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REPORT 53-13

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FINAL REPORT

TECHNICAL POSITIONS RESEARCH PROJECT

Margaret Hubbard Jones

Department of Engineering
University of California
Los Angeles

FOREWORD

Harry W. Case directly supervised and was technically responsible for the research described in this Final Report of the Technical Positions Research Project.

The research, conducted under the sponsorship of the U.S. Office of Naval Research, was performed in the Department of Engineering, University of California, Los Angeles. L. M. K. Boelter is Chairman of the Department.

Margaret Hubbard Jones
Associate Project Leader

Submitted in partial fulfillment of
Contract No. Nonr-233(08)

Robert Bromberg

Robert Bromberg
Representative of the Chairman

Harry W. Case

Harry W. Case
Project Leader
Technical Positions Research .

June 1953

ABSTRACT

This report for the Technical Positions Research Project, Contract Nonr-233(08), discusses briefly all techniques and materials used in the study of technical jobs found at the U.S. Naval Air Missile Test Center at Pt. Mugu, California, and at the U.S. Naval Civil Engineering Research and Evaluation Laboratory at Port Hueneme, California. The techniques used in describing, analyzing, and classifying these jobs are presented. It is concluded that technical skills and knowledge are the important variables in these jobs, and that purely verbal techniques must necessarily fail to provide an ideal solution to difficulties. Recommended directions for future research are presented.

Copies of the final report are available upon request from the Engineering Department, University of California, Los Angeles 24, California.

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FINAL REPORT
TECHNICAL POSITIONS RESEARCH

I. NATURE OF THE PROBLEM:

This project was established with a rather general objective in mind: the study of technical, or subprofessional jobs to discover as much as possible about them. The view was held by the advisory committee that although a good deal is known about engineers and skilled tradesmen, very little is known about the technically-trained sub-professional group, whose training and skills lie somewhere in between those of the other two groups. More specifically, it was proposed that a start be made by obtaining job descriptions of technical positions and analyzing and classifying as many of these as possible. The positions to be described and analyzed were those classified or judged to be sub-professional in the Naval laboratories of Southern California. The material to be used for the study was to be the existing Civil Service Position Descriptions, which are located at the Navy Area Wage and Classification Office in Long Beach. If time and material became available, the work was to be extended to include a study of the training of technicians, with a view to establishing recommended curricula and selection procedures.

II. FIRST PHASE OF THE STUDY: Review of the Literature.

A complete review of the literature on technical positions was

undertaken with respect to job evaluation, selection, and training. No references containing useful data were uncovered in the fields of either selection or training. In the field of job evaluation and analysis, 307 pertinent references were discovered. These form the basis of Technical Report No. 1: A Survey of the Literature on Job Analysis of Technical Positions. Examination of these articles revealed that in only 9 of these are technical jobs explicitly recognized as problems for the job analyst. Most of these 9 articles are quite general, merely pointing out that conventional job evaluation plans do not work well with technical people. But there is ample suggestion that in the evaluation of technical jobs too little attention has been paid to technical skills and knowledge. This technical report will appear in Personnel Psychology, Summer Issue, 1953, and will be distributed in accordance with the official distribution list as soon as reprints are available.

The implications of this report for the conduct of the project were important. First, it was apparent that our job descriptions would have to concentrate on the skills and technical knowledge involved in a given job. Second, a new job analysis form was developed on the basis of information obtained for the report. This new form places greater emphasis upon abilities, skills, and knowledge than previous forms.

III. SECOND PHASE OF THE STUDY: Preparation for the Job Analyses.

The newly-devised job analysis form was tried out, using technical

jobs occurring in the Engineering Department at the University of California, Los Angeles. The purpose of this try-out was to discover any difficulties in the use of the form, and to give the job analysts some practice with technical jobs. On the basis of this experience the form was revised. A copy of this final revision will be found in Appendix A.

IV. THIRD PHASE OF THE STUDY: Analysis of Civil Service Position Descriptions.

As originally conceived, this project was to confine itself to the analysis of the material already collected and appearing on the regular Civil Service Position Descriptions. It became obvious immediately that much of the information which the new job analysis form called for could not be obtained from the Civil Service descriptions. It was equally obvious that the descriptions were written in order to obtain a maximum rating, not unnaturally. But due to peculiarities of the Civil Service ratings, the emphasis is largely on supervisory responsibility, a factor which has not been found to be a crucial one for technical positions. It was our judgment that the Civil Service position descriptions would not provide enough specific information to give us meaningful technical job descriptions, and that the positions were described as being so much more responsible and complex than they actually are that we would be unable to make consistent vertical ratings.

For these reasons, the advisory committee approved a modified plan. This plan was to go ahead with the analysis of the Civil Service position descriptions for one laboratory only, and then to test the classification by the use of more detailed information about the jobs concerned. For a number of reasons the Naval Air Missile Test Center at Pt. Mugu, California was selected as the laboratory to be investigated.

The Civil Service position descriptions for about 80 jobs believed to fall in the category of technical jobs were then abstracted to our newly-developed job analysis forms. As soon as all available material had been recorded, an attempt was made to classify these jobs into horizontal categories, or types, which would require the same general kind of training, knowledge and skills, but at various levels. The three members of the project staff made independent judgments, as to categories required and the jobs which should be placed in them. Then, by discussion, agreement was reached as to the most useful categories for these particular jobs and the specific jobs which belonged in each. Definitions of these categories, together with the P.D. numbers of the jobs occurring in each, will be found in Appendix B.

Vertical ratings (grade level) were made independently by three raters, using a four-point scale. The agreement, even after prolonged discussion, was poor. Even complete reversals occurred -- one rater placing a job at the top of the scale while another placed it at the bottom of the scale -- and it was impossible to reconcile the differences. The difficulty appeared to lie in lack of precise and specific information, and diametrically opposed interpretations of the rather general statements we had to work with.

The conclusions reached at this stage were that it had proved impossible to make precise judgments due to the extreme generality of the available information, and that more specific knowledge about what the men in the jobs actually did was imperative if we were to make our job categories less general or reach any agreement as to grade level.

V. FOURTH PHASE OF THE STUDY: Analysis of New Pt. Mugu Job Descriptions and Interviews.

We were provided with copies of about 140 job descriptions prepared

by technical personnel at Pt. Mugu. These descriptions had been written by the incumbents some months previous to this. Whereas they still suffered from an attempt to gain a higher rating for the job, they did contain more specific information and more examples of what the men actually did. These were abstracted to the job analysis forms. Wherever pertinent additional information occurred in the previous job analyses based upon the Civil Service position descriptions, it was utilized.

A check list was prepared for use in interviewing the supervisors of technical personnel. For each job, information still lacking or inadequate on the job analysis form was noted on the check-list. Interviews were then arranged.

Interviews lasting about 40 minutes were conducted with the supervisors of the technical personnel at Pt. Mugu. The notes taken during these interviews, and the judgment of the interviewer were then abstracted to the job analysis form.

