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This report lists all unclassified technical reports which have been published during the period from November 1977 through September 1978. Reports are listed under the following four NPRDC product areas: Personnel Acquisition, Utilization, and Effectiveness, Human Performance in Navy Systems, Personnel Education and Training, and Personnel/Manpower Management.

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER SAN DIEGO, CALIFORNIA 92152

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SUMMARY

Reports are listed under the following four NAVPERSRANDCEN product areas:

1. Personnel Acquisition, Utilization, and Effectiveness--Techniques, procedures, and systems for recruiting, selecting, assigning, advancing, and retaining Navy personnel for optimum initial and career assignment and utilization. Development of measures, tests, and instruments to determine occupational and skill requirements and career advancement paths and to assess aptitudes, attitudes, and motivation.

2. Human Performance in Navy Systems--Techniques and methods for measuring and enhancing human performance in Navy systems under various conditions and the application of those methods to assess personnel proficiency levels and to quantify human capabilities and limitations. Includes consideration of human factors in the design of equipment.

3. Personnel Education and Training--Development of instructional technologies and procedures and their application to human learning principles to develop required skills, knowledges, and abilities in naval personnel. Includes test and evaluation of training concepts, methods, and programs.

4. Personnel/Manpower Management--Models, tests, and techniques for improved manpower forecasting and planning systems and development of management decision aids and processes. Includes measures of organizational and management effectiveness.

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CONTENTS

PERSONNEL ACQUISITION, UTILIZATION, AND EFFECTIVENESS

Occupational Scales of the Navy Vocational Interest Inventory: III. Relationship to Job Satisfaction, "A" School Grades, and Job Performance. TR 78-3. November 1977. J. E. Dann and N. M. Abrahams. (AD-A046 754)

The Navy Vocational Interest Inventory (NVII) is an interest measure that was developed to help guide recruits into the ratings corresponding most closely to their vocational preferences and in which they would probably be most satisfied.

In a previous study, occupational scales were constructed for the NVII to reflect the degree of relationship between an individual's interest and the interests of men in 15 specific Navy ratings. The present study evaluated these scales in terms of their classification accuracy and ability to satisfy certain logical relationships and their association with "A" school performance, job satisfaction, and job performance for individuals in 15 ratings. The scales were also compared with more traditional occupational and homogeneous scales developed several years ago.

Results indicated that the scales were quite effective in a cross-sectional sample in relating to job satisfaction, in classifying individuals into ratings where they were known to be satisfied, and in conforming to certain logical relationships. The scales were less promising, however, in a longitudinal sample in terms of all of these criteria and showed little relationship to either "A" school grades or job performance. They also failed to improve upon the previously developed NVII scales.

Considering constraints under the present method of recruit classification, it is suggested that future Navy interest measurement efforts be directed toward development of a transservice interest inventory.

Relationship Between Navy Off-duty Educational Programs and Recruitment, Performance, and Retention. TR 78-8. December 1977. W. H. Githens and G. L. Wilcove. (AD-A048 351)

A series of studies was conducted relating off-duty educational programs to recruiting, performance, and retention. The relationships are all high and positive in studies involving the opinions of recruits, current and past program participants, Navy operational commands, Navy recruiters, and Navy wives. When participants are compared to a matched group (same rate, rating, years in service, age, etc.) of nonparticipants, there is evidence that they are promoted more frequently, but are less likely to stay in the Navy. No relationships were found with rated performance, disciplinary records, or commendations.

Women at the Naval Academy: The First Year of Integration. TR 78-12. February 1978. K. P. Durning. (AD-A052 878)

A study was made of the first year of integration of women midshipmen at the U.S. Naval Academy. The degree of traditionalism of males of the Class of 1980 toward rights and roles of women in society was evaluated as a function of level of contact with female plebes. A small effect on the Attitudes Toward Women Scale was found after 5 months of integration, with men in mixed-sex platoons or squads expressing the most equalitarian attitudes. Irrespective of company assignment, the male plebes became more equalitarian by the end of the academic year. In general, these men were least equalitarian in areas that will affect them most closely as naval officers, as in their opinions about shipboard and other military roles for women. Upperclassmen were most resistant to the integration of Annapolis (19% were neutral or favorable toward coeducation, vs. 26% of plebe men).

