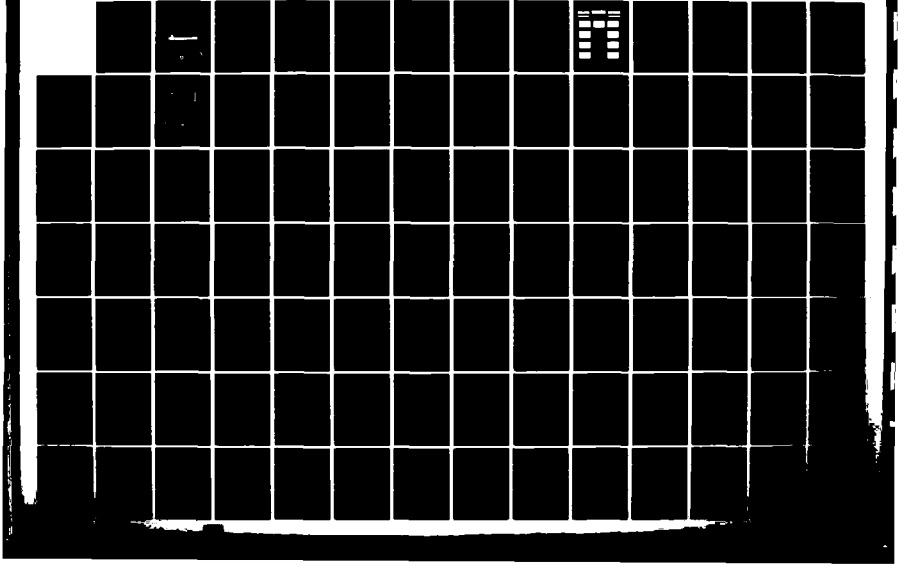
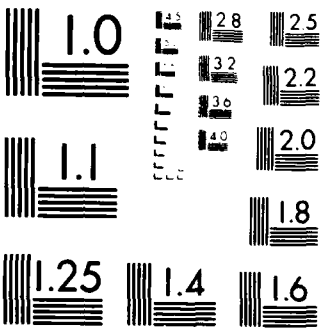
AD-A150 524 SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT 1/2
SYSTEM MV SUGAR I..(U) PACIFIC-GULF MARINE INC NEW
ORLEANS LA P F JOHNSON ET AL. JUL 84 MA-RD-770-84025
UNCLASSIFIED DTMA91-82-C-20001 F/G 9/2 NL





SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT SYSTEM

PHASE II

FINAL REPORT

M.V. SUGAR ISLANDER

CONTRACT NO. DT-MA-91-82-C-20001
REPORT NO. MA-RD-770-84025
JULY 1984

U.S. Department of Transportation, Maritime Administration

Office of Advanced Ship Operation

LEGAL NOTICE

This report was prepared as an account of government-sponsored work. Neither the United States, nor the Maritime Administration, nor any person acting on behalf of the Maritime Administration (A) Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness of usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may *not infringe privately owned rights; or* (B) Assumes any liabilities with respect to the use of or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report. As used in the above, "persons acting on the behalf of the Maritime Administration" includes any employee or contractor of the Maritime Administration to the extent that such employee or contractor prepares, handles, or distributes, or provides access to any information pursuant to his employment or contract with the Maritime Administration.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. MA-RD-770-84025	2.	3. Recipient's Accession No.

4. Title and Subtitle Integrated Shipboard/Shoreside Computer Information and Management System Phase II, Preventive Maintenance and Machinery History

5. Report Date July, 1984

6.

7. Author(s) P. F. Johnson, L. A. Marciello, R. R. Tremayne, W. R. Taylor, D. Z. Korkut

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
Pacific-Gulf Marine, Inc.
3010 General DeGaulle Drive Suite 100
New Orleans, Louisiana 70114

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C) DT-MA-91-82-C-20001
(G)

12. Sponsoring Organization Name and Address
U.S. Department Transportation
Maritime Administration - Office of Advanced Ship Operations
400 Seventh Street, S.W.
Washington, D.C. 20590

13. Type of Report & Period Covered
Final Report

14. 3/82 - 3/84

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This is the final report on Contract No. DT-MA-91-82-C-20001 on the design, development and implementation of Phase II of a two-phase integrated shipboard/shoreside computer management information system. Phase II concerns Preventive Maintenance and Machinery History operating on shipboard/shoreside minicomputers. Phase I (Contract No. MA-80-SAC-01110) dealt with spare parts inventory control and ordering.

The design of the system was based on computerization of the existing Shipboard Maintenance and Repair System (SMARS-MARAD Contract No. 7-38014) which was implemented aboard the M/V SUGAR ISLANDER in 1977.

The present system utilizes a minicomputer aboard the ship and another minicomputer in the ship operator's office ashore. The shipboard computer is used to generate maintenance schedules based on calendar days and by engine hours, update maintenance performed and add to machinery history, enter planned maintenance items, review regulatory body inspection schedules, and send/receive data to/from office. The shoreside computer is used to update regulatory body inspections, review maintenance performed, send/receive data to/from ship, and generate numerous reports useful to management.

Appraisal for the system thus far has been favorable. The system works well and has eliminated most of the time lag difficulties inherent in the "SMARS".

17. Document Analysis a. Descriptors

Logistic Support
Maintenance Management
Management Systems
Maintenance Programs
Maintenance
Merchant Ships
Spare Parts
Upkeep

b. Identifiers/Open-Ended Terms

Inventory Systems
M & R (Maintenance & Repair)
Shipboard Maintenance and Repair System
Spare Parts Inventories

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No of Pages
Approved for release. National Technical Information Service Springfield, VA 22161	UNCLASSIFIED	viii + 132
	20. Security Class (This Page) UNCLASSIFIED	22. Price

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

FINAL REPORT

SHIPBOARD/SHORESIDE COMPUTER INFORMATION

AND

MANAGEMENT SYSTEM

PHASE II

CONTRACT NO. DT-MA-91-82-C-20001
REPORT NO. MA-RD-770-84025

Prepared by

Pacific-Gulf Marine, Inc.

July 1984

Prepared for

U.S. DEPARTMENT OF TRANSPORTATION, MARITIME ADMINISTRATION

OFFICE OF ADVANCED SHIP OPERATIONS

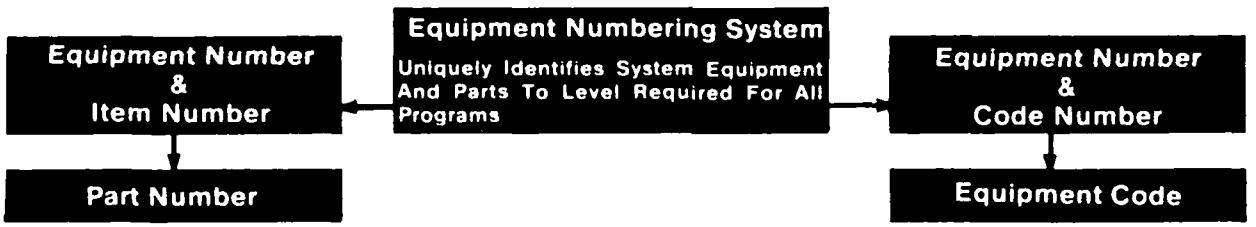
PREFACE

This report covers Phase II of a two-phase project to develop and implement an integrated shipboard/shoreside computer information and management system for spare parts, preventive maintenance and machinery history aboard the M/V SUGAR ISLANDER and at the home office of the ship operator, Pacific-Gulf Marine, Inc. Phase I (MARAD Contract No. MA-80-SAC-01110 and Final Report No. MA-RD-930-83010) of the overall project dealt with inventory control, requisitioning, ordering, receiving and stowing spare parts for all major machinery aboard the SUGAR ISLANDER. Phase II of the project covers preventive maintenance based on calendar days, planned maintenance, regulatory body inspection schedules, repair maintenance based on engine hours, and machinery history. During Phase I of the project, a minicomputer was installed at the home office of Pacific-Gulf Marine. During Phase II, a minicomputer similar to the one at the home office was installed aboard the ship. With the completion of Phase II, the SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT SYSTEM is fully operational.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT.)

Shipboard/Shoreside Management System



Spares Inventory Control

1

Inventory Reports

- Print/Display/Edit Inventory, Parts Usage & Name Plate Data Reports

2

Requisition Processing

- Enter/Process/Print Requisitions
- Reduce Inventory Levels

3

Purchase Order Processing

- Enter/Process/Print Purchase Orders
- Retains Prices Paid

4

Material Receipts And Tag Printing

- Enter/Process Material Received & Print ID Tags

System Maintenance

- Maintains File Data
- Backup & Restore
- Ship/Shore Data Transfer
- Yearend Processing

Maintenance & Machinery History

1

Preventative Maintenance

- Print/Display/Schedule Preventative Maintenance Actions

2

Planned Maintenance

- Print/Display/Schedule Shipyard Or Shoreside Repairs
- Maintains ABS & Regulatory Body Inspection Schedules

3

Repair Maintenance

- Print/Display/Schedule Change Out / Hourly Maintenance
- Enter Repair Reports

4

Machinery History

- Maintains Permanent File Of Pertinent Data From Other Programs
- Print/Display Machinery History

MASTER PLAN

SECTION I
BACKGROUND

BACKGROUND

PURPOSE

Pacific-Gulf Marine, Inc. and the Maritime Administration have jointly funded a research and development project aimed at solving shipboard inventory and maintenance control problems. The program design is such that Pacific-Gulf Marine, with the assistance of its subcontractors, are to develop, implement, demonstrate and evaluate an integrated shipboard/shoreside computer management information system in two phases as follows:

PHASE I - SPARE PARTS INVENTORY CONTROL AND ORDERING PROGRAM

PHASE II - PREVENTIVE MAINTENANCE AND MACHINERY HISTORY PROGRAM

With the assistance of the Maritime Administration, the results of this project are being made available to other vessel operators for adaptation to their individual needs. The use of this integrated shipboard/shoreside system will increase vessel availability, lower maintenance and repair costs, minimize environmental risks and enhance the safety and productivity of operations and personnel. Widespread adoption of the integrated system by U.S. flag vessel operators could result in significant corporate profitability, increased personnel productivity, and marked improvement in the future competitive position of the U.S. Merchant Marine.

Effective spare parts management and inventory control will allow for the availability of spares for equipment requiring maintenance and at the same time, reduce onboard inventories and associated expenses. The system allows shipboard personnel to use and requisition spare parts while keeping associated booking chores to the barest minimum. Similarly, the system significantly reduces the manual effort required to write purchase orders in the office. Further savings accrue from reductions in time spent by shipboard personnel in determining the availability and stowage location of spare parts prior to performing maintenance actions.

BACKGROUND/HISTORY

In August 1973, the first U.S. flag vessel designed and built for unattended engineroom operation, the diesel-driven dry-bulk carrier M/V SUGAR ISLANDER was placed in service. As bareboat charterer and operator of this unique vessel, Pyramid Marine, Inc. of New Orleans, La. was faced with a number of new problems in shipboard organization and management. Among these was the development of a planned maintenance program to meet the requirements of U.S. Coast Guard Navigation and Vessel Inspection Circular No. 1-69. A preliminary maintenance program, developed by the vessel's Chief Engineer, was approved by the U.S. Coast Guard. However, it was recognized that the program did not provide a complete system for effective management of the total shipboard maintenance and repair effort. Upon learning of the Maritime Administration's program to develop a shipboard maintenance and repair system, Pyramid Marine, Inc. proposed to undertake direction of the effort to develop a basic system design and to provide and evaluate a diesel-plant prototype system. In July 1975, MARAD awarded a contract to Pyramid Marine, Inc. to begin work. The Stanwick Company, a division of The Stanwick Corporation, based in Norfolk, Virginia was engaged as a subcontractor to develop the basic system design and the diesel prototype system. TIMSCO, Inc. of Mobile, Alabama, was engaged to develop supporting computer programs, manage shoreside operation of the spare parts and machinery history subsystems, monitor system operation, and collect data during the evaluation. Pyramid Marine, Inc. was to exercise overall project management and provide the services of the M/V SUGAR ISLANDER as the evaluation vessel. In September 1976, Pacific-Gulf Marine, Inc. became the charterer and operator of the SUGAR ISLANDER and the contract was modified accordingly. The completed shipboard maintenance and repair system, known unofficially as "SMARS", was installed aboard the M/V SUGAR ISLANDER in August 1977. The system was evaluated during the period from August 1977 to March 1978, and the results of this evaluation were reported in MARAD Report No. MA-RD-920-78042 dated April 1978.

Although the Shipboard Maintenance And Repair System continued in use aboard the SUGAR ISLANDER and was enhanced through the introduction of preprinted requisition forms, it was recognized that the effectiveness of the system could be improved. One of the major factors influencing the effective operation of "SMARS" on the SUGAR ISLANDER was the substantial time lag between the acquisition and submittal of shipboard data and subsequent receipt of the updated automatic data processing printouts and replacement requisitions onboard the vessel. This time lag was primarily influenced by the length and nature of the vessel's trade routes coupled with the necessity of Pacific-Gulf Marine having to use an outside contractor to perform the automatic data

processing support functions. In many cases, this resulted in delays of several months in the availability of reliable and meaningful data to the vessel's engineers and to the shore staff. This delay in access to current spare parts and maintenance data was compounded by the frequent rotation of the vessel's engineers on vacation. As a result of these factors, the overall efficiency and reliability of the "SMARS" program was severely hampered and on occasions, resulted in expensive duplication of effort and purchases of spare parts. It became readily apparent that in order to function properly and obtain the maximum benefits from use of the shipboard maintenance/repair and spare parts inventory control system, up-to-date reliable data had to be made easily and readily available to both shipboard and shoreside office personnel on a continuous basis.

The most obvious solution to eliminating the time delay problems associated with the "SMARS" appeared to be conversion of the partially computerized "SMARS" into a fully computerized system utilizing one onboard minicomputer and another minicomputer at the vessel operator's office.

On September 29, 1980, a Proposal submitted to The Maritime Administration by Pacific-Gulf Marine became MARAD Contract #MA-80-SAC-1110 titled INTEGRATED SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT SYSTEM FOR PREVENTIVE MAINTENANCE AND MACHINERY HISTORY AND INVENTORY/SPARE PARTS CONTROL AND ORDERING PROGRAM. The original contract covered only Phase I "Inventory/ Spare Parts Control and Ordering Program". The results of Phase I were reported in MARAD Report No. MA-RD-930-83010.

On March 23, 1982 MARAD Contract DT-MA-91-82-C-20001 was issued for the implementation of Phase II. The Phase II project was a joint effort of Pacific-Gulf Marine, Inc. (PGM), Trans-International Marine Services Corporation (TIMSCO) and Korkut Engineers, Inc.

TIMSCO was contracted by Pacific-Gulf Marine to assist in the preparation of the Preventive Maintenance and Machinery History Plan in accordance with guidelines set by the aforementioned contract and the specific needs of Pacific-Gulf Marine. Korkut Engineers was subcontracted by TIMSCO to provide computer programing for Phase II.

The computer hardware, Model HP250, was supplied by Hewlett Packard Company. The office computer was purchased during Phase I and the shipboard computer was purchased during Phase II.

Phase II is the subject of this report.

SECTION II
INTRODUCTION

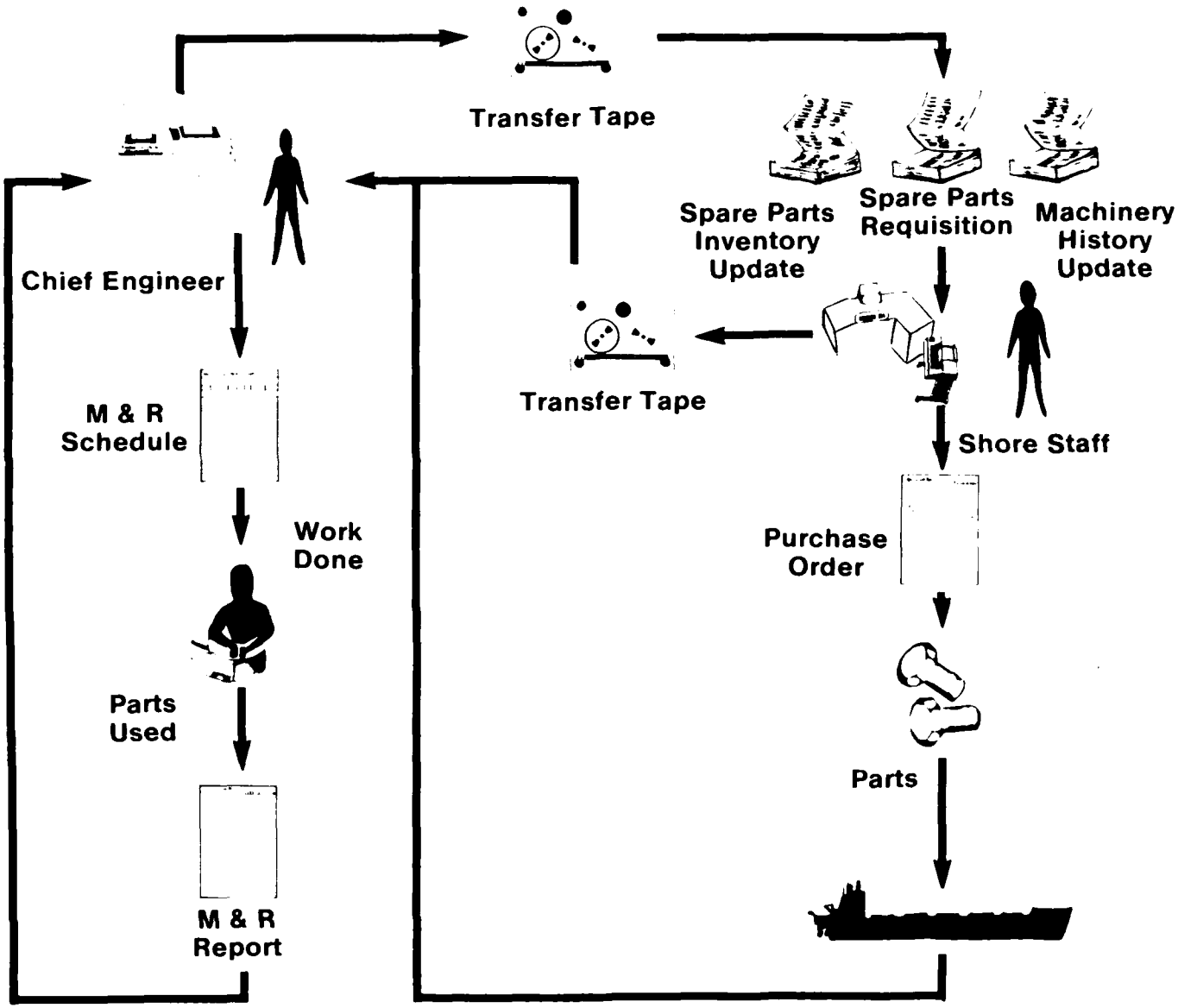
INTRODUCTION

SYSTEM PLAN

A system plan was prepared to guide the development of the overall SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT SYSTEM. During Phase I, the emphasis and detail design was concerned with inventory/spare parts control, requisitioning procedures and purchasing functions. At the same time, an awareness of Phase II requirements (preventive maintenance and machinery history) was maintained to facilitate continuity of numbering systems, compatibility of forms, etc. The essential task during Phase I was to convert the manual aspects of the existing "SMARS" program into a computerized system. Additional tasks involved the review and careful consideration of all evaluations, comments, and criticisms accumulated since the implementation of the "SMARS" aboard the SUGAR ISLANDER; and an analysis of current and contemplated maintenance accounting requirements of Pacific-Gulf Marine, Inc. The integrated Phase I and Phase II system is diagrammatically represented on page II-2.

The design philosophy and general requirements throughout the development of the entire system emphasized accuracy and timeliness in getting information to/from the ship. A prime consideration throughout was minimization of paperwork required from the ship's personnel. Specific objectives during Phase II of the project were to:

1. Eliminate the requirement for redundant entry of the same information.
2. Enable quick resume and display of failure or repair history of machinery.
3. Provide positive identification of machinery and its components.
4. Produce concise and timely reminders of anticipated preventive maintenance activity for each major component.
5. Provide simple procedures to record preventive maintenance activities just performed.



Shipboard/Shoreside Computer Information and Management System

MAJOR PROCEDURES

The Maintenance and Machinery History System accumulates machinery history data and provides a history for applicable equipment items in "calendar day" and "running hour" order. The consumption of spare parts for repair actions is reflected in the program. Regulatory body inspections are recorded and man hours consumed are noted. The program is very flexible and can be used to record many items of information relative to maintenance, repair and operation of equipment. The HP250 computer based system includes the following major procedures:

CREATE MACHINERY HISTORY FILE - The history file is not to be purged, and correction of history information once entered requires authorization from a management level. The input to this file is from the repair work order report submitted by the Chief Engineer. It identifies the equipment, running hours, man hours required to repair, and the type and quantity of spares used.

MACHINERY HISTORY DATA ENTRY ROUTINE - An entry routine, tutorial in nature, will accept information contained in the repair work order report. The CRT display screen follows the actual hard copy repair work order format. Entry sequence is by the flashing cursor on the CRT. This routine will capture the equipment identification, running hours, textural failure information, preventive maintenance services rendered, and type and quantity of spares used.

PREVENTIVE MAINTENANCE SCHEDULE MATRIX FILE - The Preventive Maintenance Schedule tabulates equipment by functional category and time interval elapsed to perform inspection or preventive maintenance service. As maintenance is performed, schedules are updated.

LINKAGE TO SPARE PARTS INVENTORY SYSTEM - The data base management concept enables the data base to be shared between the Spare Parts Requisition/Purchase Order System and the Preventive Maintenance/Machinery History System. The data base design accounts for such linkage to enable the flow of information in either direction.

