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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 included. (AG)

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

FINISHER I (fabric. plastics prod.) 9-10.10

B-523 S-246

U. S. Employment Service
in Cooperation with
Wisconsin State Employment Service

April 1963

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

FINISHER I (fabric. plastics prod.) 9-10.10

B-523 S-246

Summary

The General Aptitude Test Battery, B-1002A, was administered to a final sample of 50 women employed as Finisher I 9-10.10 at Hartland Plastics, Incorporated, Hartland, and Whitewater Products Company, Whitewater, Wisconsin. The criterion consisted of supervisory ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes P-Form Perception, F-Finger Dexterity and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Finisher I 9-10.10, B-523.

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
P	CB-1- A CB-1- L	90	P	Part 5 Part 7	90
F	CB-1- O CB-1- P	85	F	Part 11 Part 12	80
M	CB-1- M CB-1- N	100	M	Part 9 Part 10	95

Effectiveness of Norms

The data in Table IV indicate that only 68 percent of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 93 percent would have been good workers. 32 percent 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 7 percent would have been poor workers.

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TECHNICAL REPORT

I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Finisher I 9-10.10.

II. Sample

On August 17, 1954, the General Aptitude Test Battery, B-1002A, was administered to 28 women employed as Finisher I 9-10.10 at Hartland Plastics, Inc., Hartland, Wisconsin. One of the women, age 58 and having only 5 years of education, had much difficulty in taking all parts of the GATB and was eliminated from the sample.

On July 3, 1962, the General Aptitude Test Battery, B-1002A, was administered to 22 women employed as Finisher I 9-10.10 at the Whitewater Products, Co., Whitewater, Wisconsin. One additional woman who claimed she had taken the GATB at a local office was not tested at that time. A check of her test record card indicated that she had been administered two specific aptitude test batteries which measured Aptitudes S, P, K, F, and M. Since 5 of the 9 aptitudes of the GATB were covered, she was included in the test sample.

Workers in the sample were hired on the basis of a personal interview. There were no requirements as to age, education, or previous experience, and no tests were used in selecting individuals for employment. One week is the average time for a worker to become proficient on the job. All the workers in this sample had at least one month of experience as a Finisher I 9-10.10.

TABLE I

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

N = 50	M	σ	Range	r
Age (years)	30.2	11.0	18-54	-.080
Education (years)	11.1	2.1	6-15	-.076
Experience (months)	11.2	15.3	1-82	.314*

*Significant at the .05 level.

The significant correlation in Table I indicates that either (1) more experienced workers performed better on the job, or (2) raters were biased in giving higher ratings to these workers.

III. Job Description

Job Title: Finisher I (fabric plastics prod.) 9-10.10.

Job Summary: Finishes molded plastic or organic rubber products for use in the manufacture of industrial electronic assemblies, domestic appliances, and novelty items by assembling multiple part molds in fixture and cementing together. Visually inspects molded products for excess material and defects, and removes flashing, sprues, and rough edges of products by manual or mechanical methods.

Work Performed: Inspects products by visually observing for excess flashing sprues and defects resulting from molding process; assembles parts of molded products in jigs at assembly bench or on revolving assembly wheel. Applies adhesive solution with brush to edges and clamps completed product in jig or plaster of paris mold; removes product when edges are securely adhered to and trims rough edges with knife. Fills in any small holes with plastic compound; separates rows of small products from mold sheet. Lays mold sheet on work table with molded area up, selects proper size dinking tool, and cuts out product from mold sheet by centering tool over molded product and pressing with a twisting motion; cuts sprues and trims flashing from molded products using small scissors or razor blade. Brushes parts with tooth brush to remove loose particles, deflashes gaskets and other type center-holed, circular molded products on rotary brush. Inserts row of products on abrasive covered holding fixture or metal needle , according to size of product, and applies to rotating brush with sufficient pressure to remove flashing; trims large sprues, such as center prongs, from molded products using dinking machine; writes out time ticket to maintain a record of number of items produced, amount of waste, and part number; may use scale to weigh very small parts to estimate count; may use magnifying inspection lamp when finishing and inspecting extremely small parts.

