1983

An analysis of the relationship of personnel characteristics to the performance of DD 963 class ships.

May, John D.

Monterey, California. Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

AN ANALYSIS OF THE RELATIONSHIPS OF PERSONNEL
CHARACTERISTICS TO THE PERFORMANCE
OF DD 963 CLASS SHIPS

by

John Donald May

December 1983

Thesis Advisor: William E. McGarvey

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) An Analysis of the Relationships of Personnel Characteristics to the Performance of DD 963 Class Ships		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis December 1983
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) John Donald May		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE December 1983
		13. NUMBER OF PAGES 83
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; Distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Personnel attributes and performance, engineering department, DD 963

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The purpose of this thesis was to analyze the relationship of fill ratios and personnel attributes to the performance of seventeen operational DD 963 class ships. Data sets were created from files provided by the Defense Manpower Data Center to determine the fill ratios and attributes. Descriptive aggregate data such as percentage of high school graduates, entry age, AFQT score and time in grade were selected to provide demographic information for the personnel involved. Summary CASREP data,

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

S/N 0102-LF-014-6601

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

provided by SPCC, were converted to nine variables to be used as the measures of ship performance. They included total downtime, downtime due to maintenance, total number of CASREPs, and two "readiness" indices. The relationships between these variables and personnel attributes were examined at the ship, departmental and individual rating level. Separate effects of the individual UIC's as well as overhaul quarters were accounted for. Personnel attributes and number of personnel vs personnel requirements had little relationship to readiness. In summary, the relationships between personnel attributes, personnel staffing levels and ship readiness measures remain to be proven.

An Analysis of the Relationships of Personnel Characteristics to the Performance of DD 963 Class Ships

by

John D. May
Lieutenant Commander, United States Naval Reserve
B.A., Roanoke College, 1968

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1983

ABSTRACT

The purpose of this thesis was to analyze the relationship of fill ratios and personnel attributes to the performance of seventeen operational DD 963 class ships. Data sets were created from files provided by the Defense Manpower Data Center to determine the fill ratios and attributes. Descriptive aggregate data such as percentage of high school graduates, entry age, AFQT score and time in grade were selected to provide demographic information for the personnel involved. Summary CASREP data, provided by SPCC, were converted to nine variables to be used as the measures of ship performance. They included total downtime, downtime due to maintenance, total number of CASREPS, and two "readiness" indices. The relationships between these variables and personnel attributes were examined at the ship, departmental and individual rating level. Separate effects of the individual UIC's as well as overhaul quarters were accounted for. Personnel attributes and number of personnel vs personnel requirements had little relationship to readiness. In summary, the relationships between personnel attributes, personnel staffing levels and ship readiness measures remain to be proven.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGEMENT

I would like to thank CDR Bill King, USN (Ret.) and Mrs. Barbara Cunningham from DMDC for their assistance in providing the personnel input files used in this thesis. I would also like to thank Professor William E. McGarvey for his expert technical guidance, generous assistance and untiring patience.

I. INTRODUCTION

A. PROBLEM

The need to document quantitative relationships between readiness and resources is an ongoing problem that the Navy is trying to solve. Manning Naval ships with the "correct" number of sailors with the proper "attributes" receives an enormous amount of attention by personnel at all echelons within the Navy. The problem is also of vital concern and receives much attention from the Congress, OMB and OSD.

A conceptual model describing relationships between resources and readiness needs to be developed. If the Navy had an explicit, quantitative method for determining the best mix of each rating and rate on board each class of ship, it would be better able to man that ship.

As a result, ship readiness could then be increased cost effectively. Knowledge of how personnel characteristics are likely to contribute to readiness is necessary for policy analysis regarding ship manning, assignment and rotation.

Research, to date, has not produced an accepted, "working" model which can measure current ship readiness or predict future ship performence. Two such formal measures currently used by the Navy to measure readiness are the UNITREP and CASREP reporting systems. One problem with such a measurement is that many areas are difficult to quantify, e.g., training, morale and esprit de corps.

From one perspective, an effective unit can be defined as one that meets its commitments. Throughout the fleet there are various administrative and practical procedures to measure readiness. There are local assistance visits and more formal inspections such as Propulsion Examining Board

inspections, Diesel Readiness Assistance Team inspections, Squadron Administrative inspections, Operational Readiness inspections, and Command inspections, just to name a few. All of these, however, usually result in a subjective analysis by the inspecting party instead of a consistent, valid, and quantifiable measure.

The purpose of this thesis was to examine the relationship between personnel characteristics and unit performance. The terms "readiness" and "downtime" are used interchangeably in this thesis as a measure of "success". Emphasis was not placed on the reasons for differences among personnel assigned to different ships or ship types, but rather on the unit and the relationship that may exist between personnal characteristics and the performance of that unit. Similarly, reasons for the differences between UIC's as to their reasons for submitting CASREPS were not explored; however, some differences among UICs were statistically controlled for in the regression equations.

B. BACKGROUND

Every officer has thought to himself "If I only had enough of the right people, I'd get better results more quickly." There is more discussion than research as to whether higher quality people or the proper number of people is more important in accomplishing the mission. For the purpose of this thesis, personnel characteristics are hypothesized to influence the readiness of a unit.

Among other things, a study by the Center For Naval Analyses (CNA) in 1976, [Ref. 1] concluded, that entry test scores appear to be more consistent predictors of maintenance effectiveness than high school graduation, and that length of service was frequently a significant determinant of a ship's condition.

The CNA published another study in 1977 [Ref. 2] which concluded in part that higher quality personnel are more valuable on ships with more complex equipment. On ships with relatively simple equipment, however, having a full complement of personnel might be more valuable.

Both CNA studies used CASREP data as the bases for their criteria. Total number of CASREPs, total downtime and downtime due to maintenance were all used as dependent variables. In addition, to the three criteria mentioned above, the present study will look at six other variables based on the CASREP system.

Personnel turbulence (crew turnover) has been examined as a predictor for ship performance. Reeves [Ref. 3] determined that no significant relationship could be supported between macro levels of turnover and ship performance. It could not be concluded that personnel characteristics were related to downtime.

Since older more experienced personnel are likely to be in the higher paygrades, an analysis which only focused on paygrade would not be able to determine how much productivity was due to promotion and how much was actually the result of experience. By including both paygrade and years of active duty, it is hoped one can separate to some extent the quality dimension of higher paygrade from the effect of experience.

Age was used as a predictor in order to determine if an older force made a difference. With an increase in retention rates, the average age of the force will increase. Might such an increase in age foretell an improvement in readiness? Additionally, time in grade was examined to ascertain the correlation between individual time in pay grade and level of ship performance. However, an extended period of time in a paygrade might mean poor performance because the individual was not promoted.

Even when personnel characteristics have been taken into account, a very large range of individual human behavior remains unaccounted for. Individuals in the same rating at the same time, having the same years of service and paygrade, may still be extremely different from one another in how they will perform their shipboard jobs. These performance differences among the individuals may be largely uncorrelated with level of education, metal group, pay grade etc. Additionally, attitudes and motivation are influenced by the interaction of the crew. Regretably, such measures were not available for use in the present study. Future studies of ship readiness should try to take into account measures of motivation, esprit de corps, etc.

C. PURPOSE

The objectives of this thesis were to:

1. examine the characteristics and fill ratios of each rating for the personnel on the ships involved; and
2. examine the differences among ships on measures of readiness; and
3. explore any relationship that may exist between measures of readiness and personnel attributes of the crew.

The study will examine seventeen DD 963 class ships and their assigned personnel from September 1976 to March 1983. Personnel characteristics and personnel fill ratios will be the predictors, and CASREP information will provide the measures of readiness.

II. DATA

A. DATA BASES

Three data bases were utilized in this effort. The first was a personnel characteristics file created from information provided by the Defense Manpower Data Center (DMDC). The data came from all personnel assigned to the ships in question during the time frame involved and contained some 14,622 observations. A data file was then created which aggregated for each ships Unit Identification Code (UIC) within each of the 27 calender quarters, attributes of personnel assinged to a given rating. An example of a Statistical Analysis System (S.A.S.) "production model" used for the 32 ratings aggregations, (developed by Prof. W. E. McGarvey, Naval Postgraduate School, Monterey, Calif.) is given in Appendix A.

Thus, the new file associated each UIC by quarter with the personnel assigned to it. It also recoded the education level of each individual by high school or non high school graduate. The percentage of high school graduates within a rating was then calculated. The data were then sorted by quarter and UIC bringing along the data for the independent variables that were chosen for use in this thesis. In total, thirty three files were created and then sorted and merged by UIC and quarter for each rating to create the final output file.

A second data bank utilized was also created by DMDC and included the fill ratio, by rating, of each ship's billets. The data included number authorized, number assigned and the fill ratio. Fill ratio was computed as the number of personnel on board divided by the number required. The

number required for each ship, by Department and rating, were provided by OPNAV914 from the Ship Manning Document (SMD) files.

A third data base was a statistical summary report provided by the Navy Ships Parts Control Center (SPCC), Mechanicsburg, Pa. The data contained information provided by the individual units through the Consolidated Casualty Reporting System (CASREP).

The casualty reporting system provides a timely method for reporting equipment failures and the effect of these failures on the capability of the reporting units. The CASREP Reports are designed to assist in indentifying problem equipment, supply support deficiencies, maintenance difficulties, etc., which tend to reduce the combat readiness of the Navy. CASREPs are reported by the individual ships and the data was compiled by SPCC. The severity rating of each CASREP is assigned by the individual ship in accordance with Operation Reports Publication NWP 7. The severity codes are as follows:

C-2 - (Substantially Ready) A deficiency exists in mission essential equipment which causes a minor degradation in any primary mission area.

C-3 - (Marginally Ready) A deficiency exists in mission essential equipment which causes a major degradation but not the loss of any primary mission area.

C-4 - (Not Ready) A deficiency exists in mission essential equipment that is worse than C-3 and causes a loss of at least one primary mission area.

The three data files were merged into one file that contained for each quarter the personnel characteristics, fill ratios and CASREP data for each UIC.

TABLE I

List of Ships

USS SPRUANCE	DD963
USS PAUL F. FOSTER	DD964
USS KINKAID	DD965
USS HEWITT	DD966
USS ELLIOTT	DD967
USS ARTHUR W. RADFORD	DD968
USS PETERSON	DD969
USS CARON	DD970
USS DAVID R. RAY	DD971
USS OLDENDORF	DD972
USS JOHN YOUNG	DD973
USS COMTE DE GRASSE	DD974
USS O'BRIEN	DD975
USS MERRILL	DD976
USS BRISCOE	DD977
USS STUMP	DD978
USS CONOLLY	DD979

The seventeen ships involved are named in Table I. A single class of ships built by the same contractor was selected to eliminate some factors that could effect readiness. The ships contain, for the most part, similiar equipment, propulsion plants, and armament, and are all were approximately the same age, viz., three to seven years old at the time the data were collected for this thesis.

B. DEPENDENT VARIABLES

A completely adequate set of measures of readiness, or ship performance, is difficult to achieve. Yet a set of readiness measures must be used to analyze or design policies. Instead of trying to invent measures of readiness, measures which are currently in use were utilized. In this study, CASREP data provided by SPCC were used for the dependent variables. Nine criteria were used. They are given in Table II.

The variables TK1, TK2, TK3 and TK4 were taken directly from the information provided on the SPCC tape.

An alternative "readiness" index (TINDEX01) was derived by Professor W.E. McGarvey. It is a rough parallel to the

TABLE II

Dependent Variables

TK1	Total number cf CASREPS submitted by a unit
TK2	Number cf C-2 CASREPS
TK3	Number cf C-3 CASREPS
TK4	Number of C-4 CASREPS
TINDEX01	Readiness Index01 (McGarvey)
TMEMRAC	Readiness Index (SPCC)
TTECHASS	Number cf technical assistance calls requested
TDOWNMNT	Total dcwntime for maintenance (hours)
TDOWNTCT	Total dcwntime (hours)

"material condition index" (MCI) and the "mission essential material readiness and conditon" (MEMRAC) indices computed by SPCC but is slanted more toward maintenance downtime. INDEX01 was computed as follows:

$$\mathrm{INDEX01}=\mathrm{LOG}\ ((.1*\mathrm{TK2}*\mathrm{DOWNMNT})+(.5*\mathrm{TK3}*\mathrm{DOWNMNT})+(1.0*\mathrm{TK4}*\mathrm{DOWNMNT}))/10$$

To smooth and help equate this alternative index (INDEX01) to other variable distributions, a log transformation was employed. Instances of calls for outside technical assistance were also coded for use directly from the SPCC tape.

The "Mission Essential Material Readiness and Condition Report" (TMEMRAC) is used by SPCC [Ref. 4] to identify systems/equipments that contribute to the downtime of a Ship Category which falls belcw the Standard Ready Material Condition by 5% or more. Mathematically it is defined by SPCC as:

$$\mathrm{Index}=1/P \times ((w3)(\mathrm{Sum}\ C\text{-}3)+(W4)(\mathrm{Sum}\ C\text{-}4))(W'3)(\mathrm{Sum}\ DTC\text{-}3)+(W'4)(\mathrm{Sum}\ DTC\text{-}4)$$

Where:

W3 = A factor tc weigh the severity of the C-3 CASREPS in relation to C-4 CASREPS. (W3=.5)

W4 = A factor tc weigh the severity of the C-4 CASREPS in relation to C-3 CASREPS. (W4=1.0)

W'3 = A factor to weigh the effects of "URGENCY" on C-3 CASREP downtime. (W'3=.33)

W'4 = A factor to weigh the effects of "URGENCY" on C-4 CASREP downtime. (W'4=.67)

DTC-3 = Total Dcwntime for a C-3 casualty.

DTC-4 = Total Downtime for a C-4 casualty.

P = The average number of ships per day, by generic category, as taken from EDAC Group I Report.

A lcg transformation, plus a recoding of fractional values cn this index, was alsc performed.

For casualties that have been corrected, the following were used:

TDCWNMNT - For casualties which have been CASCORed (casualty correction message) this reflects the number cf hours the equipment was down due solely to maintenance. It is the resultant figure of subtracting the CASREP message (msg) date time group (DTG) from the CASCOR msg DTG; obtaining a balance; then subtracting the hours awaiting parts given in the CASCOR msg. The underlying assumption is that time not awaiting parts is maintenance time.

TDCWNTOT - For casualties which have been CASCORed this reflects the total number of hours the equipment was CASREPed. If the CASREP and the CASCOR are the same day, the tctal will be 0000.

Total downtime was used even though it includes supply downtime (time spent waiting for parts). While arguable, it was hypothesized that higher quality personnel could influence the total amount of time spent waiting for parts. In addition, if a problem was misdiagnosed total downtime would be increased while waiting for the the correct part to arrive (after the part which did arrive was found to be incorrect).

If preventive maintenance were performed better, the total number of CASREPs might also decrease, assuming that more qualified personnel perform better. Since the personnel characteristics may well influence total supply time, the two measures of downtime were included.

It was felt that by using nine different dependent variables a more complete picture of the inter-relationships of the personnel attributes and measures of "readiness" could be developed. Each dependent variable may measure a different aspect of maintenence, and hence, readiness.

C. INDEPENDENT VARIABLES

When both files had been sorted by UIC and calender quarter, the data file created from the DMDC tape of personnel attributes was merged with the CASREP file. The program that was needed to first match each individual assigned to a UIC, and then to correlate the individuals' characteristics with each quarter's CASREPS within each UIC is shown in Appendix E.

The new file for each quarter now contained the dependent variables and the personnel characteristics of the sailors assigned to those units in each quarter. The fill ratio file and CASREP data file were then merged so a complete file with all the desired information was available for analysis.

TABLE III

Ratings Used in Analysis

EN	Engineman
MR	Machinery Repairman
EM	Electricians Mate
IC	Intericr Communications
HT	Hull Technician
GSE	Gas Systems Technician (Electic)
GSM	Gas Systems Technician (Mechanical)

Although the file contained information for all 33 ratings assigned to the DD 963's, this research was directed instead tcward the seven ratings assigned to the engineering department. Under the assumption that many (or most) of a ship's CASREPs will originate in the engineering department, this was felt to be an acceptable, plausible directicn in which to proceed. The ratings used are shown in Table III.

A list cf the engineering ratings with the mean, standard deviation, minimum value, maximum value and the standard errcr of the mean for each variable by rating is

TABLE IV

Personnel Attributes Selected

HSDG__	The percentage cf high school graduates
AFCT__	Armed forces qualification test scores
ENAGE__	Entry age
PRAG__	Present age
PAYGR__	Paygrade
YRACD__	Years of active duty
TMEGR__	Time in grade
FIILR__	Fill ratio

Where __ represents each of the seven individual ratings.

provided in Appendix C. A complete list of the cther ratings on the ships as well as other variables is provided in Appendix D. Table IV shows the attributes selected for each rating. An "attribute" is operationally defined as the combined contributicn of the seven engineering ratings for each characteristic. For example the HSDG attribute is the

combined HSDG effect of the EN, MR, EM, IC, HT, GSE, and GSM ratings.

