO BO GO AI BO P3 AO 1.00 40.

6 FASTEN 4 BOLTS AT GOOSENECK JIG 6 SPINS COMPLEX USING FINGERS F 2

AI BO GI AO BO (F3 AI F1O)AOBO PO AO (4) 2.00 1160.

7 GET+PICKUP TACK-LEAD TO TEE BAR BUTT

A3 B6 G3 A3 B6 PO AO 1.00 210.

8 HOLD+PUSH TACK-LEAD PROCESS F 5

AO BO GO M1 X42 IO AO 5 . O O 2150.

9 HOLD+MOVE TACK-LEAD TO NEXT STRINGER-LINE

AO BO GO A3 B6 P1 AO 1.00 100.

TOTAL TMU 5090 .

SHIFFITTING

289. MOVE PLATE ON PANEL WITH STRONGBACK AT ANY WORK AREA SHIFFIT
 PER OCCASION OFG: 2 04-NOV-81
 ALL MATERIAL AND EQUIPMENT MOVED TO WORKSITE PRIOR, SEAM IS ALREADY
 MADE UP
 * USE TO IMMOBILIZE SEAMS
 * WHEN STUDS ARE NOT AVAILABLE
 FITTER BEGINS AT JOB

1 PICKUP STRONGBACK FROM TOOLS WITH BEND TO JOB	A6 B6 G1 A6 B0 PO AO	1.00	190.
2 GET+PUSH TACK-LEAD FOR TACKING PROCESS PF 6 (4 5)	AI BO G3 (M1 X42)10 AO (6)	1.00	2620 l
3 HOLD+MOVE TACK-LEAD TO JOB	AO BO GO AI BO P1 AO	1.00	20•
4 PICKUP SADDLE FROM TOOLS TO JOB	A6 BO G1 A6 BO PO AO	1.00	130.0
5 GET+PUSH TACK-LEAD FOR TACKING SADDLE PROCESS PF 2 (4 5)	AI BO G3 (M1 X42)10.AO (2)	1.00	. 900.
6 HOLD+MOVE TACK-LEAD TO JOB	AO BO GO AI BO P1 AO	1.00	20•
7 PICKUP HAMMER AND WEDGE TO JOB AND INSERT WEDGE INTO SADDLE FOR STRAIGHTENING BULKHEAD	A6 BO G1 A6 BO PO AI	1.00	140.
8 HOLD+FASTEN WEDGE 5 STRIKES USING HAMMER AND HOLD	AO BO GO AI BO FO F10 AO BO PO AO	1.00	110.
9 INSPECT 1 POINT F 2	AO BO GO AO BO PO T1 AO BO PO AO	2.00	20.
10 HOLD+FASTEN WEDGE 3 STRIKES USING HAMMER AND ASIDE TO JOB	AO BO GO AI BO PO F6 AI BO P1 AO	1.00	90.
11 LOOSEN WEDGE 3 STRIKES USING HAMMER AND RETURN TO TOOLS	AI BO G1 AI BO PO L6 A6 BO P1 AO	1.00	160.,
	TOTAL TMU		4400 .

SHIPFITTING

290. MAKE UP VERTICAL SEAM IN BULKHEAD WITH DOG 8 WEDGE AT UPPER UNIT
ASSEMBLY SHOP SHIPFIT

PER FOOT OFG: 2 04-NOV-81

* FREQ DOG & WEDGE = 1 (LOC # 15)

* FREQ STRONGBACK " 1/2 (LOC #289)

* FREQUENCIES FROM SAMPLES

FITTER BEGINS AT TOOLBOX

1 MOVE TOOLTRAY TO BULKHEAD F 1 / 40

A1 BO G1 A152BO P1 AO 0.03 39.

2 HOVE DOGS AND WEDGES FROM TOOLBOX TO BULKHEAD F 1 / 10

A15236 G1 A152BO P1 AO 0.10 312.

3 GET+MOVE STRONGRACKS TO BULKHEAD F 1 / 10

A152B6 G3 A152110 P1 AO 0.10 314.

4 GET+PULL WITH 20 STEPS TACK-LEAD FROM WELD-AREA AND CLIMB-STEP TO
BULKHEAD WITH 25 STEPS PF 4 (2) F 1 / 20

A32 (B1O)G3 M1 XO IO A42 (4) 0.05 39.

5 SLIDE DOG ACROSS BULKHEAD AT BULKHEAD FOR CHECKING ALIGNMENT PF 4 (4
)

A1 BO G1 (M3)XO IO AO (4) 1.00 140.

6 GET+PUSH TACK-LEAD WITH BEND PROCESS 2 TACKS FOR THAT PART OF WORK
WHICH IS WITHIN REACH F 2 / 3

A1 B6 G3 M1 X96 IO AO 0.67 713.

7 GET+PUSH TACK-LEAD WITH CLIMB-OBJECT PROCESS 2 TACKS FOR THAT PART
OF WORK WHICH REQUIRES STAGING F 1 / 3

A1 B32 G3 M1 X96 IO AO 0.33 443.

8 HOLD+MOVE TACK-LEAD TO ASSEMBLY WITHOUT STEPS

AO BO GO A1 BO P1 AO 1.00 20.

TOTAL TMU 2040.

SHIPFITTING

318. MOVE OPERATOR ON UNIT WITH LADDER AT UNIT ASSEMBLY SHOF'
 PER TRIP OFG: 2 01-DEC-81
 FOR 16 RUNG LADDER WITHOUT LOAD 60% OF THE TIME.
 FITTER BEGINS AT UNIT

1 HOLD+MOVE OPERATOR WITHOUT BURDEN FROM UNIT TO HIGH PART OF ASSEMBLY UP 16 STEP LADDER SIMO 6 F .6	AO BO GO A32 B16 <P1>*AO	0.60	288 .
2 HOLD+MOVE OPERATOR WITH BURDEN FROM UNIT TO HIGH PART OF ASSEMBLY UP 16 STEP LADDER SIMO 6 F .4	AO BO GO A32 B16 <P1>.AO	0.40	192.
3 PUSH LADDER-RUNG PF 16 (1 2 3 4 5 6 7) F .6	(A1 BO G1 H1 XO IO AO)	0.60	288.
4 PRESS LADDER-RUNG PF 16 (1 2 3 4 5 6 7) F .4	(A1 BO G1 M3 XO IO AO)	0.40	320.
	TOTAL TMU		1088 .

552. MOVE (1 TON) IN (ANY POSITION) WITH HOIST (CABLE LUGALL) AT ANY (WORK AREA) SHIPFIT
 PER OCCURANCE OFG: 3 08-FEB-82
 ATTACHMENTS INSTALLED PRIOR, LUGALL MOVED TO WORKSITE PRIOR.
 FITTER BEGINS AT JOB

1 GET+PLACE HOIST TO JOB AND INSERT LOWER HOOK	A6 BO G3 A6 BO P3 A1	1.00	190.
2 PUSH LOCK AT HOIST	A1 BO G1 M1 XO IO AO	1.00	30.
3 HOLD+PULL HOIST FROM JOB TO HOOK-UP	AO BO GO M1 XO IO A10	1.00	110.
4 HOLD+PLACE HOIST TO HOOK-UP AND INSERT UPPER HOOK	AO BO GO A1 BO P3 A1	1.00	50.
5 OPERATE LEVER AT HOIST FOR MOVING OBJECT PF 30 (4)	A1 BO G1 (M6)XO IO AO (30)	1.00	1820.
6 PUSH LOCK AT HOIST WITH BEND	A1 B6 G1 M1 XO IO AO	1.00	90.
7 OPERATE LEVER AT HOIST FOR UNLOCKING PF 4 (4)	A1 BO G1 (M6)XO IO AO (4)	1.00	260 .
8 PUSH +HOLD LOCK AT HOIST FOR UNLOCKING	A1 BO G1 M1 XO IO AO	1.00	30.
9 PULL WIRE AT HOIST FOR SLACK	A1 BO G1 M1 XO IO AO	1.00	30.
10 HOLD+REMOVE HOIST FROM HOOK-UP TO SELF	AO BO GO A1 BO P1 AO	1.00	20.
11 OPERATE HOIST LEVER +WALK FROM HOOK-UP TO JOB PF 60 (4)	A1 BO G1 (M6)XO IO A10	1.00	3720.

SHIPFITTING

12 REMOVE LOWER HOIST HOOK FROM JOB TO SELF			
	A1 BO G1	A1 BO P1 AO	1.00 40.
13 HOLD+REMOVE HOIST TO TOOLS			
	AO B0 GO	A6 BO P1 AO	1.00 70.
		TOTAL TMU	6460.

557. MOVE (SHALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT
 ASSEMBLY SHOP SHIPFIT
 PER UP TO 10 PIECES OFG: 2 08-FEB-82
 PARTS ARE PRESORTED ON MOCK STORAGE -- MAY BE BUNDLED.
 FITTER BEGINS AT UNIT

1-GET+MOVE PARTS WITH CLIMB-STEP FROM MOCK TO UNIT WITH CLIMB-STEP			
	A67 B1O G3	A67 B1O P1 AO	1.00 1580.
		TOTAL TMU	1580.

559. INSTALL COLLAR ON BULKHEAD AT ANY (WORK AREA) SHIPFIT
 PER EACH OFG: 3 08-FEB-82
 FITTER BEGINS AT JOB

1 MOVE HAMMER TO JOB WITH 1 STEP			
	A6 BO G1	A3 BO P1 AO	1.00 110.
2 PLACE COLLAR TO BULKHEAD CUTOUT AND INSERT			
	AI BO G1	AI EO P3 AI	1.00 70.
3 INSPECT 3 POINTS			
	AO BO GO	AO BO PO T3 AO EO PO AO	1.00 30.
4 FASTEN COLLAR 3 STRIKES USING HAMMER AND ASIDE TO JOB			
	AI BO G1	AI B0 PO F6 AI BO P1 AO	1.00 110.
5 INSPECT 3 POINTS			
	AO BO GO	AO BO PO T3 AO BO PO AO	1.00 30.
6 MARK AT COLLAR 3 DIGITS (WELD SIZE) USING MARKER AND ASIDE TO FITTER			
	AI BO G1	AI BO P1 R1O AI BO P1 AO	1.00 160.
		TOTAL TMU	510.

SHIPFITTING

583 . MAKE READY (FITTER FOR SEAM MAKE-UP) AT FLAT PANEL SHOP (P.L.).SHIFFIT
PER EACH OFG: 4 12-APR-82

MOVING ALL PERSONAL GEAR TO SEAM-FIT-GANTRY*USUALLY ONCE PER PANEL
BLANKET,

* FITTER BEGANS AT OFFICE.

* ALSO INCLUDES GANTRY

* POWER TURN ON/OFF.

* AND RETURN TO TOOLBOX

* AT END OF JOB.

FITTER BEGINS AT OFFICE

1	WAIT 2 M (RECEIVE INSTRUCTIONS BY LEAD PERSON		
		1.00	2334 .
2	OPEN COVER AT TOOLBOX PF 2 (3 4) OPEN / CLOSE		
	A32 BO (G1 M3)XO IO AO (2)	1.00	400.
3	GET+MOVE WITH BEND TOOLBAG AND TOOLTRAY FROM TOOLBOX TO S EAM-FIT-GANTRY WITH CLIMB-STEP PF 2 (5)		
	A1 B6 G3 A196(B10)P1 AO (2)	1.00	2270 .
4	PUSH BUTTON AT SEAM-FIT-GANTRY F 2.PT 1 S AND TURN POWER ON / OFF		
	A1 BO G1 M1 X3 IO AO	2.00	120 .
5	WAIT 5 M AND STUDY BLUEPRINT		
		1.00	8335.
6	GET-MOVE TOOLBAG AND TOOLTRAY WITH BEND FROM SEAM-FIT-GANTRY TO TOOLBOX WITH CLIMB-STEP PF 2 (5)		
	A1 B6 G3 A196(B10)P1 AO (2)	1.00	2270.
7	OPEN COVER AT TOOLBOX PF2 (3 4) OPEN / CLOSE		
	A1 BO (G1 M3)XO IO AO (2)	1.00	90.

TOTAL TMU 16819.

SHIPFITTING

584, SET-UP AND TEAR DOWN CLEVIS (GROUND-CLAMP) ON ASSEMBLY (PLATE) AT FLAT
PANEL SHOP (P.L.) SHIPFIT

PER EACH OFG: 4 13-APR-82

ALLOWS FITTER TO CHECK ALIGNMENT BEFORE ATTACHING GROUND-CLAMP; AND
REMOVAL OF GROUND AFTER SEAM MAKE-UP.

* FITTER STARTS AT GANTRY

FITTER BEGINS AT GANTRY

1 WALK FROM GANTRY TO UNIT WITH 20 STEPS

A32 BO Go Ao Bo Po Ao 1.00 320.

2 PLACE GROUND-CLAMP FROM GANTRY TO GANTRY (PLATE EDGE) WITH BEND
AND WITHOUT STEPS

A16 BO G1 A1 B6 P3 AO 1.00 270.

3 HOLD+FASTEN GROUND-CLAMP WITH 5 WRIST-TURNS USING HAND

AO BO GO AI B0 P1 F1O AO BO PO AO 1.00 120.

4 LOOSEN GROUND-CLAMP WITH 5 WRIST-TURNS USING HAND

AI BO G1 AI BO P1 L1O AO BO PO AO 1.00 140.

TOTAL TMU 850.

585, TRANSPORT PLATE ON POSITIONER WITH MAGNET (CRANE) AT FLAT PANEL SHOP
(P.L.) SHIPFIT

PER EACH OFG: 4 13-APR-132

1ST PLATE FOR EACH PANEL BLANKET.

* TO LAND 1ST PLATE ONLY.

FITTER BEGINS AT UNIT

1 WALK FROM UNIT TO GANTRY WITH 6 STEPS

A1O BO GO AO BO PO AO 1.00 1.00

2 WAIT 45 S WHILE CRANE TRANSFORMS PLATE FROM GRIND-PREP AREA TO
SEAM-FIT-AREA

1.00 1251.

3 FULL HANDLE AT GANTRY PT 30 S AND DISPLACE PLATE 10 FT. BY CONVEYOR

AI BO G1 MI X81 IO AO 1.00 640.

4 WALK FROM GANTRY TO UNIT WITH 6 STEPS

A1O BO GO AO BO PO AO 1.00 100.

TOTAL TMU 2291.

SHIPFITTING

586. ALIGN PLATE ON POSITIONER WITH MAGNET AT FLAT PANEL SHOP (P.L.) SHIPFIT

PER EACH OFG: 4 12-APR-82

PLATE EDGE GROUND PRIOR BY D-39. ONE PLATE OR MADE-UP PANELS
ALREADY IN POSITION,

- * THIS SUB-OF FOR 2ND FLATE
- * OF ANY BLANKET MAKE-UP.
- * ASSUME PLATE WITHIN 61N.
- * OF ALIGNMENT POSITION.

FITTER BEGINS AT GANTRY

1 WAIT 45 S WHILE CRANE TRANSFORMS FLATE FROM GRIND-FREF AREA TO SEAM
-FIT-GANTRY AREA

1.00 1251 .

2 FULL HANDLE AT GANTRY AND BEND+STAND PT 30 S (DISPLACE PLATE 10 FT.
BY CONVEYOR)

AI B16 G1 M1 X81 IO AO 1.00 1000.

3 FITTER WALK TO UNIT WITH 4 STEPS

A6 BO GO AO BO PO AO 1.00 60•

4 MEASURE PLATE AT UNIT WITH BEND USING STEEL-TAFE AND HOLD

AI BO G1 AI BO P1 M32 AO BO PO AO 1.00 360.

5 HOLD+MOVE STEEL-TAPE TO UNIT EDGE WITH 3 STEPS AND BEND

AO B0 GO A6 B6 P1 AO 1.00 130.

6 HOLD-PRESS STEEL-TAPE FROM UNIT TO FITTER

AO BO GO M3 XO IO AI 1.00 40.

7 MANIPULATE STOP AT UNIT WITH 4 STEPS AND CLIMB-STEP AND RETURN TO
GANTRY WITH 16 STEPS AND CLIMB-STEP PF 4 (1 2 3 4)

(A6 B10 G1 M10)XO IO A32 B10 1.00 1500.

8 PUSH BUTTON AT GANTRY WITH BEND+SIT FIT 3 S PF 4 (34 5) LINE
PLATE UP-TO END STOPS

A1 B6 (G1 M1 X10)10 AO (4) 1.00 550 l

9 PUSH BUTTON AT GANTRY PT 3 S F 4 LINE FLATE UP-TO SIDE ROLLS

AI BO G1 M1 X10 IO AO 4.00 520.

10 PUSH BUTTON AT GANTRY F 2 PT 3 S LINE-UP LEVELING TABLE

AI BO G1 M1 X10 IO AO 2.00 260.

TOTAL TMU 5571 .

SHIPFITTING

537. TACK PLATE ON POSITIONER WITH SEMIAUTOMATIC AT FLAT PANEL SHOP (P.L.)
SHIPFIT

PER EACH OFG: 4 13-APR-82

POSITION JACKS TO WELD 1ST TACK.

* FITTER AT GANTRY (PLATE

* EDGE),

* METHOD ONLY FOR 1ST TACK+

FITTER BEGINS AT GANTRY

1 WALK FROM GANTRY (PLATE EDGE) TO GANTRY (JACKS) WITH 3 STEPS

A6 BO GO Ao BO Po Ao 1.00 60.

2 PUSH BUTTON AT GANTRY FIT 1.5 S AND ENGAGE JACKS

A1 BO G1 MI X3 IO AO 1.00 60.

3 PLACE SEMIAUTOMATIC FROM WEB WITHOUT STEPS TO GANTRY WITH KNEEL SIMO

<A1 BO G1 AI)B16 P3 AO> 1.00 0.

4 INSPECT 5 POINTS

AO BO GO AO BO PO T6 AO HO PO AO 1.00 60.

5 MOVE HOOD FROM TOOL-BAG WITHOUT STEPS TO FITTER WITH 3 STEPS

AI BO G1 AA HO PI AO 1.00 90.

5 PULL HOOD AT FITTER

AI BO G1 MI XO IO AO 1.00 30.

7 PRESS SEMIAUTOMATIC AT GANTRY FT 6 S

A1 BO G1 M3 X16 IO AO 1.00 210.

8 PUSH HOOD AT FITTER

AI BO G1 M1 XO IO AO 1.00 30.

9 PRESS BUTTON AT GANTRY F 12 / 14 PT 6.5 S JACKS RELEASE AND TRAVERSE
14 IN, THEN REENGAGE

AI BO G1 M3 X16 IO AO 0+86 180.

TOTAL TMU 720 .

SHIPFITTING

588, MAKE UP SEAM ON POSITIONER WITH JACK AND MAGNETS AT FLAT PANEL SHOP
(P.L.) SHIPFIT

PER EACH OFG: 4 13-APR-82

PLATES POSITIONED PRIOR TO MAKE UP,

- * FITTER BEGINS AT SEAM.
- * METHOD FOR 1 FT. OF SEAM.
- * FITTER BEGINS WITH PRESS
- * ENGAGED AND WELDING HOOD
- * ON.

FITTER BEGINS AT GANTRY

1	GET+PLACE SEMIAUTOMATIC FROM WEB WITHOUT STEPS TO GANTRY													
		A1	BO	G3	A1	BO	P3	AO	1.00	80.				
2	INSPECT 3 POINTS													
		AO	BO	GO	AO	BO	PO	T3	AO	BO	PO	AO	1.00	30.
3	MOVE HOOD FROM TOOL-BAG TO FITTER SIMO													
		<	A16B0	G1	A16	BO	P1	AO	>	1.00	0.			
4	PULL HOOD AT FITTER													
		A1	BO	G1	M1	XO	IO	AO	1.00	30.				
5	PRESS SEMIAUTOMATIC AT GANTRY PT 6 S													
		A1	BO	G1	M3	X16	IO	AO	1.00	210.				
6	PUSH HOOD AT FITTER													
		A1	BO	G1	M1	XO	10	AO	1.00	30.				
7	PRESS BUTTON AT GANTRY F 12 / 14 PT 6.5 S JACKS RELEASE AND TRAVERSE													
	14 IN. THEN REENGAGE													
		A1	BO	G1	M3	X16	IO	AO	0.86	180.				

TOTAL TMU 560.

SHIPFITTING

(609, MARK (LAYOUT LINE) ON DECK (PLATE) WITH (HAMMER AND) F'UNCH AT ANY (WORK AREA) SHIPFIT

PER FOOT OFG: 1 15-NW-82

LINES ARE MARKED PRIOR WITH CHALKLINE

* ASSUMES FITTER MUST CHANGE POSITION

* BY CRAWLING ON KNEES ALONG LAYOUT LINE

FITTER BEGINS AT UNIT

1	HAVE TOOLTRAY FROM UNIT TO STIFFENER SIMO		
	<A1 B0 G1 A10 B0 P1 A0 >	1.00	0.
2	PICKUP HAMMER AND CENTER PUNCH TO FITTER WITH BEND F 1 / 40		
	AI H0 G1 AI B6 F0 A0	0.03	2.
3	HOLD+FUSH AND GUIDE FUNCH F 2		
	A0 B0 G0 M1 X0 13 A0	2.00	80.
4	HOLD+FASTEN FUNCH 1 STRIKE USING HAMMER AND HOLD F 2		
	A0 B0 G0 AI E0 P0 F3 A0 E0 F0 A0	2.00	80.
5	MOVE HAMMER AND FUNCH TO STIFFENER WITH PBEND F .5 SIMO (1 3)		
	<AI>B0 <G1>A1 B3 P1 A0	0.50	25.
6	HOLD+MOVE HAMMER AND.PUNCH TO TOOLTRAY F 1 / 40		
	A0 80 GO AI D0 F1 A0	0*03	0.
	TOTAL TMU		188.

SHIPFITTING

610, MARK PLATE WITH CHALKLINE AT ANY PANEL SHOP SHIFFIT

PER FOOT OFG: 3 19-APR-82

TWO MAN OPERATION, BOTH BEGIN AT JOB, METHOD DEVELOPED FROM 20 FOOT, OPERATION,

- * REVS. BASED ON 61N.
- * PER RERACTION.
- * FITTER AND HELPER
- * HAVE CHALKLINE AT
- * STIFFENER,
- * TMU'S MUST BE DOUBLED
- * FOR SECOND OPERATOR.

FITTER BEGINS AT STIFFENER

1 HELPER MOVE TOOLTRAY FROM UNIT TO STIFFENER SIMO	<A1 B0 G1 A10 E10 P1 A0 >	1.00	0.
2 HELPER MOVE CHALKLINE FROM TOOLTRAY TO SELF F 1 / 20	A1 B0 G1 A1 B0 P1 A.0	0.05	2.
3 FITTER FULL CHALKLINE FROM HELPER TO UNIT WITH 8STEPS F1 / 20	A1 B0 G1 M1 X0 I0 A10	0.05	7.
4 FITTER PRESS CHALKLINE WITH BEND AND LOCATE F 1 / 20	A1 B6 G1 M3 X0 I1 A0	0.05	6.
5 HELPER PRESS CHALKLINE WITH BEND AND LOCATE SIMO	<A10B6 G1 M3 X0 I1 A0 >	1.00	0.
6 FITTER PRESS CHALKLINE AT UNIT AND SNAP LINE F 1 / 20	A1 B0 G1 M3 X0 I0 A0	0.05	2.
7 FITTER CRANK CHALKLINE 21 REVS F 2 / 20	A1 B0 G1 M32 X0 I0 A0	0.10	34.

TOTAL TMU 51.

SHIPFITTING

(611, MARK ASSEMBLY WITH MARKER AT ANY LAYOUT AREA SHIPFIT
PER EACH OFG: 3 19-APR-82

THIS SUB-OP MARKS ONE POINT AFTER ANY MEASURING DEVICE HAS BEEN
POSITIONED

* TYPICAL SINGLE POINT

* LAYOUT,

FITTER BEGINS AT UNIT

1 FITTER WALK FROM UNIT TO WEB WITHOUT STEPS AND WITH PBENU			
	A1 B3 GO A0 B0 F0 A0	1.00	40.
2 HAVE MARKER FROM TOILTRAY TO FITTER AND HOLD SIMO			
	<A10B0 G1 A10 B0 F1 A0 >	1.00	0.
3 HOLD+MARK ON WEB 1 DIGITS USING MARKER AND HOLD			
	A0 E10 G0 A1 E0 P1 R3 A0 B0 P0 A0	1.00	50.
		TOTAL TMU	90.

612, ARRANGE TAPE ON ASSEMBLY AT ANY LAYOUT AREA SHIFFIT
PER FOOT OFG: 3 19-APR-82

THIS SUB-OF ALLOWS FULLING OUT TAPE AND RETRACTION. SUB-OF FOR 50 FT.
METHOD, INCLUDING ALIGNMENT OF TAPE.

* SPRING-CLAMF USED TO

* HOLD TAPE,

FITTER BEGINS AT TOOLBOX

1 MOVE LONGTAPE FROM TOOLBOX TO TOOLTRAY SIMO			
	<A1 E0 G1 A1 B0 F1 A0 >	1.00	0.
2 MOVE CLAMP FROM TOOLCRIB TO TOOLTRAY SIMO			
	<A152E0 G1 A152B0 P1 A0 >	1.00	0.
3 MOVE TOOLTRAY FROM TOOLBOX TO STIF-FIT SIMO			
	<A1 H0 G1 A113B0 F1 A0 >	1.00	0.
4 HAVE LONGTAPE AND CLAMP FROM TOOLTRAY TO FITTER F 1 / 50			
	A1 H0 G1 A1 B0 P1 A0	0.02	1.
5 FULL LONGTAPE AT STIF-FIT AND HOLD F 1 / 50			
	A1 B0 G1 M1 X0 I0 A0	0.02	1.
6 PRESS AND GUIDE LONGTAPE AT STIF-FIT WITH BEND F 1 / 50			
	A1 B6 G1 M3 X0 I3 A0	0.02	3.
7 OPEN+SHUT CLAMF ON TAPE AT STIF-FIT F 2 / 50			
	A1 B0 G1 M6 X0 I0 A0	0.04	3.
8 FITTER WALK FROM STIF-FIT TO STIF-FIT WITH 20 STEPS AND WITH BEND F 1 / 5 0			
	A32 B6 G0 A0 B0 P0 A0	0.02	8.
9 FITTER CRANK LONGTAPE 21 REVS F 4 / 50 (WHILE WALKING)			
	A1 E10 G1 M32 X0 I0 A0	0.08	27.
10 MOVE LONGTAPE AND CLAMP FROM FITTER TO TOOLTRAY F 1 / 50			
	A1 B0 G1 A1 B0 F1 A0	0.02	1.

SHIPFITTING

TOTAL TMU 43.

613. MAKE-UP SEAM ON POSITIONER WITH SHIM (PLATE) AT FLAT PANEL SHOP (P.L.)
SHIPFIT

PER FOOT OFG: 2 22-APR-82

THIS PROCESS USED WITH PLATES THAT ARE LESS THAN .375 IN.

- * METHOD DEVELOPED
- * FROM 30 FT, SEAM.
- * SHIM-PLATE AT UNIT.
- * SHIM IS 10'X8'X.750' PLT.

FITTER BEGINS AT UNIT

1 GET+MOVE SHIM-PLATE FROM UNIT TO GANTRY AND HOLD			
	A1 B0 G3 A16 B0 P1 A0	1.00	210.
2 GET+PRESS SHIM-PLATE AT GANTRY WITH BEND F 1 / 30 SIMD 1 3			
	<A1>B6 <G3>M3 X0 I0 A0	0.03	3.
3 PLACE SEMIAUTOMATIC FROM WEB TO GANTRY SIMO			
	<A1 B0 G1 A1 B0 P3 A0 >	1.00	0.
4 HAVE SEMIAUTOMATIC FROM GANTRY TO FITTER F 2			
	A1 B0 G1 A1 80 P1 A0	2.00	80.
3 GET+SLIDE SHIM-PLATE AT GANTRY			
	A1 B0 G3 M3 X0 I0 A0 >	1.00	70.
6 GET+PLACE SHIM-PLATE FROM GANTRY TO UNIT F 1 / 30			
	A1 B0 G3 A16 B0 P3 A0	0.03	8.

TOTAL TMU 371.

614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT

PER FOOT OFG: 2 19-APR-82

THIS SUB-OP ALLOWS OPERATOR TO MOVE 1 FOOT. BASED ON 20 FOOT WALK.

- * TYPICAL 30 IN, STEP,

FITTER BEGINS AT UNIT

1 FITTER WALK FROM UNIT TO WEB WITH 8 STEPS F 1 / 20			
	A16 E0 G0 A0 B0 P0 A0	0.05	8.

TOTAL TMU 8.

SHIPFITTING

617. MOVE TOOL (LUG-ALL) WITH HANDI TO FLAT PANEL SHOP (SEAM-FIT) SHIPIFIT
 PER SHIFT OFG: 4 30-APR-82

THIS SUB-OP COVERS GETTING THE CUM-A-LONG AND RETURNING IT.
 FITTER BEGINS AT SEAM-FIT-GANTRY

1 MOVE LUG-ALL FROM TOOLCRIB TO SEAM-FIT-GANTRY		
A270B0 G1 A270B0 P1 A0	1.00	5420.
2 MOVE LUG-ALL FROM SEAM-FIT-GANTRY TO TOOLCRIB		
AI B0 G1 A270B0 P1 A0	1.00	2730.
	TOTAL TMU	8150.

618. TRANSPORT OPERATOR ON POSITIONER AT FLAT PANEL SHOP SHIPFIT
 PER EACH OFG: 3 04-MAY-82

COVERS GANTRY CHAIR MOVEMENT AT THE RATE OF ,67SEC. / FT. (181N. /
 SEC.) . BASED ON 30FT. TRAVEL

- * FITTER ON UNIT.
- * CHAIR MOVED AFTER
- * EACH SEAM.

FITTER BEGINS AT UNIT

1 WALK FROM UNIT TO GANTRY WITH 4 STEPS F 1 / 30		
A6 B0 G0 A0 80 P0 A0	0.03	2.
2 PULL HANDLE AT GANTRY PF 20 T PF 30 (5 6 7) F 1 / 30		
AI H0 G1 M1 (X3 IO A0)	0.03	31.
	TOTAL TMU	33

SHIPFITTING

650. MEASURE DECK FOR (BUTTOCK LINE) WITH (SURVEYORS) AT ANY UNIT ASSEMBLY SHOP SHIPFIT

PER EACH OFG:-4 25-MAY-82

SURVEYORS FIND C.L. AND MASTER FRAME LINE OF PANELo THEN SET O.B. EDGE ,

- * TWO SURVEYORS FOR JOB.
- * THEY DO C.L. AND MASTER FRAME
- * AND BOTH O.B. EDGES.
- * THIS SUB-OF FOR 1 EDGE.

FITTER BEGINS AT UNIT

1 WALK TO OFFICE AND CALL URVEYORS.			
	A81 B0 G0 A0 B0 P0 A0	1.00	810.
2 WAIT 15 MIN FOR SURVEYORS ARRIVAL		1.00	25005 .
3 WALK TO UNIT SIMIO			
	<A81B0 GO A0 B0 F0 A0 >	1.00	0.
4 WAIT 15 MIN FOR SURVEYORS TO SET UP		1.00	25005.
5 WAIT 15 MIN FOR SURVEYORS TO READ TRANSIT		1.00	25005.
6 READ 50 WORDS F 20 FOR DATA TRANSFER			
	A0 B0 G0 A0 B0 F0 T24 A0 E0 F0 A0	20.00	4800.
		TOTAL TMU	80625.

673. ADJUST (BUDDA JACK) ON DECK WITH HAND AT ANY (WORK AREA) SHIPFIT PER EACH OFG: 3 27-MAY-82

COVERS PLACING BUDDA JACK AND SMALL BLOCKING, BLOCKING AND JACK OBTAINED PRIOR. SEE SUB-OF 619 FOR JACK USE.

- * ALLOWS ARMS REACH DISPLACEMENT

FITTER BEGINS AT UNIT

1 MOVE JACK AND BLOCKING FROM TOOLCRIB TO HOUSE-SIDE SIMO			
	<A330B0 G1 A427R0 F1 A >	1.00	0.
2 GET+SLIDE AND GUIDE JACK AT HOUSE-SIDE WITH PBEND			
	A1 B3 G3 H3 X0 13 A0	1.00	130.
3 PLACE BLOCKING FROM HOUSE-SIDE TO JACK WITH PBEND			
	A1 B0 G1 A1 B3 F3 A0	1.00	90.
4 REPLACE BLOCKING FROM JACK TO HOUSE-SIDE WITH PBEND			
	A1 B0 G1 A1 B3 F3 A0	1.00	90.
		TOTAL TMU	310.

SHIPFITTING

690. MEASURE (AND MARK) BRACKET FOR (TRIMMING) WITH STEEL TAPE AT. (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT

PER EACH OFG: 3 26-MAY-82

FITTER FINDS BRACKET IS USABLE WITH MINOR TRIM.