REPORTS - The Preventive Maintenance and Machinery History Program includes the following reports:

a. Preventive Maintenance Schedules by Calendar Days;
b. Repair Maintenance Schedules by Engine Hours;
c. Planned Maintenance Reports;
d. Machinery History Reports;
e. ABS Continuous Survey Reports; and
f. Regulatory Body Inspection Schedule Reports.

MAINTENANCE CATEGORIES

The Preventive Maintenance and Machinery History Program for the M/V SUGAR ISLANDER covers auxiliary equipment of the Deck and Engineering Departments as well as main propulsion equipment. Also covered is interior communications equipment, electrical equipment, navigation and automation equipment, galley and scullery equipment, and some but not all electronic equipment.

The Preventive Maintenance System provides guidelines (Maintenance Action Sheets) which show recommended maintenance actions and frequencies of those actions which, if performed on a regular basis, lead to longer equipment life and fewer breakdowns. Scheduling is included for all actions of a monthly or longer periodicity on a weekly basis by computer printed Preventive Maintenance Schedule Forms. The maintenance philosophy evolves around knowledge of equipment condition at all times rather than open and inspect routines to determine equipment condition. Preventive maintenance should be viewed as a means of extending equipment life which will lead to reduced costs over a period of time. Preventive maintenance is not a quick means of reducing costs and each individual ship operator must decide how much preventive maintenance is cost effective for his particular use.

The Equipment Numbering Identification System utilized in the earlier "SMARS" Program is retained with minor modifications.

The Planned Maintenance System includes the required data to maintain schedules for shipyard and shoreside repairs, ABS Continuous Survey, and Regulatory Body Inspections.

The Repair Maintenance System includes those items which will be directly recorded in the Machinery History System. The system includes programs to report repairs for entry to machinery history and a means for scheduling change-out items and parts required on an operational hours frequency. Scheduling of equipment preventive maintenance by equipment hours is also accomplished in this section. The purpose of including change-out items and preventive maintenance items scheduled by equipment hours is that these are items which seriously affect the vessel's operation and safety. They have come to be known as vital preventive maintenance whereas those listed in the Preventive Maintenance System described above are considered nonvital preventive maintenance.

The Machinery History System provides a means of recording all significant events concerning the ship's mechanical, electrical and electronic equipment. The system contains a ready means for researching any particular component by use of the equipment code. Regulatory Body Inspections and ABS Continuous Survey items may be recorded in the Machinery History System as they occur.

The entire system is designed so that only a minimum of time and effort is required by the operator in order to maintain the schedules. All schedules are updated by entering the completion date in the proper computer program with the exception of change-out items and items scheduled by operating hours. These are updated by entering the appropriate equipment operating hours. Proper programs for entry are identified by the forms used. In each part of the system, explicit instructions are included. The computer programs contain all necessary EDIT and ERROR checking routines to preclude ENTRY mistakes.

Detailed computer operating instructions are contained in Appendix D.

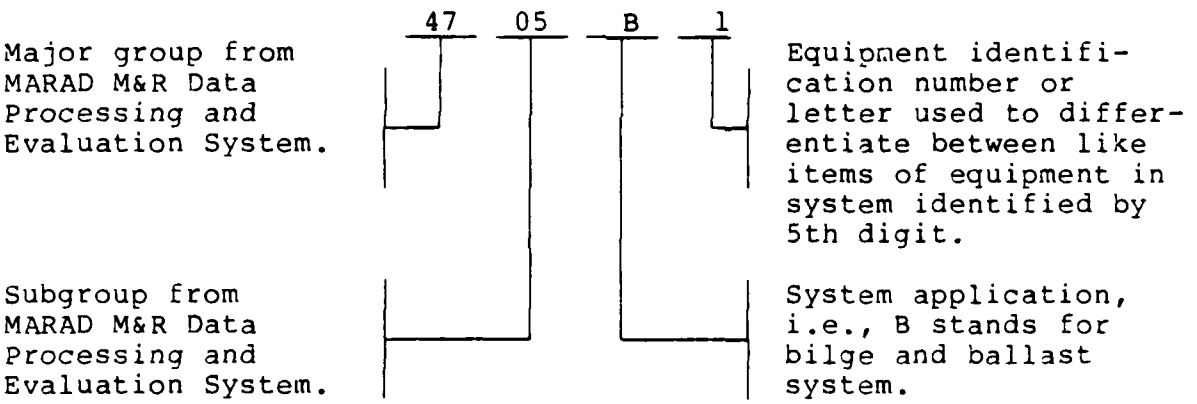
SECTION III
EQUIPMENT NUMBERING SYSTEM

EQUIPMENT NUMBERING SYSTEM

EQUIPMENT NUMBERING

The Equipment Numbering System is made up as shown below from the MARAD Maintenance and Repair Data Processing and Evalulation System. Each equipment is identified for reporting purposes by a group number. This number appears as the first six digits of the part number for associated spare parts and as the first six digits of the equipment code for Maintenance and Machinery History. Some group numbers are listed in Spares Inventory Control which do not appear in Maintenance and Machinery History and vice versa.

An example **GROUP NUMBER** is made up as follows:



See Appendix A, pages A-1 to A-3 for additional explanation and listing of each group number component.

NUMBERING SYSTEM

The six digit group numbering system allows for unique identification of each piece of equipment and for every spare part in inventory. Group numbers may be expanded in two ways.

An Example **GROUP NUMBER** is expanded as follows:

GROUP NUMBER [4] [7] [0] [5] [B] [1]

FOR SPARES INVENTORY CONTROL

ADD THE 3 OR 4 DIGIT ITEM NUMBER

[0] [5] [1]

[0] [5] [1] [A]

TO YIELD THE PART NUMBER

[4705B1] [051]

FOR MAINTENANCE AND MACHINERY HISTORY

ADD THE TWO DIGIT CODE NUMBER

[0] [1] STARBOARD

[0] [2] PORT

TO YIELD THE EQUIPMENT CODE

[4705B1] [01]

The two digit equipment code is used several different ways. When used to identify like equipment: #1 Bilge Pump = 01; #2 Bilge Pump = 02, etc. When denoting main and auxiliary diesel engines: Pistons #1 through #12 = 01 through 12. When denoting location: 01 = Starboard; 02 = Port or 01 = Forward; 02 = Aft.

In all sections of the SHIPBOARD/SHORESIDE MANAGEMENT SYSTEM, all equipment is listed in sequence based on this numbering system.

SYSTEM APPLICATION

The list below defines the fifth digit of each group number and is very useful for quickly identifying to which system a piece of equipment belongs to.

A. Compressed Air Systems

B. Bilge & Ballast

C. Air Conditioning & Refrigeration

D. Deck & Cargo Machinery

E. Workshop & Miscellaneous Equipment

F. Fuel Oil System

G. Galley & Laundry

H. Hull Structure & Fittings

I. Undesignated

J. Electrical Power Generation Distribution

K. Cargo Oil System

L. Lube Oil System

M. Main Steam

N. Auxiliary Steam

O. Undesignated

P. Steering System

Q. Automation/Centralized Control System

R. Undesignated

S. Salt Water Service/Cooling

T. Main Propulsion

U. Interior Communications

V. Ventilation & Heating

W. Distilling Plant & Fresh Water System/Cooling

X. Navigation & Communication (External) Systems

Y. Fire Protection & Lifesaving System

Z. Sanitary System/Sewage Plant

Page IV-2 denotes the major group numbers belonging to each system application.

SECTION IV
EQUIPMENT INDEX

EQUIPMENT INDEX

SECTION EXPLANATION

This section provides an index (page IV-3) of the major group numbers used aboard the M/V SUGAR ISLANDER as listed in the MARAD Maintenance and Repair Data Processing and Evaluation System. Page IV-2 is a system application list with each major group number belonging to the individual systems, printed above the system application names. Pages IV-3 to IV-6 provide an example listing of major group numbers with their associated equipment names.

SYSTEM APPLICATION WITH MAJOR GROUP DESIGNATION

MAJOR GROUPS BELONGING TO SYSTEM APPLICATION APPEAR IN PARENTHESIS ABOVE SYSTEM APPLICATION NAME

(38-49)
A. Compressed Air Systems

(38-46-47-48-50)
B. Bilge & Ballast

(38-48-49)
C. Air Conditioning & Refrigeration

(13 Through 27)
D. Deck & Cargo Machinery

(85)
E. Workshop & Miscellaneous Equipment

(47-48-54-55-57)
F. Fuel Oil System

(34-38)
G. Galley & Laundry

(11-12)
H. Hull Structure & Fittings

I. Undesignated

(61-62)
J. Electrical Power Generation & Distribution

(47-48)
K. Cargo Oil System

(47-48-55-57)
L. Lube Oil System

M. Main Steam

(38-38-50-51-53)
N. Auxiliary Steam

O. Undesignated

(13-22-47-48)
P. Steering System

(95)
Q. Automation/Centralized Control System

R. Consolidated Parts

(40-47-48-55-57)
S. Salt Water Service/Cooling

(40-41-42-43-44-95)
T. Main Propulsion

(65)
U. Interior Communications

(38-39-51-53)
V. Ventilation & Heating

(46-47-48-54-58-65)
W. Distilling Plant & Fresh Water System/Cooling

(66)
X. Navigation & Communication (External) Systems

(81)
Y. Fire Protection & Lifesaving Systems

(96)
Z. Sanitary System/Sewage Plant

MAINTENANCE AND REPAIR MAJOR GROUPS

MAJOR GROUP		MAJOR GROUP	
10	BEARINGS, CONSOLIDATED	53	BLOWERS & FANS
11	STRUCTURAL	54	UNFIRED PRESSURE VESSELS & NON-STRUCTURAL TANKS
12	HULL FITTINGS & OUTFIT	55	HEAT EXCHANGERS (NOT COVERED IN OTHER SECTIONS)
16	ACCESS	57	PURIFIERS, SEPARATORS, CHLORINATORS
17	MASTS & BOOMS	58	EVAPORATORS
20	WINCHES	61	ELECTRIC GENERATORS
22	STEERING GEAR	62	ELECTRIC POWER DISTRIBUTION
24	HATCH COVERS	63	ELECTRIC MOTORS
25	ELEVATORS, CONVEYORS & DUMBWAITERS	64	ELECTRIC MOTOR CONTROLLERS
26	MOORING EQUIPMENT	65	INTERIOR COMMUNICATIONS
34	COMMISSARY & LAUNDRY SPACES	66	EXTERIOR COMMUNICATIONS
38	HEATING, VENTILATION & CONDITIONING	67	NAVIGATION EQUIPMENT
40	DIESEL ENGINES	68	LIGHTING & FIXTURES
42	MAIN PROPULSION GEARS	81	FIRE FIGHTING EQUIPMENT
43	MAIN PROPULSION SHAFTING & BEARINGS	85	WORKSHOP EQUIPMENT, MATERIAL & STORES
44	MAIN PROPULSION PROPELLERS & BOW THRUSTERS	87	INSTRUMENTS (NOT COVERED IN OTHER SECTIONS)
47	PUMPS	95	AUTOMATION
48	PIPING & FITTINGS	96	SANITATION AND SEWAGE
49	COMPRESSORS & SYSTEMS	99	MISCELLANEOUS
51	BOILERS-MAIN PROPULSION HEATING		

GROUP NUMBER AND EQUIPMENT NAME EXAMPLES

GROUP NUMBER	EQUIPMENT NAME
2420D5	HATCH COVER #5
2420D6	HATCH COVER #6
2505G1	DUMBWAITER
2605D1	ANCHOR WINDLASS
2615D1	C.T. MOORING WINCH #1, FWD-S
2615D2	C.T. MOORING WINCH #2, FWD-P
2615D3	C.T. MOORING WINCH #3, AFT-S
2615D4	C.T. MOORING WINCH #4, AFT-P
3421G1	REFRIGERATOR, MOD MLH-10-ADU
3421G2	REFRIG/FREEZER, MOD 20/20 ADT
3421G3	REFRIGERATOR, MOD SS4SC
3421G4	REFRIGERATOR, MOD SS3SC
3421G5	AFT ICE CREAM FREEZER
3422G1	ELECTRIC DISHWASHER
3423G1	ICE CUBE MAKER
3424G1	GARBAGE DISPOSER #1
3424G2	GARBAGE DISPOSER #2
3429G1	GARBAGE SCUTTLE
3430G1	WASHING MACHINE - OFFICERS
3430G2	WASHING MACHINE - CREW
3431G1	CLOTHES DRYER - OFFICERS
3431G2	CLOTHES DRYER - CREW

GROUP NUMBER	EQUIPMENT NAME
3439G1	ELECTRIC BROILER
3441G1	FOOD MIXER
3803V7	VENTILATION HEATER - 2 ELEM
3840V1	HI LIMIT THERMOSTAT
3840V2	A/C CONTROL SYS.
4005T1	STBD MN. ENGINE - GENERAL
4005T2	PORT MN. ENGINE - GENERAL
4006T1	STBD MN. ENGINE - FRAME
4006T2	PORT MN. ENGINE - FRAME
4007T1	STBD MN. ENGINE - CRANKSHAFT
4007T2	PORT MN. ENGINE - CRANKSHAFT
4008T1	STBD MN. ENGINE - POWER CYLS
4008T2	PORT MN. ENGINE - POWER CYLS
4009T1	STBD MN. ENGINE - CAM, VLV TRAIN
4009T2	PORT MN. ENGINE - CAM, VLV TRAIN
4010T1	STBD MN. ENGINE - GEAR TRAIN
4010T2	PORT MN. ENGINE - GEAR TRAIN
4011T1	STBD MN. ENGINE - CYLINDER HEADS
4011T2	PORT MN. ENGINE - CYLINDER HEADS
4012T1	STBD MN. ENGINE - INT/EXH SYS
4012T2	PORT MN. ENGINE - INT/EXH SYS
4013T1	STBD MN. ENGINE - TURBOCHARGERS
4013T2	PORT MN. ENGINE - TURBOCHARGERS

GROUP NUMBER	EQUIPMENT NAME
4014T1	STBD MN. ENGINE - LUBE SYS
4014T2	PORT MN. ENGINE - LUBE SYS
4015T1	STBD MN. ENGINE - FUEL SYS
4015T2	PORT MN. ENGINE - FUEL SYS
4016T1	STBD MN. ENGINE - COOLING SYS
4016T2	PORT MN. ENGINE - COOLING SYS
4017T1	STBD MN. ENGINE - CONTROLS/GOVS
4017T2	PORT MN. ENGINE - CONTROLS/GOVS
4018T1	STBD MN. ENGINE - STARTING SYS
4018T2	PORT MN. ENGINE - STARTING SYS
4019T1	STBD MN. ENGINE - MISCELLANEOUS
4019T2	PORT MN. ENGINE - MISCELLANEOUS
4035J2	AUX DIESEL ENGINE #2 - PORT
4035J3	AUX DIESEL ENGINE #3 - STBD
4035J4	AUX DIESEL ENGINE - EMERG GEN
4050P1	AUX DIESEL ENGINE - BOW THRUSTER
4080Y1	LIFEBOAT DIESEL ENGINE
4201T1	REDUCTION GEAR
4201T2	SPEED INCREASER FOR GENERATOR
4203T1	FLEXIBLE DRIVE COUPLING - STBD
4203T2	FLEXIBLE DRIVE COUPLING - PORT
4203T3	SPEED INCREASER FLEX COUPLING
4203T4	SHAFT GENERATOR FLEX COUPLING

SECTION V
PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE

SYSTEM EXPLANATION

The Preventive Maintenance System includes programs to maintain records and schedule preventive maintenance actions by calendar days. The system includes equipment preventive maintenance action requirements by equipment codes. Example maintenance action sheets are included in Appendix A.

The computer prints preventive maintenance schedules weekly on a computer generated form. Completion dates are entered by the person who performs the maintenance. If, during the performance of a maintenance action, it is discovered that repairs other than routine preventive maintenance are required, the repairs are brought to the Chief Engineer's attention by noting the requirements at the bottom of the form in the "Comment/Equipment Condition" space. This data is not entered in the computer but may be used to schedule repairs in the Planned Maintenance Section. The asterisk (*) in the frequency column of the preventive maintenance schedule is a reminder to the Chief Engineer that this equipment requires attention other than scheduled preventive maintenance.

The Chief Engineer or computer operator enters dates of completion into the computer weekly in order to update the schedules for the following weeks. Incompleted maintenance actions will appear on the following week's schedule and will continue to appear on subsequent schedules until completion dates are entered. The Chief Engineer may use the preventive maintenance schedule form as a temporary record for scheduling repairs until the repairs are scheduled in the Planned Maintenance Section.

The System also allows for the printing of schedules for any future period for planning purposes. Detailed computer operation instructions are contained in Appendix "D".

DETAILED PREVENTIVE MAINTENANCE SCHEDULE EXPLANATION

Below are the descriptions and purposes of the items which appear on the computer generated form used to schedule preventive maintenance actions. Item numbers below correspond to numbers on the sample form on page V-3.

1. Computer prints equipment name in equipment code sequence.

2. Computer prints equipment code corresponding to equipment name. When equipment code is different than the Maintenance Action Sheet, the equipment code is followed on the next line by the applicable Maintenance Action Sheet Number.

3. Computer prints frequency of action as explained at bottom of form. See item #8 below.

4. Date completed is entered by person performing the maintenance. The date is entered weekly into the computer by the Chief Engineer in order to update the schedules for the following weeks.

5. Computer prints last date completed.

6. Initials of person performing maintenance is entered by that person. This indicates to the Chief Engineer that the maintenance action has been completed for the period.

7. This space is used to report/comment on any unusual condition noted during performance of maintenance actions.

8. Explanations of frequency of action abbreviations appearing in item #3 above.

NOTE: Pages V-3 through V-5 are samples of the computer generated Preventive Maintenance Schedules. They may be obtained as scheduled or for future planning by projecting a future date as explained in Appendix D.

PREVENTATIVE MAINTENANCE SCHEDULE

FOR WEEK NUMBER: 05/84

SHIP: M/V SUGAR ISLANDER DATE DUE: 02/01/84

EQUIPMENT NAME	CODE	FQ	DATE COMP	LAST COMP	INIT
STORES BOOM	1715D101	QT		(3)	
STORES BOOM	1715D202 1715D1	QT			
STORES BOOM	1715D202 1715D1	SA		(3)	
LIFEBOAT WINCH	2025Y101	MY		(3)	
LIFEBOAT WINCH	2025Y101	QT			
LIFEBOAT WINCH	2025Y101	SA			
LIFEBOAT WINCH	2025Y202 2025Y1	MY			
LIFEBOAT WINCH	2025Y202 2025Y1	QT			
LIFEBOAT WINCH	2025Y202 2025Y1	SA			
STORES WINCH	2040D101	SA			
STEERING GEAR SYSTEM	2201P101	MY			
STEERING GEAR SYSTEM	2201P101	AN		(3)	
ANCHOR WINDLASS	2605D101	MY		(3)	
ANCHOR WINDLASS	2605D101	AN			
MOORING WINCH,W/AUTO TENSION	2615D101	MY			

COMMENT/EQUIPMENT CONDITION:

NOTES:

1) AN '*' INDICATES THAT EQUIPMENT NEEDS ATTENTION.
2) NUMBERS IN ( ) INDICATE NUMBER OF WEEKS AN ACTION IS PAST DUE.
3) ABBREVIATIONS:

MY=MONTHLY	AN=ANNUAL	2Y=2 YEARS
QT=QUARTERLY	OH=OVERHAUL	4Y=4 YEARS
SA=SEMI-ANNUAL	DD=DRY DOCK	8Y=8 YEARS

FUTURE PREVENTATIVE MAINTENANCE SCHEDULE

FOR WEEK NUMBER: 52/83

SHIP: M/V SUGAR ISLANDER DATE OUT: 12/25/83

PAGE NUMBER: 1

EQUIPMENT NAME	CODE	FQ	DATE COMP	LAST COMP	INIT
STEERING GEAR SYSTEM	2201P101	MY			
MOORING WINCH,W/AUTO TENSION	2615D202 2615D1	MY			
MOORING WINCH,W/AUTO TENSION	2615D303 2615D1	QT			
GALLEY EQUIPMENT	3441G101 342200	MY			
GALLEY EQUIPMENT	3444G101 342200	MY			
GALLEY EQUIPMENT	3480G101 342200	MY			
VENTILATION HEATERS	3803V101 3803V0	SA			
VENTILATION HEATERS	3803V301 3803V0	MY			
VENTILATION HEATERS	3803V701 3803V0	MY			
AUXILIARY DIESEL ENGINE	4035J101	MY			
BOWTHRUSTER/GEAR DRV/RED GEAR	4460P101	AN			
BALLAST&STANDBY COOLINGWTRPUMP	4705B101	MY			
VACUUM PRIMING PUMP	4705B501	SA			
VACUUM PRIMING PUMP	4705B602 4705B5	MY			

COMMENT/EQUIPMENT CONDITION:

NOTES:

1) AN 'X' INDICATES THAT EQUIPMENT NEEDS ATTENTION.
2) NUMBERS IN ( ) INDICATE NUMBER OF WEEKS AN ACTION IS PAST DUE.
3) ABBREVIATIONS:

MY=MONTHLY	AN=ANNUAL	2Y=2 YEARS
QT=QUARTERLY	OH=OVERHAUL	4Y=4 YEARS
SA=SEMI-ANNUAL	DD=DRY DOCK	8Y=8 YEARS

FUTURE PREVENTATIVE MAINTENANCE SCHEDULE

FOR WEEK NUMBER: 52/84

SHIP: M/V SUGAR ISLANDER DATE DUE: 12/25/84

EQUIPMENT NAME	CODE	FQ	DATE COMP	LAST COMP	INIT
PURIFIER OPERATING WATER PUMP	4705L202 4705L1	QT			
AUXILIARY BOILER FEED PUP	4705N202 4705N1	MY			
GENERATOR SALT WATER CIR PUMP	4705S401 4705S3	MY			
MAIN ENGINE INJ COOL WTR PUMP	4705T202 4705T1	MY			
ME STANDBY JACKET WTR PUMP	4705T602 4705T5	MY			
BILGE HLD TANK DISCHARGE PUMP	4705W301	MY			
EVAPORATOR RECIRCULATING PUMPS	4705W701 4705W6	MY			
EVAPORATOR RECIRCULATING PUMPS	4705W701 4705W6	SA			
EVAP DIST & CONDENSATE PUMP	4705W901 4705W8	QT			
EMERGENCY FIRE PUMP	4705Y201	MY			
FWD. FUEL OIL TRANSFER PUMP	4710F101	MY			
FUEL OIL SERVICE PUMP	4710F501	MY			
SLUDGE TRANSFER PUMP	4710F901	MY			
STEERING PUMP UNIT	4715P101	MY			

COMMENT/EQUIPMENT CONDITION:

NOTES:

1) AN 'X' INDICATES THAT EQUIPMENT NEEDS ATTENTION.
2) NUMBERS IN ( ) INDICATE NUMBER OF WEEKS AN ACTION IS PAST DUE.
3) ABBREVIATIONS:

MY=MONTHLY	AN=ANNUAL	2Y=2 YEARS
QT=QUARTERLY	OH=OVERHAUL	4Y=4 YEARS
SA=SEMI-ANNUAL	DD=DRY DOCK	8Y=8 YEARS

SECTION VI
PLANNED MAINTENANCE

PLANNED MAINTENANCE

SYSTEM EXPLANATION

The Planned Maintenance System includes EDIT and ERROR checking routines to maintain schedules of equipment requiring repairs ashore at shoreside repair facilities and/or shipyards. The system also provides for the scheduling and recording of regulatory body inspections and the scheduling and recording of American Bureau of Shipping Continuous Survey items.

