DOCUMENT RESUME

ED 065 581 TM 001 768

TITLE	Cold Saw Operator (iron & steel) 6-88.651; Cold Sizing Mill Operator (iron & steel) 4-88.315; Decambering Mill Operator (iron & steel) 6-88.346; Flying Cut-Off Machine Operator (iron & steel) 6-88.655; Rotary Straightener Operator (iron & steel) 6-88.346; Straightener Machine Operator (iron & steel) 6-88.354; Tube Straightener Operator (iron & steel) 6-88.346; Welder (iron & steel) 4-88.343; Welder, Assistant (iron & steel) 4-88.344--Technical
INSTITUTION	Manpower Administration (DOL), Washington, D.C. U.S. Training and Employment Service.
REPORT NO	S-257
PUB DATE	May 63
NOTE	9p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; *Cutting Scores; Evaluation Criteria; Job Applicants; *Job Skills; Metal Working Occupations; Norms; Occupational Guidance; *Personnel Evaluation; Skilled Workers; *Steel Industry; Test Reliability; Test Validity; *Welders
IDENTIFIERS	Cold Saw Operator; Cold Sizing Mill Operator; Decambering Mill Operator; Flying Cutoff Machine Operator; GATB; *General Aptitude Test Battery; Rotary Straightener; Straightener Machine; Tube Straightener Operator

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

COLD SAW OPERATOR (iron and steel) 6-88.651
COLD SIZING MILL OPERATOR (iron and steel) 4-88.315
DECAMBERING MILL OPERATOR (iron and steel) 6-88.346
FLYING CUT-OFF MACHINE OPERATOR (iron and steel) 6-88.655
ROTARY STRAIGHTENER OPERATOR (iron and steel) 6-88.346
STRAIGHTENER MACHINE OPERATOR (iron and steel) 6-88.354
TUBE STRAIGHTENER OPERATOR (iron and steel) 6-88.346
WELDER (iron and steel) 4-88.343
WELDER, ASSISTANT (iron and steel) 4-88.344

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

May 1963

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

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WELDER (iron and steel) 4-88.343
WELDER, ASSISTANT (iron and steel) 4-88.344

B-534

Summary

The General Aptitude Test Battery, B-1001, was administered to a final sample of 54 applicants who were later employed in various pipe and tube making occupations at the Lone Star Steel Company, Longview, Texas. 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 S-Spatial Aptitude, P-Form Perception and F-Finger Dexterity were selected for inclusion in the final test norms.

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
S	CB-1-F CB-1-H	80	S	Part 3	75
P	CB-1-A CB-1-L	70	P	Part 5 Part 7	70
F	CB-1-O CB-1-P	80	F	Part 11 Part 12	75

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, 97 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 3 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 occupations of Cold Saw Operator 6-88.651, Cold Sizing Mill Operator 4-88.315, Decambering Mill Operator 6-88.346, Flying Cut-Off Machine Operator 6-88.655, Rotary Straightener Operator 6-88.346, Straightener Machine Operator 6-88.354, Tube Straightener Operator 6-88.346, Welder 4-88.343 and Welder, Assistant 4-88.344.

II. Sample

The General Aptitude Test Battery, B-1001, was administered during the period 1953-1959 to a sample of 54 applicants subsequently employed in various pipe and tube making occupations at the Lone Star Steel Company, Longview, Texas. The only procedure used in selection of individuals for employment was a standard interview. All workers in the sample had at least 12 months experience and are considered experienced workers.

TABLE I

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

N = 54	M	σ	Range	r
Age (years)	37.4	8.8	21-56	-.106
Education (years)	10.8	2.3	7-16	-.105
Experience (months)	49.0	23.2	12-72	.175

III. Job Description

Job Title: Cold Saw Operator (iron and steel) 6-88.651
Cold Sizing Mill Operator (iron and steel) 4-88.315
Decambering Mill Operator (iron and steel) 6-88.346
Flying Cut-Off Machine Operator (iron and steel) 6-88.655
Rotary Straightener Operator (iron and steel) 6-88.346
Straightener Machine Operator (iron and steel) 6-88.354
Tube Straightener Operator (iron and steel) 6-88.346
Welder (iron and steel) 4-88.343
Welder, Assistant (iron and steel) 4-88.344

Cold Saw Operator
Job Summary.--Operates a Kling rotary saw to cut rejected electric welded steel pipe into suitable lengths for recharging into furnace, using hydraulic lever and button controls.