FITTER BEGINS AT HOUSE-SIDE

1 MOVE WEB FROM FRAME-LINE TO HOUSE-SIDE SIMO		
<A16B4 G1 A16 B0 P1 A0 >	1.00	0.
2 MOVE TOOLTRAY FROM TOOLBOX TO HOUSE-SIDE SIMO		
<A113B6 G1 A113B0 P1 A0 >	1.00	0.
3 MOVE BRACKET FROM UNIT TO WEB SIMO		
<A16B0 G1 A16 B0 P1 A0 >	1.00	0.
4 INSPECT 8 POINTS		
A0 B0 G0 A0 B0 P0 T10 A0 B0 P0 A0	1.00	100.
5 MEASURE BRACKET USING STEEL-TAPE AND ASIDE TO FITTER		
A1 B0 G1 A1 B0 P1 M32 A1 B0 P1 A0	1.00	380.
6 GET+PLACE BRACKET FROM WEB TO HOUSE-SIDE		
A1 B0 G3 A1 B0 P3 A0	1.00	80.
7 MEASURE BRACKET USING STEEL-TAPE AND ASIDE TO FITTER		
A1 B0 G1 A1 B0 P1 M32 A1 E0 P1 A0	1.00	380.
8 MARK BRACKET 2 DIGITS USING MARKER AND ASIDE TO FITTER PF 2 (4 5 6 7.)		
A1 B0 G1 (A1 N0 P1 R6)A1 B0 P1 A0 (2)	1.00	200.
9 MEASURE BRACKET USING PROFILE-GAUGE (SQUARE) AND ASIDE TO TOOLTRAY P F 2 (6 7)		
A1 B0 G1 A1 B0 (P1 M10)A1 H0 F1 A0 (2)	1.00	270.+

TOTAL TMU 1410.

SHIPFITTING

704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT
PER EACH OFG: 3 02-JUN-82
THIS SUE-OP DESCRIBES A BODY MOTION IN A COMB. SUE-OP THAT HAS NOT
BEEN COVERED IN THE INHERENT SUB-OP.
FITTER BEGINS AT UNIT

1 HOLD+TOSS OBJECT FROM UNIT TO UNIT WITH KNEEL SIMO (4)
A0 B0 G0 <A1>B16 P0 A0 1.00 160.

TOTAL TMU 160.

705. MOVE (OPERATOR) ON ASSEMBLY WITH (CLIMB-OBJECT) AT ANY (WORK AREA)
SHIPFIT
PER EACH OFG: 3 02-JUN-82
THIS SUB-OP DESCRIBES A BODY MOTION IN A COME. SUB-OP THAT IS NOT IN
THE INHERENT SUB-OPS.
FITTER BEGINS AT UNIT

1 HOLD+TOSS OBJECT FROM UNIT TO UNIT WITH CLIME-OBJECT SIMO (4)
A0 B0 G0 <A1>B32 PO 40 1.00 320.

TOTAL TMU 320.

SHIPFITTING

A1 B0 G1 (A1 B0 P1 R6 A1)B0 P1 A0 (6) 1.00 570.
 10 MEASURE AT UNIT USING PROFILE-GAUGE (= LEVEL) AND ASIDE PF 4 (6
 7)
 A1 B0 G1 A1 E0 (P1 M1O)A1 E0 P1 A0 (4) 1.00 490.
 11 MARK AT UNIT 2 DIGITS USING MARKER AND ASIDE TO FITTER (=SCRIBE
 AGAINST LEVEL) PF 6 (67)
 A1 B0 G1 A1 B0 (P1 R6)A1 B0 P1 A0 (6) 1.00 470.

TOTAL TMU 6120.

739. MEASURE HEADER ON UNIT WITH (ADJUSTABLE) JIG AT (INVERTED ALUMINUM)
 UNIT ASSEMBLY SHOP SHIPFIT

PER EACH OFG: 3 08-JUN-82

MARK HEADER FOR CUT AT BANDSAW. JIG IS SHOWN IN BIW HANDBOOK OF JIGS
 AND FIXTURES.

FITTER BEGINS AT FRAME-LINE

1 MOVE TOOLTRAY TO FRAME-LINE SIMO
 <A67B5 G1 A67 B6 P1 A0 > 1.00 0.
 2 MOVE JIG TO FRAME-LINE SIMO
 <A393B0 G1 A393B6 P1 A0 > 1.00 0.
 3 PRESS AND LOCATE JIG AT FRAME-LINE WITH KNEEL
 A1 B16 G1 M3 X0 I1 A0 1.00 220.
 4 LOOSEN 4 NUTS ON JIG.AT FRAME-LINE 2 WRIST-TURNS USING HAND PF 2 (1
 2 3)
 (A1 B0 G1)A0 B0 (P1 A1 L6)A0 B0 P0 A0 (4) 1.00 360.
 5 CLOSE+SLIDE AND ADJUST JIG AT FRAME-LINE FOR LENGTH AND ANGLE F 2
 A0 B0 G1 M3 X0 I6 A0 2.00 200.
 6 FASTEN 4 NUTS ON JIG AT FRAME-LINE 2 WRIST-TUENS USING HAND PF 2 (1
 2 3)
 (A1 B0 G1)A0 B0 (P1 A1 F6)A0 B0 P0 A0 (4) 1.00 360,
 7 GET+PLACE JIG FROM FRAME-LINE LOCATION TO FRAME-LINE HEADER WITH 1
 STEP AND REND
 A1 B0 G3 A3 B6 F3 A0 1.00 160.
 8 MARK AT FRAME-LINE 1 DIGIT USING MARKER AND ASIDE TO FITTER PF 20 (6
 7) [=ALL MARKING NEEDED FOR SCRIBE]
 A1 B0 G1 A1 B0 (P1 R3)A1 B0 P1 A0 (20) 1.00 850.
 9 MOVE SQUARE TO FRAME-LINE HEADER AND HOLD F 2
 A1 B0 G1 A1 B0 F1 A0 2.00 80.
 10 HOLD+SLIDE AND GUIDE SQUARE F 2
 A0 B0 G0 M3 X0 I3 A0 2.00 120.
 11 HOLD+MOVE SQUARE TO TOOLTRAY
 A0 B0 G0 A1 B0 F1 A0 1.00 20.

TOTAL TMU 2370.

SHIPFITTING

784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT
 PER EACH FOOT OFG: 2
 INCLUDES SET-UP, WIRE CHANGE, HOOD PLACEMENT,
 FTIS.1-AI-1/8...FLUXCORE TACK.

1 1 1/8 FLAT FILLET, FLUXCORE SEMIAUTOMATIC

TOTAL TMU 1472.

786. MOVE (KICKERS) FOR (STIFFENERS) WITH HAND AT FLAT (P.L.) PANEL SHOP
 SHIPFIT

PER 5 SETS OF KICKERS (10 PIECES) OFG: 3 02-AUG-82
 METHOD DOUBLED TO COVER RETURNING KICKERS TO STORAGE,
 * KICKERS ARE SIZED FOR STIFFENERS
 FITTER BEGINS AT PANEL

1 GET+MOVE TOOLTRAY WITH BEND FROM TOOLBOX TO LONGITUDINAL WITH BEND F

A113B6 G3 A113B6 P1 A0 2.00 4840.

2 MOVE KICKERS FROM TOOLTRAY TO FRAME-LINE WITH PBEND PF 5 (4 5 6) F

A1 B0 G1 (A3 B3 P1)A0 (5) 2.00 740.

TOTAL TMU 5580.

SHIPFITTING

787. REMOVE (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT

PER EACH KICKER SET (2 PIECES) OFG: .2 02-AUG-82

METHOD TO PICKUP KICKERS TO A CARRIER FOR REMOVAL FROM UNIT, DOES NOT ACCOUNT FOR BURNING AND GRINDING.

* 1 BEND PER 2 PIECES,

FITTER BEGINS AT FRAME-LINE

1	MOVE TOOLTRY TO FRAME-LINE SIMO		
	<A113B0 G1 A113B0 F1 A0 >	1.00	0.
2	PICKUP KICKER FROM FRAME-LINE TO FITTER WITH BEND PF 2 (1 2 3)		
	(A1 E0 G1)A1 B6 F0 A0 (2)	1.00	110.
3	MOVE KICKER FROM FITTER TO TOOLTRAY		
	A1 B0 G1 A1 B0 P1 A0	1.00	40.
4	WALK 1 STEP TO LONGITUDINAL		
	A3 B0 G0 A0 B0 P0 A0	1.00	30.

TOTAL TMU 180.

788. TRANSPORT RACK WITH (CRANE) TO FLAT (P.L.) PANEL SHOP SHIPFIT

PER EACH LIFT OFG: 4 02-AUG-82

METHOD ALLOWS HOOK-UP, TRANSPORT AND UNHOOKING, DOES NOT USE MOST CRANE PARAMETERS,

* CRANE OPERATOR IN PLACE, HIS METHOD

* NOT ADDRESSED.

FITTER BEGINS AT PANEL

1	GET+SLIDE PORT-STEPS AT 2DOOR FOR RACK ACCESS		
	A1311B0 G3 M3 X0 I0 A01	1.00	1370.
2	WALK TO RACK AT 2DOOR WITH 4 STEPS AND LADDER FOR GETTING ON HORSES		
	A6 B16 G0 A0 B0 P0 A0	1.00	220.
3	PLACE HOOK FROM 2DOOR TO RACK WITH BEND AND 5 STEPS F 4		
	A1 B0 G1 A10 B6 P3 A0	4.00	840.
4	WAIT 103 S FOR CRANE REACHING LAYOUT - FITTER MOVES SIMO		
		1.00	2863.
5	REPLACE HOOK FROM RACK TO LAYOUT WITH BEND AND 5 STEPS F 4		
	A1 B0 G1 A10 B6 P3 A0	4.00	840.

TOTAL TMU 6133.

SHIPFITTING

789. TRANSPORT STIFFENER FOR (PANEL) UNIT WITH (MAGNET-CRANE) AT FLAT (F.L.)
 PANEL SHOP SHIPFIT

PER EACH STIFFENER OFG: 3 02-AUG-82

METHOD ALLOWS LOAD-OUT USING MAGNET-CRANE, FITTERS ALIGN STIFFENERS
 AND DIRECT CRANE OPERATOR. 2 FITTERS USUALLY.1

* CRANE TRAVEL 50% FASTER THAN GANTRY.

* FITTERS FEEL CRANE IS SAFER.`

FITTER BEGINS AT PANEL

1 MOVE STIFFENER TO RACK SIMO		
	<410B0 G1 A131B0 P1 A0 >	1.00 0.
2 MOVE RACK TO LAYOUT SIMO		
	<A1 B0 G1 A113B0 P1 A0 >	1.00 0.
3 WAIT 7 S FOR MAGNET TO ATTACH AND LIFT STIFFENER		
		1.00 194.
4 WAIT 19 S FOR MAGNET TO BRING STIFFENER TO KICKERS	ABT 25 FT.	
		1.00 528.
5 WAIT 14 S FOR DROP - FITTERS ALIGN SIMULTANEOUSLY		
		1.00 389.
6 WAIT 19 S FOR RELEASE AND RETURN TO RACK		
		1.00 528.
	TOTAL TMU	1639.

SHIPFITTING

790. MAKE READY OPERATOR (FITTER) FOR (WORK SHIFT) AT FLAT (F.L.) PANEL SHOP
SHIFFIT

PER EACH SHIFT OFG: 4 03-AUG-82

MOVING ALL PERSONAL GEAR TO STIFFENER GANTRY.

* FITTER BEGINS AT TOOLBOX. GETS TOOLTRAY

* AND RETURNS TO TOOLBOX AT END OF SHIFT.

FITTER BEGINS AT TOOLBOX

1 WAIT 2 M FOR INSTRUCTIONS BY LEAD PERSON

1.00 3334.

2 OPEN COVER AT TOOLBOX WITH BEND FOR OPEN / CLOSE OPERATION PF 2 (3)

A1 B6 (G1 M3)X0 IO A0 (2) 1.00 150.

3 GET+MOVE TOOLTRAY TO PANEL WITH BEND

A1 B0 G3 A113B6 F1 A0 1.00 1240.

4 WAIT 5 M AND STUDY SKETCH

1.00 8335.

5 GETMOVE WITH BEND TOOLTRAY TO TOOLBOX

A1 B6 G3 A113B0 F1 A0 1.00 1240.

6 OPEN COVER AT TOOLBOX WITH BEND PF 2 (34)

A1 B6 (G1 M3)X0 IO A0 (2) 1.00 150.

7 PLACE TOOLTRAY TO TOOLBOX

A1 B0 G1 A1 B0 P3 A0 1.00 60.

TOTAL TMU 14509.

SHIPFITTING

793. ALIGN STIFFENER ON (PANEL) UNIT WITH (SLEDGE) HAMMER AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

PER EACH STIFFENER OFG: 2 03-AUG-82

METHOD USED WHEN GANTRY NOT AVAILABLE. ONLY NEEDED FOR HEAVY
 STIFFENERS. ONLY ALIGNS TO PLATE EDGE.

* PRIOR LOAD-OUT BY CRANE.

FITTER BEGINS AT FRAME-LINE

1 MOVE TOOLTRAY TO FRAME-LINE SIMO		
	<A113B0 G1 A113B0 P1 A0>	1.00 0.
2 FASTEN STIFFENER 6 STRIKES USING HAMMER AND HOLD		
	A1 B G1 A1 B0 P0 F16 A0 E0 P0 A0	1.00 190.
3 PLACE LEVEL TO STIFFENER WITH BEND F 2		
	A1 B0 G1 A1 B6 F3 A0	2.00 240.
4 INSPECT 4 POINTS FOR CHECKING ALIGNMENT F 2		
	A0 B0 G0 A0 B0 P0 T6 A0 B0 P0 A0	2.00 120.
5 HOLD+FASTEN STIFFENER 2 STRIKES USING HAMMER AND ASIDE TO TOOLTRAY		
	A0 B0 G0 A1 B0 P0 F6 A1 B0 P1 A0	1.00 90.
A PLACE OEGEE-BAR WITH BEND FROM FRAME-LINE TO STIFFENER		
	A1 B6 G1 A1 B0 F3 A0	1.00 120.
7 HOLD+PRESS OEGEE-BAR AT FRAME-LINE FOR FLUMBING		
	A0 B0 G0 M3 X0 I0 A0	1.00 30.
8 REMOVE OEGEE-BAR FROM STIFFENER TO FRAME-LINE		
	A1 B0 G1 A1 B0 P1 A0	1.000 40.

TOTAL TMU 830.

SHIPFITTING

796. MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.) PANEL
SHOP SHIPFIT

PER EACH 10 FT. OF STIFFENER OFG: 2 04-AUG-82

METHOD FOR ALIGNING AND TACKING,

* GANTRY IN PLACE,

* STIFFENERS LOADED OUT PRIOR.

FITTER BEGINS AT PANEL

1 MOVE GANTRY TO FRAME-LINE SIMO

<A1 B0 G1 A10 E0 P1 A0 > 1.00 0.

2 WALK TO RAM AT FRAME-LINE WITH 12 STEPS

A24 B0 G0 A0 B0 F0 A0 1.00 240.

3 PUSH BUTTON ON GANTRY AND TRAVEL RAM 40 FT, FOR ACQUIRING STARTING
POINT PT 32 S

A1 B0 G1 M1 X96 I0 A0 1.00 990.

4 PUSH BUTTON ON GANTRY FOR ENGAGING MAGNETS 1 FT, PT 3.36 S F 2

A1 B0 G1 M1 X10 I0 A0 2.00 260.

5 PUSH BUTTON ON GANTRY FOR ENGAGING RAM 3 IN. PT 2.31 S F 2

A1 B0 G1 M1 X6 I0 A0 2.00 180.

6 INSPECT 3 POINTS F 2

A0 B0 G0 A0 B0 P0 T3 A0 B0 F0 A0 2.00 60.

7 WALK TO FRAME-LINE WITH 0 STEPS AND BEND F 2

A1 B6 G0 A0 B0 F0 A0 2.00 140.

8 TURN BUTTON ON GANTRY FOR ALIGNING AGAINST LINE F 2

A1 B0 G1 M3 X0 I0 A0 2.00 100.

9 FULL BUTTONS ON GANTRY FOR RELEASING RAM. AND MAGNETS 3 IN. PT 3 S F
2

A1 B0 G1 M1 X10 I0 A0 2.00 260.

10 PUSH BUTTON ON GANTRY AND TRAVEL RAM 10 FT. PT 8 S

A1 B0 G1 M1 X24 I0 A0 1.00 270.

TOTAL TMU 2500.

SHIPFITTING

797. POSITION (GANTRY) ON (PANEL) UNIT AT FLAT (L+) PANEL SHOP SHIPFIT
 PER EACH STIFFENER OFG: 3 04-AUG-82

METHOD FOR POSITIONING GANTRY TO STIFFENER.

* CONTROLLED FROM MAIN PANEL.

FITTER BEGINS AT PANEL

1 WALK TO GANTRY WITH 12 STEPS AND CLIMB-OBJECT		
A24 B32 G0 A0 E0 P0 A0	1.00	560.
2 PRESS BUTTON FOR RELEASING BAR		
AI B0 GI M3 X0 I0 A0	1.00	50.
3 PUSH HANDLE AND HOLD FOR 6 IN. RELEASE MOVE PT .5 S		
AI B0 G1 M1 X1 I0 A0	1.00	40.
4 HOLD+PUSH HANDLE AND HOLD FOR RAISING MAGNETS 18 IN. PT 6 3		
A0 80 G0 M1 X16 I1 A0	1.00	170.
5 HOLD+PULL HANDLE AND HOLD FOR TRAVELING 30 IN. PT 2.5 S		
A0 B0 G0 M1 X6 I0 A0	1.00	70.
6 HOLD+PUSH HANDLE AND HOLD FOR LOWERING MAGNETS 18 IN. PT 6 S		
A0 R0 G0 M1 X16 I0 A0	1.00	170.
7 HOLD+PULL HANDLE FOR 6 IN. ENGAGE MOVE PT .5 S		
A0 B0 G0 M1 X1 I0 A0	1.00	20.
8 PUSH BUTTON FOR ENGAGING BAR		
AI B0 G1 H1 X0 I0 A0	1.00	30.
9 PRESS BUTTON FOR ALIGNING AGAINST END		
AI B0 G1 M3 X0 I0 A0	1.00	50.
10 PUSH BUTTON FOR SETTING STOPS F 2		
AI B0 G1 H1 X0 I0 A0	2.00	60.

TOTAL TMU 1220.

SHIPFITTING

603. MOVE TOOL TO FLAT (P.L.) PANEL SHOP SHIPFIT
 PER EACH MOVE FROM TOOLCRIB OFG: 4 10-AUG-82
 METHOD ALLOWS FITTER TO BRING AN ISSUED TOOL FROM THE TOOLCRIB TO THE
 STIFFENER FITTING GANTRY AND TO RETURN IT.
 * USED TO DESCRIBE ANY COMPANY TOOL0
 FITTER BEGINS AT PANEL

1 GET+MOVE TOOL FROM TOOLCRIB TO PANEL WITH PBEND A173B0 G3 A173B3 F1 A0	1.00	3530.
2 WAIT 15 S FOR FILLING OUT FORM	1.00	417.
3 GET+MOVE WITH PBEND TOOL FROM PANEL TO TOOLCRIB AND RETURN TO PANEL A1 B3 G3 A17380 P1 A173	1.00	3540.
4 WAIT 15 S FOR TOOLKEEPER CHECKING RECORDS	1.00	417.
TOTAL TMU		7904.

841. TRANSPORT OBJECT FOR ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE)
 (P.L.) PANEL SHOP SHIPFIT
 PER EACH VERTICAL LIFT > 10 FT. OFG: 3 18-AUG-82
 METHOD FOR SOUTHERN-MOST 100 TONNER'S WHIP IN VERTICAL DIRECTION.
 FALL SFEED IS 1 FT / SEC.
 * INCLUDES HOOK AND UNHOOK. CRANE-DOG ON
 * CHAIN, DOUBLE HOOK,
 * FOR SIMPLICITY: HELPER = RIGGER.
 * TRAVEL COVERED ELSEWHERE.
 HELPER BEGINS AT LONGITUDINAL

1 PLACE CRANE-DOG FROM HELPER TO FLOOR-MAGNET F 2 A1 B0 G1 A1 B0 F3 A0	2.00	120.
2 SHUT CRANE-DOG AT FLOOR-MAGNET FOR LOCKING F 2 A1 B0 G1 M3 X0 IO A0	2.00	100.
3 INSPECT 3 POINTS FOR CHECKING DOG F 2 A0 B0 G0 A0 B0 P0 T3 A0 B0 P0 A0	2.00	60
4 INSPECT 6 POINTS FOR LOOKING FOR OPERATOR A0 B0 G0 A0 B0 F0 T10 A0 B0 P0 A0	1.00	100.
5 WAIT 5 S FOR SIGNALING OPERATOR	1.00	139..
6 PUSH BUTTON WITH 0 STEPS FOR OPERATOR'S OPERATION A1 R0 G1 H1 X0 IO A0	1.00	30.
7 WAIT 11 S FOR LIFTING FLOOR-MAGNET 3 FEET	1.00	305.
8 8 WAIT 11 S FOR LOWERING FLOOR-MAGNET 3 FEET	1.00	305.
9 OPEN WITH 0 STEPS CRANE-DOG AT FLOOR-MAGNET F 2		

SHIPFITTING

	A1 B0 G1 M3 X0 I0 A0	2.00	100.
10	GET+PLACE CRANE-DOG FROM FLOOR-MAGNET TO HELPER WITH 0 STEPS F 2		
	A1 B0 G3 A1 B0 P3 A0	2.00	160.
11	WAIT 5 S FOR REMOVING CRANE		
		1.00	139.
	TOTAL TMU		1558.

845. TRANSPORT OBJECT FOR ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE)
(P.L.) PANEL SHOP SHIPFIT
PER EACH LIFT OFG: 3 18-AUG-82
METHOD FOR SOUTHERN-HOST 100 TONNER'S WHIP IN HORIZONTAL DIRECTION,
HOVE BETWEEN 50 & 100 FT. DIAGONAL TRAVEL = 3.75 FT. / SEC.
* ONLY COVERS HORIZONTAL, VERTICAL COVERED
* ELSEWHERE,
HELPER BEGINS AT LONGITUDINAL

1	WAIT 20 S FOR TRAVEL	1.00	556.
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TOTAL TMU 556.

848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE)
(P.L.) PANEL SHOP SHIPFIT
PER EACH CRANE USE OFG: 3 18-AUG-82
METHOD ALLOWS FITTER TO GET RIGGER WHO SIGNALS & BRINGS TO WORK
AREA. METHOD USED WITH ANY CRANE.
* FITTER RETURNS TO WORK AREA PRIOR TO
* CRANE AND IS WORKING UNTIL CRANE ARRIVAL
FITTER BEGINS AT PANEL

1	WALK TO 2DOOR FOR CALLING RIGGER F .5		
	A131B0 GO A0 B0 P0 A0	0.50	655.
2	WALK TO PANEL FOR RETURNING F *5		
	A131B0 GO A0 B0 P0 A0	0.50	655.
3	WAIT 6 S FOR LOWERING FALL		
		1.00	166.

TOTAL TMU 1476.

SHIPFITTING

852. TRANSPORT STIFFENER FOR (PANEL) UNIT WITH (MAGNET-CRANE) AT FLAT (P.L.)

PANEL SHOP SHIPFIT

PER EACH LOAD OF 8 FFG STIFFENERS, OFG: 3 19-AUG-82

METHOD ALLOWS LOAD-OUT USING MAGNET-CRANE, FITTERS MUST PUSH STIFFENERS TO LAYOUT POSITION. 2 FITTERS USUALLY.

* CRANE PICKS UP ALL STIFFENERS SIMO,

* STIFFENERS RACKED IN ORDER AT HARDINGS, FITTER BEGINS AT PANEL

1 MOVE STIFFENER TO RACK SIMO

<A10B0 G1 A131B0 P1 A0 > 1.00 0.

2 MOVE RACK TO LAYOUT SIMO

<A1 B0 G1 4113B0 P1 A0> 1.00 0.

3 WAIT 7 S FOR MAGNET ATTACHING ONTO STIFFENER5

1.00 194.

4 WAIT 19 S FOR MAGNET BRINGING STIFFENERS OVER LOCATION

1.00 528.

5 WAIT 7 S FOR DROP AND CRANE REMOVAL

1.00 194.

6 GET+POSITION AND GUIDE STIFFENER TO FRAME-LINE WITH 3 STEPS AND CRAWL F 8

A1 B0 G3 A32 B0 P6 A0 B24 8.00 5280.

TOTAL TMU 6196.

SHIPFITTING

853. POSITION STIFFENER FOR (PANEL) UNIT WITH (OEGEE-BAR) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

PER EACH FFG STIFFENER OFG: 3 19-AUG-82

METHOD USED TO STAND UP STIFFENER. 2 FITTERS - 1 USES OEGEE-BAR :
 OTHER ALIGNS,

* TACKING DONE WITH MWELD SUB-OP FOR 6011.

* NO KICKERS NEEDED.

FITTER BEGINS AT FRAME-LINE

1 PICKUP OEGEE-BAR FROM FRAME-LINE TO FITTER WITH BEND													
	A1	B0	G1	A1	B6	P0	A0		1.00		90.		
2 PUSH WITH BEND OEGEE-BAR AT STIFFENER													
	A1	B6	G1	M1	X0	I0	A0		1.00		90.		
3 HANDLE OEGEE-BAR AT STIFFENER FOR LIFTING UPRIGHT													
	A1	B0	G1	M6	X0	I0	A0		1.00		80.		
4 HOME TOOLTRAY TO FRAME-LINE SIMO													
	<A113B0 G1 A113B0 P1 A1 >								1.00		0.		
5 FASTEN STIFFENER 3 STRIKES USING HAMMER AND ASIDE TO TOOLTRAY FOR ALIGNING													
	A1	B0	G1	A1	B0	F0	F6	A1	B0	P1	A0	1.00	110.
6 INSPECT 3 POINTS													
	A0	B0	G0	40	80	PO	T3	A0	B0	P0	A0	1.00	30.
7 REMOVE OEGEE-BAR FROM STIFFENER TO LONGITUDINAL WITH BEND													
	A1	B0	G1	A3	B6	P1	A0		1.00		120.		

TOTAL TMU 520.

879. MARK PLATE WITH MARKER AT ANY LAYOUT AREA SHIPFIT

PER EACH PIECE MARK OFG: 2 01-SEF-82

METHOD INVOLVES READING SKETCH AND HARKING CODE AT ONE LOCATION.

* ONE LETTER, DASH, 3 NUMBERS USER FOR

* FIECE ID NUMBER.

FITTER BEGINS AT LAYOUT

1 READ ON SKETCH 4 DIGITS													
	A0	B0	G0	A0	B0	P0	T6	A0	B0	P0	A0	1.00	60.
2 WALK TO LAYOUT WITH 0 STEPS AND PBEND													
	A1	B3	G0	A0	B0	P0	A0		1.00		40.		
3 MARK ON PLATE AT LAYOUT 5 DIGITS USING MARKER AND ASIDE													
	A1	B0	G1	A1	B0	P1	R16	A1	B0	P1	40	1.00	220.

TOTAL TMU 320.

SHIPFITTING

941. MARK (PANEL) FOR WEB FRAME WITH STRAIGHTEDGE AT FLAT (P.L.) PANEL SHOP SHIPFIT

PER FOOT OF WEB OFG: 2 09-SEP-82

PANEL LAYOUT IS DONE PRIOR, THIS OPERATION IS FOR REMARKING EXISTING LINES,

BASED ON 30 INCH SPACING,
FITTER BEGINS AT LONGITUDINAL

1 PICKUP STRAIGHTEDGE FROM LONGITUDINAL TO FRAME-LINE F 12 / 30

A1 B0 G1 A3 B0 P0 A0 0.40 20.

2 PRESS AND ADJUST STRAIGHTEDGE AT FRAME-LINE WITH KNEEL PF 2 (4 5 A) F 1 2 / 3 0

A1 B16 G1 (M3 X0 16)A0 (2) 0.40 144.

3 SLIDE AND GUIDE MARKER ALONG STRAIGHTEDGE AT FRAME-LINE FOR MARKING P F 2 (1 2 3 4 5 6) F 1 2 / 3 0

(A1 B0 G1 M3 X0 I3)A0 (2) 0.40 64.

TOTAL TMU 228.

944. UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT

PER WEB OFG: 2 09-SEP-82

METHOD ALLOWS FITTER TO AID RIGGER WHILE LANDING WEBS.

* FITTER ALIGNS WEB SIMO TO CRANE SET,
FITTER BEGINS AT FRAME-LINE

1 MANIPULATE AND ALIGN WEB AT FRAME-LINE WITH PBEND

A1 B3 G1 M10 X0 I10 A0 1.00 250.

2 INSPECT 9 POINTS

A0 B0 G0 A0 B0 P0 T10 A0 B0 P0 A0 1.00 100.

3 WALK FROM FRAME-LINE TO PANEL WITH 8 STEPS FOR INSPECTING

A16 B0 G0 A0 B0 P0 A0 1.00 160.

TOTAL TMU 510.

SHIPFITTING

948. ALIGN BRACKET FOR WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT

PER WEB CUTOUT OFG: 2 15-SEF-82

METHOD USED IN CONJUNCTION WITH PLUMBING OPERATION AND IS USED TO CLOSE TANKER BKTS, AND F.B. TO STIFFENER FOR TIGHT WELD.

* BKTS, DONE BY LUG-ALL AND FLAT BAR BY

* JACK AND DOG, FREQ, 5 F.B. TO 3 BKTS.

FITTER BEGINS AT LONGITUDINAL

1	WALK FROM LONGITUDINAL TO FRAME-LINE WITH FBEND F 2		
	A3 B3 G0 A0 B0 F0 A0	2.00	120.
2	INSPECT 3 POINTS F 2		
	A0 B0 G0 A0 B0 F0 T3 A0 B0 F0 A0	2.00	60.
3	MOVE LUG-ALL FROM TOOLTRAY TO FRAME-LINE FOR USE SIMO		
	<A113B0 G1 A113B0 P1 A0 >	1.00	0.
4	MOVE JACK&KICKER FROM TOOLTRAY TO FRAME-LINE FOR USE SIMO		
	<A113B0 G1 A113B0 F1 A0 >	1.00	0.
5	MOVE LEAD TO FRAME-LINE FOR TACKING SIMO		
	<A3 B0 G1 A3 B0 F1 A0 >	1.00.	0.
	TOTAL TMU		180.

949 . ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

PER WEB CUTOUT OFG: 2 15-SEP-82

METHOD ALLOWS FLUMBING WITH LUG-ALL AND CHECK WITH LARGE SQUARE. FREQ. TO SQUARE STIFFENER IN CUTOUT.

* FREQ. FOR 1 LUG-ALL USE AND INSPECTION.

* SIMO FREQ, USED FOR METHOD CLARITY.

FITTER BEGINS AT LONGITUDINAL

1	MOVE TOOLTRAY TO LONGITUDINAL SIMO		
	<A113B0 GI A113B0 F1 A0 >	1.00	0.
2	PLACE SQUARE FROM TOOLTRAY TO FRAME-LINE F 2 FOR CHECKING SQUARENESS		
	A1 B0 G1 A3 B0 F3 A0	2.00	160.
3	INSPECT 5 POINTS		
	A0 B0 G0 A0 B0 P0 T6 A0 B0 P0 A0	1.00	60.
4	MOVE LUG-ALL FROM TOOLTRAY TO FRAME-LINE FOR LUG-ALL USE SIMO		
	<A3 B0 G1 A3 B0 P1 A0 >	1.00	0.
5	INSPECT 5 POINTS		
	A0 B0 G0 A0 B0 F0 T6 A0 B0 P0 A0	1.00	60.
6	REMOVE SQUARE FROM FRAME-LINE TO TOOLTRAY		
	A1 B0 G1 A3 B0 P1 A.	1.00	60.
7	MOVE JACK&KICKER FROM TOOLTRAY TO FRAME-LINE FOR USE SIMO		
	<A1 B0 G1 A3 B0 F1 A0 >	1.00	0.
8	MOVE LEAD FROM TOOLTRAY TO FRAME-LINE FOR TWO TACKS SIMO		
	<A3 B0 G1 A3 B0 P1 A0 >	1.00	0.

SHIPFITTING

952 FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA)
SHIPFIT

PER 12 INCHES OFG: 2
HAND BURNING BASED ON SUB-OF 951 AND MWELD OPERATIONS
BURN-A-1/8X1/2...PL...BURN-A-8, OBSERVED CUTTING SPEED OF 8.5
IN./MIN.

1 IGNITE TORCH; MAKE BURN; EXTINGUISH TORCH; DESLAG, OPERATION DOES
NOT ALLOW BURNER SET-UP OR GETTING TORCH TO JOB,

TOTAL TMU 5004.

1019. MOVE WEB FRAME ON (PANEL) UNIT WITH (KING WEB) CLAMP AT FLAT (P.L.)
PANEL SHOP SHIPFIT

PER EACH FFG CUT-OUT OFG: 2 22-SEP-82
METHOD FOR OPERATING A BIW DEVICE USED FOR TIGHTENING WEBS TO PANELS
USING STIFFENERS FOR PULLING POINTS.
* CLAMP HAS 'ICE TONG' JAWS AND LARGE
* SCREW FOR TIGHTENING.