Since we did not uncover adequate information regarding education or previous experience, a form was prepared for this material. Then the personnel records for the incumbents were consulted, and the relevant material abstracted. This was utilized in two ways: first, the incumbent's actual education and experience was inserted on the job analysis form; second, a "standard" education and experience was calculated, based upon the median education and experience for all jobs of a single type and general level. Raters were forced to make their judgments by considering both actual and "standard" education and experience, because neither could be considered what the job actually required. This solution is recognized as being far from ideal, but it appeared to be the only workable compromise. A preferable approach would be one based upon both experimental and psychometric techniques, but it was obviously impossible in

this situation because of limitation of time and funds, and the security problem.

New horizontal classifications, or categories were made, on the basis of all the available information, by four raters independently. Discussion was utilized to arrive at a mutually agreeable set of categories and the jobs which should be placed in each. A list of these categories, together with definitions for each, will be found in Appendix C. These definitions are purposely as succinct as possible; it is believed that they are sufficient to permit accurate horizontal classification and that no useful service is performed by a multiplicity of synonyms. It is apparent that the increased specificity of information has resulted in finer discriminations among job categories. Also in Appendix C will be found a table of comparisons of the present Civil Service classification, the first classification by this project, and the final classification by the project. Comparisons are possible in less than the full number of cases, but the evident result of the study has been to make the classification more specific. In a few cases a change of general category did occur, but such changes are in the minority.

A study of the reliability of the psychological abilities rating scales (Worker Characteristics Check List, last page of job analysis form) was undertaken. In spite of repeated revision of the definitions of the traits and the anchor points on the scale, little agreement could be reached by four raters. There appeared to be no hope for reasonable reliability, at least with the material available to the project. It was concluded that a shotgun testing program would hold greater promise of results than this rating technique. The ratings were therefore abandoned, and this sheet no longer appears on the job analysis form.

Vertical classification was again attempted, based upon the expanded knowledge of the technical jobs at Pt. Hugu. Independent judgments were made by four raters for each job, but each category was judged by itself. Then over-all ratings, on a 5-point scale, were attempted, which placed each job category in proper relation to a single category taken as a standard. In these over-all ratings 34 judgments were made by each of three raters. The results were surprisingly good: in 10 cases no discrepancy in rating occurred, in 20 cases there was a discrepancy of one point, and in four cases a discrepancy of two points. No larger discrepancies occurred. The over-all rating for each of the jobs will be found in Appendix D. These were determined by translation of the original independent vertical ratings of each category into the over-all scale by means of tables which each individual prepared showing translation factors for his judgments. Also shown are median ratings and the number of discrepancies in over-all ratings. As can be readily seen, in general the agreement is good. The number of discrepancies is not excessive for ratings of this sort: no discrepancies in 29 cases, 66 one-point differences, and 17 cases where two-point differences occurred. There were none larger. The definition of the five anchor points for the vertical scale will also be found in Appendix D.

Whereas the results of the second attempt at vertical rating appear to be an improvement over the first, the raters are not convinced that they are meaningful. Although the ratings were made completely independently, it became apparent, during discussion, that each had found it necessary to rely upon a few key words and concepts. If design were mentioned in the job description, then the job was never rated below a given point, for example. The implications of this procedure are sobering: the rating of a particular job

is thus seen to be dependent in large measure upon the particular words a man happens to use in describing his job. If he has some verbal facility, and readily catches on to the job analyst's lingo, he may gain as much as two points for his job. It appears to be an inevitable result of any system whereby the incumbent writes any significant part of his own job description.

VI. FIFTH PHASE OF THE STUDY: Background of Technicians.

Because of the general interest of the project in learning as much as possible about technicians as a group, some thought was given to possible ways of gathering information about where technicians come from, what their hobbies are, and any other characteristics which might set them off from other related groups, and thus help in the selection of technicians. As a result a questionnaire, called a Job Research Questionnaire, was developed. A copy of this questionnaire will be found in Appendix E. It was designed to elicit as much background information as possible. The plan was to compare the responses of technicians with those of engineers and of skilled tradesmen in order to discover whether or not there were any background factors which would help in discovering whether a man was suitable for technical level work, and would remain in the work. The questionnaire was administered to about 40 engineers, technicians and shop employees in the Engineering Research Group at the University of California, Los Angeles. Analysis of the results showed few significant differences. Those differences which did appear seemed to have some relation to age, salary, or education, which factors are different among the three groups. It was concluded that any study using the questionnaire would require that the three groups be equated for these variables. It did not appear practical, therefore, to pursue this phase of the study because of

the limited funds available and the size of the sample necessary.

VII. SIXTH PHASE OF THE STUDY: Technical Jobs at the U.S. Naval Civil Engineering Research and Evaluation Laboratory at Port Hueneme, Calif.

It was proposed that a check on the new classification system be made by repeating the job analysis aspects of the study at a second laboratory. Since the time remaining before the termination of the project was not great, and since we did not want to take a selected sample, we chose a station where there were few technicians, so that we could investigate the entire populations. The only feasible location was the U.S. Naval Civil Engineering Research and Evaluation Laboratory at Port Hueneme, California. The nineteen technical jobs at this station were described and analyzed on the basis of the standard position descriptions, interviews with both the incumbents and their supervisors, and education and experience records in the personnel folders. The procedure was similar to that of the second study of the Pt. Mugu jobs. Classification into job categories was done independently by three raters. These were then amalgamated into a single scheme. The classifications used, their definitions, and the Position Description Numbers will be found in Appendix F. Most of the jobs here are not similar to the technical jobs occurring at Pt. Mugu. The major function of this extension of the study has been to expand somewhat the scope, to include more diverse jobs.

The median vertical ratings, with the numbers of the positions occurring in each, will also be found in Appendix F. Again we find reasonably good agreement for ratings of this sort. The comments about the vertical ratings at Pt. Mugu apply here also, however.

VIII. CONCLUSIONS.

The major conclusion reached by this project is that technical skills and technical knowledge are the most important factors in technical jobs, and that any job description form, like that in current use by the Civil Service Commission, which places great emphasis on various phases of responsibility and supervision will yield a minimum of information about technical jobs.

Even with the increased information provided by the supplementary procedures, it was discovered that great dependence was placed upon key words and concepts in the process of classification and rating. It was felt by the raters that the occurrence of these key words was to some extent a fortuitous matter, and related, not to the job as much as to the verbal facility of the incumbent. This is, of course, particularly true of descriptions written entirely by the incumbent, but is nevertheless applicable to job descriptions of the ordinary industrial type, where the key words are provided by the job analyst.

A third factor of importance in determining the accuracy of the job analyses is the degree of familiarity of the rater with the details of the job. Lack of such knowledge may result in either too lenient or too harsh a judgment. Since judgments about the complexity and difficulty of the skills involved are important in analysis and evaluation of technical jobs, this factor may loom rather large, even in the classification of jobs into discrete categories.

A second fact brought to light by the investigation is the dearth of information regarding the education and experience required by various

technical jobs. The experience and education of individuals at present employed varies widely, and no standards are available. It appears to be rather important that some attention be given to the development of such standards in order that training given be related as closely as possible to training required. This would assist materially in reducing the number of years of experience required, and would provide a more certain source for technicians. At present the main source for such employees seems to be the Armed Forces Training Schools. This source is not sufficiently reliable to serve as the major one.

