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MAY 82 J MATAKOVICH, C BEYERS N00140-80-D-1059
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DEVELOPMENT OF MAINTENANCE-CRITICAL SYSTEMS AND EQUIPMENTS LISTS FOR FFG-1 AND FF-1040 CLASS SHIPS

May 1982

Prepared for
OFFICER IN CHARGE
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FOR REPAIRS AND ALTERATIONS [PERA (CRUDES)]
PHILADELPHIA, PENNSYLVANIA 19112
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ABSTRACT

This document presents lists, in SWAB order, of the maintenance-critical systems and equipments installed on FFG-1 and FF-1040 Class ships.

SUMMARY

This report presents the results of analyses performed to identify maintenance-critical systems and equipments on FFG-1 and FF-1040 Class ships. Maintenance-critical systems are those systems which have contributed significantly to the maintenance burden of ships of the class; maintenance-critical equipments are those equipments within maintenance-critical systems which have contributed significantly to the systems' maintenance burdens. The objective of this study is to establish areas of concentration for future engineering efforts.

The data analyzed were obtained for ship's force and intermediate maintenance activity (IMA) maintenance experience as reported in the maintenance data system (MDS) and casualty reports (CASREPs). The PERA (CD) Working Repair Profile Ship Alteration and Repair Package (SARP) was reviewed to determine which of the systems identified as maintenance-critical by MDS or CASREP data required repetitive repairs or overhauls during regular overhauls.

The study identified 103 systems on FFG-1 Class ships and 106 systems on FF-1040 Class ships as being maintenance-critical. These systems accounted for a substantial majority of the total reported job control numbers (JCNs), ship's force and IMA man-hours, parts costs, and CASREPs for all systems and equipments installed on those ships.

The results of this study should be used as a basis for selecting ship systems for in-depth analyses directed toward improving maintenance strategies and system reliability and maintainability.

CONTENTS

	<u>Page</u>
ABSTRACT	v
SUMMARY	vii
CHAPTER ONE: INTRODUCTION	1-1
CHAPTER TWO: APPROACH	2-1
2.1 Introduction	2-1
2.2 Identification of Maintenance-Critical Systems	2-1
2.2.1 MDS Data	2-1
2.2.2 CASREP Data	2-2
2.2.3 Overhaul Data	2-2
2.3 Ranking of Maintenance-Critical Systems	2-2
2.4 Identification of Equipments Contributing to System Man-Hours	2-4
2.4.1 Identification of Maintenance-Critical Equipments	2-4
2.4.2 Identification of Equipment Configuration	2-4
2.5 Selection of Systems That Should be Subjected to Detailed Analysis	2-4
CHAPTER THREE: RESULTS	3-1
3.1 Maintenance-Critical Systems and Equipments	3-1
3.2 Portion of Class Maintenance Burden Contributed by Maintenance-Critical Systems and Equipments	3-1
3.3 Systems Identified as Being Maintenance- and Mission-Critical	3-1
CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS	4-1
APPENDIX: MAINTENANCE-CRITICAL SYSTEMS AND EQUIPMENTS LISTS.	A-1

CHAPTER ONE

INTRODUCTION

This report lists ship systems and equipments on FFG-1 and FF-1040 Class ships that have been determined to be maintenance-critical. The lists are based on analyses of historical maintenance data and are intended to be used as a guide for directing future engineering activity for these classes.

The lists of maintenance-critical systems and equipments were compiled on the basis of the following historical information:

- Maintenance burden in terms of job control numbers (JCNs) (maintenance actions), man-hours, and parts costs accumulated during normal operating periods
- Number of casualty reports (CASREPs) submitted
- Repair history during regular overhauls

The lists reflect the identified maintenance-critical systems and equipments for the entire ship, ranked by experienced maintenance burden, and provide a basis for prioritizing subsequent engineering analyses. The reasons why systems and equipments have significant maintenance burdens were not investigated.

Chapter Two of this report documents the approach used in preparing the maintenance-critical systems and equipments lists, which are included in the appendix; Chapter Three summarizes the results; and Chapter Four presents the conclusions and recommendations. The appendix to this report also provides quantitative and qualitative information on the observed maintenance burdens of maintenance-critical systems and equipments on FFG-1 and FF-1040 Class ships.

CHAPTER TWO

APPROACH

2.1 INTRODUCTION

The development of maintenance-critical systems and equipments lists was divided into four steps. The first step was to identify the systems to be included in the lists. The second was to prioritize the lists in order of the most significant maintenance burdens and prepare preliminary maintenance-critical systems lists for each ship. Step three was to identify the equipments that contributed significantly to the related system's maintenance burden. The fourth step was to select systems that should be subjected to detailed analysis. The four steps are described in the following sections.

Separate lists were prepared for each ship; those lists are presented in the appendix. The mission criticality of maintenance-critical systems was evaluated to define candidates for detailed analysis.

2.2 IDENTIFICATION OF MAINTENANCE-CRITICAL SYSTEMS

Identification of the maintenance-critical systems resulted from the review and analyses of the following three independent data sources:

- Maintenance data system (MDS) data
- CASREP data
- Working Repair Profile Ship Alteration and Repair Package (SARP) data

The following subsections describe how each data source was used in the identification of maintenance-critical systems.

2.2.1 MDS Data

Raw MDS maintenance transaction data from January 1978 through December 1981 were acquired from the Navy Maintenance Support Office (NAMSO), Mechanicsburg, Pennsylvania, on computer tape and sorted into Ship Work Authorization Boundary (SWAB) sequence. The data were analyzed to identify system maintenance burdens.

The following MDS data categories were used:

- JCNs
- Parts dollars
- Total man-hours (ship's force and intermediate maintenance activity man-hours)

The number of maintenance actions, represented by the number of JCNs, was used to indicate the frequency of maintenance. The parts dollars were used to indicate the costs of parts used in system maintenance. The ship's force man-hours and intermediate maintenance activity (IMA) man-hours were used to show the effort required to maintain systems at both levels of maintenance.

If the MDS data reported against a SWAB in any of the three categories met a threshold value that was significant in relation to the entire data base, then the system represented was designated a maintenance-critical system. The significance threshold selected was one-half of one percent of the data base total for each category.

2.2.2 CASREP Data

CASREPs were chosen as a data source because the maintenance necessary to correct a CASREP represents a maintenance burden that is required by a ship to fulfill its operational commitments. Specific identification of this information is not contained in the MDS. CASREP summaries were obtained from the Ships Parts Control Center (SPCC), Mechanicsburg, Pennsylvania, for the two ship classes for the period January 1979 through December 1981. The data were used to identify the systems that had recurring malfunctions (as indicated by the number of CASREPs submitted), which affected the operational commitments of each ship. The threshold value chosen for significance was one or more CASREPs per ship operating year.

2.2.3 Overhaul Data

The PERA (CD) Working Repair Profile SARP was reviewed to determine which of the systems identified as being maintenance-critical by MDS or CASREP data required repetitive repair or overhauls during regular overhauls. The Working Repair Profile SARP specifies those systems and equipments that have been identified by PERA (CD) as being common to 9 of the 17 SARPs reviewed for the FFG-1 and FF-1040 Class ships. Review of that document identified those systems and equipments which required repetitive repairs during regular overhauls.

2.3 RANKING OF MAINTENANCE-CRITICAL SYSTEMS

After the maintenance burdens were calculated for each maintenance-critical system, the systems were divided into four lists by data category: JCNs, parts costs, total man-hours, and CASREPs. The systems were ranked in descending order on each list.

To arrive at a final ranking of maintenance-critical systems, it was necessary to develop a method of logically combining the four separate rankings into a single consolidated list. The algorithm selected assumes that each of the four categories previously ranked are of equal importance in defining the final ranking of maintenance-critical systems. To the extent that this assumption is in error, the final composite ranking is imprecise. However, we are confident that the error introduced by this assumption does not have a significant impact on the validity of the final ranking.

To obtain this final ranking, the relative standings of the systems from each of the four sources were summed. The resultant sum was the maintenance burden factor (MBF). This is expressed symbolically as:

$$MBF_i = MH_i + PC_i + JCN_i + C_i$$

where

MBF_i = maintenance burden factor for the i^{th} system

MH_i = Rank of the i^{th} system by man-hours

PC_i = Rank of the i^{th} system by reported parts costs

JCN_i = Rank of the i^{th} system by JCNs

C_i = Rank of the i^{th} system by number of CASREPs

Since the system with the lowest MBF represents the highest maintenance burden, the maintenance-critical systems were ranked by ascending MBF, as illustrated in Table 2-1. The method used to rank the maintenance-critical system was developed to permit equal weighting of the four categories (JCNs, man-hours, parts costs, and CASREPs).

Table 2-1. EXAMPLE OF RANKING BY ASCENDING MAINTENANCE BURDEN FACTOR (MBF)							
SWAB	System	JCNs	Man-Hours	Parts Costs	CASREPs	MBF	MBF Rank
110-1	A	2	1	4	2	9	1
105-3	B	1	9	2	1	13	2
329-4	C	4	16	1	5	26	3
350-2	D	5	4	9	10	28	4
400-4	E	7	15	6	12	40	5

2.4 IDENTIFICATION OF EQUIPMENTS CONTRIBUTING TO SYSTEM MAN-HOURS

After the maintenance-critical systems were identified, it was necessary to identify which equipments within the maintenance-critical systems contributed most to the maintenance burdens of their respective systems. This was accomplished in two steps and identified those equipments whose aggregate man-hour burdens were at least 90 percent of each system's burden.

2.4.1 Identification of Maintenance-Critical Equipments

A computer program was used that sorted the SWAB-ordered MDS data and ranked, by total man-hours, the Allowance Parts List numbers (APLs) reporting data against each SWAB. The program then printed out the APLs whose aggregate man-hour burdens were at least 90 percent of the SWAB man-hours for each SWAB. The equipments represented by the APLs were designated as being maintenance-critical, unless the APLs reported were "NOT LISTED," "UNKNOWN," or something similar. In these cases, the burden was considered to be reported at the system or SWAB level and not against specific identified equipments within those systems.

2.4.2 Identification of Equipment Configuration

After the APLs for the maintenance-critical equipments were defined, the equipments represented by the APLs were identified and listed. This configuration summary was prepared following review of the Surface Ship Type Commander's (TYCOM's) Coordinated Shipboard Allowance Lists (COSALs) for both the Atlantic and Pacific fleets. Because some systems have equipments that do not have APL numbers (e.g., platforms, flats, and decks), it was not always possible to identify the specific equipments that contributed most to the maintenance burdens of the respective maintenance-critical systems. In addition, correlation of summarized maintenance burden data to specific equipments where APLs were reported as "NOT LISTED" or "UNKNOWN" was also not possible.

A series of lists was prepared for each ship class of the maintenance-critical systems and its respective maintenance burdens. Additional lists of the maintenance-critical systems and equipments were also prepared. All systems were listed in SWAB order. In the maintenance-critical equipment tables the APLs were listed in descending order by reported man-hours. For systems where the maintenance burden is reported at the system level or where APL identification was not possible, no APLs were listed. These lists defined the maintenance-critical systems and equipments.

2.5 SELECTION OF SYSTEMS THAT SHOULD BE SUBJECTED TO DETAILED ANALYSIS

Systems that were mission-critical -- in addition to being maintenance-critical -- were also identified. OPNAVINST C3501.2E (19 October 1977) was reviewed to identify the ships' primary mission areas. The functions of maintenance-critical systems were then compared to these mission areas. If the function of a maintenance-critical system was judged to be required for fulfillment of a primary mission, the system was considered to be

mission-critical. Tables were then prepared to list those systems on each ship which were both maintenance- and mission-critical and thus the most appropriate candidates for detailed analysis.

CHAPTER THREE

RESULTS

3.1 MAINTENANCE-CRITICAL SYSTEMS AND EQUIPMENTS

As a result of the review and analysis of MDS and CASREP data, 103 systems on FFG-1 Class ships and 106 systems on FF-1040 Class ships were identified as being maintenance-critical. The appendix lists each of the identified systems in SWAB order and the equipments within each of the identified systems (when equipment identification was possible) that are also maintenance-critical. Included in the lists are the relative rankings of each system within each data category that led to the final MBF rankings.

3.2 PORTION OF CLASS MAINTENANCE BURDEN CONTRIBUTED BY MAINTENANCE-CRITICAL SYSTEMS AND EQUIPMENTS

The maintenance-critical systems and equipments identified by this analysis account for a substantial majority of the total reported maintenance burdens for each ship. The combined burdens for the maintenance-critical systems on FFG-1 Class ships account for about 87 percent of the JCNs, 83 percent of the total reported ship's force and IMA man-hours, 87 percent of the reported parts costs, and 99 percent of the CASREPs. For FF-1040 Class ships the combined burdens account for 86 percent of the JCNs, 84 percent of the total reported ship's force and IMA man-hours, 86 percent of the reported parts costs, and 98 percent of the CASREPs. The remaining maintenance burden is distributed over a wide range of systems and equipments that failed to meet the previously defined selection criteria for maintenance-critical systems and equipments. Thirty-eight percent of the systems on FFG-1 Class ships and 37 percent of the systems on FF-1040 Class ships were determined to be critical to one or more primary mission areas.