FITTER BEGINS AT LONGITUDINAL

- 1 MOVE WITH BEND CLAMP FROM LONGITUDINAL TO FRAME-LINE WITH BEND
A1 B6 G1 A3 B6 P1 A0 1.00 180.
- 2 OPEN+SHUT AND GUIDE CLAMP-JAWS AT FRAME-LINE FOR HOOKING ONTO
STIFFENER F 2
A1 E0 G1 M6 X0 13 A0 2.00 220
- 3 SLIDE CLAMP AT FRAME-LINE FOR FLACING TENSION ONTO JAWS
A1 B0 G1 M3 X0 I0 A0 1.00 50.
- 4 FASTEN CLAMP AT FRAME-LINE 10 WRIST-TURNS USING HAND FOR INCREASING
TENSION
A1 B0 G1 A1 B0 P1 F24 A0 B0 F0 A0 1.00 280.
- 5 MOUE TOOLTRAY TO FRAME-LINE SIMO
<A113B0 G1 A113B0 F1 AO > 1.00 0.
- 6 FASTEN CLAMP AT FRAME-LINE 5 ARM-STROKES USING WRENCH AND ASIDE TO
TOOLTRAY
A1 B0 G1 A1 B0 F3 F32 A1 B0 P1 A0 1.00 400.
- 7 LOOSEN CLAMP AT FRAME-LINE 3 ARM-STROKES USING WRENCH AND ASIDE TO
TOOLTRAY
A1 B0 G1 A1 B0 P3 L16 A1 B0 P1 A0 1.00 240.
- 8 LOOSEN CLAMP AT FRAHE-LINE 12 WRIST-TURNS USING HAND
A1 B0 G1 A1 B0 P1 L24 A0 B0 P0 A0 1.00 280.
- 9 OPEN CLAMP-JAWS AT FRAME-LINE FOR REMOVAL F 2
A1 B0 G1 M3 X0 I0 A0 2.00 100.
- 10 MOVE CLAMP FROM FRAME-LINE TO TOOLTRAY
A1 B0 G1 A1 B0 P1 A0 1.00 40.

SHIPFITTING

TOTAL TMU 1790,

1020, INSPECT CUTOUT ON WEB FRAME WITH SQUARE AT FLAT (P.L.) PANEL SHOP

SHIPFIT

PER EACH FFG CUTOUT OFG: 2 22-SEP-82

METHOD USED BECAUSE OF VARIATIONS IN LONGITUDINAL HEIGHTS DUE TO MILL SPEC ALLOWANCES, SOME CUTOUTS NEED TO BE TRIMMED, FREQ. 0.33.

* CHECK ALL CUTOUTS, BURN 0.33

FITTER BEGINS AT LONGITUDINAL

- | | | | |
|---|--|-----------------------------------|-----------|
| 1 | MOUE TOOLTRAY TO LONGITUDINAL SIMO | | |
| | | <A113B0 B0 G1 A113B0 P1 A0 > | 1.00 0. |
| 2 | MEASURE WITH BEND STIFFENER USING PROFILE-GAUGE AT FRAME-LINE AND HOLD | | |
| | | A3 B6 G1 A1 B0 P1 M10 A0 B0 P0 A0 | 1.00 220. |
| 3 | HOLD+FLACE PROFILE-GAUGE FROM FITTER TO (WEB-FRAME AT LONGITUDINAL WITH PBEND AND HOLD | | |
| | | A0 B0 G0 A3 B3 P3 A0 | 1.00 90. |
| 4 | PICKUP MARKER TO FITTER F .33 | | |
| | | A1 B0 G1 A1 B0 P0 A0 | 0.33 10. |
| 5 | HOLD+OPERATE PROFILE-GAUGE AT LONGITUDINAL AND HOLD F 1.33 | | |
| | | A0 B0 G0 M6 X0 I0 A0 | 1.33 80. |
| 6 | SLIDE MARKER ON PROFILE-GAUGE AT LONGITUDINAL AND HOLD SIHO | | |
| | | <A1 B0 G1 M3 X0 I0 A0 > | 1.00 0. |
| 7 | MARK ON WEB-FRAME AT LONGITUDINAL 2 DIGITS USING MARKER AND ASIDE TO FITTER FOR RADIUS CORNERS F .33 | | |
| | | A1 B0 G1 A1 B0 P1 R6 A1 B0 F1 A0 | 0.33 40. |
| 8 | MOVE PROFILE-GAUGE FROM FITTER TO TOOLTRAY | | |
| | | A1 B0 G1 A1 B0 P1 A0 | 1.00 40. |

TOTAL TMU 479.

SHIPFITTING

1021. MAKE UP WEB FRAME (FLAT) ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
 PER FFG CUTOFF OFG: 2 22-SEP-82

METHOD USED TO MAKE UP FLATS BETWEEN STIFFENERS AND BASED ON 18 IN,
 FRAME SFACING.

* MAKE UP WITH KING CLAMP AND HAMMER,
 FITTER BEGINS AT LONGITUDINAL

1	MOVE KING-CLAMP FROM LONGITUDINAL TO STIFFENER FOR TIGHTENING OPERATION SIMO	<A1 R0 G1 A3 B0 P1 A0 >	1.00	0.
2	MOVE TOOLTRAY TO FRAME-LINE SIMO	<A113B0 G1 A1131B0 P1 A0 >	1.00	0.
3	FASTEN WEB-FRAME AT FRAME-LINE 3 STRIKES USING HAMMER AND ASIDE TO TOOLTRAY F 2	A1 R0 G1 A1 B0 P0 F6 A1 B0 P1 AO	2.00	220.
4	INSPECT 3 POINTS F2	A0 B0 G0 A0 B0 P0 T3 A0 R0 F0 A0	1.00	30.
5	INSPECT 3 POINTS	A0 B0 G0 A0 B0 F0 T3 A0 B0 F0 A0	1.00	30.
6	MOVE BOLT&CLIP FROM TOOLTRAY TO STIFFENER FOR FULLING TOGETHER SIMO	<A1 B0 G1 A1 B0 P1 A0 >	1.00	0.
7	MOVE DOG&WEDGE FROM TOOLTRAY TO STIFFENER FOR ALIGNING SIMO	<A1 B0 G1 A1 B0 P1 A0 >	1.00	0.
			TOTAL TMU	280.

SHIFFITTING

115. COMBINED SUB-OF

MAKE UP STIFFENER TIE-BUTT WITH BOLT-ON GOOSENECK & JACK AT LOWER
 UNIT ASSEMBLY SHOP SHIPFIT
 THE GOOSENECK USED IN THIS METHOD IS DETAILED IN BIW BOOK OF JIGS &
 FIXTURES ,
 PER EACH OFG: 3 31-AUG-81

TOTAL TMU 13940.0

Combined sub-operation elements	Free.	TMU
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114. MAKE UP STIFFENER TIE-BUTT ON BOTTOM SHELL WITH BOLT-ON GOOSENECK,
 JACK, LUGALL AT LOWER UNIT ASSEMBLY

	1.00	5090.0
16, MOVE 1 TON WITH 1-TON CABLE LUGALL AT UNIT SHIPFIT {25}		

	1.00	6480.0
17, MOVE 25 TON ON FLAT WITH HYDRAULIC JACK AT GENERAL SHIPFIT {25}		

	1.00	2370.0

Total TMU		13940.0
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SHIPFITTING

120. COMBINED SUB-OF

INSTALL TIGHT COLLAR ON WEB FRAME AT SHELL SHOP SHIPFIT
 TIME ALLOWED TO TRIM 1/4 OF THE COLLARS,
 PER EACH OFG: 2 01-SEP-81

TOTAL TMU 7534 . 0

----- Combined sub-operation elements -----	FREQ, --	TMU -----
32. INSTALL TIGHT COLLAR ON SIDE SHELL AT SHELL SHOP SHIPFIT	1.00	6942.0
53. MARK B/M WITH PENCIL AT SHELL SHOP SHIPFIT	1.00	337.0
34. IGNITE AND EXTINGUISH TORCH FOR BURNING OR HEATING AT HYDE GENERAL SHIPFIT {25}	0.25	255.0 -----
Total TMU		7534.0

SHIPFITTING

792. COMBINED SUB-OP

TRANSPORT STIFFENER ON RACK WITH (MAGNET-CRANE) AT FLAT (F.L.)
 PANEL SHOP SHIPFIT
 FALCON TANKER METHOD ALLOWS TRANSPORT OF RACK AND
 LOADING-OUT THE STIFFENERS BY MAGNET CRANE.
 PER EACH PANEL BLANKET STIFFENER SET OFG: 3 03-AUG-82
 * BASED ON 15 STIFFENERS AND 2 RACKS.

TOTAL TMU 36851,0

Combined sub-operation elements	FreQ,	TMU
-----	_ _	

788. TRANSPORT RACK WITH (CRANE) TO FLAT (P.L.) PANEL SHOP SHIPFIT

2.00 12266.0

789. TRANSPORT STIFFENER FOR (EANEL) UNIT WITH (MAGNET-CRANE) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

15.00 24585.0

Total TMU	-----	36851,0
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SHIPFITTING

861. COMBINED SUB-OP

SET-UP STIFFENER ON (PANEL) UNIT WITH MAGNET (CRANE) AT FLAT
(P.L.) PANEL SHOP SHIPFIT
METHOD ALLOWS LOADING-OUT ALL STIFFENERS.
PER EACH FFG PANEL [30 FT X FULL WIDTH 3 OFG: 3 20-AUG-82
* CRANE & 2 FITTERS. 27 STIFFENERS AVE.
* 3 TACK / BAR. 81 TACKS (6011).
* COVERS 1 FITTER.

TOTAL TMU 92786.0

Combined sub-operation elements	FreQ.	TMU
-----	-----	-----

783. TRANSPORT RACK WITH (CRANE) TO FLAT (P.L.) PANEL SHOP SHIPFIT

4.00 24532.0

852. TRANSPORT STIFFENER FOR (PANEL) UNIT WITH (MAGNET-CRANE) AT FLAT (P.L.)
PANEL SHOP SHIPFIT

4.00 24784.0

853. POSITION STIFFENER FOR (PANEL) UNIT WITH (OEGEE-IMR) AT FLAT (P.L.)
PANEL SHOP SHIPFIT

27.00 14040.0

783. TACK (STEEL) ON ASSEMBLY WITH SMAW (1/8 6011) AT ANY (SHOP) SHIPFIT

6.75 29430.0

Total TMU	-----	92786.0
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SHIPFITTING

883. COMBINED SUB-OP

MAKE READY (PANEL) PLATES FOR (LAYOUT) AT ANY (P. L.) PANEL SHOP
 SHIPFIT
 METHOD PRESUMES 2 FITTERS FOR LAYOUT, BUT ONLY 1 WITH SURVEYORS.
 PER EACH PANEL OFG: 4 01-SEP-82

TOTAL TMU 109643.0

-----	Freq.	TMU
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790. MAKE READY OPERATOR (FITTER) FOR (WORK SHIFT) AT FLAT (P. L.) PANEL SHOP SHIPFIT	2.00	29018.0
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650. MEASURE DECK FOR (BUTTOCK LINE) WITH (SURVEYORS) AT ANY UNIT ASSEMBLY SHOP SHIPFIT	1.00	80625.0
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Total TMU		----- 109643.0
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SHIPFITTING

889. COMBINED SUB-OP

MAKE READY PLATES FOR (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.

PER PANEL OFG: 4 02-SEF-82

- * SET 1ST PLATE, PREPARE OPERATOR,
- * CHECK SQUARENESS.

TOTAL TMU 107885.0

Combined sub-operation elements	FreQ.	TMU
-----		-----

650. MEASURE DECK FOR (BUTTOCK LINE) WITH (SURVEYORS) AT ANY UNIT ASSEMBLY SHOP SHIPFIT	1.00	80625.0
585. TRANSPORT PLATE ON POSITIONER WITH MAGNET (CRANE) AT FLAT PANEL SHOP (F.L.) SHIPFIT	1.00	2291.0
617. HOVE TOOL (LUG-ALL) WITH HAND TO FLAT PANEL SHOP (SEAM-FIT) SHIPFIT	1.00	8150.0
583. MAKE READY (FITTER FOR SEAM MAKE-UP) AT FLAT PANEL SHOP (F.L.) SHIPFIT	1.00	16819.0
Total TMU		----- 107885.0

SHIPFITTING

904. COMBINED SUB-OP

MAKE READY (PANEL) PLATES FOR (STIFFENERS) AT FLAT (P.L.) PANEL SHOP SHIPFIT

METHOD ALLOWS FOR COUNTING AT STIFFENER-FITTING.

PER PANEL OFG: 4 03-SEP-82

* PREPARE FITTERS, SET-UP GROUND

* AND GET CRANE.

TOTAL TMU 31344,0

Combined Sub-Operation elements	Freq.	TMU

790. MAKE READY OPERATOR (FITTER) FOR (WORK SHIFT) AT FLAT (P.L.) PANEL SHOP SHIPFIT	2.00	29018.0
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584. SET-UP AND TEAR DOWN CLEVIS (GROUND-CLAMP) ON ASSEMBLY (PLATE) AT FLAT PANEL SHOP (P.L.) SHIPFIT	1.00	850.0
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848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT	1.00	1476.0
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Total TMU		31344,0
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SHIPFITTING

905. COMBINED SUB-OP

POSITION STIFFENERS ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD ALLOWS FOR COUNTING AT STIFFENER-FITTING. BASED ON FULL SIZED
 PANEL.

PER TANKER PANEL OFG: 4 03-SEP-82

- * INSTALL KICKERS AND LOADOUT
- * STIFFENERS.

TOTAL TMU 99161.0

-----	FreQ.	TMU
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791. COMBINED SUB-OP

INSTALL (KICKER) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL
 SHOP SHIPFIT

1.00 62310.0

792. COMBINED SUB-OP

TRANSPORT STIFFENER ON RACK WITH (MAGNET-CRANE) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

1.00 36851.0

Total TMU		99161.0
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SHIPFITTING

943. COMBINED SUB-OP

TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
 OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT
 METHOD USED TO BRING WEB FROM # 1 DOOR TO WEB FITTING AREA AND IS
 USER FOR HANGING LARGER WEBS.
 PER WEB OFG: 3 09-SEP-82
 * RIGGER HOOKS AND UNHOOKS.
 * TRANSPORT BY CRANE.

TOTAL TMU 2392.0

Combined sub-operation elements -----	FreQ.	TMU

841. TRANSPORT OBJECT FOR ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT	1.00	1558.0
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845. TRANSPORT OBJECT FOR ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT	1.50	834.0
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Total TMU		----- 2392.0
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SHIPFITTING

945. COMBINED SUB-OP

SET-UP WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
 FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD TO LOAD OUT FULL SIZED TANKER PANEL (40' X 40'). 10 LARGE
 WEBS OR EQUIVANTS. ALLOWS COUNTING AT WEB-FITTING.
 PER TANKER PANEL OFG: 3 09-SEP-132
 * REDO LAYOUT LINES, GET RIGGER, HOOK-UP
 * TRANSPORT C. CRANE, LAND AND UNHOOK.

TOTAL TMU 76096.10

Combined sub-operation elements	FreQ.	TMU

941. MARK (PANEL) FOR WEB FRAME WITH STRAIGHTEDGE AT FLAT (P.L.) PANEL SHOP SHIPFIT

200.00 45600.0

848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT

1.00 1476.0

943. COMBINED SUB-OP

TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
 OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT

10.00 23920.0

944. UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT

10.00 5100.0

Total TMU	-----	76096.0
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SHIPFITTING

946. COMBINED SUB-OP

INSTALL (KICKER) ATTACHMENT FOR WEB FRAME AT FLAT (P.L.) PANEL
SHOP SHIPFIT

KEY

PER TANKER PANEL OFG: 4 10-SEP-82

* OBTAIN, PLACE AT POSITION, SET-UP,

* TACK, REMOVE FROM PANEL.

TOTAL TMU 130920.0

Combined sub-operation elements	FreQ.	TMU
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735. SET-UP (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT	20.00	5400.0
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784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	20.00	29440.0
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787. REMOVE (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT	20.00	3600.0
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786. MOVE (KICKERS) FOR (STIFFENERS) WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT	16.00	89280.0
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704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	20.00	3200.0
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Total TMU		----- 130920.0
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SHIPFITTING

947. COMBINED SUB-OP

ALIGN WEB FRAME ON (PANEL) ASSEMBLY WITH JACK AT FLAT (P.L.) PANEL SHOP SHIPFIT

METHOD ALLOWS ALIGNMENT OF WEB TO PROPER POSITION VS. STIFFENER CUTOUT S. DOES NOT COVER PLUMBING.

PER TANKER WEB [ANY HEIGHT @ 20FT.] OFG: 3 10-SEP-82

* TACK 1 KICKER TO PANEL AND 1 TO WEB.

* PLACE JACK AND MOVE PANEL TO POSITION.

* BASED ON 5 WEB ALIGNMENT.

TOTAL TMU 7434. a

Combined sub-operation elements	FreQ.	TMU
-----		-----

803. MOVE TOOL TO FLAT (P.L.) PANEL SHOP SHIPFIT

0.20 1580.8

17. MOVE 25 TON ON FLAT WITH HYDRAULIC JACK AT GENERAL SHIPFIT {25}

1.00 2370.0

784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT

0.50 736.0

787. REMOVE (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT

0.20 36.0

704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT

1.00 160.0

614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT

40.00 320.0

786. MOVE (KICKERS) FOR (STIFFENERS) WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT

0.40 2232.0

Total TMU 7434.8

SHIPFITTING

953. COMBINED SUB-OP

MAKE UP WEB FRAME (FLATS) ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT

METHOD FOR MAKING UP FLAT BETWEEN LONGITUDINALS. PRESUMES TANKERS, BUT CAN BE USED FOR FFG WITH ALLOWANCES FOR LESS WELD. 30 INCH FRAME SPACING.

PER WEB CUTOUT OFG: 2 15-SEP-82

- * CHECK POSITION VS. LAYOUT LINES,
- * PULL TO POSITION, TACK, CHANGE
- * LUG-ALL POSITION, PULL, CHECK AND
- * ALIGN MIDDLE BY HAMMER, TACK.
- * FREQ. FOR SOME DOG&WEDGE PLUS
- * BOLT&CLIP.

TOTAL TMU 15872.5

Combined sub-operation elements -----	FreQ. -----	TMU -----
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	4.00	640.0
16. MOVE 1 TON WITH 1-TON CABLE LUGALL AT UNIT SHIPFIT {25}	2.00	12960.0
15. MOVE 5 TON IN DOWNHAND POSITION WITH DOG AND WEDGE AT GENERAL SHIPFIT {25}	0.12	198.8
14. MOVE 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}	0.25	522.5
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	0.50	736.0
950. MAKE UP WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT	1.00	420.0
803. MOVE TOOL TO FLAT (P. L.) PANEL SHOP SHIPFIT	0.05	395.2
Total TMU		----- 15872.5

SHIPFITTING

934. COMBINED SUB-OP

MOVE ASSEMBLY WITH JACK AT ANY (WORK AREA) SHIPFIT
 METHOD ALLOWS JACK USE AND INSTALLATION OF KICKER. NO ALLOWANCE FOR
 GRINDING KICKER SCARS OR 'UNWELDING.'
 PER EACH USE OFG: 3 15-SEP-82
 * GET KICKER, TACK IT, USE JACK,
 * REPLACE KICKER TO STGE.

TOTAL TMU 4288.8

Combined sub-operation elements	FreQ.	TMU

785. SET-UP (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT	0.50	135.0
786. MOVE (KICKERS) FOR (STIFFENERS) WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT	0.20	1116.0
787. REMOVE (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP SHIPFIT	0.10	18.0
782. TACK (STEEL) ON ASSEMBLY WITH SMAM (1/8 7018) AT ANY (SHOP) SHIPFIT	0.25	649.8
17. MOVE 25 TON ON FLAT WITH HYDRAULIC JACK AT GENERAL SHIPFIT {25}	1.00	2370.0
Total TMU		----- 4288.8

SHIPFITTING

COMBINED SUB-OP

INSTALL COLLAR ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD MAKES USE OF EARLIER FILED DATA WITH PROPER FREQ. FOR TANKERS.
 PER EACH CUTOUT OFG: 2 15-SEP-82
 * GET COLLAR, PLACE TO WEB, TACK.

TOTAL TMU 1570.8

Combined sub-operation elements -----	Freq.	TMU -----
557. MOVE (SMALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT		
	0.25	395.0
559. INSTALL COLLAR ON BULKHEAD AT ANY (WORK AREA) SHIPFIT		
	1.00	310.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT		
	0.33	485.8
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT		
	1.00	160.0
614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT		
	2.50	20.0 -----
Total TMU		1570.8

SHIPFITTING

957. COMBINED SUB-OP

ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

METHOD FOR PLUMBING WEB AND SQUARING STIFFENER. FREQ. FOR 1 OUT OF 4.

PER WEB CUTOUT OFG: 2 16-SEP-82

* CHECK FOR SQUARE, FULL WITH LUG-ALL,

* PUSH STIFFENER AND TACK IT TO WEB.

TOTAL TMU 8935.4

Combined sub-operation elements	Freq.	TMU
-----		-----

803. MOVE TOOL TO FLAT (P.L.) PANEL SHOP SHIPFIT

0.05 395.2

703. MOVE (OPERATOR) ON ASSEMBLY WITH (BEND) AT ANY (WORK AREA) SHIPFIT

2.00 120.0

704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT

1.00 160.0

16. MOVE 1 TON WITH 1-TON CABLE LUGALL AT UNIT SHIPFIT {25}

1.00 6480.0

954. COMBINED SUB-OP

MOVE ASSEMBLY WITH JACK AT ANY (WORK AREA) SHIPFIT

0.25 1072.2

949. ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

1.00 340.0

784. TACK (STEEL) ON ASSEMBLY WITH SEMI AUTOMATIC AT ANY (SHOP) SHIPFIT

0.25 368.0

Total TMU

8935.4

SHIPFITTING

960. COMBINED SUB-OP

INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT
 METHOD FOR KICKERS, E.G., ASS-HOLES, ETC., THAT ARE USED
 INDEPENDENTLY

PER EACH OFG: 3 16-SEP-82

* GET & SET-UP KICKER, TACK, RETURN IT
 * STGE. REMOVAL DONE SEPARATELY.

TOTAL TMU 3403.5

Combined sub-operation elements	FreQ.	TMU

786. MOVE (KICKERS) FOR (STIFFENERS) WITH HAND AT FLAT (P.L.) PANEL SHOP
 SHIPFIT

0.30 1674.0

785. SET-UP (TEMPORARY) ATTACHMENT FOR (STIFFENER) AT FLAT (P.L.) PANEL SHOP
 SHIPFIT

1.00 270.0

704. HOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT

1.00 160.0

782. TACK (STEEL) ON ASSEMBLY WITH SMAW (1/8 7018) AT ANY (SHOP) SHIPFIT

0.50 1299.5

Total TMU	3403.5
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SHIPFITTING

	6,50	9568.0

Total TMU		86636.0
965. COMBINED SUB-OP		
MAKE UP (TRANSVERSE) WEB FRAME ON (LONGITUDINAL) WEB FRAME AT FLAT		
(P.L.) PANEL SHOP SHIPFIT		
METHOD BASED ON 6 FT, HIGH TRANSVERSE WEB THAT IS MADE UP WITH A		
LUG-A LL.		
PER TRANSVERSE WEB FRAME OFG: 4 17-SEP-82		
* USE LARGE SQUARE TO CHECK PLUHB,		
* PULL WITH LUG-ALL, TACK, FREQ, FOR		
* JACK USE AT DIFFICULT POINTS,		
	TOTAL TMU	14770.9
Combined sub-operation elements	Freq,	TMU
-----	-----	*****
957, COMBINED SUB-OP		
ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP		
SHIPFIT		
	1.00	8935.4
784, TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT		
	1.00	1472.0
705, HOVE (OPERATOR) ON ASSEMBLY WITH (CLIMB-OBJECT) AT ANY (WORK AREA) SHIPFIT		
	2.00	640.0
960, COMBINED SUB-OP		
INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT		
	1.00	3403.5
614, HOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT		
	40.00	320.0
Total TMU		14770.9

SHIPFITTING

964. COMBINED SUB-OP

MAKE UP (LONGITUDINAL) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL
SHOP SHIPFIT

METHOD FOR MAKING UP LONGITUDINALLY RUNNING WEBS THAT HAVE TRANSVERSE
WEBS INTERSECTING EVERY 8 FT. FITTER WORK ONE SIDE ONLY.

DOUBLE FOR TWO OPERATORS.

PER WEB > 6 FT. HIGH AND @ 40 FT. LONG. OFG: 4 17-SEP-82

* FITTER STARTS AT ONE AND WORKS TO THE

* OTHER 'JACKIN & TACKIN'. USES

* BOLT & CLIPS TO PULL WEB TO PANEL

* JACKS USED WITH BLOCKING FOR ALIGNING

* TIME ALLOWED FOR PREP AND MOVING

* AROUND THE SMALL WEBS ON UNIT.

TOTAL TMU 86636.0

Combined sub-operational elements	FreQ.	TMU
-----		-----

614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT

500.00 4000.0

14. MOVE 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}

10.00 20900.0

673. ADJUST (BUDDA JACK) ON DECK WITH HAND AT ANY (WORK AREA) SHIPFIT

10.00 3100.0

17. MOVE 25 TON ON FLAT WITH HYDRAULIC JACK AT GENERAL SHIPFIT {25}

10.00 23700.0

704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT

20.00 3200.0

705. MOVE (OPERATOR) ON ASSEMBLY WITH (CLIMB-OBJECT) AT ANY (WORK AREA)
SHIPFIT

10.00 3200.0

803. MOVE TOOL TO FLAT (P.L.) PANEL SHOP SHIPFIT

2.00 1580800

557. MOVE (SMALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT
ASSEMBLY SHOP SHIPFIT

2.00 3160.0

784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT

SHIPFITTING

967.1 COMBINED SUB-OP

INSTALL (DOCKING) BRACKET ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD FOR INSTALLING DOCKING BRACKETS THAT ARE SHIPPED LOOSE TO JOB.
 THESE BRACKETS FOUND ON LONGITUDINAL WEBS AND MAKE UP TO
 LONGITUDINAL STIFFENERS.
 PER TANKER BRACKET OFG: 4 20-SEP-82
 * LAYOUT, SET KICKERS, TRANSPORT WITH
 * CRANE, LAND, SCRIBE, PULL TIGHT.
 * PUSH TO LOCATION, TACK.

TOTAL TMU 54074.6

 Combined sub-operation elements FreQ. TMU

206.	MEASURE AND MARK ASSEMBLY FOR LOCATION OF FOUNDATION OR SMALL TANK LOWER UNIT ASSEMBLY SHOP SHIPFIT		
		1.00	11040.0
960.	COMBINED SUB-OP		
	INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT		
		2.00	6807.0
943.	COMBINED SUB-OP		
	TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT OUERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT		
		1.00	2392.0
945.	COMBINED SUB-OP		
	SET-UP WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT FLAT (P.L.) PANEL SHOP SHIPFIT		
		0.10	7609.6
690.	MEASURE (AND MARK) BRACKET FOR (TRIMMING) WITH STEEL TAPE AT (INUERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT		
		1.00	1410.0
952.	FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA) SHIPFIT		
		3.00	15012.0
14.	MOVE 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}		

SHIPFITTING

966. COMBINED SUB-OP

ALIGN (DOCKING) BRACKET ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT

METHOD FOR ALIGNING AND TACKING FIRE-INSTALLED BRACKETS. THESE BRACKET S ARE FOUND ON LONGITUDINAL WEBS AND MAKE UP TO LONGITUDINAL STIFFENER S.

PER BRACKET (TANKER) OFG: 4 17-SEP-82

* PULL TIGHT WITH BOLT&CLIP, PUSH TO * LOCATION WITH JACK, TACK.

TOTAL TMU 12278,8

Combined sub-operational elements	FreQ.	TMU
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14. MOVE 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}

1.00 2090.0

954. COMBINED SUB-OP

MOVE ASSEMBLY WITH JACK AT ANY (WORK AREA) SHIPFIT

1.00 4288,8

704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT

1.00 160.0

952. FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA) SHIPFIT

1.00 5004.0

784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT

0.50 736.0

Total TMU		12278.8
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SHIPFITTING

1020. INSPECT CUTOUT ON WEB FRAME WITH SQUARE AT FLAT (P. L.) PANEL SHOP SHIPFIT		
	27.00	12933.0
952. FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA) SHIPFIT		
	4.50	22518.0
853. POSITION STIFFENER FOR (PANEL) UNIT WITH (OEGEE-BAR) AT FLAT (P. L.) PANEL SHOP SHIPFIT		
	4.00	2080.0
703. MOVE (OPERATOR) ON ASSEMBLY WITH (BEND) AT ANY (WORK AREA) SHIPFIT		
	6.00	360.0
793. ALIGN STIFFENER ON (PANEL) UNIT WITH (SLEDGE) HAMMER AT FLAT (P. L.) PANEL SHOP SHIPFIT		
	2.00	1660.0
614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT		
	160.00	1280.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT		
	1.00	1472.0
Total TMU		58703.0

SHIPPING

15. MOVE 5 TON IN DOWNHAND POSITION WITH DOG AND WEDGE AT GENERAL SHIPFIT {25}	1.00	2090.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	3.00	4770.0
	2.00	2944.0

Total TMU		54074.6

1029. COMBINED SUB-OP

POSITION WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD TO POSITION 12 IN. HIGH FFG WEB @ 40 FT. LENGTH. PRESUMES 27
S STIFFENER CUTOUTS AND TWO WEB SECTIONS.

PER TRANSVERSE WEB OFG: 4 23-SEP-82

- * REDO LAYOUT; TRANSPORT BY CRANE;
- * LAND WEBS ON FACEPLATES; CHECK C/O'S
- * DEPTH VS. STIFFENER HEIGHT; STAND WEBS;
- * ALIGN AND TACK.

TOTAL TMU 58703.0

Combined sub-operation elements -----	Freq. -----	TMU -----
941. MARK (PANEL) FOR WEB FRAME WITH STRAIGHTEDGE AT FLAT (P.L.) PANEL SHOP SHIPFIT		
	40.00	9120.0
943. COMBINED SUB-OP		
TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT		
	2.00	4784.0
944. UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P.L.) PANEL SHOP SHIPFIT		
	2.00	1020.0
848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT		
	1.00	1476.0

SHIPFITTING

1U31. COMBINED SUB-OP

INSTALL (TOE) BRACKET WITH (JIG) AT FLAT (P. L.) PANEL SHOP SHIPFIT
 METHOD FOR OBTAINING, INSTALLING, AND TACKING.
 PER EACH OFG: 2 23-SEP-82
 * COVERS ALL SHALL BKTS. INSTALLED ON
 * WEB AT PANEL LINE.

TOTAL TMU 1798.0

Combined sub-operation elements	FREQ.	TMU
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557. HOVE (SMALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT	0.10	158.0
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709. INSTALL (TOE) BRACKET WITH JIG AT ANY (WORK AREA) SHIPFIT	1.00	390.0
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704. HOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	1.00	160.0
--	------	-------

783. TACK (STEEL) ON ASSEMBLY WITH SMAW (1/8 6011) AT ANY (SHOP) SHIPFIT	0.25	1090.0
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Total TMU		----- 1798.0
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SHIPFITTING

1030. COMBINED SUB-OP

MAKE UP WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT
 METHOD TO MAKE UP 12 IN HIGH FFG WEB @ 40 FT. PRESUMES 27 STIFFENERS
 AND TWO WEB SECTIONS.
 PER TRANSVERSE WEB FFG OFG: 2 23-SEP-82
 * MAKE UP-FLAT USING KING CLAMP; FREQ.
 * FOR BOLT&CLIF AND DOG2&WEDGE USE.

TOTAL TMU 111134.0

Combined sub-operation elements	Freq.	TMU
1021. MAKE UP WEB FRAME (FLAT) ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT	27.00	7560.0
1019. MOVE WEB FRAME ON (PANEL) UNIT WITH (KING WEB) CLAMP AT FLAT (P. L.) PANEL SHOP SHIPFIT	27.00	48330.0
14. MOVE ' 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}	6.00	12540.0
15. MOVE 5 TON IN DOWNHAND POSITION WITH DOG AND WEDGE AT GENERAL SHIPFIT {25}	8.00	12720.0
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	54.00	8640.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOHATIC AT ANY (SHOP) SHIPFIT	14.50	21344.0
Total TMU		111134.0

SHIPFITTING

1041. COMBINED SUB-OP

MAKE READY (FFG PANEL) FOR ASSEMBLY AT FLAT (P.L.) PANEL SHOP
 SHIPFIT
 METHOD ALLOWS PANEL PREP. PER SHIFT.
 PER EACH FFG PANEL OFG: 4 23-SEP-82

TOTAL TMU 111616.0

Combined sub-operation elements -----	Freq. -----	TMU -----
790. MAKE READY OPERATOR (FITTER) FOR (WORK SHIFT) AT FLAT (P.L.) PANEL SHOP SHIPFIT	6.00	87054.0
584. SET-UP AND TEAR DOWN CLEVIS (GROUND-CLAMP) ON ASSEMBLY (PLATE) AT FLAT PANEL SHOP (P.L.) SHIPFIT	1.00	850.0
803. MOVE TOOL TO FLAT (P.L.) PANEL SHOP SHIPFIT	3.00	23712.0
Total TMU		----- 111616.0

SHI PFI TTING

1040. COMBINED SUB-OP

MAKE READY (TANKER PANEL) FOR ASSEMBLY AT FLAT (P. L.) PANEL SHOP
SHI PFI T

METHOD ALLOWS PANEL PREP. PER SHI FT.
PER EACH PANEL OFG: 4 23-SEP-82

TOTAL TMU 400380.0

Combined sub-operation elements

Freq. TMU

790. MAKE READY OPERATOR (FITTER) FOR (WORK SHIFT) AT FLAT (P. L.) PANEL SHOP
SHI PFI T

10.00 145090.0

584. SET-UP AND TEAR DOWN CLEVIS (GROUND-CLANP) ON ASSEMBLY (PLATE) AT FLAT
PANEL SHOP (P. L.) SHI PFI T

1.00 850.0

945. COMBINED SUB-OP

SET-UP WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
FLAT (P. L.) PANEL SHOP SHI PFI T

1.00 76096.0

946. COMBINED SUB-OP

INSTALL (KICKER) ATTACHMENT FOR WEB FRAME AT FLAT (P. L.) PANEL
SHOP SHI PFI T

1.00 130920.0

803. MOVE TOOL TO FLAT (P. L.) PANEL SHOP SHI PFI T

6.00 47424.0

Total TMU

400380.0

SECTION 1.2
DATA SYNTHESIS AND ANALYSIS

888. COMBINED SUB-OP

POSITION PLATES FOR (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT
 METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.
 PER NUMBER OF SEAMS OFG: 3 02-SEP-82
 * SET PLATES, ATTACH GROUND, MAKE 1ST.
 * TACK. ALLOWS USING LUG-ALL.