The shipyard and shoreside repair schedules permit the user to enter data concerning future repairs for planning purposes. While entering repair items, the class of repair feature may be utilized to preclude entering standard information. The American Bureau of Shipping Continuous Survey program permits the printing of schedule data at any time. Schedules are updated by entering completion dates for individual items as they occur. See Appendix B for detailed explanation.

The regulatory body inspection schedule program permits the printing of schedule data at any time. Schedules are updated by entering completion dates for individual items as they occur. See Appendix C for detailed explanation.

The following are examples of repair classifications which may be used to preclude entering standard information.

CLASS A REPAIR - Repair per owner's instructions replacing only designated parts.

CLASS B REPAIR - Open, inspect, repair as required to make equipment fully operable. Reinstall and test in system with owner's representative as witness.

CLASS C REPAIR - Open, inspect, repair to manufacturer's specifications for new equipment. Test in shop witnessed by owner's representative. Install equipment, test in system witnessed by owner's representative.

If a repair does not "fit" one of these classes, specific actions required may be entered. If one of the classes "fit" the repair desired but amplification is required, the standard class repair may be entered along with special instructions.

Properly maintained shipyard and shoreside planned maintenance schedules become the ship's repair specifications for future shipyard and shoreside repair periods. A sample planned maintenance schedule is included on page VI-3. Pages VI-4 and VI-5 list scheduled planned maintenance items individually.

PLANNED MAINTENANCE FOR SHIP M/V SUGAR ISLANDER

TYPE OF REPAIR: SHIPYARD

EQUIPMENT CODE: 4008T201 CLASS REPAIR:A

PARTS: 4008T2059 ,4008T2074 ,4008T2091 ,4008T2225 ,4008T2226 ,4008T2282 , 4011T1021 ,4013T1084A,4013T1084B

DESCRIPTION:

REMOVE #1 CYLINDER HEAD AND PISTON (PORT MAIN ENGINE) FOR AMERICAN BUREAU OF SHIPPING INSPECTION. ALSO REMOVE PISTON PIN AND DYE CHECK FOR CRACKS. HONE AND GAUGE CYLINDER LINER. RE-INSTALL USING OWNER FURNISHED PARTS.

EQUIPMENT CODE: 4014T102 CLASS REPAIR:B

PARTS: 4014T1001 ,4014T1030 ,4014T1050

DESCRIPTION:

OPEN AND INSPECT STARBOARD MAIN ENGINE INBOARD LUBE OIL PUMP. ADVISE COMPANY REPRESENTATIVE OF FINDINGS BEFORE PERFORMING REPAIRS.

PLANNED MAINTENANCE - REPAIRS

SHIP NAME: M/V SUGAR ISLANDER

TYPE OF REPAIR: SHIPYARD

EQUIPMENT: 4008T201

CLASS REPAIR: A

PARTS:

4008T2059	4008T2074
4008T2091	4008T2225
4008T2226	4008T2289
4011T1021	4013T1084A
4013T1084B	

DESCRIPTION OF REPAIR:

REMOVE #1 CYLINDER HEAD AND PISTON (PORT MAIN ENGINE) FOR AMERICAN BUREAU OF SHIPPING INSPECTION. ALSO REMOVE PISTON PIN AND DIE CHECK FOR CRACKS. HONE AND GAUGE CYLINDER LINER. RE-INSTALL USING OWNER FURNISHED PARTS.

PLANNED MAINTENANCE - REPAIRS

SHIP NAME: M/V SUGAR ISLANDER

TYPE OF REPAIR: SHIPYARD

EQUIPMENT: 4014T102

CLASS REPAIR: B

PARTS:

4014T1001 4014T1030
4014T1050

DESCRIPTION OF REPAIR:

OPEN AND INSPECT STARBOARD MAIN ENGINE INBOARD LUBE OIL PUMP. ADVISE COMPANY REPRESENTATIVE OF FINDINGS BEFORE PERFORMING REPAIRS.

SECTION VII
REPAIR MAINTENANCE

REPAIR MAINTENANCE

SYSTEM EXPLANATION

The Repair Maintenance System permits the computer to post to machinery history all repairs by use of a pre-printed Repair Report which also serves as a computer data input sheet. As repairs are accomplished, the required data is entered on the Repair Report Form. As time permits, the data is entered into the computer. The computer displays data entered for editing, performs normal computer edits and error checks, and posts data to the Machinery History Section.

The program also allows for the entry of machinery operating hours into machinery history for main engines and other equipment requiring parts/component change-out at operating hour intervals. The name(s) of inspectors and/or surveyors may be recorded if repairs are witnessed by them.

After initial entry of periodicity information, change-out schedules based on operating hour frequencies only require the entry of completion dates to remain updated. Provision has been made to change schedules, add equipment, add parts and check for their availability (A) or non-availability (N). Pages VII-4 through VII-6 are computer printed examples of schedules. To maintain schedules up to date, equipment operating hours must be entered regularly. Provision is made to project hours any time in the future and obtain printouts of future schedules for planning purposes.

DETAILED PROCEDURE FOR ENTRY OF REPAIR REPORT DATA INTO COMPUTER

The Maintenance And Report Form is preprinted in pad form.

Numbers below correspond to numbers on sample form on page VII-3.

Enter data concerning repair on preprinted form. When time permits, enter the data into the computer. For complete operating instructions, see Appendix D.

1. Computer prints vessel name.

2. Enter date of repair.

3. Computer prints repair number consecutively starting with 000001.

4. Enter equipment code for equipment being repaired.

5. The Computer prints equipment name.

6. Enter check mark or "X" to indicate type of repair.

7. Enter name of ABS Surveyor if present for repair.

8. Enter name of U.S.C.G. Inspector if present for repair.

9. Enter straight time and/or overtime hours as applicable.

10. Enter equipment running hours at time of repair.

11. Enter brief description of problem or conditions which necessitated repair such as: "During accomplishment of Preventive Maintenance, a cracked rotor was noted." or "Noted loss of pressure during operation, investigation disclosed a cracked impeller."

12. Enter name of person or company performing repair.

13. Enter brief but complete description of repair such as: "Removed and replaced impeller from spares, inspections indicated no further repairs required, equipment tests were satisfactory."

14. Enter complete part number for each part used for repair.

15. Enter quantity for each part used.

16. The Computer will select and print part name.

REPAIR REPORT

VESSEL: 1 REPORT NUMBER: 3

EQUIPMENT CODE: 4 DATE: 2

EQUIPMENT NAME: 5

ABS SURVEYOR: 7 USCG INSPECTOR: 8

S.T. HOURS 9 O.T. HOURS: 9

RUN HOURS: 10

REPAIR TYPE	
SHIPBOARD	6
SHIPYARD	
VOYAGE	
DAMAGE	

PROBLEM/CONDITIONS: 11

MAINTENANCE PERFORMED BY: 12

REPAIR DESCRIPTION: 13

PART NOS.: 14 QTY.: 15 DESCR.: 16

CHANCE-OUT/HOURLY PM SCHEDULE - AUDIT LIST

FOR M/V SUGAR ISLANDER DATE: 02/01/81 PAGE NUMBER 1

1)EQUIPMENT CODE 2)M.A. SHEET NO 3)EQUIPMENT NAME 4)PART NO & NAME 5)EXTRA PARTS 6)EXTRA PARTS	FQ	ACTUAL HOURS	HOURS LAST DONE	HOURS NEXT DUE	HOURS COMPLETED	STANDARD ENTRY
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1020A(N) - EXHAUST VALVE COMPLETE 5) 6)	002K	00058091	00057053	00059053		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1002 (A) - CYLINDER HEAD ASSEMBLY 5) 6)	075H	00058091	00057053	00064553		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4015T1021 (A) - INJECTION PUMP ASSEMBLY 5) 6)	015K	00058091	00057255	00072255		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4008T1011 (A) - PISTON ASSEMBLY 5) 6)	015K	00058091	00057053	00072053		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1020A(N) - EXHAUST VALVE COMPLETE 5) 6)	002K	00058091	00058091	00060091		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1002 (A) - CYLINDER HEAD ASSEMBLY 5) 6)	075H	00058091	00052954	00060454		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4015T1021 (A) - INJECTION PUMP ASSEMBLY 5) 6)	015K	00058091	00057053	00072053		

CHANGE-OUT/HOURLY PM SCHEDULE - BASED ON ACTUAL OPERATING HOURS

FOR M/V SUGAR ISLANDER DATE: 02/01/84 PAGE NUMBER 1

1)EQUIPMENT CODE 2)M.A. SHEET NO 3)EQUIPMENT NAME 4)PART NO & NAME 5)EXTRA PARTS 6)EXTRA PARTS	FQ	ACTUAL HOURS	HOURS LAST DONE	HOURS NEXT DUE	HOURS COMPLETED	STANDARD ENTRY
1)4013T101 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1046 (N) - CLEAN TURBO AFTER COOLER 5) 6)	006K	00058091	00049258	00055258		
1)4013T101 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1047 (N) - CLEAN & CHECK NOZZLE RING 5)4013T1004 (A) 6)	002K	00058091	00055760	00057760		
1)4013T102 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1046 (N) - CLEAN TURBO AFTER COOLER 5) 6)	006K	00058091	00050452	00056452		
1)4013T102 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1047 (N) - CLEAN & CHECK NOZZLE RING 5)4013T1004 (A) 6)	002K	00058091	00055760	00057760		
1)4013T201 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1046 (N) - CLEAN TURBO AFTER COOLER 5) 6)	006K	00057771	00050726	00056726		
1)4013T201 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1047 (N) - CLEAN & CHECK NOZZLE RING 5)4013T1004 (A) 6)	002K	00057771	00055400	00057400		
1)4013T202 2)4013T1 3)MN.TURBOCHARGER 1=STBD 2=PORT 4)4013T1046 (N) - CLEAN TURBO AFTER COOLER 5) 6)	006K	00057771	00050211	00056211		

CHANGE-OUT/HOURLY PM SCHEDULE - BASED ON FUTURE OPERATING HOURS

FOR M/V SUGAR ISLANDER DATE: 02/01/84 PAGE NUMBER 1

1)EQUIPMENT CODE 2)M.A. SHEET NO 3)EQUIPMENT NAME 4)PART NO & NAME 5)EXTRA PARTS 6)EXTRA PARTS	FQ	FUTURE HOURS	HOURS LAST DONE	HOURS NEXT DUE	HOURS COMPLETED	STANDARD ENTRY
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1020A(N) - EXHAUST VALVE COMPLETE 5) 6)	002K	00060001	00057053	00059053		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1002 (A) - CYLINDER HEAD ASSEMBLY 5) 6)	075H	00060001	00057053	00064553		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4015T1021 (A) - INJECTION PUMP ASSEMBLY 5) 6)	015K	00060001	00057255	00072255		
1)4005T101 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4008T1011 (A) - PISTON ASSEMBLY 5) 6)	015K	00060001	00057053	00072053		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1020A(N) - EXHAUST VALVE COMPLETE 5) 6)	002K	00060001	00058091	00060091		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4011T1002 (A) - CYLINDER HEAD ASSEMBLY 5) 6)	075H	00060001	00052954	00060454		
1)4005T102 2)4005T0 3)MAIN ENGINES---T1=STBD T2=PORT 4)4015T1021 (A) - INJECTION PUMP ASSEMBLY 5) 6)	015K	00060001	00057053	00072053		

SECTION VIII
MACHINERY HISTORY

MACHINERY HISTORY

SYSTEM EXPLANATION

The Machinery History Program is designed to maintain a permanent record of repairs, maintenance inspection and survey data for the ship. This data is helpful in preparing reports for insurance claims, justification for equipment overhaul or replacement, selecting equipment for new shipbuilding and in scheduling and budgeting major maintenance and repair work.

Data is posted to machinery history by entry of a Repair Report in the Repair Maintenance Section. Once posted to the machinery history file, changes or deletions may only be made by management level personnel on the office computer.

Sample machinery history reports are included on pages VIII-2 and VIII-3. Complete operating instructions are included in Appendix D.

EQUIPMENT CODE / EQUIPMENT NAME / DATE / R.R.NO. / S.T. / O.T. / RUN HRS. / PERF.BY / I/S	EQUIPMENT CONDITION / REPAIR DESCRIPTION	QTY	PART NO	PART NAME
4014T102 MAIN ENGINE LUBE OIL PUMP 01/15/84 000001 2 . 1 . 00058001 FIRST ENGINEER ABS USCG	A VERY HIGH FREQUENCY NOISE WAS BEING MADE BY THE MAIN ENGINE IN THE VICINITY OF THE STARBOARD INBOARD LUBE OIL PUMP. THE OIL PUMP ASSEMBLY WAS REMOVED AND INSPECTED. THE 40 TOOTH GEAR HAD A HAIR LINE CRACK AND WAS SEVERELY WORN. IT WAS ALSO FOUND THAT SOME SET SCREWS WERE NOT TIGHT. A NEW GEAR WAS INSTALLED AND WITNESSED BY ABS AND COAST GUARD INSPECTORS.	1 1 1	4014T1201 4014T1202 4014T1203	GASKET, ATTACHED L.O. PUMP - GEAR, 40 TEETH - PC #602 MECHANICAL SEAL, PACIFIC WEITZ
4008T101 MAIN ENGINE POWER CYLINDERS 02/01/84 000002 75 . . 00058091 SHIP'S FORCE	ROUTINE MAINTENANCE ON #1 CYLINDER STARBOARD MAIN ENGINE REMOVED HEAD AND PISTON. DISASSEMBLED ROD AND PISTON. CLEANED ALL PARTS AND RECORDED ALL DIMENSIONS. LAPPED LINER FACE AND HONED CYLINDER. REINSTALLED PISTON AND CONNECTING ROD WITH NEW PISTON RINGS AND NEW CONNECTING ROD BIG END BEARING. INSTALLED NEW CYLINDER HEAD.	1 1	4008T1003 4008T1012	BEARING ASSEMBLY PISTON RING SET
4011T102 MAIN ENGINE CYLINDER HEADS 02/01/84 000003 2.5 1.5 00058091 THIRD ENGINEER	ROUTINE MAINTENANCE - EXHAUST VALVE CHANGE-OUT ROUTINE EXHAUST VALVE CHANGE-OUT. NO UNUSUAL WEAR NOTED.	1 1	4011T1021 4011T1022	EXHAUST VALVE ASSEMBLY EXHAUST VALVE ASSEMBLY
4011T103 MAIN ENGINE CYLINDER HEADS 02/01/84 000004 3. . 00058091 THIRD ENINEER	ROUTINE MAINTENANCE - EXHAUST VALVE CHANGE-OUT ROUTINE EXHAUST VALVE CHANGE-OUT. FOUND VALVES TO BE EXCEPTIONALLY FOULED.	1 1	4011T1021 4011T1022	EXHAUST VALVE ASSEMBLY EXHAUST VALVE ASSEMBLY

EQUIPMENT CODE / EQUIPMENT NAME / DATE / R.R.NO. / S.T. / O.T.		EQUIPMENT CONDITION	PARTS USED		
RUN HRS. / PERF.BY	I/S	REPAIR DESCRIPTION	QTY	PART NO	PART NAME
4014T102 / MAIN ENGINE LUBE OIL PUMP					
01/15/84 000001 2 . 1 .		A VERY HIGH FREQUENCY NOISE WAS BEING MADE BY THE MAIN ENGINE IN THE VICINITY OF THE STARBOARD INBOARD LUBE OIL PUMP.	1	4014T1201	GASKET, ATTACHED L.O. PUMP -
			1	4014T1202	GEAR, 40 TEETH - PC #602
			1	4014T1203	MECHANICAL SEAL, PACIFIC WEITZ
00058001 FIRST ENGINEER	ABS USCG	THE OIL PUMP ASSEMBLY WAS REMOVED AND INSPECTED. THE 40 TOOTH GEAR HAD A HAIR LINE CRACK AND WAS SEVERELY WORN. IT WAS ALSO FOUND THAT SOME SET SCREWS WERE NOT TIGHT. A NEW GEAR WAS INSTALLED AND WITNESSED BY ABS AND COAST GUARD INSPECTORS.			
4014T102 / MAIN ENGINE LUBE OIL PUMP					
02/01/84 000006 60. .		LUBE OIL DISTRIBUTION HEADER WAS LEAKING AT WELD.	7	4014T1081	GASKET - PC #1
00058091 WESTWINDS		REMOVED HEADER FROM ENGINE. THIS REQUIRED THE REMOVAL OF ALL INTERNAL OIL FEED PIPES TO THE BEARINGS. WELDED AREA OF LEAK. CLEANED AND REPLACED HEADER ON ENGINE. TESTED AND PROVED TIGHT. RENEWED ALL BEARING OIL PIPE FLANGE GASKETS.			

SECTION IX
FINAL COMMENTS

FINAL COMMENTS

SHIPBOARD HARDWARE PROBLEMS

During two years of computerized shipboard operation, only three problems were experienced that were hardware related.

PROBLEM 1 - During the first week of operation at sea, the computer aboard the SUGAR ISLANDER was out of operation for approximately two days due to equipment failures. The problem stemmed from loose circuit boards and two improperly secured ribbon cable wires within the central processing unit.

A modification was incorporated within the central processing unit to eliminate the circuit board problem. The modification included the gluing of a small strip of foam rubber padding to the back of the PCB board retaining brackets. With the retaining brackets in place, the foam rubber was between the retaining brackets and the edge of the PCB boards. This placed a small amount of pressure on the edge of each PCB board and prevented the boards from vibrating loose.

The two improperly secured ribbon cable wires originally had not been completely plugged in. The ribbon cables used in the HP250 have locking clips designed into the mating connectors. Once the cables were plugged in properly and the foam rubber backing was installed, the central processing unit functioned properly.

PROBLEM 2 - Approximately one month after installation, the hard disk drive failed. At the time of the failure, the vessel was positioned in the Persian Gulf area discharging cargo. No Hewlett Packard service facilities were in the vicinity so it was decided to delay repairs until the vessel's return to the United States.

Forty-five days later, upon return to Jacksonville, Florida, the problem was corrected by means of a ninety cent fuse. The Hewlett Packard representative discovered that the internal wiring schematic indicated that a 15 amp fuse was to be installed in the circuit but evidently the unit was shipped from the factory with a 10 amp fuse. The improperly sized fuse caused the computer to be out of service for 45 days. Once the correct fuse was installed, the hard disk drive functioned properly.

PROBLEM 3 - After 18 months subsequent to its installation, the display screen (CRT) failed. At the time of the failure, the vessel was discharging cargo in Mozambique but the closest service facility existed in Durban, South Africa.

The CRT was removed from the vessel and transported to Durban. The problem was apparently caused by a small piece of scrap metal inside the unit which caused several wires to short circuit. How the scrap metal entered the CRT remains a mystery. The equipment may have been shipped from the factory with the metal inside or the metal may have been inadvertently left within the CRT during installation aboard the ship or it may have rolled/bounced from the desk into the CRT vent port. Due to the logistics of transporting the CRT to and from the vessel between two African countries, the scrap metal caused the equipment to be out of service for three weeks. Once the metal was removed and the wires repaired, the CRT functioned properly.

OTHER SHIPBOARD RELATED PROBLEMS AND COMMENTS

The initial reaction to the computer on board was mixed; some of the engineers and mates were interested, and others did not want to get involved. The Chief Engineer and the First Assistant Engineer, the parties most involved in operation of the system, were interested and made several suggestions which they believed should be incorporated into the system. In general, their comments centered around changes to make the computer easier to use; i.e., making information easier to access. Their comments were evaluated and incorporated into the system. Also, as program "bugs" appeared at sea with no programmer onboard to fix the "bugs", the computer users became very frustrated and at times felt like throwing the computer overboard. After the "bugs" were worked out, system acceptance improved greatly.

At the first rotation of engineers after implementation of the system, indoctrination of the oncoming Chief Engineer for the Phase I programs was accomplished within eight hours with a very favorable reaction from the oncoming Chief. At a later date, indoctrination of the Phase II programs required an additional six hours. The Phase I spare part tag printing features of the onboard computer were highly praised by both Chief Engineers.

