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IDENTIFIERS	Flexographic Press Man; 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 and a personnel evaluation form are also included. (AG)

Development of USES Aptitude Test Battery

for

Flexographic Press Man

(print. & pub.) I 651.782

U.S. DEPARTMENT OF LABOR
W. Willard Wirtz, Secretary
MANPOWER ADMINISTRATION
BUREAU OF EMPLOYMENT SECURITY
Washington, D.C. 20210

Technical Report on Development of USES Aptitude Test Battery

For .....

Flexographic Press Man (print. & pub.) I 651.782

S-371

U. S. Employment Service
in Cooperation with
California, Georgia, Massachusetts, New York,
North Carolina, and Texas State Employment Services

Revised August 1966

GATB Study #2599

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Flexographic Press Man (print. & pub.) I 651.782

B-651 or S-371

This report describes research undertaken for the purpose of determining General Aptitude Test Battery (GATB) norms for the occupation of Flexographic Press Man (print. & pub.) I 651.782. Mr. Julian Ross, Executive Secretary, Flexographic Technical Association, Inc., was instrumental in obtaining employer cooperation for this study and Mr. Howard Bowen, President, Printing Specialties, AFL-CIO Local #388 was instrumental in obtaining the sample from the Los Angeles Area. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
S - Spatial Aptitude	90
P - Form Perception	70
M - Manual Dexterity	90

RESEARCH SUMMARY

Sample:
75 male workers employed as Flexographic Press Men in California, Georgia, Massachusetts, New York, North Carolina and Texas.

Criterion:
Supervisory ratings

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

Minimum aptitude requirements were determined on the basis of a job analysis and statistical analyses of aptitude mean scores, standard deviations, and selective efficiencies.

Concurrent Validity:
Phi Coefficient = .28 ($P/2 < .01$)

Effectiveness of Norms:
Only 68% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 78% would have been good workers. 32% of the non-test-selected workers used for this study were poor workers; if the workers had been test-selected with the above norms, only 22% would have been poor workers. The effectiveness of norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Workers	68%	78%
Poor Workers	32%	22%

SAMPLE DESCRIPTION

Size:
N = 75

Occupational Status:
Employed workers

Work Setting:
Workers were employed by the following companies:

Acme Cellophane Converting Co.
Temple City California

Flexible Packaging Division
Continental Can Corp.
South Gate, California

Flexible Packaging Division
Crown Zellerback Corp.
Los Angeles, California

Modern Packaging Division
Standard Packaging Corp
Los Angeles, California

St. Regis Paper Co.
Bag Division
Los Angeles, California

Standard Paper Box Corp.
Web Converting Div.
Los Angeles, California

Riegal Paper Co.
Greensboro, North Carolina and
Atlanta, Georgia

MB Claff & Sons, Inc.
Brockton, Massachusetts

Package Products
Charlotte, North Carolina

Dixie Wax Paper Co.
Dallas, Texas

Equitable Paper Bag Co.
Long Island City, New York

Employer Selection Requirements:

Education: No requirement

Previous Experience: No requirement for entry work as trainees or press helpers. Several companies in California have, in the past, hired only experienced workers.

Tests: None

Other: Personnel interview

Principal Activities:

The job duties for each worker are comparable to those shown in the Appendix.

Minimum Experience:

All workers had completed an on-the-job training period of twelve months.

TABLE 2

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

	Mean	SD	Range	r
Age (years)	35.4	8.3	22-61	.088
Education (years)	10.8	1.8	6-16	.188
Experience (months)	106.2	70.0	12-300	.247*

* Significant at the .05 level

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B were administered during the period March 1963 through September 1965.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency. Ratings and reratings for each worker were made at approximately the same time as the tests were administered with a time interval of from one week and four days to five weeks and three days between the two ratings.

Rating Scale: The USES Descriptive Rating Scale, Form SP-21, was used. The scale (see Appendix) consists of nine items with five alternatives for each item. The alternatives indicate the different degrees of job proficiency.

Reliability: The coefficient of reliability between the two ratings was .89 indicating a significant relationship. The final criterion score consisted of the combined scores of the two sets of ratings.

Criterion Score Distribution:

Possible Range:	18-90
Actual Range:	39-86
Mean:	64.9
Standard Deviation:	10.4

Criterion Dichotomy: The criterion distribution was dichotomized into high and low groups by placing 32% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers". The criterion critical score was 60.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitude G, which does not have a significant correlation with the criterion was considered for inclusion in the norms because the qualitative analysis indicated that it was important for the job duties and the sample had a relatively high mean score on this aptitude. A relatively high mean score with employed workers may indicate that some sample pre-selection has taken place. Tables 3, 4 and 5 show the results of the qualitative and statistical analyses.

TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear to be important to the work performed)

Aptitude	Rationale
G - General Learning Ability	To interpret and follow job orders and setup charts; to plan non-repetitive setups. To register and level printing plates according to specified standards.