TOTAL TMU 10471.0

Combined sub-operation elements	Freq.	TMU
586. ALIGN PLATE ON POSITIONER WITH MAGNET AT FLAT PANEL SHOP (P. L.) SHIPFIT		
	1.00	5671.0
587. TACK PLATE ON POSITIONER WITH SEMIAUTOMATIC AT FLAT PANEL SHOP (P. L.) SHIPFIT		
	1.00	720.0
552. MOVE (1 TON) IN (ANY POSITION) WITH HOIST (CABLE LUGALL) AT ANY (WORK AREA) SHIPFIT		
	0.50	3230.0
584. SET-UP AND TEAR DOWN CLEVIS (GROUND-CLAMP) ON ASSEMBLY (PLATE) AT FLAT PANEL SHOP (P. L.) SHIPFIT		
	1.00	830.0
Total TMU		10471.0

DATA SYNTHESIS AND ANALYSIS

880. COMBINED SUB-OP

MARK (PANEL) PLATE FOR (LAYOUT) AT ANY (P.L.) PANEL SHOP SHIPFIT
 METHOD USED FOR PANEL LAYOUT ON PANEL LINE.
 PER FOOT OF STIFFENERS 2 WEBS OFG: 2 01-SEP-82

TOTAL TMU 239.0

----- Combined sub-operation elements -----	Freq.	TMU
	-----	-----

610. MARK PLATE WITH CHALKLINE AT ANY PANEL SHOP SHIPFIT

1.00 51.0

609. MARK (LAYOUT LINE) ON DECK (PLATE) WITH (HAMMER AND) PUNCH AT ANY
 (WORK AREA) SHIPFIT

1.00 188.0

Total TMU 239.0

1043. COMBINED SUB-OP

MAKE READY OPERATOR FOR (PANEL) ASSEMBLY AT FLAT (P.L.) PANEL SHOP
 SHIPFIT
 METHOD FOR TOTAL PREP TIME FOR FFG PANEL.
 PER EACH PANEL OFG: 4 24-SEP-82

TOTAL TMU 453274.0

----- Combined sub-operation elements -----	Freq.	TMU
	-----	-----

889. COMBINED SUB-OP

MAKE READY PLATES FOR (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

1.00 107885.0

883. COMBINED SUB-OP

MAKE READY (PANEL) PLATES FOR (LAYOUT) AT ANY (P.L.) PANEL SHOP
 SHIPFIT

1.00 109643.0

904. COMBINED SUB-OP

DATA SYNTHESIS AND ANALYSIS

	MAKE READY (PANEL) PLATES FOR (STIFFENERS) AT FLAT (P. L.) SHOP SHIPFIT	PANEL	
			1.00 31344.0
861.	COMBINED SUB-OP		
	SET-UP STIFFENER ON (PANEL) UNIT WITH MAGNET (CRANE) AT (P. L.) PANEL SHOP SHIPFIT	FLAT	
			1.00 92786.0
1041.	COMBINED SUB-OP		
	MAKE" READY (FFG PANEL) FOR ASSEMBLY AT FLAT (P. L.) PANEL SHOP SHIPFIT		
			1.00 111616.0
	Total TMU		----- 453274.0

891. COMBINED SUB-OP

MAKE UP (THIN) PLATES FOR (PANEL) AT FLAT (P. L.) PANEL SHOP
SHIPFIT
METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.
PER FOOT (TOTAL SEAM FOOTAGE) OFG: 2 02-SEP-82
* MAKE UP FOR PLATES LESS THAN OR EQUAL
* TO .375 IN. OR 15.3 LBS.

TOTAL TMU 404.0

	<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
	-----	-----	-----
613.	HAKE-UP SEAM ON POSITIONER WITH SHIM (PLATE) AT FLAT PANEL SHOP (P. L.) SHIPFIT		
		1.00	371.0
618.	TRANSPORT OPERATOR ON POSITIONER AT FLAT PANEL SHOP SHIPFIT		
		1.00	33.0
	Total TMU		----- 404.0

DATA SYNTHESIS AND ANALYSIS

882. COMBINED SUB-OP

MEASURE (PANEL) PLATE FOR (LAYOUT) AT ANY (P.L.) PANEL SHOP SHIPFIT
 METHOD USED FOR 18 INCH FRAME SPACING AND 8 FOOT WEB SPACING.
 PER EACH FOOT OF PANEL PERIMETER OFG: 2 01-SEP-82
 * 1 MARK / 2.4 FEET.

TOTAL TMU 223.2

Combined sub-operation elements	FreQ.	TMU
614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT	1.00	8.0
612. ARRANGE TAPE ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT	1.00	43.0
611. MARK ASSEMBLY WITH MARKER AT ANY LAYOUT AREA SHIPFIT	0.42	37.8
879. HARK PLATE WITH MARKER AT ANY LAYOUT AREA SHIPFIT	0.42	134.4
Total TMU		223.2

DATA SYNTHESIS AND ANALYSIS

1034. COMBINED SUB-OP

MAKE UP (TRANSVERSE) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

METHOD FOR COMPLETE MANUAL MAKE UP OF 12 IN. WEB @ 40 FT. LENGTH. 27 STIFFENER C/O'S AND 18 IN. FRAME SPACING. WELD FOOTAGE: FLAT - 65; TIE-3UTT - 3.5; STIF+ FACEPLATES - 18; COLLARS - 90; SHALL BK

PER TRANSVERSE WEB OFG: 4 23-SEP-82

- * SMALL BKTS. 8 FT. OF WELD.
- * REDO LAYOUT; LAND WEBS; CHECK C/O'S;
- * SET-UP WEBS; ALIGN AND TACK; MAKE UP;
- * PLUMB AND SET STIFF.; TACK TIE-BUTTS;
- * INSTALL COLLARS AND BKTS.

TOTAL TMU 571787.6

Combined sub-operation elements

Freq. TMU

1029. COMBINED SUB-OP

POSITION WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

1.00 58703.0

957. COMBINED SUB-OF

ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT

9.00 80418.6

115. COMBINED SUB-OF

MAKE UP STIFFENER TIE-BUTT WITH BOLT-ON GOOSENECK & JACK AT LOWER UNIT ASSEMBLY SHOP SHIPFIT

1.00 13940.0

76. INSTALL NON-TIGHT COLLAR ON BOTTOM SHELL AT LOWER UNIT ASSEMBLY SHOP SHIPFIT

27.00 79002.0

120. COMBINED SUB-OP

INSTALL TIGHT COLLAR ON WEB FRAME AT SHELL SHOP SHIPFIT

27.00 203418.0

1031. COMBINED SUB-OP

DATA SYNTHESIS AND ANALYSIS

	INSTALL (TOE) BRACKET WITH (JIG) AT FLAT (P. L.) PANEL SHOP	SHIPFIT	
		14.00	25172.0
1030.	COMBINED SUB-OP		
	MAKE UP WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL SHOP	SHIPFIT	
		1.00	111134.0

	Total TMU		571787.6

1033.	COMBINED SUB-OP		
	INSTALL (KNEE) BRACKET ON WEB FRAME AT FLAT (P. L.) PANEL SHOP	SHIPFIT	
	METHOD DESCRIBES PLACING AND TACKING BRACKET ON ONE LEG ONLY. CAN BE HANDLED MANUALLY. 3 FT. OF WELD.		
	PER FFG TYPE BRACKET OFG: 4 23-SEP-82		
	* SET ON WEB, CHECK, TACK,		
	TOTAL TMU		11187.0

	<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
	-----	-----	-----
557.	MOVE (SHALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT		
		1.00	1580.0
692.	INSTALL BRACKET ON (HOUSE SIDE) AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT		
		1.00	460.0
704.	MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT		
		1.00	160.0
960.	COMBINED SUB-OP		
	INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT		
		2.00	6807.0
783.	TACK (STEEL) ON ASSEMBLY WITH SMAW (1/8 6011) AT ANY (SHOP) SHIPFIT		
		0.50	2180.0

DATA SYNTHESIS AND ANALYSIS

Total TMU 11187.0

956, COMBINED SUB-OP

INSTALL HEADER ON (PANEL) AT FLAT (P. L.) FANEL SHOP SHIPFIT
 HEADER SHALL AND LIGHT ENOUGH TO BE EASILY HANDLED MANUALLY.

PER HEADER OFG: 3 15-SEP-82

- * FITTER LOCATES HEADER POSITION; SETS
- * JIG; TRANSFERS LINES TO HEADER; HAS
- * HEADER TRIMMED; THEN ALIGNS AND TACKS
- * HEADER.

TOTAL TMU 18852.0

Combined sub-operation elements Freq. TMU

557. MOVE (SMALL PARTS) FOR ASSEMBLY WITH HAND AT (INVERTED ALUMINUM) UNIT
 ASSEMBLY SHOP SHIPFIT

721. MARK ASSEMBLY FOR FOUNDATION (LOCATION) AT ANY. (WORK AREA) SHIPFIT 1.00 1580.0

739. MEASURE HEADER ON UNIT WITH (ADJUSTABLE) JIG AT (INVERTED ALUMINUM)
 UNIT ASSEMBLY SHOP SHIPFIT 1.00 6120.0

740. ALIGN HEADER ON ASSEMBLY AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP
 SHIPFIT 1.00 2370.0

783. TACK (STEEL) ON ASSEMBLY WITH SMAM (1/8 6011) AT ANY (SHOP) SHIPFIT 1.00 1120.0

952. FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA)
 SHIPFIT 1.00 4360.0

614. HOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT 0.50 2502.0

100.00 800.0

Total TMU 18852.0

DATA SYNTHESIS AND ANALYSIS

1044.	COMBINED SUB-OF		
	MAKE READY OPERATOR FOR (PANEL) ASSEMBLY AT FLAT (P.L.)	PANEL SHOP	
	SHIPFIT		
	METHOD FOR TOTAL PREP TIME FOR TANKER PANEL.		
	PER EACH TANKER PANEL OFG: 4 24-SEP-82		
		TOTAL TMU	748413.0
	Combined sub-operation elements	Freq.	TMU
889.	COMBINED SUB-OP		
	MAKE READY PLATES FOR (PANEL) AT FLAT (P.L.)	PANEL SHOP	
		SHIPFIT	
		1.00	107885.0
883.	COMBINED SUB-OP		
	MAKE READY (PANEL) FLATES FOR (LAYOUT) AT ANY (P.L.)	PANEL SHOP	
	SHIPFIT		
		1.00	109643.0
904.	COMBINED SUB-OP		
	MAKE READY (PANEL) PLATES FOR (STIFFENERS) AT FLAT (P.L.)	PANEL	
	SHOP SHIPFIT		
		1.00	31344.0
905.	COMBINED SUB-OF		
	POSITION STIFFENERS ON (PANEL) AT FLAT (P.L.)	PANEL SHOP	
		SHIPFIT	
		1.00	99161.0
1040.	COMBINED SUB-OP		
	MAKE READY (TANKER PANEL) FOR ASSEMBLY AT FLAT (P.L.)	PANEL SHOP	
	SHIPFIT		
		1.00	400380.0
	Total TMU		748413.0

DATA SYNTHESIS AND ANALYSIS

1053. COMBINED SUB-OF

HAKE UP PLATES FOR (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.
 PER FOOT (TOTAL SEAM FOOTAGE) OFG: 2 02-SEP-82
 * MAKE UP FOR PLATES GREATER THAN
 * .375 IN. OR 15.3 LBS.

TOTAL TMU 593.0

----- Combined sub-operation elements -----	Freq.	TMU
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588. MAKE UP SEAM ON POSITIONER WITH JACK AND MAGNETS AT FLAT PANEL SHOP (P.L.) SHIPFIT		
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	1.00	560.0
618. TRANSPORT OPERATOR ON POSITIONER AT FLAT PANEL SHOP SHIPFIT		

	1.00	33.0
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Total TMU		----- 593.0
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DATA SYNTHESIS AND ANALYSIS

881. COMBINED SUB-OP

MEASURE (PANEL) PLATE FOR (LAYOUT) AT ANY (P.L.) PANEL SHOP SHIPFIT
 METHOD USED FOR 30 INCH FRAME SPACING AND 8 FOOT WEB SPACING.
 PER FOOT OF PERIMETER OFG: 2 01-SEP-82
 * 1 MARK / 4 FEET.

TOTAL TMU 153.5

Combined sub-operation elements	Freq.	TMU
614. MOUE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT	1.00	8.0
612. ARRANGE TAPE ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT	1.00	43.0
611. MARK ASSEMBLY WITH MARKER AT ANY LAYOUT AREA SHIPFIT	0.25	22.5
879. MARK PLATE WITH MARKER AT ANY LAYOUT AREA SHIPFIT	0.25	80.0
Total TMU		153.5

DATA SYNTHESIS AND ANALYSIS

798. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

METHOD DESCRIBES OPERATION OF ONE MECHANIC, MUST BE DOUBLED TO COVER
 BOTH OPERATORS.

PER EACH STIFFENER UP TO 20 FT. IN LENGTH OFG: 3 06-AUG-82

* POSITION GANTRY, MAKE UP STIFFENER.

* TACKING BY SEMIAUTOMATIC.

TOTAL TMU 13040.0

Combined sub-operation elements	Freq.	TMU
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797, POSITION (GANTRY) ON (PANEL) UNIT AT FLAT (P.L.) PANEL SHOP SHIPFIT	1.00	1220.0
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796. MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.) PANEL SHOP SHIPFIT	3.00	7500.0
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784, TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	2.50	3680.0
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704, MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	4.00	640.0
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Total TMU		13040.0
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DATA SYNTHESIS AND ANALYSIS

799. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

METHOD DESCRIBES OPERATION OF ONE MECHANIC. MUST BE DOUBLED TO COVER
 BOTH OPERATORS.

PER EACH STIFFENER > 20 FT. AND < 30 FT. OFG: 3 06-AUG-82

- * POSITION GANTRY, MAKE UP STIFFENER,
- * TACKING BY SEMIAUTOMATIC.

TOTAL TMU 17700.0

Combined sub-operation elements	Freq.	TMU
797. POSITION (GANTRY) ON (PANEL) UNIT AT FLAT (P.L.) PANEL SHOP SHIPFIT	1.00	1220.0
796. MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.) PANEL SHOP SHIPFIT	4.00	10000.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	3.75	5520.0
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	6.00	960.0
Total TMU		17700.0

DATA SYNTHESIS AND ANALYSIS

800. COMBINED SUB-OF

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT
 METHOD DESCRIBES THE OPERATION OF ONE MECHANIC. MUST BE DOUBLED TO
 COVER BOTH OPERATORS
 PER EACH STIFFENER > 30 FT. AND) < 40 FT. OFG: 3 06-AUG-82
 * POSITION GANTRY, MAKE UP STIFFENER.
 * TACKING BY SEMIAUTOMATIC.

TOTAL TMU 22360.0

Combined sub-operation elements	Freq.	TMU
797. POSITION (GANTRY) ON (PANEL) UNIT AT FLAT (P.L.) PANEL SHOP SHIPFIT	1.00	1220.0
796. MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.) PANEL SHOP SHIPFIT	5.00	12500.0
784. TACK (STEEL) ON ASSEMBLY (WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	5.00	7360.0
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	8.00	1280.0

Total TMU		22360.0

DATA SYNTHESIS AND ANALYSIS

801. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
 PANEL SHOP SHIPFIT
 METHOD DESCRIBES THE OPERATION OF ONE MECHANIC, MUST BE DOUBLED TO
 COVER BOTH OPERATORS,
 PER EACH STIFFENER > 40 FT. OFG: 3 06-AUG-82
 * POSITION GANTRY, MAKE UP STIFFENER,
 * TACKING BY SEMIAUTOMATIC.

TOTAL TMU 25756.0

Combined sub-operation elements -----	Freq.	TMU
797. POSITION (GANTRY) ON (PANEL) UNIT AT FLAT (P.L.) PANEL SHOP SHIPFIT	1.00	1220.0
796. MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.) PANEL SHOP SHIPFIT	6.00	15000.0
704. MOVE (OPERATOR) ON ASSEMBLY WITH (KNEEL) AT ANY (WORK AREA) SHIPFIT	9.00	1440.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	5.50	8096.0
Total TMU		25756.0

DATA SYNTHESIS AND ANALYSIS

962. COMBINED SUB-OF

MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
 METHOD FOR WEB FRAME THAT IS 20 FT. LONG WITH 30 IN, FRAME SPACING.
 WELD FOOTAGE: BACKUP STRUCTURE - 26,25; FLAT - 32; COLLARS -
 22.5.

PER TANKER WEB >6 FT. HIGH, OFG: 3 16-SEP-82

* LAND, ALIGN, MAKE UP FLAT, PLUMB,

* TACK, MAKE UP STIFFENER, INSTALL

* COLLAR,

* COUNTING COMB, SUB-OP,

TOTAL TMU 266570.3

Combined sub-operation elements Freq. TMU

947. COMBINED SUB-OP

ALIGN WEB FRAME ON (PANEL) ASSEMBLY WITH JACK AT FLAT (P.L.) PANEL
 SHOP SHIPFIT

1.00 7434.8

953. COMBINED SUB-OP

MAKE UP WEB FRAME (FLATS) ON (PANEL) AT FLAT (P.L.) PANEL SHOP
 SHIPFIT

7.50 119043.8

957. COMBINED SUB-OP

ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP
 SHIPFIT

7.50 67015.5

318. MOVE OPERATOR ON UNIT WITH LADDER AT UNIT ASSEMBLY SHOP

4.50 4896.0

960. COMBINED SUB-OP

INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT

2.00 6807.0

958. COMBINED SUB-OP

ALIGN BRACKET FOR WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT

DATA SYNTHESIS AND ANALYSIS

14.	MOVE 2 TON WITH BOLT & CLIP AT GENERAL SHIPFIT {25}	7.50	43322.3
955.	COMBINED SUB-OP	3.00	6270.0
	INSTALL COLLAR ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT	7.50	11781.0
	Total TMU		266570.3
963.	COMBINED SUB-OF		
	MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT		
	METHOD FOR WEB THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING, WELD		
	PO OTAGE: BACKUP STRUCTURE - 14.25; FLATS - 32.0; COLLARS -		
	17.4.		
	PER TANKER WEB < 6 FT. HIGH OFG: 3 16-SEP-82		
	* MAKE UP FLAT, PLUMB, MAKE UP STIFFENER,		
	* INSTALL COLLAR,		
	* COMB, SUB-OF FOR COUNTING,		
	TOTAL TMU	248597.3	
	Combined sub-operation elements	Freq,	TMU
953.	COMBINED SUB-OF		
	MAKE UP WEB FRAME (FLATS) ON (PANEL) AT FLAT (P.L.) PANEL SHOP		
	SHIPFIT	7.50	119043.8
957 |	COMBINED SUB-OF		
	ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (F.L.)		PANEL SHOP
	SHIPFIT	7.50	67015.5
958.	COMBINED SUB-OP		
	ALIGN BRACKET FOR WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT	7.50	43322.3
947.	COMBINED SUB-OP		

DATA SYNTHESIS AND ANALYSIS

ALIGN WEB FRAME ON (PANEL) ASSEMBLY WITH JACK AT FLAT (P.L.) SHOP SHIPFIT		
	1.00	7434.8
955, COMBINED SUB-OP		
INSTALL COLLAR ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT	7.50	11781.0
Total TMU		248597.3
968. COMBINED SUB-OP		
MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT METHOD FOR LONGITUDINAL WEB FRAME THAT IS 40 FT. LONG WITH 8 FT. BAYS SPACING, WELD FOOTAGE: FLAT - 80; VERTICAL - 120; PRE-INSTALLED DOCKING BKTS, - 12; JOB INSTALLED DOCKING BKTS, - 25.5. PER TANKER WEBS > 6 FT+ HIGH OFG: 4 20-SEP-82 * CRANE OPERATION INCLUDED DUE TO LARGE * SIZE OF WEB, REMARK L.O. LINES, LAND * WEB, ALIGN WEB, MAKE UP FLAT, PLUMB * AND MAKE UP VERTICALS, * OPERATION FOR 1 OPERATOR,		
	TOTAL TMU	544202.1
Combined sub-operation elements	Freq.	TMU
941, HARK (PANEL) FOR WEB FRAME WITH STRAIGHTEDGE AT FLAT (P.L.) PANEL SHOP SHIPFIT	40.00	9120.0
848, POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT	1.00	1476.0
943. COMBINED SUB-OP		
TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT	1.00	2392.0

DATA SYNTHESIS AND ANALYSIS

944.	UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		2.00	1020.0
947.	COMBINED SUB-OF		
	ALIGN WEB FRAME ON (PANEL) ASSEMBLY WITH JACK AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		1.00	7434.8
964.	COMBINED SUB-OF		
	MAKE UP (LONGITUDINAL) WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		1.00	86636.0
957.	COMBINED SUB-OF		
	ALIGN (BY FLUMBING) WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		10.00	89354.0
965.	COMBINED SUB-OF		
	MAKE UP (TRANSVERSE) WEB FRAME ON (LONGITUDINAL) WEB FRAME AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		10.00	147709.0
966.	COMBINED SUB-OF		
	ALIGN (DOCKING) BRACKET ON WEB FRAME AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		3.00	36836.4
967.	COMBINED SUB-OF		
	INSTALL (DOCKING) BRACKET ON WEB FRAME AT FLAT (P. L.) PANEL SHOP SHIPFIT		
		3.00	162223.8
	Total TMU		544202.1

DATA SYNTHESIS AND ANALYSIS

1038. COMBINED SUB-OF

INSTALL (MEDIUM SIZED KNEE) BRACKET ON WEB FRAME AT FLAT (P.L.)
 PANEL SHOP SHIPFIT
 METHOD DESCRIBES PLACING AND TACKING ONE LEG OF A 60 IN. BY 32 IN.
 BRACKET. NEED CRANE FOR HANDLING+ WELD FOOTAGE = 16.7 @ 5/16.
 PER EACH BRACKET OFG: 4 23-SEP-82
 * SET ON WEB WITH CRANE, CHECK, TACK,

TOTAL TMU 20754,0

Combined sub-operation elements Freq, TMU

960. COMBINED SUB-OP

INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT

4.00 13614.0

692. INSTALL BRACKET ON (HOUSE SIDE) AT (INVERTED ALUMINUM) UNIT ASSEMBLY
 SHOP SHIPFIT

1.00 460.0

848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE)
 (P.L.) PANEL SHOP SHIPFIT

1.00 1476.0

943. COMBINED SUB-OP

TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
 OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT

1.00 2392.0

944. UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P.L.) PANEL
 SHOP SHIPFIT

1.00 510.0

793. ALIGN STIFFENER ON (PANEL) UNIT WITH (SLEDGE) HAMMER AT FLAT (P.L.)
 PANEL SHOP SHIPFIT

1.00 830.0

784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT

1.00 1472.0

Total TMU 20754,0

DATA SYNTHESIS AND ANALYSIS

1039. COMBINED SUB-OP

INSTALL (LARGE KNEE) BRACKET ON WEB FRAME AT FLAT (P.L.) PANEL
 SHOP SHIPFIT
 METHOD DESCRIBES PLACING AND TACKING ON ONE LEG OF AN EIGHT BY EIGHT
 F T. KNEE BRACKET, NEED CRANE FOR HANDLING. WELD FOOTAGE = 18
 @ 5/16.
 PER EACH BRACKET OFG: 4 23-SEP-82
 * SET ON WEB WITH CRANE; ALIGN AND
 * MAKE UP,

TOTAL TMU 46759.0

Combined sub-operation elements FreQ, TMU

960. COMBINED SUB-OP

INSTALL (KICKER) ON ASSEMBLY AT ANY (WORK AREA) SHIPFIT

7.00 23824.5

692. INSTALL BRACKET ON (HOUSE SIDE) AT (INVERTED ALUMINUM) UNIT ASSEMBLY
 SHOP SHIPFIT

2.00 920.0

848. POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE)
 (P.L.) PANEL SHOP SHIPFIT

1.00 1476.0

943. COMBINED SUB-OP

TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT
 OVERHEAD (CRANE) (P.L.) PANEL SHOP SHIPFIT

1.00 2392.0

944. UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P.L.) PANEL
 SHOP SHIPFIT

0.10 51.0

947. COMBINED SUB-OP

ALIGN WEB FRAME ON (PANEL) ASSEMBLY WITH JACK AT FLAT (P.L.) PANEL
 SHOP SHIPFIT

0.75 5576.1

957. COMBINED SUB-OP

DATA SYNTHESIS AND ANALYSIS

	ALIGN (BY PLUMBING) WEB FRAME ON (PANEL) AT FLAT (F. L.)	PANEL SHOP	
	SHIPFIT		
			1.00 8935.4
784.	TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP)	SHIPFIT	
			2.00 2944.0
705.	HOVE (OPERATOR) ON ASSEMBLY WITH (CLIMB-OBJECT) AT ANY (WORK AREA)		
	SHIPFIT		
			2.00 640.0
	Total TMU		46759,0
1032.	COMBINED SUB-OF		
	INSTALL (LARGE) HEADER ON (PANEL) AT FLAT (P. L.)	PANEL SHOP	
	SHIPFIT		
	HEADER LARGE AND NEEDS CRANE TO BE HANDLED, WELD FOOTAGE: 8 FT.		
	PER EACH HEADER OFG: 4 23-SEP-82		
	* FITTER LOCATES HEADER POSITION; SETS		
	* JIG; TRANSFERS LINES TO HEADER; HAS		
	* HEADER TRIMMED; THEN ALIGNS AND TACKS		
	* HEADER.		
	TOTAL TMU		23120.0
	Combined sub-operation elements	FreQ.	TMU
848.	POSITION (OVERHEAD CRANE) ON UNIT WITH WINCH (FALL) AT OVERHEAD (CRANE)		
	(P. L.) PANEL SHOP SHIPFIT		
			1.00 1476.0
943.	COMBINED SUB-OF		
	TRANSPORT WEB FRAME FOR (PANEL) ASSEMBLY WITH (AUXILIARY FALL) AT		
	OVERHEAD (CRANE) (P. L.) PANEL SHOP SHIPFIT		
			2.00 2392.0
944.	UNLOAD WEB FRAME FOR (PANEL) ASSEMBLY WITH HAND AT FLAT (P. L.)	PANEL	
	SHOP SHIPFIT		
			1.00 510.0
721.	MARK ASSEMBLY FOR FOUNDATION (LOCATION) AT ANY (WORK AREA)	SHIPFIT	

DATA SYNTHESIS AND ANALYSIS

739. MEASURE HEADER ON UNIT WITH (ADJUSTABLE) JIG AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT	1.00	6120.0
952. FLAME CUT (STEEL) FOR (BURNING PROCESS) WITH TORCH AT ANY (WORK AREA) SHIPFIT	1.00	2370.0
740. ALIGN HEADER ON ASSEMBLY AT (INVERTED ALUMINUM) UNIT ASSEMBLY SHOP SHIPFIT	1.00	5004.0
614. MOVE (OPERATOR) ON ASSEMBLY AT ANY LAYOUT AREA SHIPFIT	2.00	2240.0
784. TACK (STEEL) ON ASSEMBLY WITH SEMIAUTOMATIC AT ANY (SHOP) SHIPFIT	100.00	800.0
	1.50	2208.0
Total TMU		23120.0

DATA SYNTHESIS AND ANALYSIS

291. COMBINED SUB-OP

MAKE UP VERTICAL SEAM IN BULKHEAD WITH DOG & WEDGE AT UPPER UNIT
 ASSEMBLY SHOP SHIPFIT
 COMPLETE
 PER FOOT OFG: 2 04-NOV-81
 * 10 FT

TOTAL TMU 5830,0

Combined sub-operation elements FreQ. TMU

290. MAKE UP VERTICAL SEAM IN BULKHEAD WITH DOG & WEDGE AT UPPER UNIT
 ASSEMBLY SHOP SHIPFIT

1.00 2040.0

15. HOVE 5 TON IN DOWNHAND POSITION WITH DOG AND WEDGE AT GENERAL SHIPFIT
 {25}

1.00 1590.0

289, HOVE PLATE ON PANEL WITH STRONGBACK AT ANY WORK AREA SHIPFIT

0.50 2200.0

Total TMU 5830.0

SECTION 1.3.1
TITLESHEET

WHOLE PANEL LINE FITTING COUNT

Titlesheet Organization List

Assemble/Disassemble

888 . COMBINED SUB-OP

POSITION PLATES FOR (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.

880. COMBINED SUB-OP

MARK (PANEL) PLATE FOR (LAYOUT) AT ANY (P.L.) PANEL SHOP SHIPFIT
METHOD USED FOR PANEL LAYOUT ON PANEL LINE.

798. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L*)
PANEL SHOP SHIPFIT
METHOD DESCRIBES OPERATION OF ONE MECHANIC, MUST BE DOUBLED TO COVER B
OTH OPERATORS.

799. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
PANEL SHOP SHIPFIT
METHOD DESCRIBES OPERATION OF ONE MECHANIC, MUST BE DOUBLED TO COVER B
OTH OPERATORS.

Join

1043. COMBINED SUB-OP

MAKE READY OPERATOR FOR (PANEL) ASSEMBLY AT FLAT (P.L.) PANEL SHOP
SHIPFIT
METHOD FOR TOTAL PREP TIME FOR FOR PANEL.

891. COMBINED SUB-OP

MAKE UP (THIN) PLATES FOR (PANEL) AT FLAT (P.L.) PANEL SHOP
SHIPFIT
METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.

TITLESHEET

882. COMBINED SUB-OP

MEASURE (PANEL) PLATE FOR (LAYOUT) AT ANY (P. L.) PANEL SHOP
SHIPFIT
METHOD USED FOR 18 INCH FRAME SPACING AND 8 FOOT WEB SPACING,

1034. COMBINED SUB-OP

MAKE UP (TRANSVERSE) WEB FRAME ON (PANEL) AT FLAT (P. L.) PANEL
SHOP SHIPFIT
METHOD FOR COMPLETE MANUAL MAKE UP OF 12 IN, WEB @ 40 FT. LENGTH, 27 S
TIFFENER C/O'S AND 18 IN. FRAME SPACING, WELD FOOTAGE: FLAT -65; T I
E-BUTT - 3,5; STIF+ FACEPLATES- 18; COLLARS - 90; SMALL BK

1033. COMBINED SUB-OP

INSTALL (KNEE) BRACKET ON WEB FRAME AT FLAT (P. L.) PANEL SHOP
SHIPFIT
METHOD DESCRIBES PLACING AND TACKING BRACKET ON ONE LEG ONLY, CAN BE H
ANDLED MANUALLY. 3 FT. OF WELD.

756. COMBINED SUB-OP

INSTALL HEADER ON (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT
HEADER SHALL AND LIGHT ENOUGH TO BE EASILY HANDLED MANUALLY.

Operate

1044. COMBINED SUB-OP

MAKE READY OPERATOR FOR (PANEL) ASSEMBLY AT FLAT (P. L.) PANEL SHOP
SHIPFIT
METHOD FOR TOTAL PREP TIME FOR TANKER PANEL,

1053. COMBINED SUB-OP

MAKE UP PLATES FOR (PANEL) AT FLAT (P. L.) PANEL SHOP SHIPFIT
METHOD ALLOWS FOR COUNTING AT SEAM-FITTING GANTRY.

881. COMBINED SUB-OP

MEASURE (PANEL) PLATE FOR (LAYOUT) AT ANY (P. L.) PANEL SHOP
SHIPFIT
METHOD USED FOR 30 INCH FRAME SPACING AND 8 FOOT WEB SPACING.

800. COMBINED SUB-OP

TITLESHEET

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (P.L.)
PANEL SHOP SHIPFIT
METHOD DESCRIBES THE OPERATION OF ONE MECHANIC, MUST BE DOUBLE TO COVER BOTH OPERATORS

801. COMBINED SUB-OP

MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) AT FLAT (F.L.)
PANEL SHOP SHIPFIT
METHOD DESCRIBES THE OPERATION OF ONE MECHANIC, MUST BE DOUBLED TO COVER BOTH OPERATORS,

962. COMBINED SUB-OP

MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD FOR WEB FRAME THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING. WELD FOOTAGE: BACKUP STRUCTURE - 26.25; FLAT - 32; COLLARS - 22.5.

963. COMBINED SUB-OP

MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD FOR WEB THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING, WELD FOOTAGE: BACKUP STRUCTURE - 14.25; FLATS - 32,0; COLLARS - 17,4,

968. COMBINED SUB-OP

MAKE UP WEB FRAME ON (PANEL) AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD FOR LONGITUDINAL WEB FRAME THAT IS 40 FT. LONG WITH 8 FT. BAY SPACING, WELD FOOTAGE: FLAT - 80; VERTICAL - 120; PRE-INSTALLED DOCKING BKTS. - 12; JOB INSTALLED DOCKING BKTS, - 25.5.