Some concern was expressed regarding dusty conditions which exist when the ship is loading/discharging grain and certain ores. To remedy this situation, the ventilation to the computer room is shut off and the door is kept closed when loading/discharging these types of cargo. A schedule has been established for periodic cleaning of the HP250 system hardware. Additional protection, including special filters for the computer room will be provided in the future if needed.

The initial rubber shock absorbing bushings used for mounting the central processing unit and hard disk drive assembly have functioned satisfactorily until now but have exhibited a need for improvement. The bushings could be improved to enhance their ability to absorb inertia loads from extremely heavy pounding which is sometimes experienced with the ship in ballast. A revised mounting system, incorporating shock/vibration isolators has been designed for a HP250 installation on a similarly sized vessel. After evaluation of this new mounting system, appropriate modifications may be made to the installation on the SUGAR ISLANDER.

RECOMMENDATIONS FOR FUTURE DEVELOPMENT

It has been suggested that the system should allow for economic order quantities for frequently used parts, and automatically reorder those parts at certain in-stock levels. It has also been suggested that in the future it may become cost effective to transmit inventory/ordering data between the shipboard and the shoreside computers by satellite, via modems.

With regards to the establishment of economic order quantities, Pacific-Gulf Marine does plan to establish such quantities after it has been firmly established what the yearly spare part usages are. Since the computer keeps track of yearly usage of all parts, the establishment of economic order quantities and an automatic reorder procedure may be forthcoming fairly soon. Only minor programming changes are anticipated to accomplish this task.

Pacific-Gulf Marine has always been interested in the possibility of data transmission to/from ship to shore via satellite. At the inception of the Phase I project, the technology to transfer data by satellite was in an embryonic stage, and satellite communication equipment was not installed aboard the SUGAR ISLANDER. For those reasons, data was transferred by floppy disk during Phase I and then by tape cartridge during Phase II. The data transfer procedure established for the project is satisfactory and works well. In the near future, Pacific-Gulf Marine may possibly be installing satellite communication equipment aboard the vessel. At that time, depending upon the stage of technological development for computer data transfer, it will be decided whether to modify the data transfer procedure to include satellite transfer or keep the procedure as it presently exists. An additional plus to satellite communication is that if software "bugs" develop while the vessel is at sea, it would be possible for a programmer ashore to correct those "bugs".

CONCLUSIONS

The Shipboard/Shoreside Computer Information and Management System using a computer onboard the M/V SUGAR ISLANDER and an in-office computer at Pacific-Gulf Marine has been in use for approximately two years. It is concluded that the program is a success and does meet the following Phase I and Phase II goals and objective as stated at the beginning of the project.

PHASE I OBJECTIVES

Allow the ship's personnel to requisition spare parts while keeping associated bookkeeping chores to the barest minimum.

Assure accurate data transmission from ship to shore.

Allow positive identification of the spare parts delivered to the ship, which provides for inventory status update.

A further objective "Reduce capital investment in spare parts to the lowest degree possible" will be a gradual accomplishment. Any conclusion on this last objective will have to be made during a long term evaluation.

PHASE II OBJECTIVES

Eliminate the requirement for redundant entry of the same information.

Enable quick resume and display of failure or repair history of machinery.

Provide positive identification of machinery and its components.

Produce concise and timely reminders of anticipated preventive maintenance activity for each major component within the power plant on a periodic basis.

Provide simple procedures to record preventive maintenance activities just performed.

SECTION X
DOCUMENTATION

DOCUMENTATION

Documentation is available to enable individual operators to examine the complete SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT SYSTEM in detail and to modify it to suit their particular needs.

Copies of the documentation are available from:

Pacific-Gulf Marine, Inc.
P. O. Box 6479
3010 General De Gaulle Drive - Suite 100
New Orleans, Louisiana 70114
Attention: Louis A. Marciello
(504) 362-8121

The documentation includes the System Operating Manual for both the Spares Inventory Control System (Phase I) and Maintenance and Machinery History System (Phase II). Source code copies of all computer programs, schema text files, data files and menus are available on either two 8 inch, 1.2MB, dual sided, double density floppy discs or one 150 foot tape cartridge. All programs, etc. are written in Hewlett Packard Basic language and operate on a Hewlett Packard Model 250 Computer.

In order to cover the cost of magnetic data storage material, data processing, printing and handling, a charge of seventy-five dollars is required.

APPENDIX A
MAINTENANCE ACTION SHEET INDEX
AND
SAMPLE MAINTENANCE ACTION SHEETS

MAINTENANCE ACTION SHEET INDEX AND SAMPLE MAINTENANCE ACTION SHEETS

MAJOR MAINTENANCE AND REPAIR GROUPS

MAJOR GROUP		MAJOR GROUP	
10	BEARINGS, CONSOLIDATED	53	BLOWERS & FANS
11	STRUCTURAL	54	UNFIRED PRESSURE VESSELS & NON-STRUCTURAL TANKS
12	HULL FITTINGS & OUTFIT	55	HEAT EXCHANGERS (NOT COVERED IN OTHER SECTIONS)
16	ACCESS	57	PURIFIERS, SEPARATORS, CHLORINATORS
17	MASTS & BOOMS	58	EVAPORATORS
20	WINCHES	61	ELECTRIC GENERATORS
22	STEERING GEAR	62	ELECTRIC POWER DISTRIBUTION
24	HATCH COVERS	63	ELECTRIC MOTORS
25	ELEVATORS, CONVEYORS & DUMBWAITERS	64	ELECTRIC MOTOR CONTROLLERS
26	MOORING EQUIPMENT	65	INTERIOR COMMUNICATIONS
34	COMMISSARY & LAUNDRY SPACES	66	EXTERIOR COMMUNICATIONS
38	HEATING, VENTILATION & CONDITIONING	67	NAVIGATION EQUIPMENT
40	DIESEL ENGINES	68	LIGHTING & FIXTURES
42	MAIN PROPULSION GEARS	81	FIRE FIGHTING EQUIPMENT
43	MAIN PROPULSION SHAFTING & BEARINGS	85	WORKSHOP EQUIPMENT, MATERIAL & STORES
44	MAIN PROPULSION PROPELLERS & BOW THRUSTERS	87	INSTRUMENTS (NOT COVERED IN OTHER SECTIONS)
47	PUMPS	95	AUTOMATION
48	PIPING & FITTINGS	96	SANITATION AND SEWAGE
49	COMPRESSORS & SYSTEMS	99	MISCELLANEOUS
51	BOILERS-MAIN PROPULSION HEATING		

MAJOR GROUP EXAMPLE

THE 1ST AND 2ND DIGITS IDENTIFY CATEGORY:
(EXAMPLE: 47 47 = PUMP)

SUBGROUP CATEGORY EXAMPLE

MAJOR GROUP	SUBGROUP	
40	05	MAIN DIESEL ENGINES
40	35	SHIPS SERVICE/EMERGENCY DIESEL ENGINES
40	50	BOWTHRUSTER DIESEL ENGINE/LIFEBOAT DIESEL ENGINES
47	05	CENTRIFUGAL PUMPS
47	10	POSITIVE DISPLACEMENT PUMPS
47	15	HYDRAULIC PUMPS/MOTORS
47	20	ROTARY VANE PUMPS

SUBGROUP EXAMPLE

THE 3RD AND 4TH DIGITS IDENTIFY TYPE:
(EXAMPLE: 4705 47=PUMP; 05=CENTRIFUGAL)

SYSTEM APPLICATION

A. Compressed Air Systems

B. Bilge & Ballast

C. Air Conditioning & Refrigeration

D. Deck & Cargo Machinery

E. Workshop & Miscellaneous Equipment

F. Fuel Oil System

G. Galley & Laundry

H. Hull Structure & Fittings

I. Undesignated

J. Electrical Power Generation & Distribution

K. Cargo Oil System

L. Lube Oil System

M. Main Steam

N. Auxiliary Steam

O. Undesignated

P. Steering System

Q. Automation/Centralized Control System

R. Undesignated

S. Salt Water Service/Cooling

T. Main Propulsion

U. Interior Communications

V. Ventilation & Heating

W. Distilling Plant & Fresh Water System/Cooling

X. Navigation & Communication (External) Systems

Y. Fire Protection & Lifesaving Systems

Z. Sanitary System/Sewage Plant

SYSTEM APPLICATION EXAMPLE

THE 5TH DIGIT IDENTIFIES SYSTEM:
(EXAMPLE: 4705B 47=PUMP; 05=CENTRIFUGAL; B=BILGE/BALLAST)

THE 6TH DIGIT DIFFERENTIATES BETWEEN LIKE ITEMS OF EQUIPMENT IN THE SYSTEM IDENTIFIED BY THE 5TH DIGIT.

MAINTENANCE ACTION SHEET INDEX

M.A. SHEET	MAJOR GROUP 16 -- ACCESS
1635D1	ACCOMMODATION LADDER
	MAJOR GROUP 17 -- MASTS AND BOOMS
1715D1	STORES BOOM (STBD)
1715D2	STORES BOOM (PORT)
	MAJOR GROUP 20 -- WINCHES
2025Y1	LIFEBOAT WINCH (STBD)
2025Y2	LIFEBOAT WINCH (PORT)
2040D1	STORES WINCH (STBD)
2040D2	STORES WINCH (PORT)
	MAJOR GROUP 22 -- STEERING GEAR
2201P1	STEERING GEAR SYSTEM
INCLUDING:	4720P1
	MAJOR GROUP 24 -- HATCH COVERS
2420DX	HATCH COVER SYSTEM
INCLUDING:	2420D1, 2420D2, 2420D3, 2420D4, 2420D5, 2420D6 HATCH COVER NUMBERS ONE THROUGH SIX
	MAJOR GROUP 26 -- MOORING EQUIPMENT
2605D1	ANCHOR WINDLASS
2615D1	C.T. MOORING WINCH
	MAJOR GROUP 34 -- COMMISSARY AND LAUNDRY
342200	GALLEY EQUIPMENT (ALL)
3461G1	GAYLORD HOOD
	MAJOR GROUP 38 -- HEATING/VENTILATION
3803V0	VENTILATION HEATERS (ALL)
INCLUDING:	3803V1, 3803V2, 3803V3, 3803V4, 3803V5, 3803V6, 3803V7

M.A. SHEET	MAJOR GROUP 40 -- DIESEL ENGINES
4005T0	MAIN DIESEL ENGINES
INCLUDING:	4005T1/T2 THROUGH 4019T1/T2 EXCEPT 4013T1/T2 AND 4017T1/T2
4013T1/T2	MAIN ENGINE TURBO CHARGERS
4017T1/T2	MAIN ENGINE CONTROLS/GOVERNOR
4035J1/J2	AUXILIARY DIESEL ENGINE
4035J4	EMERGENCY GENERATOR DIESEL ENGINE
4050P1	BOWTHRUSTER ENGINE
INCLUDING:	4063P1/P2, 4470P1
4080Y1/Y2	LIFEBOAT DIESEL ENGINES
	MAJOR GROUP 42 -- REDUCTION GEARS
4201T1	MAIN REDUCTION GEARS
4201T2	SPEED INCREASER/SHAFT DRIVEN GENERATOR
4203T1/T2	MAIN ENGINE FLEXIBLE DRIVE COUPLINGS
4203T3/T4	SPEED INCREASER FLEXIBLE COUPLINGS/SHAFT DRIVEN GENERATOR FLEXIBLE COUPLINGS
4204T1/T2	MAIN ENGINE AIR CLUTCHES
	MAJOR GROUP 43 -- MAIN PROPULSION SHAFTING/ BEARINGS
4301T2	MAIN LINE SHAFT BEARINGS
4315T1	STERN TUBE BEARING/SEAL
	MAJOR GROUP 44 -- MAIN PROPULSION PROPELLERS/ BOWTHRUSTERS
4410T1	CPP SYSTEM/CONTROLS
INCLUDING:	4305T1
4460P1	BOWTHRUSTER
INCLUDING:	4461P1, 4462P1, 4463P1/P2, 4470P1
	MAJOR GROUP 87 -- INSTRUMENTS
8705F1	TANK LEVEL INDICATING SYSTEM
8705T1/T2	OIL MIST DETECTORS (MAIN ENGINES)
	MAJOR GROUP 95 -- AUTOMATION
9505Q2	ENGINE ROOM CONTROL CONSOLE

M.A. SHEET	MAJOR GROUP 96 -- SANITATION
9601Z1	SEWAGE PLANT AND COMMINUTOR
9602Z1	
	MAJOR GROUP 99 -- MISCELLANEOUS
990000	CONSOLIDATED LUBRICATION CHART (MONTHLY)
991000	CONSOLIDATED LUBRICATION CHART (QUARTERLY)
992000	CONSOLIDATED LUBRICATION CHART (SEMI-ANNUAL)
993000	CONSOLIDATED LUBRICATION CHART (ANNUAL & EVERY 4 YEARS)

MAINTENANCE ACTION FOR SHIP M/V SUGAR ISLANDER

EQUIPMENT: STORES ROOM M.A. SHEET: 1715D1

MANUFACTURER: REV. DATE: 07/30/84

DESCRIPTION:
THIS EQUIPMENT ALSO INCLUDES 1715D2

REFERENCE:

NOTE; Lifts, winches, davits etc. are operated intermittently making periodic preventive maintenance, in general impractical. Operator attention to equipment condition is imperative if long life and safe operation is to be expected.

DURING OPERATION;

1. Ensure smooth non-erratic operation of all standing and running rigging.

2. Inspect lubrication fittings for adequate lubricant per manufacturers instructions.

QUARTERLY;

3. Inspect condition of sheaves.

SEMI-ANNUALLY;

4. Lubricate gooseneck and sheaves per manufacturers instructions.

EACH OVERHAUL;

5. Disassemble, clean and inspect all components for wear and ensure lubrication passages are clear.

MAINTENANCE ACTION FOR SHIP M/V SUGAR ISLANDER

EQUIPMENT: MAIN ENGINES---T1=STBD T2=PORT M.A. SHEET: 4005T0

MANUFACTURER: REV. DATE: 05/18/94
COLT - PIELSTICK

DESCRIPTION:
MODEL; 12 PC 2V 12 CYLINDER, 40 CYCLE, NON-REVERSING RATING 6000 BHP @ 520 RPM. THIS EQUIPMENT INCLUDES 4005T1/T2 THRU 4019T1/T2 EXCEPT 4013T1/T2 & 4017T1/T2

REFERENCE:

To realize the longest operating life for these engines with a minimum of engine down time for unscheduled maintenance or repair, a program of cleanliness, inspection, preventive maintenance and record keeping is essential.

Certain major engine mounted components such as governors and turbo-chargers are covered on separate M.A. Sheets, as are all external engine system components.

DAILY;

1. When operating, a thorough regular visual inspection of the engines and accessories is vital to a good preventive maintenance program. Check for leakage of operating fluids; vibration of components and piping; any evidence of loose bolting or fasteners; damage or deterioration of piping, tubing or wiring; damaged insulation both thermal and electrical; inoperative instrumentation; and any signs of external mechanical damage to the engine or components.

2. Engine operating parameters should be reviewed for any signs of improper operation, component malfunction, or unexplained changes.

3. Blow down compressed air lines for starting and control air to remove any moisture and drain accumulated moisture from air tanks.

4. Check level in lube oil sumps.

5. Check level in fuel oil day tank.

6. Check engine cooling water condition.

7. Check rocker lube oil tank level and check for absence of water in oil.

8, Check for absence of fuel in injector cooling water system and check tank water level.

9. Check pressure differential across all filters and strainers.

10. Check water level in jacket water expansion tank.

EVERY 100 HOURS;

11. Check lube oil viscosity and check for absence of water. Make spot test for detergency in both main and rocker systems.

12. Check operation and lubrication of valves and rockers by lifting cylinder head covers.

13. Lubricate injection pumps and check freedom of racks. Check the comparative positions of all racks per manufacturers instructions.

WEEKLY (150 - 200 HOURS);

14. Drain off any accumulated water in fuel oil day tanks.

15. Check starting air reducing station inlet strainer for evidence of sediment build up. Blow down.

16. Check monitoring system electrical wiring on engines for good condition and all electrical connections for tightness.

EVERY 500 HOURS;

17. Check all engine safety devices.

18. Check firing pressures, air and exhaust temperatures, air pressure after cooler, and turbocharger speed. Compare these values with previous readings to determine changes.

19. Sound all engine foundations bolts.

20. Check all engine fuel control linkage settings for tightness.

MONTHLY;

21. Test cooling water for proper treatment.

22. Drain and clean rocker arm lube tank. Replace oil.

23. Take sample of engine lube oil for analysis.

EVERY 1,500 HOURS;

24. Remove all injectors and replace with rebuilt units. Rebuild removed injectors and save for next changeout.

25. Check for freedom of intake and exhaust valves by observing motion when barring engine.

26. Check valve-to-rocker clearances.

27. Check Belleville washers on exhaust valve cage hold down bolts.

EVERY 2000 HOURS;

28. Replace exhaust valves.

EVERY 2,500 - 3,000 HOURS;

29. Visually examine timing gear for uneven tooth wear, camshafts and bearings, fuel cams and push-rods, exhaust and inlet cams, and foundation bolts for engine and reduction gear.

30. Check crank web deflections and crankshaft alignment. Also inspect bearing jackscrews and crossbolts for tightness.

31. Test engine alarm and shut-down mechanisms.

32. Check movement of main starting air valve and lubricate.

EVERY 5,000 - 6,000 HOURS;

33. Pull two piston assemblies for inspection, observe cleanliness and measure ring clearances of first and second ring grooves.

34. For pistons pulled check connecting rod bearing clearances and inspect condition of bearing shells visually.

35. Sound all main bearing cap bolts.

36. Remove and inspect all exhaust valves clean and reface if required, check ovality of stems and guides.

37. Disassemble main air start valve and clean.

38. Remove air start valves from cylinder heads, dismantle and clean.

39. Disassemble air start distributor and clean.

40. Inspect jacket water and injector cooling water system and clean if required.

41. Inspect exhaust expansion joints for leaks or cracks at least annually.

42. Inspect lube oil pump relief valve and pressure regulating valve.

EVERY 7,500 HOURS;

43. Remove and replace cylinder head. Send removed head ashore for reconditioning.

EVERY 10,000 - 12,000 HOURS;

44. Visually inspect timing gear train and measure backlash.

45. Check all piston pin tubes for tightness and replace all pin seals and lock plates.

46. Check all connecting rod big end bearing clearances and inspect bearing shells.

47. Inspect and measure all piston pin bushings.

48. Measure all liners for wear and deglaze liner surface for seating new rings.

49. Reface inlet valves and seats, if necessary. Check stem and bushing wear.

50. Measure compression ring grooves on all pistons and replace all compression and oil rings.

51. Inspect and clean engine overspeed trip.

52. Clean lube oil sump pump.

EVERY 15,000 HOURS;

53. Replace fuel injection pump assembly. Also replace piston assembly.

54. Take all cylinder liners and jackets apart for inspection and cleaning.

55. Check all connecting rod big end bolts for evidence of cracking.

56. Check all connecting rod big end bearings for possible replacement per manufactures instructions.

57. Remove all pistons and inspect ring grooves for refacing and fitting of oversize rings, if required. Replace all piston rings.

58. Check general condition of all cylinder heads for damage, corrosion and scale deposits.

59. Pressure check all cylinder relief valves after dismantling and inspecting.

60. Disassemble all pushrods and followers. Check camshaft bearings and clearances. Check roller bearing clearances and follower-to-guide clearances.

61. Replace all fuel injection pumps.

EVERY 20,000 HOURS;

62. Disassemble and replace all main bearings.

NOTES;

1. The manufcturers progressive maintenance recommendations included in the preceding are based on cyclic duty operating on heavy fuel. When operating exclusively on No. 2 Diesel Fuel it may be possible to extend the maintenance action frequencies for some of the items.

2. Whenever the engine crankcase is open check interior of the engines with a light for any evidence of babbitt flakes or any other abnormal condition.

3. For periods of extended engine shut-down, the manufacturers recommendations for preservation, maintenance and special procedures should be followed.

MAINTENANCE ACTION FOR SHIP M/V SUGAR ISLANDER

EQUIPMENT: GENERAL M.A. SHEET: 990000

MANUFACTURER: REV. DATE: 05/18/84
VARIOUS

DESCRIPTION:
CONSOLIDATED LUBRICATION CHART (MONTHLY)

REFERENCE:
INDIVIDUAL M.A. SHEETS LISTED BELOW.

BELOW IS A LIST OF EQUIPMENT REQUIRING PERIODIC LUBRICATION. PERIODS OF REQUIREMENTS ARE KEYED TO M.A. SHEETS: 990000= MONTHLY; 991000= QUARTERLY; 992000= SEMI-ANNUAL; 993000= ANNUAL & EVERY FOUR YEARS

MONTHLY:

M.A. SHEET	EQUIPMENT NAME
1635D1	ACCOMODATION LADDER
2025Y1/Y2	LIFEBOAT WINCHES #1 AND #2
2420DX	HATCH COVER SYSTEM
4005T0	MAIN DIESEL ENGINES #1 AND #2
4035J1/J2	AUX. DIESEL ENGINES #1 AND #2
4050P1	BOWTHRUSTER ENGINE
4201T1	MAIN REDUCTION GEAR
4301T2	MAIN LINE SHAFT BEARING
4315T1	STERN TUBE BEARING
4460P1	BOWTHRUSTER
4705B1/B2	BALLAST PUMP AND STDBY C.W.PUMP.
4705B5/B6	VACUUM PRIMING PUMPS #1 AND #2
4705S2	AUX. CIRCULATING PUMP
4705Y1	FIRE AND BILGE PUMP
4710F8	AUX. BOILER F.O. SERVICE PUMP
4906A1/A2	STARTING AIR COMP. #1 AND #2
4906A3	CONTROL AIR COMPRESSOR
4914C0	QUARTERS A.C. PLANT
4916C1/C2	S.S.REFRIGERATION PLANTS #1 & #2
5701L1/L2	L.O. PURIFIERS #1 AND #2
5715F1/F2	F.O. PURIFIERS #1 AND #2
5715F3	DIESEL OIL PURIFIER
6741P1	GYRO PILOT SYSTEM.

