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TITLE	Drafter, Civil (Profess. & Kin.) 005.281. Technical Report on Development of USES Specific Aptitude Test Battery.
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IDENTIFIERS	GATB; *General Aptitude Test Battery

ABSTRACT
         The United States Training and Employment Service
General Aptitude Test Battery (GATB), first published in 1947, has
been included in a continuing program of research to validate the
tests against success in many different occupations. The GATB
consists of 12 tests which measure nine aptitudes: General Learning
Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form
Perception; Clerical Perception; Motor Coordination; Finger
Dexterity; and Manual Dexterity. The aptitude scores are standard
scores with 100 as the average for the general working population,
and a standard deviation of 20. Occupational norms are established in
terms of minimum qualifying scores for each of the significant
aptitude measures which, when combined, predict job performance.
Cutting scores are set only for those aptitudes which aid in
predicting the performance of the job duties of the experimental
sample. The GATB norms described are appropriate only for jobs with
content similar to that shown in the job description presented in
this report. A description of the validation sample is also included.
(RC)

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October 1974

U.S. Employment Service
Technical Report
S-266R74

Development of USES

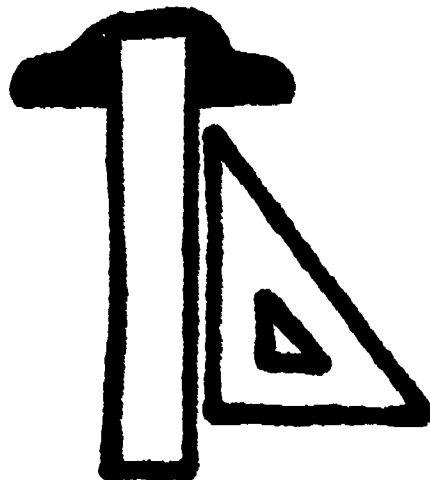## APTITUDE TEST BATTERY FOR

DRAFTER

U.S. DEPARTMENT OF LABOR
Manpower Administration

2

Technical Report on Development of USES
Specific Aptitude Test Battery

For

Drafter, Civil (profess. & kin.) 005.281
Drafter, Geological (petrol. production) 010.281
Drafter, Mechanical (profess. & kin.) 007.281
Drafter, Structural (profess. & kin.) 005.281

S-266R74

Developed in Cooperation with the
Alabama, California, Connecticut, Georgia,
Illinois, Michigan, Nevada, New Jersey
and New York State Employment Services

U. S. DEPARTMENT OF LABOR
Peter J. Brennan, Secretary

Manpower Administration
William H. Kolberg
Assistant Secretary for Manpower

October 1974

3

Development of USES Specific Aptitude Test Battery S-260R74

For

Drafter, Civil (profess. & kin.) 005.281
Drafter, Geological (petrol. production) 010.281
Drafter, Mechanical (profess. & kin.) 007.281
Drafter, Structural (profess. & kin.) 005.281

RESEARCH SUMMARY

This report describes the research which resulted in the develop-
ment of the following Specific Aptitude Test Battery for use in
selecting inexperienced or untrained individuals for training as
Drafters:

Aptitudes	Cutting Scores
G - General Learning Ability	85
N - Numerical Aptitude	100
S - Spatial Aptitude	100
Q - Clerical Perception	90

Sample:
Validation sample: 320 Civil, Geological, Mechanical and Struc-
tural Drafters (290 males and 30 females) from the North, South
and West. A total of 105 were minority group members (40 Blacks,
30 Spanish Surnamed, 30 Orientals and 5 American Indians) and 221
were nonminority group members.

Cross-validation sample: 35 Mechanical and Structural Drafters
(34 males and 1 female) from the North. A total of 16 were mi-
nority group members (12 Blacks, 1 Oriental and 3 Spanish Surnamed)
and 19 were nonminority group members.

Criterion:
Supervisory ratings. Criterion data were collected during the
period 1966 through 1973 for the validation sample and during
1973 for the cross-validation sample.

Design:
Concurrent (test and criterion data were collected at approxi-
mately the same time).

4

Concurrent Validity:
Validation Sample:
Phi coefficient for total sample = .37 (P/2 < .0005)
Phi coefficient for Black subsample = .32 (P/2 <.025)
Phi coefficient for Spanish Surnamed subsample = .48 (P/2 < .005)
Phi coefficient for Oriental subsample = .13 (P/2 < .25)
Phi coefficient for nonminority subsample = .34 (P/2 < .0005)
Phi coefficient for male subsample = .37 (P/2 < .0005)
Phi coefficient for female subsample = .22 (P/2 < .10)

Cross-validation Sample:
Phi coefficient for total sample = .53 (P/2 < .005)

Effectiveness of Battery for Total Validation Sample:
For the total validation sample, 66% of the nontest-selected
individuals in this study were in the high criterion group; if
they had been test-selected, 77% would have been in the high
criterion group. 34% of the nontest-selected individuals were in
the low criterion group; if they had been test-selected 23% would
have been in the low criterion group. The effectiveness of the
battery is shown in Table 1.