PERSONNEL ACQUISITION, UTILIZATION, AND EFFECTIVENESS (Continued)

Females and males had very different perceptions of treatment of the sexes in the 1976-77 year, with the majority of men perceiving favoritism to women, and women denying they received such treatment. Women generally felt resented and less accepted than male peers. Greater numbers of women in more varied roles (e.g., upperclassmen) should partially alleviate several problems by reducing the over-visibility of the women and resultant performance pressures, as well as by allowing more peer contact to challenge the stereotypes held by men.

Determinants and a Measure of Navy Recruiter Effectiveness. TR 78-21. June 1978. J. K. Arima. (AD-A055 800)

Using educational data from California school districts, an equation was developed for estimating a recruiter's expected production for a given geographic area. It was found that over half of the variation in recruiter productivity could be attributed to individual differences among recruiters, and the rest to environmental factors. Of the latter, over one-third could be predicted on the basis of management policy and school district statistics, provided that (1) the productivity measure was weighted for the quality of output, and (2) the resources allocated to the recruiting effort were considered in the prediction equation. Recruiter effectiveness was found to be distributed in a similar manner around the mean production values of each Navy Recruiting District (NRD). Differences in mean production among the districts, however, accounted for a significant portion of the variation in recruiter productivity. The variables representing the districts and one based on male minority enrollments in vocational education classes were the predominant factors in predicting recruiter production. The common practice of assigning proportionately more recruiters to denser metropolitan areas seemed to have a negative effect on the quality and quantity of recruits. The practice of assigning quotas and resources on the basis of the number of Qualified Military Eligibles and on the number of high school graduates in an area did not control for the differential potential of an area to produce quality recruits.

Total recruiter production is determined approximately equally by (1) the personal characteristics and abilities of the recruiter and (2) the potential of the recruiting station territory and the NRD in which it is located. Accordingly, individual recruiter effectiveness can be conceived as the ratio of actual productivity to expected productivity. The differential effects of NRDs on expected recruiter productivity and the variability among stations in the expected production of their individual recruiters suggest that goal assignments, resource allocation, and other management practices can be improved.

Recommendations were made concerning use of the procedures developed and additional research.

Navy Vocational Information System. TR 78-22. June 1978. T. M. I. Yellen and P. P. Foley. (AD-A055 805)

As part of a program to develop computerized Navy techniques for recruit assignment, counseling, and testing, a computer-based occupational counseling system has been developed, based on useful features of existing information retrieval systems. Not only does the system acquaint individuals with various civilian careers that they might want to explore, but it also provides occupational information concerning various Navy ratings that are related to those civilian fields.

PERSONNEL ACQUISITION, UTILIZATION, AND EFFECTIVENESS (Continued)

Armed Services Vocational Aptitude Battery Forms 6 and 7: Validation Against School Performance--Interim Report. TR 78-24. June 1978. L. Swanson. (AD-A056 700)

Two validation studies, one concurrent and one predictive, were conducted to evaluate the effectiveness of the Armed Services Vocational Aptitude Battery (ASVAB), used since January 1976 as the basis for acceptance of applicants into the Armed Services and for initial assignment to school after completion of recruit training.

ASVAB subtest and current selector composite validities against a final school grade or days-in-training criterion were determined for each school sample. Validities of many other two-, three-, and four-test sets of ASVAB composites were also determined to discover more valid composites than those operationally used. In addition, in the predictive study, revised composites developed in a related study on basic electricity and electronics courses were validated in several follow-on "A" schools.