3.3 SYSTEMS IDENTIFIED AS BEING MAINTENANCE- AND MISSION-CRITICAL

Thirty-nine systems on FFG-1 Class ships and 39 systems on FF-1040 Class ships were identified from the analysis as being both maintenance- and mission-critical. Tables 3-1 and 3-2 list the SWAB, system nomenclature, MBF, and MBF rank for those systems on FFG-1 Class ships and FF-1040

Table 3-1. FFG-1 CLASS MAINTENANCE- AND MISSION-CRITICAL SYSTEMS IN SWAB ORDER

SWAB	System Nomenclature	MBF	MBF Rank	SWAB	System Nomenclature	MBF	MBF Rank
110-1	Underwater body hull	264	82	440-3	Quality monitoring and control	265	83
221-1	Propulsion boilers	9	1	441-1	Communication antenna systems	200	58
231-1	Propulsion steam turbines	177	50	441-3	Communication transmitters	130	33
241-1	Propulsion reduction gears	303	97	441-4	Communication receivers	102	21
243-1	Propulsion shafting	221	64	441-5	Communication transceivers	65	12
253-1	Main steam piping	129	30	445-1	Teletype and facsimile	92	17
254-1	Main condensers and air ejectors	234	69	450-1	Radar distribution systems	97	18
255-1	Feed and condensate	31	5	451-X	Surface search radars	191	56
262-1	Main lube oil piping	132	34	452-X	2D air search radars	35	8
311-1	SSTGs	32	6	455-1	IFF	165	46
312-1	Emergency generator sets	289	93	460-X	Sonar systems	28	4
314-1	Power conversion equipment	183	53	471-1	Active ECM	191	57
320-1	Power cable	182	51	472-1	Passive ECM	122	27
411-1	Tactical data displays	319	100	481-X	Gun fire control systems	54	10
412-1	Tactical data processing	284	91	482-X	Missile fire control systems	13	2
423-1	Electronic navigation	244	76	483-X	ASW fire control systems	168	48
426-1	Gyrocompass	157	43	520-1/ 521-1	Sea valves/fire and flushing	27	3
426-2	Electrical navigation	122	26	711-1	Guns and mounts	87	15
437-1	Indicating, order, and metering	184	54	721-1	Missile launching systems	35	7
440-2	Satellite communications	173	49				

Table 3-2. FF-1040 CLASS MAINTENANCE- AND MISSION-CRITICAL SYSTEMS IN SWAB ORDER

SWAB	System Nomenclature	MBF Rank	SWAB	System Nomenclature	MBF Rank	MBF Rank
110-1	Underwater body hull	290	440-3	Quality monitoring and control	87	306
221-1	Propulsion boilers	7	441-1	Communication antenna systems	1	222
231-1	Propulsion steam turbines	178	441-3	Communication transmitters	50	111
241-1	Propulsion reduction gears	248	441-4	Communication receivers	75	82
243-1	Propulsion shafting	263	441-5	Communication transceivers	80	53
252-1	Automatic propulsion controls	294	445-1	Teletype and facsimile	89	108
253-1	Main steam piping	74	450-1	Radar distribution systems	12	135
254-1	Main condensers and air ejectors	298	451-X	Surface search radars	91	193
255-1	Feed and condensate	20	452-X	2D air search radars	3	117
262-1	Main lube oil piping	139	455-1	IFF	33	210
311-1	SSTGs	43	460-X	Sonar systems	5	14
312-1	Emergency generator sets	210	471-1	Active ECM	59	215
314-1	Power conversion equipment	230	472-1	Passive ECM	68	127
320-1	Power cable	198	481-X	Gun fire control systems	54	43
411-1	Tactical data displays	218	482-X	Missile fire control systems	62	319
423-1	Electronic navigation	169	483-X	ASW fire control systems	46	161
426-1	Gyrocompass	150	520-1/ 521-1	Sea valves/fire and flushing	37	27
426-2	Electrical navigation	109	711-1	Guns and mounts	21	47
437-1	Indicating, order, and metering	167	721-1	Missile launching systems	44	130
440-2	Satellite communications	168			45	

Class ships, respectively, in SWAB order. All systems listed were determined to be critical to one or more primary mission areas (mobility; command, control, and communications; electronic warfare) from the results of a review of OPNAVINST C3501.2E (19 October 1977). Tables 3-3 and 3-4 present the same information in MBF rank order.

Table 3-3. FFG-1 CLASS MAINTENANCE- AND MISSION-CRITICAL SYSTEMS IN MBF RANK ORDER

SWAB	System Nomenclature	MBF Rank	SWAB	System Nomenclature	MBF Rank	MBF Rank
221-1	Propulsion boilers	9	426-1	Gyrocompass	157	43
482-X	Missile fire control systems	13	455-1	IFF	165	46
520-1/ 521-1	Sea valves/fire and flushing	27	483-X	ASW fire control systems	168	48
460-X	Sonar systems	28	440-2	Satellite communications	173	49
255-1	Feed and condensate	31	231-1	Propulsion steam turbines	177	50
311-1	SSTGS	32	320-1	Power cable	182	51
721-1	Missile launching systems	35	314-1	Power conversion equipment	183	53
452-X	2D air search radars	35	437-1	Indicating, order, and metering	184	54
481-X	Gun fire control systems	54	451-X	Surface search radars	191	56
441-5	Communication transceivers	65	471-1	Active ECM	191	57
711-1	Guns and mounts	87	441-1	Communication antenna systems	200	58
445-1	Teletype and facsimile	92	243-1	Propulsion shafting	221	64
450-1	Radar distribution systems	97	254-1	Main condensers and air ejectors	234	69
441-4	Communication receivers	102	423-1	Electronic navigation	244	76
426-2	Electrical navigation	122	110-1	Underwater body hull	264	82
472-1	Passive ECM	122	440-3	Quality monitoring and control	265	83
253-1	Main steam piping	129	412-1	Tactical data processing	284	91
441-3	Communication transmitters	130	312-1	Emergency generator sets	289	93
262-1	Main lube oil piping	132	241-1	Propulsion reduction gears	303	97
			411-1	Tactical data displays	319	100

Table J-4. FF-1040 CLASS MAINTENANCE- AND MISSION-CRITICAL SYSTEMS IN MBF RANK ORDER						
SWAB	System Nomenclature	MBF Rank	SWAB	System Nomenclature	MBF Rank	MBF Rank
221-1	Propulsion boilers	7	483-X	ASW fire control systems	1	161
460-X	Sonar systems	14	437-1	Indicating, order, and metering	2	167
255-1	Feed and condensate	20	440-2	Satellite communications	3	168
520-1/ 521-1	Sea valves/fire and flushing	27	423-1	Electronic navigation	4	169
311-1	SSTGs	43	231-1	Propulsion steam turbines	5	178
481-X	Gun fire control systems	43	451-X	Surface search radars	7	193
711-1	Guns and mounts	47	320-1	Power cable	8	198
441-5	Communication transceivers	53	312-1	Emergency generator sets	9	210
253-1	Main steam piping	74	455-1	IFF	12	210
441-4	Communication receivers	82	471-1	Active ECM	14	215
445-1	Teletype and facsimile	108	411-1	Tactical data displays	19	218
426-2	Electrical navigation	109	441-1	Communication antenna systems	21	222
441-3	Communication transmitters	111	314-1	Power conversion equipment	22	230
452-X	2D air search radars	117	241-1	Propulsion reduction gears	23	248
472-1	Passive ECM	127	243-1	Propulsion shafting	28	263
721-1	Missile launching systems	130	110-1	Underwater body hull	30	290
450-1	Radar distribution systems	135	252-1	Automatic propulsion controls	32	294
262-1	Main lube oil piping	139	254-1	Main condensers and air ejectors	33	298
426-1	Gyrocompass	150	440-3	Quality monitoring and control	37	306
			482-X	Missile fire control systems		319

CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS

The analysis presented in this report resulted in the identification of 103 systems on FFG-1 Class ships and 106 systems on FF-1040 Class ships that have contributed significantly to the maintenance burden of each ship class. As shown by the MDS data, these systems have required considerable expenditure of corrective maintenance resources. The systems have also been the source of virtually all of the CASREPs reported by the classes.

Because this study identifies the most significant contributors to the maintenance burden for the FFG-1 and FF-1040 ship classes, it serves as an essential first step in the development of improved maintenance strategies for these classes of ships. The study results can be used to direct analytical efforts to areas where significant advances can be realized in developing engineered maintenance strategies for systems and equipments that historically have been sources of maintenance problems. Maintenance data reported for highly ranked systems should be reviewed and analyzed in detail to identify specific areas in which improvements can be made to maintenance strategies and reliability and maintainability. These efforts can reduce the overall system maintenance burden and improve the reliability and maintainability of the installed systems.

APPENDIX

MAINTENANCE-CRITICAL SYSTEMS AND EQUIPMENTS LISTS

This appendix presents the maintenance-critical systems and equipments lists for FFG-1 Class ships and FF-1040 Class ships. Tables A-1 and A-2 list the systems in SWAB order. Each list presents summaries of the pertinent data for each system that indicated its maintenance criticality. Tables A-3 and A-4 list the maintenance-critical equipments within the maintenance-critical systems in order of reported man-hours. In these tables, AEL refers to the Allowance Equipage List number.

SWAB	System Nomenclature	Rank				MBF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile	
		JCNs	Man-Hours	Parts Costs	CASREPs		JCNs	Man-Hours	Parts Costs (dollars)	CASREPs	JCNs	Man-Hours	Parts Costs	CASREPs			
																	MBF
110-1	Underwater body hull	77	60	97	35	264	62	141	1,966	6,131	2	0.2	0.3	0.1	0.1		
120-1	Hull structural bulkheads	83	69	93	34	281	88	104	1,570	6,061	3	0.2	0.3	0.0	0.2		
123-1	Tanks	75	50	99	33	257	81	151	2,691	590	4	0.2	0.5	0.0	0.2		X
130-1	Flight and helicopter decks	85	71	96	35	288	92	69	1,388	1,313	1	0.1	0.2	0.0	0.1		
165-1	Sonar domes	66	75	70	34	245	77	226	1,179	24,616	3	0.3	0.2	0.1	0.2		
167-1	Structural closures	26	19	46	37	128	29	699	7,373	46,876	0	1.0	1.3	0.2	0.0		X
221-1	Propulsion boilers	1	1	6	1	9	1	4,022	49,713	667,355	148	5.9	8.6	3.4	9.0		X
231-1	Propulsion steam turbines	61	57	34	25	177	50	262	2,240	84,571	13	0.4	0.4	0.4	0.8		X
233-1	Main propulsion diesel engines	91	93	82	36	302	96	37	198	13,139	1	0.1	0.0	0.1	0.1		
241-1	Propulsion reduction gears	84	88	97	34	303	97	72	389	2,090	3	0.1	0.1	0.0	0.2		X
243-1	Propulsion shafting	81	35	74	31	221	64	113	4,288	19,574	6	0.2	0.7	0.1	0.3		X
253-1	Main steam piping	31	23	52	23	129	30	671	6,543	41,122	15	1.0	1.1	0.2	0.9		X
254-1	Main condensers and air ejectors	72	42	91	29	234	69	172	3,084	7,126	8	0.3	0.5	0.0	0.5		X
255-1	Feed and condensate	10	4	14	3	31	5	1,588	20,048	241,427	105	2.3	3.5	1.2	6.0		X
256-1	Circulating and cooling SW system	57	45	68	35	205	60	329	3,007	29,348	2	0.5	0.5	0.1	0.1		X
258-1	HP steam drain system	34	24	56	30	144	39	642	6,505	37,493	7	0.9	1.1	0.2	0.4		
261-1	Fuel oil service	30	31	29	29	119	25	672	5,218	101,563	8	1.0	0.9	0.5	0.5		
262-1	Main lube oil piping	38	34	39	21	132	34	559	4,317	70,735	17	0.8	0.7	0.4	1.0		X
311-1	SSTGs	6	6	12	8	32	6	1,711	14,281	288,809	51	2.5	2.5	1.5	3.0		X
312-1	Emergency generator sets	89	83	85	32	289	93	50	487	9,808	5	0.1	0.1	0.1	0.3		X
314-1	Power conversion equipment	59	55	48	21	183	53	300	2,316	15,310	17	0.4	0.4	0.2	1.0		X
320-1	Power cable	45	48	55	34	182	51	495	2,849	38,695	1	0.7	0.5	0.2	0.2		X
320-2	Switchgear and panels	49	67	77	30	223	67	400	1,633	17,558	7	0.6	0.3	0.1	0.4		
330-1	Lighting	15	70	43	37	165	47	929	1,406	59,801	0	1.2	0.2	0.3	0.0		
411-1	Tactical data displays	92	97	94	36	319	100	34	47	5,904	1	0.1	0.0	0.0	0.1		X

(continued)

Table A-1. (continued)