TABLE 1

Effectiveness of Battery for Total Validation Sample

	Without Tests	With Tests
High Criterion Group	66%	77%
Low Criterion Group	34%	23%

Comparison of Minority and Nonminority Groups for the Validation
Sample:
No differential validities for this battery were found. The dif-
ferences between the phi coefficients for minority and nonminority
groups (above) are not statistically significant (CR Black-non-
minority =-.12, CR Spanish Surnamed-nonminority = .84, CR Oriental-
nonminority = -1.10).

The battery is fair to minority group members since the proportion
of Blacks, Spanish Surnamed and Orientals who met the cutting
scores approximated the proportion who were in the high criterion
group. 60% of the Blacks met the cutting scores and 60% were in
the high criterion group; 70% of the Spanish Surnamed met the cut-
ting scores and 63% were in the high criterion group; and 87% of
the Orientals met the cutting scores and 77% were in the high cri-
terion group.

The battery is fair to females since the proportion of females who
met the cutting scores approximated the proportion who were in the
high criterion group. 73% met the cutting scores and 67% were in
the high criterion group.

JOB ANALYSIS

A job analysis was performed by observation of the workers' per-
formance on the job and in consultation with the workers' super-
visors for each occupation included in the research. A comparison
of these job analysis schedules indicated that the critical job
duties for each of the four occupations were similar enough to per-
mit combination of the workers in these occupations.

On the basis of the job analyses, the job descriptions shown in
Appendix 4 were prepared. These job descriptions were used to
(1) select an experimental sample of workers who were performing
the job duties; (2) choose an appropriate criterion or measure of
job performance; (3) determine which aptitudes are critical, im-
portant or irrelevant to job performance (see Tables 2 and 6); and
(4) provide information on the applicability of the test battery
resulting from this research.

TABLE 2

Qualitative Analysis

Aptitude	Rationale
G - General Learning Ability	Required in determining scale to be used by analysis of specifications and data and organizing and arranging data into logical sequence for drafting.
N - Numerical Aptitude	Required in determining scale to be used through analysis of data.
S - Spatial Aptitude	Required to draw and plot detailed graphic representations to scale in conformity with specifications, computed dimensions and spatial relationships.

P - Form Perception   Required to differentiate minor
                                     variances in shading.

Q - Clerical Perception   Required to observe fine detail in
                                     checking work to perceive errors.

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B, were administered during the
period from 1966 to 1973 to the validation sample and during 1973
to the cross-validation sample.

CRITERION

The immediate supervisor rated each worker. The ratings were
obtained by means of personal visits of State test development
analysts who explained the rating procedure to the supervisors.
Two ratings were obtained from each supervisor with an interval
of two weeks between the ratings. Since sample members' test
scores are confidential, supervisors had no knowledge of
the test scores of the workers.

Validation Sample:
A descriptive rating scale was used. The scale (see Appendix 3)
consists of ten items. Nine of these items cover different aspects
of job performance. The tenth item is a global item on the Drafter's
"all-around" ability. Each item has five alternative responses
corresponding to different degrees of job proficiency. For the
purpose of scoring the items, weights of 1 to 5 were assigned to
the responses. The total score on the rating scale is the sum of
the weights for the ten items. The possible range is 10-50.

A review of the job descriptions indicated that the subjects
covered by the rating scale were directly related to important
aspects of job performance.

A - Amount of work: Satisfactory production must be achieved in
     order to maintain desirable progression of work projects.

B - Accuracy of work: Plans and drawings must be accurate in
     order to be acceptable.

C - Quality of work: Workmanship must be high quality in order to
     produce plans and drawings which are readily used and durable.

D - Amount of knowledge: Drafter must have sufficient knowledge
     to produce satisfactory plans and drawings.

E - Facility for work: Drafter must be able to integrate broad
     and specific knowledge of principles in order to produce
     satisfactory work.

F - Knowledge of mathematics: Drafter must have specific knowledge
     of mathematics in order to produce acceptable plans and draw-
     ings.

G - Analysis of source data: Drafter must determine validity of
     source data and separate them into compor   s for drafting.

H - Judgment: Drafter must analyze problems and make sound judg-
     ments without constant supervision.

I - Checking of finished work: Drafter must verify completed
     plans and drawings for completeness and accuracy without check-
     ing by supervisor.

J - "All-around" ability: Drafter's value to employer involves a
     combination of the aspects of job performance listed above.

A reliability coefficient of .94 was obtained between the initial
ratings and the re-ratings, indicating a significant relationship.
Therefore, the final criterion score consists of the combined scores
of the two ratings. The possible range for the final criterion is
20-100. The actual range is 27-99. The mean is 65.2 and the stan-
dard deviation is 15.3. The relationship between the criterion and
age, education and job experience is shown in Table 3.