Voluntary Release Pilot Program: Effects on Attrition of General Detail Personnel. TR 78-27. July 1978. R. V. Guthrie, R. A. Lakota, and M. W. Matlock. (AD-A057 832)

The attrition rates, performance, and discipline of first-term general detail personnel holding a voluntary release option were compared with those of a matched control group not holding such an option. Both groups included a sample of recruits who ordinarily would not meet minimum recruiting standards (DELTAs) to assess the impact on attrition of recruiting such persons. After 23 months, 73 percent of the voluntary release eligibles had attrited, compared to 48 percent of the control group. Attrition rates for DELTAs were comparable to those of the total group. The majority of those who voluntarily separated from the Navy expressed dissatisfaction with Navy life.

It was concluded that a blanket voluntary release option is not a prudent mechanism for controlling attrition of general detail personnel. Analysis of interviews held with both groups yielded information potentially useful in addressing the attrition problem.

Preenlistment Drug Experiences of Navy Women and Men: A Comparison. TR 78-28. August 1978. M. S. Olson and P. J. Thomas. (AD-A058 640).

The purpose of this study was to replicate, with female respondents, a 1975 survey of male preservice substance abuse and its correlates. The Navy's Drug Experiences Questionnaire (DEQ) was administered in June 1976 to 519 women at the Recruit Training Command, Orlando, FL. Responses were compared to those of the 1975 male sample. Results showed that female and male preservice drug experiences were similar. No significant differences were found in the proportions of female and male nondrug users (49.8 vs. 47.0% respectively), marijuana-only users (22.2 vs. 25.8%), and other drug users (28.0 vs. 27.2%). Upon analyzing the "other drug" category in more detail, however, significantly more men than women were found to have used hallucinogens, such as LSD, STP, and DMT. The relationships between substance abuse and racial or ethnic membership, age, high school grades, level of education, geographic origin, size of hometown, and preservice delinquency were similar for both sexes. Frequency of drunkenness during the previous year, however, was significantly higher for men than for women.

Despite the finding that patterns of preservice substance abuse of women and men entering the Navy are similar, it is difficult to predict what effect the enlistment of more women will have on the service's drug problems. Further research with samples of both sexes to determine the extent of substance abuse during the first enlistment is recommended.

Identification of NROTC Applicants with Engineering and Science Interests. TR 78-31. August 1978. I. Neumann and N. M. Abrahams. (AD-A059 343)

Due to the Navy's increasing needs for high quality officers with technical training, the NROTC program must increase the number of midshipmen selecting engineering or science (E-S) majors. In an attempt to meet this goal, students entering the program in 1970 and 1971 were used to develop and validate an interest scale, based on responses to the Strong Vocational Interest Blank, for predicting choice of major. Validation results indicated that the scale was effective in predicting choice of major and was stable over time. Further, midshipmen scoring high on the scale were no more likely to disenroll than those scoring lower. Thus, it was highly recommended for use in selecting NROTC midshipmen with E-S majors.

Intentions of Women (18-25 Years Old) to Join the Military: Results of a National Survey. TR 78-34. September 1978. J. I. Borack. (AD-A060 104)

In anticipation of the projected decline in the national population of young men, defense planners have given increased thought to expanding the role of women in the military. Therefore, a survey was conducted to gauge the interest of women and men in joining the military under present conditions and under three alternative options involving greater utilization of women. These options relate to the expansion of the role of women in terms of both the physical location (ships, aircraft, combat zones) and nontraditional job classifications (mechanics, electronics) where they are likely to serve. Findings are presented regarding the percentages of women and men interested in joining the military currently and under each alternative. The composition of the pool of interested women is also analyzed in terms of its demographic and attitudinal components.

Pregnancy in the Navy: Impact on Absenteeism, Attrition, and Workgroup Morale. TR 78-35. September 1978. M. S. Olson and S. S. Stumpf. (AD-A061 321)

Because of objections to the optional discharge and leave provisions of the Navy's present pregnancy policy, a study was conducted to determine the impact of pregnancy on Navy absenteesim, attrition, and workgroup productivity and morale. Data were obtained by analyzing administrative records for and conducting a survey of a previously identified longitudinal sample and by interviewing an aviation squadron sample. Results showed that abolishment of the present discharge option would increase the number of days lost by women, lower women's attrition rates, and increase the impact of pregnancy on workgroup productivity and morale. Further, if mandatory discharge for pregnancy were reinstated, it would decrease female absenteeism, increase female attrition, and increase workgroup turnover. Finally, if the policy's leave provisions were changed, it could reduce workgroup efficiency, while not improving morale of male Navy members, since interview results showed that most were not aware of them.