1038. COMBINED SUB-OP

INSTALL (MEDIUM SIZED KNEE) BRACKET ON WEB FRAME AT FLAT (P.L.)
PANEL SHOP SHIPFIT
METHOD DESCRIBES PLACING AND TACKING ONE LEG OF A 60 IN. BY 32 IN. BRACKET. NEED CRANE FOR HANDLING. WELD FOOTAGE = 16.7 @ 5/16.

1039. COMBINED SUB-OP

INSTALL (LARGE KNEE) BRACKET ON WEB FRAME AT FLAT (P.L.) PANEL SHOP SHIPFIT
METHOD DESCRIBES PLACING AND TACKING ON ONE LEG OF AN EIGHT BY EIGHT FT. KNEE BRACKET. NEED CRANE FOR HANDLING, WELD FOOTAGE = 18 @ 5/16.

1032. COMBINED SUB-OF

TITLESHEET

INSTALL (LARGE) HEADER ON (PANEL) AT FLAT (P.L.) PANEL SHOP
SHIPFIT
HEADER LARGE AND NEEDS CRANE TO BE HANDLED, WELD FOOTAGE: 8 FT.

291. COMBINED SUB-OP

MAKE UP VERTICAL SEAM IN BULKHEAD WITH DOG & WEDGE AT UPPER UNIT
ASSEMBLY SHOP SHIPFIT
COMPLETE

SECTION 1.3.2
HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

DETAIL/UNIT/PART	3021-STBD,	REV. LTR/DATE	X
PROCESS/OPER CODE	INNERBOTTOM	STANDARD CODE	PROD
PART NAME	LONG-BHD,		
SHIP CLASS	FALCON	HULL	404
COST CLASS/JOB #	PANEL LINE	TRADE	SHIPFIT
GROUP (UNIT/ZONE)	3020	WORK AREA	x
SUB-GROUP	3021	WORK ZONE	x
SUB-SUB-GROUP	x	WORK CENTER	PNL. LN
CREW/MACHINE	1-2	ASSET/MACHINE	x
ITEM	GIRTH	SUB-ITEM	STBD.
GEN. DRAWING	200-3030	WORK ORDER	x
DET. DRAWING	x	SHEET	x
WORK PACKAGE	x	APPLICATOR	MWC
OPER, DESCRIPTION	FIT BHD, ASSY, AND SHELL ASSY. THEN BHD. TO SHELL. STBD, SHOWN, PORT IS SIMILAR BUT OPPOSITE.		
DATE	17-NOV-82	ISSUE #	3

Step	Method Instruction	()	Freq
1	POSITION PLATES FOR (PANEL) * SET PLATES, ATTACH GROUND, HAKE 1ST. * TACK. ALLOWS USING LUG-ALL. * FREQ, = 1 PER PANEL SEAM	(888)	0
2	MARK (PANEL) PLATE FOR (LAYOUT) * FREQ, = TOTAL LINEAR FOOTAGE OF WEBS * AND STIFFENERS.	(880)	447
3	MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY) * POSITION GANTRY, MAKE UP STIFFENER.	(798)	0

HOW TO CALCULATE TIME STANDARDS

	* TACKING BY SEMIAUTOMATIC.		
	* FREQ, = TWICE THE NUMBER OF STIFFENERS		
	* AT THIS LENGTH,		
4	MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY)(799)		
	* POSITION GANTRY, MAKE UP STIFFENER.		
	* TACKING BY SEMIAUTOMATIC,		
	* FREQ, = TWICE THE NUMBER OF STIFFENERS		
	* AT THIS LENGTH.		
5	MAKE READY OPERATOR FOR (PANEL) ASSEMBLY (1043)		0
	* FREQ, = 1 PER PANEL.		
6	MAKE UP (THIN) PLATES FOR (PANEL) (891)		0
	* MAKE UP FOR PLATES LESS THAN OR EQUAL		
	* TO .375 IN, OR 15.3 LBS.		
	* FREQ. = TOTAL SEAM FOOTAGE.		
7	MEASURE (PANEL) PLATE FOR (LAYOUT) (882)		0
	* 1 MARK / 2.4 FEET.		
	* FREQ. = TOTAL PERIMETER FOOTAGE.		
8	MAKE UP (TRANSVERSE) WEB FRAME ON (PANEL) (1034)		0
	* FREQ. = TWICE THE NUMBER OF WEBS OF THIS		
	* TYPE,		
9	INSTALL (KNEE) BRACKET ON WEB FRAME (1033)		0
	* SET ON WEB, CHECK, TACK.		
	* FREQ, = 1 PER BRACKET.		
10	INSTALL HEADER ON (PANEL) (956)		0
	* FITTER LOCATES HEADER POSITION; SETS		
	* JIG; TRANSFERS LINES TO HEADER; HAS		
	* HEADER TRIMMED; THEN ALIGNS AND TACKS		
	* HEADER.		
	* FREQ, = 1 PER HEADER.		
11	MAKE READY OPERATOR FOR (PANEL) ASSEMBLY (1044)		0.5
	* FREQ, = 1 PER PANEL.		
12	MAKE UP PLATES FOR (PANEL) (1053)		0
	* MAKE UP FOR PLATES GREATER THAN		
	* .375 IN, OR 15.3 LBS.		
	* FREQ, = TOTAL SEAM FOOTAGE.		
13	MEASURE (PANEL) PLATE FOR (LAYOUT) (881)		324
	* 1 MARK / 4 FEET.		
	* FREQ, = TOTAL FOOTAGE OF PERIMETER.		
14	MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY)(800)		0
	* POSITION GANTRY, MAKE UP STIFFENER.		
	* TACKING BY SEMIAUTOMATIC.		
	* FREQ, = TWICE THE NUMBER OF STIFFENERS		
	* AT THIS LENGTH.		
15	MAKE UP STIFFENER ON (PANEL) UNIT WITH (GANTRY)(80i)		14
	* POSITION GANTRY, MAKE UP STIFFENER,		
	* TACKING BY SEMIAUTOMATIC.		
	* FREQ, = 2PER EACH STIFFENER THIS LENGTH		

HOW TO CALCULATE TIME STANDARDS

*		
i 6	MAKE UP WEB FRAME ON (PANEL) * LAND, ALIGN, MAKE UP FLAT, PLUMB, * TACK, MAKE UP STIFFENERS INSTALL * COLLAR. * COUNTING COMB, SUB-OP. * FREQ, = 2 PER EACH WEB OF THIS TYPE,	(962) 0
17	MAKE UP WEB FRAME ON (PANEL) * MAKE UP FLAT, PLUMB, MAKE UP STIFFENER. * INSTALL COLLAR. * COMB, SUB-OF FOR COUNTING. * FREQ, = 2 PER EACH WEB OF THIS TYPE.	(963) 6
i 8	MAKE UP WEB FRAME ON (PANEL) * CRANE OPERATION INCLUDED DUE TO LARGE * SIZE OF WEB, REMARK L.O. LINES, LAND * WEB, ALIGN WEB, MAKE UP FLAT, PLUMB * AND MAKE UP VERTICALS. * OPERATION FOR 1 OPERATOR, * FREQ, = 2 PER EACH WEB OF THIS TYPE.	(968) 2.2
19	INSTALL (MEDIUM SIZED KNEE) BRACKET ON WEB FRAM(i 038) E I * FREQ, = 2 PER EACH BRACKET OF THIS TYPE.	8
20	INSTALL (LARGE KNEE) BRACKET ON WEB FRAME * FREQ, = 2 PER EACH BRACKET OF THIS TYPE. *	(1039) 0
21	INSTALL (LARGE) HEADER ON (PANEL) * FITTER LOCATES HEADER POSITION; SETS * JIG; TRANSFERS LINES TO HEADER; HAS * HEADER TRIMMED; THEN ALIGNS AND TACKS * HEADER, * FREQ, = 1 PER EACH HEADER.	(1032) 0
22	MAKE UP VERTICAL SEAM IN BULKHEAD WITH DOG & WE(291) DGE * 10 FT * FREQ, = TOTAL FOOTAGE OF VERTICAL SEAM, *	0
23	MISC, SMALL PARTS SUCH AS LADDER RUNGS, FAD EYES() , ETC. * FREQ, = 1 PER EACH SMALL MISC, PART.	6

HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

STEP	SA	FREQ	INTERNAL TMU	EXTERNAL TMU	LOC #
1	0.00	0.00		0.	888
2	0.00	447.00		106833.	880
3	0.11	0.00		0.	798
4	0.11	0.00		0.	799
5	0.00	0.00		0.	1043
6	0.00	0.00		0.	891
7	0.00	0.00		0.	882
8	0.00	0.00		0.	1034
9	0.00	0.00		0.	1033
10	0.00	0.00		0.	956
11	0.00	0.50		374207.	1044
12	0.00	0.00		0.	1053
13	0.00	324.00		49734.	881
14	0.11	0.00		0.	800
15	0.11	14.00		400248.	801
16	0.00	0.00		0.	962
17	0.00	6.00		1491584.	963
18	0.00	2.20		1197245.	968
19	0.00	8.00		166032.	1038
20	0.00	0.00		0.	1039
21	0.00	0.00		0.	1032
22	0.00	0.00		0.	291
23	0.00	6.00		150000.	0

MANUAL TIME(TMU)	0.	3935882.
ACTUAL PROCESS TIME(TMU)	0.	0.
FACTORED PROCESS TIME(TMU)	0.	
TOTAL INTERNAL TIME(TMU)	0.	

TITLE SHEET USED IN SETTING STANDARD: 0

HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

Engineered Operation Time Calculation

Type of Work	Elemental Time	Percent Allowance	Allowance Time	Standard Time
EXTERNAL MANUAL	39.359		0.000	39.359
ASSIGNED INTERNAL (	0.000)	()	(0.000)	(0.000)
PROCESS TIME	0.000		0.000	0.000
STANDARD(HRS. /CYCLE)	39.359		0.000	39.359
PIECES PER CXCLE	1			
STANDARD HOURS				39.4

COMPUTERIZED STANDARDS BACKUP DATA

WELDING OPERATIONS

Pages 110 - 167

MANUAL METHODS BACKUP

186. CLEAN WELD JOINT ON ASSEMBLY WITH PICK AND WIRE-BRUSH AT ANY SHOP AREA WELDING PER ELECTRODE OFG: 2 08-SEP-81 INCLUDES WIRE-BRUSHING WELDER BEGINS AT JOB		
1 PUSH HOOD UP AT WELDER 'S HEAD	A1 BO G1 H1 XO IO AO	1.00 30.
2 HOLD+MOVE ELECTRODE HOLDER FROM WELDER TO THE WIREBOX	AO BO GO A1 BO P1 AO	1.00 20.
3 LOOSEN THE SLAG ON THE WELD AT THE JOB WITH 6 STRIKES USING THE PICK AT THE JOB AND RETURN	A1 BO G1 A1 BO PO L16 AI BO P1 AO	1.00 210.
4 PICKUP+HOLD THE WIRE-BRUSH	A1 BO G1 A1 BO PO AO	1.00 30.
5 BRUSHCLEAN THE WELD AT THE JOB .5 SQ. FT. USING WIRE-BRUSH AT THE JOB AND RETURN	A1 BO G1 A1 BO P1 S6 A1 BO P1 AO	1.00 120.
6 INSPECT 4 POINTS	AO BO GO AO BO PO T6 AO BO PO AO	1.00 60.
7 PICKUP+HOLD ELECTRODE HOLDER	A1 BO G1 A1 BO PO AO	1.00 30.
	TOTAL TMU	500.

MANUAL METHODS BACKUP

188.	CLEAN WELD JOINT ON ASSEMBLY WITH PICK AND WIRE-BRUSH AT ANY SHOP WELDING AREA		
	PER INCREMENT (18 INCHES) OF WELD OFG: 2 14-SEP-81		
	* INCLUDES WIRE-BRUSHING		
	WELDER BEGINS AT JOB		
	1 PUSH HOOD UP AT WELDER 'S HEAD		
	AI BO G1 H1 XO IO AO	1.00	30.
	2 HOLD+MOVE ELECTRODE HOLDER FROM WELDER TO THE WIREBOX		
	AO BO GO AI BO P1 AO	1.00	20.
	3 LOOSEN THE SLAG ON THE WELD AT THE JOB WITH 6 STRIKES USING THE PICK AT THE JOB AND RETURN		
	AI BO G1 AI EO PO L16 AI EO Pi AO	i.00	210.
	4 PICKUP+HOLD THE WIRE-BRUSH		
	AI BO G1 AI BO PO AO	1.00	30.
	5 BRUSHCLEAN THE WELD AT THE JOB .5 SQ. FT. USING WIRE-BRUSH AT THE JOB AND RETURN		
	A1 BO G1 A1 BO F1 S6 A1 BO P1 AO	1.00	120.
	6 INSPECT 4 POINTS		
	AO BO GO AO BO PO T6 AO BO PO AO	1.00	60.
	7 PICKUP+HOLD ELECTRODE HOLDER		
	A1 BO G1 A1 BO PO AO	1.00	30.
		- TOTAL TMU	500 I
366.	WELD GOUGE ON ASSEMBLY WITH SEHIAUTOMATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING		
	PER 100 FEET OFG: 2		
	WELD GOUGE-2-A-5/16... ASSEMBLY BUILDING... S727ANVI GO05W		
	1 1/8' X5/16' GROOVE PLUS OVERWELD VERTICAL WITH SEMIAUTOMATIC AT THE A.B.		
		TOTAL TMU	1526268.

MANUAL METHODS BACKUP

378. WELD GOUGE ON ASSEMBLY WITH SEMI AUTOMATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING

PER 100 FEET OFG: 2

WELD GOUGE-2-A-5/16... ASSEMBLY BUILDING... S727ANVI G005W

1 1/8' X5/16' GROOVE PLUS OVERWELD VERTICAL WITH SEMI AUTOMATIC AT THE A. B.

TOTAL TMU 1526268.

382. GOUGE BUTT ON ASSEMBLY WITH CARBON ELECTRODE AT ANY UNIT ASSEMBLY SHOP WELDING

PER 100 FEET OFG: 2

GOUGE B.V.I -AGOUGE-5/16... ASSEMBLY BUILDING... GOUGE-1-A

1 1/8' X5/16' GROOVE MADE WITH 5/16' CARBON ELECTRODE AT THE A. B.

TOTAL TMU 484213.

425. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING

PER EACH OFG: 3 19-JAN-82

MOVING ITEMS AT THE JOB SITE.

* FOR SHORT MOVES...

* AS FROM ONE SIDE OF A WEB TO THE OTHER.

* FOR MOVING ANY OF THE TOOLS A WELDER...

*...MIGHT BE USING EXCEPT A WIREFEEDER,
WELDER BEGINS AT WELD-AREA

1 MOVE OBJECT FROM JOB TO JOB WITH CRAWL

AI BO GI AI B24 P1 AO 1.00 280.

TOTAL TMU 280.

MANUAL METHODS BACKUP

429. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING
PER EACH OFG: 3 18-JAN-82
FOR SHORT MOVES AT THE JOB SITE.
* IN A CONGESTED AREA.
* FOR EXAMPLE, AS TO MOVE AROUND PIPING.
WELDER BEGINS AT WELD-AREA

1 MOVE OBJECT FROM JOB TO JOB WITH CRAWL-COMPLEX
A1 BO G1 A1 B32 P1 AO 1.00 360.

TOTAL TMU 360.

432. WELD B2V. 1AP ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL UNIT ASSEMBLY
SHOP WELDING
PER 100 FEET OFG: 2
1/2' V-BUTT VERTICAL WITH SEMIAUTOMATIC AT THE A. B.

1 WELD B2V. 1AP-1/4. . . ASSEMBLY BUILDING. . . S727AGVI G005W

TOTAL TMU 1268665.

439. WELD B2V, 1AP ON ASSEMBLY WITH STICK ELECTRODE AT VERTICAL UNIT ASSEMBLY
SHOP WELDING
PER 100 FEET OFG: 2
5/16' V-BUTT VERTICAL WITH 7018 ELECTRODE AT THE A. B.

1 WELD B2V. 1AP-1/4. . . ASSEMBLY BUILDING. . . B2V. 1A7018V000

TOTAL TMU 2417813.

MANUAL METHODS BACKUP

590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA)
 PANEL SHOP (PANEL LINE) WELDING

PER 1 FOOT OFG: 2 16-APR-82

FOR MULTI TRIP WELDS USE (TX L X C = CLEANING TIME)

- * THIS INCLUDES WIRE-BRUSHING, LIFTING
- * AND LOWERING THE HOOD, AND MOVING THE
- * VENT-TUBE.

WELDER BEGINS AT WEB

1	MOVE WIREBRUSH AND PICK AND) HOOD TO THE TOOLTRAY PF 3 (3 4 5 6) F 1 / 100	A10 BO (GI A1 BO F1)AO (3)	0.01	2.
2	GET+MOVE TOOLTRAY TO THE WEB WITH KNEEL F 1 / 100	A1 BO G3 A10 BI 6 F1 AO	0.01	3.
3	PUSH HOOD UP AT WELDER 'S HEAD	A1 BO G1 M1 XO IO AO	1.00	30.
4	HOLD+MOVE GUN FROM WELDER TO TOOLTRAY	AO BO GO AI BO F1 AO	1.00	20.
5	LOOSEN THE SLAG ON THE WELD AT THE WEB WITH 6 STRIKES USING THE PICK AND RETURN	A1 BO G1 A1 BO FO L16 A1 BO P1 AO	1.00	210.
6	BRUSHCLEAN THE WELD AT THE WEB .5 SQ. FT. USING THE WIREBRUSH AND RETURN	AI BO G1 A1 BO P1 S6 A1 BO F1 AO	1.00	i20.
7	INSPECT 4 POINTS	AO BO GO AO BO TO T6 AO BO PO AO	1.00	60.
8	PICKUP+HOLD GUN	AI BO G1 A1 BO FO AO	1.00	30.

TOTAL TMU 475.

MANUAL METHODS BACKUP

595. COMBINE HELMET (HOOD AND HARDHAT) AT ANY (WORK STATION) PANEL SHOP
(PANEL LINE) WELDING

PER EACH OCCURANCE OFG: 4 19-APR-82

GEAR WAS MOVED) TO THE ASSEMBLY AT THE BEGINNING OF THE SHIFT,

- * THE HARDHAT SHOLD BE ALREADY ON THE
- * WELDER' S HEAD,
- * THE HOOD IS USUALLY IN THE TOOL-BAG,
- * BUT IS NOT DIFFICULT TO GET OUT,
- * NORMALLY THE WELDER WOULD DISASSEMBLE
- * THE HELMET AT EACH BREAK (COFFEE BREAK
- * AND LUNCH BREAK) AS WELL AS EACH TIME
- * HE MOVES THE SEMIAUTOMATIC OR GOES FOR
- * A NEW ROLL OF WIRE, (ALSO WHEN THE GANTRY
- * OR THE UNIT IS MOVED,)

WELDER BEGINS AT UNIT

1	MOVE HOOD FROM TOOL-BAG TO UNIT													
		A1	BO	G1	A1	BO	P1	AO	1.00	40.				
2	PLACE HARTDHAT TO THE HOOD													
		A1	BO	G1	A1	BO	P3	AO	1.00	60.				
3	CLOSE+PUSH THE LOCKING PINS ON THE HARDHAT AT THE HOOD (LOCK IN PLACE) F 2													
		AO	BO	G1	H1	XO	IO	AO	2.00	40.				
4	WIPE LENS AT HOOD .5 SQ. FT. USING HAND													
		A1	BO	G1	A1	BO	P1	S3	AO	BO	PO	AO	1.00	70.
5	HOLD+PLACE HOOD ON TO THE WELDER 'S HEAD													
		AO	BO	GO	A1	BO	P3	AO	1.00	40.				
6	REMOVE HOOD FROM THE WELDER 'S HEAD TO THE UNIT													
		A1	BO	G1	A1	BO	P1	AO	1.00	40.				
7	CLOSE+PUSH THE LOCKING PIN ON THE HARDHAT AT THE HOOD (UNLOCK) F 2													
		AO	BO	G1	M1	XO	IO	AO	2.00	40.				
8	HOLD+MOVE HARDHAT ON TO THE WELDER 'S HEAD													
		AO	BO	GO	A1	BO	P1	AO	1.00	20.				
9	MOVE HOOD TO TOOL-BAG													
		A1	BO	G1	A1	BO	P1	AO	1.00	40.				

TOTAL TMU 390.

MANUAL METHODS BACKUP

608. ARRANGE GLOVES (MITTENS) ON ASSEMBLY AT ANY (WORK AREA) PANEL SHOP
(PANEL LINE) WELDING

PER EACH OCCURANCE OFG: 4 19-AFR-82

THIS OCCURS DURING THE SHIFT.

- * THE GLOVES ARE ALREADY OUT
- * OF THE TOOLBAG,
- * SIMPLY PICK THE UP AND) PUT THEM ON.
- * LATER LAY THEM ASIDE AT EITHER THE
- * JOB SIGHT OR THE WIREBOX.

WELDER BEGINS AT WEB

1 PICKUP+HOLD GLOVES			
	A10 BO G1 AI BO PO AO	1.00	120.
2 HOLD+PLACE GLOVE ON TO WELDER 'S HAND F 2			
	AO BO GO AI BO P3 AO	2.00	80.
3 REMOVE GLOVE FROM WELDER 'S HAND TO TOOL TRAY F 2			
	A1 BO G1 A1 BO P1 AO	2.00	80.

TOTAL TMU 280.

719. WELD B2V.1AP (7/16' GROOVE JOINT) ON ASSEMBLY WITH SEMIAUTOMATIC AT
(STEEL) UNIT ASSEMBLY SHOP WELDING

PER 100,0 FEET OFG: 2

B2V.1AP-1/4... S727AGV1G00W

1 7/16' GROOVE JOINTOINT.

TOTAL TMU 1159131.

MANUAL METHODS BACKUP

746. ARRANGE GLOVES (MITTENS) ON ASSEMBLY (AT TOOL-BAG) AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING
 PER SHIFT OFG: 4 23-JUL-82
 TAKE GLOVES OUT OF BAG AT START OF SHIFT AND RETURN THEM TO THE BAG AT THE END OF THE SHIFT.
 * TAKE GLOVES OUT OF TOOL-BAG.
 * THIS OCCURS AT THE UNIT.
 * PUT GLOVES BACK IN THE BAG
 * AT THE END OF THE SHIFT.
 WELDER BEGINS AT UNIT
- | | | | |
|---|----------------------|-----------|------|
| 1 PULL GLOVES WITH BEND AT TOOL-BAG F 2 | | | |
| | A1 B6 G1 H1 XO IO AO | 2.00 | 180. |
| 2 HOLD+TOSS GLOVES TO TOOLTRAY | | | |
| | AO BO GO A1 BO PO AO | 1.00 | 10. |
| 3 HOLD+PLACE GLOVES FROM WELDER TO TOOL-BAG | | | |
| | AO BO GO A1 BO P3 AO | 1.00 | 40. |
| | | | |
| | | TOTAL TMU | 230. |
747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING
 PER EACH OCCURANCE OFG: 1 23-JUL-82
 THE WELDER IS ALL SET UP FOR WELDING AND IS WITHIN REACH OF WHERE THE ARC WILL BE STRUCK.
 * WELDER REPOSITIONS BODY AFTER EACH WELD
 WELDER BEGINS AT WJEB
- | | | | |
|--|----------------------------------|------|-----|
| 1 MOVE PLIERS AND HOOD AND TOOLTRAY WITH BEND TO WEB F 1 / 50 | | | |
| | A10 B6 G1 A10 BO P1 AO | 0.02 | 6. |
| 2 PICKUP PLIERS F 1 / 4 | | | |
| | A1 BO Gi A1 BO PO AO | 0.25 | 7. |
| 3 HOLD+LOOSEN SLAG IN NOZZLE AT WEB 2 TAPS USING FLIERS AND HOLD F 1 / 4 | | | |
| | AO BO GO A1 BO PO L3 AO EO PO AO | 0.25 | 10. |
| 4 HOLD+CUTOFF END-OF-WIRE AT WEB SOFT USING PLIERS AND RETURN TO WEB WITH BEND F 1 / 4 | | | |
| | AO BO GO AI BO P3 C3 A1 B6 P1 AO | 0.25 | 37. |
| 5 HOLD+MOVE GUN FROM WELDER TO JOINT AT WEB AND HOLD (NEAR AREA WHERE ARC WILL BE STRUCK) | | | |
| | AO BO GO A1 BO P1 AO | 1.00 | 20. |
| 6 INSPECT 1 POINT ON THE JOINT | | | |
| | AO BO GO AO BO PO T1 AO BO PO AO | 2.00 | 10. |
| 7 HOVE THE VENT-TUBE FROM THE WEB TO THE WEB (REPOSITION A SHORT DISTANCE FOR THE NEXT WELD) | | | |
| | A1 BO G1 A1 BO P1 AO | 1.00 | 40. |

MANUAL METHODS BACKUP

8	MANEUVER SELF AT WEB (REPOSITION BODY)		
	A1 BO G1 M10 XO IO AO	1.00	120.
9	HOLD+PUSH SEMIAUTOMATIC TRIGGER FOR STARTING ARC		
	AO BO GO M1 XO IO AO	1.00	10.
		TOTAL TMU	261.

863.	SET-UP WIRE FEEDER (SEMI AUTOMATIC) FOR (WELDING) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELD		
	PER EACH SET-UP OFG: 4 26-AUG-82		
	LEADS ARE ALL HOOKED UP.		
	* MOVE FEEDER ONTO UNIT AT START OF JOB,		
	* AND OFF AT THE END OF THE JOB.		
	* LEADS ARE HOOKED UP AND COILED ON OR		
	* NEAR THE RECTIFIER,		
	WELDER BEGINS AT UNIT		
1	GET+MOVE WIRE FEEDER WITH CLIMB-STEP FROM WEST WALL NEAR UNIT TO UNIT WITH 2 STEPS		
	AI B10 G3 A3 BO P1 AO	1.00	180.
2	MANEUVER SEMIAUTO-GUN AT UNIT (UNCOIL OFF WIRE FEEDER)		
	AI BO G1 M10 XO IO AO	1.00	120.
3	PULL LEAD WITH BEND FROM RECTIFIER ALONG WEST WALL NEAR UNIT TO UNIT PF 5(4)		
	AI B6 G1 (MI)XO IO A1 (5)	1.00	140.
4	PUSH SWITCH AT RECTIFIER (ALONG WEST WALL) NEAR UNIT (TURN ON RECTIFIER)		
	AI BO G1 M1 XO IO AO	1.00	30.
5	TURN KNOB AT RECTIFIER NEAR UNIT (SET VOLTAGE)		
	AI BO G1 M3 XO IO AO	1.00	50.
6	WALK TO UNIT 5 STEPS WITH CLIMB-STEP (GO-TO MANIFOLD)		
	A10 B10 GO AO BO PO AO	1.00	200.
7	LOOSEN GAS VALVE AT MANIFOLD NEAR UNIT 5 SPINS USING FINGERS		
	AI BO G1 AI BO P1 L10 AO BO PO AO	1.00	140.
8	WALK TO UNIT 5 STEPS WITH CLIMB-STEP (BACK-TO WIRE FEEDER)		
	A10 B10 GO AO BO PO AO	1.00	200.
9	PICKUP SEMIAUTO-GUN FROM UNIT TO WELDER WITH KNEEL		
	AI BO G1 AI B16 PO AO	1.00	190.
10	PUSH SEMIAUTO-GUN ON-SWITCH AT UNIT		
	AI BO G1 M1 XO IO AO	1.00	30.
11	HOLD+PUSH SEMIAUTO-GUN TRIGGER AT UNIT		
	AO BO GO M1 XO IO AO	1.00	10.
12	WAIT 10 SEC FOR GAS LINE TO PURGE		
		1.00	278.
13	TURN AND ADJUST SEMIAUTO-GUN WIRE SPEED KNOB AT UNIT		
	AI BO G1 M3 XO I6 AO	1.00	110.

MANUAL METHODS BACKUP

14	PUSH SEMI AUTO-GUN OFF SWITCH AT UNIT							
		AI	BO	G1	U1	XO	IO	AO
								1.00 30.
15	MANEUVER SEMI AUTO-GUN WITH BENI+STAND AT UNIT (COIL LEAD ONTO FEEDER)							
		AI	B16	G1	M10	XO	IO	AO
								1.00 280.
16	GET+MOVE WIRE FEEDER FROM UNIT TO UNIT WITH BEND AND 10 STEPS							
		A1	BO	G3	A16	B6	P1	AO
								1.00 270.
17	MANEUVER LEAD AT RECTIFIER NEAR UNIT WITH CLIMB-STEP (COIL ONTO OR NEAR RECTIFIER)							
		AI	BO	G1	M10	XO	IO	AO
								1.00 120.
18	PUSH SWITCH AT RECTIFIER NEAR UNIT (TURN OFF RECTIFIER)							
		AI	BO	G1	M1	XO	IO	AO
								1.00 30.
19	FASTEN GAS VALVE WITH CLIMB-STEP AT RECTIFIER MANIFOLD NEAR UNIT 5 SPINS USING FINGERS							
		AI	B10	G1	AI	BO	P1	F10
								AO BO PO AO
								1.00 240.

TOTAL TMU 2648.

866. WELD PLATE (LARGE STARTING PAD) ON ASSEMBLY (PLATE BLANKET) WITH SEMIAUTOMATIC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL "NE) WELDING

PER EACH STARTING PAD OFG: 3 11-AUG-82

MOVE PADS TO UNIT IN A SEPARATE SUB-OP, THIS IS FOR LARGE PADS SUCH AS ARE USED ON TANKER UNITS,

- * WELDER TAKES ONE PAD AT A
- * TIME AND TACKS IT ON, AS
- * SOON AS THE TACK IS MADE,
- * THE WELDER WILL FINISH
- * WELDING THE PAD,

WELDER BEGINS AT UNIT

1	GET+PLACE STARTING-PAD FROM UNIT TO WELDER WITH KNEEL							
		AI	B10	G3	AI	B16	P3	AO
								1.00 240 I
2	PICKUP WELD-GUN FROM UNIT							
		A1	BO	G1	AI	BO	PO	AO
								1.00 30.
3	CLOSE+PUSH TRIGGER ON WELD-GUN AT WELDER PT 5 S (MAKE TACK)							
		AO	BO	G1	M1	X16	IO	AO
								1.00 180.
4	INSPECT 1 POINT USING EYES ON STARTING-PAD AT UNIT							
		AO	BO	GO	AO	BO	PO	T1
								AO BO PO AO
								1.00 10.
5	CLOSE+PUSH TRIGGER ON WELD-GUN AT WELDER PT 65 S (FINISH WELD STARTING PAD)							
		AO	BO	GI	M1	X173I	IO	AO
								1.00 1750.

TOTAL TMU 2210.

MANUAL METHOD BACKUP

869, SET-UP WELDING MACHINE (TANDEM-ARC) AT ANY (WORK STATION - SEAM WELD)
 PANEL SHOP (PANEL LINE) WELDING

PER EACH SEAM OFG: 3 17-AUG-82

HOIST HAS BEEN UNHOOKED AND THE TANDEM-ARC IS BEING MANUALLY
 POSITIONED AT THE SEAM,

* THIS IS FOR THE LINDE LT-56 MACHINE,

* A TANDEM-ARC MACHINE,

WELDER BEGINS AT UNIT

1	PULL LOCK-HANDLE OF SUE-ARC AT UNIT SEAM WITH KNEEL		
	AI B16 G1 M XO IO AO	1.00	190.
2	PUSH TOGGLE AT UNIT SEAM TO-TURN THE MACHINE ON F 2		
	AI BO G1 MI XO IO AO	2.00	60.
3	PUSH BUTTON AT UNIT SEAM -- INCH WIRE DOWN PT 5 S		
	AI BO G1 M1 X16 IO AO	1.00	190.
4	CUTOFF AT UNIT HARD WIRE USING PLIERS AND ASIDE PLIERS PF 2 (1 2 3 4 5 6 7)		
	(A1 BO G1 A1 BO P3 C10) A1 BO P1 AO (2)	1.00	340.
5	MANEUVER SUB-ARC AT UNIT SEAM (LINE IT UP WITH THE GROOVE)		
	AI BO G1 M10 XO IO AO	1.00	120.
6	TURN KNOB ON SUB-ARC AT UNIT F 5		
	AI BO G1 M3 XO IO AO	5.00	250.
7	PUSH LOCK-HANDLE ON SUB-ARC AT UNIT (LOCK IN GEAR)		
	AI BO G1 M1 XO IO AO	1.00	30.
a	PULL CLIP ON SUB-ARC AT UNIT (RELEASE FLUX) F 2		
	AI BO G1 M1 XO IO AO	2.00	60.
9	HOLD+MOVE CLIP FROM WELDER TO UNIT (SUB-ARC MACHINE) F 2		
	AO BO GO A1 BO P1 AO	2.00	40.
10	PUSH START BUTTON ON SUB-ARC AT UNIT F 2		
	AI BO G1 M1 XO IO AO	2.00	60.
11	PICKUP CLIP FROM UNIT (SUB-ARC MACHINE TO) TO WELDER SIMO		
	METHOD-STEPS 11-13 ARE INTERNAL TO-THE PROCESS TIME. F 2		
	<AI BO G1 AI BO PO AO >	2.00	0.
12	HOLD+PUSH CLIP ON SUB-ARC HOSE (STOP. FLUX) AT UNIT SIMO F 2		
	<AO BO GO M1 XO IO AO >	2.00	0.
13	PUSH STOP BUTTON ON SUB-ARC AT UNIT (STOP MACHINE) SIMO F 2		
	<AI BO G1 MI XO IO AO >	2.00	0.