These attributes were selected because it was hypothesized that as each attribute showed improvement, readiness would improve. It was hypothized that "smarter", older, more senior personnel, plus a full complement of personnel, would be associated with increased readiness.

Because of its greater statistical robustness as a measure of central tendency with small samples, the median was used to represent the personnel characteristics of ratings (except for HSDG and FILLR). The median for education was almost always a high school education, or just less than that level of education. As a result, a new variable was developed - HSDG, or percentage of high school graduates on board (college education was not taken into account). The new variable had enough variability to be used as a predictor. FILLR was calculated as a percentage of the on board strength as compared to the required strength of the SMD.

III. ANALYSIS

A. METHOD

Multiple regression analyses was used to determine if a set of variables could be developed to predict "readiness". The nine dependent variables and the eight personnel characteristics for each engineering rating were utilized, for a total of 72 prediction equations.

Calculating R Squares in this manner and using the F test to evaluate the statistical significance of increments to prediction is a robust method of analysis. It enables the user to determine the relative contribution of different variables in the regression equation.

The statistical significance used in this thesis was the .05 level. It is quite possible for a variable to be in and of itself a significant predictor of a dependent variable, but, when added to a model with another variable (that by itself is a significant predictor) contribute insignificantly to the prediction. Numerous systematic regressions were run in an effort to determine the significant predictors.

B. ANALYSIS

The first step in the analysis was to examine the realtionship of downtime to the UIC's themselves. Before addressing the issue of personnel attributes, it was felt that some individual differences among the ships had to be examined before the personnel characteristics should be utilized as predictors of readiness.

Overhaul quarters were accounted for with the variable OVERHAUL. This dichotomous dummy variable takes into

account the quarters that the individual UIC's reported C-5 in the CASREP system (CASREPs, perhaps not supprisingly, drop to a very low level during overhaul quarters). The variable made each quarter that a ship was in overhaul a separate predictor. It separated overhaul quarters from normal operating quarters.

TABLE V

PERCENTAGE OF VARIANCE ACCOUNTED FOR

DEPENDENT VARIABLE	UIC'S ONLY	WITH UIC'S & OVERHAUL	ALL VARIABLES	FINAL REGRESSION	CHANGE IN R2 x 100
TDOWNMNT	32.73	36.59	55.70	40.64	4.05
TK1	28.10	41.57	60.28	46.85	5.28
TK2	25.94	40.66	56.21	***	
TK3	16.29	16.89	47.54	22.71	5.82
TK4	11.43	11.86	33.07	16.16	4.30
TINDEX01	36.69	43.06	63.12	47.06	4.00
TMEMRAC	22.13	22.61	49.92	25.31	2.70
TTECHASS	17.79	31.21	50.80	32.59	1.38
TDOWNTOT	30.98	33.03	53.18	33.50	.47

*** Not Statistically Significant

The results were significant. Individual ship differences acccunted for from 11.43 percent to 36.69 percent of the variance for each individual dependent variable and with the overhaul quarters added, the percentage of variance accounted for ranged from 11.86 to 43.06. The results are given in Table V. This table shows the percentage of R-squared for the ship differences, with all the variables and the final regression after the F tests.

The variables used in the regressions to get the results in the "ALL VARIABLES" column of Table V are: the overhaul predictors, UIC effects, and each personnel variable listed in Table IV for all the shipboard ratings. For the "FINAL REGRESSION", the list of variables used is shown in Table VII.

The change in R-squared (times 100) is the increase in the percentage of dependent variable variance accounted for by the final regression equation over the regressions with just the UIC's and CVERHAUL as predictors. The R-squared with all the variables entered is shown as an example of how a R-Square can be artifically inflated by using a large number of predictors. This is why successive F-tests must be computed - to determine which predictors are statistically significant and appropriate for retention.

The results of the UIC and overhaul regressions are interesting. For the total number of CASREPs, 41.57% of the variance could be "explained" by ship differences, while only 11.86% could be explained for the number of C-4 CASREPs and 16.89 for C-3 CASREPs. This could be the result of the differences among the philosophies or practices of Commanding Cfficers or Squadron Commanders.

While the directions cf the CASREP system are quite specific, the judgment of the Commanding Officer probably always plays a part. If a system is C-3 or C-4 it will usually be CASREP'd because it seriously degrades scme missicn area of the ship. But the number of C-2 CASREPs could be a functicn of the operational policy of the Commanding Officer. If his philosophy (or that of the Squadrcn Commander) is such that CASREPs make the ship look bad, then he might be hesitant to submit too many. On the cther hand, if he follows policy to the letter, more CASREPs might be submitted.

The next step was to compute an F ratio on each of the personnel "attributes" listed in table Four. As described above an "attribute" is operationally defined as the combined contributicn of the seven engineering ratings for each characteristic. For example the HSDG attribute is the combined HSDG effect cf the EN, MR, EM, IC, HT, GSE, and GSM ratings. The combined data from all ratings were utilized.

The question that must be answered is: Does the addition of each attribute add significantly to the prediction? The F ratio must be calculated for the difference between the two R-Squares for each predictor on each dependent variable. The formula used [Ref. 5] was:

$$F = \frac{(R2xyz - R2xy)/(K1 - K2)}{(1-R2xyz)/(N-K1-1)}$$

Where N = total number of cases

R2xyz = larger R Squared

R2xy = smaller R Squared

K1 = Number of independent variables of the larger R Squared and

K2 = Number of independent variables of the smaller R Squared.

TABLE VI

F Ratio - Each Attribute

	HSDG	AFQT	ENAGE	PRAG	PAYGR	YRACD	TMEGR	FILLR
TDOWNMNT	2.12*	1.13	0.64	0.97	2.66*	1.53	0.64	0.37
TK1	2.53*	1.86	0.60	0.54	2.57*	1.56	0.82	0.56
TK2	1.67	1.70	0.47	0.70	1.88	1.21	0.39	0.52
TK3	3.67*	1.15	1.33	0.91	1.73	2.35*	1.45	0.47
TK4	0.43	0.82	1.16	0.93	0.66	0.90	0.90	2.31*
TINDEX01	2.94*	1.73	0.82	0.62	3.16*	1.97	1.05	0.66
TMEMRAC	2.69*	0.98	1.45	0.98	1.40	1.26	1.51	0.77
TTECHASS	1.24	2.32*	0.78	0.49	1.55	0.91	0.89	0.85
TDOWNTOT	1.49	0.98	0.60	1.30	2.24*	1.66	0.97	0.35

F .05 = 2.07 *Statistically significant
Degrees of Freedom: Numerator = 7 Denominator = 174

In this case each individual attribute (i.e., 7 degrees of freedom) was removed from each equation and a F ratio calculated. The results are given in Table VI. In this step, 72 different regression equations were derived and 72 F ratios calculated.

TABLE VII

Statistically Significant Attributes

DEPENDENT VARIABLE	SIGNIFICANT PREDICTORS
TDOWNMNT	HSDG, PAYGR
TK1	HSDG, PAYGR
TK2	NONE
TK3	HSDG, YRACD
TK4	FILLR
TINDEX01	HSDG, PAYGR
TMEMRAC	HSDG
TTECHASS	AFQT
TDOWNTCT	PAYGR

As can be seen, only twelve variables seemed to contribute significantly (p less than .05). These are shown in Table VII. TK2 had no personnel attributes which proved to be statistically significant predictors of it.

Even though there was a variance among individuals within ships, as can be seen in Appendix C, it is interesting to note that entry age, present age, and time in grade did not contribute to any prediction, These results would indicate that in the engineering department age and time in grade are not a factor in determining "readiness".

The two attributes that proved statistically significant most often were the percentage of high school graduates and pay grade. This would seem to indicate that the more high school graduates and more senior personnel on board each UIC would effect the measure of downtime, but such a conclusion

would be premature. Additionally, this finding disagrees with the earlier studies by CNA that found HSDG was not a significant predictor of maintenance effectiveness.

TABLE VIII

F Ratio - By Rating

	EN	MR	EM	IC	HT	GSE	GSM
			Without AFQT				
TTECHASS	8.52*	1.17	1.45	1.20	.743	.353	.672
			Without HSDG				
TDOWNTOT	2.47	6.28*	.47	.353	.432	.471	.393
TK1	5.17*	8.72*	.175	0	.044	.263	2.32
TK3	10.41*	3.58**	.630	6.00*	0	2.25	2.72
TINDEX01	4.81*	11.75*	.99	.047	.283	.613	1.93
TMEMRAC	7.96*	2.02	.138	4.44*	.312	.903	3.05
			Without PAYGR				
TDOWNTOT	0.08	3.02	0.12	2.86	0.51	0.47	10.49*
TK1	0.09	0.04	0	4.95*	0	2.23	11.52*
TINDEX01	0.33	0.47	0.09	5.56*	0.24	1.56	13.35*
TDOWNMNT	0.04	1.63	0.11	4.05*	0	0.07	7.92*
			Without YRACD				
TK3	1.79	2.26	0.13	0.27	0	0.30	11.31*
			Without FILLR				
TK4	2.99	1.66	1.69	6.06*	0.13	4.11*	0.52

F .05 = 3.90 *Significant using F ratio
T .05 = 1.97 **Significant using T statistic

Degrees of Freedom - Numerator = 1 Denominator = 174

Now that it was determined twelve attributes were statistically significant, the next step was to take these twelve, and separate each individual attribute into seven different predictors, one for each of the seven ratings' within the engineering department. In this stage, each individual ratings' characteristics are taken into consideration, to determine, in other words, which rating in each proven predictor made the difference. For example, was it the HSDGEN (the percentage ot EN's with high-school degrees) or HSDGGSM (the percentage of GSM's with high school degrees) attribute that made the difference. The results are summarized in Table VIII.

By way of explanation, Table VIII is broken down into five sections. One section for each attribute that proved significant. Each section shows the F ratio that was computed when each rating was omitted from the regression equation. Another series of regressions were computed to determine for which rating the attribute was statistically significant.

For example, the general attribute AFQT was shown to predict the number of technical assistance calls requested. A series of seven regressions was computed, leaving a different rating out of the equation each time to determine for which ratings AFQT was important. The result of the F test indicated that in the EN rating AFQT was significantly related to the measure, number of technical assistance calls requested. All the ratings found which influenced the dependent variable for each valid predictor are stared in Table VIII.

The twenty rating variables whose F ratios indicated they contributed significantly were then combined with the original regression equation. The R-squares of these new regressions were then used to compute a new F ratio to determine if the variables that were deleted had added to the prediction. The following F's were computed: TDOWNTOT 1.09, TK1 1.13, TK3 1.62, TK4 .814, TINDEX01 1.46, TMEMRAC 1.58, TTECHASS 1.17, TDOWNMNT 1.35. (The F for p less than .01 = 1.65 and for p less than .05 = 1.44.)

This showed that for the dependent variables TK3 and the two readiness indices, the combined predictive value of all the variables was significant at the .05 level (but not at the .01 level), although individually each independent variable was not significant enough.

To determine if any of the other variables, which had been deleted, made a difference in the prediction a t test was run on all the predictors to see if any more could be

determined to be significant. The t test indicates which variables contribute significantly to the regression after the other variables are taken into account. As a result of this procedure the variable HSDGMR was found to be valid and was added to the final regression equations.

C. SUMMARY OF DATA ANALYSIS

A statistical truism: it is worth remembering that F or t ratios can be statistically significant when the magnitude of a relationship is actually small. This is the case in this research. Although the several variables discussed did make a statistically significant addition to the prediction equation, the contributions were small (the percentage change ranging from .47 to 5.82, as was shown in Table V).

Another important, if yet unaddressed problem in the analysis, is the sign of the independent variables. Naively, it was thought that as each variable "improved" the amount of downtime would decrease. Surprisingly, this was not always the case in the empirical results. In most regression equations, some predictors had positive signs and some negative signs. An example of the final regression output is provided in Appendix E.

This shows that for the dependent variable Total Hours Downtime, percentage of high school graduates for the MR rating (HSDGMR) had a negative effect and pay grade for the GSM rating (PAYGRGSM) had a positive. This can be interpreted to mean that as the percentage of high school graduates increased the total number of downtime hours decreased. However, it also means that the more senior the GSM's on board, the greater was the total hours of downtime.

Of the retained predictors for the dependent variables nine were positive and the other eleven negative. The actual results can be seen in Appendix E and Table IX also

TABLE IX

Effect of the Predictors

Dependent Variable	Direction of Obtained Relationship: Intuitive	Counter-Intuitive
TDOWNTOT	HSDGMR	PAYGRGSM
TK1	HSDGMR PAYGRIC	HSDGEN PAYGRGSM
TK3	YRACDGSM	HSDGEN HSDGIC
TK4	FILLRIC FILLRGSE	
TINDEX01	HSDGMR PAYGRIC	HSDGEN PAYGRGSM
TMEMRAC		HSDGEN HSDGIC
TTECHASS		AFQTEN
TDOWNMNT	PAYGRIC	PAYGRGSM

shows the effects of each predictor on each dependent variable. HSDGMR and PAYGRIC behaved as expected but HSDGEN and PAYGRGSM did not. An "intuitive" effect indicates that as the predictor increases (e.g. more senior, greater percentage, etc.) the downtime decreases. A "counter-intuitive" effect, of course, is opposite.

As is evident, attributes of the personnel in the EN rating had nothing but counter-intuitive relationships with downtime. Four of the five variables for the GSM ratings also had counter-intuitive relationships. An explanation for this might be the rapid promotion in the GSM rating when it was first created. Perhaps the promotion rate was so accelerated that the requisite experience level of senior petty officers was lost.

As can be seen, the only independent variable that consistently had the intuitively proper sign was fill-ratio. The variable FILLR was only significant for the total number of C-4 CASREPs, however, and not at all useful in the predictions of the other eight measures used. The results showed that the more IC's and GSE's on board, the lower the number of C-4 CASREP's. However, the IC rating also had some predictors that had counter-intuitive signs. Such a mixture of results makes any comprehensive conclusion ambiguous.

IV. CONCLUSIONS

The amount of ship downtime was related to the individual ship, (i.e., there were differences among the readiness data of ships that could not be explained by the predicters used) the fill ratio and the characteristics of the crew. Disregarding the direction of their relationship for the moment, those personnel characteristics that influenced readiness included percentage of high school graduates, AFQT scores, pay grade, years of active duty and fill ratio.

The analyses determined that although a relationship existed between certain personnel characteristics and equipment downtime, it was small and often in a counter-intuitive direction. For example, the inverse relationship between the median GSM paygrade and downtime is difficult to explain. The fill ratio for the GSE's did, however, behave as expected in predicting the total number of C-4 CASREPs.

Other questions remain. What effect did each Commanding Officer have on the number of CASREPs submitted? Further research is warranted in this area, matching Commanding Officers against CASREPs submitted during their command.

The differences that were discovered in the amount of R-squared for the number of CASREPs submitted in the different categories makes it imperative that each individual UIC be accounted for in any analysis before any other variable is examined.

Some predictors and some ratings showed both an intuitive and counter-intuitive relationship with readiness. For example, the HSDG predictor and the IC rating had both sorts of relationships. Without a plausible theoretical explanation for this, the results might be due to chance.

CASREP reporting may depend on what a ship is doing when the equipment fails. What effect does a 3-M or INSURV inspection have? The CASREP system itself is often said to be abused. For instance, were some CASREP's submitted to get priority status for the ordering of parts? Although this is not allowed, it does happen.

Inclusion of the other ratings from the other ship departments would undoubtedly have raised R-Squares to a higher figure. Alternatively, concentrating on only those equipment identification codes (EIC's) associated with the engineering department might have proven useful. But attaining a large R- Square was not the major purpose of this thesis. The effect, if any, of the personnel characteristics of the ratings in the engineering department on downtime was the prime concern.

Given all the above, the analysis of the personnel characteristics can still be considered valid because the effects of differences between UICs were accounted for. However, the results would tend to indicate that personnel characteristics have no real effect and other correlates should be sought.

The results do not mean that personnel characteristics do not make a difference, but that variations in these characteristics within the ranges observed on the DD 963's are not likely to make much difference. Furthermore, such effects may often be counter-intuitive.

CASREPs for the entire ship level might result in too gross a criterion for analysis. Analysis by sub-systems or pieces of individual equipment, where downtime can be identified by a specific rating, might be more appropriate. Such an approach, however, would still not preclude the possibility that the rating which "should have" worked on the equipment might not have. In summary, the relationships between personnel attributes, fill-ratios and ship readiness remain complex--not intuitively obvious.