Although the project has achieved a reliable classification for some technical jobs, and has made available to interested offices the detailed job descriptions which represent the major investment of time for the project, we believe that our most fruitful results lie in the direction of recommendations for future research on technical jobs. It is evident that, if our conclusions are accurate, research on descriptions and analyses of technical jobs should take one or more of these directions:

1. The development of performance tests and paper-and-pencil achievement tests for technical areas. Only in this way can the actual skills involved be carefully defined. Attempts at verbal description of skills have been uniformly unsuccessful.
2. The use of job analysts with some technical training, together with thorough observation of performance on the job. This would avoid dependence upon the incumbent's verbal facility or the usual job analyst's lingo, and, though not as satisfactory as the first suggestion, it would be an improvement over the existing situation.
3. The use of supervisors of technicians to write the job descriptions.

To be workable this would require considerable training of the supervisors in the techniques of industrial psychology and psychometrics. But since the individuals involved are largely engineers and scientists, it is likely to be an easier task than giving job analysts some technical background.

Secondly, it is apparent that much research needs to be done in the area of education for technical jobs. This is important from two points of view:

1. From that of Junior Colleges and technical schools who would like to train for these technical positions but do not know how to do so, and
2. From that of the employer who would like a supply of thoroughly trained men who do not need years of on-the-job experience before they are competent to handle any but the simplest problems. A joint research team consisting of the job analysts, the selection and other personnel officers, and representatives from recognized training institutions could probably solve this problem more readily than any of them alone.

Finally, a concerted effort to construct reliable and valid measures of skills and knowledge would serve many useful purposes: the establishment of adequate selection and promotion devices, the precise definition of the skills involved, the specification of the kinds and levels of knowledge and skill to be developed by technical curricula. This may prove, in the long run, to be the least costly approach to many of the problems involved in dealing with technical jobs.

Margaret Hubbard Jones
Associate Project Director

APPENDIX A

JOB ANALYSIS FORM -- TECHNICAL POSITIONS

1. Identification Data

Date _____

Job Title _____ No. _____ GS _____

Incumbent _____ Date Hired _____

Department _____ Station _____

Supervisor _____
(Title) _____ (Incumbent) _____

Job Analyst _____

2. Work performed

Operations

3. Skill (level)	1	2	3	4	5	6	7
	low			avg.			Exceptional

4. Job background

a. Tools and equipment used:

b. Tolerances and/or standards:

c. Materials used:

d. Special knowledge (specific, as: work out trigonometric formulas from tables, not trigonometry):

5. Education

- a. Liberal (H.S. or College, with degree and number of years):
- b. Technical (trade school, Jr. College Tech., Engineering Degree, Physics major, etc., and years):

6. Experience (give length of time):

- a. Specific Occupation:
- b. This organization on prior jobs:
- c. Time on this job to attain acceptable proficiency:
- d. Other combinations of education and experience acceptable:

7. Line of promotion

- a. Is this an entry job? Yes _____ No _____
- b. Prior Job:
- c. Next higher job:

8. Sources of workers

Job Characteristics Check-List

1. Job cycle 1 2 3 4 5 6 7
 minutes hrs day few days few weeks few months 6 months or longer
2. Number of jobs at one time 1 2 3 4 5
3. Similarity of assignments 1 2 3 4 5
 essentially similar some-what varied each unique
4. Physically fatiguing 1 2 3 4 5
 normal moderate extreme
5. Mentally fatiguing 1 2 3 4 5
 normal moderate extreme
6. Unusual hazards: Type:
 Probability of occurrence of accidents:
7. Unpleasant job aspects: Type
 (heat, solitude, pressure, etc.)
 Frequency:
8. Unusual physical requirements:
 (specify - great strength, etc.)
9. Any common physical impairments disqualifying?
10. Can job be performed by handicapped? (Specify)
11. Supervision received 1 2 3 4 5 6 7
 close moderate general none
12. Supervision given 1 2 3 4 5 6 7
 close moderate general none

13. Number supervised:	1	2	3	4	5	6	7
	none	1 to 2	3 to 9	10-29	30-99	100-500	over 500
		ind.	ind.	ind.	ind.	ind.	ind.

14. Personal contacts

	Never	Seldom	Frequently	Constant
a. Public	1	2	3 4	5
b. Other dept's.	1	2	3 4	5
c. Security	1	2	3 4	5
d. Subordinates	1	2	3 4	5
e. Superiors	1	2	3 4	5

Skill Required

	Normal		Moderate		Exceptional
a. Public	1	2	3	4	5
b. Other dept's.	1	2	3	4	5
c. Security	1	2	3	4	5
d. Subordinates	1	2	3	4	5
e. Superiors	1	2	3	4	5

Worker Characteristics Check-List

Rate, on 5-point scale, the degree to which the Job demands special abilities of the incumbent, above and beyond a minimum expected in all employees.

	Average 1	2	Superior 3	4	Exceptional 5
1. General intelligence					
2. Problem-solving ability (resourcefulness)					
3. Spatial - visualization					
4. Ability to change set					
5. Analytical ability					
6. Verbal ability					
7. Mathematical ability					
8. Sustained attention					
9. Manual dexterity					
10. Detail accuracy					
11. Perceptual speed					
12. Mechanical ability					
13. Ability to organize own work					
14. Ability to organize work of others					
15. Ability to handle people					

APPENDIX B

TECHNICAL JOB CATEGORIES

Definition of Technical Level:

General level of work is not of the complexity or scope of professional level work, but requires some knowledge of principles within a specialized area. Some college-level work or equivalent experience is required. Work is typically confined to a rather narrow specialty, but considerable complexity of task, knowledge of principles, and judgment may be required.

The distinction between professional and technical jobs lies mainly in the amount and breadth of knowledge of principles.

The distinction between technical and skilled jobs lies in the emphasis in the former upon intellectual rather than manual skills, and upon background knowledge.

Definition of Technical Job Categories

- I. Draftsman: Make accurate drawings of equipment, machines, structures, or sites. Must have techniques of drawing, knowledge of conventions and some acquaintance with specific area. May assemble data from several sources. May use formulas.
 - A. Electrical: concerned with electrical systems only, in structures or equipment.
 - B. Electronic: concerned with electronic equipment only.
 - C. Electronic - Mechanical: concerned with electronic equipment and mechanical systems.
 - D. Construction: concerned with buildings, bridges or other structures, roads, and sites.
 - E. Mechanical: concerned with mechanical systems or equipment only.
 - F. Jr. Draftsman: simple drawings under close supervision. Little experience. Does not meet standards for general classification as Technician.
- II. Electronic Technician - deals solely with electronic equipment: maintenance, repair, modification, operation, construction, installation, testing, calibration, design of electronic circuits.

- III. Engineering Aide: sub-engineering work of various sorts; drawing, mathematical calculation, gathering of data, some supervision of construction. Duties are varied, of general engineering nature, no specialization.
- IV. Electronic - Mechanic: concerned with both electronic and mechanical systems.
- V. Mechanic Technician: concerned with mechanical systems only.
- VI. Fluids Mechanic: concerned primarily with hydraulics.
- VII. Electronic - Photo-Audio Technicians concerned with electronics, photography, and reproduction of sound.

Job Categories, Pt. Mugu
Long Beach P.D.