SWAB	System Nomenclature	Rank				MBF	MRF Rank	Class Burden				Percentage of Class Burden			Critical To Primary Mission	Repairs Included In Repair Profile	
		JCNs	Man-Hours	Parts Costs	CASREPs			JCNs	Man-hours	Parts Costs (Dollars)	CASREPs	JCNs	Man-Hours	Parts Costs			CASREPs
412-1	Tactical data processing	92	96	71	25	284	91	34	93	20,776	13	0.1	0.0	0.1	0.8	X	
421-1	Nonelectric/electronic navigation aids	11	15	20	31	77	14	1,322	10,058	159,388	6	2.0	1.7	0.8	0.3		
423-1	Electronic navigation	80	87	61	16	244	76	128	432	31,968	23	0.2	0.1	0.2	1.3	X	
424-1	Depth sounding equipment	79	91	80	32	202	90	130	265	14,788	5	0.2	0.0	0.1	0.3		
426-1	Gyrocompass	51	59	25	22	157	43	384	2,216	126,027	16	0.6	0.4	0.6	0.9	X	X
426-2	Electrical navigation	52	36	15	19	122	26	376	4,154	277,557	19	0.6	0.7	1.2	1.1	X	X
432-1	Telephone systems	41	40	32	37	150	41	543	3,234	93,978	0	0.8	0.6	0.5	0.0		
433-1	Announcing systems	42	56	33	32	163	45	520	2,290	86,654	5	0.8	0.4	0.4	0.3		
434-1	Audio-visual equipment	58	51	59	36	204	59	316	2,581	37,252	1	0.5	0.4	0.2	0.1		
436-1	Alarm, safety, and warning	53	76	67	33	229	68	363	989	29,893	4	0.5	0.2	0.2	0.2		
437-1	Indicating, order, and metering	48	55	47	34	184	54	445	2,316	45,687	3	0.7	0.4	0.2	0.2	X	
440-2	Satellite communications	62	78	18	15	173	49	253	855	182,907	24	0.4	0.1	0.9	1.4	X	
440-3	Quality monitoring and control	82	92	60	31	265	83	105	229	32,044	6	0.2	0.0	0.2	0.3	X	
440-4	Message processing distribution systems (MPDS)	88	90	45	27	250	79	51	367	53,110	11	0.1	0.1	0.3	0.6		
441-1	Communication antenna systems	65	47	62	26	200	58	238	2,859	31,709	12	0.4	0.5	0.2	0.7	X	
441-2	Antennas--multicouplers & tuners	94	99	101	13	307	99	0	0	0	30	0.0	0.0	0.0	1.8		
441-3	Communication transmitters	46	68	9	7	130	33	486	1,581	403,784	53	0.7	0.3	2.1	3.1	X	X
441-4	Communication receivers	27	53	5	17	102	21	687	2,435	766,982	22	1.0	0.4	3.9	1.3	X	X
441-5	Communication transceivers	14	41	4	6	65	12	1,142	3,194	939,376	59	1.7	0.6	4.8	3.4	X	X
441-6	Remote communication devices	54	81	36	14	185	55	354	683	78,404	25	0.5	0.1	0.4	1.5	X	X

(continued)

Table A-1. (continued)

SNAP	System Nomenclature	Rank			MBF Rank	Class Burden				Percentage of Class Burden			Critical To Primary Mission	Repairs Included In Repair Profile		
		JCHS	Man-Hours	Parts Costs		CASREPs	JCHS	Man-Hours	Parts Costs (Dollars)	CASREPs	JCHS	Man-Hours			Parts Costs	CASREPs
442-1	Underwater communication systems	90	86	90	35	301	95	38	450	7,576	2	0.1	0.1	0.0	0.1	
443-1	Visual and audible communication systems	73	82	53	36	244	75	170	497	40,075	1	0.3	0.1	0.2	0.1	
445-1	Teletype and facsimile	24	12	28	28	92	17	722	10,631	101,803	9	1.1	1.8	0.5	0.5	X
446-1	Security equipment	57	79	73	27	236	71	329	800	19,600	11	0.5	0.1	0.1	0.6	
450-1	Radar distribution systems	43	25	16	13	97	18	512	6,409	202,589	30	0.8	1.1	1.0	1.7	X
451-X	Surface search radar	60	74	41	16	191	56	264	1,186	64,070	73	0.4	0.2	0.3	4.3	X
452-X	20 air search radar	7	22	2	4	35	8	1,605	6,622	1,929,479	81	2.4	1.1	9.9	4.7	X
455-1	IFF	55	61	37	12	165	46	344	1,893	77,417	35	0.5	0.3	0.4	2.0	X
460-X	Sonar systems	9	10	3	6	28	4	1,591	11,278	1,156,931	59	2.3	1.9	5.9	3.4	X
465-1	Bathythermograph	88	95	76	34	293	94	51	123	17,637	3	0.1	0.0	0.1	0.2	
471-1	Active ECM	72	80	21	18	191	57	172	749	158,463	20	0.3	0.1	0.8	1.2	X
472-1	Passive ECM	37	52	23	10	122	27	571	2,545	154,075	44	0.8	0.4	0.8	2.6	X
475-1	Declassing	36	85	78	32	281	89	66	458	15,858	5	0.1	0.1	0.1	0.3	
480-3	Testing, antisubmarine warfare intra-system	87	89	95	36	307	98	60	380	3,926	1	0.1	0.1	0.0	0.1	
481-X	Gun fire control systems	12	27	8	7	54	10	1,236	5,575	470,448	53	1.8	1.0	2.4	3.1	X
482-X	Missile fire control systems	2	8	1	2	13	2	2,795	13,717	3,998,949	118	4.1	2.4	20.4	6.9	X
483-X	ASW fire control systems	47	73	17	31	168	48	446	1,252	198,207	6	0.7	0.2	1.0	0.3	X
490-1	Special purpose systems	93	98	100	36	327	102	9	15	20	1	0.0	0.0	0.0	0.1	
491-1	Electronics test, checkout, and monitoring equipment	4	5	13	36	58	11	2,509	17,692	285,755	1	3.7	3.1	1.5	0.1	X
492-1	Flight deck lighting	68	84	58	31	241	74	218	472	35,500	6	0.3	0.1	0.2	0.3	
511-1	Heating systems	20	20	40	20	100	20	798	6,905	69,557	18	1.2	1.2	0.4	1.0	
512-1	Non-machinery ventilation	28	30	50	25	133	36	679	5,272	44,842	13	1.0	0.9	0.2	0.8	X
514-1	Chilled water cooling distribution	13	13	22	20	68	13	1,188	10,367	154,287	18	1.8	1.8	0.8	1.0	X

(continued)

Table A-1. (continued)

SWAB	System Nomenclature	Rank				MHF	MHF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNS	Man-Hours	Parts Costs	CASREPs			JCNS	Man-Hours	Parts Costs (Dollars)	CASREPs	JCNS	Man-Hours	Parts Costs	CASREPs		
516-1	Ships service refrigeration	44	49	54	35	182	52	504	2,732	39,224	2	0.7	0.5	0.2	0.1	X	
520-1/	Sea valves/fire and flushing	3	3	10	11	27	3	2,573	20,865	339,551	42	1.8	3.6	1.7	2.4	X	
528-1	Plumbing drains	67	38	66	35	206	61	219	1,179	29,982	7	0.3	0.6	0.2	0.1	X	
531-1	Distilling plants	21	28	35	21	105	24	787	5,507	82,900	17	1.2	1.0	0.4	1.0	X	
533-1	Potable water service	16	17	26	31	90	16	890	8,075	120,647	6	1.3	1.4	0.6	0.3	X	
541-1	Fuel and fuel commencing system	71	64	63	36	234	70	185	1,777	31,440	1	0.3	0.3	0.2	0.1	X	
543-1	Aviation and general purpose lube oil system	56	55	69	28	218	63	340	1,760	28,943	9	0.5	0.3	0.1	0.5	X	
551-1	HP air system	8	16	11	9	44	9	1,598	8,811	324,524	46	2.4	1.5	1.7	2.7	X	
551-4	Prairie masker air system	78	72	89	33	272	85	135	1,353	8,484	4	0.2	0.2	0.0	0.2	X	
555-1	Fog foam and APFF	39	46	44	32	161	44	548	2,874	51,285	5	0.8	0.5	0.3	0.3	X	
561-1	Steering system	72	62	87	32	253	80	172	1,863	8,638	5	0.3	0.3	0.0	0.3	X	
565-1	Stabilizing fins	63	60	75	25	223	66	252	1,966	18,082	13	0.4	0.3	0.1	0.8	X	
571-1	Replenishment-at-sea winches	74	77	86	29	266	84	163	862	9,729	8	0.2	0.1	0.0	0.5	X	
573-1	Cargo handling elevators	40	29	65	20	154	42	546	5,334	30,720	18	0.8	0.9	0.2	1.0	X	
581-1	Anchor handling and stowage	70	63	83	31	247	78	211	1,805	11,802	6	0.3	0.3	0.1	0.3	X	
583-1	Boat handling and stowage	94	99	101	36	330	103	0	0	0	1	0.0	0.0	0.0	0.1	X	
583-3	Small boats	35	14	31	24	104	23	617	10,199	99,036	14	0.9	1.8	0.5	0.8	X	
593-1	Sanitary waste	94	99	101	29	323	101	0	0	0	8	0.0	0.0	0.0	0.5	X	
611-1	Hull fittings	32	49	49	35	123	28	660	14,132	45,225	2	1.0	2.4	0.2	0.1	X	
613-1	Rigging and canvas	69	54	81	37	241	73	216	2,378	13,172	0	0.3	0.4	0.1	0.0	X	
622-1	Floor plates and gratings	64	43	79	37	223	65	250	3,070	15,843	0	0.4	0.5	0.1	0.0	X	
634-1	Deck covering	36	9	51	37	133	35	579	11,337	41,241	0	0.9	2.0	0.2	0.0	X	
635-1	Hull insulation	50	32	88	37	207	62	387	4,919	8,570	0	0.6	0.8	0.0	0.0	X	
651-1	Commissary spaces	17	39	40	37	133	37	849	3,339	62,947	0	1.3	0.6	0.3	0.0	X	

(continued)

Table A-1. (continued)

SWAP	System Nomenclature	Rank				MBF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNs	Man-Hours	Facts Costs	CASREPs		JCNs	Man-Hours	Facts Costs (\$-1000s)	CASREPs	JCNs	Man-Hours	Facts Costs	CASREPs		
654-1	Utility spaces	29	21	64	33	147	674	6,914	30,729	4	1.0	1.2	0.7	0.2		
660-1	Working spaces	33	33	27	37	130	655	4,648	119,857	0	1.0	0.8	0.6	0.6		
665-1	HMSE workshops	18	44	30	37	129	805	3,023	99,946	0	1.2	0.5	0.5	0.0		X
670-1	Non-cargo stowage spaces	19	11	48	35	103	799	10,909	72,788	2	1.2	1.9	0.4	0.1		
711-1	Guns and mounts	25	26	24	12	87	710	6,927	146,569	35	1.0	1.0	0.7	2.9	X	X
721-1	Missile launching systems	5	18	7	5	35	1,720	7,418	512,250	63	2.5	1.3	2.6	3.7	X	X
722-2	Missile handling and stowage	22	37	19	20	98	768	3,764	162,223	18	1.1	0.6	0.8	1.0		
772-1	Ammunition cargo handling and stowage	90	94	57	36	277	38	150	37,163	1	0.1	0.0	0.2	0.1		
830-1	Design services	76	66	99	37	277	150	1,659	2,017	0	0.2	0.3	0.0	0.0		X
843-1	Tests	58	58	84	37	237	316	2,241	11,491	0	0.5	0.4	0.1	0.0		
991-3	Care and preservation	23	2	72	37	134	750	24,514	19,717	0	1.1	4.2	0.1	0.0		

Table A-2. FF-1040 CLASS MAINTENANCE-CRITICAL SYSTEMS

SNMP	System Nomenclature	Rank				MBF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNs	Man-Hours	Parts Costs	CASREPs		JCNs	Man-Hours	Parts Costs (dollars)	CASREPs	JCNs	Man-Hours	Parts Costs	CASREPs		
110-1	Underwater body hull	77	78	92	43	290	87	264	1,827	10,794	3	0.2	0.2	0.1	0.1	X
120-1	Hull structural bulkheads	90	59	103	39	291	88	117	1,664	1,741	7	0.1	0.4	0.0	0.3	
123-1	Tanks	65	51	102	40	258	79	402	4,251	4,095	6	0.3	0.4	0.0	0.3	X
150-1	Lock house structure	83	69	98	45	295	90	188	2,724	6,702	1	0.2	0.3	0.0	0.0	
165-1	Sonar domes	86	74	83	40	283	34	168	2,475	24,235	6	0.2	0.3	0.1	0.3	
167-1	Structural closures	26	12	40	41	119	24	1,186	19,618	126,364	5	1.0	2.0	0.6	0.2	X
223-1	Propulsion boilers	1	1	4	1	7	1	5,635	62,983	724,194	191	5.0	6.5	3.7	8.1	X
231-1	Propulsion steam turbines	57	39	48	34	178	50	564	5,734	89,975	13	1.0	0.6	0.5	0.6	X
241-1	Propulsion reduction gears	81	85	39	43	248	75	205	1,183	129,151	3	0.2	0.1	0.7	0.1	X
243-1	Propulsion shafting	75	63	90	35	263	80	285	3,140	12,546	11	0.3	0.3	0.1	0.5	X
251-1	Combustion air system	89	89	85	45	308	97	120	1,075	20,965	1	0.1	0.1	0.1	0.0	X
252-1	Automatic propulsion controls	84	80	86	44	294	89	186	1,402	20,437	2	0.2	0.1	0.1	0.1	X
253-1	Main steam piping	15	7	19	33	74	12	1,615	28,088	240,575	14	2.0	2.9	1.2	0.6	X
254-1	Main condensers and air ejectors	80	77	97	44	298	91	245	1,970	6,834	2	0.2	0.2	0.0	0.1	X
255-1	Feed and condensate	5	2	11	2	20	3	2,809	39,305	435,710	137	3.0	4.1	2.2	5.8	X
256-1	Circulating and cooling SW system	53	37	60	37	187	51	593	6,012	64,071	9	1.0	0.6	0.3	0.4	X
258-1	HP steam drain system	21	18	54	31	124	27	1,281	14,576	73,386	17	1.0	1.5	0.4	0.7	
261-1	Fuel oil service	24	23	20	18	85	16	1,228	12,108	232,515	39	1.0	1.3	1.2	1.7	
262-1	Main lube oil piping	35	34	44	26	139	33	993	6,745	110,439	23	1.0	0.7	0.6	1.0	X
311-1	SSTCs	6	8	21	8	43	5	2,664	25,207	227,797	69	3.0	2.6	1.2	3.0	X
311-4	Ship service power generation	101	104	104	45	354	105	6	30	3	1	0.0	0.0	0.0	0.0	
312-1	Emergency generator sets	63	71	47	29	210	59	430	2,603	91,500	19	0.4	0.3	0.5	0.8	X
314-1	Power conversion equipment	72	52	75	31	230	68	359	4,195	36,272	17	0.3	0.4	0.2	0.7	X
320-1	Power cable	37	58	63	40	198	54	925	3,702	51,316	6	0.9	0.4	0.1	0.3	X
320-2	Switchgear and panels	49	70	71	15	225	66	654	2,655	38,601	11	0.6	0.3	0.2	0.5	