APPENDIX A

PERSONNEL SELECTION PROGRAM LISTING

```
DATA RATING;SET FILEIN.MRGDFI01;IF
```

(The cases having a given rating through the 27 quarters are extracted by the following section)

```
    ((RATING01='___') OR (RATING02='___') OR
     (RATING03='___') OR (RATING04='___') OR
     (RATING05='___') OR (RATING06='___') OR
     (RATING07='___') OR (RATING08='___') OR
     (RATING09='___') OR (RATING10='___') OR
     (RATING11='___') OR (RATING12='___') OR
     (RATING13='___') OR (RATING14='___') OR
     (RATING15='___') OR (RATING16='___') OR
     (RATING17='___') OR (RATING18='___') OR
     (RATING19='___') OR (RATING20='___') OR
     (RATING21='___') OR (RATING22='___') OR
     (RATING23='___') OR (RATING24='___') OR
     (RATING25='___') OR (RATING26='___') OR
     (RATING27='___'));
DATA QUARTR01;SET RATING;
```

(Here high-shcool degreed are defined and those with a given rating aboard one of the UIC's are assembled.)

```
IF (((UIC01='574') OR (UIC01='575') OR (UIC01='576')
OR (UIC01='586') OR (UIC01='588')) AND (RATING01='___'));
IF (((HYEC01 GE 1) AND (HYEC01 LE 5)) OR (HYEC01 EQ 13))
THEN CHYEC01=0; IF ((HYEC01 GE 6) AND (HYEC01 LE 12))
THEN CHYEC01=1; PROC SORT DATA=QUARTR01 OUT=QUARTR01;BY UIC01;
DATA QUARTR02;SET RATING;
IF (((UIC02='574') OR (UIC02='575') OR (UIC02='576')
OR (UIC02='586') OR (UIC02='588')) AND (RATING02='___'));
```

```
IF (((HYEC02 GE 1) AND (HYEC02 LE 5)) OR (HYEC02 EQ 13))
THEN CHYEC02=0; IF ((HYEC02 GE 6) AND (HYEC02 LE 12))
THEN CHYEC02=1;
PROC SORT DATA=QUARTRC2 OUT=QUARTR02;BY UIC02;
DATA QUARTR03;SET RATING;
IF (((UIC03='574') OR (UIC03='575')
OR (UIC03='576') OR (UIC03='586') OR
    (UIC03='587') OR (UIC03='588')) AND (RATING03='___'));
IF (((HYEC03 GE 1) AND (HYEC03 LE 5))
OR (HYEC03 EQ 13)) THEN CHYEC03=0;
IF ((HYEC03 GE 6) AND (HYEC03 LE 12)) THEN CHYEC03=1;
PROC SORT DATA=QUARTR03 OUT=QUARTR03;BY UIC03;
DATA QUARTR04;SET RATING;
IF (((UIC04='574') OR (UIC04='575') OR
(UIC04='576') OR (UIC04='586') OR
     (UIC04='587') OR (UIC04='588') OR
(UIC04='589')) AND (RATING04='___'
IF (((HYEC04 GE 1) AND (HYEC04 LE 5))
OR (HYEC04 EQ 13)) THEN CHYEC04=0;
IF ((HYEC04 GE 6) AND (HYEC04 LE 12)) THEN CHYEC04=1;
PROC SORT DATA=QUARTR04 OUT=QUARTR04;BY UIC04;
DATA QUARTR05;SET RATING;
IF (((UIC05='574') OR (UIC05='575')
OR (UIC05='576') OR (UIC05='586') OR
     (UIC05='587') OR (UIC05='588')
OR (UIC05='589') OR (UIC05='590')) AN
     (RATING05='___'));
IF (((HYEC05 GE 1) AND (HYEC05 LE 5))
OR (HYEC05 EQ 13)) THEN CHYEC05=0;
IF ((HYEC05 GE 6) AND (HYEC05 LE 12)) THEN CHYEC05=1;
PROC SORT DATA=QUARTR05 OUT=QUARTR05;BY UIC05;
DATA QUARTR06;SET RATING;
IF (((UIC06='574') OR (UIC06='575')
OR (UIC06='576') OR (UIC06='586') OR
     (UIC06='587') OR (UIC06='588')
```

```
OR (UIC06='589') OR (UIC06='590') OR
     (UIC06='591')) AND (RATING06='___'));
IF (((HYEC06 GE 1) AND (HYEC06 LE 5))
OR (HYEC06 EQ 13)) THEN CHYEC06=0;
IF ((HYEC06 GE 6) AND (HYEC06 LE 12)) THEN CHYEC06=1;
PROC SORT DATA=QUARTR06 OUT=QUARTR06;BY UIC06;
DATA QUARTR07;SET RATING;
IF (((UIC07='574') OR (UIC07='575')
OR (UIC07='576') OR (UIC07='586') OR
     (UIC07='587') OR (UIC07='588')
OR (UIC07='589') OR (UIC07='590') OR
     (UIC07='591') OR (UIC07='598')
OR (UIC07='601') OR (UIC07='602')) AN
     (RATING07='___'));
IF (((HYEC07 GE 1) AND (HYEC07 LE 5))
OR (HYEC07 EQ 13)) THEN CHYEC07=0;
IF ((HYEC07 GE 6) AND (HYEC07 LE 12)) THEN CHYEC07=1;
PROC SORT DATA=QUARTR07 OUT=QUARTR07;BY UIC07;
DATA QUARTR08;SET RATING;
IF (((UIC08='574') OR (UIC08='575') OR
(UIC08='576') OR (UIC08='586') OR
     (UIC08='587') OR (UIC08='588') OR
(UIC08='589') OR (UIC08='590') OR
     (UIC08='591') OR (UIC08='598') OR
(UIC08='599') OR (UIC08='601') OR
     (UIC08='602') OR (UIC08='603')) AND (RATING08='___'));
IF (((HYEC08 GE 1) AND (HYEC08 LE 5))
OR (HYEC08 EQ 13)) THEN CHYEC08=0;
IF ((HYEC08 GE 6) AND (HYEC08 LE 12)) THEN CHYEC08=1;
PROC SORT DATA=QUARTR08 OUT=QUARTR08;BY UIC08;
DATA QUARTR09;SET RATING;
IF (((UIC09='574') OR (UIC09='575') OR
(UIC09='576') OR (UIC09='586') OR
     (UIC09='587') OR (UIC09='588') OR
(UIC09='589') OR (UIC09='590') OR
```

```
     (UIC09='591') OR (UIC09='598')
OR (UIC09='599') OR (UIC09='600') OR
     (UIC09='601') OR (UIC09='602')
OR (UIC09='603') OR (UIC09='604')) AND (RATING09='___'));
IF (((HYEC09 GE 1) AND (HYEC09 LE 5))
OR (HYEC09 EQ 13)) THEN CHYEC09=0;
IF ((HYEC09 GE 6) AND (HYEC09 LE 12)) THEN CHYEC09=1;
PROC SORT DATA=QUARTR09 OUT=QUARTR09;BY UIC09;
DATA QUARTR10;SET RATING;
IF (((UIC10='574') OR (UIC10='575') OR
(UIC10='576') OR (UIC10='586') OR
     (UIC10='587') OR (UIC10='588') OR
(UIC10='589') OR (UIC10='590') OR
     (UIC10='591') OR (UIC10='598') OR
(UIC10='599') OR (UIC10='600') OR
     (UIC10='601') OR (UIC10='602') OR
(UIC10='603') OR (UIC10='604') OR
     (UIC10='611')) AND (RATING10='___'));
IF (((HYEC10 GE 1) AND (HYEC10 LE 5))
OR (HYEC10 EQ 13)) THEN CHYEC10=0;
IF ((HYEC10 GE 6) AND (HYEC10 LE 12)) THEN CHYEC10=1;
PROC SORT DATA=QUARTR10 OUT=QUARTR10;BY UIC10;
DATA QUARTR11;SET RATING;
IF (((UIC11='574') OR (UIC11='575') OR
(UIC11='576') OR (UIC11='586') OR
     (UIC11='587') OR (UIC11='588') OR
(UIC11='589') OR (UIC11='590') OR
     (UIC11='591') OR (UIC11='598') OR
(UIC11='599') OR (UIC11='600') OR
     (UIC11='601') OR (UIC11='602') OR
(UIC11='603') OR (UIC11='604') OR
     (UIC11='611')) AND (RATING11='___'));
IF (((HYEC11 GE 1) AND (HYEC11 LE 5)) OR
(HYEC11 EQ 13)) THEN CHYEC11=0;
IF ((HYEC11 GE 6) AND (HYEC11 LE 12)) THEN CHYEC11=1;
```

```
PROC SORT DATA=QUARTR11 OUT=QUARTR11;BY UIC11;
DATA QUARTR12;SET RATING;
IF (((UIC12='574') OR (UIC12='575') OR
(UIC12='576') OR (UIC12='586') OR
     (UIC12='587') OR (UIC12='588') OR
(UIC12='589') OR (UIC12='590') OR
     (UIC12='591') OR (UIC12='598') OR
(UIC12='599') OR (UIC12='600') OR
     (UIC12='601') OR (UIC12='602') OR
(UIC12='603') OR (UIC12='604') OR
     (UIC12='611')) AND (RATING12='___'));
IF (((HYEC12 GE 1) AND (HYEC12 LE 5))
OR (HYEC12 EQ 13)) THEN CHYEC12=0;
IF ((HYEC12 GE 6) AND (HYEC12 LE 12)) THEN CHYEC12=1;
PROC SORT DATA=QUARTR12 OUT=QUARTR12;BY UIC12;
DATA QUARTR13;SET RATING;
IF (((UIC13='574') OR (UIC13='575') OR
(UIC13='576') OR (UIC13='586') OR
     (UIC13='587') OR (UIC13='588') OR
(UIC13='589') OR (UIC13='590') OR
     (UIC13='591') OR (UIC13='598') OR
(UIC13='599') OR (UIC13='600') OR
     (UIC13='601') OR (UIC13='602') OR
(UIC13='603') OR (UIC13='604') OR
     (UIC13='611')) AND (RATING13='___'));
IF (((HYEC13 GE 1) AND (HYEC13 LE 5))
OR (HYEC13 EQ 13)) THEN CHYEC13=0;
IF ((HYEC13 GE 6) AND (HYEC13 LE 12)) THEN CHYEC13=1;
PROC SORT DATA=QUARTR13 OUT=QUARTR13;BY UIC13;
DATA QUARTR14;SET RATING;
IF (((UIC14='574') OR (UIC14='575') OR
(UIC14='576') OR (UIC14='586') OR
     (UIC14='587') OR (UIC14='588') OR
(UIC14='589') OR (UIC14='590') OR
     (UIC14='591') OR (UIC14='598') OR
```

```
(UIC14='599') OR (UIC14='600') OR
     (UIC14='601') OR (UIC14='602') OR
(UIC14='603') OR (UIC14='604') OR
     (UIC14='611')) AND (RATING14='___'));
IF (((HYEC14 GE 1) AND (HYEC14 LE 5))
OR (HYEC14 EQ 13)) THEN CHYEC14=0;
IF ((HYEC14 GE 6) AND (HYEC14 LE 12)) THEN CHYEC14=1;
PROC SORT DATA=QUARTR14 OUT=QUARTR14;BY UIC14;
DATA QUARTR15;SET RATING;
IF (((UIC15='574') OR (UIC15='575') OR
(UIC15='576') OR (UIC15='586') OR
     (UIC15='587') OR (UIC15='588') OR
(UIC15='589') OR (UIC15='590') OR
     (UIC15='591') OR (UIC15='598') OR
(UIC15='599') OR (UIC15='600') OR
     (UIC15='601') OR (UIC15='602') OR
(UIC15='603') OR (UIC15='604') OR
     (UIC15='611')) AND (RATING15='___'));
IF (((HYEC15 GE 1) AND (HYEC15 LE 5))
OR (HYEC15 EQ 13)) THEN CHYEC15=0;
IF ((HYEC15 GE 6) AND (HYEC15 LE 12)) THEN CHYEC15=1;
PROC SORT DATA=QUARTR15 OUT=QUARTR15;BY UIC15;
DATA QUARTR16;SET RATING;
IF (((UIC16='574') OR (UIC16='575') OR
(UIC16='576') OR (UIC16='586') OR
     (UIC16='587') OR (UIC16='588') OR
(UIC16='589') OR (UIC16='590') OR
     (UIC16='591') OR (UIC16='598') OR
(UIC16='599') OR (UIC16='600') OR
     (UIC16='601') OR (UIC16='602') OR
(UIC16='603') OR (UIC16='604') OR
     (UIC16='611')) AND (RATING16='___'));
IF (((HYEC16 GE 1) AND (HYEC16 LE 5))
OR (HYEC16 EQ 13)) THEN CHYEC16=0;
IF ((HYEC16 GE 6) AND (HYEC16 LE 12)) THEN CHYEC16=1;
```

```
PROC SORT DATA=QUARTR16 OUT=QUARTR16;BY UIC16;
DATA QUARTR17;SET RATING;
IF (((UIC17='574') OR (UIC17='575')
OR (UIC17='576') OR (UIC17='586') OR
     (UIC17='587') OR (UIC17='588')
OR (UIC17='589') OR (UIC17='590') OR
     (UIC17='591') OR (UIC17='598')
OR (UIC17='599') OR (UIC17='600') OR
     (UIC17='601') OR (UIC17='602')
OR (UIC17='603') OR (UIC17='604') OR
     (UIC17='611')) AND (RATING17='___'));
IF (((HYEC17 GE 1) AND (HYEC17 LE 5))
OR (HYEC17 EQ 13)) THEN CHYEC17=0;
IF ((HYEC17 GE 6) AND (HYEC17 LE 12)) THEN CHYEC17=1;
PROC SORT DATA=QUARTR17 OUT=QUARTR17;BY UIC17;
DATA QUARTR18;SET RATING;
IF (((UIC18='574') OR (UIC18='575') OR
(UIC18='576') OR (UIC18='586') OR
     (UIC18='587') OR (UIC18='588') OR
(UIC18='589') OR (UIC18='590') OR
     (UIC18='591') OR (UIC18='598') OR
(UIC18='599') OR (UIC18='600') OR
     (UIC18='601') OR (UIC18='602') OR
(UIC18='603') OR (UIC18='604') OR
     (UIC18='611')) AND (RATING18='___'));
IF (((HYEC18 GE 1) AND (HYEC18 LE 5))
OR (HYEC18 EQ 13)) THEN CHYEC18=0;
IF ((HYEC18 GE 6) AND (HYEC18 LE 12)) THEN CHYEC18=1;
PROC SORT DATA=QUARTR18 OUT=QUARTR18;BY UIC18;
DATA QUARTR19;SET RATING;
IF (((UIC19='574') OR (UIC19='575') OR
(UIC19='576') OR (UIC19='586') OR
     (UIC19='587') OR (UIC19='588') OR
(UIC19='589') OR (UIC19='590') OR
     (UIC19='591') OR (UIC19='598') OR
```

```
(UIC19='599') OR (UIC19='600') OR
     (UIC19='601') OR (UIC19='602') OR
(UIC19='603') OR (UIC19='604') OR
     (UIC19='611')) AND (RATING19='___'));
IF (((HYEC19 GE 1) AND (HYEC19 LE 5))
OR (HYEC19 EQ 13)) THEN CHYEC19=0;
IF ((HYEC19 GE 6) AND (HYEC19 LE 12)) THEN CHYEC19=1;
PROC SORT DATA=QUARTR19 OUT=QUARTR19;BY UIC19;
DATA QUARTR20;SET RATING;
IF (((UIC20='574') OR (UIC20='575') OR
(UIC20='576') OR (UIC20='586') OR
     (UIC20='587') OR (UIC20='588') OR
(UIC20='589') OR (UIC20='590') OR
     (UIC20='591') OR (UIC20='598') OR
(UIC20='599') OR (UIC20='600') OR
     (UIC20='601') OR (UIC20='602') OR
(UIC20='603') OR (UIC20='604') OR
     (UIC20='611')) AND (RATING20='___'));
IF (((HYEC20 GE 1) AND (HYEC20 LE 5))
OR (HYEC20 EQ 13)) THEN CHYEC20=0;
IF ((HYEC20 GE 6) AND (HYEC20 LE 12)) THEN CHYEC20=1;
PROC SORT DATA=QUARTR20 OUT=QUARTR20;BY UIC20;
DATA QUARTR21;SET RATING;
IF (((UIC21='574') OR (UIC21='575') OR
(UIC21='576') OR (UIC21='586') OR
     (UIC21='587') OR (UIC21='588') OR
(UIC21='589') OR (UIC21='590') OR
     (UIC21='591') OR (UIC21='598') OR
(UIC21='599') OR (UIC21='600') OR
     (UIC21='601') OR (UIC21='602') OR
(UIC21='603') OR (UIC21='604') OR
     (UIC21='611')) AND (RATING21='___'));
IF (((HYEC21 GE 1) AND (HYEC21 LE 5))
OR (HYEC21 EQ 13)) THEN CHYEC21=0;
IF ((HYEC21 GE 6) AND (HYEC21 LE 12)) THEN CHYEC21=1;
```

```
PROC SORT DATA=QUARTR21 OUT=QUARTR21;BY UIC21;
DATA QUARTR22;SET RATING;
IF (((UIC22='574') OR (UIC22='575') OR
(UIC22='576') OR (UIC22='586') OR
     (UIC22='587') OR (UIC22='588') OR
(UIC22='589') OR (UIC22='590') OR
     (UIC22='591') OR (UIC22='598') OR
(UIC22='599') OR (UIC22='600') OR
     (UIC22='601') OR (UIC22='602') OR
(UIC22='603') OR (UIC22='604') OR
     (UIC22='611')) AND (RATING22='___'));
IF (((HYEC22 GE 1) AND (HYEC22 LE 5))
OR (HYEC22 EQ 13)) THEN CHYEC22=0;
IF ((HYEC22 GE 6) AND (HYEC22 LE 12)) THEN CHYEC22=1;
PROC SORT DATA=QUARTR22 OUT=QUARTR22;BY UIC22;
DATA QUARTR23;SET RATING;
IF (((UIC23='574') OR (UIC23='575') OR
(UIC23='576') OR (UIC23='586') OR
     (UIC23='587') OR (UIC23='588') OR
(UIC23='589') OR (UIC23='590') OR
     (UIC23='591') OR (UIC23='598') OR
(UIC23='599') OR (UIC23='600') OR
     (UIC23='601') OR (UIC23='602') OR
(UIC23='603') OR (UIC23='604') OR
     (UIC23='611')) AND (RATING23='___'));
IF (((HYEC23 GE 1) AND (HYEC23 LE 5))
OR (HYEC23 EQ 13)) THEN CHYEC23=0;
IF ((HYEC23 GE 6) AND (HYEC23 LE 12)) THEN CHYEC23=1;
PROC SORT DATA=QUARTR23 OUT=QUARTR23;BY UIC23;
DATA QUARTR24;SET RATING;
IF (((UIC24='574') OR (UIC24='575') OR
(UIC24='576') OR (UIC24='586') OR
     (UIC24='587') OR (UIC24='588') OR
(UIC24='589') OR (UIC24='590') OR
     (UIC24='591') OR (UIC24='598') OR
```

```
(UIC24='599') OR (UIC24='600') OR
     (UIC24='601') OR (UIC24='602') OR
(UIC24='603') OR (UIC24='604') OR
     (UIC24='611')) AND (RATING24='___'));
IF (((HYEC24 GE 1) AND (HYEC24 LE 5))
OR (HYEC24 EQ 13)) THEN CHYEC24=0;
IF ((HYEC24 GE 6) AND (HYEC24 LE 12)) THEN CHYEC24=1;
PROC SORT DATA=QUARTR24 OUT=QUARTR24;BY UIC24;
DATA QUARTR25;SET RATING;
IF (((UIC25='574') OR (UIC25='575') OR
(UIC25='576') OR (UIC25='586') OR
     (UIC25='587') OR (UIC25='588') OR
(UIC25='589') OR (UIC25='590') OR
     (UIC25='591') OR (UIC25='598') OR
(UIC25='599') OR (UIC25='600') OR
     (UIC25='601') OR (UIC25='602') OR
(UIC25='603') OR (UIC25='604') OR
     (UIC25='611')) AND (RATING25='___'));
IF (((HYEC25 GE 1) AND (HYEC25 LE 5))
OR (HYEC25 EQ 13)) THEN CHYEC25=0;
IF ((HYEC25 GE 6) AND (HYEC25 LE 12)) THEN CHYEC25=1;
PROC SORT DATA=QUARTR25 OUT=QUARTR25;BY UIC25;
DATA QUARTR26;SET RATING;
IF (((UIC26='574') OR (UIC26='575') OR
(UIC26='576') OR (UIC26='586') OR
     (UIC26='587') OR (UIC26='588') OR
(UIC26='589') OR (UIC26='590') OR
     (UIC26='591') OR (UIC26='598') OR
(UIC26='599') OR (UIC26='600') OR
     (UIC26='601') OR (UIC26='602') OR
(UIC26='603') OR (UIC26='604') OR
     (UIC26='611')) AND (RATING26='___'));
IF (((HYEC26 GE 1) AND (HYEC26 LE 5))
OR (HYEC26 EQ 13)) THEN CHYEC26=0;
IF ((HYEC26 GE 6) AND (HYEC26 LE 12)) THEN CHYEC26=1;
```

```
PROC SORT DATA=QUARTR26 OUT=QUARTR26;BY UIC26;
DATA QUARTR27;SET RATING;
IF (((UIC27='574') OR (UIC27='575') OR
(UIC27='576') OR (UIC27='586') OR
     (UIC27='587') OR (UIC27='588') OR
(UIC27='589') OR (UIC27='590') OR
     (UIC27='591') OR (UIC27='598') OR
(UIC27='599') OR (UIC27='600') OR
     (UIC27='601') OR (UIC27='602') OR
(UIC27='603') OR (UIC27='604') OR
     (UIC27='611')) AND (RATING27='___'));
IF (((HYEC27 GE 1) AND (HYEC27 LE 5))
OR (HYEC27 EQ 13)) THEN CHYEC27=0;
IF ((HYEC27 GE 6) AND (HYEC27 LE 12)) THEN CHYEC27=1;
PROC SORT DATA=QUARTR27 OUT=QUARTR27;BY UIC27;
PROC UNIVARIATE DATA=QUARTR01 NOPRINT; BY UIC01;
     VAR CHYEC01 AFQTMSTR ENTAGE01
PRSAGE01 PAYGRD01 YRACDU01 TIMEGR01;
OUTPUT OUT=SUMMRY01 MEAN=HSDG___
MEDIAN=MEDHSDG AFQT___ ENAGE___
      PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY01;SET SUMMRY01; DROP MEDHSDG; QUARTER=1;
PROC PRINT DATA=SUMMRY01;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 1;
```