MAINTENANCE ACTION FOR SHIP M/V SUGAR ISLANDER

EQUIPMENT: GENERAL M.A. SHEET: 993000

MANUFACTURER: REV. DATE: 05/18/84
VARIOUS

DESCRIPTION:
CONSOLIDATED LUBRICATION CHART (ANNUAL AND EVERY FOUR YEARS)

REFERENCE:
INDIVIDUAL M.A. SHEETS LISTED BELOW.

ANNUAL:

M.A.SHEET	EQUIPMENT NAME
2201P1	STEERING GEAR SYSTEM
2605D1	ANCHOR WINDLASS
2615D1	MOORING WINCHES #1 THROUGH #4
342200	ALL GALLEY EQUIPMENT
4035J4	EMERGENGY GEN. DIESEL ENGINE
4080Y1/Y2	LIFEBOAT DIESEL ENGINE #1 & #2
4201T1	MAIN REDUCTION GEAR
4410T1	CPP SYSTEM
4705S2	AUX. CIRC. PUMP
4705S6	CONT. ROOM A/C S.W. BOOSTER PUMP
4705T5/T6	M.E. STBY J.W. PUMP #1 AND #2
4705W0	EVAP. CHEMICAL INJ. PUMP
4705W3	BILGE HOLDING TANK DISCHARGE PUMP
4705W4	HOT WATER CIRC. PUMP
4705Z1/Z2	SEWAGE PLANT PUMP #1 & #2
6741P1	GYRO PILOT SYSTEM

EVERY FOUR YEARS:

4410T1	CPP SYSTEM

APPENDIX B
ABS CONTINUOUS SURVEY FORMAT

ABS CONTINUOUS SURVEY FORMAT

AMERICAN BUREAU OF SHIPPING (ABS) CONTINUOUS SURVEY

The ABS Continuous Survey is a list of required items in a schedule format. The completion date of each item gives the manager a continuing record of what has been done and what needs to be done. The schedule may be viewed on the CRT screen or a printout, in the format shown on pages B-2 and B-3, may be produced.

INITIAL PROGRAM DATA

1. Enter equipment name in computer for each ABS survey item.
2. Enter equipment code in computer for each ABS survey item.
3. Enter date accomplished in computer for each ABS survey item.
4. Enter name of port where accomplished in computer for each survey item.
5. Enter name of surveyor present for each ABS survey item.

When initial data has been entered for all equipment, the computer file will maintain a schedule and record of all ABS survey data. From that point on, only date #3; port #4; and name will be required to maintain an updated schedule and record.

See Appendix D for complete operating procedure.

A B S C O N T I N U O U S S U R V E Y

F O R

M/V SUGAR ISLANDER

DATE: 01/01/84 PAGE NUMBER: 1

EQUIPMENT NAME	CODE	COMPLETED			DATE NEXT DUE	COMMENT
		DATE	PORT	ABS #		
HTCH CVRS W/O TRP/HT	00000000	10/01/78			10/01/83	
BOTTOM PLATING	1003H101	10/01/78			10/01/83	
DECKS	1105H101	08/01/81			08/01/86	
STEERING GEAR FLATS	1107H101	10/01/78			10/01/83	
PLTNG WAY OF INSL SP	1109H101	10/01/78			10/01/83	
PEAK SPACE FWD	1115H101	08/01/81			08/01/86	
FOREPEAK WB	1116B101	10/01/78			10/01/83	
PEAK SPACE AFT	1117H101	10/01/78			10/01/83	
AFT-PEAK TANK WB	1118B101	08/01/77			08/01/82	
HOLD 02(BHD/FRM/T.T.	1132D101	08/01/78			08/01/83	
HOLD 02(BHD/FRM/T.T.	1132D201	10/01/78			10/01/83	
HOLD 03(BHD/FRM/TK	1132D301	08/01/81			08/01/86	
HOLD 04(BHD/FRM/TK	1132D401	10/01/78			10/01/83	
HOLD 05(BHD/FRM/TK	1132D501	08/01/78			08/01/83	
HOLD 06(BHD/FRM/TK	1132D601	08/01/81			08/01/86	
PLATNG WAY OF AIRPRT	1133H101	10/01/78			10/01/83	
ENG DBL BTM STBD DO	1155F101	10/01/78			10/01/83	
E.R.DBL BTM P.DO	1155F201	10/01/78			10/01/83	
E.R.MSC.FW P.177-180	1155W101	10/01/78			10/01/83	
ER MSC FW STBD17/179	1155W201	10/01/78			10/01/83	
#1P DP TNK FO 22-32	1156F101	10/01/78			10/01/83	
#1S DP TNK FO 22-32	1156F201	10/01/78			10/01/83	
E.R.DBL BTM 193-203	1156F301	10/01/78			10/01/83	
#6 LWR WING STBD FO	1156F301	10/01/78			10/01/83	
#6 LWR WING PORT FO	1156F401	10/01/78			10/01/83	
STLNG TNK PORT FO	1157F101	10/01/78			10/01/83	
STLNG TNK STBD FO	1157F201	10/01/78			10/01/83	
STLNG TNK PORT DO	1157F301	10/01/78			10/01/83	
STLNG TNK STBD DO	1157F401	10/01/78			10/01/83	
SERV TNK PORT FO	1158F101	10/01/78			10/01/83	
SERV TNK STBD FO	1158F201	10/01/78			10/01/83	
#2 WNG TNK PORT WB	1159BB01	08/01/81			08/01/86	
#2 WNG TNK STBD WB	1159BC01	10/01/78			10/01/83	
#3 WNG TNK PORT WB	1159BD01	10/01/78			10/01/83	
#3 WNG TNK STBD WB	1159BE01	10/01/78			10/01/83	
#4 WNG TNK PORT WB	1159BF01	10/01/78			10/01/83	
#4 WNG TNK STBD WB	1159BG01	10/01/78			10/01/83	
#5 WNG TNK PORT WB	1159BH01	10/01/78			10/01/83	
#5 WNG TNK STBD WB	1159BJ01	10/01/78			10/01/83	
#1 DBL BTM WB320-56	1159BK01	10/01/78			10/01/83	
#6 UPR WING PRT WB	1159BK01	08/01/81			08/01/86	
#6 UPR WNG STBD WB	1159BL01	10/01/78			10/01/83	
#2 DBL BTM WB	1159BM01	10/01/78			10/01/83	
#3 DBL BTM WB	1159BN01	10/01/78			10/01/83	

A B S C O N T I N U O U S S U R V E Y

F O R

M/V SUGAR ISLANDER

DATE: 01/01/84 PAGE NUMBER: 2

EQUIPMENT NAME	CODE	COMPLETED DATE	PORT	ABS #	DATE NEXT DUE	COMMENT
#4 DBL BTM WB	1159BP01	10/01/78			10/01/83	
#5 DBL BTM WB	1159BQ01	10/01/78			10/01/83	
#6 DBL BTM WB	1159BR01	10/01/78			10/01/83	
BILGES/DRAIN WELLS	1164B101	10/01/78			10/01/83	
COFFERDAMS/VDS/FRM'S	1166H101	10/01/78			10/01/83	
CHAIN LKRS/PMPNG ARG	1167H101	10/01/78			10/01/83	
SHAFT TUNNELS	1169H101	10/01/78			10/01/83	
ANCHOR CHAINS	1201D101	10/01/78			10/01/83	
ANCHORS	1201D201	10/01/78			10/01/83	
HAWSE PIPES	1203H101	10/01/78			10/01/83	
STRN FR/RUDDER ETC.	1302H101	10/01/78			10/01/83	
STEERING ENGINE	2201P101	11/01/78			11/01/83	
ANCHR WNDLS/AUX.	2605D101	10/01/78			10/01/83	
STORAGE SPACES	3305H101	10/01/78			10/01/83	
ACCOMODATION SPACES	3315H101	08/01/78			08/01/83	
MCHRY RM SPACES	3320H101	08/01/78			08/01/83	
BOW THRUSTER SPACE	3320H201	08/01/78			08/01/83	
MAIN ENGINE PORT	4005T201	08/01/81			08/01/86	
CRANK RELF VLV STBD	4006T101	10/01/78			10/01/83	
END BLTS/CHOCKS STBD	4006T102	10/01/78			10/01/83	
CRANK RELF VLV PORT	4006T201	10/01/78			10/01/83	
END BLTS/CHOCKS PRT	4006T202	10/01/78			10/01/83	
CRANK PIN/BRNG #1 S	4007T101	06/01/79			06/01/84	
CRANK PIN/BRNG #2 S	4007T102	10/01/78			10/01/83	
CRANK PIN/BRNG #3 S	4007T103	08/01/81			08/01/86	
CRANK PIN/BRNG #4 S	4007T104	08/01/81			08/01/86	
CRANK PIN/BRNG #5 S	4007T105	10/01/78			10/01/83	
CRANK PIN/BRNG #6 S	4007T106	08/01/81			08/01/86	
CRANK PIN/BRNG #7 S	4007T107	06/01/79			06/01/84	
CRANK PIN/BRNG #8 S	4007T108	06/01/79			06/01/84	
CRANK PIN/BRNG #9 S	4007T109	08/01/81			08/01/86	
CRANK PIN/BRNG #10 S	4007T110	06/01/79			06/01/84	
CRANK PIN/BRNG #11 S	4007T111	08/01/81			08/01/86	
CRANK PIN/BRNG #12 S	4007T112	05/01/77			05/01/82	
CRANK DEFLECTION STR	4007T120	10/01/78			10/01/83	
MAIN BEARING #1 STBD	4007T120	03/01/77			03/01/82	
MAIN BEARING #2 STBD	4007T122	03/01/77			03/01/82	
MAIN BEARING #3 STBD	4007T122	05/01/78			05/01/83	
MAIN BEARING #4 STBD	4007T123	03/01/77			03/01/82	
MAIN BEARING #5 STBD	4007T124	03/01/77			03/01/82	
MAIN BEARING #6 STBD	4007T125	03/01/77			03/01/82	
MAIN BEARING #7 STBD	4007T126	03/01/77			03/01/82	
CRANK PIN/BRNG #1 P	4007T201	08/01/81			08/01/86	
CRANK PIN/BRNG #2 P	4007T202	02/01/79			02/01/84	
CRANK PIN/BRNG #3 P	4007T203	02/01/79			02/01/84	

APPENDIX C
REGULATORY BODY INSPECTION SCHEDULE FORMAT

REGULATORY BODY INSPECTION SCHEDULE FORMAT

EXPLANATION AND EXAMPLE

The Regulatory Body Inspection Schedule and Record maintains a ready schedule and record of all of the various inspections required by the various regulatory agencies. The program permits scheduling and recording only those items which pertain to each individual ship.

INITIAL PROGRAM INPUT

1. Enter title of inspection/survey/certification for each regulatory body requirement which applies to the vessel.

2. Enter abbreviation of the regulatory body: ie, ABS; USCG; USPHS; L of L, etc. for each requirement.

3. Enter the frequency of occurrence of each requirement; ie, 1-Y, 2-Y, 3-Y etc.

4. Enter date last completed for each requirement.

5. Enter name of port where completed for each requirement.

6. Computer will calculate date next due from date entered in #3 and #4 above.

PROGRAM MAINTENANCE

1,2,&3.
Computer will print on paper or display on CRT screen, initial data entered above. A sample printout is shown on page C-2.

4. Each time an item is accomplished, enter the date. The computer will automatically maintain, record and update the next scheduled due date.

5. Enter the name of the port where accomplished. The computer will automatically maintain and record for future printing or screen display.

REGULATORY BODY INSPECTION SCHEDULE

FOR

M/V SUGAR ISLANDER

DATE: 07/30/84 PAGE NUMBER: 1

	INSPECTION/SURVEY/ CERTIFICATION	AGENCY	FQ	DATE LAST DONE	PORT LAST DONE	DUE DATE	CERT. # OR COMMENT
01	CARGO SHIP SAFETY CONST	ABS	05Y	09/05/83	GALVESTON	09/05/88	
02	MANDATORY ANNUAL SURVEY	ABS	01Y	07/12/84	NOLA	07/12/85	
03	CLASS - HULL	ABS	01Y	07/12/84	NOLA	07/12/85	
04	CLASS - MACHINERY	ABS	01Y	07/12/84	NOLA	07/12/85	
05	CLASS-CONT. HULL & MACH	ABS	05Y	08/01/83	NOLA	08/01/88	
06	ACCU - ANNUAL	ABS	01Y	07/12/84	NOLA	07/12/85	
07	ACCU - SPECIAL SURVEY	ABS	04Y	08/01/83	NOLA	08/01/87	
08	ACCU - YEAR OF GRACE	ABS	01Y	08/01/87	GRACE YEAR	08/01/88	
09	INTERMEDIATE SURVEY	ABS	02Y	02/01/84	NOLA	02/01/86	
10	LOADLINE ENDORSEMENT	ABS	01Y	07/12/84	NOLA	07/12/85	
11	LOADLINE RENEWAL	ABS	05Y	08/01/83	NOLA	08/01/88	
12	DRYDOCKING	ABS	30M	01/28/83	JAX	07/28/85	
13	TAILSHAFT DRAWN	ABS	04Y	06/01/79	NEWPO NEWS	06/01/83	EXT. 01/85
14	BOILER - AUX. FIRE TUBE	ABS	02Y	07/12/84	NOLA	07/12/86	
15	BOILER - WASTE HEAT	ABS	02Y	02/02/83	JAX	02/02/85	
16	BIENNIEL	USCG	02Y	07/12/84	NOLA	07/12/86	
17	MID - PERIOD	USCG	14M	08/01/83	NOLA	10/01/84	10-14 MTHS
18	CARGO SHIP SAFETY EQPT.	USCG	02Y	07/12/84	NOLA	07/12/86	
19	CARGO SHIP SAFETY SUPP.	USCG	02Y	07/12/84	NOLA	07/12/86	
20	CARGO SHIP SAFE.SUP.INT	USCG	01Y	08/01/83	NOLA	08/01/84	
21	LIFERAFTS SERVICE	USCG	01Y	07/10/84	NOLA	07/10/85	
22	LIFEBOAT WEIGHT TEST	USCG	02Y	07/12/84	NOLA(PORT)	07/12/86	STBD DUE
23	FIRE EXTINGUISHING EQPT	USCG	01Y	07/12/84	NOLA	07/12/85	
24	BOILER SURVEY	USCG	02Y	07/12/84	NOLA	07/12/86	
25	BOILER HYDRO-AUXILIARY	USCG	04Y	07/26/82	SAN FRAN	07/26/86	
26	BOILER HYDRO-WASTE HEAT	USCG	04Y	07/26/82	SAN FRAN	07/26/86	
27	BOILER MOUNTINGS-OPEN	USCG	04Y	08/05/81	SAN FRAN	08/05/85	
28	BOILER MOUNTINGS-REMOVE	USCG	08Y	08/05/81	SAN FRAN	08/05/89	
29	DRYDOCKING	USCG	02Y	01/28/83	JAX	01/28/85	
30	SEA VALVES	USCG	02Y	01/28/83	JAX	01/28/85	
31	PRESSURE VESSELS	USCG	02Y	07/12/84	NOLA	07/12/86	
32	CERT.FIN.RESP.WATER POL	USCG	03Y	01/26/82	WASHINGTON	01/26/85	
33	CERT. OF DOCUMENTATION	USCG	01Y	01/01/84	NOLA	01/01/85	
34	I.O.P.P. CERT. (IMCO)	USCG	04Y	10/01/80	NONE	10/01/84	NEW REQ.
35	I.O.P.P. CERT. (IMCO)	USCG	01Y	10/01/84	NONE	10/01/85	NEW REQ.
36	RADIO SAFETY	FCC	01Y	04/25/84	SAN FRAN.	04/25/85	
37	RADIO LICENSE	FCC	05Y	07/01/83	NOLA	07/01/88	
38	DERAT CERTIFICATION	USPHS	06M	04/25/84	SAN FRAN	10/25/84	
39	OPEN WASTE HEAT BOILERS	USCG	01M	07/12/84	NOLA	08/12/84	C.O. IT.12
40	RELIEF VLVS-2 FIRE PMPS	USCG	01M	07/12/84	NOLA	08/12/84	C.O. IT.11
99	STBD LIFE BOAT WT. TEST	USCG	01M	07/15/84	NOLA	08/15/84	C.O. IT.01

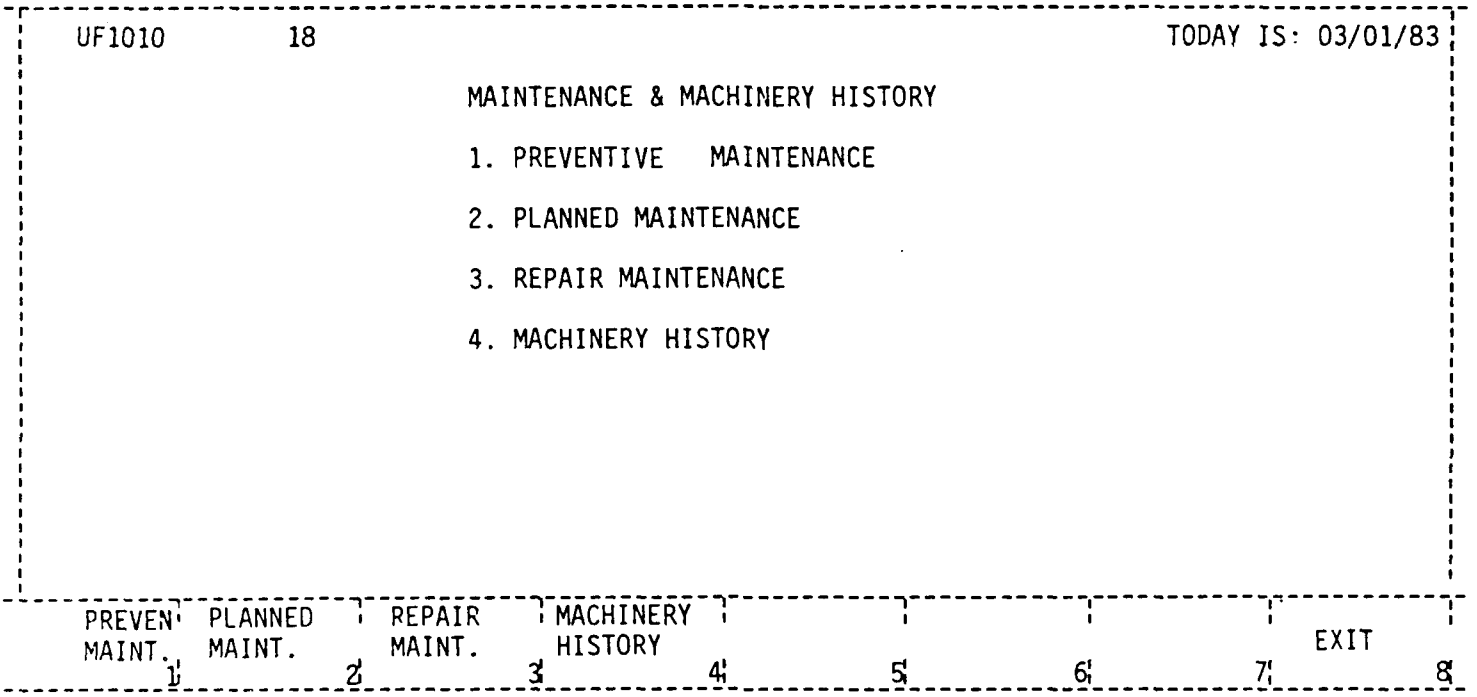
APPENDIX D
COMPUTER OPERATING INSTRUCTIONS

Maintenance & Machinery History

1. Preventive Maintenance
2. Planned Maintenance
3. Repair Maintenance
4. Machinery History

B. Maintenance & Machinery History

1. Preventive Maintenance
   - a. Maintenance Action Sheets
   - b. Preventive Maintenance Scheduling
     1. Periodicity Table Maintenance
     2. Scheduling
        - a.) Print Schedule For Given Week
          - — Calendar Items
          - — Drydock Items
          - — Overhaul Items
          - — Future P.M.
          - — Audit/Shift
        - b.) Completion Entry
        - c.) List Incompleted Schedules
2. Planned Maintenance
   - a. Shipyard/Shoreside Schedule - Maint.
   - b. Shipyard/Shoreside Schedule - Print
   - c. ABS Continuous Survey
   - d. Regulatory Body Inspection Schedule
3. Repair Maintenance
   - a. Change-out/Hourly Maint. Table Entry
   - b. Change-out/Hourly Maint. Completion
   - c. Print Change-out/Hourly Maint. Schedule
     - — Current
     - — Future
     - — List All
   - d. Enter Repair Report Data
   - e. Operating Hours Update
4. Machinery History
   - a. Edit Repair Report
   - b. Print Machinery History
   - c. Purge Machinery History (Office Use)



SELECT #1 THE FOLLOWING MENU WILL APPEAR PERMITTING
THE USER ACCESS TO THE PREVENTIVE MAINTENANCE PROGRAMS.
SELECT #2 THE MENU ON PAGE D-8 WILL APPEAR.
SELECT #3 THE MENU ON PAGE D-10 WILL APPEAR.
SELECT #4 THE MENU ON PAGE D-13 WILL APPEAR.
SELECT #8 ON ANY MENU AND THE COMPUTER WILL EXIT
THAT PROGRAM AND SHOW PREVIOUS MENU ON THE SCREEN.