PERSONNEL ACQUISITION, UTILIZATION, AND EFFECTIVENESS (Continued)

It was recommended that the present pregnancy policy be retained in its entirety, that Navy members of all ranks be made aware of the policy's leave provisions, and that present findings, which contradict many assumptions held about pregnancy's impact on the Navy, be widely disseminated.

HUMAN PERFORMANCE IN NAVY SYSTEMS

Measuring Submarine Approach Officer Performance on the 21A40 Trainer: Instrumentation and Preliminary Results. TR 78-9. January 1978. J. R. Callan, R. T. Kelly, and A. Nicotra. (AD-A049 434)

This report describes a method for providing unobtrusive performance measurement of submarine approach officers and fire control parties while they train on the 21A40 Advanced Submarine Attack Trainer. A system is described for coupling the 21A40 computer (UYK-7) to a desktop computer with graphics capability (Tektronix 4051) in order to sample fire control parameters for display in post-training critique and evaluation.

Values of target range and course were taken at fixed time intervals from the status registers of the main computer. From these values, differences between actual and fire control solution values were determined and graphically displayed. Additionally, a method for determining probability of counterdetection was derived from the existing sound conditions and plotted as a function of time.

Examples of these profiles, the computer interface schematic diagram, and the software necessary to plot the graphs are provided. Suggestions for further use of such a performance measure are included along with recommendations for other applications.

Predictions of Key Entry Performance Using the Reconceptualized Expectancy Model. TR 78-11. January 1978. D. M. Nebeker, S. L. Dockstader, and E. C. Shumate. (AD-A050 583)

Research was conducted to replicate and to extend the earlier development of the reconceptualized expectancy model, which predicts individual performance based on (1) the individual's value of outcomes, (2) the probability that these outcomes would be obtained through alternative performance levels, and (3) the individual's expectancy that he could perform at these alternative levels. Results of an earlier study showed that the model had substantial empirical validity.

A questionnaire was administered individually to 30 data entry operators at the Long Beach Naval Shipyard. The questionnaire was designed to estimate the components of the reconceptualized expectancy model. In addition, the questionnaire provided for estimates of the expectancies that specific effort levels would result in specified performance alternatives. These estimates were used to construct predictions of individual performance. It was assumed that the best predictions of performance would be obtained by using the expectancy that the performance levels would be reached at maximum effort.

Although results of the earlier study were replicated almost in their entirety, problems were found with the model. The implications of the replica-model are discussed in some detail.

A Performance-contingent Reward System that Uses Economic Incentives: Preliminary Cost-effectiveness Analysis. TR 78-13. February 1978. G. E. Bretton, S. L. Dockstader, D. M. Nebeker, and E. C. Shumate. (AD-A059 830)

A Performance-Contingent Reward System (PCRS) that uses economic incentives was evaluated based on performance of federal civil service data transcribers in the Management Information System Department of the Long Beach Naval Shipyard (LBNSY). Evaluation of the PCRS was conducted primarily from the following perspectives: (1) the cost-effectiveness of the proposed PCRS, (2) issues involving the generalizability of the test-site results to other Navy activities, and (3) projections of PCRS-induced cost savings.