(The aggregate statistics are now computed)

```
PROC UNIVARIATE DATA=QUARTR02 NOPRINT; BY UIC02;
     VAR CHYEC02 AFQTMSTR ENTAGE02 PRSAGE02
PAYGRD02 YRACDU02 TIMEGR02;
OUTPUT OUT=SUMMRY02 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___  PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY02;SET SUMMRY02; DROP MEDHSDG; QUARTER=2;
PROC PRINT DATA=SUMMRY02;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
```

```
TITLE3 ___ RATING, QUARTER NO. 2;
PROC UNIVARIATE DATA=QUARTR03 NOPRINT; BY UIC03;
     VAR CHYEC03 AFQTMSTR ENTAGE03 PRSAGE03
PAYGRD03 YRACDU03 TIMEGR03;
OUTPUT OUT=SUMMRY03 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY03;SET SUMMRY03; DROP MEDHSDG; QUARTER=3;
PROC PRINT DATA=SUMMRY03;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 3;
PROC UNIVARIATE DATA=QUARTR04 NOPRINT; BY UIC04;
     VAR CHYEC04 AFQTMSTR ENTAGE04 PRSAGE04
PAYGRD04 YRACDU04 TIMEGR04;
OUTPUT OUT=SUMMRY04 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY04;SET SUMMRY04; DROP MEDHSDG; QUARTER=4;
PROC PRINT DATA=SUMMRY04;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 4;
PROC UNIVARIATE DATA=QUARTR05 NOPRINT; BY UIC05;
     VAR CHYEC05 AFQTMSTR ENTAGE05 PRSAGE05
PAYGRD05 YRACDU05 TIMEGR05;
OUTPUT OUT=SUMMRY05 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY05;SET SUMMRY05; DROP MEDHSDG; QUARTER=5;
PROC PRINT DATA=SUMMRY05;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 5;
PROC UNIVARIATE DATA=QUARTR06 NOPRINT; BY UIC06;
     VAR CHYEC06 AFQTMSTR ENTAGE06 PRSAGE06
PAYGRD06 YRACDU06 TIMEGR06;
OUTPUT OUT=SUMMRY06 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY06;SET SUMMRY06; DROP MEDHSDG; QUARTER=6;
PROC PRINT DATA=SUMMRY06;
```

```
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 6;
PROC UNIVARIATE DATA=QUARTR07 NOPRINT; BY UIC07;
     VAR CHYEC07 AFQTMSTR ENTAGE07 PRSAGE07
PAYGRD07 YRACDU07 TIMEGR07;
OUTPUT OUT=SUMMRY07 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY07;SET SUMMRY07; DROP MEDHSDG; QUARTER=7;
PROC PRINT DATA=SUMMRY07;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 7;
PROC UNIVARIATE DATA=QUARTR08 NOPRINT; BY UIC08;
     VAR CHYEC08 AFQTMSTR ENTAGE08 PRSAGE08
PAYGRD08 YRACDU08 TIMEGR08;
OUTPUT OUT=SUMMRY08 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY08;SET SUMMRY08; DROP MEDHSDG; QUARTER=8;
PROC PRINT DATA=SUMMRY08;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 8;
PROC UNIVARIATE DATA=QUARTR09 NOPRINT; BY UIC09;
     VAR CHYEC09 AFQTMSTR ENTAGE09 PRSAGE09
PAYGRD09 YRACDU09 TIMEGR09;
OUTPUT OUT=SUMMRY09 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY09;SET SUMMRY09; DROP MEDHSDG; QUARTER=9;
PROC PRINT DATA=SUMMRY09;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 9;
PROC UNIVARIATE DATA=QUARTR10 NOPRINT; BY UIC10;
     VAR CHYEC10 AFQTMSTR ENTAGE10 PRSAGE10
PAYGRD10 YRACDU10 TIMEGR10;
OUTPUT OUT=SUMMRY10 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY10;SET SUMMRY10; DROP MEDHSDG; QUARTER=10;
```

```
PROC PRINT DATA=SUMMRY10;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 10;
PROC UNIVARIATE DATA=QUARTR11 NOPRINT; BY UIC11;
     VAR CHYEC11 AFQTMSTR ENTAGE11 PRSAGE11
PAYGRD11 YRACDU11 TIMEGR11;
OUTPUT OUT=SUMMRY11 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY11;SET SUMMRY11; DROP MEDHSDG; QUARTER=11;
PROC PRINT DATA=SUMMRY11;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 11;
PROC UNIVARIATE DATA=QUARTR12 NOPRINT; BY UIC12;
     VAR CHYEC12 AFQTMSTR ENTAGE12 PRSAGE12
PAYGRD12 YRACDU12 TIMEGR12;
OUTPUT OUT=SUMMRY12 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY12;SET SUMMRY12; DROP MEDHSDG; QUARTER=12;
PROC PRINT DATA=SUMMRY12;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 12;
PROC UNIVARIATE DATA=QUARTR13 NOPRINT; BY UIC13;
     VAR CHYEC13 AFQTMSTR ENTAGE13 PRSAGE13
PAYGRD13 YRACDU13 TIMEGR13;
OUTPUT OUT=SUMMRY13 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY13;SET SUMMRY13; DROP MEDHSDG; QUARTER=13;
PROC PRINT DATA=SUMMRY13;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 13;
PROC UNIVARIATE DATA=QUARTR14 NOPRINT; BY UIC14;
     VAR CHYEC14 AFQTMSTR ENTAGE14 PRSAGE14
PAYGRD14 YRACDU14 TIMEGR14;
OUTPUT OUT=SUMMRY14 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
```

```
DATA SUMMRY14;SET SUMMRY14;DROP MEDHSDG;QUARTER=14;
PROC PRINT DATA=SUMMRY14;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 14;
PROC UNIVARIATE DATA=QUARTR15 NOPRINT; BY UIC15;
     VAR CHYEC15 AFQTMSTR ENTAGE15 PRSAGE15
PAYGRD15 YRACDU15 TIMEGR15;
OUTPUT OUT=SUMMRY15 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY15;SET SUMMRY15;DROP MEDHSDG;QUARTER=15;
PROC PRINT DATA=SUMMRY15;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 15;
PROC UNIVARIATE DATA=QUARTR16 NOPRINT; BY UIC16;
     VAR CHYEC16 AFQTMSTR ENTAGE16 PRSAGE16
PAYGRD16 YRACDU16 TIMEGR16;
OUTPUT OUT=SUMMRY16 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY16;SET SUMMRY16;DROP MEDHSDG;QUARTER=16;
PROC PRINT DATA=SUMMRY16;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 16;
PROC UNIVARIATE DATA=QUARTR17 NOPRINT; BY UIC17;
     VAR CHYEC17 AFQTMSTR ENTAGE17 PRSAGE17
PAYGRD17 YRACDU17 TIMEGR17;
OUTPUT OUT=SUMMRY17 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY17;SET SUMMRY17;DROP MEDHSDG;QUARTER=17;
PROC PRINT DATA=SUMMRY17;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 17;
PROC UNIVARIATE DATA=QUARTR18 NOPRINT; BY UIC18;
     VAR CHYEC18 AFQTMSTR ENTAGE18 PRSAGE18
PAYGRD18 YRACDU18 TIMEGR18;
OUTPUT OUT=SUMMRY18 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
```

```
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY18;SET SUMMRY18;DROP MEDHSDG;QUARTER=18;
PROC PRINT DATA=SUMMRY18;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 18;
PROC UNIVARIATE DATA=QUARTR19 NOPRINT; BY UIC19;
     VAR CHYEC19 AFQTMSTR ENTAGE19 PRSAGE19
PAYGRD19 YRACDU19 TIMEGR19;
OUTPUT OUT=SUMMRY19 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY19;SET SUMMRY19;DROP MEDHSDG;QUARTER=19;
PROC PRINT DATA=SUMMRY19;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 19;
PROC UNIVARIATE DATA=QUARTR20 NOPRINT; BY UIC20;
     VAR CHYEC20 AFQTMSTR ENTAGE20 PRSAGE20
PAYGRD20 YRACDU20 TIMEGR20;
OUTPUT OUT=SUMMRY20 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY20;SET SUMMRY20;DROP MEDHSDG;QUARTER=20;
PROC PRINT DATA=SUMMRY20;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 20;
PROC UNIVARIATE DATA=QUARTR21 NOPRINT; BY UIC21;
     VAR CHYEC21 AFQTMSTR ENTAGE21 PRSAGE21
PAYGRD21 YRACDU21 TIMEGR21;
OUTPUT OUT=SUMMRY21 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY21;SET SUMMRY21;DROP MEDHSDG;QUARTER=21;
PROC PRINT DATA=SUMMRY21;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 21;
PROC UNIVARIATE DATA=QUARTR22 NOPRINT; BY UIC22;
     VAR CHYEC22 AFQTMSTR ENTAGE22 PRSAGE22
PAYGRD22 YRACDU22 TIMEGR22;
```

```
OUTPUT OUT=SUMMRY22 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY22;SET SUMMRY22;DROP MEDHSDG;QUARTER=22;
PROC PRINT DATA=SUMMRY22;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 22;
PROC UNIVARIATE DATA=QUARTR23 NOPRINT; BY UIC23;
     VAR CHYEC23 AFQTMSTR ENTAGE23 PRSAGE23
PAYGRD23 YRACDU23 TIMEGR23;
OUTPUT OUT=SUMMRY23 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY23;SET SUMMRY23;DROP MEDHSDG;QUARTER=23;
PROC PRINT DATA=SUMMRY23;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 23;
PROC UNIVARIATE DATA=QUARTR24 NOPRINT; BY UIC24;
     VAR CHYEC24 AFQTMSTR ENTAGE24 PRSAGE24
PAYGRD24 YRACDU24 TIMEGR24;
OUTPUT OUT=SUMMRY24 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY24;SET SUMMRY24;DROP MEDHSDG;QUARTER=24;
PROC PRINT DATA=SUMMRY24;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 24;
PROC UNIVARIATE DATA=QUARTR25 NOPRINT; BY UIC25;
     VAR CHYEC25 AFQTMSTR ENTAGE25 PRSAGE25
PAYGRD25 YRACDU25 TIMEGR25;
OUTPUT OUT=SUMMRY25 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY25;SET SUMMRY25;DROP MEDHSDG;QUARTER=25;
PROC PRINT DATA=SUMMRY25;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 25;
PROC UNIVARIATE DATA=QUARTR26 NOPRINT; BY UIC26;
     VAR CHYEC26 AFQTMSTR ENTAGE26 PRSAGE26
```

```
PAYGRD26 YRACDU26 TIMEGR26;
OUTPUT OUT=SUMMRY26 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY26;SET SUMMRY26;DROP MEDHSDG;QUARTER=26;
PROC PRINT DATA=SUMMRY26;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 26;
PROC UNIVARIATE DATA=QUARTR27 NOPRINT; BY UIC27;
     VAR CHYEC27 AFQTMSTR ENTAGE27 PRSAGE27
PAYGRD27 YRACDU27 TIMEGR27;
OUTPUT OUT=SUMMRY27 MEAN=HSDG___ MEDIAN=MEDHSDG AFQT___
ENAGE___ PRAGE___ PAYGR___ YRACD___ TMEGR___ N=N_HSD___;
DATA SUMMRY27;SET SUMMRY27;DROP MEDHSDG;QUARTER=27;
PROC PRINT DATA=SUMMRY27;
TITLE ON THE CONTENTS OF A PROC UNIVARIATE OUTPUT DATASET;
TITLE3 ___ RATING, QUARTER NO. 27;

DATA READY___;SET
```