UF1010 20 TODAY IS: 03/01/83

PREVENTIVE MAINTENANCE

1. MAINTENANCE ACTION SHEETS

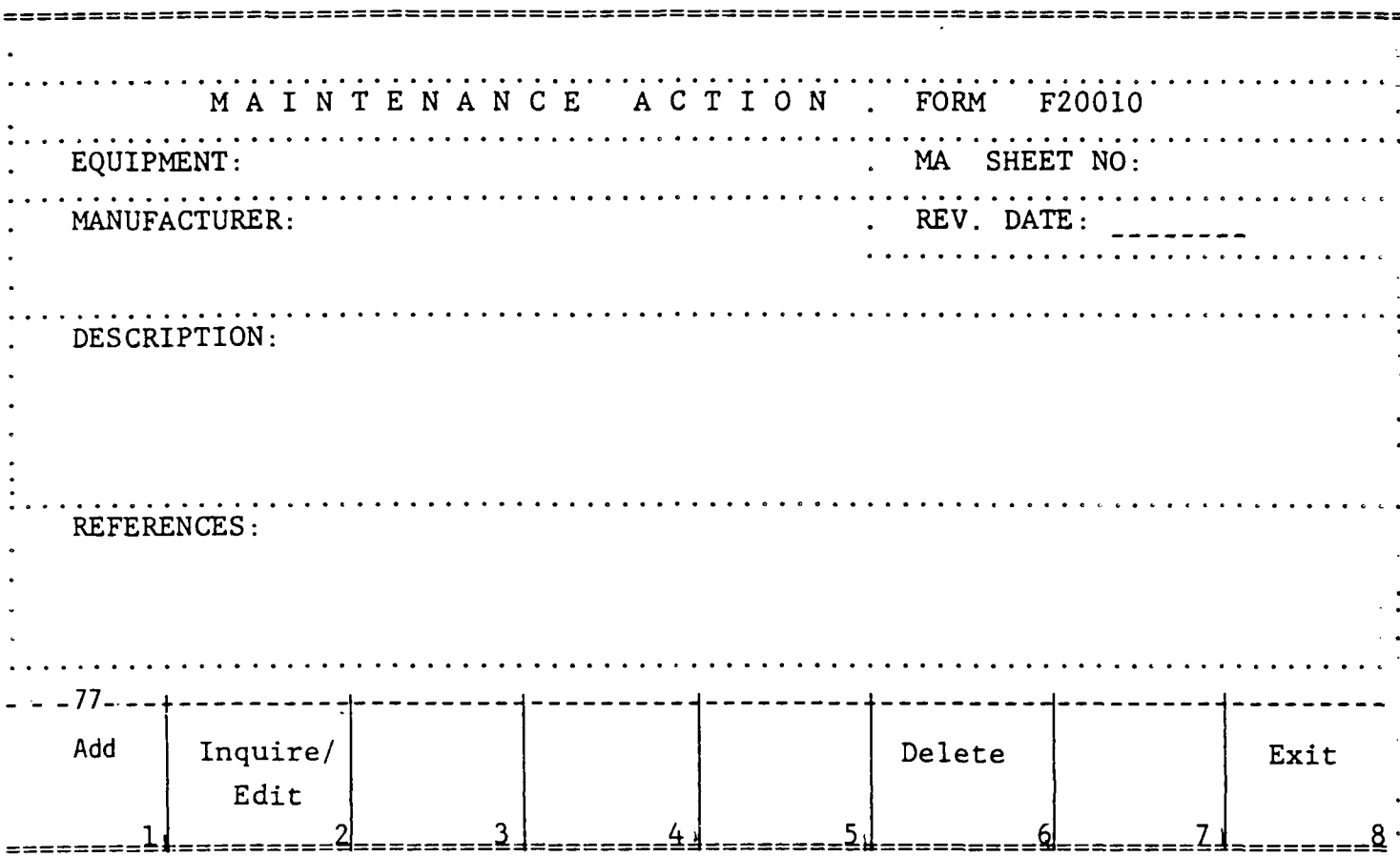
2. PREVENTATIVE MAINTENANCE SCHEDULING

8. EXIT

M.A. SHEETS 1	P.M. SCHEDULE 2	3	4	5	6	7	EXIT 8

SELECT #1 THE SCREEN ON PAGE D-2.1 WILL APPEAR.

SELECT #2 THE MENU ON PAGE D-5 WILL APPEAR ON THE SCREEN.



NOTE:

1. Pressing key 'Add', 'Inquire/Edit' or 'Delete' will cause the program to request a MA sheet number. If you are adding, the number cannot be duplicated. If you are editing or deleting, the number must exist. The screen on page D-2.2 will then appear.

2. Pressing key 'Delete' will cause the computer to print:

   ' This will erase all text and periodicity data for
   (MA Sheet number that you entered)
   Are you sure?'

   If you wish to delete, enter 'yes' (three characters followed by <enter>). Any other entry will be assumed to be 'No'.

```
MAINTENANCE ACTION . FORM F20010
EQUIPMENT: . MA SHEET NO:
MANUFACTURER: . REV. DATE: _______
DESCRIPTION:
REFERENCES:
-----77---+---------+---------+---------+---------+---------+---------+---------+---------
ACCEPT | TEXT | | | | PRINT SHEET | | EXIT
1 2 3 4 5 6 7 8
```

NOTES:

1. You may position the cursor to any input field to make entries. If you press (enter) the cursor will automatically go to the next input field. Attempts to alter the MA Sheet number will be ignored.

2. Pressing key 'Accept' will enter all data and return to the screen on page D-2.1 . You can then enter another MA Sheet number for adding or editing.

3. Pressing key 'Text' will cause the screen on page D-2.3 to appear.

4. Pressing key 'Print Sheet' will cause the output on page D-3/D-4 to be listed on the line printer.

MAINTENANCE ACTION SHEET NO.____ FORM F20011 SECTION NO._____

NEXT SECTION 1	PREVIOUS SECTION 2	EDIT SECTION 3	INSERT SECTION 4	ADD TO END 5	DELETE SECTION 6	EXIT 7

NOTES:

1. If there are no sections of text currently stored, then only keys 'Add to end' and 'Exit' will appear, you must either add a section or exit back to the screen on Page D-2.2.

2. Keys 'Next Section' and 'Previous Section' will allow you to page through the sections of text.

3. Key 'Edit Section' will cause the screen on Page D-2.4 to appear.

4. Pressing keys 'Insert' or 'Delete' will allow the adding and deleting of whole sections. When adding a section you may use the cursor keys to position the cursor on any input line. You may use the keyboard clear, insert and delete keys on individual lines.

MAINTENANCE ACTION SHEET NO._____ FORM F20011 SECTION NO._____

ACCEPT 1	2	INSERT LINE 3	4	DELETE LINE 5	6	7	EXIT 8

NOTES:

1. Pressing key 'Accept' will enter all data and return you to the screen on Page D-2.3.

2. Pressing key 'Insert Line' will insert a blank line at the current cursor position.

   !!CAUTION!! When you insert a line, the last line of text will be lost. Be careful!

3. Pressing key 'Delete Line' will cause the line at the current cursor position to be deleted.

MAINTENANCE ACTION FOR SHIP: M.V. SUGAR ISLANDER

EQUIPMENT: MAIN ENGINE CONTROLS/GOVERNOR M.A. SHEET: 4017T1

MANUFACTURER: WOODWARD REV. DATE: 04/28/83

DESCRIPTION: GOVERNOR MODEL PGA58
THIS EQUIPMENT ALSO INCLUDES 4017T2

REFERENCE:
* THIS IS A SAMPLE OF A MAINTENANCE ACTION SHEET AS PRINTED BY COMPUTER.

The basic Preventive Maintenance essential to proper operation of the pneumatic controls is to ensure a clean dry air supply and proper lubrication of linkage of mechanical parts.

DAILY:

1. While in operation observe the various pneumatic components and linkages for proper mounting and absence of loose bolting and vibration. Inspect condition of pneumatic tubing and electrical components.

2. Inspect pneumatic system for air leaks.

3. Blow down air supply filters to remove moisture.

4. Observe that pneumatic control functions are properly performed at the proper time. Any sluggishness or failure to operate properly should be investigated.

MONTHLY:

5. Test operation of emergency shutdown controls locally and from Control Room and Bridge consoles.

SEMI-ANNUALLY:

6. Visually and by use of a multimeter check condition of solenoids, limit switches and pressure switches.

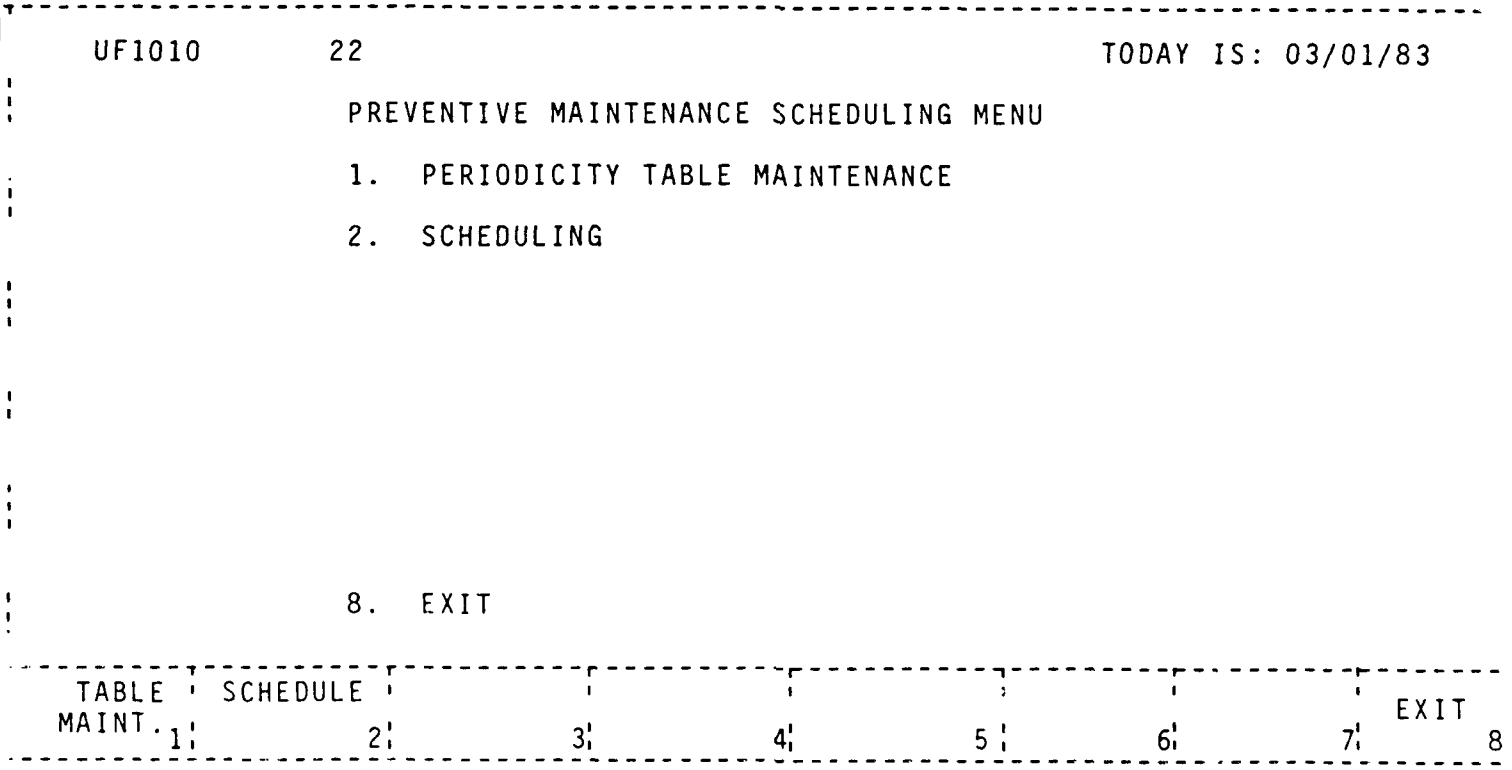
7. Check cleanliness of filters and pneumatic regulators and clean as required.

* THIS IS PAGE 2 OF THE SAMPLE COMPUTER PRINTED M.A. SHEET.

ANNUAL:

8. Perform a thorough inspection of all tubing, valves, filters, regulators and other components for condition, tightness and integrity.

9. Disassemble, inspect and repair as required the pneumatic regulating valves.



SELECT #1 THE SCREEN ON PAGE D5.1 WILL APPEAR.

SELECT #2 THE MENU ON PAGE D-7 WILL APPEAR.

PREVENTATIVE MAINTENANCE REQUIREMENTS FOR M.V. SUGAR ISLANDER

MAINT. SHEET NO. NAME: _____

EQUIPMENT CODE: REVISION DATE _____

PERIODICITY	DATE LAST COMPLETED (MM/DD/YY)	WEEK NUMBER (WW/YY)
MONTHLY	(.. DO NOT	-----
QUARTERLY	USE	-----
SEMI-ANNUAL	CURSOR	-----
ANNUAL	OR TAB	-----
2 YEAR	KEYS TO	-----
4 YEAR	POSITION	-----
8 YEAR	CURSOR!	-----

OVERHAUL MAINTENANCE REQUIRED: ...) (Y OR N)

DRYDOCK MAINTENANCE REQUIRED : ...) (Y OR N) -----

ADD 1	INQUIRE/ EDIT 2	3	PRINT DATA 4	5	DELETE 6	7	EXIT 8

NOTES:

1. Pressing key 'Add', 'Inquire/Edit', or 'Print Data' will cause the program to ask for a MA Sheet Number and Equipment Code. If you are adding, you can not duplicate equipment codes. If you are editing or printing, the Code must exist.

2. If you enter the Equipment Code in the form '/XX' the computer will assume that the first six (6) digits are the same as the MA Sheet Number. The last two (2) digits will be 'XX'.

3. Use only the (Enter) key to position the cursor.

4. There are two (2) formats for the date last completed. 'MM/DD/YY/' and 'WXX/YY'. MM,DD and YY are 2 digit codes for the month, day and year. XX is a 2 digit Code for the week number. 'WXX/YY' is used for initializing purposes. Use it to initially schedule an action.

PREVENTATIVE MAINTENANCE REQUIREMENTS FOR M.V. SUGAR ISLANDER

MAINT. SHEET NO. NAME: _____

EQUIPMENT CODE: REVISION DATE _____

PERIODICITY	DATE LAST COMPLETED (MM/DD/YY)	WEEK NUMBER (WW/YY)
MONTHLY	(.. DO NOT	-----
QUARTERLY	USE	-----
SEMI-ANNUAL	CURSOR	-----
ANNUAL	OR TAB	-----
2 YEAR	KEYS TO	-----
4 YEAR	POSITION	-----
8 YEAR	CURSOR!	-----

OVERHAUL MAINTENANCE REQUIRED: ...) (Y OR N)

DRYDOCK MAINTENANCE REQUIRED : ...) (Y OR N) -----

1	2	3	4	5	6	7	8
ADD	INQUIRE/ EDIT		PRINT DATA		DELETE		EXIT

5. Pressing key 'print data' will cause the output on Page D-6 to be listed on the line printer.

6. Pressing key 'Delete' will cause the computer to print:

'ARE YOU SURE?'

If you wish to delete the table enter 'Yes' (Three characters followed by (enter). Any other entry will be assumed to be 'No'.

7. Enter A 'Y' if overhaul or drydock PM is required. Else enter 'N'.

P E R I O D I C I T Y T A B L E

SHIP NAME: M/V SUGAR ISLANDER

SHIP NUMBER: S/I

EQUIPMENT CODE: 4017T101

APPLICABLE MAINTENANCE ACTION SHEET NUMBER: 4017T1

EQUIPMENT NAME: MAIN ENGINE CONTROLS/GOVERNOR

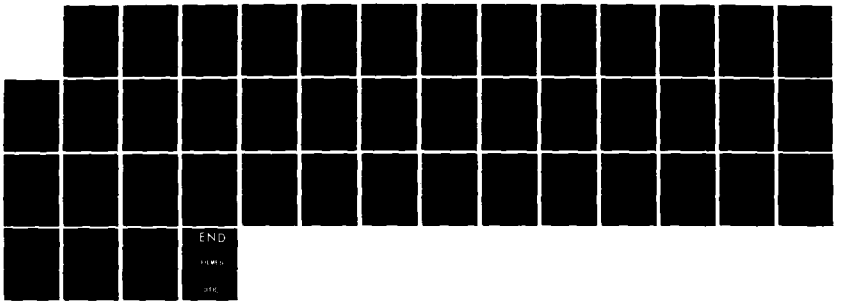
LAST EDITED OR REVISED ON 04/28/83

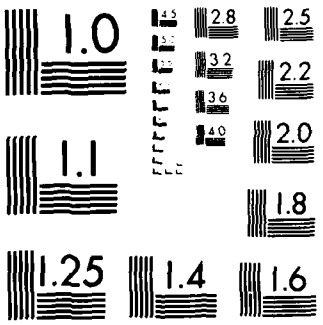
PERIODICITY	DATE LAST COMPLETED
MONTHLY	WEEK 15/83
QUARTERLY	N/A
SEMI-ANNUAL	WEEK 19/83
ANNUAL	WEEK 32/83
TWO YEAR	N/A
FOUR YEAR	N/A
EIGHT YEAR	N/A

THIS EQUIPMENT DOES NOT REQUIRE DRY DOCK MAINTENANCE.

THIS EQUIPMENT DOES NOT REQUIRE OVER HAUL MAINTENANCE.

AD-A150 524 SHIPBOARD/SHORESIDE COMPUTER INFORMATION AND MANAGEMENT 2/2
SYSTEM MV SUGAR I..(U) PACIFIC-GULF MARINE INC NEW
ORLEANS LA P F JOHNSON ET AL. JUL 84 MA-RD-770-84025
UNCLASSIFIED DTMA91-82-C-20001 F/G 9/2 NL





```
IF1010          23                                   TODAY IS: 03/01/83

                    PREVENTIVE MAINTENANCE SCHEDULING

                1.  PRINT SCHEDULE FOR GIVEN WEEK

                2.  ENTER COMPLETED ITEMS ON A SCHEDULE

                3.  LIST INCOMPLETED SCHEDULES



                8.  EXIT

-------------------------------------------------------------------------------
 WEEKLY  ¦ ENTER  ¦ INCOM-  ¦     ¦     ¦     ¦     ¦     ¦
 SCHED. 1¦ ITEMS 2¦ PLETED 3¦   4 ¦   5 ¦   6 ¦   7 ¦ EXIT  8
-------------------------------------------------------------------------------
```

SELECT #1 THE SCREEN ON PAGE D-7.1 WILL APPEAR.

SELECT #2 THE SCREEN ON PAGE D-7.6 WILL APPEAR.

SELECT #3 THE SCREEN ON PAGE D-7.12 WILL APPEAR.

CHOOSE A LISTING OPTION:

Calendar Items 1	Drydock Items 2	Overhaul Items 3		Future P.M. 5	Audit/ Shift 6		Exit 8

NOTES:

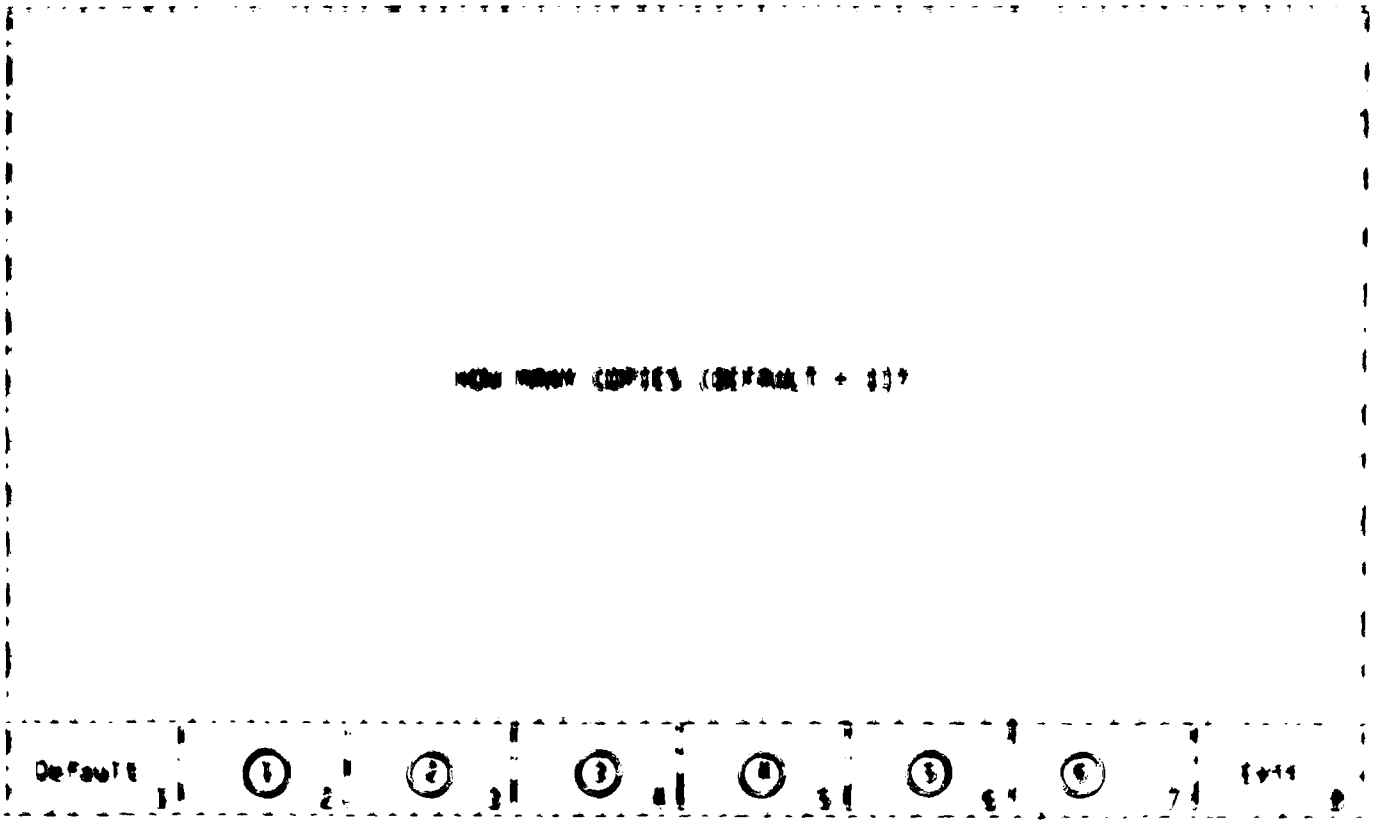
1. Pressing key 'Calendar Items' will cause the screen on Page D-7.2 to appear.