I. Draftsman

A. Electrical

2954
 3433
 4793

B. Electronic

3937
 4209

C. Electronic-Mechanical

2473
 4084
 4233
 4261
 4312

D. Construction

2847
 2850
 2852
 2956
 3427
 3430
 3431
 4483
 4553

E. Mechanical

1263
 2399
 2498
 3896
 3905
 3909
 3925
 4309

F. Jr. Draftsman

3933

4211

4229

II. Electronic Technician

2523

3545

2530

3551

2740

3553

2741

3554

2750

3769

2774

3798

2972

3799

3092

3800

3094

3802

3095

3900

3106

4217

3131

4218

3170

4225

3192

4370

3462

4488

3467

4491

3468

4493

3495

4496

3496

III. Engineering Aide

3050

3589

IV. Electronic-Mechanic

2361

3353

2803

3542

V. Mechanic Technician

2229

3590

3552

4262

3558

VI. Fluids Mechanic

2387

VII. Electronic-Photo-Audio Technician

3193

3855

APPENDIX C

DEFINITIONS OF TECHNICAL JOBS

- I. **Technician:** One whose work requires some knowledge of general principles, often of great complexity within a limited area, and considerable background of education or equivalent experience within this area.
 - A. **Electronician:** A technician whose knowledge and skills are in the area of electronics: (N-95)
 1. **Electronician-General:** Broad, unspecialized knowledge of electronics; works on a wide range of equipment. (N-36)
 2. **Electronician-Communications and Telemetering:** Specialized knowledge in command radio, audio communications, telemetering and related areas; may work with miniature and subminiature components, pulsing and shaping circuits, servo control systems. (N-26).
 3. **Electronician-Electrical:** Specialized knowledge of 3-phase wiring, motors, generators, heavy duty power circuits, etc. (N-2)
 4. **Electronician-Computer:** Specialized knowledge in digital computing devices; works with pulsing, shaping circuits, storage units. (N-1)
 5. **Electronician-Radar:** Specialized knowledge of radar; works with scanning circuits, radar pulsing and shaping circuits, directional antennas, indicators. (N-17)
 6. **Electronician-Physical Test Instrumentation:** Knowledge of instrumentation, engineering mechanics, and strength of materials with electronic recording; works with small voltages, precision assembly, calibration against physical measurement standards (small tolerances). (N-11)
 7. **Electronician-Photo-optical:** Knowledge of optical instruments and photographic techniques coupled with principles of electronic control. (N-2)
 - B. **Engineering Aide:** A technician who has knowledge of general engineering, including drafting, investigation of engineering proposals, etc. (N-1)
 - C. **Mechanician:** A technician whose knowledge and skills are in the area of mechanics. (N-11)
 1. **Mechanician-General:** Knowledge of general mechanical principles, including strength of materials. (N-3)
 2. **Mechanician-Aircraft:** Knowledge is in area of aerodynamics, aircraft power plants, controls, etc. (N-1)
 3. **Mechanician-Missile:** Knowledge of missiles, rocket propulsion systems, jet engines, aerodynamics and servo controls. (N-7)
 - D. **Instrument Technician:** A technician who has knowledge of instrumentation, involving electronic, mechanical, optical, and photographic aspects. (N-6)
- II. **Non-Technical Employee:** One whose work does not require knowledge of general principles within area of competence; apprentice-type training ordinarily suffices. (N-20)

COMPARISON OF JOB CLASSIFICATIONS FOR PT. MUGN TECHNICIANS

No.	P. D. No.	Civil Service Title	1st Classification	2nd Classification
1	1360	Laboratory Mechanic	--	Non-Technical
2	3106a	Electronic Technician	Electronic Technician	Electronician - General
3	3290	Electronic Technician	--	Electronician - General
4	3285	Electronic Technician	--	Electronician - Radar
5	3282	Electronic Technician	--	Electronician - Telemetering
6	3283	Electronic Technician	--	Electronician - Telemetering
7	3295	Electronic Technician	--	Electronician - Telemetering
8	3050	Engineering Aide (General)	Engineering Aide	Electronician - Photo Optical
9	3051	Engineering Aide (General)	--	Engineering Aide
10	4901	Electronic Technician	--	Electronician - Electrical
11	3468a	Electronic Technician	Electronic Technician	Electronician - Telemetering
12	3467a	Electronic Technician	Electronic Technician	Electronician - Telemetering
13	4370	Electronic Technician	Electronic Technician	Electronician - Radar
14	3900	Electronic Technician	Electronic Technician	Electronician - Computer
15	3714	Electronic Technician	--	Electronician - Radar
16	3192	Electronic Technician	Electronic Technician	Electronician - Radar
17	2774	Laboratory Electronic Mechanic (General)	Electronic Technician	Electronician - General
18	3048	Laboratory Mechanic (General)	--	Electronician - Photo Optical
19	3856	Electronic Technician	--	Electronician - Telemetering
20	3855	Electronic Technician	Electronic - Photo-Audio Technician	Electronician - Telemetering
21	3193	Electronic Technician	Electronic - Photo-Audio Technician	Electronician - Telemetering
22	3280	Electronic Technician	--	Electronician - Radar
23	3854	Electronic Technician	--	Electronician - Telemetering
24	2972	Electronic Technician	Electronic Technician	Electronician - General
25	3717	Electronic Technician	--	Electronician - Radar
26	2999	Electronic Technician	--	Electronician - General
27	3462	Electronic Technician	Electronic Technician	Electronician - General
28	4135	Engineering Aide (General)	--	Non-Technical
29	3170	Electronic Technician	Electronic Technician	Electronician - Radar

30	Electronic Technician	Electronic Technician	Electronic Technician - Radar
31	Electronic Technician	Electronic Technician	Electronic Technician - Radar
32	Electronic Technician	Electronic Technician	Electronic Technician - General
33	Electronic Technician	Electronic Technician	Electronic Technician - Telemetering
34	Electronic Mechanic	--	Electronic Technician - Radar
35	Electronic Mechanic	--	Electronic Technician - Radar
36	Electronic Mechanic	--	Electronic Technician - Radar
37	Electronic Mechanic	--	Electronic Technician - Telemetering
38	Electronic Mechanic	--	Electronic Technician - Telemetering
39	Electronic Mechanic	--	Electronic Technician - General
40	Test Range Equipment Repairman	--	Electronic Technician - Radar
41	Test Range Equipment Repairman	--	Electronic Technician - Radar
43	Machinist	--	Non-technical
44	Machinist	--	Non-technical
45	Rocket Propulsion Mechanic	--	Non-technical
46	Test Range Equipment Repairman	--	Instrument Technician
47	Laboratory Electrician	--	Electronic Technician - Electrical
48	Electronic Mechanic	--	Electronic Technician - Physical Test Instrumentation
49	Electronic Mechanic	--	Electronic Technician - Physical Test Instrumentation
50	Electronic Mechanic	--	Electronic Technician - Telemetering
51	Instrument Maker	--	Mechanician - General
52	Instrument Maker	--	Mechanician - General
53	Machinist	--	Non-Technical
54	Electronic Technician	Electronic Technician	Electronic Technician - Physical Test Instrumentation
55	Electronic Technician	Electronic Technician	Electronic Technician - Physical Test Instrumentation
56	Electronic Technician	Electronic Technician	Electronic Technician - Physical Test Instrumentation
57	Laboratory Mechanic (General)	--	--
58	Laboratory Mechanic	Mechanic Technician	Non-Technical
59	Laboratory Mechanic	--	Non-Technical
60	Laboratory Mechanic	Mechanic Technician	Non-Technical