TABLE 3

Validation Sample

Means, Standard Deviations (SD) and Pearson
Product-Moment Correlations with the Criterion (r) for
Age, Education and Experience

	Total Sample		
	Mean	SD	r
Age (years)	34.3	9.7	.006
Education (years)	13.5	1.4	-.040
Total Experience (months)	108.4	83.0	.161**

**Significant at the .01 level

About one third of the workers are considered to be marginal workers. Therefore, the criterion distribution was dichotomized so as to include as close as possible to one third of the sample in the low criterion group and the remainder in the high criterion group. The criterion cutting score was set at 39 which places 34% in the low criterion group and 66% in the high criterion group.

Cross-validation Sample:

A descriptive rating scale was used. The scale (see Appendix 3) consists of six performance items. Five of these items cover different aspects of job performance. The sixth item is a global item on the Drafter's "all-around" ability. Each item has five alternative responses corresponding to different degrees of job proficiency. For the purpose of scoring the items, weights of 1 to 5 were assigned to the responses. The total score on the rating scale is the sum of the weights for the six items. The possible range is 6-30.

A review of the job descriptions indicated that the subjects covered by the rating scale were directly related to important aspects of job performance.

A - Amount of work: Satisfactory production must be achieved in order to maintain desirable progression of work projects.

B - Quality of work: Workmanship must be high quality in order to produce plans and drawings which are readily used as well as durable.

C - Accuracy of work: Plans and drawings must be accurate in order to be acceptable.

D - Amount of knowledge: Drafter must have specific mathematical and design knowledge in order to produce satisfactory plans and drawings.

E - Variety of job duties: Drafter should be able to handle a large variety of tasks without specific instruction.

F - "All-around" ability: Drafter's value to employer involves a combination of the aspects of job performance listed above.

A reliability coefficient of .89 was obtained between the Initial ratings and the re-ratings, indicating a significant relationship. The final criterion score consists of the combined scores of the two ratings. The possible range is 12-60. The mean score on the final criterion was 39.8 with a standard deviation of 8.0.

The relationship between the criterion and age, education and job experience is shown in Table 4.

TABLE 4

Cross-validation Sample

Means, Standard Deviations (SD) and Pearson
Product-Moment Correlations with the Criterion (r) for
Age, Education and Experience

	Mean	SD	r
Age (years)	29.7	10.4	.037
Education (years)	13.5	1.4	-.285
Experience (months on current job)	62.1	70.2	.022

About one-third of the workers are considered to be marginal workers. Therefore the criterion distribution was dichotomized so as to include as close as possible to one-third of the sample in the low criterion group and the remainder in the high criterion group. The criterion cutting score was set at 38 which places 34% in the low criterion group and 66% in the high criterion group.

SAMPLE

Validation Sample:
The validation sample consisted of 326 Civil, Geological, Mechanical and Structural Drafters (296 males and 30 females) employed at various companies in the North, South and West (see Appendix 2). A total of 105 were minority group members (40 Blacks, 30 Spanish Surnamed, 30 Orientals and 5 American Indians) and 221 were nonminority group members. The means and standard deviations for age, education and experience of the sample members are shown in Table 3. State Civil Service tests were used for selection of

some sample members. All workers had been employed at least one month in a job whose duties are similar to those found in the job descriptions in Appendix 4.

Cross-validation Sample:
The cross-validation sample consisted of 35 Mechanical and Structural Drafters (34 males and 1 female) employed at various companies in the North (see Appendix 2). A total of 16 were minority group members (12 Blacks, 1 Oriental and 3 Spanish Surnamed) and 19 were nonminority group members. The means and standard deviations for age, education and experience of sample members are shown in Table 4. All workers had been employed at least four months in a job whose duties are similar to those found in the job descriptions in Appendix 4.

STATISTICAL RESULTS

TABLE 5

Statistical Results for Total Validation Sample

N=326

Aptitude	Mean	SD	r
G - General Learning Ability	114.6	14.3	.466**
V - Verbal Aptitude	106.8	13.5	.333**
N - Numerical Aptitude	109.8	14.8	.416**
S - Spatial Aptitude	119.9	14.8	.339**
P - Form Perception	118.8	19.3	.237**
Q - Clerical Perception	117.6	15.1	.224**
K - Motor. Coordination	107.9	17.5	.124*
F - Finger Dexterity	94.9	18.2	.074
M - Manual Dexterity	103.9	19.5	.135*

*Significant at the .05 level
**Significant at the .01 level

TABLE 6   **BEST COPY AVAILABLE**

Validation Sample

Summary of Qualitative and Quantitative Data for Total Sample

Type of Evidence	G	V	N	S	P	Q	K	F	M
"Critical" on Basis of Job Analysis									
"Important" on Basis of Job Analysis	X		X	X	X	X			
"Irrelevant" on Basis of Job Analysis									
Relatively High Mean					X	X	X		
Relatively Low Standard Deviation	X	X	X	X					
Significant Correlation with Criterion	X	X	X	X	X	X	X		X
Aptitudes Considered for Inclusion in the Battery	G	V	N	S	P	Q	K		M

The information in Table 6 indicates that the following aptitudes should be considered for inclusion in the battery: G, V, N, S, P, Q, K and M. The objective is to develop a battery of 2, 3 or 4 aptitudes with cutting scores set at five point intervals at the point (a) where about the same percent will meet the cutting scores as the percent placed in the high criterion group and (b) which will maximize the relationship between the battery and the criterion. The cutting scores are set at approximately one standard deviation below the mean aptitude scores of the sample, with deviations above or below these points to achieve the objectives indicated above.