(continued)

Table A-2. (continued)

SMAB	System Nomenclature	Rank				MRB Rank	Class Burden				Percentage of Class Burden			Critical To Primary Mission	Repairs Included In Repair Profile	
		JCNs	Man-Hours	Parts Costs	CASREFFs		JCNs	Man-Hours	Parts Costs (dollars)	CASREFFs	JCNs	Man-Hours	Parts Costs			CASREFFs
330-1	Lighting	11	72	42	45	170	47	1,975	2,595	115,300	1	1.9	0.3	0.6		
411-1	Tactical data displays	61	64	24	30	218	62	344	455	187,804	7	0.4	0.0	1.0	0.3	X
412-1	Tactical data processing	82	95	52	38	267	81	197	405	76,488	8	0.2	0.0	0.4	0.3	
421-1	Non-electric/electronic navigation aids	13	15	23	33	84	15	1,932	15,311	193,234	14	1.8	1.6	1.0	0.6	X
421-1	Electronic navigation	60	79	18	12	169	46	451	1,779	240,728	51	0.4	0.2	1.2	2.2	X
421-1	Depth sounding equipment	78	86	87	34	285	86	248	1,162	20,343	14	0.2	0.1	0.1	0.6	
426-1	Gyrocompass	52	42	34	22	150	37	610	5,436	150,844	20	0.6	0.6	0.8	1.2	X
426-2	Electrical navigation	54	33	13	9	109	21	585	7,086	371,919	67	0.6	0.7	1.9	2.4	X
432-1	Telephone systems	36	38	27	45	146	36	950	6,006	172,828	1	0.0	0.6	0.0	0.0	
433-1	Announcing systems	43	48	35	45	171	48	776	4,536	145,382	1	0.7	0.5	0.2	0.0	
434-1	Audio-visual equipment	50	47	59	44	200	56	642	4,599	64,201	2	0.6	0.5	0.3	0.1	
436-1	Alarm, safety, and warning	51	75	64	40	230	70	619	2,145	50,878	4	0.6	0.2	0.3	0.3	
437-1	Indicating, order, and metering	45	62	33	27	167	44	719	3,574	151,182	21	0.7	0.4	0.8	0.9	X
440-2	Satellite communications	59	84	14	11	168	45	446	1,315	325,026	52	0.4	0.1	1.7	2.2	X
440-3	Quality monitoring and control	89	98	80	39	306	96	120	223	27,871	7	0.1	0.0	0.1	0.3	X
440-4	Message processing distribution systems (MFDS)	87	100	32	34	253	78	140	108	162,407	13	0.1	0.0	0.8	0.6	
441-1	Communication antenna systems	69	43	84	26	222	63	379	4,958	23,611	22	0.4	0.5	0.1	0.9	X
441-2	Antennas-multicouplers & tuners	102	105	105	14	326	100	0	0	0	45	0.0	0.0	0.0	2.0	
441-3	Communication transmitters	34	66	5	6	111	22	999	2,984	655,241	85	0.9	0.3	3.4	3.6	X
441-4	Communication receivers	19	40	3	20	82	14	1,380	5,511	970,414	32	1.3	0.6	5.0	1.3	X
441-5	Communication transceivers	12	36	1	4	53	9	1,946	6,449	1,406,307	102	1.8	0.7	7.2	4.3	X
441-6	Remote communication devices	66	88	41	30	225	67	401	1,121	116,909	18	0.4	0.1	0.6	0.8	X

(continued)

SWAB	System Nomenclature	Rank				MBF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNs	Man-Hours	Parts Costs	CASREPs		JCNs	Man-Hours	Parts Costs (Dollars)	CASREPs	JCNs	Man-Hours	Parts Costs	CASREPs		
442-1	Underwater communication systems	99	102	95	43	339	102	53	92	8,413	3	0.0	0.0	0.0	0.1	
443-1	Visual and audible communication systems	79	92	67	45	283	85	247	533	45,467	1	0.2	0.1	0.2	0.0	
445-1	Teletype and facsimile	17	27	28	36	108	19	1,473	9,826	170,137	10	1.4	1.0	0.9	0.4	X
446-1	Security equipment	46	57	55	16	174	49	674	3,709	73,301	42	0.6	0.4	0.4	1.8	
450-1	Radar distribution systems	40	54	15	26	135	32	855	4,101	321,114	22	0.8	0.4	1.6	0.9	X
451-X	Surface search radar	55	81	36	21	193	53	584	1,373	138,713	31	0.6	0.1	0.7	1.3	X
452-X	2D air search radar	48	45	7	17	117	23	665	4,670	541,803	41	0.6	0.5	2.8	1.7	X
455-1	IFF	71	82	38	19	210	60	364	2,372	131,309	33	0.3	0.1	0.7	1.4	X
460-X	Sonar systems	3	6	2	3	14	2	3,368	28,219	1,104,023	116	3.2	2.9	5.6	5.0	Y
462-1	Passive sonar	100	103	99	45	347	104	26	52	6,111	1	0.0	0.0	0.0	0.0	
465-1	Bathythermograph	91	99	69	39	298	94	108	215	42,191	7	0.1	0.0	0.2	0.3	
471-1	Active ECM	74	87	30	24	215	61	312	1,144	168,711	25	0.3	0.1	0.9	1.1	X
472-1	Passive ECM	33	55	29	10	127	28	1,053	4,098	169,879	56	1.0	0.4	0.9	2.4	X
473-1	Torpedo decoys	92	90	74	42	298	93	103	866	36,821	4	0.1	0.1	0.2	0.2	
475-1	Deausing	85	83	96	34	298	92	184	1,345	8,253	14	0.2	0.1	0.0	0.6	
480-3	Testing, antisubmarine warfare intra-system	96	97	82	45	320	99	78	243	25,570	1	0.1	0.0	0.1	0.0	
481-X	Gun fire control systems	9	21	8	5	43	7	2,170	12,350	536,671	86	2.1	1.3	2.7	3.6	X
482-X	Missile fire control systems	97	101	77	44	319	98	67	98	33,702	2	0.1	0.0	0.2	0.1	X
483-X	ASW fire control systems	41	73	17	30	161	42	843	2,516	263,782	18	0.8	0.3	1.1	0.8	X
491-1	Electronics test, checkout, and monitoring equipment	4	5	10	40	59	10	3,144	28,245	442,753	6	3.0	2.9	2.3	0.3	X
492-1	Flight deck lighting	76	91	72	36	275	83	272	719	38,274	10	0.3	0.1	0.2	0.4	
511-1	Heating systems	27	24	45	24	120	25	1,183	11,532	107,766	25	1.1	1.2	0.6	1.1	
512-1	Non-machinery ventilation	23	26	51	32	132	31	1,239	10,973	84,202	15	1.2	1.1	0.4	0.6	X

(continued)

Table A-2. (continued)

SWAB	System Nomenclature	Rank				MRF Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNs	Man-Hours	Parts Costs	CASREPs		JCNs	Man-Hours	Parts Costs (Dollars)	CASREPs	JCNs	Man-Hours	Parts Costs	CASREPs		
514-1	Chilled water cooling distribution	10	11	16	26	63	2,117	19,659	274,817	22	2.0	2.0	1.4	0.9	X	
516-1	Ships service refrigeration	44	35	37	35	151	756	6,662	138,530	11	0.7	0.7	0.7	0.5	X	
520-1/2	Sea valves/fire and flushing	2	4	6	15	27	3,388	30,831	597,627	44	3.2	3.2	3.0	1.9	X	
524-1	Plumbing drains	64	49	70	41	224	409	4,426	41,926	5	0.4	0.5	0.2	0.2	X	
531-1	Distilling plants	14	16	43	13	86	1,649	15,276	114,598	50	1.6	1.6	0.6	2.1	X	
533-1	Potable water service	22	20	26	32	100	1,251	12,436	177,959	15	1.2	1.3	0.1	0.6	X	
541-1	Fuel and fuel compensating system	6	67	61	40	230	440	2,873	61,808	6	0.4	0.3	0.3	0.3	X	
542-3	MOCAS handling and piping	98	96	101	45	340	54	322	4,944	1	0.0	0.0	0.0	0.0		
543-1	Aviation and general purpose lube oil system	56	53	58	36	203	580	4,116	71,124	10	0.6	0.4	0.4	0.4		
545-1	Tank heating	95	93	100	45	333	88	511	5,084	1	0.1	0.1	0.0	0.0		
551-1	HP air system	7	14	12	10	43	2,225	16,536	376,138	56	2.1	1.7	1.9	2.4	X	
551-4	Fractie masker air system	67	50	65	23	205	381	4,380	40,189	27	0.4	0.5	0.3	1.1		
554-1	foam and AFF	42	64	53	40	199	784	3,095	75,073	6	0.7	0.3	0.4	0.3		
561-1	Steering system	64	68	91	28	251	409	2,738	12,497	20	0.4	0.3	0.1	0.8		
565-1	Stabilizing fins	70	65	78	22	235	373	3,012	31,654	29	0.4	0.3	0.2	1.2		
571-1	Replenishment-at-sea winches	70	60	76	37	243	373	3,622	33,581	9	0.4	0.4	0.2	0.4	X	
573-1	Cargo handling elevators	32	25	62	25	144	1,073	11,263	61,205	24	1.0	1.2	0.3	1.0		
581-1	Anchor handling and stowage	58	56	93	37	244	464	3,995	10,757	9	0.4	0.4	0.1	0.4	X	
583-2	Life-saving equipment	94	76	88	44	302	92	2,069	18,780	2	0.1	0.2	0.1	0.1	X	
583-3	Small boats	16	10	31	19	76	1,518	21,031	168,166	33	1.4	2.2	0.9	1.4	X	
593-1	Sanitary waste	102	105	105	44	356	0	0	0	2	0.0	0.0	0.0	0.1		
611-1	Hull fittings	29	9	50	41	129	1,130	22,720	85,788	5	1.0	2.4	0.4	0.2		
613-1	Pligging and canvas	73	44	89	46	252	320	4,948	12,877	0	0.3	0.5	0.1	0.0		

(continued)

Table A-2. (continued)

SWAB	System Nomenclature	Rank				MBF	MBP Rank	Class Burden				Percentage of Class Burden				Critical To Primary Mission	Repairs Included In Repair Profile
		JCNS	Man-Hours	Parts Costs	CASREFS			JCNS	Man-Hours	Parts Costs (Inflate)	CASREFS	JCRS	Man-Hours	Parts Costs	CASREFS		
622-1	Floor plates and gratings	68	32	79	46	225	65	380	7,674	28,538	0	0.4	0.8	0.1	0.0		
634-1	Deck covering	47	17	81	46	191	52	666	15,197	26,182	0	0.6	1.6	0.1	0.0		X
651-1	Commissary spaces	8	28	46	40	122	26	2,176	9,207	105,095	6	2.1	1.0	0.5	0.3		
654-1	Utility spaces	30	19	68	41	158	40	1,122	14,214	46,467	5	1.1	1.5	0.2	0.2		
660-1	Working spaces	31	30	56	46	163	43	1,104	8,247	73,243	0	1.0	0.9	0.4	0.0		
665-1	HME workshops	25	29	49	43	146	35	1,220	8,911	86,037	3	1.2	0.9	0.4	0.1		X
670-1	Non-cargo stowage spaces	20	22	22	45	109	20	1,363	12,257	214,686	1	1.3	1.3	1.1	0.0		
711-1	Guns and mounts	18	13	9	7	47	8	1,417	18,288	514,106	70	1.3	1.9	2.6	3.0		X
721-1	Missile launching systems	39	46	25	20	130	30	202	4,645	178,885	32	0.9	0.5	0.9	1.4		X
722-2	Missile handling and stowage	28	41	57	27	153	39	1,148	5,451	72,912	21	1.1	0.6	0.4	0.9		
772-1	Ammunition cargo handling and stowage	88	61	94	29	272	82	133	3,587	8,754	19	0.1	0.4	0.0	0.8		
993-1	Care and preservation	38	3	73	46	160	41	921	33,757	37,743	0	0.9	3.5	0.2	0.0		
ORD-1	Expendable ordnance (missiles, mines, torpedoes)	93	31	66	46	236	72	96	8,146	48,682	0	0.1	0.8	0.2	0.0		