61	2726	Electronic Technician (General)	--	Electronician - Telemetering
62	3595	Laboratory Electronic Mechanic	--	Electronician - General
63	3590	Laboratory Mechanic (General)		Non-Technical
64	3568	Laboratory Electronic Mechanic	--	Electronician - General
65	3567	Laboratory Electronic Mechanic (General)	--	Electronician - General
66	2725	Electronic Technician	--	Electronician - General
67	2526	Laboratory Electronic Mechanic	--	Electronician - General
68	2524	Laboratory Electronic Mechanic	--	Electronician - General
69	3589	Laboratory Mechanic (General)		Mechanician - General
70	2727	Electronic Technician	--	Electronician - General
71	3553	Laboratory Mechanic	Electronic Mechanic	Electronician - Physical Test Instrumentation
72	3073	Laboratory Mechanic	--	Electronician - Physical Test Instrumentation
73	3074	Laboratory Mechanic (General)	--	Electronician - Physical Test Instrumentation
74	4496	Electronic Technician	Electronic Technician	Electronician - Physical Test Instrumentation
75	324	Laboratory Mechanic (General)	--	Electronician - Physical Test Instrumentation
76	2523	Laboratory Electronic Mechanic	Electronic Technician	Mechanician - Missile
77	2803	Laboratory Mechanic	Electronic Mechanic	Electronician - Telemetering
78	2361	Laboratory Mechanic	Electronic Mechanic	Instrument Technician
79	325	Laboratory Mechanic (General)	--	Mechanician - Missile
80	---	Electronic Mechanic	--	Electronician - General
81	---	Aircraft Mechanic (Motor)	--	--
82	---	Aircraft Mechanic	--	--
83	---	Aircraft Mechanic	--	--
84	---	Aircraft Mechanic	--	--
85	---	Aircraft Mechanic (General)	--	Non-Technical

86	---	Machinist	--	Non-Technical
87	---	Electronic Mechanic	--	Electronician - General
88	---	Electronic Mechanic	--	Electronician - Telemetering
89	---	Electronic Mechanic	--	Electronician - Missile
90	3558	Laboratory Mechanic	Mechanic Technician	Electronician - General
91	4218	Electronic Technician	Electronic Technician	Electronician - General
92	4225	Electronic Technician	Electronic Technician	Electronician - Telemetering
93	4891	Electronic Technician	--	Electronician - Telemetering
94	3803	Engineering Aide (Electronic)	--	Electronician - Telemetering
95	3128	Electronic Technician	--	Electronician - Telemetering
96	4170	Electronic Technician	--	Electronician - Telemetering
97	4138	Electronic Technician	--	Electronician - Telemetering
98	3559	Laboratory Mechanic	--	Mechanician - Missile
99	3553	Electronic Technician	Electronic Technician	Electronician - Telemetering
100	3551	Electronic Technician	Electronic Technician	--
101	3552	Laboratory Mechanic	Mechanic Technician	Mechanician - Missile
102	3554	Electronic Technician	Electronic Technician	Electronician - Telemetering
103	2740	Electronic Technician	Electronic Technician	--
104	2750	Electronic Technician	Electronic Technician	Electronician - Telemetering
105	2741	Electronic Technician	Electronic Technician	Electronician - Telemetering
106	3754	Laboratory Mechanic	--	Mechanician - Missile
107	4165	Laboratory Mechanic	--	Mechanician - Missile
108	---	Aircraft Mechanic (General)	--	Non-Technical
109	---	Sheet Metal Worker	--	Non-Technical
110	---	Test Range Equipment Repairman	--	Electronician - Radar
111	---	Test Range Equipment Repairman	--	Electronician - Physical Test Instrumentation
112	---	Test Range Equipment Repairman	--	Instrument Technician
113	---	Rocket Propulsion Mechanic	--	Instrument Technician
114	---	Jet Propulsion Mechanic	--	Instrument Technician
115	---	Electronic Mechanic	--	Electronician - General
116	---	Electrician	---	Non-Technical
117	---	Test Range Equipment Repairman	---	Non-Technical

118	Electronic Mechanic	---	Electronic Mechanic (General)	---	Electronic Mechanic	Electronic Mechanic - Physical Test Instrumentation
119	Electronic Mechanic	---	Aircraft Mechanic (General)	---	Electronic Mechanic	Electronic Mechanic - Radar
120	Electronic Mechanic	---	Aircraft Mechanic (Ld man)	---	Electronic Mechanic	Electronic Mechanic - General
121	Aircraft Mechanic (General)	---	Aircraft Mechanic	---	Electronic Mechanic	Non-Technical
122	Aircraft Mechanic (General)	---	Radio Mechanic	---	Non-Technical	Non-Technical
123	Aircraft Mechanic (Ld man)	---	Aircraft Mechanic (General)	---	Non-Technical	Non-Technical
124	Aircraft Mechanic	---	---	---	---	---
125	Radio Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
126	Aircraft Mechanic (General)	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
---	---	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
128	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - Radar	Electronic Mechanic - Radar
129	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
130	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
131	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
132	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
133	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
134	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
135	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
136	Electronic Mechanic	---	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
137	Electronic Mechanic	4491	Electronic Mechanic	---	Electronic Mechanic - Radar	Electronic Mechanic - Radar
138	Electronic Mechanic	3495	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
139	Electronic Mechanic	3545	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
140	Electronic Mechanic	3496	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
141	Electronic Mechanic	4493	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
142	Electronic Mechanic	3095	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General
143	Electronic Mechanic	3092	Electronic Mechanic	---	Electronic Mechanic - General	Electronic Mechanic - General

APPENDIX D

OVER-ALL VERTICAL RATINGS FOR PT. MUGU JOBS

Electronician - General

<u>P. D. #</u>	<u>S-#</u>	<u>1234</u>	<u>Median</u>	<u>Discrepancies</u>
3106	2	4334	3.5	1
3290	3	4333	3	1
2774	17	3333	3	0
2972	24	3333	3	0
2999	26	1122	1.5	1
3162	27	3223	2.5	1
3131	32	1111	1	0
---	39	4333	3	1
3595	62	4433	3.5	1
3568	64	2333	3	1
3567	65	4433	3.5	1
2725	66	3222	2	1
2526	67	4334	3.5	1
2524	68	3334	3	1
2727	70	2223	2	1
---	80	5555	5	0
---	87	5555	5	0
4218	91	2221	2	1
4225	92	4343	3.5	1
---	115	4554	4.5	1
---	120	5555	5	0
---	126	5555	5	0
---	129	4555	5	1
---	130	4444	4	0
---	131	4333	3	1
---	132	5555	5	0
---	133	5554	5	1
---	134	5555	5	0
---	135	5555	5	0
---	136	5555	5	0
3495	138	4334	3.5	1
3545	139	3223	2.5	1
3496	140	3333	3	0
4493	141	3333	3	0
3095	142	3334	3	1
3092	143	3332	3	1