(The 27 quarters of data aggregation across a rating within a UIC are now combined.)

```
 SUMMRY01 SUMMRY02 SUMMRY03 SUMMRY04 SUMMRY05
SUMMRY06 SUMMRY07 SUMMRY08
 SUMMRY09 SUMMRY10 SUMMRY11 SUMMRY12 SUMMRY13
SUMMRY14 SUMMRY15 SUMMRY16
 SUMMRY17 SUMMRY18 SUMMRY19 SUMMRY20 SUMMRY21
SUMMRY22 SUMMRY23 SUMMRY24
 SUMMRY25 SUMMRY26 SUMMRY27;
IF (UIC01 NE .) THEN UIC=UIC01;
IF (UIC02 NE .) THEN UIC=UIC02;
IF (UIC03 NE .) THEN UIC=UIC03;
IF (UIC04 NE .) THEN UIC=UIC04;
IF (UIC05 NE .) THEN UIC=UIC05;
IF (UIC06 NE .) THEN UIC=UIC06;
IF (UIC07 NE .) THEN UIC=UIC07;
```

```
IF (UIC08 NE .) THEN UIC=UIC08;
IF (UIC09 NE .) THEN UIC=UIC09;
IF (UIC10 NE .) THEN UIC=UIC10;
IF (UIC11 NE .) THEN UIC=UIC11;
IF (UIC12 NE .) THEN UIC=UIC12;
IF (UIC13 NE .) THEN UIC=UIC13;
IF (UIC14 NE .) THEN UIC=UIC14;
IF (UIC15 NE .) THEN UIC=UIC15;
IF (UIC16 NE .) THEN UIC=UIC16;
IF (UIC17 NE .) THEN UIC=UIC17;
IF (UIC18 NE .) THEN UIC=UIC18;
IF (UIC19 NE .) THEN UIC=UIC19;
IF (UIC20 NE .) THEN UIC=UIC20;
IF (UIC21 NE .) THEN UIC=UIC21;
IF (UIC22 NE .) THEN UIC=UIC22;
IF (UIC23 NE .) THEN UIC=UIC23;
IF (UIC24 NE .) THEN UIC=UIC24;
IF (UIC25 NE .) THEN UIC=UIC25;
IF (UIC26 NE .) THEN UIC=UIC26;
IF (UIC27 NE .) THEN UIC=UIC27;

DROP UIC01 UIC02 UIC03 UIC04 UIC05
UIC06 UIC07 UIC08 UIC09 UIC10 UIC11
     UIC12 UIC13 UIC14 UIC15 UIC16
UIC17 UIC18 UIC19 UIC20 UIC21 UIC22
     UIC23 UIC24 UIC25 UIC26 UIC27;

HSDG___=INT(100*HSDG___);
LABEL N_HSD___=N USED IN COMPUTING HIGH SCHOOL GRADS
      HSDG___ =PERCENTAGE OF HIGH SCHOOL GRADUATES;
PROC SORT DATA=READY___ OUT=FILEOUT.READY___;BY UIC QUARTER;
PROC PRINT DATA=FILEOUT.READY___;
TITLE SORTED BY U.I.C. AND THE AGGREGATE DATA FOR THE;
TITLE3                          ___ RATING;
```

APPENDIX B

CASREP PROGRAM LISTING

HERE THE FIRST CARD ONLY IS SELECTED, THROUGH USE OF THE SEVERITY OF CASREP VARIABLE. THIS DISTINGUISHES THE CASREPS FROM THE SITREPS (SITUATION REPORTS) WHICH FOLLOW ON CARD NUMBER 2.

```
                                IF SEVERITY NE '.';
```

IN THIS SECTION, A SERIES OF NEW VARIABLES ARE DEFINED. THE OCCURRENCE OF ANY SEVERITY CASREP (K1), THE OCCURRENCE OF A LEVEL 2 CASREP (K2), THE OCCURRENCE OF A LEVEL 3 CASREP (K3), THE OCCURRENCE OF A LEVEL 4 CASREP (K4), ARE NOTED. AN ALTERNATIVE 'READINESS' INDEX IS DERIVED, IN ROUGH PARALLEL TO THE 'MATERIAL CONDITION INDEX' (MCI) AND THE 'MISSION ESSENTIAL MATERIAL READINESS AND CONDITION' (MEMRAC) INDICES COMPUTED BY THE NAVY SHIP PARTS CONTROL CENTER (USNSPCC), AS WELL AS A ROUGH EQUIVALENT TO THE 'MEMRAC' INDEX. TO SMOOTH, AND HELP TO EQUATE THIS ALTERNATIVE INDEX (INDEX01) TO OTHER VARIABLES' DISTRIBUTIONS, A LOG TRANSFORM--AND A DIVISION BY 10--ARE EMPLOYED. A LOG TRANSFORM, PLUS A RECODING OF FRACTIONAL VALUES, ON THE 'MEMRAC' INDEX ARE ALSO PERFORMED. ADDITIONALLY, CASREP CAUSE CODES (CAUSECDE) WHICH MIGHT LOOSELY BE TERMED 'PERSONNEL-RELATED' ARE ALSO NOTED AND THEIR OCCURRENCES CODED. INSTANCES OF CALLS FOR OUTSIDE TECHNICAL ASSISTANCE (CODE 'T' OF THE VARIABLE REPRACTV) ARE ALSO CODED.

```
M=DOWNMNTN+0;S=DOWNSUPL+0;T=DOWNTOTL+0;
IF ((SEVERTY=2) OR (SEVERTY=3) OR (SEVERTY=4))
THEN K1=1;ELSE K1=0;
    IF SEVERTY='2' THEN K2=1;ELSE K2=0;
             IF SEVERTY='3' THEN K3=1;ELSE K3=0;
```

```
                        IF SEVERTY='4' THEN K4=1;ELSE K4=0;
INDEX01=(LOG((.1*K2*M)+(.5*K3*M)+(1.0*K4*M)+1))/10;
                        IF K3=1 THEN DT3=.33*T;ELSE DT3=0;
                        IF K4=1 THEN DT4=.67*T;ELSE DT4=0;
MEMRAC  =((.5*K3)+K4)*(DT3+DT4);
        IF MEMRAC<1.0 THEN CMEMRAC=1.0;ELSE CMEMRAC=MEMRAC;
MEMRAC  =LOG(CMEMRAC);
IF ((CAUSECDE='F') OR (CAUSECDE='3') OR (CAUSECDE='S')
OR (CAUSECDE='7') OR
    (CAUSECDE='6') OR (CAUSECDE='H') OR (CAUSECDE='9')
OR (CAUSECDE='0')) THEN
     PRSCAUSE=1;ELSE PRSCAUSE=0;
IF REPRACTV='T' THEN TECHASS=1;ELSE TECHASS=0;
```

THE DATA ARE NEXT SORTED BY UIC AND QUARTER NUMBER.

```
PROC SORT DATA=CASREP OUT=CASREP;BY UIC QUARTER;
```

QUARTERLY TOTALS FOR EACH UIC ARE COMPUTED NEXT ON THE FOLLOWING VARIABLES:

(1) TOTAL NUMBER OF CASUALTY REPORTS--TK1,
(2) TOTAL NUMBER OF LEVEL 2 CASREPS--TK2,
(3) TOTAL NUMBER OF LEVEL 3 CASREPS--TK3,
(4) TOTAL NUMBER OF LEVEL 4 CASREPS--TK4,
(5) TOTAL ALTERNATIVE READINESS INDEX SCORES--TINDEX01,
(6) TOTAL 'MEMRAC' INDEX SCORES--TMEMRAC,
(7) TOTAL 'PERSONNEL-RELATED' INDEX SCORES--TPRSCASE,
(8) TOTAL TECHNICAL ASSISTANCE CALLS--TTECHASS,
(9) TOTAL DOWNTIME DUE TO MAINTENCE--TDOWNMNT,
(10) TOTAL DOWNTIME DUE TO SUPPLIES--TDOWNSUP,
AND (11) TOTAL DOWNTIME--TDOWNTOT.

```
PROC MEANS NOPRINT DATA=CASREP;BY UIC QUARTER;VAR
           K1 K2 K3 K4 INDEX01 MEMRAC PRSCAUSE TECHASS
           M S T;
     OUTPUT OUT=NEW
            SUM=TK1 TK2 TK3 TK4 TINDEX01 TMEMRAC TPRSCASE
            TTECHASS TDOWNMNT TDOWNSUP TDOWNTOT;
PROC PLOT UNIFORM DATA=NEW;PLOT
          TMEMRAC*QUARTER='M'
          TINDEX01*QUARTER='I'/
                       HAXIS=1 TO 27 BY 1
                       VAXIS=0 TO 60 BY 1 OVERLAY;BY UIC;
TITLE SOME MEASURES OF READINESS, ACROSS QUARTERS, BY UIC;
PROC PLOT UNIFORM DATA=NEW;PLOT
          TK1*QUARTER='1'
          TK2*QUARTER='2'
          TK3*QUARTER='3'
          TK4*QUARTER='4'
          TPRSCASE*QUARTER='P'
          TTECHASS*QUARTER='T'/
                         HAXIS=1 TO 27 BY 1
                         VAXIS=0 TO 35 BY 1 OVERLAY;BY UIC;
TITLE SOME MEASURES OF READINESS, ACROSS QUARTERS, BY UIC;
LABEL
TK1      =TOTAL NUMBER OF CASREPS
TK2      =TOTAL NUMBER OF C-2 CASREPS
TK3      =TOTAL NUMBER OF C-3 CASREPS
TK4      =TOTAL NUMBER OF C-4 CASREPS
TINDEX01=TRANSFORMED READINESS INDEX (NPS)
TMEMRAC =TRANSFORMED READINESS INDEX (SPCC)
TPRSCASE=TOTAL OF PRESUMED PERSONNEL-BASED CAUSES
TTECHASS=NUMBER OF TECHNICAL ASSISTANCE REQUESTS
TDOWNMNT=TOTAL HOURS DOWNTIME DUE TO MAINTENANCE
TDOWNSUP=TOTAL HOURS DOWNTIME DUE TO SUPPLY
TDOWNTOT=TOTAL HOURS DOWNTIME;
```

APPENDIX C

DATA - ENGINEERING DEPARTMENT

Descriptive Statistics

VARIABLE	N	MEAN	STANDARD DEVIATION	MIN VALUE	MAX VALUE	STD Error OF MEAN
HSDGEM	386	94.191	8.56781	60.00	100.00	0.4360
AFQTEM	386	66.255	11.35749	21.00	92.00	0.5780
ENAGEEM	386	18.831	0.81473	17.50	23.50	0.0414
PRAGEEM	386	23.507	2.10471	19.00	32.00	0.1071
PAYGREM	386	4.306	0.55915	3.00	6.00	0.0284
YRACDEM	386	4.555	1.55342	1.00	11.50	0.0790
TMEGREM	386	15.905	6.82800	2.00	44.00	0.3475
N_HSDEM	386	7.852	2.62781	2.00	16.00	0.1337
HSDGEN	386	80.588	12.82403	33.00	100.00	0.6527
AFQTEN	386	57.770	8.23785	41.00	82.50	0.4192
ENAGEEN	386	18.408	0.52715	17.00	21.00	0.0268
PRAGEEN	386	21.920	1.47123	19.00	29.00	0.0748
PAYGREN	386	3.871	0.62398	2.00	6.00	0.0317
YRACDEN	386	3.667	1.05741	2.00	9.00	0.0538
TMEGREN	386	10.677	4.51724	2.00	33.00	0.2299
N_HSDEN	386	15.313	5.96985	5.00	38.00	0.3038
HSDGGSE	305	96.186	7.09901	71.00	100.00	0.4064
AFQTGSE	305	77.442	5.96984	55.00	91.00	0.3418
ENAGEGSE	305	18.867	0.75300	17.50	22.50	0.0431
PRAGEGSE	305	24.459	1.93839	21.00	31.00	0.1109
PAYGRGSE	305	4.947	0.39802	4.00	6.00	0.0227
YRACDGSE	305	5.272	1.39950	2.00	11.00	0.0801
TMEGRGSE	305	19.057	6.44581	5.00	40.00	0.3690
N_HSDGSE	305	7.911	1.78131	2.00	13.00	0.1019
HSDGGSM	306	94.673	5.13021	78.00	100.00	0.2932
AFQTGSM	306	76.276	6.05925	64.50	91.00	0.3463

ENAGEGSM	306	18.669	0.55711	18.00	20.00	0.0318
PRAGEGSM	306	23.176	1.23404	20.00	28.00	0.0705
PAYGRGSM	306	4.516	0.48895	3.00	6.00	0.0279
YRACDGSM	306	4.223	0.89884	2.00	8.00	0.0513
TMEGRGSM	306	17.772	5.55006	2.00	37.50	0.3172
N_HSDGSM	306	16.830	4.19413	1.00	25.00	0.2397
HSDGGS	128	87.890	32.44990	0.00	100.00	2.8681
AFQTGS	111	68.121	20.03908	29.00	93.00	1.9020
ENAGEGS	128	18.800	2.62284	17.00	28.00	0.2318
PRAGEGS	128	37.464	3.11915	32.00	47.00	0.2756
PAYGRGS	128	8.339	0.47344	8.00	9.00	0.0418
YRACDGS	128	19.230	2.30363	14.00	24.00	0.2036
TMEGRGS	128	23.113	13.25183	2.00	59.00	1.1713
N_HSDGS	128	1.031	0.17468	1.00	2.00	0.0154
HSDGHT	386	84.663	11.18931	42.00	100.00	0.5695
AFQTHT	386	56.306	6.54463	36.00	83.00	0.3331
ENAGEHT	386	18.582	0.55443	17.50	20.00	0.0282
PRAGEHT	386	22.444	1.48591	20.00	35.00	0.0756
PAYGRHT	386	4.077	0.46895	2.00	5.50	0.0238
YRACDHT	386	4.003	0.85165	2.00	8.00	0.0433
TMEGRHT	386	10.661	3.96744	1.00	29.00	0.2019
N_HSDHT	386	10.792	2.50476	2.00	18.00	0.1274
HSDGIC	385	93.838	11.75466	50.00	100.00	0.5990
AFQTIC	385	67.853	10.45295	36.00	90.50	0.5327
ENAGEIC	385	18.809	1.05168	17.00	24.00	0.0535
PRAGEIC	385	22.309	1.53621	20.00	32.00	0.0782
PAYGRIC	385	4.215	0.55693	2.00	6.00	0.0283
YRACDIC	385	3.771	0.97946	2.00	9.00	0.0499
TMEGRIC	385	12.972	6.60807	2.00	40.50	0.3367
N_HSDIC	385	4.446	1.30420	1.00	9.00	0.0664
HSDGMR	363	86.545	32.52470	0.00	100.00	1.7071
AFQTMR	323	63.273	17.05995	22.00	97.00	0.9492
ENAGEMR	363	19.950	2.71257	17.00	31.00	0.1423
PRAGEMR	363	26.287	5.02512	19.00	41.00	0.2637
PAYGRMR	363	4.820	1.26399	1.00	7.00	0.0663

YRACDMR	363	6.840	4.29626	1.00	21.00	0.2254
TMEGRMR	347	18.309	15.95436	1.00	97.00	0.8564
N_HSDMR	363	1.269	0.47461	1.00	3.00	0.0249
AUTHREM	388	5.000	0.00000	5.00	5.00	0.0000
ASSGNEM	388	7.811	2.68081	0.00	16.00	0.1360
FILLREM	388	156.237	53.61616	0.00	320.00	2.7219
AUTHREN	388	11.000	0.00000	11.00	11.00	0.0000
ASSGNEN	388	15.234	6.05480	0.00	38.00	0.3073
FILLREN	388	138.500	55.04216	0.00	345.50	2.7943
AUTHRGS	388	1.000	0.00000	1.00	1.00	0.0000
ASSGNGS	388	0.340	0.49570	0.00	2.00	0.0251
FILLRGS	388	34.020	49.56993	0.00	200.00	2.5165
AUTHRGSE	388	7.721	0.44877	7.00	8.00	0.0227
ASSGNGSE	388	6.219	3.61177	0.00	13.00	0.1833
FILIRGSE	388	80.107	46.24058	0.00	171.39	2.3475
AUTHRGSM	388	21.000	0.00000	21.00	21.00	0.0000
ASSGNGSM	388	13.273	7.82282	0.00	25.00	0.3971
FILLRGSM	388	63.204	37.25216	0.00	119.00	1.8911
AUTHRHT	388	9.000	0.00000	9.00	9.00	0.0000
ASSGNHT	388	10.737	2.61539	0.00	18.00	0.1327
FILLRHT	388	119.296	29.06051	0.00	200.00	1.4753
AUTHRIC	388	5.054	0.22655	5.00	6.00	0.0115
ASSGNIC	388	4.412	1.35641	0.00	9.00	0.0688
FILLRIC	388	87.465	27.09953	0.00	180.00	1.3757
AUTHRMR	388	1.000	0.00000	1.00	1.00	0.0000
ASSGNMR	388	1.188	0.55514	0.00	3.00	0.0281
FILIRMR	388	118.814	55.51392	0.00	300.00	2.8182

Where:

HSDG__	The percentage of high school graduates
AFQT__	Armed forces qualification test scores
ENAGE__	Entry age
PRAG__	Present age
PAYGR__	Paygrade
YRACD__	Years of active duty

TMEGR__ Time in grade
AUTHR__ Number Authorized
ASSGN__ Number Assigned
FILLR__ Fill ratio