Table A-3. FFG-1 CLASS MAINTENANCE-CRITICAL EQUIPMENTS

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
82	110-1	Underwater body hull Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APLs: Valve plt, .50IPS, 20PSI Valve plt, .25IPS, 13T, 20PSI Valve plt, .50IPS, 5T, 80PSI	 882220294 882220363 882220313
88	120-1	Hull structural bulkheads Burden reported at system level.	None
81	123-1	Tanks Burden reported at system level.	None
92	130-1	Flight and helicopter decks Burden reported at system level.	None
77	165-1	Sonar domes Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
29	167-1	Structural closures Burden reported at system level.	None
1	221-1	Propulsion boilers Mn stm boiler, 1300PSI Mn stm boiler, 1300PSI Mn stm boiler, 1300PSI Gate valve, 2.5IPS, 1500 PSI GLB valve, .50IPS, 1500PSI CTFGL supercharger CTFGL supercharger (continued)	 021550081 021550090 021550083* 882044936* 882055178 882001343 053010003 053010004
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	221-1 (cont)	Burner oil press atmg, 4000lbs, 14.437in BBL Burner oil press atmg, 4000lbs, 14.437in BBL	300080100 300080101
50	231-1	Propulsion steam turbines Turbine stm mn LP Turbine stm mn HIP, 7889rpm, 17100shp Thermometer SLFINDG, 90 deg Starter motor, SZ1, 440/220/110V Condenser stm aux Turbine stm mn LP, 35000shp	051800346 051800344 1-870001272 151207647 040010019 051260782
96	233-1	Main propulsion diesel engines Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
97	241-1	Propulsion reduction gears Gear assy, SPD decr Gear assy, SPD decr mn	691980149 691300125
64	243-1	Propulsion shafting Bearing assy ln shft, INBD Stuffing box	371010171 831000122
30	253-1	Main steam piping Burden reported at system level.	None
69	254-1	Main condensers and air ejectors Ejector assembly, 120PSI, 2NZL, 2stg Condenser stm mn, 600sqft, 3892TB Condenser stm aux, 54.8sqft, 100TB	730750066 040090098 040010019
5	255-1	Feed and condensate CTFGL pump, 590gpm, 1380PSI, 6650rpm, TD CTFGL pump, 630gpm, 65PSI, 1745rpm, MD CTFGL pump, 320gpm, 60PSI, 1160rpm, MD CTFGL pump, 630gpm, 65PSI, 1170rpm, MD (continued)	016031402 016210189 016210191 016000417

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	255-1 (cont)	CTFGL pump, 590gpm, 1450PSI, 7500rpm, TD Turbine stm mn, FD pump Turbine stm mn, FD pump Valve gate, 5.00IPS, 900PSI CTFGL pump, 320gpm, 60PSI, 1150rpm, MD Valve ANL, .50IPS, 1500PSI Heater deaerating, 254730lbs/hr cap Valve CHK, STP GLB, 4.00IPS, 900PSI CTFGL pump, 15gpm, 70PSI, 3500rpm Motor ac, 440V, 40hp, 1175rpm Valve DPHRM, CONT plt oper, 4.00IPS, 1500PSI Valve RLF, 1.00IPS	017020027 057300045 057260193 882043874 016031405 882002159 074240031 882033066 016110267 174802450 882190901 883113127
60	256-1	Circulating and cooling SW system Motor ac, 440V, 7.5hp, 3515rpm CTFGL pump, 13500gpm, 14PSI, 1100rpm Turbine stm mn, FD pump Valve CHK, STP ANL, 13.00IPS, 100PSI Valve gate, 24.00IPS, 30PSI	174751418 016031399 057950087 882032794 882043629
39	258-1	HP steam drain system CTFGL pump, 30gpm, 58PSI, 1715rpm, MD Motor ac, 440V, 100hp, 1775rpm CTFGL pump, 15gpm, 70PSI, 3500rpm Valve red, 1.00IPS, 1500PSI, 100T Valve GLB, .50IPS, 1500PSI Valve gate, 1.00IPS, 1500PSI Valve GLB, .75IPS, 1500PSI Motor ac, 440V, 5hp, 3450rpm Valve GLB, .50IPS, 1500PSI Valve plt, .25IPS, 20PSI Controller ac, mag LVP, SZ2, 440V, 2SPD Valve RLF, 1.50IPS, 575T, 719PSI Valve gate, .50IPS, 600PSI Valve GLB, 1.5IPS, 1500PSI Valve red spcl, .25IPS, 200PSI, 5T Valve gate, 1.00IPS, 1500PSI Valve GLB, .50IPS, 1500PSI	016210192 174802651 016110267 882094637 882054046 883113456 882044235 882051967 174720469 882051966 882220363 151205472 883112640 882044064 882053287 882240565 882044549 882055285

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
25	261-1	Fuel oil service Rty pwr pump, 25gpm, 590PSI, 1750rpm Burner oil, press atmg, 4000lbs, 14.437in BBL Motor ac, 440V, 20hp, 1800rpm Valve gate, 6.00IPS, 150PSI Valve RLF, .50IPS, 558T, 677PSI Valve B GLB, 1.5IPS, 300PSI Rty pwr pump, 2.86gpm, 1800rpm, MD Valve RLF, .50IPS, 581T, 702PSI	016160460 300080100 174342032 882045362 883113283 882302242 017210055 883113196
34	262-1	Main lube oil piping Valve, pmp gov, 1.0IPS, 600PSI, 15T, 50PSI CTFGL purifier, FO x LO, 225gph CTFGL purifier, FO x LO, 225gph Rty pwr pump, 500gpm, 55PSI, 1750RPM, TD Turbine stm, LO ser pump Motor ac, 440V, 40hp, 1800rpm Strainer dplx, 5.00in	882260313 760010081 760200196 016160463 057150188 174342031 750440017
6	311-1	SSTGs Dsl engine 10, 38F5, 716hp, 1200rpm Dsl engine 10, 38F5, 716hp, 1200rpm Turbine gen stm, 500kW Turbine gen stm, 500kW CTFGL pump Strainer dplx, 2.0in	665360215 665360216 057800169* 057260191 016110271 750430213
93	312-1	Emergency generator sets Generator ac, 450V, 500kW, 1200rpm Generator ac, 450V, 500kW, 1200rpm	162300011 162900152
53	314-1	Power conversion equipment Motor generator, 440Vac, 450Vac, 30kW Regulator V, spr400, lvr44-40 Regulator V, 10300-100 Power supply, 440Vac, 50Vdc, 3.0kW	181240036 420570001 420320005 111700010
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
51	320-1	<p>Power cable</p> <p>Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APLs:</p> <p>Cable, type THOF-400 Motor ac, 440V, 5hp, 3450rpm Transformer pwr, stpd, 1500VA, 450/120V Cable x accy, casualty pwr supply ac</p>	<p>2-620014070 174802373 131400124 2-620014055</p>
67	320-2	<p>Switchgear and panels</p> <p>Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.</p>	None
47	330-1	<p>Lighting</p> <p>Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APLs:</p> <p>Lantern elec, sym105 Relay ac, 110V, 2pole, 10.0amp control</p>	<p>249990380 198301023</p>
100	411-1	<p>Tactical data displays</p> <p>Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.</p>	None
91	412-1	<p>Tactical data processing</p> <p>Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.</p>	None
14	421-1	<p>Nonelectric/electronic navigation aids</p> <p>Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.</p>	None

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
76	423-1	Electronic navigation AN/SRN-15, beacon-transponder set	57130213
90	424-1	Depth sounding equipment AN/UQN-1H, sounding set	58413640
43	426-1	Gyrocompass Compass gyro, Mk19, Mod3B Amplifier synch SNL, Mk31, Mod8A Power supply stnby Indicator scou, Mk2, Mod2	252360028 253830008 259390001 253050016
26	426-2	Electrical navigation Plotting table, MkNC2, Mod1 Plotting table, MkNC2, Mod2 Indicator transmitter, UWTR log Indicator DRA Hoist rodmeter, hnd oper Indicator DRA, Mk2, Mod1	287810001 282130001 870420003 282130003 581030003 287810002
41	432-1	Telephone systems Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APLs: H-200/U, headset Jackbox type G-15C C-7594 A/U, control, remote switching Relay ac x dc, 2pole, 2.0amp timing LS-458/SIC, intercommunication station	67190000 70038202* 61399919 199020004 72754458
45	433-1	Announcing systems AN/SIA-114A, amplifier-oscillator group AM-4453/U, amplifier speaker Switch tgl, sym 780.5 LS-386A/SIC, intercomm station Amplifier AF, ty AM 2416/SIA AN/SIA-114B, amplifier-oscillator group	56904905 52502400 219990749 72748605 261050014 56904910
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
59	434-1	Audio-visual equipment Projector SMP, 16mm Projector SMP, 16mm C-3766 A/WIH, control, recorder-reproducer Projector SMP, 16mm	26150012 261750006 61376605 261850011
68	436-1	Alarm, safety, and warning Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
54	437-1	Indicating, order, and metering Indicator transmitter Panel ind sal, ty IC/D6RM Panel ind sal Indicator transmitter EOR Temperature measuring kit Indicator rec, tank lvl Panel ind sal, IC/D2RMSA2M	271080197 381050011 381040042 271140017 2-870004111 384890324 381050254
49	440-2	Satellite communications Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
83	440-3	Quality monitoring and control Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
79	440-4	Message processing distribution systems AN/SKR-4, receiver, telemetric data AN/USM-281, oscilloscope test	568711110 58627081
58	441-1	Communication antenna systems AS-2537/SR 66047, Fc1, whip antenna AS-2537A/SR, antenna (continued)	59309931 06604700 59129531