Electronician - Radar

<u>P.D.#</u>	<u>S-#</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>Median</u>	<u>Discrepancies</u>
3285	4	-	3	4	-	1
4370	13	4	5	5	5	1
3714	15	2	2	2	2	0
3192	16	1	2	1	1	1
3280	22	4	5	4	4	1
3717	25	2	2	2	2	0
3170	29	2	2	2	2	0
3328	30	1	1	1	1	0
3769	31	1	2	1	1	1
---	34	4	5	5	5	1
---	35	4	3	4	4	1
---	36	3	3	4	3	1
---	40	2	2	3	2	1
---	47	3	2	3	3	1
---	110	3	3	4	3	1
---	119	4	5	5	5	1
4491	137	2	2	3	2	1

Electronician -
Teleretering and Communications

3282	5	4	5	3	4	2
3283	6	4	5	3	4	2
3295	7	4	5	3	4	2
3468	11	4	5	3	4	2
3467	12	4	4	4	4	0
3856	19	3	3	2	3	1
3855	20	3	3	3	3	0
3193	21	3	3	3	3	0
3854	23	3	4	3	3	1
4489	33	3	3	2	3	1
---	37	3	4	3	3	1
---	38	4	5	-	-	1
---	50	5	5	4	5	1
2726	61	2	3	2	2	1
2523	76	4	5	3	4	2
---	88	5	5	4	5	1
---	89	5	5	4	5	1
4891	93	3	4	3	3	1
3803	94	3	4	2	3	2
3128	95	3	4	3	3	1
4470	96	3	3	3	3	0
4458	97	3	3	2	3	1
3553	99	3	3	2	3	1
3554	102	4	4	3	4	1
2750	104	4	4	3	4	1
2741	105	4	5	2	4	2

Electronician - Electrical

<u>P.D.#</u>	<u>S-#</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>Median</u>	<u>Discrepancies</u>
4901	10	4	3	2	3	2
3735	47	4	3	3	3	1

Electronician - Computer

3970	14	2	2	2	2	0
------	----	---	---	---	---	---

Electronician - Physical Test Instrumentation

---	48	4	5	3	4	2
---	49	4	5	3	4	2
3800	54	4	4	3	4	1
3799	55	4	4	3	4	1
3798	56	2	3	2	2	1
3353	71	5	5	3	5	2
3073	72	4	4	3	4	1
3074	73	5	5	3	5	2
4496	74	2	3	1	2	2
---	111	4	5	3	4	2
---	118	4	5	3	4	2

Electronician - Photo-Optical

3050	8	2	2	2	2	0
3048	18	2	2	2	2	0

Mechanician - Aircraft

<u>P.D.#</u>	<u>S-#</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>Median</u>	<u>Discrepancies</u>
---	123	4	4	5	4	1

Mechanician - General

---	51	4	4	3	4	1
---	52	4	4	3	4	1
3589	69	3	3	3	3	0

Mechanician - Missile

324	75	4	4	4	4	0
325	79	4	5	4	4	1
3558	90	4	4	3	4	1
3559	98	5	5	4	5	1
3552	101	3	3	3	3	0
3754	106	5	4	4	4	1
4065	107	4	5	4	4	1

Instrument Technician

---	46	5	5	5	5	0
2803	77	3	3	5	3	2
2961	78	2	3	3	3	1
---	112	5	5	5	5	0
---	113	3	4	5	4	2
---	114	4	4	5	4	1

Engineering Aide

3051	9	-	4	5	4.5	1
------	---	---	---	---	-----	---

Definitions of Anchor Points for Over-All Vertical Scale

- I. Must do design, and of rather complex nature. Responsible for technical judgments; often responsible for high-level technical reports. Little direct supervision of others.
- II. Must do design, but of simpler sort than I. Has more supervisory responsibility than I; does installation and inspection. May do some report writing. Has some independence of technical judgment.
- III. Has no real design work, except at the simplest possible level. May make modifications. Independence of judgment within limited sphere. Does installation, calibration, inspection, etc. May write departmental reports. Has sound knowledge of very complex systems.
- IV. Responsible for operation of complex systems; inspection, some calibration, some installation. Independent judgment rarely exercised, and then in minor problems.
- V. Does largely installation and operation, but systems are simpler than in IV. Routine inspection. Little independent judgment.

APPENDIX E

JOB RESEARCH QUESTIONNAIRE

This questionnaire is designed to tell us about you and your fellow employees as a group. We know something about many other employee groups, but very little about your group. We want this information so that we can study the interests and background of successful people in your kind of work. Please answer all questions. Your answers will be kept strictly confidential--in fact, do not put your name on the questionnaire. The results will be reported only as group results and will be used only for research purposes. The answers cannot affect your job in any way.

This study is being conducted by a research project in the U.C.L.A. Department of Engineering for the Office of Naval Research.

JOB RESEARCH QUESTIONNAIRE

1. Male _____ Female _____
2. Age: 18-20 _____ 25-29 _____ 35-39 _____ 45-49 _____
 20-24 _____ 30-34 _____ 40-44 _____ 50 or over _____
3. Are you:
 single _____ separated or divorced _____
 married _____ widow or widower _____
4. How many children do you have? none _____ 2 _____ 4 or more _____
 1 _____ 3 _____
5. Your monthly income at present:
 below \$200 _____ \$300-350 _____ \$450-500 _____
 \$200-250 _____ \$350-400 _____ over \$500 _____
 \$250-300 _____ \$400-450 _____
6. How many people are dependent upon this income? (include yourself):
 1 _____ 2 _____ 3 _____ 4 _____ 5 or more _____
7. What is your present occupation? _____
8. Are any of your relatives engaged in work such as yours? yes _____ no _____
- Which ones: relative field of work
- _____
- _____
- _____
- _____

9. Living accommodations: own home _____ rent apartment or flat _____
 own apartment _____ rent home _____ lease apartment or flat _____
 rent room _____ lease home _____ live in hotel _____
10. Do you happen to own an automobile at present? Yes _____ no _____
 make _____ year _____ model _____
 reworked or "hopped up" yes _____ no _____

11. Education completed: Check where applicable.

<u>Grade</u> <u>School</u>	<u>Jr.High</u> <u>School</u>	<u>High</u> <u>School</u>	<u>College</u>	<u>Trade School</u> <u>Name of Course</u>	<u>Time in Months</u>
_____	1 _____	1 _____	1 _____	_____	_____
	2 _____	2 _____	2 _____	_____	_____
	3 _____	3 _____	3 _____	_____	_____
		4 _____	4 _____	_____	_____
			5 _____	_____	_____
			6 _____	_____	_____
			7 _____	_____	_____

12. Do you intend to, or are you now obtaining additional education? Yes _____
 No _____

If yes, which of the following are you considering:

- _____ high school diploma
 _____ trade school courses in your line of work
 _____ trade school courses in other lines of work
 _____ general educational courses at junior college or college level
 _____ night school hobby or general educational courses
 _____ college level courses leading to a degree

13. Which courses and areas of study that you have taken are proving helpful in your present work?

Mathematics:

Shop Courses:

Science Courses:

Other Courses:

14. Number of years employed: 0-1 _____ 2-3 _____ 4-6 _____ 7-10 _____
 11-14 _____ 15-20 _____ 20-25 _____ more than 25 _____