TOTAL TMU 1340.

MANUAL METHODS BACKUP

870. MOVE WELDING MACHINE (SEMI AUTOMATIC) AT ANY (WORK STATION - SEAM WELD)
 PANEL SHOP (PANE

PER EACH SEAM OFG: 3 17-AUG-82

DRAG THE MACHINE BY THE WHIP END.

- * SEAMS ARE ABOUT EIGHT FEET APART AND
- * ABOUT FORTY FEET LONG, THEREFORE, AN
- * AVERAGE DISTANCE FOR MOVING THE MACHINE
- * MIGHT BE TWENTY FOUR FEET.

WELDER BEGINS AT UNIT

1 PICKUP WITH BEND WHIP FROM UNIT			
	A1 B6 G1 A1 BO PO AO	1.00	90.
2 HOLD+MANIPULATE WHIP AT UNIT			
	AO HO GO M10 XO IO AO	1.00	100.
3 HOLD+MOVE WHIP FROM WELDER TO UNIT WITH BEND			
	AO BO GO A1 B6 P1 AO	1.00	80.

TOTAL TMU 270.

873. SET-UP AND TEAR DOWN CLAMP (GROUND-CLAMP) AT (SEAM WELD STATION) PANEL
 SHOP (PANEL LINE) WELDING

PER EACH OFG: 4 30-AUG-82

MUST BE CONNECTED PRIOR TO WELDING.

- * GROUND-CLAMP LOCATED
- * AT EACH END OF GANTRY.
- * ONLY ONE NEED BE ATTACHED.

WELDER BEGINS AT UNIT

1 WALK FROM UNIT TO GANTRY WITH CLIMB-STEP			
	A16 B10 GO AO BO PO AO	1.00	260.
2 WITHOUT STEPS MANIPULATE GROUND-CLAMP-CORD AT GANTRY WITH CLIMB-STEP			
	AI B10 G1 M10 XO IO AO	1.00	220.
3 HOLD+PLACE GROUND-CLAMP FROM WELDER TO GANTRY WITH BEND , PLATE EDGE			
	AO BO GO A1 B6 P3 AO	1.00	100.
4 HOLD+FASTEN GROUND-CLAMP WITH 5 WRIST-TURNS USING HAND			
	AO BO GO AI BO P1 F10 AO BO PO AO	1.00	120.
5 WALK FROM GANTRY TO UNIT WITH CLIMB-STEP			
	A16 B10 GO AO BO PO AO	1.00	260.
6 WALK FROM UNIT TO GANTRY WITH CLIMB-STEP			
	A16 B10 GO AO BO PO AO	1.00	260.
7 LOOSEN GROUND-CLAMP WITH 5 WRIST-TURNS USING HAND			
	AI BO G1 AI BO P1 L10 AO BO PO AO	1.00	140.
8 MANIPULATE GROUND-CLAMP AT GANTRY WITH CLIMB-STEP FOR COILING CORD SIMO (1 3)			
	<A1>B10 <G1>M10 XO IO AO	1.00	200.
9 HOLD+PLACE GROUND-CLAMP FROM WELDER TO GANTRY			

MANUAL METHODS BACKUP

AO BO GO AI BO P3 AO 1.00 40.

TOTAL TMU 1600.

874. TEAR DOWN WELDING MACHINE (SUB-ARC) AT ANY (WORK STATION - SEAM WELD)
 PANEL SHOP (PAN

PER EACH ASSEMBLY OFG: 4 12-AUG-82

SUB-ARC WELDING HAS BEEN COMPLETED.

* SUB-ARC IS STORED AT THE WEST SIDE

* OF THE PANEL LINE.

WELDER BEGINS AT UNIT

1 PUSH BUTTON AT HOIST PT 14 S

A16 BO G1 MI X42 IO AO 1.00 600.

2 PUSH BUTTON AT HOIST 7 S

AI BO G1 M1 XO IO AO 1.00 30.

3 MANIPULATE HOOK AT SUB-ARC UNIT WITHOUT STEPS

AI BO G1 M10 XO IO AO 1.00 120.

4 PUSH BUTTON AT HOIST PT 7 S

A16 BO G1 M1 X16 IO AO 1.00 340.

5 PUSH BUTTON AT HOIST PT 14 S

AI BO G1 H1 X42 IO AO 1.00 450.

6 PUSH GANTRY-LADDER AT GANTRY WITH 4 STEPS

A6 BO G1 M1 XO IO AO 1.00 80.

7 HOLD+SLIDE GANTRY-LADDER AT GANTRY

AO BO GO H3 XO IO AO 1.00 30.

8 PUSH RUNGS AT GANTRY F 28

AI BO G1 M1 XO IO AO 28.00 840.

9 PUSH LADDER RUNGS AT GANTRY SIMO (1) (3 4 5) PF 2 (2)

<A1>(B16)<G1M1 XO >IO AO (2) 1.00 320.

10 WITH 4 STEPS PUSH BUTTON AT GANTRY WITH PBEND AND RETURN TO GANTRY
 WITH 4 STEPS PF S (234)

A6 (B3 G1 MI)XO IO A6 (5) 1.00 370 I

11 MANIPULATE GANTRY-LADDER AT GANTRY TO-PUT IT AWAY

AI BO G1 M10 XO IO AO 1.00 120.

12 WALK FROM GANTRY TO GANTRY WITH 16 STEPS AND WITH CLIMB-STEP

A32 B10 GO AO BO PO AO 1.00 420.

13 PUSH BUTTON AT GANTRY F 3

AI BO G1 M1 XO IO AO 3.00 90.

TOTAL TMU 3810.

MANUAL METHODS BACKUP

875. MOUE GANTRY CRANE FOR SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING

PER EACH MOVE OFG: 4 12-AUG-82

COVERS MOVING JUST THE GANTRY (WITH ANY ATTACHED LOAD) ABOUT EIGHT FEET.

* WALK FROM THE UNIT TO THE GANTRY, MOVE

* THE GANTRY AND RETURN TO THE UNIT.

WELDER BEGINS AT UNIT

1 WALK TO GANTRY WITH CLIMB-STEP								
	A16	B10	G0	AO	BO	FO	AO	1.00 260.
2 PUSH START BUTTON AT GANTRY								
	A1	BO	G1	M1	XO	IO	AO	1.00 30.
3 PULL HANDLE PT 8.32 S								
	AI	BO	G1	MI	X24	IO	AO	1.00 270.
4 PUSH OFF BUTTON AT GANTRY								
	AI	BO	G1	MI	XO	IO	AO	1.00 30.
5 WALK TO WEB WITH CLIMB STEP								
	A3	B16	G0	AO	BO	FO	AO	1.00 190.

TOTAL TMU 780.

876. CLEAN WELDMENT ON (STARTING PAD) WITH BRUSH (AND PICK) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING

PER EACH PAD OFG: 3 12-AUG-82

AVERAGE ABOUT THREE TRIPS PER PAD.

* ESTIMATE THAT THERE WILL USUALLY BE

* AN AVERAGE OF EIGHT STARTING FADS PER

* PLATE BLANKET.

WELDER BEGINS AT UNIT

1 HOVE WI REBRUSH AND PICK TO UNIT SEAM PF (3 4 5 6) F 1 / 8								
	AI	BO	(GI	AI	BO	P1	)AO (1)	0.12 5.
2 HOLD+MOVE WELD-GUN FROM WELDER TO UNIT								
	AO	BO	GO	A1	BO	P1	AO	1.00 20.
3 LOOSEN THE SLAG ON THE STARTING FAD AT THE UNIT SEAM WITH 6 STRIKES USING THE PICK AND RETURN F 3								
	AI	BO	G1	AI	BO	PO	L16 AI BO P1 AO	3.00 630.
4 BRUSH CLEAN THE STARTING PAD AT THE UNIT SEAM .5 SQ. FT. USING THE WIREBRUSH AND RETURN F 3								
	AI	BO	G1	AI	BO	P1	S6 AI BO P1 AO	3.00 360.
5 INSPECT 1 POINT F 3								
	AO	BO	GO	AO	BO	PO	T1 AO BO PO AO	3.00 30.

TOTAL TMU 1045.

MANUAL METHODS BACKUP

877. SET-UP WELDING MACHINE FOR SUB-ARC (WELDING) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP(FANEL LINE) WELDING

PER EACH ASSEMBLY OFG: 4 31-AUG-82

EVERYTHING SHOULD BE SHUT DOWN WHEN JOB IS FINISHED.

- * THE SUB-ARC IS LEFT AT THE HIGHEST POINT
- * AT THE GANTRY AFTER THE WELDING IS COMPLETED+ THE WELDER MUST CLIMB UP
- * ONTO THE GANTRY PLATFORM TO TURN ON THE POWER FOR THE SUB-ARC, THE POWER SHOULD BE SHUT OFF AFTER THE WELDING IS COMPLETED,

WELDER BEGINS AT UNIT

1	PUSH GANTRY-LADDER AT GANTRY							
		A16	BO	G1	MI	XO	IO	AO
								1.00 180.
2	HOLD+SLIDE GANTRY-LADDER AT GANTRY							
		AO	BO	GO	M3	XO	IO	AO
								1.00 30.
3	PUSH RUNGS AT GANTRY F 28							
		AI	BO	G2	M1	XO	IO	AO
								28.00 840.
4	PUSH LADDER RUNGS AT GANTRY SIMO (1) (3 4 5) PF 2 (2)							
		<A1>(B16)<G1M1				XO>IO		AO (2)
								1.00 320.
5	WITH 4 STEPS PUSH BUTTON AT GANTRY WITH PBEND AND RETURN TO GANTRY WITH 4 STEPS PF5 (2 3 4)							
		A6	(B3	G1	M1)	XO	IO	A6 (5)
								1.00 370.
6	MANIPULATE GANTRY-LADDER AT GANTRY TO-PUT IT AWAY							
		AI	BO	G1	M1O	XO	IO	AO
								1.00 120.
7	WITH 4 STEPS PUSH BUTTON AT HOIST PT 15 S							
		A6	BO	G1	M1	X42	IO	AO
								1.00 500.
8	WITH CLOSE+OPEN PUSH BUTTON AT GANTRY F 3 (TURN ON GANTRY)							
		AO	BO	G1	M3	XO	IO	AO
								3.00 120.
9	PULL HANDLE AT GANTRY PT 20 S							
		A1	8O	G2	M1	X54	15	AO
								1.00 570.
10	WITH CLOSE+OPEN PUSH BUTTON AT HOIST PT 7 S							
		AO	BO	G1	M3	X16	IO	AO
								1.00 200.
11	PULL SUB-ARC AT UNIT SEAM WITHOUT STEPS							
		AI	BO	G1	M1	XO	IO	AO
								1.00 30.
12	PUSH BUTTON AT HOIST PT 1 S WITHOUT STEPS							
		AI	BO	G1	M1	X3	IO	AO
								1.00 60.
13	MANIPULATE HOOK AT UNIT WITHOUT STEPS (UNHOOK SUB-ARC)							
		AI	BO	G1	M1O	XO	IO	AO
								1.00 120.

TOTAL TMU 3460.

MANUAL METHODS BACKUP

878. MAKE READY OPERATOR FOR SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING

PER EACH ASSEMBLY OFG: 4 13-AUG-82

MEET LEAD PERSON NEAR TOOLBOX FIRST

- * GET VERBAL INSTRUCTIONS FROM LEAD PERSON
- * GET HARD HAT AND TOOL
- * BAG FROM TOOLBOX, WALK OVER TO THE UNIT
- * IN THE SEAM-WELD STATION.

WELDER BEGINS AT TOOLBOX

1	READ 54 WORDS (RECEIVE INSTRUCTIONS FROM SUPERVISOR)		
	AO BO GO AO BO PO T24 AO BO PO AO	1.00	240.
2	MOVE WITH BEND HARDHAT FROM TOOLBOX TO WELDER 'S HEAD		
	AI B6 GI AI BO P1 AO	1.00	100.
3	GET+MOVE TOOLBAG WITH BEND FROM TOOLBOX TO SEAM-WELD WITH		
	BEND+CLIMB-STEP		
	AI B6 G3 A113B16 P1 AO	1.00	1400.

TOTAL TMU 1740.

884. MOVE PLATE (LARGE STARTING PAD) ON ASSEMBLY (PLATE BLANKET) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING

PER EACH LARGE STARTING PAD. OFG: 3 02-SEP-82

MOVE EACH PAD TO THE UNIT AND SET IT DOWN AT THE END OF THE SEAM.

- * PADS SHOULD BE STORED
- * ALONG THE SIDE OF THE SEAM WELD STATION.
- * ONLY TAKE ONE AT A TIME BECAUSE
- * THEY ARE HEAVY.

WELDER BEGINS AT SEAM-WELD

1	WALK TO SEAM-WELD STATION PILE OF STARTING PADS 10 STEPS WITH		
	CLIMB-STEP		
	A16 B10 GO AO BO PO AO	1.00	260.
2	GET+MOVE START-PAD WITH BEND FROM SEAM-WELD STATION PILE OF STARTING		
	PADS TO WELDER		
	AI B6 G3 AI BO P1 AO	1.00	120.
3	MOVE START-PAD FROM WELDER TO SEAM-WELD 10 STEPS AND WITH CLIMB-STEP		
	AI BO G1 A16 MO P1 AO	1.00	290.

TOTAL TMU 670.

MANUAL METHODS BACKUP

886, CLEAN SEAM ON ASSEMBLY WITH BROOM AT ANY PANEL SHOP (PANEL LINE)
 WELDING
 PER EACH SEAM OFG: 3 02-SEP-82
 SWEEP OFF DIRT PRIOR TO WELDING

- * THAT THE TYPICAL SEAM LENGTH WILL BE
- * ABOUT 30 FEET
- * THE OPERATOR WILL BE ABLE TO SWEEP THE
- * SEAM IN THREE FOOT INCREMENTS.
- * THEREFORE A FREQUENCY OF 10 IS USED TO
- * COVER THE ENTIRE SEAM.

WELDER BEGINS AT UNIT

1 MOVE BROOM FROM WEST WALL NEAR UNIT TO UNIT WITH 10 STEPS F 1 / 4	AI BO G1 A16 BO P1 AO	0.25	48.
2 BRUSHCLEAN UNIT SEAM 3 SQ. FT. USING THE BROOM AND HOLD F 10	AI BO G1 AI BO PI S24 AO BO PO AO	10.00	2800.
3 MOVE BROOM FROM WELDER TO UNIT	AI BO G1 AI BO PI AO	1.00	40.

TOTAL TMU 2888.

887. CLEAN WELDMENT ON (SEAM) WITH HAMMER (PICK) AT ANY PANEL SHOP (PANEL LINE) WELDING

PER EACH FOOT OFG: 2 02-SEP-82
 CLEAN WELDMENT AFTER SUB-ARC / TANDEM-ARC WELDING

- * ESTIMATE THAT 75% OF THE SLAG WOULD BE
- * CLEANED WHILE THE MACHINE WAS STILL
- * WELDING. THE REMAINING 25% WOULD BE
- * CLEANED AFTER THE MACHINE HAS STOPPED,

WELDER BEGINS AT UNIT

1 LOOSEN THE SLAG ON THE SEAM AT THE UNIT WITH 6 STRIKES USING THE PICK AND RETURN	AI BO G1 AI BO PO L16 AI BO P1 AO	1.00	2100
2 INSPECT 1 POINT	AO BO GO AO BO PO T1 AO BO PO AO	1.00	10.

TOTAL TMU 220 .

MANUAL METHODS BACKUP

893, WELD BUTT ON ASSEMBLY WITH SUB-ARC AT ANY PANEL SHOP (PANEL LINE) W
ELDING
PER 1 FOOT OFG: 2
. BUTT-1/16X1/2... PL... LT7-1NA-5/16
1 FIRST SIDE 5/16' PLATE, LINCOLN LT7

TOTAL TMU 958.

894, WELD BUTT (ON ASSEMBLY WITH SUB-ARC AT ANY PANEL SHOP (PANEL LINE) W
ELDING
PER 1 FOOT OFG: 2
BUTT-1/16X5/8... PL... LT7-2NA-5/16
1 SECOND SIDE 5/14^s PLATE, LINCOLN LT7

TOTAL TMU 1101.

896, WELD BUTT ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE)
WELDING
PER 1 FOOT OFG: 2
BUTT-1/16X5/8... PL... LT56-1NA-5/8
1 FIRST SIDE 1/2' <-> 5/8' PLATE, TANDEM-ARC

TOTAL TMU 675.

897, WELD SEAM ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE)
WELDING
PER 1 FOOT OFG: 2
B2V, 2-AI-5/8... PL... LT56-2GA-5/8
1 SECOND SIDE 3/8' <-> 5/8' PLATE, TANDEM-ARC

TOTAL TMU 809.7

MANUAL METHODS BACKUP

- 902, WELD SEAM ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE)
WELDING
PER 1 FOOT OFG: 2
B2V.2-AI-1/2...PL...LT56-1GA-1
1 FIRST SIDE 1' PLATE, TANDEM-ARC

TOTAL TMU 1445.3
- 903, WELD SEAM ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE)
WELDING
PER 1 FOOT OFG: 2
B2V, 3-AI-1/2...PL...LT56-2GA-1
1 SECOND SIDE 1' PLATE, TANDEM-ARC

TOTAL TMU 1346.6
992. WELD PT1S.1-AI-1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION)
PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PT1S.1-AI-1/4...PL...E71T-1-A-FIN---3
1 1/4' FLAT FILLET.

TOTAL TMU 3331 .
993. WELD PT1S.1-AI-5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB S
TATION) PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PTIPT1S.1-AI-5/16...PL...E71T-1-A-FIN---3
1 5/16' FLAT FILLET.

TOTAL TMU 5006.

MANUAL METHODS BACKUP

994. WELD PT1S, 1-AI -3/8 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION)
PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PT1S, 1-AI -3/8. . . PL. . . E71T-1-A-FIN---3
1 3/8' FLAT FILLET.

TOTAL TMU 6883.

998. WELD PT1S, 1-AI -1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB S
TATION) PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PT1S, 1-AI -1/4. . . PL. . . E71T-1-A-VIN---4
1 1/4' VERTICAL FILLET,

TOTAL TMU 3273.

999. WELD PT1S, 1-AI -5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB
STATION) PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PT1S, 1-AI -5/16. . . PL. . . E71T-1-A-VIN---5
1 5/16' VERTICAL FILLET,

TOTAL TMU 4405.

1000. WELD PT1S, 1-AI -3/8 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB S
TATION) PANEL SHOP (PANEL LINE) WELDING
PER 1 FOOT OFG: 2
PT1S, 1-AI -3/8. . . PL. . . E71T-1-A-VIN---5
1 3/8' VERTICAL FILLET.

TOTAL TMU 6820.

MANUAL METHODS BACKUP

441. COMBINED SUB-OP

WELD GOUGE (SECOND SIDE) ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL
 UNIT ASSEMBLY SHOP WELDING
 SECOND SIDE OF GROOVE JOINT, GOUGED VERTICAL, (5/16' FLATE OR LESS)
 FER 1 FOOT OFG: 3 20-JAN-82
 * GOUGE SECOND SIDE
 * WELD AFTER GOUGE

TOTAL TMU 20104.8

Combined sub-operation elements	FreQ.	TMU
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378. WELD GOUGE ON ASSEMBLY WITH SEMIAUTOUATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING		
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382. GOUGE BUTT ON ASSEMBLY WITH CARBON ELECTRODE AT ANY UNIT ASSEMBLY SHOP WELDING	0.01	15262.7
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	0.01	4842.1
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Total TMU		20104.8
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MANUAL METHODS BACKUP

497 . COMBINED SUB-OP

WELD TIE BUTT ON ASSEMBLY WITH STICK ELECTRODE AT (COMPLETE) UNIT
 ASSEMBLY SHOP WELDING
 9' X7 1/2' X25# TEE BAR
 PER EACH OFG: 3 20-JAN-82
 * WELD FIRST SIDE
 * GOUGE AND WELD SECOND SIDE

TOTAL TMU 63921.1

----- Combined sub-operation elements ----- **Freq.** ----- TMU -----

432. WELD B2V, 1AP ON ASSEMBLY WITH SEMI AUTOMATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING

439. WELD B2V, 1AP ON ASSEMBLY WITH STICK ELECTRODE AT VERTICAL UNIT ASSEMBLY SHOP WELDING

186. CLEAN WELD JOINT ON ASSEMBLY WITH PICK AND WIRE-BRUSH AT ANY SHOP AREA WELDING

174. PREPARE % STRIKE ARC FOR MANUAL (STICK) WELDING AT ANY SHIP OR SHOP AREA WELDING

382. GOUGE BUTT ON ASSEMBLY WITH CARBON ELECTRODE AT ANY UNIT ASSEMBLY SHOP WELDING

178. PREPARE+STRIKE ARC FOR ARC GOUGING WITH CARBON AT ANY SHOP WELDING AREA

429 . REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING

366. WELD GOUGE ON ASSEMBLY WITH SEMI AUTOMATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING

0.01 21367.8

Total TMU ----- 63921.1

MANUAL METHODS BACKUP

917. COMBINED SUB-OP

SET-UP AND TEAR DOWN (GEAR) FOR (WELDING PADS) WITH SEMI AUTOMATIC
 AT ANY (WORK STATION -SEAM WELD) PANEL SHOP (PANEL LINE) WELDING
 USE FOR ANY PANEL BUILT AT THE PANEL LINE,
 PER EACH PANEL OFG: 4 03-SEP-82
 * GET SEMI AUTOMATIC SET-UP,
 * ALSO COVERS USING GLOVES AND HOOD,
 * COVERS PUTTING SEMI AUTOMATIC AWAY,

TOTAL TMU 3548.0

----- Combined sub-operation elements -----	Free. -----	TMU -----
863. SET-UP WIRE FEEDER (SEMI AUTOMATIC) FOR (WELDING) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELD		
	1.00	2648.0
746. ARRANGE GLOVES (MITTENS) ON ASSEMBLY (AT TOOL-BAG) AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		
	1.00	230.0
608. ARRANGE GLOVES (MITTENS) ON ASSEMBLY AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
	1.00	280.0
595. COMBINE HELMET (HOOD AND HARDHAT) AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		
	1.00	390.0
Total TMU		<u>3548.0</u>

MANUAL METHODS BACKUP

920. COMBINED SUB-OP

WELD PLATE (STARTING PADS) ON ASSEMBLY (PANEL) WITH SEMI AUTOMATIC
 AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING
 CAN BE USED FOR ANY PANEL

PER EACH COMPLETE PANEL OFG: 4 07-SEP-82

- * SINCE THE OVERALL TIME FOR PUTTING ON
- * LARGE PADS IS VERY CLOSE TO THE SAME
- * TIME REQUIRED FOR SMALL PADS ON A PER
- * PANEL BASIS, THE SUB-OPS FOR THE LARGE
- * PADS ARE USED HERE AND ARE FREQUENCED
- * TO COVER THE COMPLETE PANEL.

TOTAL TMU 25170.0

	Freq.	TMU
----- Combined sub-operation elements -----	-----	-----
384. MOVE PLATE (LARGE STARTING PAD) ON ASSEMBLY (PLATE BLANKET) AT ANY (WORK STATION- SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	6.00	4020.0
866. WELD PLATE (LARGE STARTING PAD) ON ASSEMBLY (PLATE BLANKET) WITH SEMI AUTOMATIC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	6.00	13260.0
870. MOVE WELDING MACHINE (SEMI AUTOMATIC) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANE	6.00	1620.0
876. CLEAN WELDMENT ON (STARTING PAD) WITH BRUSH (AND PICK) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	6.00	6270.0
Total TMU		----- 25170.0

MANUAL METHODS BACKUP

921. COMBINED SUB-OP

SET-UP AND TEAR DOWN WELDING MACHINE (ET. ALL) FOR SUB-ARC (OR
TANDEM-ARC) AT ANY (WORK STATION - SEAM WELDING) PANEL SHOP
(PANEL LINE) WELDING

CAN BE USED FOR ANY PANEL

PER EACH COMPLETE PANEL OFG: 4 07-SEP-82

- * ALL FREQUENCIES IN THIS COMBINED SUB-OP
- * ARE DOUBLED INORDER TO COVER BOTH SIDES
- * OF THE PANEL WITH THIS ONE COMBINED
- * SUB-OP. THIS COMBINED SUB-OP COVERS
- * MOVING THE GANTRY TO THE SEAM, UNHOOKING
- * THE MACHINE, HOOKING THE MACHINE BACK
- * UP.

TOTAL TMU 21220.0

<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
873. SET-UP AND TEAR DOWN CLAMP (GROUND-CLAMP) AT (SEAM WELD STATION) PANEL SHOP (PANEL LINE) WELDING	2.00	3200.0
877. SET-UP WELDING MACHINE FOR SUB-ARC (WELDING) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	2.00	6920.0
874. TEAR DOWN WELDING MACHINE (SUB-ARC) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PAN	2.00	7620.0
878. MAKE READY OPERATOR FOR SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	2.00	3480.0

Total TMU		21220.0

MANUAL METHODS BACKUP

1013. COMBINED SUB-OP

WELD COLLAR ON ASSEMBLY WITH SEMI AUTOMATIC AT (WEB STATION) PANEL
 SHOP (PANEL LINE) WELDING
 FOR TIGHT COLLARS WITH LARGEST DIMENSION =>6' AND <=12'

- * CLEAN PRIORITY TO WELDING
- * CHANGE POSITION FOR PREPARE AND STRIKE
- * 4 TIMES PER SIDE OF COLLAR.
- * REPOSITION LEAD, VENT TUBE, ETC. WITH A
 * CRAWLING MOTION AND KNEELING/ARISING

TOTAL TMU 19820.0

Combined sub-operation elements	Freq.	TMU
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590 . CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
	8.00	3800.0
747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		
	8.00	2088.0
998. WELD PTIS. 1-AI-1/4 ON ASSEMBLY WITH SEMI AUTOMATIC AT VERTICAL (WEB S TATION) PANEL SHOP (PANEL LINE) WELDING		
	4.00	13092.0
425. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING		
	3.00	840.0
Total TMU		19820.0

MANUAL METHODS BACKUP

1015+ COMBINED SUB-OP

WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (WEB STATION) PANEL
 SHOP (PANEL LINE) WELDING
 FOR NON-TIGHT COLLARS WITH LARGEST DIMENSION =>6' AND <=12' +
 PER EACH COLLAR OFG: 3 21-SEP-82
 * CLEAN PRIOR TO WELDING,
 * CHANGE POSITION FOR PREPARE AND STRIKE
 * 4 TIMES PER SIDE OF THE COLLAR,
 * REPOSITION LEAD, VENT TUBE, ETC. WITH A
 * CRAWLING MOTION AN KNEELING/ARISING,
 TOTAL TMU 19820,0

<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
590 * CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
	8,00	3800+0
747, START (PREPARE +STRIKE ARC) WELDMENT FOR (SEMIAUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		
	8+00	2088+0
998, WELD PTIS, I-AI -1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB S TATION) PANEL SHOP (PANEL LINE) WELDING		
	4,00	13092,0
425, REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING		
	3,00	840,0
Total TMU		19820+0

MANUAL METHODS BACKUP

1022. COMBINED SUB-OP

WELD COLLAR ON ASSEMBLY WITH SEMI AUTOMATIC AT (TIGHT) **PANEL SHOP**
(PANEL LINE) WELDING
FOR TIGHT COLLARS WITH LARGEST DIMENSION OF ABOUT 18'
PER 1 EACH OFG: 3 22-SEP-82
* CLEAN PRIOR TO WELDING.
* TIME IS ALLOWED FOR MOVING FROM ONE
* COLLAR TO THE NEXT. WELD ALL COLLARS
* ON ONE SIDE AND THEN MOVE TO THE OTHER
* SIDE OF THE WEB.

TOTAL TMU **66896.0**

----- Combined sub-operation elements -----	Freq. -----	TMU -----
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570. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA)
PANEL SHOP (PANEL LINE) WELDING

16.00 7600.0

747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH
WELDING GUN AT ANY (WORK STATION) PANEL SHOP {PANEL LINE} WELDING

16.00 4176.0

1000. WELD PT19.1-A1-3/8 ON ASSEMBLY WITH SEMI AUTOMATIC AT VERTICAL (WEB S
TATION) PANEL SHOP (PANEL LINE) WELDING

8.00 54560.0

425. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING

2.00 560.0

Total TMU	66896.0
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MANUAL METHODS BACKUP

1023. COMBINED SUB-OP

WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (NON-TIGHT} PANEL
SHOP (PANEL LINE) WELDING

FOR NON-TIGHT COLLARS WITH LARGEST DIMENSION OF ABOUT 18'
PER EACH COLLAR OFG: 3 22-SEP-82

* CLEAN PRIOR TO WELDING.

* ALL COLLARS ARE TO BE WELDED ALONG ONE

* SIDE OF THE WEB. THEN MOVE TO THE

* OTHER SIDE OF THE WEB TO WELD THE

* SECOND SIDE. TIME IS ALLOWED FOR

\$. MOVING FROM ONE COLLAR TO THE NEXT.

TOTAL TMU 47576.0

Combined sub-operation elements

Freq. TMU

590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA)
PANEL SHOP (PANEL LINE) WELDING

747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH
WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING

16.00 7600.0

999. WELD FT1S.1-AI-5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB
STATION) PANEL SHOP (PANEL LINE) WELDING

16.00 4174.0

425. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING

8.00 35240.0

2.00 560.0

Total TMU

47576.0

SECTION 2.2
DATA SYNTHESIS AND ANALYSIS

906. COMBINED SUB-OP

WELD (COMPLETE) SEAM (5/16' PLATE) ON ASSEMBLY (PANEL) WITH
SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE)
WELDING

THE COMPLETE WELD, USING A LINCOLN LT7
PER FOOT OFG: 2 03-SEP-82

- * WELD THE FIRST SIDE AND CLEAN 25% OF
- * THE SLAG, AFTER THE PANEL IS TURNED
- * OVER, WELD THE SECOND SIDE AND CLEAN
- * 25% OF THE SLAG. THE REST OF THE SLAG
- * SHOULD HAVE BEEN CLEANED WHILE THE
- * MACHINE WAS RUNNING.

TOTAL TMU 2169.0

Combined sub-operation elements

Freq. TMU

887. CLEAN WELDMENT ON (SEAM) WITH HAMMER (PICK) AT ANY PANEL SHOP (PANEL
LINE) WELDING

0.50 110.0

893. WELD BUTT ON ASSEMBLY WITH SUB-ARC AT ANY PANEL SHOP (PANEL LINE) W
ELDING

1.00 958.0

894. WELD BUTT ON ASSEMBLY WITH SUB-ARC AT ANY PANEL SHOP (PANEL LINE) W
ELDING

1.00 1101.0

Total TMU

2169.0

928. WELD (15 FEET OF BAR) FT1S.1-AI-3/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PER 15 FEET OF BAR (30 FEET OF WELD) OFG: 3
FT1S.1-AI-3/16...FL...DB-A-3/16FF

1 3/16' FLAT FILLET USING .045' SOLID WIRE.

TOTAL TMU 16963.

DATA SYNTHESIS AND ANALYSIS

931. WELD (25 FEET OF BAR) PT16, I-A1-3/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
 AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
 PER 25 FEET OF BAR (50 FEET OF WELD) OFG: 3
 PT1S, I-A1-3/16... PL... DB-A-3/16FF
 1 3/16 FLAT FILLET USING .045" SOL1D WIRE.

TOTAL TMU 25215.

1035. COMBINED SUB-OP

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (FFG TRANSVERSE)
 PANEL SHOP (PANEL LINE) WELDING
 FOR 12' WEB 40 FT LONG WITH 27 STIFFS ON 18' SPACING. WELD
 IS:FLAT=65F T: TIE BUTT=1(3.5FT); STIFF,FACEPLATES=54(18FT);
 COLLARS=27T AND 27NT(90FT); SMALL BRKS=14(18FT).
 PER EACH FFG TRANSVERSE WEB OFG: 4 23-SEP-82
 * USE 7018 STICK WIRE TO WELD THE TIE BUTT
 * AND SINCE THE TIMES ARE COMPARABLE USE
 * #497 FOR THE 'TIE BUTT' RATHER THAN WRITE
 * A-NEW SUB-OP
 * USE 1/4" FILLETS FOR ALL THE OTHER
 * WELDS. USE A VERTICAL METHOD FOR THE
 * STIFFENER FACEPLATES BECAUSE THEY WILL
 * PROBABLY BE DONE WHEN THE COLLARS ARE.

