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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

DISPATCHER, PETROLEUM TRANSPORT (clerical) 1-18.61

B-528 S-251

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

April 1963

GATB # 2425

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

DISPATCHER, PETROLEUM TRANSPORT (clerical) 1-18.61

B- 528

Summary

The General Aptitude Test Battery, B-1002A, was administered to a final sample of 50 individuals employed as Dispatcher, Petroleum Transport 1-18.61 by the Ruan Transport Corporation at terminals in Illinois, Indiana, Iowa, Minnesota, Nebraska and 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 G-Intelligence, V-Verbal Aptitude and N-Numerical Aptitude were selected for inclusion in the final test norms.

GATB Norms for Dispatcher, Petroleum Transport 1-18.61, B-528.

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	120	G	Part 3 Part 4 Part 6	115
V	CB-1-J	100	V	Part 4	100
N	CB-1-O CB-1-I	105	N	Part 2 Part 6	100

Effectiveness of Norms

The data in Table IV indicate that only 64 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, 85 percent would have been good workers. 36 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 15 percent would have been poor workers.

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 Dispatcher, Petroleum Transport 1-18.61.

II. Sample

The GATB, B-1002A, was administered during the period April 1960 through May 1961 to a sample of 50 male Dispatchers employed by the Ruan Transport Corporation of Des Moines, Iowa at 16 terminals in six states. Individuals from the following terminals were included in the sample:

Location	Number	Location	Number
Lemont, Ill.	7	St. Paul, Minn.	3
Wood River, Iowa	3	Sauk Centre, Minn.	1
South Bend, Ind.	1	Omaha, Nebr.	5
Bettendorf, Iowa	3	Green Bay, Wisc.	2
Coralville, Iowa	2	LaCrosse, Wisc.	2
Des Moines, Iowa	7	Madison, Wisc.	2
Dubuque, Iowa	6	Milwaukee, Wisc.	3
Sioux City, Iowa	2	Superior, Wisc.	1

Tests were not used in the selection of workers for employment in this occupation. Job applicants were required to complete a work application and have an oral interview. The company prefers to hire applicants who are between 25 and 35 years of age. At the present time only college graduates are considered for employment. However, twenty of the individuals included in the sample for this study had not attended college.

The Ruan Transport Corporation conducts a twelve month on-the-job training program. However, the worker can learn the routine duties of the dispatching office in six months. Training is usually given formally and informally by the terminal manager or chief dispatcher. All but one of the workers in the sample had at least 12 months experience; one worker was terminated before completing the training.

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)	35.8	9.8	19-58	.088
Education (years)	13.9	2.2	8-17	.123
Experience (months)	59.7	48.0	11-216	.058

III. Job Description

Job Title: Dispatcher, Petroleum Transport (clerical) 1-18.61.

Job Summary: Directs the activities of a number of drivers of tractor-trailer units for the delivery of petroleum products in accordance with company and governmental regulations and policies. Receives and completes customers' orders. Prepares daily schedule of deliveries for each tractor-trailer unit. Utilizes the available delivery equipment to achieve maximum efficiency of use. Prepares, checks, evaluates and maintains reports and records.

Work Performed: Receives telephone orders from customers, notes any special instructions and provides estimated delivery time if requested. Completes customers' pre-signed orders obtained from file and notes delivery instructions to drivers on load order slip. Prepares daily delivery schedule for each tractor-trailer unit utilizing customers' orders. Determines the type of assignments to give each unit by considering the type of petroleum product to be carried, the equipment available including trailer and compartment capacities and metering and pumping equipment, and considering the tractor and trailer licenses carried. Schedules deliveries to achieve the greatest amount of "load" time and overall efficiency. Utilizes company, customer, union and ICC rules and regulations and the latest highway detour and posted load limit information. Estimates accurately the time needed for each delivery taking into consideration such factors as bulk plant or station facilities, road and weather conditions, and delivery equipment capacity.