15. How many times have you changed employer or company?

0 _____ 6-7 _____
 1 _____ 8-9 _____
 2-3 _____ more than 10 _____
 4-5 _____

16. Do you consider your present position:

Temporary _____

Permanent _____

17. What influenced you and how did you obtain your first full-time job and how did you obtain your present job? (You may check more than one in each column)

<u>FIRST JOB</u>	<u>PRESENT JOB</u>
☐ best pay offer you received	☐
☐ through private employment office	☐
☐ by direct application	☐
☐ through a previous employer	☐
☐ position with most opportunity for advancement	☐
☐ through friends	☐
☐ vocational advisor	☐
☐ through relative	☐
☐ location of work	☐
☐ approached by employer	☐
☐ by investing in a business	☐
☐ through an advertisement	☐
☐ through school placement office	☐
☐ through public employment	☐
☐ other, please specify	☐

18. Did you have a shop to work in as a youngster?

☐ none at all
☐ I used a friend's shop
☐ yes, a complete one at home
☐ yes, but I was not allowed to work in it often

19. Check the home workshop equipment that you have at present:

_____	work bench with vise
_____	ordinary hand tools for woodworking
_____	ordinary hand tools for metal working
_____	portable electric drill
_____	drill press
_____	power saw (table)
_____	power saw portable
_____	electric sander
_____	planer
_____	wood lathe
_____	metal lathe
_____	joiner
_____	jig-saw
_____	band-saw
_____	grinder
_____	kiln
_____	shopsmith
_____	radial saw
_____	other

20. If you were able to go back and choose your life work all over again, which type of work would you choose?

☐ actor	☐ salesman
☐ musician	☐ sales manager
☐ artist	☐ advertising man
☐ writer	☐ stock broker
☐ lawyer	☐ stenographer
☐ doctor	☐ bookkeeper
☐ engineer	☐ office clerk
☐ clergymen	☐ production worker
☐ scientist	☐ butcher
☐ teacher	☐ truck driver
☐ librarian	☐ draftsman
☐ carpenter	☐ tool maker
☐ painter	☐ electronic technician
☐ machinist	☐ laboratory assistant
☐ electrician	☐ pharmacist
☐ plumber	☐ aviator
☐ locomotive engineer	☐ social worker
☐ professional athlete	☐ nurse
☐ automobile mechanic	☐ your own job
☐ radio repairman	☐ member of the armed forces
☐ photographer	☐ unskilled labor
☐ printer	☐ farmer
☐ newspaper reporter	☐ business executive

21. Which of the following are most important in your satisfaction with a job?

(Check column 1 for the most important item)

(Check column 2 for the second most important item) CHECK ONLY THREE

(Check column 3 for the third most important item)

(1)	(2)	(3)	
_____	_____	_____	pay
_____	_____	_____	security
_____	_____	_____	freedom and independence
_____	_____	_____	pleasant people to work with
_____	_____	_____	opportunity to work with many people
_____	_____	_____	opportunity to meet people
_____	_____	_____	great responsibility
_____	_____	_____	interesting work
_____	_____	_____	varied work
_____	_____	_____	the nature or kind of work
_____	_____	_____	opportunity for creative activity
_____	_____	_____	healthful outdoor work
_____	_____	_____	employee benefits, (group insurance, sick leave, vacation with pay, medical care)
_____	_____	_____	opportunity to use your abilities fully
_____	_____	_____	respect of others for your job, and position it gives you among your friends
_____	_____	_____	opportunity to help other people
_____	_____	_____	chances for advancement
_____	_____	_____	good hours
_____	_____	_____	easy work
_____	_____	_____	clean work
_____	_____	_____	work which not everyone can do
_____	_____	_____	work which is familiar
_____	_____	_____	competition
_____	_____	_____	influence over others

22. Which of the following are most important in your dissatisfaction with a job?

(Check column 1 for the most important item)

(Check column 2 for the second most important item) CHECK ONLY THREE

(Check column 3 for the third most important item)

(1) (2) (3)

_____	_____	_____	low pay
_____	_____	_____	job not steady
_____	_____	_____	job too hard
_____	_____	_____	no chance for advancement
_____	_____	_____	no chance to attain ambitions
_____	_____	_____	lack of freedom
_____	_____	_____	work monotonous
_____	_____	_____	job too confusing
_____	_____	_____	work not in line with training
_____	_____	_____	work too confining
_____	_____	_____	hours bad (long or irregular)
_____	_____	_____	job does not utilize your full abilities
_____	_____	_____	poor working conditions
_____	_____	_____	unpleasant superiors
_____	_____	_____	unpleasant people to work with
_____	_____	_____	dislike dealing with the public
_____	_____	_____	kind or nature of work
_____	_____	_____	dirty work
_____	_____	_____	being away from home
_____	_____	_____	lack of employee benefits (medical care, sick leave, group insurance, vacation with pay)
_____	_____	_____	job physically fatiguing

23. From the standpoint of value to society, place in order the types of work listed below: (place numeral 1 through 10 in spaces)(number 1 is of most value)

_____ Artistic (writers, musicians, actors, performers, artists)
_____ Clerical (stenographers, secretaries, bookkeepers, clerks)
_____ Technical (tool-makers, electronic, nurses, draftsmen)
_____ Semi-skilled (butchers, truck drivers, farmers, production workers)
_____ Professional (engineers, lawyers, doctors, teachers, clergymen)
_____ Politics (mayors, congressmen, governors)
_____ Un-skilled labor (night watchman, building custodian, laborer)
_____ Business (executives, managers, salesmen, advertising men)
_____ Scientific (pure research, applied research)
_____ Skilled trades (carpenters, painters, machinists, electricians)

24. List all occupations in which you have ever been employed:

25. Have you ever done repetitious production work: yes _____ no _____
26. Does it bother you to work "under pressure"? Not always _____ yes _____
no _____ only if the job is difficult _____
27. Do you prefer to work: alone _____ in small groups (3 or 4) _____
with larger groups _____
28. Do you, or would you, encourage your son to enter your own or a closely related field of work?
_____ I wouldn't insist on it but I would prefer it.
_____ No, I would urge him to other work.
_____ Yes, I would strongly urge him to do so.
_____ I would not attempt to influence him either way.
_____ Yes, but only if he showed promise and interest in the work.
29. What length work project do you prefer: hours _____ days _____ months _____ longer _____
30. Do you consider your present job to be:
_____ very repetitious _____ somewhat repetitious _____ slightly repetitious
_____ varying only in details _____ varying in major aspects
_____ always different
31. When performing a work project do you usually:
_____ immediately take up a pencil and paper to make sketches and jot down specifications.
_____ make a formal mechanical drawing and materials list.
_____ start to work directly with the materials
32. Are you usually more interested in the
_____ assembly and finishing stages of a particular work project
_____ planning and layout stages of a particular work project
_____ working and forming stages of a particular work project

33. Are you annoyed by being required to interrupt or discontinue an activity?

☐ never	☐ greatly
☐ sometimes	☐ soon get over it
☐ always	☐ does not bother me at all
☐ a little	☐ cannot rest until completed

34. Please check the statements which best express your reaction to working with equipment and machinery about which you lack detail design knowledge.