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	441-1 (cont)	66046, antenna mast section	06604600*
99	441-2	Antennas -- multicouplers & tuners Burden reported at system level.	None
33	441-3	Communication transmitters AN/URT-23A(V), transmitting set, radio AN/WRC-1, radio set AN/URT-24A, transmitting set, radio AM-3924A(P)/URT, amplifier, radio freq AN/URT-24, transmitting set, radio AN/URT-23(V), transmitting set, radio	58557800CL 59001100CL 58557835CL 52389000 58557824CL* 58557823CL
21	441-4	Communication receivers R-1051/URR, receiver AN/SRR-19A, receiving set, radio AN/WRR-3A, receiving set, radio AN/URA-38A, antenna coupler, radio AN/SRR-19, receiving set, radio R-390A/URR, receiver, RA radio AN/WRR-3B, receiving set, radio R-1051E/URR, receiver, RA radio	81095100 57141318 59005301* 58433801 57141319 81039001 59005302 81099010
12	441-5	Communication transceivers AN/URC-9, radio set AN/SRC-20, radio set AN/SRC-2 radio set AN/URC-9, Fc-1	58439716 57112000 57112100 10017419NA
55	441-6	Remote communication devices Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
95	442-1	Underwater communication systems AN/WQC-2A, communication set, sonar	58992423
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
75	443-1	Visual and audible communication systems Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
17	445-1	Teletype and facsimile AN/UGC-6K, printer, TY page AN/UGC-25A, teletypewriter set AN/UGC-16, teletypewriter set	58138242 58139025 58139050
71	446-1	Security equipment Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
18	450-1	Radar distribution systems AN/SPA-25A, indicator group AN/SPA-25C, indicator group AN/SPA-66B, radar indicator AN/SPA-25B, indicator group AN/SPA-66, indicator group	56982411 56982420 56986610 56982418 56986600
56	451-X	Surface search radar AN/SPS-10F, radar set 90073-LM-66, 36mi range radar	57036630 37391404
8	452-X	2D air search radar CP-784/U IP-801/SPS-52, indicator digital display T-1221/SPS-52A, transmitter, radar OA-6566/SPS-52, computer, radar group PU-455/U, motor generator, radar	62406440* 95445500 88486011 62405340 57040801
46	455-1	IFF AN/UPM-137A, radar AN/UPX-23, interrogator set (continued)	58286940 58393723
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	455-1 (cont)	AN/UPX-11, interrogator set AN/UPX-17, transponder set MX-8758/UPX, blanker interference AN/UPM-98, test set radar	58393100 58393700 57194369 58289800
4	460-X	Sonar systems AN/SQS-26 BX, detecting-ranging set, sonar AN/SQS-26 AXR, detecting-ranging set, sonar Cooler FD, 0.18sqft, 57TB, ty A	57091610 57091608 030010110
94	465-1	Bathythermograph Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
57	471-1	Active ECM AN/ULQ-6B, countermeasures set AN/SLQ-25, torpedo countermeasures set AN/SLQ-24A(V)1, countermeasures set	58158610 57011410 56940342CL
27	472-1	Passive ECM AN/WLR-1C with transistorized radio AN/WLR-1G, receiving set, ECM AN/WLR-1A w/o tuner, receiving set AN/SLA-12A AN/SLQ-32(V)2, CRPS AS-571A/SLR, antenna array AN/SLA-10A, blanker-video mixer group	58981717* 58981705 58981706* 56935918 56940357 59157100 56935901*
89	475-1	Degaussing Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
98	480-3	Testing, antisubmarine warfare intra-system Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
10	481-X	Gun fire control systems Director, gun, Mk56, M7&8 Element, stable, Mk6 Elev-train amp mot-gen, for dir, gun, Mk56, M3,6,7&8 Mk35, Mod2, radar equipment Console, Mk4, M9&17	49402624 49400240* 49402678 49402600 49402657*
2	482-X	Missile fire control systems AN/SPG-51C, digital update Mk24, Mod0, transmitter, target designation Mk72, Mod13, converter, signal data Mk73, Mod1, director, gun & guided missile, ser 52-87 Mk73, Mod1, director, gun & guided missile, ser 18-51 Mk152, Mod1, digital computer Mk1, Mod2, weapons direction equip	49402955 49400960 49401919 49402832 49402831 49402772 49401754
48	483-X	ASW fire control systems Mk53, Mod0, console, attack Switchboard Fc, Mk33, Mod15	005000002 220510093*
102	490-1	Special purpose systems Burden reported at system level.	None
11	491-1	Electronics test, checkout, and monitoring equipment Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equip- ment APLs: AN/USM-281, oscilloscope 89536-893A, Voltmeter, electronic AN/USM-115, calibrator set, range AN/USM-117C, oscilloscope	58627081 61954492 58614100 58614308
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
74	492-1	Flight deck lighting Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
20	511-1	Heating systems Boiler stm aux, 155PSI, 4000lbs/hr cap Boiler stm aux, 155PSI, 4000lbs/hr cap Heater vent, DCTP, SZ S23L Heater vent, DCTP, SZ S21L Heater vent, DCTP, SZ S21M Valve GLB, .50IPS, 1500PSI CTFGL pump, 8gpm, 22PSI, 3500rpm Heater vent, DCTP, SZ S24L Heater vent, DCTP, SZ S25L Rty pwr pump, 330gpm, 100PSI, 1725rpm Boiler stm mn, 635PSI, 1837TB Heater wtr insts, 40.0gpm max	022050020 022050019 070990032 070990021 070990022 882051966 017030046 070990036 070990041 017210135 021550019* 074100017
36	512-1	Non-machinery ventilation Motor ac, 2spd, 440V, 15/6.7hp Fan vanaxial, portable Fan vanaxial, prt1, SZ 01-2A1X5, 500cfm Motor ac, 2spd, 440V, 15/6.7hp Motor ac, 440V, 1.5hp, 3450rpm Motor ac, 440V, 1.25hp, 3450rpm Ice-making machine, flake Motor ac, 2spd, 440V, 4/1.8hp	174720549 2-380044060 400090105 174720471 174720467 174720470 326120042 174720519
13	514-1	Chilled water cooling distribution CTFGL pump, 75gpm, 60PSI, 3500rpm CTFGL pump, 75gpm, 60PSI, 3480rpm Compressor RFG, vert Motor ac, 440V, 30hp, 1760rpm Compressor RFG, ty V Refrigeration plant, air cond, 24ton cap Motor ac, 440V, 10hp, 1800rpm Refrigeration plant, air cond, 24ton cap Motor ac, 440V, 7.5hp, 3480rpm Compressor RFG, ty W	016110270 0162101083 060950146 174801836 060150113 325010279* 174342044 325000227 174342396 060950152
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
52	516-1	Ships service refrigeration Refrigeration system, food sto, 4ton cap Refrigeration system, food sto, 1.8ton cap	325000226 325010278
3	520-1/ 521-1	Sea valves/fire and flushing Gate valve, 5.0IPS, 250PSI CTFGL pump, 900gpm, 125PSI, 1775rpm, MD CTFGL pump, 900gpm, 125PSI, 3550rpm CTFGL pump, 150gpm, 30PSI, 1750rpm, mcc CTFGL pump, 900gpm, 125PSI, 1800rpm, MD Valve GLB, B, 3.00IPS, 150PSI Engine dsl, 25.0hp, 2400rpm Valve red, 4.0IPS, 150PSI, 30T, 60PSI Motor ac, 440V, 100hp, 1775rpm Motor ac, 440V, 100hp, 3510rpm Valve gate, 3.0IPS, 250PSI	882044023 016210195 016020765* 017000027 016150938 882303684 667770002 882091115 174802651 174030910* 882042017
61	528-1	Plumbing drains Valve press reg, 1.00IPS, 50PSI Ejector, 4.00in conn, 100PSI, 10ft suct, 27ft hd CTFGL pump, 30gpm, 58PSI, 3500rpm, mcc	882094394 740000207 016031398
24	531-1	Distilling plants CTFGL pump, 120GPM, 30PSI, 3500rpm Distillation unit, 12000gpd, 501TB Distillation unit, 8000gpd, 398TB CTFGL pump, 4gpm, 50PSI, 3550rpm, mcc Valve, SOL, 115Vac, .75IPS CTFGL pump, 7gpm, 35PSI, 3550rpm, mcc Motor ac, 440V, 1.5hp, 3520rpm	016110276 080030019 080100020 016020791 882180795 016020792 174751264
16	533-1	Potable water service CTFGL pump, 40gpm, 50PSI, 3515rpm CTFGL pump, 40gpm, 50PSI, 3500rpm CTFGL pump, 15gpm, 25PSI, 3555rpm Demineralizer, pure water system (continued)	016210196 016110273 016110321 080150006
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	533-1 (cont)	Heater wtr insts, 20gpm max CTFGL pump, 125gpm, 80PSI, 3500rpm Strainer sgl, 8.0in Valve RLF, 1.5IPS, 49T, 68PSI CTFGL pump, 30gpm, 58PSI, 3500rpm CTFGL pump, 155gpm, 100PSI, 3530rpm Motor ac, 2spd, 440V, 15/6.7hp Valve temp regg, 1.25IPS, 140T, 180°F	074100015 016110356 750430212 883113209 016031398 016110325 174720471 882142134
70	541-1	Fuel and fuel compensating system Burden reported at system level.	None
63	543-1	Aviation and general purpose lube oil system Valve RLF, 1.25IPS, 43T, 69PSI Motor ac, 440V, 3hp, 1730rpm Rty pwr pump, 50.0gpm, 75PSI, 520rpm, MD Valve ANL, 2.50IPS, 100PSI	883113197 174751113 016200106 882000473
9	551-1	HP air system Compressor HIP air, 7.5cfh, 3000PSI Compressor LP air, 100cfm, 125PSI Dehydrator fltr dscc, 15scfm, 80PSIG Valve RLF ANL, .50IPS, 18T, 32PSI Compressor LP air, 100cfm, 150PSI Compressor HIP air, 20cfh, 3000PSI Valve RLF, .50X, .75IPS, 116T, 150PSI Valve GLB, .37IPS, 6000PSI Dehydrator fltr RT-GT, 30scfm, 120PSIG Motor ac, 440V, 30hp, 1760rpm Valve RLF, .75IPS, 35T, 44PSI Dehydrator fltr RFGT, 100scfm Valve GLB, .25IPS, 600PSI	061900210 061900359 440210029 883113348 061900294* 061430260 883112214 882054058 440300014 174750904 883114901 440300032 882053987
85	551-4	Prairie masker air system Turbine stm, aux gen Compressor CTFGL, 1400cfm, 25PSI CTFGL pump, 6gpm, 70PSI, 3600rpm, mcc	057260189* 061900282 017030097*
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
44	555-1	Fog foam and AFFF Valve DPHRM CONT, plt oper, 1.00IPS, 150PSI Extinguisher x accy CO ₂ , 15lb Valve DPHRM CONT, plt oper, 2.50IPS, 150PSI CO ₂ cylinders fxd, CO ₂ sys Proportioner folq, 60/180gpm	882191594 2-930054004 882191528 2-930054056 640020009
80	561-1	Steering system Steering gear, ELHYD ram ty Steering gear, ELHYD ram ty Axial pstn pump, 45.4gpm, 1750rpm, 2000PSI	600250061 600230014 019160360
66	565-1	Stabilizing fins Stabilizer ship, fin ty Stabilizer ship, fin ty Axial pstn pump, 6.3gpm, 1200rpm, 500PSI Axial pstn pump, 41.0gpm, 1200rpm, 3500PSI	319160005 319350001 019210099 019210098
84	571-1	Replenishment-at-sea winches Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
42	573-1	Cargo handling elevators Davit boat, TRWA, sgl bank Davit boat, TRWA, sgl bank Winch elec Conveyor vert tray, 85lbs cap @56fpm Cylinder act lin Davit boat, TRWA, sgl bank	560010207 560010206 620890078 590390026 853160310 560010204
78	581-1	Anchor handling and stowage Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
103	583-1	Boat handling and stowage Burden reported at system level.	None

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
23	583-3	Small boats Engine dsl 6, 250hp, 2300rpm Engine dsl 6, 250hp, 2300rpm Engine dsl 6, 230hp, 2300rpm Engine dsl 4, 4.107 Boat pers, 26ft, Mk3	666010297 666010147 666010146 664070001* 720100079
101	593-1	Sanitary waste Burden reported at system level.	None
28	611-1	Hull fittings Burden reported at system level.	None
73	613-1	Rigging and canvas Burden reported at system level.	None
65	622-1	Floor plates and gratings Burden reported at system level.	None
35	634-1	Deck covering Burden reported at system level.	None
62	635-1	Hull insulation Burden reported at system level.	None
37	651-1	Commissary spaces Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
40	654-1	Utility spaces Burden reported at system level.	None
32	660-1	Working spaces Burden reported at system level.	None
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-3. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
31	665-1	HM&E workshops Burden reported at system level.	None
22	670-1	Non-cargo stowage spaces Burden reported at system level.	None
15	711-1	Guns and mounts Mk1, Mod8, housing, 5in Fuze setter, Mk17, Mod all Slide, Mk24, Mod all Gear, elev & trn, Mk6, Mod all Mk12, Mod1, barrel gun, 5in-38cal	006020151 006020157* 006020165 006020167 006020161
7	721-1	Missile launching systems Mk123, Mod0, launcher, guided missile Mk9, Mod0, magazine, guided missile Mk7, Mod2, guide, launcher	004020071 004020072 005020021
19	722-2	Missile handling and stowage Surface vessel torpedo launcher, Mk32, Mod5&7 Hoist chn, air oper, 1000lbs cap Mk42, Mod0T2, truck handlift u/w ASROC msl	006320222 5E0540021 005030008
87	772-1	Ammunition cargo handling and stowage Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
86	830-1	Design services Burden reported at system level.	None
72	843-1	Tests Burden reported at system level.	None
38	993-3	Care and preservation Burden reported at system level.	None
*Data were reported, but installation of this equipment on FFG-1 Class ships could not be positively confirmed in the COSAL.			

Table A-4. FF-1040 CLASS MAINTENANCE-CRITICAL EQUIPMENTS

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
87	110-1	Underwater body hull Burden reported at system level.	None
88	120-1	Hull structural bulkheads Burden reported at system level.	None
79	123-1	Tanks Burden reported at system level.	None
90	150-1	Deck house structure Burden reported at system level.	None
84	165-1	Sonar domes Sonar dome rubber window Water control system, sonar dome Valve RLF press, 3.00IPS, 18T, 32PSI Valve RLF, 1.00IPS, 151T, 180PSI Valve CHK SWG, 2.50IPS, 250PSI	316330001 316330004 882112742 883112531 882032745
24	167-1	Structural closures Burden reported at system level. Maintenance not reported at system level was reported against the following equipment APL: Door MRN, 26in x 66in, 3dog	312090001
1	221-1	Propulsion boilers Boiler stm mn, 1300PSI Boiler stm mn, 1300PSI Boiler stm mn, 1300PSI Boiler stm mn, 1300PSI Supercharger CTFGL, bor Supercharger CTFGL, bor Burner oil, press ATMG, 4000lbs, 14.437in BBL Valve Y, 1.50IPS, 1500PSI (continued)	021550081 021550090 021550083* 021550089* 053010004 053010003 300080100 882010223
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment* APL or AEL
	221-1 (cont)	Valve RLF, bor sfty, 2.50IPS, 1315T, 1365PSI Indicator sgt liq, 18in LH, 33.125 in CTR to CTR Valve Y, 1.50IPS, 1500PSI Valve GLB, .75IPS, 1500PSI Valve gate, 2.50IPS, 1500PSI Valve DPHRM CONT, plt oper, 2.00IPS, 1500PSI Valve GLB, .50IPS, 600PSI Valve RLF, 1.00IPS, 459T, 557PSI	882170304 450030024 882010589 882051810 887045194* 882190899 882054864* 883111650
50	231-1	Propulsion steam turbines Turbine stm mn HIP, 7889rpm, 17100shp Turbine stm mn LP Turbine stm mn HIP, 7889rpm, 17100shp Fan CTFGL GLD exh, 10cfm Turbine stm mn LP, 38rpm, 35000shp Valve RLF, .50IPS, 100PSI Turbine stm mn HP, 50rpm, 35000shp	051800344 051800346 051800351 400060417 051260781 883112687 051260778
75	241-1	Propulsion reduction gears Gear assy, SPD decr Motor ac, 440V, 3hp, 1620rpm	691980149 174802382
80	243-1	Propulsion shafting Bearing assy in shft, INBD Seal PLN encsd Stuffing box Stuffing box	371010171 831000090 831000135 831000130
97	251-1	Combustion air system Rty pwr pump, 30.0gpm, 30PSI, 3500rpm Supercharger CTFGL, bor mdl 18AT11-2 Motor ac, 440V, 30hp, 1760rpm	016160509 053010004 174801836
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
89	252-1	Automatic propulsion controls Control system, Comb × FD WTR Valve GLB, .50IPS, 1500PSI Control vl FO, lin, 600PSI Motor ac, 440V, 25hp, 1175rpm	619510093 882051966 619040093* 174751114
12	253-1	Main steam piping Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
91	254-1	Main condensers and air ejectors Condenser stm mn, 600sqft, 3892TB Condenser stm aux, 54.8sqft, 100TB Condenser stm mn, 535sqft, 3890TB Ejector assembly, 120PSI, 2NZL, 2stg Ejector assembly, 120PSI, 2NZL, 2stg Valve RLF, 2.00IPS, 18T, 32PSI	040090098 040010019 040150078 730750066 130200082 883112451
3	255-1	Feed and condensate CTFGL pump, 590gpm, 1380PSI, 6650rpm, TD Turbine stm mn, FD pmp CTFGL pump, 590gpm, 1450PSI, 7500rpm, TD Cooler FD, 1.15sqft, clg sur, ty B CTFGL pump, 630gpm, 65PSI, 1745rpm, MD CTFGL pump, 320gpm, 60PSI, 1160rpm, MD Heater deaerating, 254730 lbs/hr cap Turbine stm mn, pmp Valve GLB, 4.00IPS, 900PSI Cooler FD, 9.50sqft, clg sur, 130TB, ty A CTFGL pump, 100 gpm, 50PSI, 3470rpm, mcc Filter fdpress, mdl D3W18774 Coupling flex, 10in, brz, 50PSI Vacuum pump, rty pwr, 10.0cfm, 3500rpm CTFGL pump, 630gpm, 65PSI, 1170rpm, MD CTFGL pump, 320gpm, 60PSI, 1150rpm, MD Valve RLF, 4.00IPS, 20T, 24PSI	016031402 057300045 017020027 030350001 016210189 016210191 074240031 057260193 882053683 030300063 016210193 480020163 990990262 017070120 016000417 016031405 883112582
(continued)			
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	255-1 (cont)	Cooler FD, 1.06sqft, clg sur, 1C, ty 1 Motor ac, 440V, 40hp, 1745rpm Valve GLB, .75IPS, 1500PSI Valve RLF, 3.00IPS, 2T1	030010122 174802650 882054364 882110071
51	256-1	Circulating and cooling SW system CTFGL pump, 320gpm, 60PSI, 1160rpm, MD Turbine stm mn, circ pump CTFGL pump, 900gpm, 125PSI, 3550rpm Valve red, 4.00IPS, 150PSI, 60PSI Valve RLF, 1.00IPS, 32PSI Valve CHK SWG, 32.00IPS, 30PSI CTFGL pump, 13500gpm, 14PSI, 1100rpm Valve gate, 24.00IPS, 30PSI	016210191 057950087 016020765* 882094026 882117277 882032814 016031399 882043841
27	258-1	HP steam drain system Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
16	261-1	Fuel oil service Rty pwr pump, 25.0gpm, 590PSI, 1750rpm Valve gate, 6.00IPS, 150IPS Valve RLF, .50IPS, 702PSI Motor ac, 440V, 20hp, 1800rpm Strainer dplx, 1.500in Strainer dplx, 1.500in Control vl FO, lin, 600PSI Valve RLF, .50IPS, 677PSI Gage, liq qty Burner oil press atmg, 4000lbs, 14.437in Receiver assy, 150PSI	016160460 882044666 883113233 174342032 754960010 754960069 619040093* 887115127 450060108 300080100 990200007
33	262-1	Main lube oil piping Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
<p>*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.</p>			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
5	311-1	<p>SSTGs</p> <p>Turbine stm generator CTFGL pump, 15gpm, 70PSI, 3435rpm CTFGL pump Turbine stm gen, 500kW CTFGL pump, 550gpm, 15PSI, 1750rpm Valve temp regg., 2.5IPS, set 159 Valve RLF, 1.0IPS, 18T, 32PSI Motor ac, 440V, 7.5hp, 1770rpm Regulator V, WZN-1, 760D842 Generator ac, 450V, 500kW, 1200rpm Motor ac, 440V, 5hp, 3435rpm Valve RLF, 2.0IPS, 15T, 25PSI</p>	<p>057800169 016210199 016110271 057260191 016110337 882141613 882117277 174802374 422040159 162900152 174802634 883112326</p>
105	311-4	<p>Ship service power generation</p> <p>Burden reported at system level.</p>	None
59	312-1	<p>Emergency generator sets</p> <p>Dsl engine 10, 716hp, 1200rpm Dsl engine 8, 706hp, 835rpm Motor ac, 440V, 7.5hp, 3515rpm Dsl engine 10, 716hp, 1200rpm CTFGL pump, 250gpm, 25PSI, 3515rpm</p>	<p>665360216 665360215 174751418 665360218 016210186</p>
68	314-1	<p>Power conversion equipment</p> <p>Motor generator 440Vac, 450Vac, 30kW Motor generator 440Vac, 50hp, 450Vac 30kW Power supply, 440Vac, 26-32Vdc, 12.5kW Regulator freq., DRGFA4-02-1 Power supply, 440Vac, 28Vdc, 300amp Power supply, 440Vac, 28Vdc, 300amp</p>	<p>181240036 181240030 111610019 420310023 111500008 111550040</p>
54	320-1	<p>Power cable</p> <p>Switching unit pwr TFR, ABT A3, 300amp, 3ph, 440V Fuse box Terminal box shpbd pwr, ty C-73A Cable assy, triple outlet ac</p>	<p>211110008 999970243 999970094 2-620014077</p>