TOTAL TMU 1547649.1

 Combined sub-operation elements

Freq. THU

992. WELD PT1S, I-A1-1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION)
 PANEL SHOP (PANEL LINE) WELDING

65.00 216515.0

497. COMBINED SUB-OP

WELD TIE BUTT ON ASSEMBLY WITH STICK ELECTRODE AT (COMPLETE) UNIT
 ASSEMBLY SHOP WELDING

1.00 63921.1

1015. COMBINED SUB-OP

WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (WEB STATION) PANEL
 SHOP (PANEL LINE) WELDING

DATA SYNTHESIS AND ANALYSIS

		27.00	535140.0
1013.	COMBINED SUB-OP		
	WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (WEB STATION) PANEL SHOP (PANEL LINE) WELDING		
		27.00	535140.0
998.	WELD PT S. I -A1 -1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING		
		26.00	85098.0
590.	CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
		175.00	83125.0
747.	START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMIAUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		
		110.00	28710.0
	Total TMU		----- 1547649.1

1036.	COMBINED SUB-OP		
	WELD BRACKET (KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT (FFG TYPE) PANEL SHOP (PANEL LINE) WELDING		
	ONLY COVERS ONE LEG OF THE BRACKET. WELD FOOTAGE = 3 FT.		
	PER EACH FFG TYPE KNEE BRACKET OFG: 4 23-SEP-82		
	*WELD FLAT TO WEB WITH 5/16" FILLET.		
	\$ OTHER LEG IS WELDED AFTER UNIT ERECTION		
	TOTAL TMU		17440.0

	Combined sub-operation elements	Freq.	TMU
	-----	-----	-----
993.	WELD PT S. I -A1 -5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION) PANEL SHOP (PANEL LINE) WELDING		
		3.00	15018.0
590.	CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND) PICK AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
		4.00	1700.0
747.	START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMIAUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING		

DATA SYNTHESIS AND ANALYSIS

2.00 522.0

17440.0

Total TMU

1024. COMBINED SUB-OP

WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC AT (4' X4' ANGLE BAR)
PANEL SHOP (PANEL LINE) WELDING
HEADER IS 4'X4' ANGLE BAR WELDED ALONG THE LENGTH OF IT FLAT, BOTH
END S ARE ALSO WELDED.
PER EACH HEADER OFG: 3 22-SEP-82
* CLEAN EACH INCREMENT PRIOR TO WELDING.
* PUT ON A 1/4' FILLET WELD ON ALL PARTS.

TOTAL TMU 28160.0

Combined sub-operation elements

Freq. TMU

992. WELD PT1S. I-AI -1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION)
PANEL SHOP (PANEL LINE) WELDING 1

998. WELD PT1S. I-AI -1/4 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB S
TATION) PANEL SHOP (PANEL LINE) WELDING

590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA)
PANEL SHOP (PANEL LINE) WELDING

747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH
WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING

425. REPOSITION OBJECT ON ASSEMBLY AT UNIT ASSEMBLY SHOP WELDING

8.00 2088.0
2.00 560.0

Total TMU

28160.0

DATA SYNTHESIS AND ANALYSIS

922. COMBINED SUB-OP

SET-UP AND TEAR DOWN WELDING MACHINE (AND PUT ON STARTING PADS)
 FOR SUB-ARC AT (SEAM WELD) PANEL SHOP (PANEL LINE) WELDING
 THIS IS MEANT TO COVER BOTH SIDES OF THE PANEL.
 PER EACH COMPLETE PANEL OFG: 4 07-SEF-K!

* COVERS ALL OPERATIONS NEEDED TO PUT ON
 * STARTING PADS. ALSO COVERS GETTING THE
 # SUB-ARC/TANDEM-ARC EQUIPMENT READY.

* ALSO COVERS GETTING THE OPERATOR READY.

TOTAL TMU 49938.0

<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
917. COMBINED SUB-OP		
SET-UP AND TEAR DOWN (GEAR) FOR (WELDING PADS WITH SEMIAUTOMATIC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	1.00	3548.0
921. COMBINED SUB-OP		
SET-UP AND TEAR DOWN WELDING MACHINE (ET., ALL) FOR TANDEM-ARC) AT ANY (WORK STATION - SEAM WELDING) (PANEL LINE) WELDING	1.00	21220.6
920. COMBINED SUB-OP		
WELD FLATE (STARTING PADS) ON ASSEMBLY (PANEL) WITH SEMIAUTOMATIC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	1.00	25170.0
Total TMU		49938.0

DATA SYNTHESIS AND ANALYSIS

913. COMBINED SUB-OP

SET-UP TANDEM-ARC FOR (SEAM WELDING) AT ANY (WORK STATION - SEAM
WELD) PANEL SHOP (PANEL LINE) WELDING
USE FOR TANDEM-ARC ONLY
PER EACH SEAM SIDE DFG: 3 03-SEP-82
* PREPARE THE MACHINE AT THE SEAM TO WELD

TOTAL TMU 5008.0

Combined sub-operation elements

Freq. TMU

375.	MOVE GANTRY CRANE FOR SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING		
357.	SET-UP WELDING MACHINE (TANDEM-ARC) AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING	1.00	790.0
386.	CLEAN SEAM ON ASSEMBLY WITH BROOM AT ANY PANEL SHOP (PANEL LINE) WELDING	1.00	1340.0
		1.00	2888.0
	Total TMU		5008.0

DATA SYNTHESIS AND ANALYSIS

907. COMBINED SUB-OP

WELD (COMPLETE) SEAM (5/8' PLATE) ON ASSEMBLY (PANEL) WITH TANDEM-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE) WELDING

THIS IS THE COMPLETE WELD AND USED THE LINCOLN LT56 PER FOOT OFG: 2 03-SEP-82

- * WELD THE FIRST SIDE AND CLEAN 25% OF THE SLAG. AFTER THE PANEL HAS BEEN
- * TURNED OVER, WELD THE SECOND SIDE AND
- * AGAIN CLEAN 25% OF THE SLAG. THE REST
- * OF THE SLAG SHOULD HAVE BEEN CLEANED
- * WHILE THE MACHINE WAS RUNNING.

TOTAL TMU 1594.7

Combined sub-operation elements	Free.	TMU
-----	-----	-----
887. CLEAN WELDMENT ON (SEAM) WITH HAMMER (PICK) AT ANY PANEL SHOP (PANEL LINE) WELDING	0.50	110.0
896. WELD BUTT ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE) WELDING	1.00	875.0
897. WELD SEAM ON ASSEMBLY WITH TANDEM-ARC AT ANY PANEL SHOP (PANEL LINE) WELDING	1.00	809.7
Total TMU		1594.7

DATA SYNTHESIS AND ANALYSIS

933. WELD (25 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PER 25 FEET OF BAR (50 FEET OF WELD) OFG: 3
PT1S.1-AI-5/16...PL...DB-A-5/16FF

1 5/16" FLAT FILLET USING .045" SOLID WIRE.

TOTAL TMU 30825.

939. WELD (35 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PER 35 FEET OF BAR (70 FEET OF WELD) OFG: 1
PT1S.1-AI-5/16...PL...DB-A-5/16FF

1 5/16' FLAT FILLET USING .045' SOLID WIRE.

TOTAL THU 41321.

936. WELD (45 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PER 45 FEET OF BAR (90 FEET OF WELD) OFG: 3
PT1S.1-AI-5/16...PL...DB-A-5/16FF

1 5/16' FLAT FILLET USING .045' SOLID WIRE.

TOTAL THU 51816.

DATA SYNTHESIS AND ANALYSIS

1028. COMBINED SUB-OP

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (TANKER) PANEL SHOP (PANEL LINE) WELDING
 METHOD FOR FRAME THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING. WELD FOOTAGE IS: BACKUP STRUCTURE = 26.25 FT.; FLAT = 32 FT. F COLLARS = 22.5 FT.
 PER EACH WEB FRAME (:6 FT. HIGH) OFG: 4 22-SEP-82
 * ALL WELDS ARE MADE WITH SEMIAUTOMATIC
 * FLUXCORE. ASSUME THAT A 3/6' FILLET
 * WELD WILL BE APPLIED TO THE FLAT
 * BECAUSE IT IS TIGHT. ALSO A 5/16'
 * FILLET WELD IS ASSUMED FOR THE BACKUP STRUCTURE.

TOTAL TMU 877982.3

Combined sub-operation elements	Freq.	THU
999. WELD PT1S. I-AI -5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	26.25	115631.3
590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING	85.00	40375.0
1022. COMBINED SUB--OP		
WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (TIGHT) (PANEL LINE) WELDING		
994. WELD PT1S. I-AI -3/8 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	7.50	501720.0
	32.00	220256.0
Total TMU		877982.3

DATA SYNTHESIS AND ANALYSIS

1026. COMBINED SUB-OP

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (TANKER) PANEL
 SHOP (PANEL LINE) WELDING
 METHOD FOR WEB THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING. WELD
 FOOTING IS: BACKUP STRUCTURE = 14.25 FT.; FLAT = 32.0 FT.;
 COLLARS = 17.4 FT.
 PER EACH WEB FRAME (:" 6 FT. HIGH) OFG: 4 22-SEP-82
 * ALL WELDS ARE MADE WITH SEMIAUTOMATIC
 * FLUXCORE. ASSUME THAT A 5/16' FILLET
 * WELD WILL BE APPLIED. USE A VERTICAL
 * METHOD FOR ALL WELDS ON BACKUP
 * STRUCTURE.

TOTAL TMU 608758.3

	<u>Combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
993.	WELD PT1S.1-AI-5}15 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB S TATION) PANEL SHOP (PANEL LINE) WELDING		
999.	WELD PT1S.1-AI-5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	32.00	160192.0
590.	CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING	14.25	62771.3
1023.	COMBINED SUB-OP	61.00	28975.0
	WELD COLLAR ON ASSEMBLY WITH SEMIAUTOMATIC AT (NON-TIGHT} SHOP (PANEL LINE) WELDING		
		7.50	356820.0
	Total TMU		608758.3

DATA SYNTHESIS AND ANALYSIS

1027. COMBINED SUB-OP

WELD WEB FRAME (LONGITUDINAL WEB) ON ASSEMBLY WITH SEMIAUTOMATIC AT (TANKER) PANEL SHOP (PANEL LINE) WELDING
 METHOD FOR WEB FRAME THAT IS 40 FT. LONG WITH 8 FT. BAY SF SPACING.
 WELD FOOTAGE IS: FLAT = 80 FT.; VERTICAL = 120 FT.
 PRE-INSTALLED DOCKING BRACKETS = 12 FT.; JOB INSTALLED DOCKING BRACKETS = 25.5 FT.
 PER EACH WEB FRAME (>6 FT. HIGH) OFG: 4 22-SEP-82
 * ALL WELDS ARE MADE WITH SEMIAUTOMATIC
 * FLUXCORE. ASSUME THAT A 3/8" FILLET
 * WILL BE APPLIED TO THE WEB ITSELF AND
 * THAT A 5/16" WELD WILL BE APPLIED TO
 * THE DOCKING BRACKETS;

TOTAL TMU 1721852.5

<u>combined sub-operation elements</u>	<u>Freq.</u>	<u>TMU</u>
999. WELD PT1S. I-AI -5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	37.50	165187.5
994. WELD PT1S. I-AI -3/8 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	50.00	550640.0
1000. WELD PT1S. I-AI -3/8 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	120.00	818400.0
590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING	395.00	187625.0
Total TMU		1721852.5

DATA SYNTHESIS AND ANALYSIS

1045. COMBINED SUB-OP

WELD BRACKET (TANKER; KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT
 (MEDIUM SIZED) PANEL SHOP (PANEL LINE) WELDING
 METHOD FOR WELDING BOTH LEGS OF A TANKER KNEE BRACKET WITH APPROXIMATE
 DIMENSIONS OF 60' X 32'. WELD FOOTAGE IS 16.7 FT. OF 5/16'
 FILLET WELD
 PER EACH MEDIUM BRACKET (60' X 32') OFG: 4 27-SEP-82
 * ONE LEG IS FLAT AND THE OTHER IS
 * VERTICAL. EXTRA CLEAN AND PREPARE/
 * STRIKE TIME IS GIVEN TO ALLOW FOR THE
 * EXTRA EFFORT OF WORKING AROUND THE
 * FACE PLATE OF THE BRACKET.

TOTAL TMU 81405.2

Combined sub-operation elements	FreQ.	TMU
590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING	6.00	2850.0
993. WELD PTIS. I-AI-5/15 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	6.00	1566.0
999. WELD PTIS. I-AI-5/1A ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	5.70	28534.2
	11.00	48455.0
Total TMU		81405.2

DATA SYNTHESIS AND ANALYSIS

1046. COMBINED SUB-OP

WELD BRACKET (TANKER: KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT
 (LARGE SIZE) PANEL SHOP (PANEL LINE) WELDING
 METHOD FOR ONE LEG ONLY OF A LARGE KNEE BRACKET WITH DIMENSIONS OF
 ABO UT 8 FT. BY 8 FT. WELD FOOTAGE IS 18 FT. OF 5/16' FILLET
 WELD.

PER EACH LARGE TANKER KNEE BRACKET (8' X8') OFG: 4 27-SEP-82

- * WELD ONLY THE FLAT LEG AT THIS TIME.
- * THE OTHER LEG WILL BE WELDED AT
- * ERECTION. USE SEMIAUTOMATIC FLUXCORE
- * TO APPLY A 5/16' FILLET WELD IN THE FLAT
- * POSITION. EXTRA CLEAN AND PREPARE/
- * STRIKE TIME IS ALLOWED IN ORDER TO WORK
- * AROUND THE END OF THE FACEPLATE.

TOTAL TMU 92316.0

Combined sub-operation elements	FreQ.	TMU
590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING		
747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMI AUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING	3.00	1425.0
993. WELD PT.S. I-AI-5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB S TATION) PANEL SHOP (PANEL LINE) WELDING	3.00	783.0
	18.00	90108.0
Total TMU		92316.0

DATA SYNTHESIS AND ANALYSIS

1037. COMBINED SUB-OP

WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC AT (30 LENGTH} PANEL
SHOP (PANEL LINE) WELDING

LARGE HEADER ABOUT 30' LONG CONTAINS ABOUT 8 FT. OF WELD.
PER EACH LARGE HEADER OFG: 4 23-SEP-82

- * USE SEMIAUTOMATIC FLUXCORE AND APPLY
- * A 5/16' FILLET WELD. THE ENDS SHOULD BE
* DONE USING A VERTICAL METHOD.

TOTAL TMU 47244.0

	Freq.	TMU
<u>Combined Sub-operation elements</u>	<u>-----</u>	<u>-----</u>
773. WELD PT'S. 1-AI-5J: 5 ON ASSEMBLY WITH SEMIAUTOMATIC AT FLAT (WEB S STATION) PANEL SHOP (PANEL LINE) WELDING	5.00	25030.0
777. WELD PT'S. 1-AI-5/16 ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL (WEB STATION) PANEL SHOP (PANEL LINE) WELDING	3.00	13215.0
590. CLEAN WELDMENT ON ASSEMBLY WITH BRUSH (AND PICK) AT ANY (WORK AREA) PANEL SHOP (PANEL LINE) WELDING	14.00	6650.0
747. START (PREPARE + STRIKE ARC) WELDMENT FOR (SEMIAUTOMATIC WELDING) WITH WELDING GUN AT ANY (WORK STATION) PANEL SHOP (PANEL LINE) WELDING	9.00	2349.0

Total TMU		47244.0

DATA SYNTHESIS AND ANALYSIS

743. COMBINED SUB-OP

WELD (+GOUGE+WELD 2ND SIDE) B2V.1AP (7/16' GROOVE JOINT) ON
 ASSEMBLY WITH SEMIAUTOMATIC AT (STEEL) UNIT ASSEMBLY SHOP WELDING
 COMPLETE JOB. WELD FIRST SIDE, GOUGE AND WELD SECOND SIDE.
 PER 1.0 FOOT OFG: 3 07-JUN-82

TOTAL TMU 32029.4

	FreQ.	TMU
-----	-----	-----
719. WELD B2V.1AP (7/16' GROOVE JOINT) ON ASSEMBLY WITH SEMIAUTOMATIC AT (STEEL) UNIT ASSEMBLY SHOP WELDING	0.01	11591.3
188. CLEAN WELD JOINT ON ASSEMBLY WITH PICK AND WIRE-BRUSH AT ANY SHOP WELDING AREA	0.67	333.3
441. COMBINED SUB-OP' WELD GOUGE (SECOND SIDE) ON ASSEMBLY WITH SEMIAUTOMATIC AT VERTICAL UNIT ASSEMBLY SHOP WELDING	1.00	20104.8
Total TMU		----- 32029.4

SECTION 2.3.1
TITLESHEET

WHOLE PANEL LINE WELDING COUNT

Titlesheet Organization List

Assemble/Disassemble

922. COMBINED SUB-OF

SET-UP AND TEAR DOWN WELDING MACHINE (AND PUT ON STARTING FADS)
FOR SUB-ARC AT (SEAM WELD) PANEL SHOP (PANEL LINE) WELDING
THIS IS MEANT TO COVER BOTH SIDES OF THE PANEL.

913. COMBINED SUB-OF

SET-UP TANDEM-ARC FOR (SEAM WELDING) AT ANY((WORK STATION - SEAM
WELD) PANEL SHOP (PANEL LINE) WELDING
USE FOR TANDEM-ARC ONLY

Join

906. COMBINED SUB-OF

WELD (COMPLETE) SEAM (5/16" PLATE) ON ASSEMBLY (PANEL) WITH
SUB-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE)
WELDING
THE COMPLETE WELD USING A LINCOLN LT7

928. WELD (15 FEET OF BAR) PTIS. 1-AI-3/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PTIS. 1-AI-3/16... PL...DB-A-3/16FF

931. WELD (25 FEET OF BAR) PTIS. 1-AI-3/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PTIS. 1-AI-3/16... PL...DB-A-3/16FF

1035. COMBINED SUB-OF

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (FFG TRANSVERSE)
PANEL SHOP (PANEL LINE) WELDING
FOR 12' WEB 40 FT LONG WITH 27 STIFFS ON 18' SPACING. WELD IS: FLAT=65F
T; TIE BUTT=1(3.5FT); STIFF. FACEPLATES=54(15FT) ; COLLARS=27T AND 27NTC
90FT); SMALL BRKS=14(18FT).

1036. COMBINED SUB-OF

TITLESHEET

WELD BRACKET (KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT (FFG TYPE)
PANEL SHOP (PANEL LINE) WELDING
ONLY COVERS ONE LEG OF THE BRACKET. WELD FOOTAGE = 3 FT.

1024. COMBINED SUB-OP

WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC AT (4' X4' ANGLE BAR)
PANEL SHOP (PANEL LINE) WELDING
HEADER IS 4' X4' ANGLE BAR WELDED ALONG THE LENGTH OF IT FLAT, BOTH ENDS ARE ALSO WELDED.

Operate

907. COMBINED SUB-OP

WELD (COMPLETE) SEAM (5/8" PLATE) ON ASSEMBLY (PANEL) WITH
TANDEM-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL
LINE) WELDING
THIS IS THE COMPLETE WELD AND USED THE LINCOLN LT56

910. COMBINED SUB-OP

WELD (COMPLETE) SEAM (1" PLATE) ON ASSEMBLY (PANEL) WITH
TANDEM-ARC AT ANY (WORK STATION - SEAM WELD) PANEL SHOP (PANEL LINE)
WELDING
THE COMPLETE WELD, USING A LINCOLN LT56

930. WELD (15 FEET OF BAR) PT1S. 1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PT1S. 1-AI-5/16... PL... DB-A-5/16FF

933. WELD (25 FEET OF BAR) PT1S. 1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PT1S. 1-AI-5/16... PL... DB-A-5/16FF

939. WELD (35 FEET OF BAR) PT1S. 1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PT1S. 1-AI-5/16... PL... DB-A-5/16FF

936. WELD (45 FEET OF BAR) PT1S. 1-AI-5/16 ON ASSEMBLY (PANEL) WITH DOODLEBUG
AT ANY (STIFFENER STATION) PANEL SHOP (PANEL LINE) WELDING
PT1S. 1-AI-5/16... PL... DB-A-5/16FF

1028 COMBINED SUB-OP

TITLESHEET

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (TANKER) PANEL
SHOP (PANEL LINE) WELDING
METHOD FOR FRAME THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING. WELD F
OOTAGE IS: BACKUP STRUCTURE = 26.25 FT.; FLAT = 32 FT.; COLLARS = 22.5
FT.

1026. COMBINED SUB-OP

WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC AT (TANKER) PANEL
SHOP (PANEL LINE) WELDING
METHOD FOR WEB THAT IS 20 FT. LONG WITH 30 IN. FRAME SPACING. WELD FO
TAGE IS: BACKUP STRUCTURE = 14.25 FT.; FLAT = 32.0 FT.; COLLARS= 17.4
FT.

1027. COMBINED SUB-OP

WELD WEB FRAME (LONGITUDINAL WEB) ON ASSEMBLY WITH SEMIAUTOMATIC
AT (TANKER) PANEL SHOP (PANEL LINE) WELDING
METHOD FOR WEB FRAME THAT IS 40 FT. LONG WITH 8 FT. BAY SPACING. WELD
OOTAGE IS: FLAT = 80 FT.; VERTICAL = 120 FT.; PRE-INSTALLED DOCKING B
RACKETS = 12 FT.; JOB INSTALLED DOCKING BRACKETS = 25.5 FT.

1045. COMBINED SUB-OP

WELD BRACKET (TANKER; KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT
(MEDIUM SIZED) PANEL SHOP (PANEL LINE) WELDING
METHOD FOR WELDING BOTH LEGS OF A TANKER KNEE BRACKET WITH APROXIMATE
DIMENSIONS OF 60' X32' WELD FOOTAGE IS 16.7 FT. OF 5/16' FILLET WELD.

1046. COMBINED SUB-OP

WELD BRACKET (TANKER; KNEE) ON WEB FRAME WITH SEMIAUTOMATIC AT
(LARGE SIZE) PANEL SHOP (PANEL LINE) WELDING
METHOD FOR ONE LEG ONLY OF A LARGE KNEE BRACKET WITH DIMENSIONS OF ABO
UT 8 FT. BY 8 FT. WELD FOOTAGE IS 18 FT. OF 5/16' FILLET WELD.

1037. COMBINED SUB-OP

WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC AT (30' LENGTH) PANEL
SHOP (PANEL LINE) WELDING
LARGE HEADER ABOUT 30' LONG CONTAINS ABOUT 8 FT. OF WELD.

743. COMBINED SUB-OP

WELD (+GOUGE+WELD 2ND SIDE) B2V. 1AP (7/16' GROOVE JOINT) ON
ASSEMBLY WITH SEMIAUTOMATIC AT (STEEL) UNIT ASSEMBLY SHOP WELDING
COMPLETE JOB. WELD FIRST SIDE. GOUGE AND WELD SECOND SIDE.

TITLESHEET

5

SECTION 2.3.2
HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

DETAIL/UNIT/PART	3021-STBD.	REV. LTR/DATE	x
PROCESS/OPER CODE	INNERBOTTOM	STANDARD CODE	PROD
PART NAME	LONG-BHD.		
SHIP CLASS	FALCON	HULL	404
COST CLASS/JOB #	PANEL LINE	TRADE	WELDING
GROUP (UNIT/ZONE)	3020	WORK AREA	x
SUB-GROUP	3021	WORK ZONE	x
SUB-SUB-GROUP	x	WORK CENTER	FNL. LN
CREW/MACHINE	1	ASSET/MACHINE	x
ITEM	GIRTH	SUB-ITEM	STBD.
GEN. DRAWING	200-3030	WORK ORDER	x
DET. DRAWING	x	SHEET	x
WORK PACKAGE	x	APPLICATOR	MWC
OPER. DESCRIPTION	WELD BHD. ASSY. AND SHELL ASSY. THEN BHD. TO SHELL. STBD. IS SHOWN, PORT IS SIMILAR BUT OPPOSITE.		
DATE	17-NOV-82	ISSUE #	3

Step	Method Instruction	Free
1	SET-UP AND TEAR DOWN WELDING MACHINE (AND PUT ON STARTING PADS)	.5
	* COVERS ALL OPERATIONS NEEDED TO PUT ON STARTING PADS. ALSO COVERS GETTING THE SUB-ARC/TANDEM-ARC EQUIPMENT READY.	
	* ALSO COVERS GETTING THE OPERATOR READY.	
	* FREQ. = 1 PER PANEL	
2	SET-UP TANDEM-ARC FOR (SEAM WELDING)	(913) 0

HOW TO CALCULATE TIME STANDARDS

- * PREPARE THE MACHINE AT THE SEAM TO WELD
- * FREQ. = TWICE PER PANEL SEAM.
- 3 WELD (COMPLETE) SEAM (5/16' PLATE) ON ASSEMBLY (906) 0
(PANEL) WITH
- * WELD THE FIRST SIDE AND CLEAN 27% OF
- * THE SLAG. AFTER THE PANEL IS TURNED
- * OVER, WELD THE SECOND SIDE AND CLEAN
- * 25% OF THE SLAG. THE REST OF THE SLAG
- * SHOULD HAVE BEEN CLEANED WHILE THE
- * MACHINE WAS RUNNING.
- * FREQ. = TOTAL SEAM FOOTAGE.
- 4 WELD (15 FEET OF BAR) PT1S. 1-AI-3/16 ON ASSEMBLY (928) 0
Y (PANEL) WITH
- * FREQ. = NUMBER OF STIFFENERS AT THIS
- * LENGTH.
- 5 WELD (25 FEET OF BAR) PT1S. 1-AI-3/16 ON ASSEMBLY (931) 0
Y (PANEL) WITH
- * FREQ. = NUMBER OF STIFFENERS AT THIS
- * LENGTH.
- 6 WELD WEB FRAME ON ASSEMBLY WITH SEMIAUTOMATIC (1035) 0
- * USE 7018 STICK WIRE TO WELD THE TIE BUTT
- * AND SINCE THE TIMES ARE COMPARABLE USE
- * #497 FOR THE TIE BUTT RATHER THAN WRITE
- * A NEW SUB-OP.
- * USE 1/4' FILLETS FOR ALL THE OTHER
- * WELDS. USE A VERTICAL METHOD FOR THE
- * STIFFENER FACEPLATES BECAUSE THEY WILL
- * PROBABLY BE DONE WHEN THE COLLARS ARE.
- * FREQ. = NUMBER OF WEBS PER PANEL.
- 7 WELD BRACKET (KNEE) ON WEB FRAME WITH SEMIAUTOMATIC (1036) 0
ATIC
- * WELD FLAT TO WEB WITH 5/16' FILLET.
- * OTHER LEG IS WELDED AFTER UNIT ERECTION
- * FREQ. = 1 PER BRACKET.
- 8 WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC (1024) 0
- * CLEAN EACH INCREMENT PRIOR TO WELDING.
- * PUT ON A 1/4' FILLET WELD ON ALL PARTS.
- * FREQ. = 1 PER HEADER.
- 9 WELD (COMPLETE) SEAM (5/8' PLATE) ON ASSEMBLY ((907) 0
PANEL) WITH
- * WELD THE FIRST SIDE AND CLEAN 25% OF
- * THE SLAG. AFTER THE PANEL HAS BEEN

HOW TO CALCULATE TIME STANDARDS

- * TURNED OVER, WELD THE SECOND SIDE AND
 - * AGAIN CLEAN 25% OF THE SLAG. THE REST
 - * OF THE SLAG SHOULD HAVE BEEN CLEANED
 - * WHILE THE MACHINE WAS RUNNING.
 - * FREQ. = TOTAL SEAM FOOTAGE.
- 10 WELD (COMPLETE) SEAM (1' PLATE) ON ASSEMBLY (PA(910) 0
NEL) WITH
- * WELD THE FIRST SIDE AND CLEAN 25% OF
 - * THE SLAG. AFTER THE PANEL IS TURNED
 - * OVER, WELD THE SECOND SIDE AND AGAIN
 - * CLEAN 25% OF THE SLAG. THE REST OF THE
 - * SLAG SHOULD HAVE BEEN CLEANED WHILE THE
 - * MACHINE WAS RUNNING.
 - * FREQ. = TOTAL SEAM FOOTAGE.
- 11 WELD (15 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBL(930) 0
Y (PANEL) WITH
- * FREQ. = 1 PER EACH STIFFENER THIS
 - * LENGTH.
- 12 WELD (25 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBL(933) 0
Y (PANEL) WITH
- * FREQ. = 1 PER EACH STIFFENER THIS
 - * LENGTH.
- 13 WELD (35 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBLY(939) 0
(PANEL) WITH DOODLEBUG
- * FREQ. = 1 PER EACH STIFFENER THIS
 - * LENGTH.
- 14 WELD (45 FEET OF BAR) PT1S.1-AI-5/16 ON ASSEMBL(936) 7
Y (PANEL) WITH
- * FREQ. = 1 PER EACH STIFFENER THIS
 - * LENGTH.
- 15 WELD WEB FRAME ON ASSEMBLY WITH SEMI AUTOMATIC (1028) 0
- * ALL WELDS ARE MADE WITH SEMI AUTOMATIC
 - * FLUXCORE. ASSUME THAT A 3/8' FILLET
 - * WELD WILL BE APPLIED TO THE FLAT
 - * BECAUSE IT IS TIGHT. ALSO A 5/16'
 - * FILLET WELD IS ASSUMED FOR THE BACKUP
 - * STRUCTURE.
 - * FREQ. = 1 PER EACH WEB OF THIS TYPE.
- 16 WELD WEB FRAME ON ASSEMBLY WITH SEMI AUTOMATIC (1026) 3
- * ALL WELDS ARE MADE WITH SEMI AUTOMATIC
 - * FLUXCORE. ASSUME THAT A 5/16' FILLET
 - * WELD WILL BE APPLIED. USE A VERTICAL

HOW TO CALCULATE TIME STANDARDS

- * METHOD FOR ALL WELDS ON BACKUP
- * STRUCTURE.
- * FREQ. = 1 PER EACH WEB OF THIS TYPE.
- 17 WELD WEB FRAME (LONGITUDINAL WEB) ON ASSEMBLY W(1027) 1.1
WITH SEMIAUTOMATIC

- * ALL WELDS ARE MADE WITH SEMIAUTOMATIC
- * FLUXCORE. ASSUME THAT A 3/8" FILLET
- * WILL BE APPLIED TO THE WEB ITSELF AND
- * THAT A 5/16" WELD WILL BE APPLIED TO
- * THE DOCKING BRACKETS.
- * FREQ. = 1 PER EACH WEB OF THIS TYPE.
- 18 WELD BRACKET (TANKER; KNEE) ON WEB FRAME WITH S(1045) 4
SEMI AUTOMATIC

- * ONE LEG IS FLAT AND THE OTHER IS
- * VERTICAL. EXTRA CLEAN AND PREPARE/
- * STRIKE TIME IS GIVEN TO ALLOW FOR THE
- * EXTRA EFFORT OF WORKING AROUND THE
- * FACE PLATE OF THE BRACKET.
- * 1 PER EACH BRACKET OF THIS TYPE.
- 19 WELD BRACKET (TANKER; KNEE) ON WEB FRAME WITH S(1046) 0
SEMI AUTOMATIC

- * WELD ONLY THE FLAT LEG AT THIS TIME.
- * THE OTHER LEG WILL BE WELDED AT
- * ERECTION. USE SEMIAUTOMATIC FLUXCORE
- * TO APPLY A 5/16" FILLET WELD IN THE FLAT
- * POSITION. EXTRA CLEAN AND PREPARE/
- * STRIKE TIME IS ALLOWED IN ORDER TO WORK
- * AROUND THE END OF THE FACEPLATE.
- * FREQ. = 1 PER EACH BRACKET OF THIS TYPE.
- *
- 20 WELD HEADER ON ASSEMBLY WITH SEMIAUTOMATIC (1037) 0
* USE SEMIAUTOMATIC FLUXCORE AND APPLY
- * A 5/16" FILLET WELD. THE ENDS SHOULD BE
- * DONE USING A VERTICAL METHOD.
- * FREQ. = 1 PER EACH HEADER.
- 21 WELD (+GOUGE+WELD 2ND SIDE) B2V. 1AP (7/16" GROO(743) 0
VE JOINT) ON

- * FREQ. = TOTAL FOOTAGE OF VERTICAL SEAM.
- *
- 22 MISC. SMALL PARTS SUCH AS LADDER RUNGS. PAD EYES() 6
ETC.

- * FREQ. = 1 PER EACH SMALL MISC. PART.

HOW TO CALCULATE TIME STANDARDS

HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

STEP	SA	FREQ	INTERNAL TMU	EXTERNAL TMU	LOC #
1	0.00	0.50		24969.	922
2	0.00	0.00		0.	913
3	0.00	0.00		0.	906
4	0.00	0.00		0.	928
5	0.00	0.00		0.	931
6	0.00	0.00		0.	1035
7	0.00	0.00		0.	1036
8	0.00	0.00		0.	1024
9	0.00	0.00		0.	907
10	0.00	0.00		0.	910
11	0.00	0.00		0.	930
12	0.00	0.00		0.	933
13	0.00	0.00		0.	939
14	0.00	7.00		362712.	936
15	0.00	0.00		0.	1028
16	0.00	3.00		1826275.	1026
17	0.00	1.10		1894038.	1027
18	0.00	4.00		325521.	1045
19	0.00	0.00		0.	1046
20	0.00	0.00		0.	1037
21	0.00	0.00		0.	743
22	0.00	6.00		150000.	0

MANUAL TIME(TMU)	0.	4583615.
ACTUAL PROCESS TIME(TMU)	0.	0.
FACTORED PROCESS TIME(TMU)	0.	
TOTAL INTERNAL TIME(TMU)	0.	

TITLE SHEET USED IN SETTING STANDARD: 0

HOW TO CALCULATE TIME STANDARDS

M O S T OPERATION TIME CALCULATION

Engineered Operation Time Calculation

Type of work	Elemental Time	Percent Allowance	Allowance Time	Standard Time
EXTERNAL MANUAL	45.836		0.000	45.836
ASSIGNED INTERNAL	(0.000)	()	(0.000)	(0.000)
PROCESS TIME	0.000		0.000	0.000
STANDARD(HRS. /CYCLE)	45.836		0.000	45.836
PIECES PER CYCLE	1			
STANDARD HOURS				45.8

APPENDIX D

MWELD MANUAL ELEMENTS DATA

MWELD DATA SUBMITTAL REQUIREMENTS

Machine or Process Type, i.e. Doodlebug with Fluxcore
or Tandem Arc, etc.