☐ does not bother me	☐ waste no time in finding out
☐ avoid when possible	☐ will not work under such conditions
☐ never thought about it before	☐ uneasy about working under such conditions

35. Do you like to do production work which involves daily repetition of the same cycle?

☐ yes	☐ no
------------------------------	-----------------------------

36. Do you tend to avoid jobs requiring the production of a large (over 5) number of identical units?

☐ yes	☐ no
------------------------------	-----------------------------

37. Do you prefer to work from:

☐ a complete and detailed plan or drawing
☐ a rough sketch or verbal description of a functional nature

38. Would you feel uneasy about performing a so-called "quick and dirty" or "rough" job even though requested to do so?

☐ yes	☐ no
------------------------------	-----------------------------

39. Would you be willing to undertake a work project even though you did not have all the materials or tools or equipment at hand that you would like to have?

☐ yes	☐ no
------------------------------	-----------------------------

40. Is there one right way to do everything?

_____ yes

_____ no

41. No matter how skilled you are, you cannot get the top jobs without influence or "pull".

_____ I agree completely

_____ This is often the case.

_____ Skill is the major factor in securing promotions

_____ The best man will usually get the job

_____ Sometimes "pull" will win, but you have to be skilled to hold the job

42. There are inventions, such as automobile engines which can run 100 miles to the gallon of gasoline, which have been suppressed:

_____ I think there are but I do not know of any first hand.

_____ I do not believe there are any.

_____ I know there are from first hand knowledge.

_____ I know there aren't any.

43. Do you feel that inventions which would drastically upset our economic structure should:

_____ be suppressed to protect those who would lose jobs and/or money

_____ not be released until arrangements have been made to offset their bad effects even though it might delay release for years

_____ be released as soon as private enterprise is able to do so, thus allowing the problems to work themselves out.

44. The workman who makes an important invention or technological change usually receives full credit (recognition and money).

_____ in most cases, yes _____ in many cases he does not
 _____ as far as I know he does _____ only rarely does he receive full credit

45. On this side check the five activities which most interest you:

On this side check the two most enjoyable activities which you actually do:

_____ listen to radio or records
 _____ watch television
 _____ read for self-improvement or study
 _____ read for entertainment (magazines or newspaper)
 _____ visit with friends or entertain guests
 _____ attend movies
 _____ attend sports events
 _____ attend concerts, plays, lectures, etc.
 _____ participate in sports
 _____ rest or loaf
 _____ do home gardening
 _____ tinker about the house
 _____ attend club or church meetings
 _____ write
 _____ engage in amateur dramatics
 _____ make wooden furniture or knickknacks
 _____ make metal objects or apparatus
 _____ build or repair automobiles
 _____ paint or draw
 _____ model in clay or carve in wood
 _____ make ceramics
 _____ weave
 _____ raise animals
 _____ cultivate flowers and special plants
 _____ eat out at restaurants
 _____ collect stamps, coins, match book covers, etc.
 _____ drink in bars and cocktail lounges
 _____ model building
 _____ raise and train animals for show
 _____ gamble
 _____ amateur radio operator
 _____ hunt and/or fish
 _____ hike and camp out
 _____ picnic
 _____ play cards

Be sure to check both columns.

46. Check those sections of the newspaper which you read:

Always	Sometimes	Rarely	Never	
_____	_____	_____	_____	comic strips
_____	_____	_____	_____	special feature articles
_____	_____	_____	_____	sports news
_____	_____	_____	_____	editorials
_____	_____	_____	_____	foreign news
_____	_____	_____	_____	national news
_____	_____	_____	_____	city or state news
_____	_____	_____	_____	political comments
_____	_____	_____	_____	society news
_____	_____	_____	_____	financial page
_____	_____	_____	_____	theater and movie criticisms
_____	_____	_____	_____	book reviews
_____	_____	_____	_____	women's page
_____	_____	_____	_____	continued stories
_____	_____	_____	_____	advertisements
_____	_____	_____	_____	classified advertisements

47. Check the magazine or type of magazine which you read regularly
(have read at least two out of each three issues during the past year.)

_____ Life
_____ Look, Pic and others
_____ Reader's Digest
_____ Science Fiction
_____ Popular Mechanics
_____ photography magazines
_____ Esquire
_____ Harpers or Atlantic Monthly
_____ Time or Newsweek or other news magazines
_____ detective or crime magazines
_____ Saturday Evening Post or Colliers
_____ National Geographic
_____ movie or Hollywood magazines
_____ aviation magazines
_____ western stories
_____ romance or true stories
_____ hunting or fishing magazines
_____ adventure stories
_____ automobile magazines
_____ body building and health magazines

48. Please check which, if any, of these activities you have engaged in during the past year.

- ☐ I followed local events regularly in my newspaper.
- ☐ I gave money to the community fund or chest.
- ☐ I talked with my neighbors about practical ways in which our neighborhood might be made better—for example, cleaner, pleasanter, friendlier.
- ☐ I belonged to a labor union, businessmen's organization, or professional society.
- ☐ I attended meetings of some local civic group.
- ☐ I was a member of a community service organization, such as Parent-Teachers Association.
- ☐ I served on a volunteer committee for some community service.
- ☐ I had some contact with a local official about a local civic problem.
- ☐ I collected money or carried a petition for some local civic cause.
- ☐ I taught, or helped in some other direct way, a volunteer young people's group, such as Scouts, Y.M.C.A., etc.
- ☐ I wrote a letter to the newspaper about some community problem.
- ☐ I followed current national and international events in the newspapers daily, and in magazines weekly.
- ☐ I discussed political issues with my friends.
- ☐ I voted in the last national election.
- ☐ I listened at least once a month to speeches and discussion programs on the radio dealing with national and international problems.
- ☐ I voted in the last primary or local election.
- ☐ I signed a petition for or against some legislation.
- ☐ I wrote a letter or sent a telegram to a public official.

APPENDIX F

CLASSIFICATION OF TECHNICAL JOBS AT PORT HUENEME

I. Technicians:

1. Draftsman: A technician whose primary technical skills lie in drafting; accessory technical-level knowledge is in an engineering specialty.

<u>P.D. No.</u>	<u>Rating</u>
9562	5
9563	5
9564	5
9565	5

2. Mechanician, general: A technician whose knowledge and skills lie in the area of general mechanical principles, including strength of materials.

<u>P.D. No.</u>	<u>Rating</u>
9360	5
9460	3
9479	4
9528	4

3. Engineering Aide: A technician who has knowledge of general engineering principles, including some drafting, investigation of engineering proposals in various fields, etc.

<u>P.D. No.</u>	<u>Rating</u>
9383	3.5
9390	3.5
9411	4
9480	4
9481	5

4. Sanitation Technician: A technician whose knowledge and skills lie in the area of sanitary engineering.

<u>P.D. No.</u>	<u>Rating</u>
9473	3

5. Chemical Aide: A technician whose knowledge and skills lie in the area of chemical processes and principles.

<u>P.D. No.</u>	<u>Rating</u>
9432	5

6. Hydraulics Technician: A technician whose knowledge and skills lie in the area of hydraulics engineering.

<u>P.D. No.</u>	<u>Rating</u>
9408	4

II. Non-technical Employees:

<u>P.D. No.</u>
9313
9365
9491

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