S - Spatial Aptitude	To ascertain that plate is in true alignment with reference lines on cylinder. To detect low spots of plate and to judge amount of underlay required to achieve a level surface; to observe action of font and ink rollers while press is in operation.
P - Form Perception	To select plate cylinder, cylinder shaft, and gears specified in setup chart; to visually examine printing emerging from press, and to detect any imperfections in quality of impressions.
M - Manual Dexterity	To set up press by assembling, positioning, aligning plate cylinders, shafts, gears, plates, font and ink rollers; to manipulate cylinder elevating wheel, ink rollers, and registering wheels of press.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

Aptitude	Mean	SD	Range	r
G - General Learning Ability	96.7	17.1	47-138	.219
V - Verbal Aptitude	92.0	14.3	63-125	.122
N - Numerical Aptitude	95.7	19.2	44-140	.193
S - Spatial Aptitude	101.1	17.5	68-163	.263*
P - Form Perception	96.5	21.9	36-145	.234*
Q - Clerical Perception	96.3	15.5	59-139	.195
K - Motor Coordination	96.0	18.2	35-134	.159
F - Finger Dexterity	91.6	17.4	54-144	-.028
M - Manual Dexterity	105.8	19.9	41-147	.297**

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

TABLE 5

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X			X	X				X
Irrelevant									
Relatively High Mean	X			X	X				X
Relatively Low Standard Dev.		X							
Significant Correlation with Criterion				X	X				X
Aptitudes to be Considered for Trial Norms	G			S	P				M

DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes G, S, P, and M at trial cutting scores were able to differentiate between the 68% of the sample considered good workers and the 32% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about 1/3 of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly higher than one standard deviation below mean will eliminate about 1/3 of the sample; for four-aptitude trial norms cutting scores of slightly lower than one standard deviation below the mean will eliminate about 1/3 of the sample. The Phi Coefficient was used as a basis of comparing trial norms. Norm of S-90, P-70 and M-90 provided a high degree of differentiation for the occupation of Flexographic Press Man I 651.782. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .28 (statistically significant at the .01 level).

TABLE 6

Concurrent Validity of Test Norms, S-90, P-70 and M-90

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	15	36	51
Poor Workers	14	10	24
Total	29	46	75

Phi Coefficient (ϕ) = .28 Chi Square (X^2) = 5.75
Significance Level = P/2 $<$ .01

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

SP-21
Rev. 2/61

A-P-P-E-N-D-I-X

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "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 (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

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

☐ See him at work all the time.

☐ See him at work several times a day.

☐ See him at work several times a week.

☐ Seldom see him in work situation.

How long have you worked with him?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

☐ 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 but not a fast 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 his 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. The grade of his work could stand improvement. 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 he in his 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 he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his 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 his job thoroughly.

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

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

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

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

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

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

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 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.

☐ 4. Can perform many different operations efficiently.

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

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and only these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

S-371 August 1966

FACT SHEET

Job Title: Flexographic Press Man (print. & pub.) I 4-48.095 (651.782)

Job Summary:

Sets up and operates flexograph press to print on paper, glassine, waxed, or cellophane roll stock.

Work Performed:

Receives job order, rubber printing plate, and cutting work plate from engraving and plate department. Reads job order to determine printing specifications, setup chart number, type of stock to be mounted on press, and type of ink to be used for printing run. Obtains setup chart, specified in job order, from chart rack and reads chart to ascertain plate cylinder size, cylinder shaft length, and size of gears to be mounted in press. Informs press helper as to type of stock to be mounted on press and color and viscosity of ink to be poured into press font. Selects plate cylinder, cylinder shaft, and gears specified in setup chart from supply racks. Slides shaft through hollow center of plate cylinder and positions assembled shaft and cylinder on holding fixture. Assembles one gear to each end of shaft, rotates plate cylinder about shaft with hands, and cleans cylinder surface with an alcohol moistened cloth Picks up printing plate and brushes coat of cement compound on reverse side of plate. Positions plate, reverse side down, onto and around plate cylinder with side edges of printing plate in alignment with cylinder reference lines specified in setup chart. Visually ascertains that plate is in true alignment with reference lines and presses plate down with hands onto cylinder to bond plate in position. Picks up cutting mark plate, brushes coat of cement compound on reverse side, and bonds plate onto plate cylinder in accordance with specifications in setup chart. Assisted by press helper, carries cylinder assembly to press and mounts assembly into press with shaft gears inserted into their respective journel boxes. Turns cylinder elevating wheel to raise cylinder and visually sets specified clearance between printing plate and ink roller. Ascertains that press helper has filled font with type of ink specified, and checks viscosity with a Zahn cup if he judges that ink is not of specified consistency. Turns font and ink roller adjusting wheels and sets required tension between rollers using a thickness gauge to insure pickup and even distribution of ink onto ink roller. Ascertains that press helper has mounted type of stock specified in job order on press and that stock has been fed correctly into press. Starts press and makes proof run. Observes actions of font and ink rollers to see that ink is being evenly distributed and adjusts roller wheels as necessary. Visually examines printing materials emerging from press to see that impressions are clear. Stops press when impressions show any imperfections caused by low spot in printing plate. Peels back from cylinder with fingers any portion of plate having low spot. Judges amount of underlay required to build up low spot in order to make plate surface level. Selects roll of pressure-sensitive tape of sufficient size and thickness to build up plate to an even surface. Tears off portion of tape large enough to cover low spot, positions tape on cylinder

in alignment with low spot, and presses tape to cylinder with fingers. Presses portion of printing plate, peeled back from cylinder, down to original position on cylinder and checks plate's alignment with reference marks. Starts press and continues proof run. Stops press, removes completed section of proof, and lays section on work table. Makes precise measurements, with steel rule, of distances between impression and edges of stock. Measures distance between specified point of impression and cutting mark printed on stock. Compares measurements made with distance specified in job order and adjusts cross and horizontal registering wheels, as necessary, to align plate with stock in accordance with job order. Starts press and observes actions of press and visually checks quality of impressions being printed. Stops press when number of impressions specified by job order has been run and prepares for next job.

(This sheet is printed in duplicate. One copy should remain as part of the Appendix in order to complete the technical report. The other copy can be removed by employment service personnel who wish to set up separate fact sheet files.)

GPO 912-185

S-371 August 1966

FACT SHEET

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