The following battery was developed:

Aptitudes	Cutting Scores
G - General Learning Ability	85
N - Numerical Aptitude	100
S - Spatial Aptitude	100
Q - Clerical Perception	90

VALIDITY OF BATTERY

TABLE 7
Validity of Battery for Total Validation Sample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	35	180	215
Low Criterion Group	57	54	111
Total	92	234	326

Phi coefficient = .37
Significance level = P/2 < .0005

TABLE 7a
Validity of Battery for Black Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	6	18	24
Low Criterion Group	10	6	16
Total	16	24	40

Phi coefficient = .32 (Yates' corrected)
Significance level = P/2 < .025

TABLE 7b
Validity of Battery for Spanish Surnamed Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	2	17	19
Low Criterion Group	7	4	11
Total	9	21	30

Phi coefficient = .48 (Yates' corrected)
Significance level = P/2 < .005

TABLE 7c
Validity of Battery for Oriental Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	2	21	23
Low Criterion Group	2	5	7
Total	4	26	30

Phi coefficient = .13 (Yates' corrected)
Significance level = P/2 < .25

TABLE 7d
Validity of Battery for Nonminority Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	24	121	145
Low Criterion Group	37	39	76
Total	61	160	221

Phi coefficient = .34
Significance level = P/2 < .0005

TABLE 7e
Validity of Battery for Male Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	32	163	195
Low Criterion Group	52	49	101
Total	84	212	296

Phi coefficient = .37
Significance level = P/2 < .0005

TABLE 7f
Validity of Battery for Female Validation Subsample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	3	17	20
Low Criterion Group	5	5	10
Total	8	22	30

Phi coefficient = .29 (Yates' corrected)
Significance level = P/2 < .10

TABLE 8
Validity of Battery for Cross-validation Sample

	Below Cutting Scores	Meeting Cutting Scores	Total
High Criterion Group	5	18	23
Low Criterion Group	10	2	12
Total	15	20	35

Phi coefficient = .53 (Yates' corrected)
Significance level = P/2 < .005

OCCUPATIONAL APTITUDE PATTERN

This occupation was incorporated into OAP-34 in Section II of the 1970 edition of the Manual for the USES General Aptitude Test Battery with a double asterisk (**) because the battery did not contain the same aptitudes as included in OAP-34 but a significant phi coefficient was obtained between the criterion and the OAP-34 cutting scores of N-90, S-95 and P-90. A phi coefficient of .30 (P/2 < .0005) was obtained for the validation sample and a phi coefficient of .41 (P/2 < .01) was obtained for the cross-validation sample.

APPLICABILITY OF BATTERY

The aptitude test battery may be used in the selection of inexperienced applicants for the jobs described in Appendix 4.

APPENDIX 1

Validation Sample

Descriptive Statistics for Black, Spanish Surnamed, Oriental and Nonminority Subgroups

Variable	Black (N=40)			Spanish Surnamed (N=30)		
	Mean	SD	Range	Mean	SD	Range
Aptitude G	100.5	12.6	71-120	112.0	12.1	84-137
Aptitude V	93.0	11.7	74-115	104.9	10.2	84-131
Aptitude N	99.6	11.7	75-127	106.9	11.2	80-125
Aptitude S	113.8	14.2	74-137	118.9	12.6	94-143
Aptitude P	113.4	17.5	82-155	118.9	16.1	81-148
Aptitude Q	109.7	14.8	87-153	115.7	13.0	93-139
Aptitude K	105.6	13.3	80-138	110.1	13.2	72-132
Aptitude F	97.3	19.1	57-132	95.9	13.7	62-119
Aptitude M	104.3	14.8	72-134	106.9	15.4	63-150
Criterion	60.7	13.8	28-98	63.5	13.1	40-85
Age	25.2	5.6	18-45	35.9	8.1	21-53
Education	13.6	1.3	11-16	13.5	1.5	10-16
Experience (total)	36.5	40.5	1-240	130.3	72.2	17-300

Variable	Oriental (N=30)			Nonminority (N=221)		
	Mean	SD	Range	Mean	SD	Range
Aptitude G	117.1	14.9	81-147	117.3	13.2	83-156
Aptitude V	107.4	11.7	80-137	109.6	12.8	70-149
Aptitude N	118.0	16.8	86-155	111.0	14.3	78-148
Aptitude S	120.9	16.1	84-156	120.7	14.8	88-163
Aptitude P	128.6	18.3	86-171	118.5	19.8	67-170
Aptitude Q	123.7	15.0	96-165	118.3	14.8	87-179
Aptitude K	120.3	19.0	78-155	100.2	17.9	29-151
Aptitude F	100.4	15.2	73-151	93.4	18.8	41-143
Aptitude M	109.3	18.6	79-155	102.6	20.6	43-167
Criterion	69.3	14.5	38-96	65.8	15.7	27-99
Age	34.8	6.9	23-50	35.8	10.0	19-63
Education	13.9	1.2	11-16	13.5	1.4	10-18
Experience (total)	96.9	63.3	14-216	120.3	86.0	6-468