APPENDIX D

DATA - OTHER VARIABLES

Descriptive Statistics

VARIABLE	N	MEAN	STANDARD DEVIATION	MIN value	MAX VALUE	STD Error OF MEAN
HSDGNC	114	88.596	31.92572	0.00	100.00	2.990
AFQTNC	67	57.761	20.92562	18.00	86.00	2.556
ENAGENC	114	20.074	2.24124	17.00	27.00	0.209
PRAGENC	114	33.767	3.04987	27.00	39.00	0.285
PAYGRNC	114	6.008	0.09366	6.00	7.00	0.008
YRACDNC	114	14.258	2.90805	9.00	20.00	0.272
TMEGRNC	114	55.000	31.22627	1.00	120.00	2.924
N_HSDNC	114	1.008	0.09366	1.00	2.00	0.008
QUARTER	389	15.840	6.97679	1.00	27.00	0.353
HSDGHM	385	95.355	14.52712	0.00	100.00	0.740
AFQTHM	374	64.604	17.09624	24.00	98.00	0.884
ENAGEHM	385	19.732	1.59544	17.00	25.00	0.081
PRAGEHM	385	28.594	3.23908	20.00	42.00	0.165
PAYGRHM	385	5.266	0.74471	2.00	7.00	0.037
YRACDHM	385	9.353	2.92905	2.00	24.00	0.149
TMEGRHM	385	27.131	16.58898	1.00	120.00	0.845
N_HSDHM	385	2.137	0.53935	1.00	4.00	0.027
HSDGMA	348	97.270	16.09649	0.00	100.00	0.862
AFQTMA	272	61.716	20.51902	22.00	95.00	1.244
ENAGEMA	348	19.748	3.22845	17.00	31.00	0.173
PRAGEMA	348	35.150	5.21866	25.00	51.00	0.279
PAYGRMA	348	6.636	0.56753	5.50	8.00	0.030
YRACDMA	348	15.992	4.18631	7.00	31.00	0.224
TMEGRMA	348	44.765	29.97601	1.00	120.00	1.606
N_HSDMA	348	1.063	0.24371	1.00	2.00	0.013
HSDGPC	356	84.269	35.28197	0.00	100.00	1.869

AFQTPC	326	46.082	19.88647	13.00	88.00	1.101
ENAGEPC	356	19.931	2.17771	17.00	30.00	0.115
PRAGEPC	356	26.592	4.71585	19.00	41.00	0.249
PAYGRPC	356	4.449	0.87306	2.00	6.00	0.046
YRACDPC	356	7.188	4.22481	1.00	18.00	0.223
TMEGRPC	356	23.369	22.73486	1.00	100.00	1.204
N_HSDPC	356	1.087	0.28235	1.00	2.00	0.014
HSDGPN	386	92.556	17.63064	0.00	100.00	0.897
AFQTPN	384	65.332	10.42854	39.00	93.00	0.532
ENAGEPN	386	19.990	2.06279	17.00	29.00	0.104
PRAGEPN	386	26.479	3.57347	18.00	37.00	0.181
PAYGRPN	386	4.475	0.85511	1.00	7.00	0.043
YRACDPN	386	6.555	3.00867	1.00	16.00	0.153
TMEGRPN	386	18.165	12.87476	1.00	85.00	0.655
N_HSDPN	386	2.367	0.70942	1.00	5.00	0.036
HSDGYN	387	92.994	13.14743	33.00	100.00	0.668
AFQTYN	387	55.202	11.01104	24.00	79.00	0.559
ENAGEYN	387	19.020	1.09560	17.00	23.00	0.055
PRAGEYN	387	22.771	2.08188	18.00	29.00	0.105
PAYGRYN	387	3.762	0.54613	2.00	5.00	0.027
YRACDYN	387	3.542	1.22902	1.00	9.00	0.062
TMEGRYN	387	10.116	5.02565	1.00	34.00	0.255
N_HSDYN	387	4.565	0.96180	1.00	8.00	0.048
HSDGEXC	387	92.622	7.14921	70.00	100.00	0.363
AFQTEXC	387	59.071	7.79602	37.00	83.00	0.396
ENAGEEXC	387	19.033	0.79435	17.00	22.00	0.040
PRAGEEXC	387	25.645	2.27967	18.00	32.00	0.115
PAYGREXC	387	4.444	0.60451	2.00	6.00	0.030
YRACDEXC	387	5.480	2.01040	1.00	11.00	0.102
TMEGREXC	387	14.175	5.70168	5.00	37.00	0.289
N_HSDEXC	387	11.307	1.57244	1.00	17.00	0.079
HSDGBM	387	77.193	14.57715	28.00	100.00	0.740
AFQTBM	386	45.621	8.81149	22.00	68.00	0.448
ENAGEBM	387	19.047	0.88359	18.00	24.00	0.044
PRAGEBM	387	25.732	2.39687	21.00	35.00	0.121

PAYGRBM	387	4.440	0.54257	3.50	7.00	0.027
YRACDBM	387	6.000	1.94083	3.00	17.00	0.098
TMEGRBM	387	13.624	6.33469	2.00	46.00	0.322
N_HSDBM	387	9.428	2.48456	1.00	18.00	0.126
HSDGOS	388	89.286	7.70872	64.00	100.00	0.391
AFQTOS	388	69.921	5.43730	58.00	86.00	0.276
ENAGEOS	388	18.800	0.70486	18.00	22.00	0.035
PRAGEOS	388	22.393	1.13928	20.00	27.00	0.057
PAYGROS	388	3.984	0.49652	3.00	5.00	0.025
YRACDOS	388	3.472	0.69134	1.00	6.00	0.035
TMEGROS	388	10.324	3.14572	1.00	21.00	0.159
N_HSDOS	388	17.943	3.32353	1.00	28.00	0.168
HSDGQM	387	86.183	15.20601	0.00	100.00	0.772
AFQTQM	387	60.475	10.09778	35.00	91.00	0.513
ENAGEQM	387	18.825	0.96234	17.00	23.00	0.048
PRAGEQM	387	22.675	1.88225	18.00	29.00	0.095
PAYGRQM	387	3.859	0.54124	2.00	5.50	0.027
YRACDQM	387	3.680	0.98346	1.00	7.00	0.049
TMEGRQM	387	10.379	4.56464	1.00	26.00	0.232
N_HSDQM	387	5.359	1.32637	1.00	9.00	0.067
HSDGRM	386	92.489	6.84531	70.00	100.00	0.348
AFQTRM	386	56.615	5.85421	39.50	78.00	0.297
ENAGERM	386	18.466	0.67336	18.00	21.00	0.034
PRAGERM	386	22.970	1.45799	20.50	27.50	0.074
PAYGRRM	386	4.156	0.45088	3.00	5.00	0.022
YRACDRM	386	4.290	1.02184	2.00	8.00	0.052
TMEGRRM	386	12.917	5.06307	3.00	44.00	0.257
N_HSDRM	386	12.450	1.56385	8.00	18.00	0.079
HSDGSM	386	73.266	17.87805	16.00	100.00	0.909
AFQTSM	386	58.170	9.65808	32.00	86.00	0.491
ENAGESM	386	18.511	0.83541	17.00	22.00	0.042
PRAGESM	386	22.168	1.74107	19.00	32.00	0.088
PAYGRSM	386	3.713	0.68683	1.00	5.50	0.034
YRACDSM	386	3.674	1.11186	1.50	10.00	0.056
TMEGRSM	386	9.902	4.08183	2.00	25.00	0.207

N_HSDSM	386	5.305	1.09536	2.00	8.00	0.055
HSDGOPS	388	85.693	5.49007	66.00	100.00	0.278
AFQTCPS	388	57.936	4.82315	32.00	75.00	0.244
ENAGEOPS	388	18.654	0.46927	18.00	20.00	0.023
PRAGEOPS	388	22.903	0.92220	20.00	25.00	0.046
PAYGROPS	388	4.076	0.26902	3.00	5.00	0.013
YRACDOPS	388	4.020	0.54354	1.00	7.00	0.027
TMEGROPS	388	10.807	2.58971	1.00	22.00	0.131
N_HSDOPS	388	50.358	6.17597	1.00	64.00	0.313
HSDGDS	387	99.152	3.95637	71.00	100.00	0.201
AFQTDS	387	82.602	8.64254	55.00	97.00	0.439
ENAGEDS	387	18.764	0.79929	18.00	22.00	0.040
PRAGEDS	387	23.928	1.85434	21.00	31.00	0.094
PAYGRDS	387	4.904	0.36157	4.00	7.00	0.018
YRACDDS	387	5.087	1.23791	2.50	12.00	0.062
TMEGRDS	387	20.346	5.91621	7.50	43.00	0.300
N_HSDDS	387	6.819	1.08849	1.00	12.00	0.055
HSDGET	385	99.124	3.42023	75.00	100.00	0.174
AFQTET	385	83.687	6.24104	66.00	95.50	0.318
ENAGEET	385	18.736	0.75604	17.50	21.50	0.038
PRAGEET	385	25.836	4.04280	21.00	38.00	0.206
PAYGRET	385	5.067	0.88129	4.00	8.00	0.044
YRACDET	385	7.123	4.09185	3.00	21.00	0.208
TMEGRET	385	24.674	18.09155	2.00	103.00	0.922
N_HSDET	385	8.592	3.70704	1.00	16.00	0.188
HSDGET2	388	98.865	3.06140	88.00	100.00	0.155
AFQTET2	388	82.997	5.25930	67.50	95.50	0.267
ENAGEET2	388	18.730	0.73945	17.50	21.50	0.037
PRAGEET2	388	23.572	1.41830	19.50	29.00	0.072
PAYGRET2	388	4.618	0.45621	4.00	6.00	0.023
YRACDET2	388	4.682	0.86192	2.00	9.00	0.043
TMEGRET2	388	18.951	5.81777	2.00	40.00	0.295
N_HSDET2	388	11.079	2.10851	1.00	21.00	0.107
HSDGETN	115	98.826	5.41483	66.00	100.00	0.504
AFQTETN	115	79.517	8.13184	66.00	95.50	0.758

ENAGEETN	115	19.178	1.15885	17.50	22.50	0.108
PRAGEETN	115	22.630	1.50596	19.50	26.00	0.140
PAYGRETN	115	4.330	0.53347	3.00	5.00	0.049
YRACDETN	115	3.760	1.03098	2.00	6.50	0.096
TMEGRETN	115	20.656	7.76699	2.00	40.00	0.724
N_HSDETN	115	4.460	2.04033	1.00	11.00	0.190
HSDGETR	114	97.798	6.21471	75.00	100.00	0.582
AFQTETR	114	80.991	6.89683	58.00	94.00	0.645
ENAGEETR	114	18.868	0.98001	17.50	22.00	0.091
PRAGEETR	114	22.307	1.25245	19.00	26.00	0.117
PAYGRETR	114	4.359	0.48202	3.00	5.00	0.045
YRACDETR	114	3.815	1.07519	2.00	7.50	0.100
TMEGRETR	114	17.188	10.50966	2.00	67.50	0.984
N_HSDETR	114	4.192	1.69788	1.00	11.00	0.159
HSDGEW	354	96.412	9.24513	50.00	100.00	0.491
AFQTEW	349	81.514	8.23190	55.00	97.00	0.440
ENAGEEW	354	19.423	1.19896	17.50	24.00	0.063
PRAGEEW	354	24.461	2.33870	19.50	33.00	0.124
PAYGREW	354	4.819	0.50192	3.00	6.00	0.026
YRACDEW	354	5.080	1.67717	2.00	13.00	0.089
TMEGREW	354	18.610	8.10094	2.00	56.00	0.430
N_HSDEW	354	4.155	1.22585	1.00	9.00	0.065
HSDGFTG	386	94.717	9.04106	55.00	100.00	0.460
AFQTFTG	386	80.777	7.50305	60.00	96.00	0.381
ENAGEFTG	386	18.822	0.82666	17.50	22.00	0.042
PRAGEFTG	386	23.318	1.75463	20.00	29.50	0.089
PAYGRFTG	386	4.643	0.53396	3.00	6.00	0.027
YRACDFTG	386	4.652	1.28879	2.00	9.50	0.065
TMEGRFTG	386	17.453	6.86941	2.00	37.00	0.349
N_HSDFTG	386	6.966	2.19478	2.00	15.00	0.111
HSDGFTM	369	96.913	7.25341	66.00	100.00	0.377
AFQTFTM	369	75.338	7.32989	51.00	97.00	0.381
ENAGEFTM	369	18.704	0.93803	17.00	23.00	0.048
PRAGEFTM	369	22.521	1.40441	18.00	28.50	0.073
PAYGRFTM	369	4.226	0.54263	2.00	6.00	0.028

YRACDFTM	369	4.025	1.11073	1.00	12.00	0.057
TMEGRFTM	369	17.124	7.03297	1.00	44.50	0.366
N_HSDFTM	369	6.344	1.93037	1.00	12.00	0.100
HSDGGMG	386	81.777	15.49334	20.00	100.00	0.788
AFQTGMG	386	62.306	9.62530	44.50	91.00	0.489
ENAGEGMG	386	18.808	0.90570	17.00	23.00	0.046
PRAGEGMG	386	24.229	2.61810	19.00	33.00	0.133
PAYGRGMG	386	4.619	0.66940	3.00	6.00	0.034
YRACDGMG	386	5.435	2.09909	2.00	13.50	0.106
TMEGRGMG	386	14.003	5.46969	2.00	32.00	0.278
N_HSDGMG	386	7.235	1.73695	2.00	12.00	0.088
HSDGGMT	386	83.611	18.75583	33.00	100.00	0.954
AFQTGMT	385	62.206	10.31923	26.00	93.50	0.525
ENAGEGMT	386	18.602	1.42264	17.00	26.00	0.072
PRAGEGMT	386	23.358	3.06151	18.00	32.50	0.155
PAYGRGMT	386	4.405	0.69656	2.50	6.00	0.035
YRACDGMT	386	4.672	2.35449	2.00	16.00	0.119
TMEGRGMT	386	14.415	11.65934	2.00	115.00	0.593
N_HSDGMT	386	4.160	1.26084	1.00	8.00	0.064
HSDGGMM	363	91.517	20.10131	0.00	100.00	1.055
AFQTGMM	355	65.415	11.57132	35.00	96.00	0.614
ENAGEGMM	363	18.973	1.35282	17.00	22.50	0.071
PRAGEGMM	363	23.396	2.75565	18.00	36.00	0.144
PAYGRGMM	363	4.165	0.79897	2.00	6.00	0.041
YRACDGMM	363	4.720	2.23907	1.00	15.00	0.117
TMEGRGMM	363	15.792	13.34012	1.00	100.00	0.700
N_HSDGMM	363	2.451	1.06151	1.00	6.00	0.055
HSDGSTG	386	94.567	5.91295	77.00	100.00	0.300
AFQTSTG	386	77.764	4.83670	64.50	90.00	0.246
ENAGESTG	386	18.661	0.59898	18.00	20.00	0.030
PRAGESTG	386	22.423	0.89515	21.00	26.00	0.045
PAYGRSTG	386	4.182	0.37059	3.00	5.00	0.018
YRACDSTG	386	3.778	0.70676	2.00	6.50	0.035
TMEGRSTG	386	14.550	3.72958	3.00	27.00	0.189
N_HSDSTG	386	17.608	2.14532	10.00	24.00	0.109

HSDGTM	385	85.680	21.66228	0.00	100.00	1.104
AFQTTM	380	47.119	11.28648	16.00	91.00	0.578
ENAGETM	385	18.462	1.30024	17.00	25.00	0.066
PRAGETM	385	22.122	3.54280	18.00	46.00	0.180
PAYGRTM	385	3.690	0.78349	1.00	6.00	0.039
YRACDTM	385	4.053	2.73202	1.00	21.00	0.139
TMEGRTM	380	12.573	12.41392	1.00	97.00	0.636
N_HSDTM	385	2.296	0.85733	1.00	5.00	0.043
HSDGCMB	388	93.229	2.81496	87.00	100.00	0.142
AFQTCMB	388	76.694	3.68654	67.00	94.00	0.187
ENAGECMB	388	18.590	0.50024	17.00	20.00	0.025
PRAGECMB	388	22.907	0.75081	19.00	26.00	0.038
PAYGRCMB	388	4.512	0.48872	4.00	5.00	0.024
YRACDCMB	388	4.213	0.57790	2.00	6.00	0.029
TMEGRCMB	388	15.712	2.67161	8.00	26.00	0.135
N_HSDCMB	388	68.064	9.02414	3.00	85.00	0.458
HSDGMM	59	94.915	22.15719	0.00	100.00	2.884
AFQTMM	51	81.686	13.06712	25.00	96.00	1.829
ENAGEMM	59	19.076	1.77340	17.00	24.00	0.230
PRAGEMM	59	22.237	4.13704	18.00	30.00	0.538
PAYGRMM	59	4.364	0.79237	2.00	7.00	0.103
YRACDMM	59	3.635	2.93732	1.00	12.00	0.382
TMEGRMM	59	9.847	7.70538	1.00	34.00	1.003
N_HSDMM	59	4.355	8.35786	1.00	58.00	1.088
HSDGENG	386	89.145	3.89868	79.00	100.00	0.198
AFQTENG	386	66.446	3.87957	58.00	80.00	0.197
ENAGEENG	386	18.595	0.48471	18.00	19.50	0.024
PRAGEENG	386	22.567	0.76064	20.50	25.00	0.038
PAYGRENG	386	4.195	0.38808	4.00	5.00	0.019
YRACDENG	386	4.034	0.53154	3.00	7.00	0.027
TMEGRENG	386	13.226	3.03183	6.00	25.00	0.154
N_HSDENG	386	59.181	7.32782	14.00	73.00	0.372
HSDGDK	385	93.228	18.63827	0.00	100.00	0.949
AFQTDK	373	51.643	15.86621	12.00	93.00	0.821
ENAGEDK	385	20.238	1.79700	17.50	26.00	0.091