Health and Safety Implications of Diesel Locomotive Emissions. TR 78-17. April 1978. M. S. Sanders and J. M. Peay. (AD-A053 455)

Relevant literature was reviewed to determine whether there are health and/or safety effects of long-term exposure to low concentrations of diesel emissions within the ranges reported in actual railroad operations. No consistent evidence was found linking low concentrations of diesel emissions to long-term health effects or short-term respiratory function. Evidence was found linking emissions to eye irritation. Interviews with union officials and operating crews, letters from union members, union file material, and miscellaneous locomotive and caboose inspection reports pointed to the conclusion that diesel emissions are not a widespread or frequent problem in the railroad environment. There may be short-term, infrequent occurrences of burning eyes, headache, and nausea, but any safety consequences of such symptoms could not be determined.

Reading Skill Levels in the Navy. TR 78-19. April 1978. T. M. Duffy and W. A. Nugent. (AD-A054 859)

The purpose of this research was to provide information on reading skill levels in the Navy. A standard reading test was administered to all recruits entering the Recruit Training Command, San Diego over a 1-year period (about 31,000). A significant proportion of the sample was found to have reading skills well below the difficulty of the manuals used in training. Reading skills were examined in relationship to rating assignments, the difficulty of rate training manuals, race, education, and Basic Test Battery Scores.

Performance Contingent Reward System: A Field Study of Effects on Worker Productivity. TR 78-20. May 1978. E. C. Shumate, S. L. Dockstader, and D. M. Nebeker. (AD-A055 796)

The Performance Contingent Reward System (PCRS), an incentive program designed to improve individual productivity, was developed, based on behavioral principles and federal guidelines, and implemented in the data entry section of a data processing center at the Long Beach Naval Shipyard. The employees participating in the study were Navy civilian key entry operators. Production standards were developed based upon keying speed and the amount of time spent working. A monetary bonus was awarded for high individual productivity, the amount of which was directly proportional to the amount of work exceeding a production standard.

Production for the 12-month trial period improved substantially, both in keying speed and in the time spent working. Excessive overtime and a heretofore perpetual backlog were virtually eliminated. The work force decreased in size through natural attrition but productivity was not affected. A rigorous cost-effectiveness analysis showed that the set-up costs of the program were recovered in the first 3 months of operation.

The report describes work measurement and standards development; details of the PCRS, including performance-reward contingencies and the payment system; and suggestions for successful program implementation.

Effects of Administrative Policy on Student Performance. TR 78-25. July 1978. M. L. Abrams, J. Sachar, C. Buckley, and L. J. Brown. (AD-A057 833)

The effects of two types of school administrative policy on Navy student performance were investigated. They were (1) direct instructor-trainee interactions with a primary stress on military behaviors and a secondary stress on academic behaviors (M^a), and (2) indirect instructor-trainee interactions with a primary emphasis on academic behaviors and a secondary emphasis on military behaviors (A^m). Subjects were 151 students attending a Navy Hydraulics course; three classes were conducted under each policy. The A^m policy treatment significantly reduced attrition and improved academic performance. It was suggested that the study be replicated in a different school setting or that the A^m treatment be tried out in one or more schools. If the results support those of the study, it is recommended that the Navy implement this policy and provide administrators with a course in the procedures for establishing and maintaining the use of A^m methods.

Job Performance Aids: Research and Technology State-of-the-art. TR 78-26. July 1978. H. R. Booher. (AD-A057 562)

This report describes and compares the various Job Performance Aid (JPA) techniques and identifies and categorizes factors important to selection, design, cost-performance trade-off, conduct of future research, and implementation of performance aiding technology. More than 100 JPA systems and techniques are classified under five categories: (1) format/content, (2) display media, (3) applied training, (4) peripheral test/diagnostic, and (5) delivery systems. Major factors are identified as critical to the development of a JPA algorithm, including personnel aptitude and experience, type and complexity of task, type and complexity of equipment, and degree of proceduralization required. A conceptual model is presented for use by the JPA community in cost trade-off analyses, in JPA selection algorithms, and in the grouping of theoretical trends. The report also presents a theoretical base for use of memory in JPA; previews a theory for mixing JPA techniques, principles, and methodologies; and outlines goals for future JPA research and technology efforts.