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment API. or AEL
66	320-2	Switchgear and panels Switchboard pwr sserv mn, 3S Switchboard pwr sserv mn, 2S Panel test electrical Circuit breaker Switchboard pwr sserv, 400Hz Panel test electrical, IC, 9000-S6508-73677 Switchboard, IC Switchboard, IC	220500525 220500524 509990150 140301303 220500523 509990146 220510080 220510083
47	330-1	Lighting Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
62	411-1	Tactical data displays Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
81	412-1	Tactical data processing CV-2036 (V)/USQ-20 (V), converter digital AN/UYK-20X(V), data processing set (60Hz)	62762811 58735726CL
15	421-1	Nonelectric/electronic navigation aids Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
46	423-1	Electronic navigation AN/SRN-15 beacon-transponder set AN/SRN-12 w/o OS-198/SRN-12 AN/SRN-15A, beacon-transponder set AN/SRN-19 (V)2, navigation set	57130213 57129101 57130211 57130128
86	424-1	Depth sounding equipment AN/UQN-16, sounding set AN/UQN-1H, sounding set	58413635 58413640

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
37	426-1	Gyrocompass Compass gyro, Mk19, Mod3A Compass gyro, Mk19, Mod3C Panel CONT Amplifier synch SNL, Mk31, Mod8A Amplifier synch SNL, Mk31, Mod8B Motor generator, 120Vdc, 115Vac Amplifier synch SNL, Mk31, Mod7 Amplifier synch SNL, Mk7, Mod7A Indicator scou, Mk2, Mod2 Power supply stnby Amplifier synch SNL, Mk31, Mod7 Amplifier synch SNL, Mk31, Mod7 Compass gyro, Mk18, Mod4C Indicator scou, Mk3, Mod6	252360019 252360028 252760063 253830008 253830024 252560013 253840048 253840005 253050016 259390001 253840026 253840030 252360015* 253160068
21	426-2	Electrical navigation Plotting table, MkNC2, Mod0 Indicator DRA, Mk9, Mod4 Indicator transmitter, UWTR log Plotting table, MkNC2, Mod1 Plotting table, MkNC2, Mod2 Tracer dr, Mk6D4A Indicator transmitter, UWTR log	280170001 282170001 870090015* 287810001 282130001 282100001 870090006
36	432-1	Telephone systems Relay ac x dc, 2pole, 2.0amp, timing AM-2210B/WTC, amplifier, audio freq. AM-2210G/WTC, amplifier, audio freq. H-200/U, headset IC-D	199020004 52221010 52221019 67190000 61595220PR*
48	433-1	Announcing systems LS-386A/SIC, intercommunication station AM-4453/U, amplifier, speaker LS-458/SIC, intercommunication station AM-2316A/SIA, amplifier assembly (continued)	72748605 52502400 72754458 52231601
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	433-1 (cont)	AN/SIA-120, amplifier-control group AN/SIA-114A, amplifier-oscillator group	56905000 56904905
56	434-1	Audio-visual equipment Projector SMP, 16mm AN/UNQ-7D, recorder-reproducer set Projector SMP, 16mm Terminal box, telcomm, ty 6TB10C-2 Projector SMP, 16mm Projector SMP, 16mm, mdl 1585ML or 1545ML C-1907/WIH, control, ships entertainment sys C-3766A/WIH, control, recorder-reproducer	261050020 58228920 261050012 999970022 261850011 2-850004011 61190700 61376605
70	436-1	Alarm, safety, and warning Switch wtr, ty PP Switchboard alm shpbd, 10ckt Switch FLO, IC/RL-1-U Panel ind sal Terminal box telcomm, ty 6TB24C-2 Switchboard alm shpbd, 30ckt ac Meter fdfi ind diff press, mdl 385/888	219990176 229990012 219990613 381050015 999970023 229990009 450100872
44	437-1	Indicating, order, and metering C-3766A/WIH, control, recorder-reproducer Cell cnd, ty sal Panel ind sal Indicator transmitter	61376605 381050120 381040046 271080197
45	440-2	Satellite communications AN/SSR-1, SATCOM, fleet broadcast sys AS-301B/WSC-1(V), antenna AN/WSC-3(V), satellite communication set OE-82C/WSC-1, antenna group	57191299CL 59129526 59011020CL 78185615CL
96	440-3	Quality monitoring and control TT-624(V)5/UG, mdl 219325-1 teleprinter R-1051B/URR, receiver radio AN/URQ-10, standard freq	92818120 81095102 58532400

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
78	440-4	Message processing distribution systems TSEC/KG-40 (parallel) AN/SQS-54B, spectrum analyzer set	92600235* 57093591
63	441-1	Communication antenna systems 66046, FcL, whip antenna AS-2537/SR	06604700 59309931
100	441-2	Antennas -- multicouplers & tuners Burden reported at system level.	None
22	441-3	Communication transmitters AN/URT-23(V), transmitting set, radio AN/URT-23A(V), transmitting set, radio AN/URT-24A, transmitting set, radio	58557823CL 58557800CL 58557835CL
14	441-4	Communication receivers R-1051/URR, receiver radio R-390A/URR, receiver radio AN/SRR-19A, receiving set AN/SRA-56, antenna coupler group AN/URA-38A, antenna coupler group AN/SRA-33, coupler group, antenna AN/SRR-19B, receiving set, radio AN/WRR-3A, receiving set, radio AN/SRA-34(V), antenna coupler group AN/URR-27A, receiver VHF	81095100 81039001 57141318 57102356 58433801 57102300 57141318SA 59005301 57102334CL 58535105
9	441-5	Communication transceivers AN/URC-9, radio set AN/SRC-20, radio set AN/SRC-21, radio set AN/VRC-46, radio set AN/URC-80(V)5, radio set AN/PRC-41, radio set	58439716 57112000 57112100 58841200 58446701 56617700
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
67	441-6	Remote communication devices C-1207A/UR, control radio set C-1138B/UR, control radio set AN/URQ-10A, standard freq AN/URQ-10, standard freq AN/SQS-54B, spectrum analyzer set	61120705 61113810 58532405 58532400 57093591
102	442-1	Underwater communication systems AN/WQC-2 communication set, sonar	58992422
85	443-1	Visual and audible communication systems Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
19	445-1	Teletype and facsimile AN/UGC-25A, teletypewriter radio set AN/UGC-6K, printer, TTY page AN/URA-17, comparator-converter group AN/UGC-16, teletypewriter set AN/UGC-25, teletypewriter radio set AN/UGC-6F, printer, TTY page AN/UGC-20A, teletypewriter radio set AN/UGC-6J; printer, TTY page AN/UGC-20B, teletypewriter radio set	58139025 58138242 58431600 58139050 58139036 58138230 58139029 58138241 58139038
49	446-1	Security equipment KWR-37/TSEC TSEC/KW-7 ser 1 up TSEC/KY-8 man TSEC/KW-7 ser 25001 up TSEC/KG-40 (parallel)	92601290 92601500 91950800 92601402 92600235*
32	450-1	Radar distribution systems Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
53	451-X	Surface search radar AN/SPS-10F, radar set 90073-LN-66, 36mi range radar	57036630 37391404
23	452-X	2D air search radar AN/SPS-40D, radar set AN/SPS-40, radar set	57039665 57039620
60	455-1	IFF AN/UPX-11, interrogator set AN/UPM-137A AN/UPX-11, Fc-4 AS-177B/UPX, antenna AN/UPM-98A, test set, radar AN/UPX-17, transponder set AN/APX-72A, transponder set AN/UPA-24C, decoder group	58393100 58286940 58393101* 59153506 58289801 58393700 53482572CA 58254015*
2	460-X	Sonar systems AN/SQS-25AXR, detecting-ranging set, sonar AN/SQS-26BX, detecting-ranging set, sonar AN/SQR-15, towed array surveillance sys LAPS, ser 23-66, power supply AN/SQS-26BX, Fc-14 Strainer dplx, 2.50in 25230-G2900-100, power supply LAPS, ser 1-22, power supply	57091608 57091610 57084803XA 32523001PA 57091633 750080114 32523002 32523000*
104	462-1	Passive sonar Burden reported at system level.	None
94	465-1	Bathymograph Winch elec, 1200lbs max cap	620420055
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
61	471-1	Active ECM AN/ULQ-6B, countermeasures set AN/ULQ-6A, countermeasures set	58158610 58158605
28	472-1	Passive ECM AN/WLR-1G, receiving set, ECM AN/WLR-1C, with transistorized tuner AS-899A/SLR, antenna DF AN/SLA-12, antenna group AS-616A/SLR, antenna AS-899C/SLR, antenna receiver assembly AN/WLR-3, receiving set, ECM	58981705 58981717* 59189905 56935912* 59161601 59189906 58981900 58189900 58981728
93	473-1	Torpedo decoys Winch elec, 2dm, 5000lbs max cap @100fpm Motor ac, 440V, 5hp, 1560rpm	620420225 174751497
92	475 -1	Degaussing Switchboard degusg, C704390008 Switchboard degusg, C704390008 Charger battery, 5amp Panel degusg pwr sup, FIQI-C-C704390010 Panel degusg pwr sup, M-C-C704390009	227020001* 940100012 090950001 940100007 940100006
99	480-3	Testing, antisubmarine warfare intra-system Test set, elec sys msl Mk363, Mlx3 Mk6, Mod 1, director dummy	005020022 006020524
7	481-X	Gun fire control systems Director, gun, Mk56, M7&9 Computer, Mk42, Mod6 Computer, Mk1A, M5 with ORDALT 3658 Mk35, Mod2, radar equipment Elev-train, amp mot-gen for gun dir, Mk56, M3,6,7,&8 (continued)	49402624 49402604 49400370 49402600 49402678
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	481-X (cont)	ORDALT 5901A, radar signal process, eqpt Mk1, M3 Mk28, Mod9, panel control Console, Mk4, M9&17 Mk27, Mod9, panel control Director gun, Mk56, M7&8	78650190* 49402643 49402657 49402626 49402624
98	482-X	Missile fire control systems Burden distributed among all equipments; no single equipment accounted for a sig- nificant percentage of system burden.	None
42	483-X	ASW fire control systems Mk53, Mod0, console attack Mk44, Mod1, transmitter relay	005000002 005000019
10	491-1	Electronics test, checkout and monitoring equipment Burden reported primarily at system level. Maintenance not reported at system level was reported against the following APLs: 55026-260-6XLP, multimeter AN/USM-116A, multimeter, electronic AN/USM-207A, counter, electronic digital AN/USM-115, calibrator set, range AN/USM-281E, oscilloscope 60086, multimeter	35502622 58614205* 58627022 58614100 58617040 06008600
83	492-1	Flight deck lighting Light, navigation	249990237*
25	511-1	Heating systems Boiler stm aux, 155PSI, 4000lbs/hr cap Boiler stm aux, 155PSI, 4000lbs/hr cap CTFGL pump, 3gpm, 125PSI, 1750rpm Valve RLF, 1.00IPS, 1151T, 275PSI (continued)	022050020 022050019 016110334 882116897
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	511-1 (cont)	Rty pwr pump, 2.86gpm, 1800rpm CTFGL pump, 15gpm, 58PSI, 3480rpm CTFGL pump, 30gpm, 58PSI, 1715rpm Boiler stm aux, 100PSI, 800lbs/hr cap	017210055 016210197 016210192 022050016*
31	512-1	Non-machinery ventilation Burden distributed among all equipments; no single equipment accounted for a sig- nificant percentage of system burden.	None
11	514-1	Chilled water cooling distribution Compressor RFG, ty V Refrigeration plant, 24ton cap CTFGL pump, 75gpm, 60PSI, 3480rpm Condenser, RFG wtr, 90gpm cap Air conditioner Motor ac, 440V, 30hp, 1760rpm Refrigeration plant, 24ton cap Air conditioner, mdl SACFS60S12 Air conditioner, mdl MCMAC7, 1-2 Motor ac, 440V, 30hp, 1760rpm Compressor RFG, vert opn Air conditioner, mdl NC33D440EP CTFGL pump CTFGL pump, 75gpm, 60PSI, 3500rpm Motor ac, 115V, 5hp, 3450rpm	060150113 325000227 016210183 043010117 330190092* 174801836 325010211 330400002 330190084 174802603 060150112 330340012 016110271 016110270 174700047
38	516-1	Ships service refrigeration Refrigeration system, food sto, 4ton cap Compressor RFG, vert opn Motor ac, 440V, 30hp, 1760rpm Condenser RFG wtr CLO, 26gpm cap Refrigeration system, food sto, 1.80ton cap Conveyor vert, tray ty, 85lbs cap @56fpm	325000226 060150118 174801836 043010137 325010215 590390020* 17470265
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
4	520-1/ 521-1	<p>Sea valves/fire and flushing</p> <p>CTFGL pump, 900gpm, 125PSI, 1775rpm Valve cont SPCL, .37IPS, 250PSI Valve pneum rel, .375IPS Valve gate, 2.50IPS, 250PSI Motor ac, 440V, 100hp, 1775rpm CTFGL pump, 250gpm, 250PSI, 3500rpm Valve GLB, 1.00IPS, 200PSI CTFGL pump, 250gpm, 25PSI, 3515rpm CTFGL pump, 900gpm, 125PSI, 3550rpm CTFGL pump, 900gpm, 125PSI, 1775rpm Motor ac, 440V, 100hp, 3570rpm CTFGL pump, 100gpm, 30PSI, 1750rpm CTFGL pump, 900gpm, 125PSI, 1775rpm Heat sensing device, 158°F CTFGL pump, 250gpm, 100PSI, 4500rpm Valve GLB, 1.50IPS, 250PSI Valve gate, 5.00IPS, 250PSI Strainer dplx, 2.50in Valve LFT, CHK GLB SPCL, .37IPS, 250PSI Valve CHK SWG, 6.00IPS, 250PSI Valve gate, 5.00IPS, 250PSI Valve gate, 8.00IPS, 150PSI Valve RLF, 5.00IPS, 48T, 60PSI Controller ac</p>	<p>016210195 882240204 882240028 882043975 174802651 016050231 882241238 016210186 016020765* 016210324 174030910* 017000043 016210195 889900796 019430001 882051262 882041003 754960023 882240169 882032749 882042020 882044076 883113226 151205928</p>
64	528-1	<p>Plumbing drains</p> <p>Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APLs:</p> <p>Pump, prt1 sbmrbl, 5hp, 440Vac, 180gpm Valve DPHRM, CONT plt oper, 2.0IPS, 150PSI Compensating control box, degaussing, ty A-1</p>	<p>017710005 882190820 280000151</p>
<p>*Data were reported but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.</p>			