The manual elements will be entered for each machine or process type. If a machine or process type is used in more than one area and would have different manual element values, the new welding program can address that. When making the submittal, simply give each machine or process type a unique name, such as Doodlebug solid wire and Doodlebut-fluxcored wire.

For each manual element, MOST analyses must be written. The data submitted for input to the MWELD files must include the TMU value for each manual element as well as your locator number.

The following items are required input:

- | | | | |
|----|---------------------------|-------|--|
| 1. | Machine or Process Type | _____ | A unique name |
| 2. | Set Up | _____ | A percent |
| 3. | Prepare and Strike Arc | _____ | TMU value per arc length and either an arc length or a factor. |
| 4. | Change Electrode | _____ | TMU value per change. |
| 5. | Clean Pass - (chip Slag) | _____ | TMU value per inch and a Factor. |
| 6. | Clean Pass - (wire brush) | _____ | TMU value per inch and a Factor. |
| 7. | Restock Electrode | _____ | TMU value per electrode or one per spool of wire. |

Any questions or comments please contact either Maurice Cunningham or Ezra Creswell at Bath Iron Works Corporation, (207) 443-3311, ext. 3592 or 2173.

MANUAL ELEMENTS

1. Initial setup of welding equipment including movement to job location.

Frequency - It is a constant time and will be applied once per shift as a percentage of normal working time.

2. Prepare to weld and strike arc for each weld including repositioning of body.

Frequency - Number of trips per joint based on normal length of weld before arc is broken and the body repositioned.

$\left(\frac{\text{Weld Length} \times \text{No. of Trips}}{\text{Arc Length}} \right)$ when an arc length is specified

- or $\left(\frac{\text{Weld Length} \times \text{No. of Trips}}{\text{Factor} \times \text{Weld Length}} \right)$ when a factor is specified instead of arc length

The Factor indicates how often during the course of the weld an automatic machine must stop and restart.

Example: If we weld a 40 ft. Tee bar with Doodlebug and start and stop the machine twice per bar, the factor would be 0.5, then the arc length would be 20 ft.

3. Change Electrode (Rod or Wire) - A constant time.

Frequency - Determined by weld program.

4. Clean Pass (chip slag)

Frequency - Factor x Weld Length x No. of Trips

1. Factor: A multiplier used to calculate how much of the weld will be deslagged external to the process time.
2. Weld length is user input.
3. No. of trips is same as in Strike Arc.

5. Clean (wire brush)
Frequency - Same as Deslag
6. Restore Supply of Electrode (Rods or Wire) or Flux (Automatic)
Frequency - Function of weld metal deposited.

To complete the file, predetermined TMU values for each of these elements are then entered by the data coordinator since the TMU values for these manual elements may be greater or less for difference size work areas

MWELD MANUAL ELEMENTS DATA

Yard: _____

Date: _____

Data Coordinator: _____

1. Machine of Process Type: _____

2. Set up: _____

3. Prepare and strike arc: _____

TMU's/arc length

Arc length OR factor

4. Change Electrode: _____

TMU's per change

5. Clean pass-(chip slag): _____

TMU's per inch

Factor

6. Clean pass-(wire brush): _____

TMU's per inch

Factor

7. Restock Electrode: _____

TMU's per electrode
or spool

APPENDIX E

UNIVERSAL DATA DEVELOPMENT AND APPLICATION

UNIVERSAL DATA DEVELOPMENT AND APPLICATION

Included within **this** demonstration packet are guidelines for universal data development. These guidelines recognize the need for 'readable' sub-operations that are immediately useable by all standards groups. Those shipyards **employing the MOST** computer system should notice the **consistency of the** sub-operation titles. The titles are **self-explanatory and** are understandable to any analyst. There are seven examples of universal data sub-operations included within the packet. These are named TOOL.M01 through TOOL.M07. The individual method steps have been written using computer key words. The key words are 'dressed out' by phrases that do not affect the computer generated time values, but add a grammatical soundness to the individual method steps. The method steps are strung together so as to accurately describe the tool's operation. The Computer has been used to print hard copy in such a way as to generate a readable form with a total TMU value. These printouts are **juxtaposed** with the standard Printouts within the packet. Lastly, two examples of the application of universal data are included with the sub-operations named YARD.M01 and YARD.M02. Proper use of the WAIT command has been made (see Pg. 4-52 of the MOST COMPUTER SYSTEMS APPLICATION MANUAL)

showing universal data sub-ops as method steps. The universal data title is copied onto the method step with a location identifier. While standard Procedure is to use a sub-operation within a combined sub-operation, the universal data technique offers the analyst the option of future editing rapidly when the sub-operation filing to the data base is coupled with the MOST ENTER Program. This editing is not available to the combined sub-operation filings to the data base. Use of universal data within a sub-operation allows maximum application of method readability as well as easy edits for different but similar shipyard operations. The combined sub-operation would still be used for combining the larger sub-operation that occur with fixed frequency.

UNIVERSAL DATA DEVELOPMENT

- **** One basic work area should be used for writing all 'Universal Data Sub-ops'.
- ***** No walking or body motions should be included.
- ***** Titles must be clear and specific. Added descriptive words/ phrases should be in parentheses.
- ***** Repetitive method steps should not be freequenced, but rather they should be repeated where they would logically occur in order to maintain an accurate method description.
- ***** Each method step should be as clear as possible. Add Verbage to 'smooth out' the computer phrases wherever needed, but be careful not to change the TMU values.
- ***** Hard copy of the sub-op should use Format 2 with total TMU's or minutes at the bottom. (Format 2 from the DATA program prints the sub-op title, keg points, and method description. It does not contain index values or method step TMU values.)
- ***** Presume all items to be within reach.
- ***** 'Universal Data Sub-ops' should be usable as a method step in yard specific sub-operations.

(40, 3)
 TOOL W01 TOOL M01
 MOVE ASSEMBLY (3/8 INCH) WITH (DOG & WEDGE) AT ANY (WORK AREA)
 (BY) MECHANIC
 PER ATTACHMENT OFG: 2 21-DEC-82
 METHOD DEVELOPED FROM SMALL (5 1 / 2' X 3 / 4') HEEL WEDGE.
 ITEM USED FOR FAIRING OR ALIGNMENT BY STRUCTURAL TRADES.
 * UNIVERSAL DATA SUB-OP TO BE USED AS A
 * METHOD STEP.
 MECHANIC BEGINS AT JOB

1	PLACE DOG FROM TOOLS TO JOB AND HOLD AGAINST PLATE	AI BO G1 AI BO P3 AO	1.00	60.
2	WAIT 727 T WHILE TACKING ATTACHMENT ON ASSEMBLY WITH SMAW (1 / 8 6011) FREQ. FOR 2 IN. DL. 783.		1.00	727.1
3	SLIDE WEDGE BETWEEN DOG AND ASSEMBLY	AI BO G1 M3 IO IO AO	1.00	50.
4	FASTEN WEDGE AT ASSEMBLY 5 STRIKES USING HAMMER AND HOLD HAMMER	AI BO G1 AI BO PO F10 AO BO PO AO	1.00	130.
5	INSPECT 3 POINTS CHECKING ALIGNMENT	AO BO GO AO BO PO T3 AO BO PO AO	1.00	30.
6	FASTEN WEDGE BETWEEN DOG AND ASSEMBLY 3 STRIKES USING HAMMER AND ASIDE HAMMER	AI BO G1 AI BO PO F6 A1 BO P1 AO	1.00	110.
7	LOOSEN WEDGE BETWEEN DUG AND ASSEMBLY 3 STRIKES USING HAMMER AND ASIDE HAMMER	A1 BO G1 AI BO PO L6 AI BO P1 AO	1.00	110.
8	TOSS WEDGE FROM JOB TO TOOLS	AI BO G1 AI BO PO AO	1.00	30.
			TOTAL TMU	1247.

Type D, EM, CT, EX, T, W <or H for help> ?

1149.

(40), 3)
 TOOL . W01 TOOL . M02
 MOVE ASSEMBLY (1/4 INCH) WITH BOLT (& CLIP) AT ANY (WORK AREA)
 (BY) MECHANIC
 PER ATTACHMENT OFG: 2 21-DEC-82
 METHOD DEVELOPED FROM 5 / 8 BOLT HAVING 12 THREADS / IN.
 TACKING FROM MWELD. ITEM USED TO CLOSE GAPS OR FOR ALIGNMENT BY
 STRUCTURAL TRADES.
 * UNIVERSAL DATA SUB-OP TO BE USED AS A
 * METHOD STEP
 * TWO TON PULLING CAPACITY.
 MECHANIC BEGINS AT JOB

1	PICKUP BOLT AND CLIP FROM TOOLS TO MECHANIC	AI BO G1 AI BO PO AO	1.00	30.
2	HOLD+PRESS BOLT THROUGH CLIP AT SELF	AO BO GO M3 XO IO AO	1.00	30.
3	GET+MOVE WASHER FROM TOOLS TO BOLT AT MECHANIC	AI BO G3 AI BO P1 AO	1.00	60.
4	GET+FASTEN NUT ONTO BOLT AT MECHANIC 3 SPINS USING FINGERS	AI BO G3 AI BO P1 F6 AO BO PO AO	1.00	120.
5	HOLD+PLACE ATTACHMENT FROM SELF TO JOB	AO BO GO AI BO P3 AO	1.00	40.
6	WAIT 1090 T WHILE TACKING ATTACHMENT ON ASSEMBLY WITH SMAW (1 / 8 6011) FREQ. FOR 3 IN. DL. 783.		1.00	1090.
7	FASTEN NUT AT JOB 12 ARM-STROKES USING SPUD WRENCH AND ASIDE TO TOOLS	AI BO G1 A1 BO P3 F67 AI BO P1 AO	1.00	750.
			TOTAL TMU	2120.

Type D, EM, CT, EX, T, W <or H for hel p> ?

1150.

(40, 3)
 TOOL W01 TOOL M03
 MOVE ASSEMBLY (1 FOOT WITH (CABLE) WINCH AT ANY (WORK AREA)
 (BY) MECHANIC
 PER EACH TOOL USE OFG: 2 21DEC-82
 METHOD DEVELOPED FROM 3000 LB. SINGLE STRAND PULL. LUGALL OR
 CUM-A-LONG TRADE NAMES ITEM USED TO PULL ASSEMBLY INTO ALIGNMENT BY
 STRUCTURAL TRADES.

* UNIVERSAL DATA SUB-OP TO BE USED AS A
 * METHOD STEP. PRESUMES MINIMUM SLACK
 * IN CABLE.
 MECHANIC BEGINS AT JOB

1	GET+PICKUP WINCH FROM TOOLS TO MECHANIC	AI BO G3 AI BO P0 AO	1.00	50.
2	HOLD+PLACE HOOK FROM MECHANIC TO ASSEMBLY	AO BO GO AI BO P3 AO	1.00	40.
3	PUSH LOCKS ON WINCH AT ASSEMBLY	AI BO G1 MI XO I0 AO	1.00	30.
4	HOLD+SLIDE WINCH AT ASSEMBLY PULLING OUT CABLE	AO BO GO M3 XO I0 AO	1.00	30.
5	HOLD+PLACE SECOND HOOK FROM MECHANIC TO JOB	AO BO GO AI BO P3 AO	1.00	40.
6	PUSH LOCK ON WINCH AT ASSEMBLY AND SECURE CABLE DRUM	AI BO G1 MI XO I0 AO	1.00	30.
7	OPERATE HANDLE ON WINCH AT JOB SIX STROKES FOR MOVING OBJECT PF 6 (4)	AI BO G1 (M6)XO I0 AO (6)	1.00	380.
8	PRESS HANDLE WHILE PUSHING LOCK ON WINCH AT JOB AND FREE CABLE DRUM	AI BO G1 M3 XO I0 AO	1.00	50.
9	HOLD+SLIDE WINCH AT ASSEMBLY LOOSENING CABLE	AO BO GO M3 XO I0 AO	1.00	30.
10	HOLD+REMOVE ONE HOOK FROM ASSEMBLY TO MECHANIC WHILE LOCKING DRUM	AO BO GO AI BO P1 AO	1.00	20.
11	OPERATE HANDLE ON WINCH AT JOB THREE STROKES PULLING IN CABLE PF 3 (4)	AI BO G1 (M6)XO I0 AO (3)	1.00	200.
12	GET=REMOVE WINCH FROM MECHANIC TO TOOLS	AI BO G3 AI BO P1 AO	1.00	60.
			TOTAL TMU	960.

Type D,EM,CT,EX,T,W <or H for help> ?

1151.

(40) 3)
 TOOL .W01 TOOL MO4
 MOVE ASSEMBLY (2 INCHES) WITH (HYDRAULIC) JACK AT ANY (WORK AREA)
 (BY) MECHANIC
 PER EACH TOOL USE OFG: 2 21-DEC-82
 METHOD DEVELOPED FOR 10 & 25 TON FORTA-POWER JACKS. ITEM USED TO
 PUSH ASSEMBLIES TO LOCATION WITH MODERATE FORCE.
 * UNIVERSAL DATA SUB-OF TO BE USED AS A
 * METHOD STEP, EIGHT STROKES PER INCH
 * OF HEAD TRAVEL.
 MECHANIC BEGINS AT JOB

1	GET+PLACE JACK FROM TOOLS TO ASSEMBLY HOLDING JACK-HEAD AGAINST KICKER	AI BO G3 AI BO P3 AO	1.00	80.
2	TURN VALVE ON JACK AT JOB	AI BO G1 M3 XO IO AO	1.00	50.
3	OPERATE HANDLE ON JACK AT JOB MOVING OBJECT PF 16 (4)	A1 BO G1(M6)XO IO AO (16)	1.00	980.
4	TURN VALVE ON JACK AT JOB AND RETRACT PISTON PT 5 S	AI BO G1 M3 X16 IO AO	1.00	210.
5	GET+REMOVE JACK FROM ASSEMBLY TO TOOLS	A1 BO G3 AI BO P1 AO	1.00	60.
			TOTAL TMU	1380.

Type D, EM, CT, EX, T, W <or H for help> ?

1152

(40, 3)

TOOL .W01

TOOL .M05

MOVE ASSEMBLY (1 FOOT) WITH CHAIN HOIST AT ANY (WORK AREA)

(BY) MECHANIC

PER EACH TOOL USE

OFG: 2 21-DEC-82

METHOD DEVELOPED FROM RATCHET DEVICE USING SIX TON DOUBLE CHAIN
PULL. ITEM USED BY STRUCTURAL TRADES FOR MODERATE TO HEAVY PULLING
PRESSURE.

* UNIVERSAL DATA SUB-OF TO BE USED AS A

* METHOD STEP. PRESUMES MINIMUM SLACK

* IN CHAIN.

* 5 STROKES PER INCH OF TRAVEL.

MECHANIC BEGINS AT JOB

1	GET+POSITION HOIST FROM TOOLS TO ASSEMBLY INSERTING MAJOR HOOK	A1 B0 G3 A1 B0 P6 A0	1.00	110.
2	PUSH LOCK ON HOIST AT ASSEMBLY FREEING CLUTCH	A1 B0 G1 M1 X0 I0 A0	1.00	30.
3	SLIDE CLUTCH OUT AT ASSEMBLY FREEING CHAIN	A1 B0 G1 M3 X0 I0 A0	1.00	50.
4	SLIDE CHAIN THROUGH HOIST AT ASSEMBLY PULLING SLACK	A1 B0 G1 M3 X0 I0 A0	1.00	50.
5	PLACE MINOR HOOK FROM MECHANIC TO JOB	A1 B0 G1 A1 B0 P3 A0	1.00	60.
6	SLIDE CLUTCH OUT AT ASSEMBLY FREEING CHAIN	A1 B0 G1 M3 X0 I0 A0	1.00	50.
7	SLIDE CHAIN THROUGH HOIST AT ASSEMBLY TIGHTENING SLACK IN CHAIN	A1 B0 G1 M3 X0 I0 A0	1.00	50.
8	FULL LOCK ON HOIST AT ASSEMBLY ENGAGING CLUTCH	A1 B0 G1 M1 X0 I0 A0	1.00	30.
9	PRESS HOIST-LEVER AT ASSEMBLY PULLING OBJECT 1 FOOT PF 60 (4)	A1 B0 G1 (M3)X0 I0 A0 (60)	1.00	1820.
10	PUSH LOCK ON HOIST AT ASSEMBLY REVERSING CLUTCH	A1 B0 G1 M1 X0 I0 A0	1.00	30.
11	PRESS HOIST-LEVER AT ASSEMBLY LOOSENING CHAIN PF 5 (4)	A1 B0 G1 (M3)X0 I0 A0 (5)	1.00	170.
12	PUSH LOCK ON HOIST AT ASSEMBLY FREEING CLUTCH	A1 B0 G1 M1 X0 I0 A0	1.00	30.
13	SLIDE CLUTCH OUT AT ASSEMBLY FREEING CHAIN	A1 B0 G1 M3 X0 I0 A0	1.00	50.
14	FULL CHAIN THROUGH HOIST AT ASSEMBLY GAINING SLACK	A1 B0 G1 M1 X0 I0 A0	1.00	30.
15	GET+PLACE HOIST FROM JOB TO TOOLS PF 2 (3)	A1 B0 (G3)A1 B0 P3 A0 (2)	1.00	110.
	TOTAL TMU			2670.

Type D,EM,CT,EX,T,W <or H for help> ?

1153.

(40, 3)

TOOL .W01

TOOL .M06

MOVE ASSEMBLY (1 INCH) WITH (BUDDA) JACK AT ANY (WORK AREA)
(BY) MECHANIC

PER EACH TOOL USE

OFB: 2 22-DEC-82

METHOD DEVELOPED FROM 35 TON "BUDDA" JACK. ITEM IS A WORM GEAR
DEVICE WITH FIVE INCH DIAMETER PRESSURE PLATE CAPABLE OF FIVE INCH
HEAD TRAVEL.

* UNIVERSAL DATA SUB-OF TO BE USED AS A

* METHOD STEP.

* SIXTEEN 1/4 TURNS OF 4 REVOLUTIONS

* NEEDED TO MOVE HEAD UP OR DOWN 1 INCH.

MECHANIC BEGINS AT JOB

1	GET+PLACE JACK FROM TOOLS TO ASSEMBLY								
		A1	B0	G3	A1	B0	P3	A0	1.00 80.
2	PUSH LOCK ON JACK AT ASSEMBLY INTO UP-SETTING								
		A1	B0	G1	M1	X0	I0	A0	1.00 30.
3	CRANK JACK-GEAR AT JOB 1 REVOLUTION TIGHTENING HEAD AGAINST OBJECT								
		A1	B0	G1	M3	X0	I0	A0	1.00 50.
4	PLACE HANDLE FROM TOOLS TO JACK-GEAR AT ASSEMBLY HOLDING ONTO HANDLE								
		A1	B0	G1	A1	B0	P3	A0	1.00 60.
5	HOLD+PRESS HANDLE AT JOB MOVING OBJECT PF 16 (4)								
		40	B0	G0	(M3	)X0	I0	A0 (16)	1.00 480.
6	PUSH LOCK ON JACK AT ASSEMBLY INTO DOWN-SETTING								
		A1	B0	G1	M1	X0	I0	A0	1.00 30.
7	PRESS HANDLE AT JOB LOWERING HEAD PF 4 (4)								
		A1	B0	G1	(M3	)X0	I0	A0 (4)	1.00 140.
8	CRANK JACK-GEAR AT JOB 4 REVOLUTIONS RESETTNG HEAD								
		A1	B0	G1	M10	X0	I0	A0	1.00 120.
9	GET+REMOVE JACK AND HANDLE FROM JOB TO TOOLS								
		A1	B0	G3	A1	B0	P1	A0	1.00 60.
									TOTAL THU 1050.

Type D,EM,CT,EX,T,W <or H for help> ?

1154.

(40, 3)

TOOL .W01

TOOL .M07

SET-UP AND TEAR DOWN (JACKING GOOSENECK) ON (TEE STRUCTURE) WITH BOLTS AT ANY (WORK AREA) (E); MECHANIC

PER EACH TOOL USE

OFG: 2 23-DEC-82

METHOD DERIVED FROM A BOLT-ON DEVICE CONSISTING OF A LARGE ELONGATED DOG - SUITABLE TO JACK AGAINST - WELDED TO A REMOVALABLE FACEPLATE CLAMP.

- * UNIVERSAL DATA SUB-OP TO BE USED AS A
 - * METHOD STEP.
 - * TWO 3/4 INCH BOLTS WITH NUTS.
 - * METHOD USED TO MAKE UP CONNECTIONS
 - * ON TEE-BAR STIFFENERS AND WEBS.
- MECHANIC BEGINS AT JOB

1	GET+MOVE GOOSENECK FROM TOOLS TO JOB	A1 B0 G3 A1 B0 P1 A0	1.00	60.
2	LOOSEN 2 NUTS ON GOOSENECK AT JOB & SPINS USING FINGERS	A1 B0 G1 A0 B0 (P1 A1 L10)A0 B0 P0 A0 (2)	1.00	260.
3	PULL MINOR PART OFF GOOSENECK AT JOB	A1 B0 G1 M1 X0 I0 A0	1.00	30.
4	GET+POSITION GOOSENECK FROM JOB TO ASSEMBLY HOLDING MAJOR PART WHILE PUTTING MINOR PART OVER BOLTS	A1 B0 G3 A1 B0 P6 A0	1.00	110.
5	FASTEN 2 NUTS ON GOOSENECK AT ASSEMBLY & SPINS USING FINGERS LOCKING GOOSENECK	A1 B0 G1 A0 B0 (P1 A1 F10)A0 B0 P0 A0 (2)	1.00	260.
6	LOOSEN 2 NUTS ON GOOSENECK AT ASSEMBLY & SPINS USING FINGERS PREPARING FOR REMOVAL	A1 B0 G1 A0 B0 (P1 A1 L10)A0 B0 P0 A0 (2)	1.00	260.
7	PULL MINOR PART OFF GOOSENECK AT ASSEMBLY	A1 B0 G1 M1 X0 I0 A0	1.00	30.
8	GET+PICKUP GOOSENECK FROM ASSEMBLY TO MECHANIC	A1 B0 G3 A1 B0 P0 A0	1.00	50.
9	REPLACE MINOR PART FROM ASSEMBLY TO MECHANIC REASSEMBLING GOOSENECK	A1 B0 G1 A1 B0 P3 A0	1.00	60.
10	FASTEN 2 NUTS ON GOOSENECK AT JOB & SPINS USING FINGERS COMPLETING REASSEMBLY	A1 B0 G1 A0 B0 (P1 A1 F10)A0 B0 P0 A0 (2)	1.00	260.
11	HOLD+REMOVE GOOSENECK FROM MECHANIC TO TOOLS	A0 B0 G0 A1 B0 P1 A0	1.00	20.
			TOTAL THU	1400.

Type D,EM,CT,EX,T,W <or H for help> ?

1155.

(40, 3)

TOOL .W01

YARD .M01

MAKE UP WEB FRAME (TIE-BUTT) ON (FFG-7 CLASS) AT FLAT PANEL SHOP
(BY) SHIFFIT

PER TIE-BUTT

DFG: 3 23-DEC-82

METHOD DEVELOPED FOR 12 INCH FFG WEBS. ONE TIE-BUTT PER
TRANSVERSE WEB.

- * MAKE UP DONE WITH BOLT-ON GOOSENECK,
- * JACK AND LUGALL.
- * UNIVERSAL DATA SUB-QFS USED IN STEPS
- * 3, 5 & 7.
- * MWELD USED IN STEP 8.

MECHANIC BEGINS AT JOB

1	MECHANIC MOVE FROM JOB TO ASSEMBLY WITH KNEEL CARRYING GOOSENECK	A1 B0 G1 A1 B16 P1 A0	1.00	200.
2	INSPECT 3 POINTS CHECKING CONDITION OF WEB	A0 B0 G0 A0 B0 P0 T3 A0 B0 P0 A0	1.00	30.
3	WAIT 1400 T & SET-UP AND TEAR DOWN (JACKING GOOSENECK) . TOOL.M07.		1.00	1400.
4	MECHANIC MOVE FROM ASSEMBLY TO JOB WITH 3 STEPS AND BEND STRINGING LUGALL FF 2 (5)	A1 B0 G1 A6 (B6)P1 A0 (2)	1.00	210.
5	WAIT 960 T & MOVE ASSEMBLY WITH (CABLE) WINCH ALIGNING FACEPLATE EDGES. TOOL.M03.		1.00	960.
6	MECHANIC MOVE FROM JOB TO ASSEMBLY WITH KNEEL PLACING JACK	A1 B0 G1 A1 B16 P1 A0	1.00	200.
7	WAIT 1380 T & MOVE ASSEMBLY WITH (HYDRAULIC) JACK ALIGNING FACEPLATE HEIGHTS. TOOL.M04.		1.00	1380.
8	WAIT 736 T & TACK ASSEMBLY WITH SEMIAUTOMATIC PLACING SIX INCHES OF WELD FROM D.L. 784.		1.00	736.
9	MECHANIC MOVE FROM ASSEMBLY TO JOB WITH 3 STEPS AND BEND REPLACING LUGALL FF 2 (5)	A1 B0 G1 A6 (B6)P1 A0 (2)	1.00	210.
10	OPERATE HANDLE ON LUGALL AT JOB 27 STROKES PULLING IN CABLE FF 27 (4)	A1 B0 G1 (M6)X0 I0 A0 (27)	1.00	1640.
			TOTAL THU	6966.

Type D,EM,CT,EX,T,W <or H for help> ?

(40, 3)
 TOOL .W01 YARD .M02
 MAKE UP WEB FRAME (SECTION) ON (FFG-7 CLASS) AT FLAT PANEL SHOP
 (BY) SHIPFIT
 PER FFG CUTOUT OFG: 2 23-DEC-82

METHOD USED TO MAKE UP FLAT SECTIONS BETWEEN STIFFENERS AND
 BASED ON 18 INCH FRAME SPACING.

- * MAKE UP DONE WITH KING CLAMP, HAMMER,
- * BOLT & CLIP AND DOG & WEDGE.
- * UNIVERSAL DATA SUB-OPS USED IN STEPS
- * 5 AND 8.
- * YARD SUB-OP USED IN STEP 3.
- * MWELD USED IN STEP 9.

MECHANIC BEGINS AT JOB

1 MECHANIC MOVE FROM JOB TO ASSEMBLY WITH KNEEL	A1 B0 G1 A1 B16 P1 A0	1.00	200.
2 INSPECT 3 POINTS CHECKING GAP OPENING	A0 B0 G0 A0 B0 P0 T3 A0 B0 P0 A0	1.00	30.
3 WAIT 1790 T & MOVE WEB FRAME ON (PANEL) UNIT C. (KING WEB) CLAMP DL 1019.		1.00	1790.
4 INSPECT 3 POINTS AFTER CLOSING GAP	A0 B0 G0 A0 B0 P0 T3 A0 B0 P0 A0	1.00	30.
5 WAIT 471 T & MOVE ASSEMBLY (1 / 4 INCH) WITH BOLT (& CLIP) . FREQ. 6 / 27 OF TOOL.M02.		1.00	471.
6 FASTEN WEB-FRAME AT JOB 3 STRIKES USING HAMMER AND ASIDE TO TOOLS F 2	A1 B0 G1 A1 B0 P0 F6 A1 B0 P1 A0	2.00	220.
7 INSPECT 3 POINTS FOR ALIGNMENT	A0 B0 G0 A0 B0 P0 T3 A0 B0 P0 A0	1.00	30.
8 WAIT 369 T & MOVE ASSEMBLY (3 / 8 INCH) WITH (DOG & WEDGE) . FREQ. 8 / 27 OF TOOL.M01.		1.00	369.
9 WAIT 368 T & TACK ON ASSEMBLY WITH SEMIAUTOMATIC. FREQ. FOR 3 INCHES FROM MWELD.		1.00	368.
	TOTAL THU		3508.

Type D,EM,CT,EX,T,W <or H for help> ?

APPENDIX F

CONSULTANT SERVICE

NATIONAL STEEL AND SHIPBUILDING COMPANY

INTER-DEPARTMENT MEMO

Date 11-13-83.....

To: Jim Ruecker..... Dept.....

Subject: LOU KUH'S LAST VISIT TO NASSCO, THURSDAY, DEC. 16, 1984..... Job No.

From: Barbara Faison/Bill Oakes..... *Bill Oakes*..... Dept.....

Lou's last visit here at NASSCO was spent reviewing our strategy for NASSCO's Labor Standards Development of the Sheet Metal Shop. We consulted with him concerning the statistical data that we have compiled, mentioned our conclusions and received ideas from Lou as to the best method of study. The Standard Data Format was also discussed.

Lou paid particular attention to the M Weld program, suggesting to us how to gather wELD data until the new welding program is on line.

Lou also checked various programs in the computer to see if things were intact.

cc: Ezra Creswell
Bath Iron Works Corp.

MARAD EXTENSION REPORT - 1. NASSCO Visit, 12/16/82

PURPOSE: To review progress on the FY82 Program: Sheet Metal Shop

SUMMARY:

As of the date of the visit, there were only two analysts working on the program. However, approval had been received to secure an individual from the Sheet Metal Shop as of January 3, 1983, to become the third analyst.

As yet, no standards had been prepared. A considerable amount of work had been completed in terms of tabulating and classifying the various ducts and components. Size ranges had been established, and some standardization had been implemented.

We reviewed the feasibility of using the existing welding program. Because the work is semi-automatic, the current program is suitable for use. We further reviewed the procedure for establishing standards for size ranges - by process.

CONCLUSION:

Although progressing at a slower pace than had been anticipated, the program is moving steadily forward. The team has specific direction, and has now established targets for accomplishment.

Signed: L.M. Kuh
Louis M. Kuh, Consultant

Date: 12/31/83

7 February 1983

Ezra C. Creswell
Program Data Coordinator
Bath Iron Works Corporation
700 Washington Street
Bath, Maine

Subject: Consultant Visit

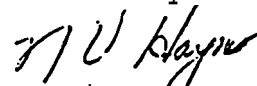
Dear Ezra:

The consultant, Lou Kuh, visit our facility on January 31st and February 1st. The purpose of his visit was to assist us in the development of the model sequences needed for the Mobile Material Handling equipment. After reviewing the accumulated data, Lou instructed us in the method needed to calculate the formulas for the model sequences.

Lou made several recommendations: (1) that more field observations be made and that these results be compared to previous results. The information received from these observations should give us the formula needed for the model sequences; (2) to define the load categories as empty, secure, oversize and loose and to develop data for each; (3) to calculate a "constant" for each type of material handling equipment based on start-up time, writing lift information, receiving lift information, pick-up time, and drop-off time; and (4) to observe local lifts in the Shop areas and to develop model sequences for them.

Since the transporter doesn't fit into any of the model sequences that we already have, Lou asked us to send him the data that we have so he can review it and make any recommendations.

N.V. Haynes



Project Manager

MARAD EXTENSION REPORT - 2. BSC Visit, 1/31/83 and 2/1/83

PURPOSE: To review data collected on the material handling equipment, and to review the method of developing data for the Material Handling Sequences.

SUMMARY :

The shipyard has been completely zoned and "addressed" for all material handling operations. Preliminary decisions had been made to use center points" of the various storage areas to measure distances for most fork trucks and similar vehicles. The method was approved as most suitable to the application of standards based on specific locations for specified materials.

The method for developing the constant and the variable was reviewed. It was recommended that a suitable calculator be used to simplify the application of the Method of Least Squares to the collected data.

Collected data were reviewed for fork trucks and for straddle trucks. Three load conditions were covered: empty, loaded-loose, and loaded-secure. It was not possible to derive completed formulas for the data because the time values were in whole minutes, which resulted in data that did not correlate well.

It was determined that the shipyard was just getting into full swing, and the test data that had been collected were not suitable for use at *this* time because of lack of traffic and expected "delays. It was specified that on future trips, a stop watch would be used to ensure that proper times were defined. A fourth probable category was defined as loaded-large. That category would cover those items that obscure the driver's vision.

OCT 29 1984

Methodology was developed for determining start and stop constants for the straddle trucks, including the need to conduct frequency studies to determine the relative frequency of dismounting versus continued operation. The analysts were instructed in the procedure for adding or deducting constants from the travel values obtained, to permit continued use of the basic MOST formulas that are incorporated in the Computer Program, precluding the need for developing any special formulas.

Finally, we reviewed the procedure for developing the transporter data, again to insure that the existing powered truck sequence could be used.

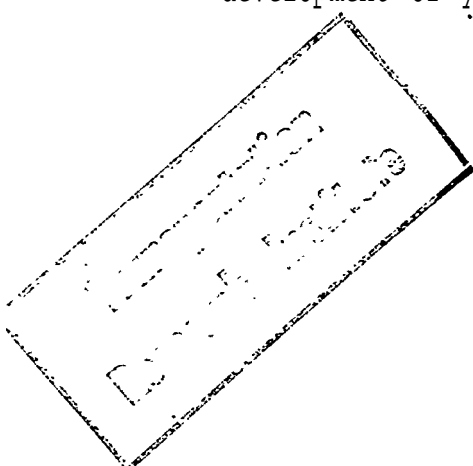
CONCLUSION:

Due to the slow start of shipyard activity, it has not been feasible to collect valid material handling data to date. The current status of the panel line and the platens indicates that proper traffic flow is beginning to form.

Ms. Pelham will be collecting data on the transporter in the near future. Data will be submitted for review, and the formulas developed will be reviewed (by mail).

Finally, we briefly reviewed the method for predetermining the material handling requirements in connection with planned yard work. The program is off to a good start relative to the development of yard activity.

Signed: L.M. Kuh
• Louis M. Kuh, Consultant
Date: 2/15/83



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