Tailoring Shipboard Training to Fleet Performance Needs: I. Approach and Initial Efforts. TR 78-30. August 1978. R. E. Main, M. L. Abrams, C. R. Chiles, M. R. Flaningam, and R. M. Vorce. (AD-A059 292)

An approach to shipboard training was proposed that was designed to produce instructional methods that are both responsive to fleet priorities and compatible with the constraints of a shipboard environment, and a three-stage plan was developed to implement and evaluate that approach. Under the first stage of that plan, an extensive survey was conducted on board three aircraft carriers (1) to determine characteristics of present training systems, (2) to assess environmental constraints, and (3) to determine major problem areas where shipboard training could be applied to enhance job performance. Survey results provided a comprehensive overview of the major types of performance problems being experienced, current training systems being implemented, and implementation difficulties caused by the shipboard environment. Twenty of the major problems were selected for further evaluation by fleet representatives. As a result, main propulsion system problems were determined as most critical and selected for research attention.

PERSONNEL EDUCATION AND TRAINING

Conference Proceedings: Schooling and the Acquisition of Knowledge. TR 78-6. December 1977. R. C. Anderson, R. J. Spiro, and W. E. Montague. (AD-A049 878)

This report summarizes activities at a conference on Schooling and the Acquisition of Knowledge held November 1975, in San Diego, California.

Alternative Delivery Systems for the Computer-aided Instruction Study Management System (CAISMS). TR 78-10. February 1978. J. Nievergelt, S. M. Alessi, and W. E. Montague. (AD-A050 330)

The Computer-aided Instruction Study Management System (CAISMS) is a system for automatic study management implemented on the PLATO IV system at the University of Illinois. This report discusses alternative configurations for delivering CAISMS varying from general-purpose time-sharing systems to a microcomputer-based stand-alone terminal.

Immediate vs. Delayed Feedback in a Computer-managed Test: Effects on Long-term Retention. TR 78-15. March 1978. P T. Sturges. (AD-A052 993)

Four groups of college undergraduates took a multiple-choice computer-managed test. Three of these groups received informative feedback (the entire item with the correct answer identified) either (1) immediately item-by-item (2-second delay), (2) following the entire test (20-minute delay), or (3) 24 hours later (24-hour delay). The fourth (control) group received no feedback. Scores on a criterion test, given 1 to 3 weeks later, showed that retention was significantly better for the two delayed feedback groups (20-minute and 24-hour delay) than for the immediate feedback group (2-second delay). These results confirmed previous findings of laboratory experiments--that retention following delayed feedback is not degraded by the delay.

Curriculum Information Networks for Computer-assisted Instruction. TR 78-18. April 1978. M. Beard, A. Barr, L. Gould, and K. Westcourt. (AD-A054 599)

This report, which describes research in curriculum design for computer-assisted instruction, covers the following topics:

1. The issues and difficulties involved in courseware development with particular emphasis on the problems of current "generative" techniques.

2. The Curriculum Information Network, as used in the Basic Instructional Program (BIP), including its advantages, weaknesses, and possible future development.

3. Results obtained from analysis of students' experience with BIP.

4. The relevance of the network idea to Navy Technical Training.

Algorithms for Developing Test Questions from Sentences in Instructional Materials. TR 78-23. June 1978. G. H. Roid and P. Finn. (AD-A056 614)

The feasibility of generating multiple-choice test questions by transforming sentences from prose instructional materials was examined. A computer-based algorithm was used to analyze prose subject matter and to identify high-information words. Sentences containing selected words were then transformed into multiple-choice items by four writers who generated foils or question alternatives informally and by an algorithmic method. Items were organized into tests and administered to subjects before and after they had studied instructional materials. Results indicated that this item-writing technique was feasible and that algorithmic methods of generating foils produce items of reasonably good quality.