2. Pressing key 'Drydock Items' or 'Overhaul Items' will cause the screen on Page D-7.3 to appear.

3. Pressing key 'Future PM' will cause the screen on Page D-7.4 to appear.

4. Pressing key Audit/Shift will cause the screen on D-7.5.1 to appear. D-7.5.1 Screen will permit you to print a Preventive Maintenance Audit List.

SCHEDULE OF PREVENTIVE MAINTENANCE ITEMS

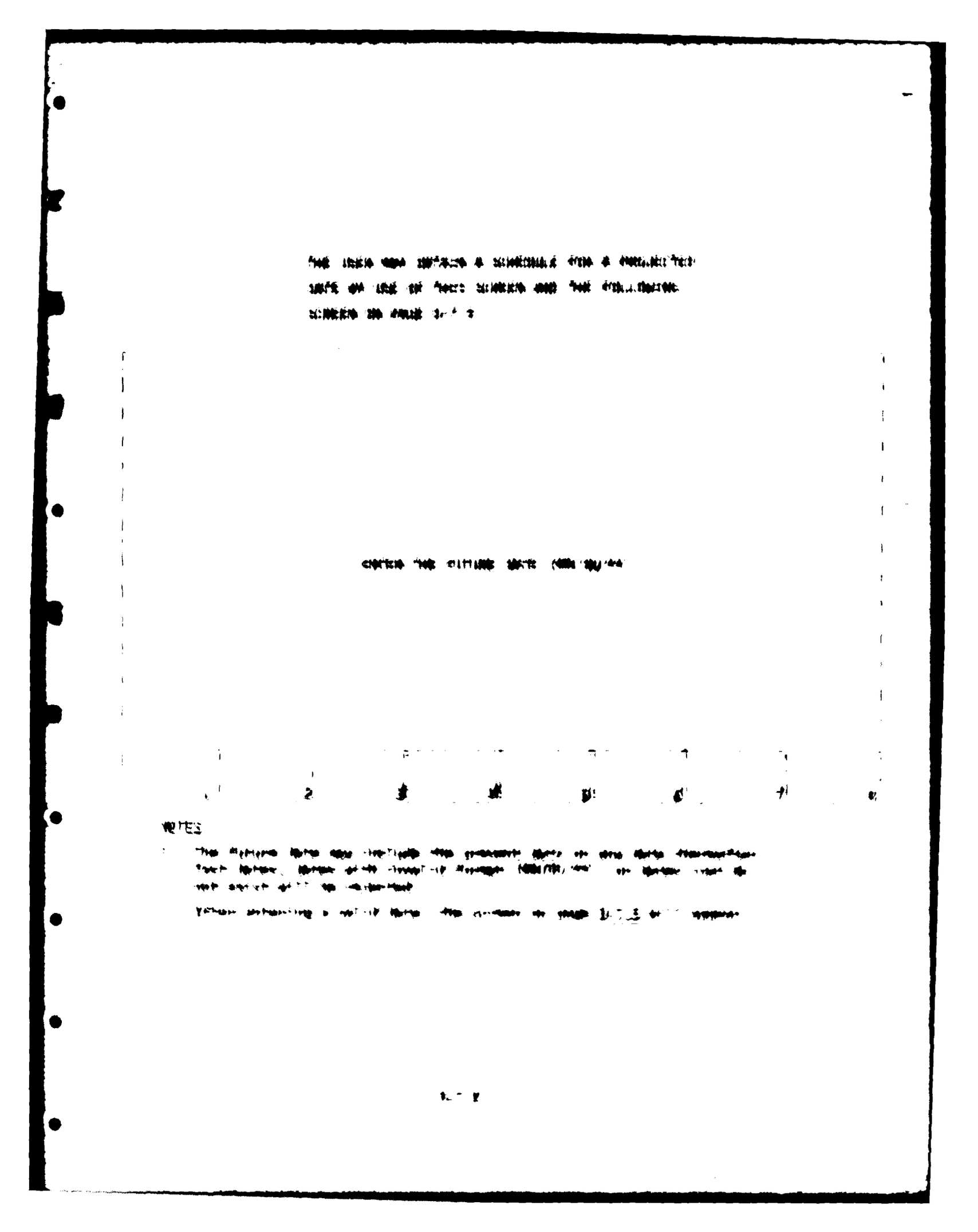


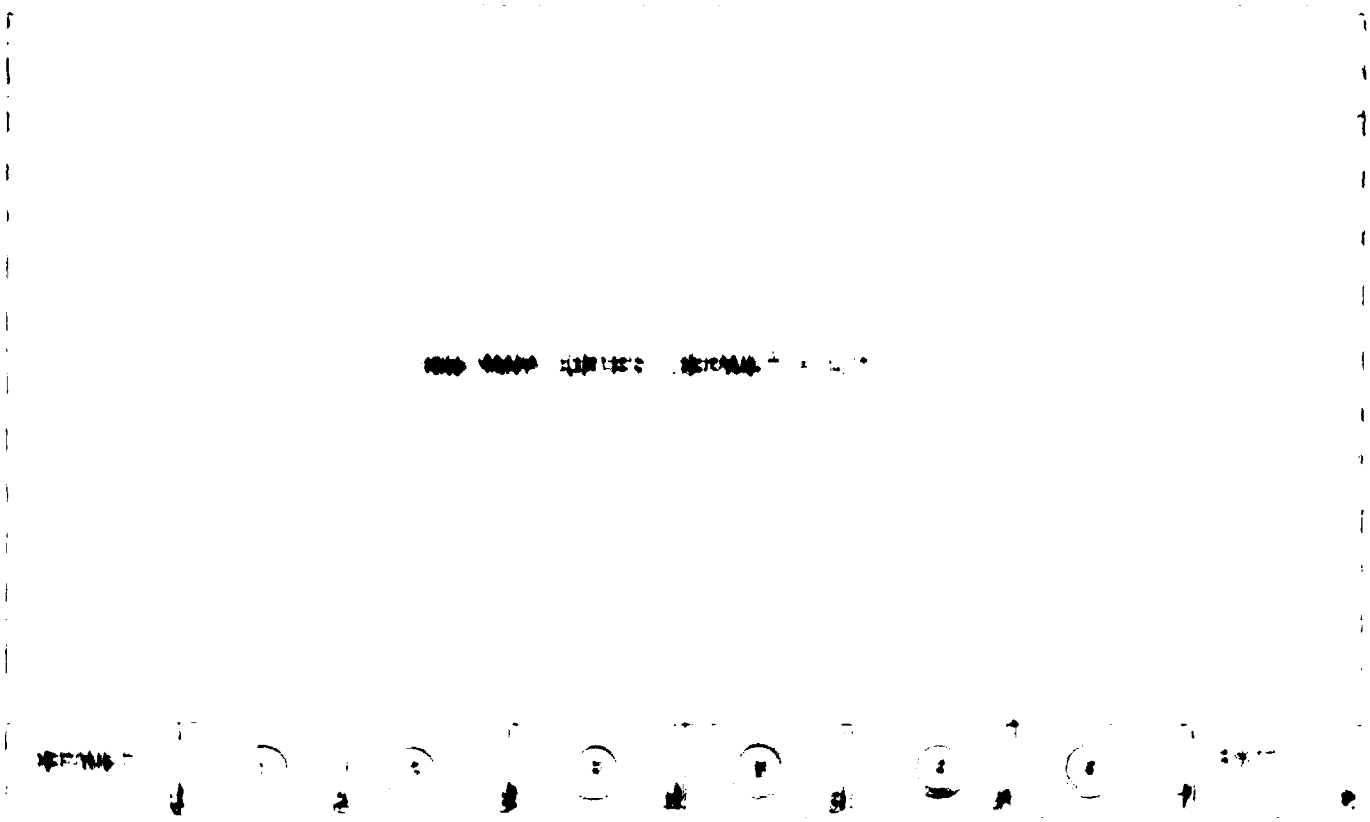
Press the key corresponding to the number of copies you desire

CAUTION!!

Some schedules may span many pages, so be careful when requesting multiple copies. Printing time may be excessive.

A schedule of PM items with calendar specifications (i.e. monthly, quarterly, etc.) will now be generated for the current week number (1 to 52). A schedule can not be generated twice for a given week. Thus you must wait for a new week to get the next schedule.





CAUTION

PREVENTIVE MAINTENANCE AUDIT LIST

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]					*
[illegible]	[illegible]		[illegible]	[illegible]					*	
[illegible]	[illegible]		[illegible]						*	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					*	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					*	
[illegible]	[illegible]		[illegible]	[illegible]					*	*
[illegible]	[illegible]		[illegible]	[illegible]					*	
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]		*	
[illegible]	[illegible]	[illegible]	[illegible]						*	
[illegible]	[illegible]	[illegible]	[illegible]						*	
[illegible]	[illegible]	[illegible]	[illegible]						*	
[illegible]	[illegible]	[illegible]	[illegible]						*	*
[illegible]	[illegible]	[illegible]	[illegible]						*	
[illegible]	[illegible]	[illegible]	[illegible]						*	
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]				*	*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				*	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				*	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				*	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				*	

[illegible]

PREVENTIVE MAINTENANCE AUDIT LIST

FOR

[illegible] SUGAR ISLANDER AS OF 06/30/83

PAGE NO 1

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]					[illegible]
[illegible]	[illegible]		[illegible]		[illegible]					
[illegible]	[illegible]		[illegible]	[illegible]					[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]					[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	
[illegible]	[illegible]		[illegible]	[illegible]					[illegible]	
[illegible]	[illegible]		[illegible] [illegible]	[illegible] [illegible]					[illegible]	
[illegible]	[illegible]	[illegible] [illegible]		[illegible] [illegible]	[illegible] [illegible]		[illegible] [illegible]			[illegible]
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]						[illegible]	
[illegible]	[illegible]	[illegible] [illegible]		[illegible] [illegible]	[illegible] [illegible]					[illegible]
[illegible]	[illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]				[illegible]	
[illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	 [illegible]				[illegible]	
[illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]	[illegible] [illegible]					[illegible]	

[illegible]

[illegible]

[redacted]

OUTSTANDING PM SCHEDULE

SHIP NAME: M.V. SUGAR ISLANDER

SCHEDULE DATE: 03/01/83

WEEK NUMBER: 09/83

EQUIPMENT NAME	CODE	FRQ	LAST COMP'D	COMPLETED	ATTN
ACCOMMODATION LADDER	16350101				Y
HATCH COVER SYSTEM	24200102	MY		NC	
HATCH COVER SYSTEM	24200103	MY		NC	
HATCH COVER SYSTEM	24200104	MY		NC	
HATCH COVER SYSTEM	24200105	MY		NC	
HATCH COVER SYSTEM	24200106	MY		NC	
GALLEY EQUIPMENT	34220001	SA		NC	
MAIN ENGINE CONTROLS/ GOVERNOR	40171202	MY		NC	

OUTSTANDING PM SCHEDULE FOR M.V. SUGAR ISLANDER FORM F20013

SCHEDULE DATE_____ SCHEDULE WEEK NUMBER:____ TODAY'S DATE:_____

EQUIPMENT NAME	EQUIPMENT NUMBER	FQ	LAST COMP'TD	DATE COMP'TD.	NEEDS ATTN
		--	--------		

FORMATS: MM/DD/YY, WNN/YY, "T", OR "N"

Next Number	Previous Number 2	Get Number 3	Needs Attention 4	5	Exit No Save 6	Get New Schedule 7	Exit Save 8

NOTES

1. The schedule date, week number, and the current date will be shown.

2. Pressing keys 'next number','previous number', or 'get number' allows you to step through the items or get one particular item. If you press key 'get number' you will be requested to enter the number. it must be a number that exists in the schedule.

3. For each item, you may enter the date completed in the following forms:
   1) MM/DD/YY - valid dates only
   2) WNN/YY - valid week numbers only
   3) T - automatically enters current date.
   4) N - automatically enters 'n/c' for'not complete'

   You do not have to press the (enter) key to enter the date completed. Use the first three (3) keys to go to the next item.

4. Press key 'needs attn' if the equipment needs attention now.

   CAUTION!!

   Press this key only once for each equipment number and not for each frequency. If you press it more than once, it will appear more than once next time you run this program.

CONT'D. FROM PAGE D-7.9

OUTSTANDING PM SCHEDULE FOR M.V. SUGAR ISLANDER FORM F20013

SCHEDULE DATE_____ SCHEDULE WEEK NUMBER:_____ TODAY'S DATE:_____

EQUIPMENT NAME	EQUIPMENT NUMBER	FQ	LAST COMP'TD	DATE COMP'TD.	NEEDS ATTN
		--	--------		

FORMATS: MM/DD/YY, WNN/YY, "T", OR "N"

1 Next Number	2 Previous Number	3 Get Number	4 Needs Attention	5	6 Exit No Save	7 Get New Schedule	8 Exit Save

5. If the equipment number has been marked for attention during previous sessions, it will appear on the screen shown on Page D-7.11. (See this page for how to mark and un-mark equipment for attention.) Equipment marked for attention during the current session will not be shown until the next time the program is run.

6. Pressing key 'exit no save' will exit the program. All completion data entered during the session will be saved in the outstanding schedule however, the periodicity tables will not be updated. You may make completion entries over the course of several days and when finished, post them to the periodicity tables using keys 'get new schedule' or 'exit save'.

7. Pressing key 'get new schedule' will update the periodicity tables. The program will then run again asking for a new schedule week number.

8 Pressing key 'exit save' will exit the program and update the periodicity tables.

NOTE: Be patient, updating the periodicity tables may take a little time.

9. When a schedule is complete, you will be given the opportunity to erase it. It is suggested that you do, for it will needlessly take up storage space.

OUTSTANDING PM SCHEDULE FOR M.V. SUGAR ISLANDER FORM F20013

SCHEDULE DATE_____ SCHEDULE WEEK NUMBER:_____ TODAY'S DATE:_____

EQUIPMENT NAME	EQUIPMENT NUMBER	FQ	LAST COMP'TD	DATE COMP'TD.	NEEDS ATTN
		--			

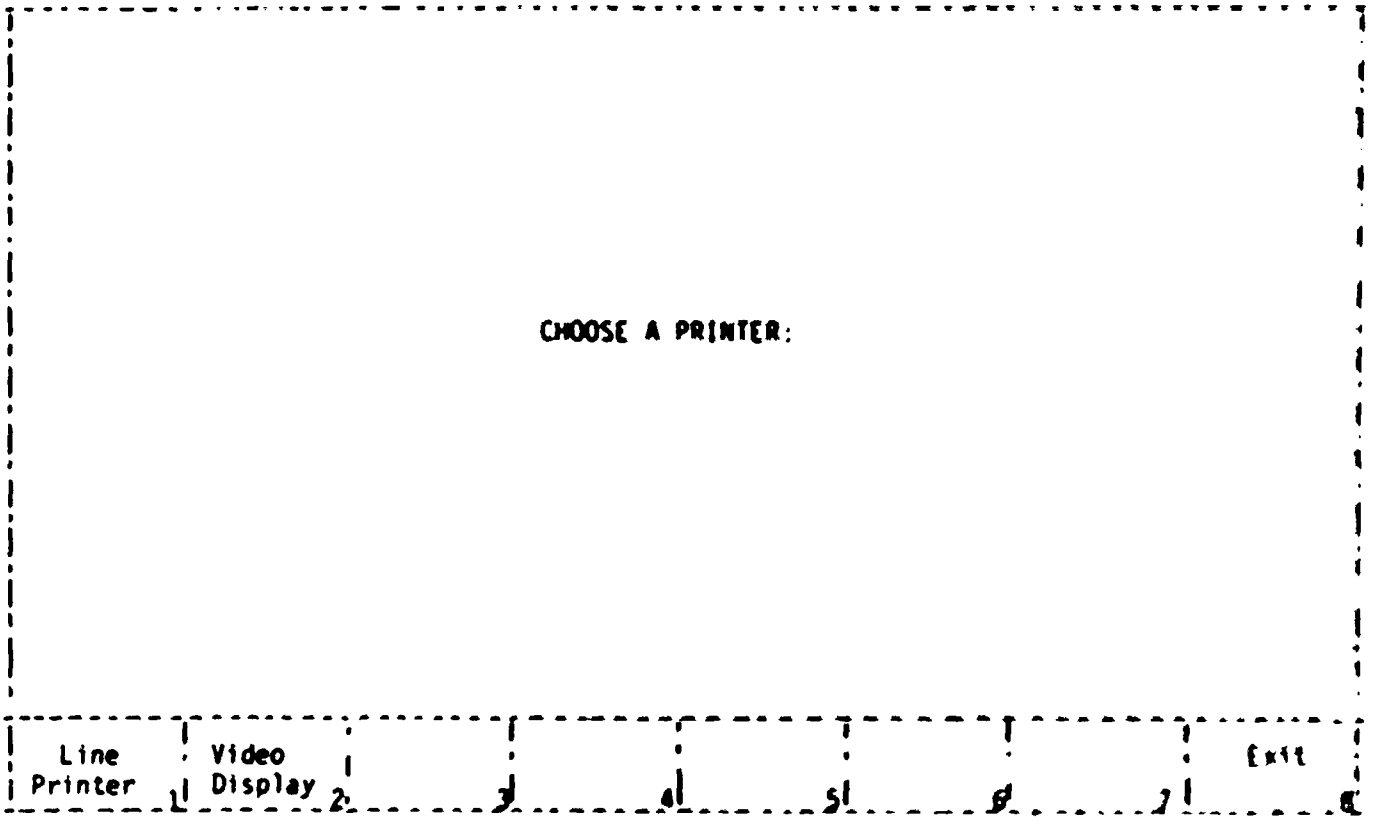
FORMATS: MM/DD/YY, WNN/YY, "T", OR "N"

DOES THIS EQUIPMENT REQUIRE ATTENTION?

YES NO 1 2 3 CT'NUE 5 6 7 8

NOTES:

1. The schedule date, week number and the week current date will be shown.
2. Repeatedly pressing key 'yes no' will toggle the attention flag on the screen between (Y) and (N).
3. Pressing key 'ct'nue' will return you to the screen on Page D-7.10. The current value of attention flag will be saved.