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IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of supervisory broad category ratings. Each worker was rated as being either above average, average, or below average with regard to her overall job performance.

At Hartland Plastics, Incorporated, separate ratings were made by the Forelady and by two Assistant Foreladies (Forelady A and Forelady B) on all 27 workers in the sample at the company. Each of these three sets of broad category ratings were converted to quantitative values which resulted in the following correlation coefficients:

	Assistant Forelady A	Assistant Forelady B
Forelady	.856	.678
Assistant Forelady B	.855	----

In view of these intercorrelations, the three ratings were combined. The combined ratings resulted in the establishment of six broad categories: Group A - rated above average by all raters; Group B - rated above average by two raters and average by one; Group C - rated above average by one rater and average by two; Group D - rated average by all raters; Group E - rated average by two raters and below by one; Group F - rated below average by all raters.

At the Whitewater Products Company, ratings were made by the Shift Foremen on the 23 workers at the company. Identical reratings were obtained three weeks after the initial ratings were made. The ratings for these workers are comparable to those for Groups A, D and F above.

The ratings for the workers at Hartland Plastics and Whitewater Products were combined resulting in the following final criterion scores:

Group	N	Final Criterion Score
A	9	65
B	3	58
C	3	56
D	19	50
E	6	44
F	10	36

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VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation:

Form Perception (P) - required in the inspection of molded products for excess flashing, sprue, and defects and in the selection of the proper sized dinking tool and metal needle.

Motor Coordination (K) - required in accurately centering dinking tool over molded product and in positioning metal needle into hole of circular products.

Finger Dexterity (F) - required in the nimble use of fingers in positioning small molded products onto metal needle and in assembling parts.

Manual Dexterity (M) - required in the rapid and skillful handling of hand tools, in removing flashing and sprue, and in cutting out the molded products from mold sheet and use of the hands in assembling parts.

On the basis of the job analysis data, V-Verbal Aptitude and N-Numerical Aptitude were rated "irrelevant" for successfully performing the duties of this job.

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B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 50

Aptitudes	M	σ	r
G-Intelligence (N = 49)	97.8	16.3	.271
V-Verbal Aptitude (N = 49)	97.9	16.5	.151
N-Numerical Aptitude(N =49)	97.4	18.1	.263
S-Spatial Aptitude	98.0	18.2	.318*
P-Form Perception	105.5	19.2	.450**
Q-Clerical Perception(N=49)	108.2	16.1	.280
K-Motor Coordination	108.7	15.2	.352*
F-Finger Dexterity	107.1	21.7	.401**
M-Manual Dexterity	109.2	21.5	.431**

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

C. Selection of Test Norms:

TABLE III

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		X	X						
Relatively High Mean						X	X		X
Relatively Low Sigma									
Significant Correlation with Criterion				X	X		X	X	X
Aptitudes to be Considered for Trial Norms				S	P		K	F	M

Trial norms consisting of various combinations of Aptitudes S,P,K,F and M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of P-90, F-80 and M-95 had the best selective efficiency.

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VII. Validity of Norms (Concurrent)

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 32 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes P, F and M with critical scores of 90, 80 and 95, respectively, and the dichotomized criterion for Finisher I 9-10.10. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Finisher I 9-10.10
(P-90, F-80, M-95)

N = 50	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	28	34
Poor Workers	14	2	16
Total	20	30	50

Phi Coefficient = .67
χ^2 = 22.110
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes P, F and M with minimum scores of 90, 80 and 95 , respectively, have been established as B-1002 norms for Finisher I 9-10.10. The equivalent B-1001 norms consist of P-90, F-85 and M-100.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for incorporation into any of the 35 OAP's included in Section II of the Guide to the Use of the GATB, January 1962. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.