PRAGEDK	385	27.902	4.12282	20.00	39.00	0.210
PAYGRDK	385	4.767	0.80193	1.00	7.00	0.040
YRACDDK	385	8.101	3.62843	1.00	22.00	0.184
TMEGRDK	385	26.751	21.18170	1.00	120.00	1.079
N_HSDDK	385	1.828	0.58338	1.00	3.00	0.029
HSDGMS	386	82.152	9.64728	50.00	100.00	0.491
AFQTMS	386	44.760	8.25166	13.50	62.00	0.419
ENAGEMS	386	19.611	1.10924	18.00	23.00	0.056
PRAGEMS	386	26.432	3.35003	20.00	36.00	0.170
PAYGRMS	386	4.160	0.46443	2.50	5.00	0.023
YRACDMS	386	6.097	2.66756	2.00	16.00	0.135
TMEGRMS	386	15.370	6.09546	1.00	49.00	0.310
N_HSDMS	386	12.217	1.89169	6.00	17.00	0.096
HSDGSH	386	82.670	15.69277	25.00	100.00	0.798
AFQTSH	386	46.287	8.82765	19.00	76.00	0.449
ENAGESH	386	19.707	1.36222	17.50	26.00	0.069
PRAGESH	386	24.606	2.63229	19.00	32.50	0.133
PAYGRSH	386	4.036	0.62521	2.50	6.00	0.031
YRACDSH	386	4.672	1.84763	1.50	12.00	0.094
TMEGRSH	386	12.796	6.05500	1.00	43.00	0.308
N_HSDSH	386	5.924	1.52283	2.00	11.00	0.077
HSDGSK	386	87.525	14.49839	33.00	100.00	0.737
AFQTSK	386	52.652	10.02820	24.00	75.00	0.510
ENAGESK	386	19.567	1.31598	17.00	24.50	0.066
PRAGESK	386	26.167	3.12945	19.00	35.00	0.159
PAYGRSK	386	4.501	0.69926	3.00	6.00	0.035
YRACDSK	386	5.744	2.53347	1.50	16.00	0.128
TMEGRSK	386	15.533	8.91170	2.00	73.00	0.453
N_HSDSK	386	5.896	1.43233	3.00	10.00	0.072
HSDGSUP	386	84.163	6.66776	60.00	100.00	0.339
AFQTSUP	386	47.665	4.98293	35.00	60.50	0.253
ENAGESUP	386	19.492	0.79115	18.00	22.00	0.040
PRAGESUP	386	25.625	1.99945	21.00	31.00	0.101
PAYGRSUP	386	4.200	0.44045	3.00	5.00	0.022
YRACDSUP	386	5.126	1.63229	2.00	10.00	0.083

TMEGRSUP	386	13.905	4.10093	5.00	32.50	0.208
N_HSDSUP	386	25.862	3.40806	12.00	37.00	0.173
HSDGSR	375	65.181	24.65840	0.00	100.00	1.273
AFQTSR	371	50.320	9.64230	21.00	82.00	0.500
ENAGESR	375	18.310	0.78600	17.00	23.00	0.040
PRAGESR	375	19.460	0.92340	17.00	25.00	0.047
PAYGRSR	375	1.000	0.00000	1.00	1.00	0.000
YRACDSR	375	1.486	0.57332	1.00	3.50	0.029
TMEGRSR	365	5.893	2.79881	1.00	19.00	0.146
N_HSDSR	375	6.856	4.18113	1.00	21.00	0.215
HSDGSA	387	72.718	15.23310	0.00	100.00	0.774
AFQTSA	387	48.807	6.70761	30.50	67.00	0.340
ENAGESA	387	18.529	0.59881	17.00	21.00	0.030
PRAGESA	387	19.918	0.71383	18.00	24.00	0.036
PAYGRSA	387	2.000	0.00000	2.00	2.00	0.000
YRACDSA	387	1.803	0.47359	1.00	3.00	0.024
TMEGRSA	387	6.910	3.19677	1.00	22.00	0.162
N_HSDSA	387	14.560	5.95869	2.00	43.00	0.302
HSDGSN	387	81.981	12.82554	41.00	100.00	0.651
AFQTSN	387	50.135	6.31485	32.50	74.00	0.321
ENAGESN	387	18.817	0.80784	17.50	22.50	0.041
PRAGESN	387	21.147	0.93244	19.00	24.00	0.047
PAYGRSN	387	3.000	0.00000	3.00	3.00	0.000
YRACDSN	387	2.586	0.56758	1.00	4.00	0.028
TMEGRSN	386	8.527	3.23313	1.00	18.00	0.164
N_HSDSN	387	16.516	5.12553	2.00	33.00	0.260
HSDGFR	298	50.510	36.88359	0.00	100.00	2.136
AFQTFR	287	49.707	10.10953	15.00	82.00	0.596
ENAGEFR	298	18.414	1.11776	17.00	25.00	0.064
PRAGEFR	298	19.614	1.29571	17.00	26.00	0.075
PAYGRFR	298	1.000	0.00000	1.00	1.00	0.000
YRACDFR	298	1.644	0.77480	1.00	6.00	0.044
TMEGRFR	275	6.849	5.22469	1.00	41.00	0.315
N_HSDFR	298	2.748	1.86959	1.00	9.00	0.108
HSDGFA	379	67.411	25.66872	0.00	100.00	1.318

AFQTFA	376	48.531	9.97726	21.00	75.00	0.514
ENAGEFA	379	18.503	0.84632	17.00	24.00	0.043
PRAGEFA	379	20.022	1.03390	18.00	26.00	0.053
PAYGRFA	379	2.000	0.00000	2.00	2.00	0.000
YRACDFA	379	1.978	0.67716	1.00	4.00	0.034
TMEGRFA	379	8.201	5.24488	1.00	33.00	0.269
N_HSDFA	379	5.514	3.18423	1.00	23.00	0.163
HSDGFN	383	74.827	21.14996	0.00	100.00	1.080
AFQTFN	381	50.108	8.83120	22.00	73.00	0.452
ENAGEFN	383	18.822	0.95367	17.00	25.00	0.048
PRAGEFN	383	21.011	1.13741	19.00	27.00	0.058
PAYGRFN	383	3.000	0.00000	3.00	3.00	0.000
YRACDFN	383	2.652	0.60390	1.00	4.00	0.030
TMEGRFN	383	8.134	3.95668	1.00	20.00	0.202
N_HSDFN	383	6.558	2.88725	1.00	19.00	0.147
UIC	389	591.239	10.65929	574.00	611.00	0.540
UICEFF01	388	-0.023	0.34021	-1.00	1.00	0.017
UICEFF02	388	-0.020	0.34415	-1.00	1.00	0.017
UICEFF03	388	-0.018	0.34802	-1.00	1.00	0.017
UICEFF04	388	-0.015	0.35184	-1.00	1.00	0.017
UICEFF05	388	-0.015	0.35184	-1.00	1.00	0.017
UICEFF06	388	-0.020	0.34415	-1.00	1.00	0.017
UICEFF07	388	-0.018	0.34802	-1.00	1.00	0.017
UICEFF08	388	-0.015	0.35184	-1.00	1.00	0.017
UICEFF09	388	-0.012	0.35560	-1.00	1.00	0.018
UICEFF10	388	-0.010	0.35929	-1.00	1.00	0.018
UICEFF11	388	-0.007	0.36294	-1.00	1.00	0.018
UICEFF12	388	0.000	0.37354	-1.00	1.00	0.018
UICEFF13	388	-0.005	0.36652	-1.00	1.00	0.018
UICEFF14	388	0.000	0.37354	-1.00	1.00	0.018
UICEFF15	388	0.000	0.37354	-1.00	1.00	0.018
UICEFF16	388	0.000	0.37354	-1.00	1.00	0.018
OVERHAUL	388	0.203	0.40320	0.00	1.00	0.020
AUTHRE9	388	1.000	0.00000	1.00	1.00	0.000
ASSGNE9	388	0.000	0.00000	0.00	0.00	0.000

FILLRE9	388	0.000	0.00000	0.00	0.00	0.000
AUTHRHM	388	2.000	0.00000	2.00	2.00	0.000
ASSGNHM	388	2.121	0.56903	0.00	4.00	0.028
FILLRHM	388	106.056	28.45127	0.00	200.00	1.444
AUTHRMA	388	1.000	0.00000	1.00	1.00	0.000
ASSGNMA	388	0.953	0.39755	0.00	2.00	0.020
FILLRMA	388	95.360	39.75537	0.00	200.00	2.018
AUTHRNC	388	1.000	0.00000	1.00	1.00	0.000
ASSGNNC	388	0.296	0.46287	0.00	2.00	0.023
FILLRNC	388	29.639	46.28720	0.00	200.00	2.349
AUTHRPC	388	1.000	0.00000	1.00	1.00	0.000
ASSGNPC	388	0.997	0.40347	0.00	2.00	0.020
FILLRPC	388	99.742	40.34650	0.00	200.00	2.048
AUTHRPN	388	2.000	0.00000	2.00	2.00	0.000
ASSGNPN	388	2.355	0.72767	0.00	5.00	0.036
FILLRPN	388	117.783	36.38347	0.00	250.00	1.847
AUTHRYN	388	5.000	0.00000	5.00	5.00	0.000
ASSGNYN	388	4.554	0.98813	0.00	8.00	0.050
FILLRYN	388	91.082	19.76250	0.00	160.00	1.003
AUTHREXC	388	13.000	0.00000	13.00	13.00	0.000
ASSGNEXC	388	11.278	1.67204	0.00	17.00	0.084
FILLREXC	388	86.742	12.87052	0.00	130.79	0.653
AUTHRBM	388	11.000	0.00000	11.00	11.00	0.000
ASSGNBM	388	9.404	2.52710	0.00	18.00	0.128
FILLRBM	388	85.482	22.98931	0.00	163.59	1.167
AUTHROS	388	25.162	0.67966	25.00	28.00	0.034
ASSGNOS	388	17.943	3.32353	1.00	28.00	0.168
FILLROS	388	71.347	13.21283	3.59	112.00	0.670
AUTHRQM	388	5.000	0.00000	5.00	5.00	0.000
ASSGNQM	388	5.345	1.35231	0.00	9.00	0.068
FILLRQM	388	106.907	27.04617	0.00	180.00	1.373
AUTHRRM	388	13.000	0.00000	13.00	13.00	0.000
ASSGNRM	388	12.386	1.79722	0.00	18.00	0.091
FILLRRM	388	95.275	13.83530	0.00	138.50	0.702
AUTHRSM	388	6.000	0.00000	6.00	6.00	0.000

ASSGNSM	388	5.278	1.15687	0.00	8.00	0.058
FILLRSM	388	87.969	19.28254	0.00	133.29	0.978
AUTHROPS	388	60.162	0.67966	60.00	63.00	0.034
ASSGNOPS	388	50.358	6.17597	1.00	64.00	0.313
FILLROPS	388	83.706	10.18457	1.59	103.29	0.517
AUTHRDS	388	6.938	0.24120	6.00	7.00	0.012
ASSGNDS	388	6.801	1.14088	0.00	12.00	0.057
FILLRDS	388	98.168	16.89963	0.00	171.39	0.857
AUTHRET	388	11.000	0.00000	11.00	11.00	0.000
ASSGNET	388	8.525	3.76875	0.00	16.00	0.191
FILLRET	388	77.511	34.25471	0.00	145.50	1.739
AUTHREW	388	6.000	0.00000	6.00	6.00	0.000
ASSGNEW	388	3.791	1.65975	0.00	9.00	0.084
FILLREW	388	63.190	27.65994	0.00	150.00	1.404
AUTHRFT	388	0.000	0.00000	0.00	0.00	0.000
ASSGNFT	388	0.113	0.32553	0.00	2.00	0.016
FILLRFT	388	0.000	0.00000	0.00	0.00	0.000
AUTHRFTG	388	7.347	1.27390	7.00	12.00	0.064
ASSGNFTG	388	6.930	2.24536	0.00	15.00	0.113
FILLRFTG	388	96.237	33.51442	0.00	214.29	1.701
AUTHRFTM	388	7.278	0.92334	7.00	11.00	0.046
ASSGNFTM	388	6.033	2.32866	0.00	12.00	0.118
FILLRFTM	388	83.642	33.17007	0.00	171.39	1.683
AUTHRGM	388	0.000	0.00000	0.00	0.00	0.000
ASSGNGM	388	0.012	0.11293	0.00	1.00	0.005
FILLRGM	388	0.000	0.00000	0.00	0.00	0.000
AUTHRGMG	388	6.876	0.32968	6.00	7.00	0.016
ASSGNGMG	388	7.198	1.80848	0.00	12.00	0.091
FILLRGMG	388	104.951	26.83412	0.00	171.39	1.362
AUTHRGMM	388	3.000	0.00000	3.00	3.00	0.000
ASSGNGMM	388	2.293	1.19052	0.00	6.00	0.060
FILLRGMM	388	76.465	39.68699	0.00	200.00	2.014
AUTHRGMT	388	3.000	0.00000	3.00	3.00	0.000
ASSGNGMT	388	4.139	1.29248	0.00	8.00	0.065
FILLRGMT	388	137.966	43.08477	0.00	266.68	2.187

AUTHRSTG	388	18.000	0.00000	18.00	18.00	0.000
ASSGNSTG	388	17.518	2.48451	0.00	24.00	0.126
FILLRSTG	388	97.318	13.80928	0.00	133.29	0.701
AUTHRTM	388	2.000	0.00000	2.00	2.00	0.000
ASSGNTM	388	2.278	0.87742	0.00	5.00	0.044
FILLRTM	388	113.917	43.87100	0.00	250.00	2.227
AUTHRCMB	388	71.440	1.59427	70.00	76.00	0.080
ASSGNCMB	388	68.190	9.04252	3.00	85.00	0.459
FILLRCMB	388	95.514	12.86908	4.00	121.39	0.653
AUTHRMM	388	0.000	0.00000	0.00	0.00	0.000
ASSGNMM	388	0.662	3.59470	0.00	58.00	0.182
FILLRMM	388	0.000	0.00000	0.00	0.00	0.000
AUTHRENG	388	60.775	0.53191	60.00	62.00	0.027
ASSGNENG	388	59.878	9.64476	0.00	131.00	0.489
FILLRENG	388	98.507	15.70193	0.00	214.79	0.797
AUTHRAK	388	0.000	0.00000	0.00	0.00	0.000
ASSGNAK	388	0.005	0.07170	0.00	1.00	0.003
FILLRAK	388	0.000	0.00000	0.00	0.00	0.000
AUTHRDK	388	2.000	0.00000	2.00	2.00	0.000
ASSGNDK	388	1.814	0.60283	0.00	3.00	0.030
FILLRDK	388	90.721	30.14170	0.00	150.00	1.530
AUTHRMS	388	12.000	0.00000	12.00	12.00	0.000
ASSGNMS	388	12.154	2.08025	0.00	17.00	0.105
FILLRMS	388	101.287	17.33906	0.00	141.69	0.880
AUTHRSH	388	5.000	0.00000	5.00	5.00	0.000
ASSGNSH	388	5.894	1.57719	0.00	11.00	0.080
FILLRSH	388	117.886	31.54370	0.00	220.00	1.601
AUTHRSK	388	5.000	0.00000	5.00	5.00	0.000
ASSGNSK	388	5.865	1.48987	0.00	10.00	0.075
FILLRSK	388	117.319	29.79744	0.00	200.00	1.512
AUTHRSUP	388	24.000	0.00000	24.00	24.00	0.000
ASSGNSUP	388	25.734	3.87187	0.00	37.00	0.196
FILLRSUP	388	107.226	16.13454	0.00	154.19	0.819
AUTHRAR	388	0.000	0.00000	0.00	0.00	0.000
ASSGNAR	388	0.115	0.33635	0.00	2.00	0.017