NOTES:

1. Pressing key 'line printer' will cause the listing to go to the line printer. Pressing key 'Video Display' will cause the listing to go to the screen. A sample listing appears on Page D-7.13

OUTSTANDING PM SCHEDULES FOR [illegible] SUBIC ISLANDS

AS OF 04/22/83

SCHEDULE WEEK	SCHEDULE DATE	# INCOMPLETE (1)	% COMPLETE (2)
09/83	03/01/83	0	100.0

NOTES

1. This is the number of items left to be done
2. This is the per cent of the total number of items that represents the level of completeness of the schedule

NOTE: SEE THE APPLICABLE SECTION IN THE SYSTEM MANUAL FOR A MORE COMPLETE EXPLANATION OF SPECIFIC [illegible]

[illegible] TODAY IS [illegible]

PLANNED MAINTENANCE SCHEDULING

1. FORWARD/QUARTER SCHEDULE [illegible]
2. FORWARD/QUARTER SCHEDULE [illegible]
3. MRC CONTINUING SURVEY
4. REGULATORY BODY INSPECTION SCHEDULE

[illegible]

ENTER DATA	UPDATE SCHEDULE	MRC SURVEY	REG BODY SCHEDULE				EXIT
1	2	3	4	5	6	7	8

SELECT #1 THE SCREEN ON PAGE 1.8.[illegible] WILL APPEAR

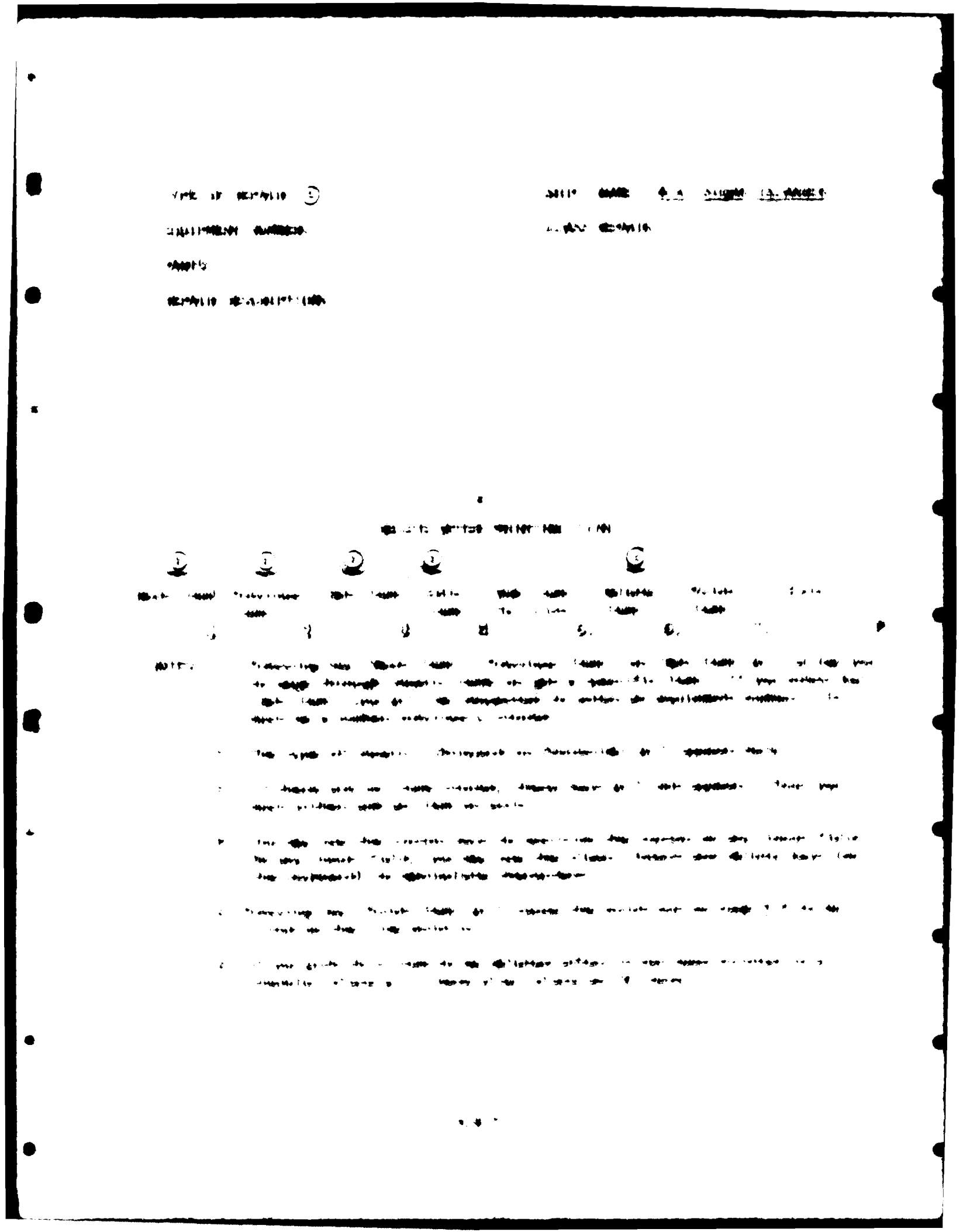
SELECT #2 THE SCREEN ON PAGE 1.8.[illegible] WILL APPEAR

SELECT #3 THE SCREEN ON PAGE 1.8.[illegible] WILL APPEAR

SELECT #4 THE SCREEN ON PAGE 1.8.[illegible] WILL APPEAR

SELECT #8 THE COMPUTER WILL RETURN TO THE OPERATING SYSTEM

[redacted]



[redacted]

[illegible]

[illegible] FORM [illegible]

[illegible]

[illegible]

NOTES

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

P3[1]3 24 TODAY IS: 03/01/83

REPAIR MAINTENANCE

1 CHANGE OUT/HOURLY MAINTENANCE TABLE ENTRY

2 CHANGE OUT/HOURLY MAINTENANCE COMPLETION

3 PRINT CHANGE OUT/HOURLY MAINTENENCE SCHEDULE

4 ENTER REPAIR REPORT DATA

5 OPERATING HOURS UPDATE

CHNG OUT DATA ENT 4	CHNG OUT COMPLETN 2	CHNG OUT SCHEDULE 3	REPAIR DATA ENT 4	OP HOURS UPDATE 5	6	7	EXIT 8

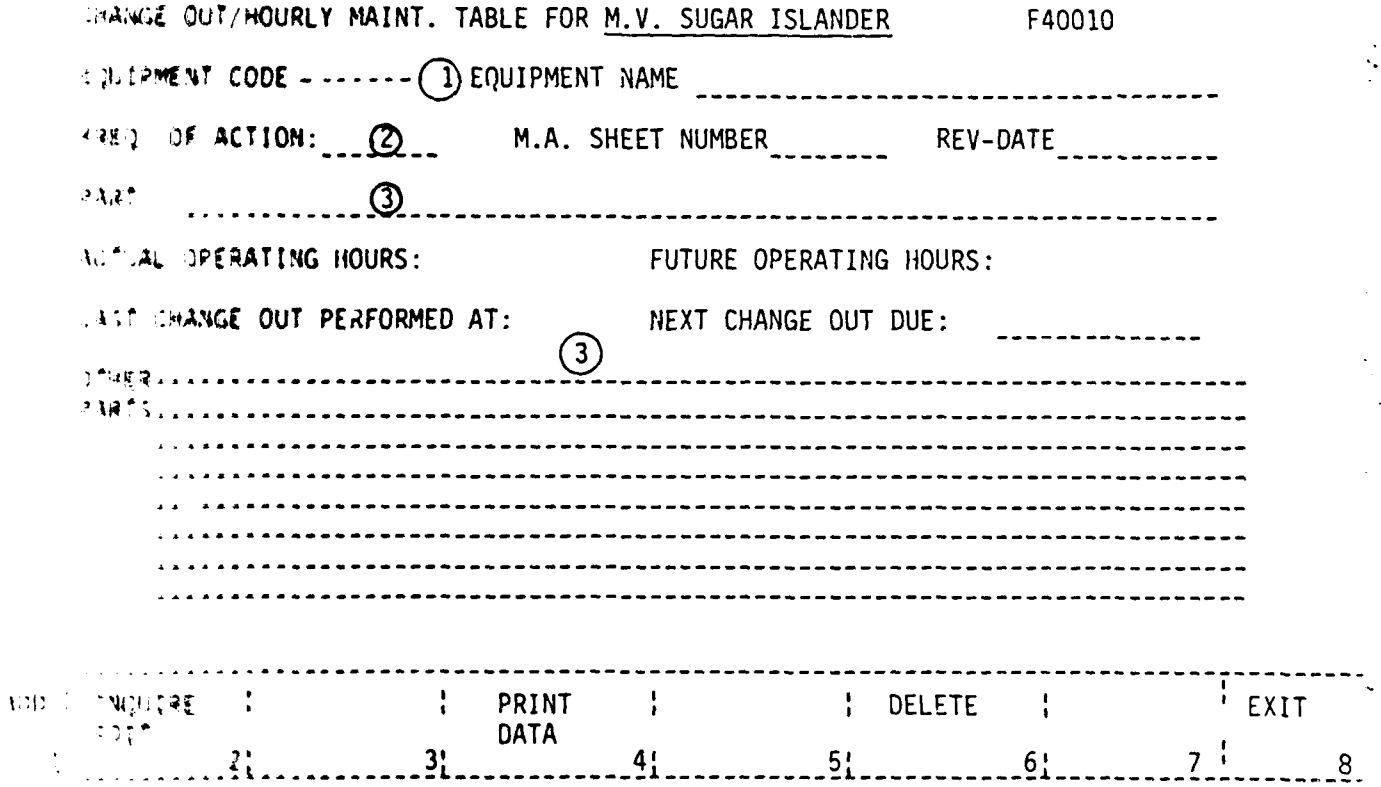
SELECT #1 THE SCREEN ON PAGE D-[illegible] WILL APPEAR.

SELECT #2 THE SCREEN ON PAGE D-[illegible] WILL APPEAR.

SELECT #3 THE SCREEN ON PAGE D-[illegible] WILL APPEAR.

SELECT #4 THE SCREEN ON PAGE D-12 WILL APPEAR.

SELECT #5 THE SCREEN ON PAGE D-12.[illegible].2 WILL APPEAR.



A valid equipment code must be entered here.

Frequency of action must be of the form XXXH or XXXK where 'H' stands for 'hundred' and 'K' stands for 'thousand'. Preceding zeroes need not be entered. (e.g. '2K' can be entered for '002K').

A valid part number must be entered, ie. one that is currently inventoried. If the group number of the part (the first 6 digits) is the same as the first six digits of the equipment code, you may use the format '/XXXX' - 'XXXX' is the remainder of the part number. The part name will be retrieved and displayed next to the part number.

IMPORTANT:

To add, edit, delete or print you must enter a valid equipment code, frequency and part.

CONT'D. FROM PAGE D-10.1

CHANGE OUT/HOURLY MAINT. TABLE FOR M.V. SUGAR ISLANDER F40010

EQUIPMENT CODE EQUIPMENT NAME _____

FREQ. OF ACTION: M.A. SHEET NUMBER:_____ REV-DATE_____

PART: _____

ACTUAL OPERATING HOURS: (4) FUTURE OPERATING HOURS: (4)

LAST CHANGE OUT PERFORMED AT: (4) NEXT CHANGE OUT DUE: _____

(5)

OTHER PARTS _____

ADD	INQUIRE EDIT		PRINT DATA		DELETE		EXIT
1	2	3	4	5	6	7	8

4. Hours must be numeric characters only. If it is easier for you, you may press the 'clear' key on the keyboard. The field will be cleared. With a clear field, you may enter the hours without preceding zeroes. These zeroes will automatically be added. Pressing (enter) with a clear field will automatically place 8 zeroes in the field. All hours will be right justified.

5. DO NOT use the cursor keys on the keyboard. Use only the (enter) key to move from field to field.

6. Pressing key 'print data' will cause the print out on Page D-11 to be listed on the line printer.

CHANGE OUT/HOURLY PM TABLE

FOR SHIP

M.V. SUGAR ISLANDER

TODAY'S DATE: 03/01/83

EQUIPMENT CODE: 4005T10D EQUIPMENT NAME: MAIN PROPULSION DIESEL ENGINES

MAINT. ACTION SHEET:4005TO REVISION DATE: 03/01/83

PART: 4008T1012B - RING, COMPRESSION, PC #17 (1 REQUIRED)

CHANGE OUT/PM TO OCCUR EVERY:	010K	HOURS
ACTUAL OPERATING TIME:	00000000	HOURS
OPERATING TIME AT LAST CHANGE OUT:	00000000	HOURS
NEXT CHANGE OUT DUE AT:	00010000	HOURS
FUTURE CHANGE OUT HOURS ARE NOW SET AT:	00000000	HOURS

OTHER REQUIRED PARTS FOR THIS CHANGE OUT/PM

PART NUMBER	PART DESCRIPTION	UNIT OF ISSUE
4008T1012C	RING, SCRAPING, PC #34, P/N P1	1
4011T1005	CYLINDER HEAD GASKET KIT - INS	1

* THIS IS A SAMPLE OF THE PERIODICITY TABLE PRESENTLY IN THE COMPUTER. ITEMS MAY BE SCHEDULED ONLY IN ACCORDANCE WITH THIS TABLE UNLESS TABLE IS CHANGED TO INCLUDE ITEM DESIRED.

FORM F40011

LAST COMPLETED OPERATING HOURS UPDATE AS OF _____

FOR

M.V. SUGAR ISLANDER

EQUIPMENT CODE: EQUIPMENT NAME _____

FREQUENCY OF ACTION: MAJOR PART:

OPERATING HOURS
(2)

1	NEXT ITEM 2	3	PREVIOUS ITEM 4	5	GET ITEM 6	STANDARD ENTRY 7	EXIT 8

NOTES:

1. Pressing key 'next item', 'previous item' or 'get item' will allow you to step through items to retrieve a particular item. If you press 'get item' then you must enter a valid equipment number, frequency of action and major part.

2. Hours must be numeric characters only. If it is easier for you, you may press the 'clear' key on the keyboard. The field will be cleared. With a clear field, you may enter the hours without preceding zeroes. These zeroes will automatically be added. Pressing (enter) with a clear field will automatically place 8 zeroes in the field. All hours will be right justified.

3. Pressing key 'next item', 'previous item' or 'get item' will automatically enter the hours you have keyed in. You do not have to use the (enter) key.

4. Pressing key "standard entry" will automatically;
   A. Enter operating hours for the current item.
   B. Make a standard entry of completion to the ships Machinery History.
   C. Place the next item on the screen.

CURRENT | FUTURE | LIST ALL
1 2 3 4 5 6 7 8

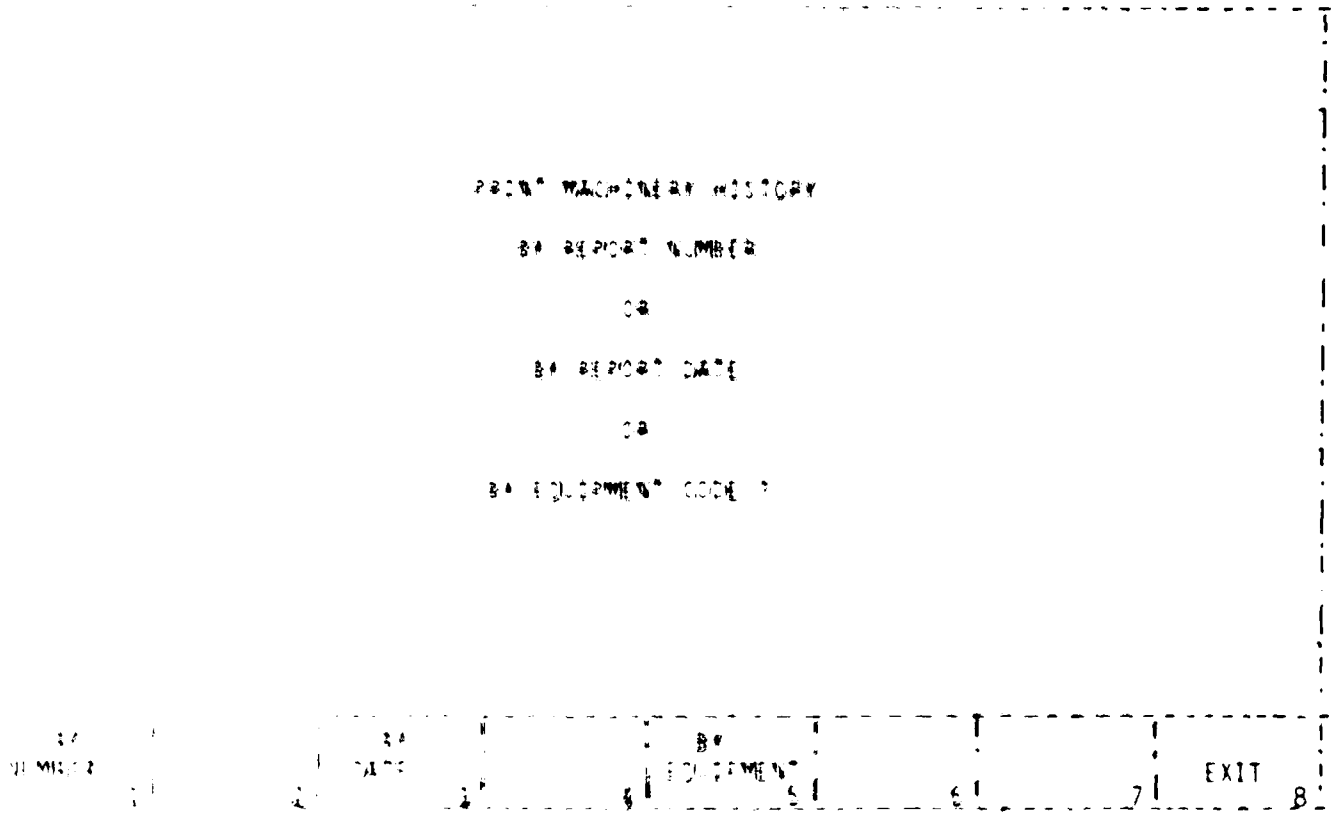
NOTES:

1. Pressing key 'current' will produce a change out schedule based on current operating hours.

2. Pressing key 'future' will produce a change out schedule based on future operating hours assuming that all interim maintenance has been performed.

3. Pressing key 'list all' will produce a listing of all change out items.

[redacted]



Pressing any of the numbers, the date or the equipment will cause the screen on page 3-13.1 to appear.

PLEASE ENTER LOWER SEARCH LIMIT

OR 'ALL' (IF YOU WISH TO LIST THE

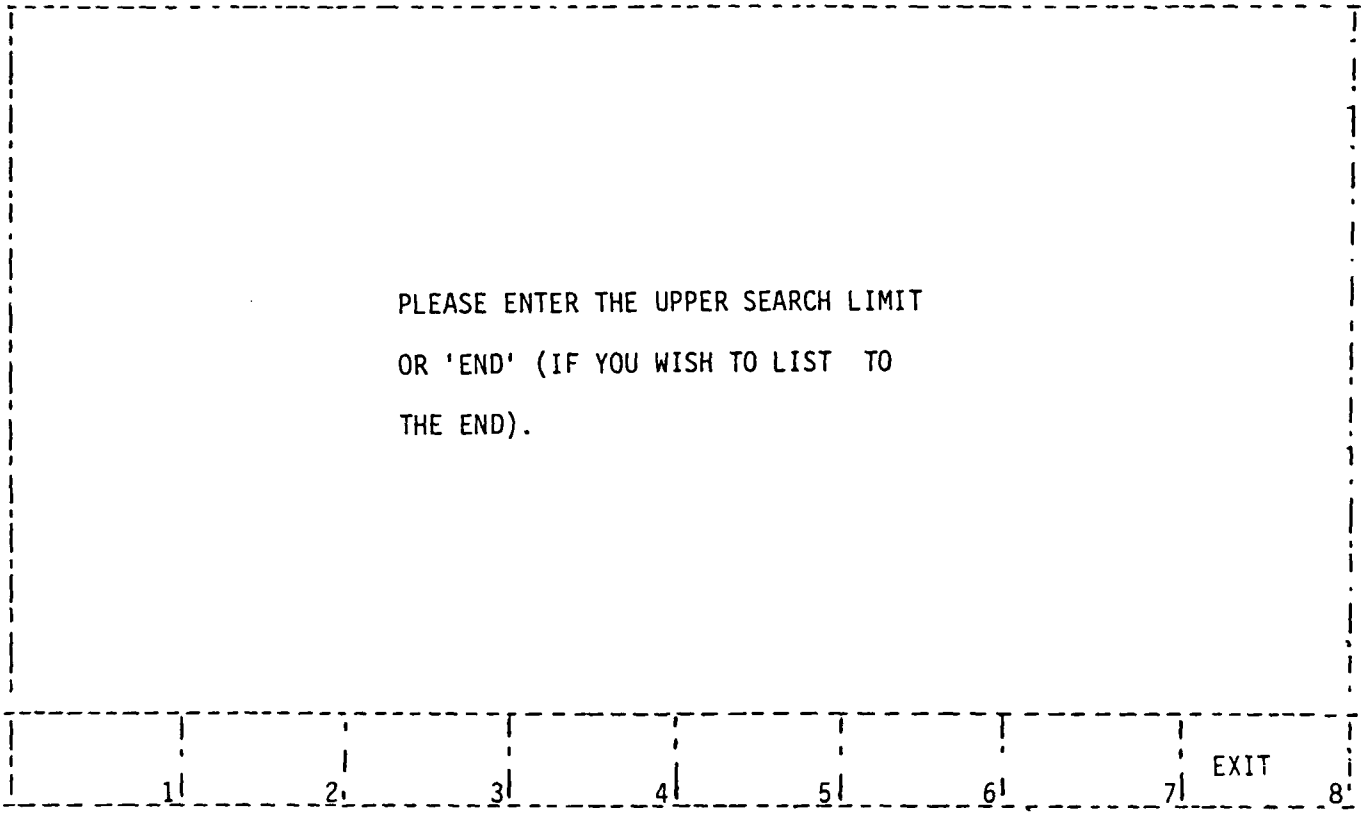
WHOLE HISTORY).

	2	3	4	5	6	7	Exit 8

NOTES

If you are listing by report number, enter a number between 1 and [illegible]. If you are listing by date enter a valid date in the form [illegible]. If you are listing by equipment code, enter the 8 [illegible] code. The screen on page D-13.5 will appear.

NOTE: If the computer cannot find the limit you enter, it will select the closest one to it.



NOTES:

1. If you are listing by report number, enter a number between 1 and 999999. If you are listing by date enter a valid date in the form 'MM/DD/YY'. If If you are listing by equipment code, enter the 8 digit code.

   NOTE: If the computer cannot find the limit you enter, it will select the closest one to it.

2. If you wish to list just one entry either enter an 's' (for same') or enter the lower limit again. Once both lower and upper limits are set, the computer will list all Machinery History entries between the limits.

```
==========================================================================
..........................................................................
 *WARNING*  *WARNING*  *WARNING*  *WARNING*  *WARNING*  *WARNING*
   Y O U   A R E   A B O U T   T O   D E S T R O Y
   T H E   M A C H I N E R Y   H I S T O R Y   F I L E
   F O R   T H E   __M.V. SUGAR  ISLANDER_______________
*WARNING*  *WARNING*  *WARNING*  *WARNING*  *WARNING*  *WARNING*
 PLEASE ANSWER THE FOLLOWING QUESTIONS WITH  "'YES' TO CONTINUE
        1.  HAVE YOU PRINTED THE FULL MACHINERY HISTORY ''''
        2.  HAVE YOU SAVED THE MACHINERY HISTORY ON TAPE ''''
..........................................................................
--------------------------------------------------------------------------
 PURGE   |        |        |        |        |        |       | EXIT
        1|       2|       3|      4 |      5 |      6|      7|       8
==========================================================================
```

*THIS IS A SAMPLE OF FORM USED WHEN THE PURGE MACHINERY HISTORY SELECTION IS MADE BY PGM MANAGEMENT.

NOTES:

1. Pressing key 'purge' will purge the Machinery History if and only if you answer 'yes' (3 characters) to these two questions. Otherwise you will be returned to the screen on Page D-13.
   The computer will tell you if the Machinery History has been successfully purged.

END

FILMED

3-85

DTIC