Validation Sample

Descriptive Statistics for Male and Female Subgroups

	Male (N=296)			Female (N=30)		
Variable	Mean	SD	Range	Mean	SD	Range
Aptitude G	114.6	14.5	71-156	114.7	13.0	88-152
Aptitude V	106.5	13.4	70-149	110.7	13.8	86-149
Aptitude N	110.0	14.8	75-155	107.1	14.3	80-141
Aptitude S	120.2	15.2	74-163	117.2	10.7	91-140
Aptitude P	119.3	19.6	67-171	113.7	15.0	70-150
Aptitude Q	117.3	14.7	87-167	121.0	17.9	87-179
Aptitude K	107.7	17.0	55-155	109.5	21.8	29-151
Aptitude F	94.9	18.2	41-151	95.5	18.4	42-127
Aptitude M	104.1	19.7	43-167	102.4	17.1	56-131
Criterion	65.5	15.3	27-99	61.9	14.2	32-93
Age	33.9	9.6	18-63	38.0	9.6	20-56
Education	13.5	1.4	10-18	13.8	1.3	12-16
Experience (total)	107.6	83.8	1-468	115.6	73.9	18-312

APPENDIX 2

Validation Sample

Geographic Distribution of Sample·

	Black Subsample	Spanish Subsample	Oriental Subsample	Total Sample
North	17	1	1	39
South	17	0	0	36
West	6	29	29	251
Total	40	30	30	326

COMPANIES CONTRIBUTING SAMPLES

Validation Sample

<u>North</u>:
Consulting Engineers Associates, Inc, Detroit, Michigan
Giffels Associates, Detroit, Michigan
Rossen/Neumann Associates, Southfield, Michigan
Rossetti Associates, Detroit, Michigan
Sidney Shorter & Associates, Detroit, Michigan
Smith, Hinchman & Grylls Associates, Inc., Detroit, Michigan
Bell Telephone Laboratories, Whippany, New Jersey
New Jersey Department of Transportation, Trenton, New Jersey

<u>South</u>:
Alabama Dry Docks and Shipbuilding Co., Mobile, Alabama
Mobile Pulley & Machine Works, Mobile, Alabama
Palmer and Baker Engineers, Mobile, Alabama
U.S. Army Corps of Engineers, Mobile, Alabama
Atlanta Gas Light Company, Atlanta, Georgia
City of Atlanta Planning Department, Atlanta, Georgia
City of Atlanta Water Department, Atlanta, Georgia
Georgia Department of Transportation, Atlanta, Georgia

<u>West</u>:
A. C. Martin and Associates, Los Angeles, California
Alderman and Swift Consulting Engineers, South Pasadena, California
Atlantic Richfield Company, Long Beach, California
Amerada Petroleum Corporation, Los Angeles, California
Bechtel Corporation, Vernon, California
Ben Schmid Structural Engineer, Pasadena, California
Brandow and Johnson Associates, Los Angeles, California
California State Division of Water Resources, Los Angeles, California
City of Signal Hill, Signal Hill, California
Daniel, Mann, Johnson & Mendenhall Engineers, Los Angeles, California
Engineering Service Corporation, Los Angeles, California
Fluor Corporation, Ltd., Los Angeles, California
Humble Oil and Refining Company, Los Angeles, California
John A. Martin, Structural Engineer, Los Angeles, California

Johnson & Nielson Consulting Engineers, Los Angeles, California
King-Benioff-Steinman-King Consulting Engineers, Sherman Oaks,
   California
Long Beach Department of Oil Properties, Long Beach, California
Los Angeles City Department of Public Works, Bridge Division,
   Los Angeles, California
Los Angeles City Department of Water and Power, Los Angeles,
   California
Marathon Oil Company, Los Angeles, California
McIntyre and Quiros, Inc., Monterey Park, California
Metropolitan Water District of Southern California, Los Angeles,
   California
Mobil Oil Corporation, Los Angeles, California
Montgomery Construction Engineers, Inc., Pasadena, California
Quinton Engineering, Los Angeles, California
Ralph M. Parsons Company, Los Angeles, California
Shell Oil Company, Los Angeles, California
Signal Oil and Gas Company, Los Angeles, California
Southern Pacific Company, Los Angeles, California
Standard Oil Company, Western Operations, La Habra, California
Suburban Water Systems, Valinda, California
Texaco, Incorporated, Los Angeles, California
Thums Long Beach Company, Long Beach, California
Union Oil Company of California, Los Angeles, California
United Concrete Pipe Corporation, Baldwin Park, California
Wheeler and Gray Consulting Engineers, Los Angeles, California
Nevada State Highway Department, Carson City, Nevada

Cross-validation Sample

Automatic Electric Company, Northlake, Illinois
Consolidated Edison Company, New York, New York
General Dynamics, Electric Boat Division, Groton, Connecticut
Seelye, Stephenson, Value & Knecht, New Rochelle, New York

DESCRIPTIVE RATING SCALE FOR VALIDATION SAMPLE

SCORE_____

RATING SCALE FOR_____
D. O. T. Title and Code

Directions: Please read the sheet "Suggestions to Raters" and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of worker_____
(Last)   (First)   (Initial)

How long have you supervised this worker and how familiar are you with his job performance?