FILLRAR	388	0.000	0.00000	0.00	0.00	0.000
AUTHRCR	388	0.000	0.00000	0.00	0.00	0.000
ASSGNCR	388	0.002	0.05077	0.00	1.00	0.002
FILLRCR	388	0.000	0.00000	0.00	0.00	0.000
AUTHRFR	388	10.000	0.00000	10.00	10.00	0.000
ASSGNFR	388	13.971	3.58676	0.00	29.00	0.182
FILLRFR	388	139.716	35.86757	0.00	290.00	1.820
AUTHRSR	388	37.226	1.75799	33.00	39.00	0.089
ASSGNSR	388	37.626	6.98925	0.00	66.00	0.354
FILLRSR	388	101.353	19.61752	0.00	173.69	0.995
AUTHRNON	388	47.226	1.75799	43.00	49.00	0.089
ASSGNNON	388	51.716	8.85788	0.00	92.00	0.449
FILLRNON	388	109.71093	19.51958	0.00	191.69	0.990
AUTHRTOT	388	276.60567	2.48232	271.00	284.00	0.126
ASSGNTOT	388	267.54124	26.20020	4.00	359.00	1.330
FILLRTOT	388	96.73761	9.52046	1.39	129.59	0.483
TK1	366	21.16940	11.34774	1.00	51.00	0.593
TK2	366	18.35246	10.34839	0.00	50.00	0.540
TK3	366	2.51639	2.61890	0.00	17.00	0.136
TK4	366	0.30055	0.66403	0.00	4.00	0.034
TINDEX01	366	6.02063	3.79400	0.00	21.91	0.198
TMEMRAC	366	11.53407	11.97704	0.00	86.17	0.626
TPRSCASE	366	6.44536	4.89238	0.00	23.00	0.255
TTECHASS	366	5.68033	3.86399	0.00	21.00	0.201
TDOWNMNT	366	11319.2759	11465.676	0.00	75936.0	599.32
TDOWNSUP	366	10951.1284	8190.798	0.00	61281.0	428.13
TDOWNTOT	366	22270.4043	16609.540	171.00	106439.0	868.19
TOTC	359	1840.2701	2755.719	0.00	19103.0	145.44
TOTE	359	2027.0835	2969.708	0.00	23699.0	156.73
TOTO	359	21.4206	348.205	0.00	6563.0	18.37

Where:

HSDG__	The percentage of high school graduates
AFQT__	Armed forces qualification test scores
ENAGE__	Entry age

PRAG__	Present age
PAYGR__	Paygrade
YRACD__	Years of active duty
TMEGR__	Time in grade
ASSGN__	Number Assigned
AUTHR__	Number Authorized
FILLR__	Fill ratio
UICEFF__	UIC effect of each ship
TK1	Total number of CASREPS submitted by a unit
TK2	Number of C-2 CASREPS
TK3	Number of C-3 CASREPS
TK4	Number of C-4 CASREPS
TINDEX01	Readiness Index01 (McGarvey)
TMEMRAC	Readiness Index (SPCC)
TTECHASS	Number of technical assistance calls requested
TDOWNMNT	Total downtime for maintenance (hours)
TDOWNTOT	Total downtime (hours)
TOT	Total

APPENDIX E

FINAL REGRESSION OUTPUT

1

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TDOWNTCT TOTAL HOURS DOWNTIME

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	19	31931104892	1680584468	8.252	0.0001
ERROR	229	46639899138	203667682		
C TOTAL	248	78571004031			

ROOT MSE	14271.219	R-SQUARE	0.4064
DEP MEAN	23427.795	ADJ R-SQ	0.3571
C.V.	60.91576		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	5548.529	9600.701	0.578
UICEFF01	1	-4421.994	3891.181	-1.136
UICEFF02	1	-5172.832	4036.091	-1.282
UICEFF03	1	-11718.158	3462.851	-3.384
UICEFF04	1	17379.680	3749.434	4.635
UICEFF05	1	9793.099	3521.378	2.781
UICEFF06	1	-13593.889	3557.343	-3.821
UICEFF07	1	14881.765	3522.093	4.225
UICEFF08	1	1980.813	4229.804	0.468
UICEFF09	1	16950.595	3429.337	4.943
UICEFF10	1	-14961.330	4939.773	-3.029
UICEFF11	1	-5175.444	3511.702	-1.474
UICEFF12	1	-13136.213	4013.530	-3.273

UICEFF13	1	-2651.594	3432.200	-0.773
UICEFF14	1	1335.107	3620.996	0.369
UICEFF15	1	-740.071	4066.522	-0.182
UICEFF16	1	17704.234	3480.064	5.087
OVERHAUL	1	-8583.670	2522.566	-3.403
HSDGMR	1	-132.980	45.458227	-2.925
PAYGRGSM	1	6822.226	2111.960	3.230

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TK1 TOTAL NUMBER OF CASREPS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	21	14772.305	703.443	9.529	0.0001
ERROR	227	16756.594	73.817596		
C TOTAL	248	31528.900			
ROOT MSE		8.591717	R-SQUARE	0.4685	
DEP MEAN		21.353414	ADJ R-SQ	0.4194	
C.V.		40.2358			

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	11.624726	8.495726	1.368
UICEFF01	1	-5.119238	2.461969	-2.079
UICEFF02	1	2.093294	2.592819	0.807
UICEFF03	1	-6.446311	2.088245	-3.087
UICEFF04	1	8.283701	2.281926	3.630
UICEFF05	1	8.152205	2.198673	3.708
UICEFF06	1	-8.880552	2.156702	-4.118
UICEFF07	1	7.858420	2.216212	3.546
UICEFF08	1	-0.586175	2.582591	-0.227
UICEFF09	1	12.411956	2.134175	5.816
UICEFF10	1	-4.127897	2.997472	-1.377
UICEFF11	1	-2.710987	2.118128	-1.280

UICEFF12	1	-8.337958	2.462128	-3.386
UICEFF13	1	0.687631	2.097971	0.328
UICEFF14	1	-1.253051	2.224906	-0.563
UICEFF15	1	-4.097570	2.516532	-1.628
UICEFF16	1	5.016752	2.189573	2.291
OVERHAUL	1	-10.363435	1.546171	-6.703
HSDGEN	1	0.043401	0.052978	0.819
HSDGMR	1	-0.068901	0.027835	-2.475
PAYGRIC	1	-1.988643	1.089516	-1.825
PAYGRGSM	1	4.936087	1.272171	3.880

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TK3 TOTAL NUMBER OF C-3 CASREPS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	21	392.650	18.697611	3.177	0.0001
ERROR	227	1335.953	5.885254		
C TOTAL	248	1728.602			

ROOT MSE	2.425954	R-SQUARE	0.2271
DEP MEAN	2.349398	ADJ R-SQ	0.1557
C.V.	103.2586		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	-0.970982	1.958948	-0.496
UICEFF01	1	-1.000923	0.677504	-1.477
UICEFF02	1	0.138726	0.727643	0.191
UICEFF03	1	-0.807997	0.586232	-1.378
UICEFF04	1	-0.041764	0.640845	-0.065
UICEFF05	1	-0.00798798	0.622547	-0.013
UICEFF06	1	-1.010776	0.603351	-1.675
UICEFF07	1	3.609680	0.640733	5.634
UICEFF08	1	-0.689457	0.740828	-0.931

UICEFF09	1	1.692948	0.647232	2.616
UICEFF10	1	-0.316427	0.844663	-0.375
UICEFF11	1	-0.721348	0.604763	-1.193
UICEFF12	1	-0.804408	0.699026	-1.151
UICEFF13	1	0.133607	0.628943	0.212
UICEFF14	1	-0.487682	0.637676	-0.765
UICEFF15	1	-1.098730	0.715484	-1.536
UICEFF16	1	1.011689	0.596174	1.697
OVERHAUL	1	-0.528242	0.439166	-1.203
HSDGEN	1	0.023832	0.015225	1.565
HSDGMR	1	-0.013163	0.007738342	-1.701
HSDGIC	1	0.043914	0.014475	3.034
YRACDGSM	1	-0.337999	0.213181	-1.585

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TK4 TOTAL NUMBER OF C-4 CASREPS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	19	17.862910	0.940153	2.324	0.0019
ERROR	229	92.643114	0.404555		
C TOTAL	248	110.506			

ROOT MSE	0.636046	R-SQUARE	0.1616
DEP MEAN	0.265060	ADJ R-SQ	0.0921
C.V.	239.963		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	1.196981	0.304683	3.929
UICEFF01	1	-0.066458	0.166810	-0.398
UICEFF02	1	0.018384	0.186498	0.099
UICEFF03	1	0.015866	0.153552	0.103
UICEFF04	1	-0.102711	0.165367	-0.621
UICEFF05	1	0.143942	0.157543	0.914

UICEFF06	1	-0.202937	0.169923	-1.194
UICEFF07	1	0.445774	0.160634	2.775
UICEFF08	1	-0.103352	0.187552	-0.551
UICEFF09	1	0.558753	0.150903	3.703
UICEFF10	1	-0.185018	0.170707	-1.084
UICEFF11	1	-0.189952	0.158960	-1.195
UICEFF12	1	-0.077447	0.177617	-0.436
UICEFF13	1	0.061348	0.159126	0.386
UICEFF14	1	-0.211516	0.162901	-1.298
UICEFF15	1	-0.305762	0.183406	-1.667
UICEFF16	1	-0.120055	0.154927	-0.775
OVERHAUL	1	-0.185411	0.113329	-1.636
FILLRIC	1	-0.00678605	0.002192912	-3.095
FILLRGSE	1	-0.0034275	0.002309794	-1.484

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TINDEX01 TRANSFORMED READINESS INDEX (NPS)

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	21	1848.552	88.026284	9.609	0.0001
ERROR	227	2079.407	9.160384		
C TOTAL	248	3927.959			
ROOT MSE		3.026613	R-SQUARE	0.4706	
DEP MEAN		6.206335	ADJ R-SQ	0.4216	
C.V.		48.76651			

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	3.642305	2.992798	1.217
UICEFF01	1	-1.635419	0.867280	-1.886
UICEFF02	1	-1.018781	0.913375	-1.115
UICEFF03	1	-2.938144	0.735628	-3.994
UICEFF04	1	3.361746	0.803856	4.182

UICEFF05	1	3.051413	0.774529	3.940
UICEFF06	1	-3.030693	0.759744	-3.989
UICEFF07	1	2.898149	0.780707	3.712
UICEFF08	1	0.611743	0.909772	0.672
UICEFF09	1	5.181669	0.751808	6.892
UICEFF10	1	-2.752034	1.055923	-2.606
UICEFF11	1	-1.450196	0.746155	-1.944
UICEFF12	1	-3.161426	0.867336	-3.645
UICEFF13	1	0.438981	0.739054	0.594
UICEFF14	1	0.178774	0.783770	0.228
UICEFF15	1	-0.897679	0.886501	-1.013
UICEFF16	1	2.612683	0.771323	3.387
OVERHAUL	1	-2.515674	0.544671	-4.619
HSDGEN	1	0.014030	0.018662	0.752
HSDGMR	1	-0.030455	0.009805563	-3.106
PAYGRIC	1	-0.330350	0.383805	-0.861
PAYGRGSM	1	1.303154	0.448149	2.908

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TMEMRAC TRANSFORMED READINESS INDEX (SPCC)

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	19	9395.381	494.494	4.085	0.0001
ERROR	229	27723.364	121.063		
C TOTAL	248	37118.744			

ROOT MSE	11.002851	R-SQUARE	0.2531
DEP MEAN	10.756668	ADJ R-SQ	0.1911
C.V.	102.2886		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	-10.862993	7.782410	-1.396
UICEFF01	1	-3.822403	2.964483	-1.289

UICEFF02	1	-1.391949	3.286655	-0.424
UICEFF03	1	-3.980647	2.629888	-1.514
UICEFF04	1	-2.152893	2.868579	-0.751
UICEFF05	1	-0.076521	2.761266	-0.028
UICEFF06	1	-6.426480	2.692132	-2.387
UICEFF07	1	17.603876	2.828506	6.224
UICEFF08	1	-5.422810	3.341368	-1.623
UICEFF09	1	10.041185	2.871149	3.497
UICEFF10	1	-0.671062	3.017736	-0.222
UICEFF11	1	-3.230901	2.724936	-1.186
UICEFF12	1	-4.021291	3.075372	-1.308
UICEFF13	1	2.482705	2.835014	0.876
UICEFF14	1	-2.848687	2.878616	-0.990
UICEFF15	1	-3.881452	3.178404	-1.221
UICEFF16	1	4.187176	2.693936	1.554
OVERHAUL	1	-1.894058	1.958756	-0.967
HSDGEN	1	0.079346	0.066641	1.191
HSDGIC	1	0.165242	0.065215	2.534

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TTECHASS NUMBER OF TECHNICAL ASSISTANCE REQUESTS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	18	1136.374	63.131907	6.177	0.0001
ERROR	230	2350.782	10.220793		
C TOTAL	248	3487.157			

ROOT MSE	3.196997	R-SQUARE	0.3259
DEP MEAN	5.566265	ADJ R-SQ	0.2731
C.V.	57.43524		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	2.230403	1.836799	1.214

UICEFF01	1	-0.224980	0.835593	-0.269
UICEFF02	1	-1.540671	0.900286	-1.711
UICEFF03	1	-0.851695	0.759823	-1.121
UICEFF04	1	1.395168	0.828624	1.684
UICEFF05	1	0.178005	0.779531	0.228
UICEFF06	1	-1.545767	0.778697	-1.985
UICEFF07	1	1.250213	0.810057	1.543
UICEFF08	1	-1.016931	0.946478	-1.074
UICEFF09	1	2.645828	0.758966	3.486
UICEFF10	1	2.533714	0.865914	2.926
UICEFF11	1	-0.117980	0.793764	-0.149
UICEFF12	1	-0.729838	0.909285	-0.803
UICEFF13	1	-1.558194	0.759174	-2.052
UICEFF14	1	-1.570366	0.824056	-1.906
UICEFF15	1	-0.617845	0.894158	-0.691
UICEFF16	1	2.355788	0.780563	3.018
OVERHAUL	1	-3.860134	0.562218	-6.866
AFQTEN	1	0.071244	0.032899	2.166

FINAL REGRESSIONS FOR ALL VARIABLES
THAT PASSED THE F TEST

DEP VARIABLE: TDOWNMNT TOTAL HOURS DOWNTIME DUE TO MAINTENANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	19	13426882498	706678026	6.072	0.0001
ERROR	229	26652958570	116388465		
C TOTAL	248	40079841068			

ROOT MSE	10788.349	R-SQUARE	0.3350
DEP MEAN	12493.904	ADJ R-SQ	0.2798
C.V.	86.3489		

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0
INTERCEP	1	9398.201	9222.760	1.019

UICEFF01	1	-6561.047	2920.772	-2.246
UICEFF02	1	-6925.338	3037.691	-2.280
UICEFF03	1	-8566.722	2604.309	-3.289
UICEFF04	1	11404.057	2808.393	4.061
UICEFF05	1	7690.291	2668.748	2.882
UICEFF06	1	-9084.174	2686.562	-3.381
UICEFF07	1	4367.707	2641.678	1.653
UICEFF08	1	4095.237	3182.395	1.287
UICEFF09	1	9386.285	2567.996	3.655
UICEFF10	1	-4252.314	2915.995	-1.458
UICEFF11	1	-6255.954	2628.229	-2.380
UICEFF12	1	-8369.711	3065.466	-2.730
UICEFF13	1	-162.088	2565.953	-0.063
UICEFF14	1	797.893	2716.524	0.294
UICEFF15	1	1416.563	3011.502	0.470
UICEFF16	1	12648.607	2733.941	4.627
OVERHAUL	1	-4629.826	1929.469	-2.400
PAYGRIC	1	-907.140	1362.898	-0.666
PAYGRGSM	1	1661.903	1559.373	1.066

LIST OF REFERENCES

1. Horowitz, S.S. and Sherman, A., Maintenance Personnel Effectiveness in the Navy, Center for Naval Analysis, Report CNA 76-0162.10, October 1976.

2. Horowitz, S.S. and Sherman, A., Crew Characteristics and Ship Conditon (Maintenance Personnel Effectiveness Study (MEPS)), Center for Naval Analysis, Report CNA 1090, March 1977.

3. Reeves, W.R., An Analysis of the effect of Personnel Turbulence on the Performance of Operational Units, M.S. Thesis, Naval Postgraduate School, December 1982.

4. Consolidated Casualty Reporting System (CASREP) Reports Catalog, May 1982.

5. Kerlinger F.N., & Pedhazur, E. J., Multiple Regression in Behavioral Research, pp. 70, Holt, Rinehart and Winston, 1973.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22314	2
2.	Library, Code 0142 Naval Postgraduate School Monterey, California 93943	2
3.	Professor Richard Elster, Code 54Ea Department of Administrative Science Naval Postgraduate School Monterey, California 93943	2
4.	William E. McGarvey, Code 54ms Department of Administrative Science Naval Postgraduate School Monterey, California 93943	4
5.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-01) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1
6.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-11) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1
7.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-12) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1
8.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-12B) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1
9.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-13) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1
10.	Deputy Chief of Naval Operations (Manpower, Personnel and Training) Chief of Naval Personnel (OP-135K) Arlington Annex Columbia Pike and Arlington Ridge Road Arlington, Virginia 20370	1

6. LCDR John D. May 1
4408 Glen Lake Path
Virginia Beach, Virginia 23462

207501

Thesis
M3883 May
c.1 An analysis of the relationships of personnel characteristics to the performance of DD 963 class ships.