PERSONNEL/MANPOWER MANAGEMENT

Analysis of Demands on the San Diego-based Intermediate Maintenance Activities. TR 78-1. November 1977. T. A. Blanco and M. W. Rowe. (AD-A046 610)

In developing a system for allocating manpower resources in the Navy, major emphasis has been placed on the design of an input-output (I/O) model to forecast the workload of shore activities, based upon the size and distribution of the fleet. To determine the feasibility of I/O analysis for operational use, a full-scale model of the 11th Naval District is being developed. The structure of I/O analysis requires data on the work output of each shore activity and its destination in the fleet and at other shore activities. In addition, fleet demands must be disaggregated by ship type, movement, and status.

A major effort underway is the collection and organization of data for an empirical analysis of the fleet-shore workload demand network, focusing on 10 major shore activities in the 11th Naval District. This report is concerned with the analysis of workload demand on the San Diego-based Intermediate Maintenance Activities (IMAs).

The structure of demands on the San Diego IMAs was analyzed by using IMA workload data that provided an annual report (in terms of man-hours expended) on all work being performed on each ship and shore activity. The data were used to determine the division of workload between fleet and shore customers, the proportion of workload accruing to each ship type, the feasibility of grouping ships by type, and the difference in workload for different ship types and homeports.

Analysis of Demands on the Navy Public Works Center, San Diego. TR 78-2. November 1977. A. W. Whisman. (AD-A046 593)

The Navy's efforts to develop a system for allocating manpower resources have emphasized the design of an input-output (I/O) model to forecast the workload of shore activities, based upon the size and distribution of the fleet. To determine the feasibility of I/O analysis for operational use, a full-scale model of the 11th Naval District is being developed. The structure of I/O analysis requires data on the work output of each shore activity and its destination in the fleet or at other shore activities.

A major effort is underway to collect and organize data for the empirical analysis of the fleet-shore workload demand network, focusing on 10 major shore activities in the 11th Naval District. This report is concerned with the analysis of workload demands on the Navy Public Works Center (PWC), San Diego.

The structure of demands on the three major departments at PWC (Maintenance, Transportation, and Utilities) was analyzed, yielding demand rates for individual customers of PWC, the proportion of fleet demands to shore demands, and utility use rates by ship type for ships in the port of San Diego.

Forecasting the Naval Enlisted Personnel Force Structure to Estimate Basic Pay. TR 78-4. November 1977. M. Chipman. (AD-A046 878)

A primary concern of Navy management is the ability to meet the Navy's manpower requirements in terms of both the quantity and quality of personnel. Recruitment, promotion, retirement, and other managerial policies are all directly

related to and restricted by the Military Personnel, Navy (MPN) budget. Because over 50 percent of the MPN budget is allocated for enlisted basic pay, special attention must be given to the accurate forecasting of enlisted populations. The Naval Pay Predictor, Enlisted (NAPPE) Model, designed to accomplish this objective, relies solely upon historical population data and user-supplied enlisted end-strengths. Time series analysis is used to determine a general set of forecasting models that adequately explain the historical data. Other statistical procedures, including those employed in costing the enlisted force and in estimating recruit input populations, are also detailed. Validation results indicating errors of less than .1 percent for total enlisted basic pay are presented.

Analysis of Demands on the Naval Station, San Diego. TR 78-7. December 1977. T. A. Blanco and M. W. Rowe. (AD-A048 349)

In developing a system for allocating manpower resources in the Navy, major emphasis has been placed on the design of an input-output (I/O) model to forecast the workload of shore activities, based upon the size and distribution of the fleet. To determine the feasibility of I/O analysis for operational use, a full-scale model of the 11th Naval District is being developed. The structure of I/O analysis requires data on the work output of each shore activity and its destination in the fleet and at other shore activities. In addition, the demands by the fleet must be disaggregated by ship type, movement, and status.

A major effort underway is the collection and organization of data and the empirical analysis of the fleet-shore workload demand network, focusing on 10 major shore activities in the 11th Naval District. This report is concerned with the analysis of workload demand on the Naval Station (NAVSTA), San Diego.

The structure of demands on the two major departments at NAVSTA, San Diego (Waterfront Operations and Military Personnel) was analyzed, and the differences in demand among ship types were determined. The Waterfront Operations Department primarily provides port services to ships in the harbor; and the Military Personnel Department, personnel services to fleet personnel.