☐	Under one month.	☐	See him at work all the time.
☐	One to two months.	☐	See him at work several times a day.
☐	Three to five months.	☐	See him at work several times a week.
☐	Six months or more.	☐	Seldom see him in work situation.

Rated by_____ _____ _____
(Signature)   (Title)   (Date)

A. How much work can he accomplish? (Volume of _acceptable_ work produced.)

☐ 1. Capable of low work output. Can perform only at a less that satisfactory rate.

☐ 2. Capable of fair work output. Can perform at a satisfactory rate.

☐ 3. Capable of good work output. Can perform at a fairly fast rate.

☐ 4. Capable of high work output. Can perform at a very fast rate.

☐ 5. Capable of extremely high work output. Can perform at highest rate.

B. How accurate is he in his work? (The correctness with which work is performed. Freedom from errors.)

☐ 1. Makes many errors. Work needs constant checking.

☐ 2. Makes frequent errors. Work needs more checking than is desirable.

☐ 3. Makes errors occasionally. Work needs only normal checking.

☐ 4. Makes few errors. Work seldom needs checking.

☐ 5. Rarely makes an error. Work almost never needs checking.

C. How good is the quality of his work? (Nature of workmanship. Ability to do high-grade work which meets quality standards.)

☐ 1. Performance is usually acceptable, but only meets minimum standards.

☐ 2. Performance is acceptable, but usually not superior in quality.

☐ 3. Performance is usually superior in quality.

☐ 4. Performance is almost of the highest quality.

☐ 5. Performance is outstanding, meets maximum standards.

D. How much does he know about his work? (Understanding of the fundamentals that have to do directly or indirectly with his immediate and related jobs.)

☐ 1. Has very limited knowledge of fundamentals. Does not know enough to do his work adequately.

☐ 2. Has limited knowledge of fundamentals. Knows enough to "get by".

☐ 3. Has fair knowledge of fundamentals. Knows enough to do adequate work.

☐ 4. Has good knowledge of fundamentals. Knows enough to do good work.

☐ 5. Has excellent knowledge of fundamentals. Outstanding in work.

E. How much aptitude or facility does he have for this kind of work? (Natural adeptness or knack for performing work easily and well.)

☐ 1. Has great difficulty doing his work. Not suited to this kind of work.

☐ 2. Usually has some difficulty doing his work. Not too well suited to this kind of work

☐ 3. Does his work without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his work without difficulty. Well suited to this kind of work.

☐ 5. Does his work with great ease. Exceptionally well suited to this kind of work.

F. How complete is his understanding of mathematics associated with his work? (Ability to make necessary computations required to perform his work.)

☐ 1. Fair understanding. Able to deal with the less difficult mathematics involved in his work.

☐ 2. Satisfactory understanding. Able to deal with most of the mathematics involved in his work.

☐ 3. Very good understanding. Able to deal with all but the most difficult mathematics involved in his work.

☐ 4. Excellent understanding. Able to deal with some of the most difficult mathematics involved in his work.

☐ 5. Superior understanding. Able to deal with all of the mathematics involved in his work.

G. How accurately and well does he analyze source data? (Ability to mentally separate information contained in source data into its component elements for drafting.)

☐ 1. Has great difficulty in analyzing and distinguishing component elements.

☐ 2. Usually has some difficulty in analyzing and distinguishing component elements.

☐ 3. Analyzes and distinguishes component elements without too much difficulty.

☐ 4. Analyzes and distinguishes component elements with ease.

☐ Analyzes and distinguishes component elements with the greatest of ease.

H. How much judgment does he exercise? (Ability to analyze a problem, grasp essentials, and make a decision to reach a sound conclusion.)

☐ 1. Can't reach a decision. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Makes quick, erratic decisions. Often has difficulty and needs help on all but simple problems.

☐ 3. Eventually comes to right conclusion. Deals with most problems that are not too complex.

☐ 4. Often makes right decisions at the right time. Needs help only on complex problems.

☐ 5. Always makes right decisions at the right time. Rarely needs help, even on complex problems.

I. How well does he check his finished work? (Ability to perceive errors in work and to make correct revisions.

☐ 1. Misses major errors. Work needs constant checking by supervisor.

☐ 2. Has difficulty locating errors. Work needs more checking than is desirable by supervisor.

☐ 3. Misses some errors. Work needs only normal checking by supervisor.

☐ 4. Checks work well. Seldom needs checking by supervisor.