Issues instructions, trip sheets, orders and other necessary material to drivers at start of each shift; gives instructions to drivers by telephone when necessary. Receives and reviews completed trip sheets, orders, and other reports from drivers at completion of their shift. Checks drivers' tachograph and tachometer sheets to determine excessive use of time. and violations of truck speed regulations and reports such violations to appropriate authorities and to driver. Compares and checks clerical and numerical data on various forms submitted by drivers for agreement, accuracy, and conformity and takes action to clear any discrepancies. Posts mileage driven to lease operators' accounts and records drivers' daily hours worked for payroll purposes; reviews and posts drivers' logs when engaged in interstate commerce. Prepares a number of daily, weekly, and monthly reports covering equipment, operations, and personnel. Compiles and prepares statistical data for studies and reports; maintains company manuals; receives, checks, and files periodically, supplies of customers' signed blank order forms.

Must have thorough knowledge of company, local, state and federal regulations and policies and must keep up with any new changes. Must be able to read, interpret and use mathematical formulas including decimals, percents, and ratios. Must know the brand names and availability of the petroleum products requested by customers. Must be familiar with company and pipeline terminal territories. Must know the transporting characteristics of various petroleum products. Must be able to organize and plan daily work to insure efficient operations.

IV. Experimental Battery

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

V. Criterion

The criterion consisted of ratings expressed in broad categories. The operations manager of the company, who is familiar with the performance of all of the workers, prepared the ratings on June 19, 1962. Workers were assigned to five categories on the basis of their overall on-the-job performance during the six month period preceding the date of the ratings. Eleven individuals were assigned to category A, 11 to category B, 10 to category C, 10 to category D and 8 to category E. Numerical values based upon the mean of the segment of the normal distribution occupied by each group were obtained for each of the categories. This resulted in a final criterion score of 63 for all workers in category A, 54 for all workers in category B, 49 for all workers in category C, 43 for all workers in category D, and 35 for all workers in category E.

VI Qualitative and Quantitative Analyses

A. Qualitative Analysis

On the basis of the job analysis data, the following aptitudes were rated "important" for success in this occupation:

Intelligence (G) - required to acquire a thorough knowledge of company and governmental regualtions, equipment, routes, and characteristics of various petroleum products. Also required to organize and plan daily work and to direct and supervise others.

Verbal Aptitude (V) - required to read and understand reports, laws, and regulations and to effectively communicate with customers and drivers.

Numerical Aptitude (N) - required to compute truck capacities for various petroleum products, estimate delivery time, compute delivery charges, and to read, interpret and use mathematical formulas to compile and analyze statistical data.

Clerical Perception (Q) - required to write telephone orders, prepare and check reports, post statistical data and maintain manuals and files.

On the basis of the job analysis data, Aptitudes S-Spatial Aptitude, P-Form Perception and K-Motor Coordination were rated "irrelevant" for success in this occupation.

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	121.2	10.8	.615**
V-Verbal Aptitude	114.7	11.7	.678**
N-Numerical Aptitude	121.1	12.2	.474**
S-Spatial Aptitude	112.8	17.7	.166
P-Form Perception	109.0	17.7	.287*
Q-Clerical Perception	114.4	15.2	.504**
K-Motor Coordination	110.2	19.4	.328*
F-Finger Dexterity	97.6	20.0	.093
M-Manual Dexterity	104.4	25.2	.156

**Significant at the .01 level.
*Significant at the .05 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		X		
Relatively High Mean	X	X	X			X			
Relatively Low Sigma	X	X	X						
Significant Correlation with Criterion	X	X	X		X	X	X		
Aptitudes to be Considered for Trial Norms	G	V	N			Q			

Trial norms consisting of various combinations of Aptitudes G,V,N and Q 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 G-115, V-100 and N-100 had the best selective efficiency.

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 36 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 G, V and N with critical scores of 115, 100 and 100, respectively, and the dichotomized criterion for Dispatcher, Petroleum Transport 1-18.61 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 Dispatcher, Petroleum Transport 1-18.61 (G-115, V-100, N-100)

N = 50	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	3	29	32
Poor Workers	13	5	18
Total	16	34	50

Phi Coefficient = .65

$\chi^2 = 20.930$

$P/2 < .0005$

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 G, V and N with minimum scores of 115, 100 and 100, respectively, have been established as B-1002 norms for Dispatcher, Petroleum Transport 1-18.61 The equivalent B-1001 norms consist of G-120, V-100 and N-105.

IX. Determination of Occupational Aptitude Pattern

The data for this study met the requirements for incorporating the occupation studied into OAP-3 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962.