Forecasting the Numbers and Types of Enlisted Personnel in the United States Marine Corps: An Interactive Cohort Model. TR 78-14. March 1978. K. T. Marshall. (AD-A052 592)

This report desribes the development of a model to forecast the total enlisted Marine Corps strength at the end of each quarter for 1 or 2 years into the future. The method involves the use of a simple cohort model, which has been implemented interactively and allows users to forecast the effects of changes in the recruit 2-3-4 year mix, education level, racial mix, or any combination. It also allows for gaming of the continuation rates, and provides long-range or steady-state results of particular recruitment policies.

Projections of the U.S. Population of 18-year-old Males in the Post-1993 Period. TR 78-16. April 1978. J. Borack and M. Govindan. (AD-A053 628)

With the advent of the all-volunteer force, it is necessary to estimate the long-term supply of individuals available for military service to determine our ability to meet future manpower requirements. Planners must be able to forecast both the size and composition of manpower supply because of the lead time necessary to take corrective action in areas such as recruitment strategies, training policies, hardware and job design, and necessary legislation whenever there are critical imbalances between projected supply and requirements.

The primary manpower pool for the military is comprised of young men 17-21 years old. This report discusses a forecasting methodology based upon asymptotic exponential regression that may be used to project this population in the post-1993 period. Specifically, a methodology is presented to project the 18-year-old male population. Extension to other age groups is straightforward. Projections obtained by this methodology are compared to Bureau of the Census population projections and actual post-period estimates. The methodology is shown to be an interesting alternative to other projection techniques.

Techniques for Evaluating Military Retirement Policies. TR 78-29. July 1978. M. Chipman, J. Silverman, and R. Willis. (AD-A059 291)

In evaluating alternative military retirement policies, models have been developed to compare regular military compensation, severance, vesting, and retirement costs given an underlying set of assumptions. The report outlines the interactive Retirement Analysis Model (RAM), which performs this task in both transitional and steady-state environments, examining both short-run and long-run effects. In addition, emphasis is given to a dynamic programming approach that will produce a set of continuation rates (which express personnel behavior) given a set of economic incentives as depicted by a retirement system. The combination of RAM with the dynamic programming approach is expected to lead to a more accurate assessment of the effects of retirement policies on both personnel behavior and total costs.

A Regional Input-output Model for Forecasting Shore-based Navy Workload. TR 78-32. August 1978. T. A. Blanco, J. M. Kissler, and A. W. Whisman. (AD-A059 316)

To forecast the changes in workload on Navy shore-based support activities caused by changes in the size and configuration of the fleet, an input-output (I/O) model has been developed to represent the fleet-support demand network of the 11th Naval District. The I/O sectors represent naval shore-based facility outputs, with final demands represented by the ships and squadrons of the fleet. The activity levels obtained from the model can be used to derive manpower requirements and to justify changes in budget requirements.

This report contains a complete description of the model including formulation, data collection and analysis, coefficient estimation, test runs, and applications.

Interactive Sea/Shore Billet Rotation Model. TR 78-33. September 1978. M. Rowe and M. Smith. (AD-A059 732)

An interactive billet rotation (BILROT) model was developed for use by billet planners in allocating enlisted billets by rate/rating between sea and shore to achieve balanced rotation flows. The model also determines (1) the number of shore billets available for women enlisted or civilians without impacting male rotation, and (2) appropriate tour lengths given current or future allowance structures. The interactive capability allows the user to access any of a series of reports for a multiyear planning horizon.

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Bibliography, Unclassified Technical Reports, July 1976 Through September 1977. TR 78-5. November 1977. (AD-A047 671)

This report lists all unclassified technical reports that were published during the period from July 1976 through September 1977. Reports are listed under the following four NAVPERSRANDCEN product areas: Personnel Acquisition, Utilization and Effectiveness; Human Performance in Navy Systems; Personnel Education and Training; and Personnel/Manpower Management.

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