☐ 5. Is very observant. Work almost never needs checking by supervisor.

J. Considering all the factors just rated, and only these factors, how acceptable is his work? ("All-around ability to do his work.)

☐ 1. Performance somewhat inferior. Prefer not to have this worker.

☐ 2. Performance only generally acceptable. Hesitant to have this worker.

☐ 3. Performance is acceptable. Satisfied to have this worker.

☐ 4. Performance usually excellent. Pleased to have this worker.

☐ 5. Performance is outstanding. Particularly desire to have this worker.

DESCRIPTIVE RATING SCALE FOR CROSS-VALIDATION SAMPLE

SCORE _____

RATING SCALE FOR _____

D.O.T. Title and Code

Directions: Please read the "Suggestions to Raters" and then fill in the items which follow. In making your ratings, only one box should be checked for each question.

SUGGESTIONS TO RATERS

We are asking you to rate the job performance of the people who work for you. These ratings will serve as a "yardstick" against which we can compare the test scores in this study. The ratings must give a true picture of each worker or this study will have very little value. You should try to give the most accurate ratings possible for each worker.

These ratings are strictly confidential and won't affect your workers in any way. Neither the ratings nor test scores of any workers will be shown to anybody in your company. We are interested only in "testing the tests." Ratings are needed only for those workers who are in the test study.

Workers who have not completed their training period, or who have not been on the job or under your supervision long enough for you to know how well they can perform this work should not be rated. Please inform the test technician about this if you are asked to rate any such workers.

Complete the last question _only_ if the worker is no longer on the job.

In making ratings, don't let general impressions or some outstanding trait affect your judgment. Try to forget your personal feelings about the worker. Rate only on the work performed. Here are some more points which might help you:

1. Please read all directions and the rating scale thoroughly before rating.

2. For each question compare your workers with "workers-in-general" in this job. That is, compare your workers with other workers on this job that you have known. This is very important in small plants where there are only a few workers. We want the ratings to be based on the same standard in all the plants.

3. A suggested method is to rate all workers on one question at a time. The questions ask about different abilities of the workers. A worker may be good in one ability and poor in another: for example, a very slow worker may be accurate. So rate all workers on the first question, then rate all workers on the second question, and so on.

4. Practice and experience usually improve a worker's skill. However, one worker with six months' experience may be a better worker than another with six years' experience. Don't rate one worker as poorer than another merely because of a lesser amount of experience.

5. Rate the workers according to the work they have done over a period of several weeks or months. Don't rate just on the basis of one "good" day, or one "bad" day or some single incident. Think in terms of each worker's usual or typical performance.

6. Rate only the abilities listed on the rating sheet. Do not let factors such as cooperativeness, ability to get along with others, promptness and honesty influence your ratings. Although these aspects of a worker are important, they are of no value for this study as a "yardstick" against which to compare aptitude test scores.

NAME OF WORKER (Print)   (Last)   (First)

MA 7-66

SEX: MALE_____   FEMALE_____

Company Job Title: _____

How often do you see this worker
in a work situation?

☐ All the time.

☐ Several times a day.

☐ Several times a week.

☐ Seldom.

How long have you worked with this worker?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A.   How much can this worker get done? (Worker's ability to make efficient use of time and to work at high speed.)
      (If it is possible to rate only the quantity of work which a person can do on this job as adequate or inadequate,
      use #2 to indicate "inadequate" and #4 to indicate "adequate.")

☐   1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐   2. Capable of low work output. Can perform at a slow pace.

☐   3. Capable of fair work output. Can perform at an acceptable pace.

☐   4. Capable of high work output. Can perform at a fast pace.

☐   5. Capable of very high work output. Can perform at an unusually fast pace.

B.   How good is the quality of work? (Worker's ability to do high-grade work which meets quality standards.)

☐   1. Performance is inferior and almost never meets minimum quality standards.

☐   2. Performance is usually acceptable but somewhat inferior in quality.

☐   3. Performance is acceptable but usually not superior in quality.

☐   4. Performance is usually superior in quality.

☐   5. Performance is almost always of the highest quality.

C.   How accurate is the work? (Worker's ability to avoid making mistakes.)

☐   1. Makes very many mistakes. Work needs constant checking.

☐   2. Makes frequent mistakes. Work needs more checking than is desirable.

☐   3. Makes mistakes occasionally. Work needs only normal checking.

☐   4. Makes few mistakes. Work seldom needs checking.

☐   5. Rarely makes a mistake. Work almost never needs checking.

D. How much does the worker know about the job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with the work.)

☐ 1. Has very limited knowledge. Does not know enough to do the job adequately.

☐ 2. Has little knowledge. Knows enough to get by.

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows the job thoroughly.

E. How large a variety of job duties can the worker perform efficiently? (Worker's ability to handle several different operations.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ ~. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

F. Considering all the factors already rated, and only these factors, how good is this worker? (Worker's all-around ability to do the job.)

☐ 1. Performance usually not acceptable.

☐ 2. Performance somewhat inferior.