(continued)

Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
17	531-1	<p>Distilling plants</p> <p>Distillation unit, 8000gpd, 472sqft Motor ac, 440V, 1.5hp, 3520rpm CTFGL pump, 125gpm, 35PSI, 3450rpm Distillation unit, 8000gpd, 398 TB CTFGL pump, 10gpm, 35PSI, 3500rpm CTFGL pump, 148gpm, 28PSI, 1750rpm CTFGL pump, 125gpm, 28PSI, 1750rpm Motor ac, 440V, 5hp, 3450rpm CTFGL pump, 148gpm, 28PSI, 1750rpm CTFGL pump, 4gpm, 50PSI, 3550rpm Motor ac, 440V, 7.5hp, 1740rpm CTFGL pump, 7gpm, 35PSI, 3550rpm Ejector assembly, 110PSI, 2stg Valve RLF, 2.5IPS, 19PSI</p>	<p>080030019 174751264 016210185 080100020 017030047 017030169 017030104 174802373 017030105 016020791 174751574 016020792 730060017 883110187</p>
18	533-1	<p>Potable water service</p> <p>CTFGL pump, 40gpm, 50PSI, 3515rpm CTFGL pump, 155gpm, 100PSI, 3515rpm Motor ac, 440V, 5hp, 3515rpm Rty pwr, vacuum pump, 10.0cfm, 3500rpm Valve gate, 2.50IPS, 100PSI Cooler FD, 58.00sqft, ty A Heater, stm htg Cooler FD, 50.30sqft, ty A Demineralizer, pure wtr sys Valve DPHRM cont, plt oper, .75IPS, 150PSI Cooling coil Heater wtr insts, 40.00gpm max Cooler fl, 1200sqft, ty A</p>	<p>016210196 016210187 174802663 017070120 882040812 030010161 074690005 030010193 080150006 882190871 326990025 074100017 030130797</p>
69	541-1	<p>Fuel and fuel compensating system</p> <p>Valve GLB, .25IPS, 800PSI Valve gate, .800IPS, 150PSI Valve ANL, 2.50IPS, 100PSI Control trmt, tk lvl</p>	<p>882054356 882045364 882002186 616330008</p>
103	542-3	<p>MOGAS handling and piping</p> <p>Nitrogen charging cart</p>	<p>2-920014190</p>

(continued)

Table A-4. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
57	543-1	Aviation and general purpose lube oil system Rty pwr pump, 50gpm, 50PSI, 520rpm Motor ac, 440V, 3hp, 1730rpm Filter Valve RLF, 4.00IPS, 7PSI Valve DPHRM cont, plt oper, 2.00IPS, 150PSI Valve RLF, 1.50IPS, 68PSI Rty pwr pump, 50gpm, 50PSI, 520rpm Valve gate, 2.00IPS, 200PSI	016200169 174751113 480030133 883113232 882190820 883113238 016200163 882041814
101	545-1	Tank heating Valve RLF, 5.00IPS, 51T, 70PSI Valve RLF, 1.00IPS, 36T, 80PSI Valve RLF, .50IPS, 55T, 65PSI	883112968 883112337* 883112328
6	551-1	HP air system Compressor air HIP, 7.5cfh, 3000PSI Compressor air LP, 100cfm, 125PSI Compressor CTFGL, 1400cfm, 25PSI Compressor air LP, 100cfm, 150PSI Valve RLF, .50X, .75IPS, 116T, 150PSI Valve RLF, .75IPS, .35T, 44PSI Dehydrator fltr dsc, 30scfm, 150PSIG	061900210 061900359 061900219 061900194* 883112214 883114901 440360004
58	551-4	Prairie masker air system Compressor CTFGL, 1400cfm, 25.0PSI, 1stg Compressor CTFGL, 1400cfm, 25.0PSI, 1stg Panel, ind sal Panel, ind sal	061900211 061900282 381040051 057260189
55	555-1	Fog foam and AFFF Engine gas, 2, P-250 pmp eng, 25hp, 4200 rpm Proportioner folq, 60/180gpm Reeling machine hose, hnd oper Valve gate, 5.00IPS, 150PSI	668500008 640020005 550490005 882045798
(continued)			
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	555-1 (cont)	Extinguisher x accy, CO ₂ , 15lb Valve DPHRM CONT, plt oper, 1.00IPS, 150PSI Valve DPHRM CONT, plt oper, 2.50IPS, 185PSI	2-930054003 882191594 882190593
76	561-1	Steering system Steering gear, ELHYD ram ty Steering gear, ELHYD ram ty Switch rty, 2JR5-3 Steering gear, ELHYD ram ty	 600230014 600250058 219990406 600250061
71	565-1	Stabilizing fins Stabilizer ship, fin ty Motor ac, 440V, .25hp, 1725rpm Motor ac, 440V, 20hp, 1080rpm Stabilizer ship, fin ty	 319160005 174900107 174342019 319350001
73	571-1	Replenishment-at-sea winches Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APL: Conveyor vert tray ty, 85lbs cap @56fpm	 500390070
34	573-1	Cargo handling elevators Davits boat, TRWA sgl bank Conveyor vert tray, 85lbs cap @56fpm Winch elec, 2dm, gyp max Davits boat, TRWA sgl bank Davits boat, TRWA sg bank Davits boat, TRWA sgl bank	 560270001 590390026 620890078 560010192* 560010204 560270002 2820374009
74	581-1	Anchor handling and stowage Chain anchor & appendage, 1-1/2in Windlass elec, 1.500in, stud link (continued)	 2-260014277 630250014
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)

MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	581-1 (cont)	Chain anchor & appendage, 1-1/2in CTFGL pump, 155gpm, 76PSI, 3515rpm Controller ac, mag lvr, SZ3, 440V Capstan elec, 2spd, max pull 10000 @60fpm Accessories & tools, mooring	2-260014126 016210198 151205395 530180017 2-260034080
95	583-2	Life-saving equipment Lifeboat IFL, CO ₂ , Mk5	2-820374009
13	583-3	Small boats Dsl engine 6, 250hp, 2300rpm Dsl engine 4, 250hp, 2400rpm Boat pers., 26ft, Mk3 Wholeboat mtr, 26ft, Mk10 Boat pers., 24ft, Mk4 Dsl engine 4, 4.107hp	666010147 667770002 720100079 720110026 720100025* 664070001
106	593-1	Sanitary waste Burden reported at system level.	None
29	611-1	Hull fittings Burden reported at system level.	None
77	613-1	Rigging and canvas Burden reported at system level.	None
65	622-1	Floor plates and gratings Burden reported at system level.	None
52	634-1	Deck covering Burden reported at system level.	None
26	651-1	Commissary spaces Burden distributed among all equipments; no single equipment accounted for a significant percentage of system burden.	None

*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.

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Table A-4. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
40	654-1	Utility spaces Burden reported at system level.	None
43	660-1	Working spaces Burden reported at system level.	None
35	665-1	HM&E workshops Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equipment APL: Cell, CNDTV sal	None 381050121
20	670-1	Non-cargo stowage spaces Burden reported at system level.	None
8	711-1	Guns and mounts Mk1, Mod8, housing, 5in Mk12, Mod1, barrel gun, 5in-38cal Gear elev & trn, Mk6, Mod all Hoist prjt, Mk2, Mod all Carriage, Mk25, Mod all Slide, Mk24, Mod all Wiper wnd, Mk2x3, Mod all	006020151 006020161 006020167 006020172 006020164 006020165 006020162
30	721-1	Missile launching systems Mk7, Mod2, guide launcher Mk7, Mod1, carriage launcher Mk7, Mod4, carriage launcher Mk3, Mod1, attachment window wiper Mk199, Mod3, panel launcher captains control	005020021 005020001* 005020017 006020162 005020013
39	722-2	Missile handling and stowage Surface vessel torpedo launcher Mk32, Mod5&7 (continued)	006320222
*Data were reported, but installation of this equipment on FF-1040 Class ships could not be positively confirmed in the COSAL.			

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Table A-4. (continued)			
MBF Rank	SWAB	System/Equipment Nomenclature	Equipment APL or AEL
	722-2 (cont)	Crane, ASROC loader Mk16, Mod4T8, launching group, tools	572130001 0-005020004
82	772-1	Ammunition cargo handling and stowage Hoist ammo, ELHYD auto, 5in-38cal	580040063
41	993-3	Care and preservation Burden reported at system level.	None
72	ORD-1	Expendable ordance (missiles, mines, torpedoes) Burden reported primarily at system level. Maintenance not reported at system level was reported against the following equip- ment APL: Torpedo Mk46, Mod1&2, common items	006300326

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