☐ 3. A fairly proficient worker.

☐ 4. Performance usually superior

☐ 5. An unusually competent worker.

Complete the following ONLY if the worker is no longer on the job.

G. What do you think is the reason this person left the job? (It is not necessary to show the official reason if you feel that there is another reason, as this form will not be shown to anybody in the company.)

☐ 1. Fired because of inability to do the job.

☐ 2. Quit, and I feel that it was because of difficulty doing the job.

☐ 3. Fired or laid off for reasons other than ability to do the job (i.e., absenteeism, reduction in force).

☐ 4. Quit, and I feel the reason for quitting was not related to ability to do the job.

☐ 5. Quit or was promoted or reassigned because the worker had learned the job well and wanted to advance.

RATED BY	TITLE	DATE

COMPANY OR ORGANIZATION	LOCATION (City, State, ZIP Code)

APPENDIX 4

Drafter, Civil (profess. & kin.) 005.281

JOB DUTIES

Prepares working plans and drawings used in connection with design, construction, alteration, maintenance and operation of highways, streets, river and harbor improvements, flood control, drainage and sewage disposal systems, lighting and water installations, airport runways and other civil engineering projects:

*Determines or ascertains scale to be used by analysis and computation of specifications and data through consultations with engineer responsible for project or from specifications and data furnished by supervisor.

Organizes and arranges data into logical sequence for drafting. Obtains and fastens on drafting table specified size and type of drawing paper, cloth or vellum.

*Draws and plots detailed graphic representations of data to scale in conformity with specifications, computed dimensions and spatial relationships using T-squares, straight edges, triangles, compasses, scribers, curve templates and drafting pens and pencils.

Delineates and identifies dimensions drawn with engineering symbols and mathematical data. Letters drawing as specified to identify project and component parts using freehand and/or lettering machine. Checks completed work for accuracy and submits drawing to supervisor. Performs related clerical work to file drawings, tabulate reports and data and index survey field notes.

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*These job duties were designated as critical job duties as they must be performed competently if the job is to be performed in a satisfactory manner. Civil Drafters spend about 80% of their working hours performing these job duties.

Drafter, Structural (profess. & kin.) 005.281

JOB DUTIES

Prepares working plans and drawings used in connection with design and construction of buildings, bridges, industrial facilities and other structural projects:

*Determines or ascertains scale to be used by analysis and computation of specifications and data through consultation with engineer responsible for project or from specifications and data furnished by supervisor.

Organizes and arranges data into logical sequence for drafting. Obtains and fastens on drafting table specified size and type of drawing paper, cloth or vellum.

*Draws and plots detailed graphic representation of data to scale in conformity with specifications, computed dimensions and spatial relationships using T-squares, triangles, straight edges, compasses, dividers, scribers and drafting pens and pencils.

Delineates and identifies dimensions drawn with engineering symbols and mathematical data. Letters drawing as specified to identify project and component parts using freehand and/or lettering machine.

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*These job duties were designated as critical job duties as they must he performed competently if the job is to be performed in a satisfactory manner. Structural Drafters spend about 80% of their working hours performing these job duties.

Drafter, Geological (petrol. production) 010.281

JOB DUTIES

Prepares maps, cross sections and profiles to show geological form-
ations, strata and subsurface conditions. Drafts new base maps
and alters existing maps to supply informative data concerning
geological formations, mineral right owners, locations of existing
and abandoned oil and gas wells, and man-made structures and roads:

*Determines scale to be used by analysis of data, consultations
with geologist or from specifications received from chief drafter.

*Draws and plots detailed graphic representations of data to scale
using T-squares, triangles, straight edges, compasses, dividers,
scribers and drafting pens and pencils.

Delineates and identifies dimensions drawn with geological symbols
and color shading. Letters drawing to identify work. Checks com-
pleted work for accuracy and submits drawing to supervisor. Per-
forms related clerical work to file drawings, tabulate reports and
data and index survey field notes.

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*These job duties were designated as critical job duties as they
must be performed competently if the job is to be performed in a
satisfactory manner. Geological Drafters spend about 80% of their
working hours performing these job duties.

Drafter, Mechanical (profess. & kin.) 007.281

JOB DUTIES

Prepares working plans and drawings of machinery and mechanical devices to scale according to specified dimensions and/or rough or detailed notes for engineering or manufacturing purposes:

*Determine scale to be used from specifications and data furnished by supervisor.

*Draws and plots detailed multiple view assembly and subassembly drawings as required for repairing and manufacturing of mechanisms using triangles, straight edges, compasses, templates, drafting pens and pencils and mechanical inking pens.

Delineates and identifies dimensions and tolerances, fasteners, joining requirements and other engineering data. Letters drawing to identify work. Prepares stocklist of items required for assembly and indicates this on drawing. Checks completed work for accuracy and submits drawing to supervisor. Performs related clerical work.

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*These job duties were designated as critical job duties as they must be performed competently if the job is to be performed in a satisfactory manner. Mechanical Drafters spend about 80% of their working hours performing these job duties.