Cold Sizing Mill Operator
Job Summary.--Operates conveyors, sprocket chains and pick-up arms by pressing control buttons mounted on control panels to move pipe across and between three cooling tables, through the cold sizer to roll pipe to proper size and to the straightener conveyor and sets up changes to specified size, and adjusts rolls in cold sizer, using wrenches, hand wheels and micrometers.

Decambering Mill Operator
Job Summary.--Sets up and operates a pipe straightening machine and controls movement of pipe from flying cut-off machine to normalizing furnace.

Flying Cut-Off Machine Operator
Job Summary.--Sets up and operates an automatic traveling pipe cutting machine to cut electric welded pipe to specified lengths, a decambering machine to straighten pipe for the normalizing furnace and three transfer tables and conveyors to the furnace conveyor, using panel mounted push button controls, helps change knives and rolls and records production by heat number, delays and reasons.

Rotary Straightener Operator
Job Summary.--Sets up, adjusts and operates a rotary pipe straightener to straighten electric welded steel pipe, flushes cut pipe with water blast and transfers pipe along conveyor and picks up pipe onto inspection table.

Straightener, Machine Operator
Job Summary.--Sets up and adjusts pipe straightener rolls to straighten 7" to 16" electric welded steel pipe after normalizing, cooling and sizing operations.

Tube Straightener Operator
Job Summary.--Sets up, adjusts and operates a series of rollers straightening electric welded stretched steel tubing, and moves pipe from lay-down table through straightener onto the mill inspection table, using push button on a control panel to actuate kick-off arms, conveyor, bumper stops and pick-up arms.

Welder
Job Summary.--Sets up, adjusts and operates pipe forming rolls and a rotator electric welding machine to form 2" to 7" steel pipe from pre-cut skelp and weld pipe seam and directs and assists other machine operators in setting-up and adjusting machines.

Welder, Assistant
Job Summary.--Sets, replaces and adjusts cutting tools to cut inside and outside flash from pipe weld, turns current on and off, adjusts voltage as directed by WELDER, trims rotary electrode to fit pipe and assists WELDER in changing or adjusting pipe forming rolls to form and weld 2" to 7" steel pipe.

IV. Experimental Battery

All the tests of the GATB, B-1001, were administered to the sample group.

V. Criterion

The criterion data were collected during the period May 1960 - July 1962 and consisted of supervisory broad category ratings made by the plant superintendent. The on-the-job performance of each individual in the sample was rated as being either "above average," "average," or "below average." The broad category ratings were converted to the following quantitative scores:

Rating	N	Quantitative Value
Above Average	17	61
Average	20	50
Below Average	17	39

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:

Form Perception (P) - required in examining welds, adjusting and operating pipe straightener, and in positioning pipe during operations.

Finger Dexterity (F) and Manual Dexterity (M) - required in pressing buttons for various operations, turning hand valves, and using hand wrenches and other tools.

On the basis of the job analysis data, V-Verbal Aptitude and Q-Clerical Perception 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- Corrected for Broad Categories (r) for the Aptitudes of the GATB; N = 54

Aptitudes	M	σ	r
G-Intelligence	90.2	18.1	.731**
V-Verbal Aptitude	84.0	15.7	.617**
N-Numerical Aptitude	91.1	16.9	.757**
S-Spatial Aptitude	95.7	19.7	.721**
P-Form Perception	90.7	21.4	.505**
Q-Clerical Perception	74.9	16.9	.653**
A-Aiming	82.4	22.4	.478**
T-Motor Speed	81.8	23.4	.554**
F-Finger Dexterity	91.6	18.8	.629**
M-Manual Dexterity	95.4	22.4	.581**

**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	A	T	F	M
Job Analysis Data										
Important					X				X	X
Irrelevant		X				X				
Relatively High Mean			X	X					X	X
Relatively Low Sigma										
Significant Correlation with Criterion	X	X	X	X	X	X	X	X	X	X
Aptitudes to be Considered for Trial Norms	G		N	S	P		A	T	F	M

Trial norms consisting of various combinations of Aptitudes G,N,S,P,A,T,F & 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-1001 norms consisting of S-80, P-70 and F-80. had the best selective efficiency (equivalent B-1002 norms are S-75, P-70 and F-75).

VII. Validity of Norms

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 B-1002 norms consisting of Aptitudes S, P and F with critical scores of 75, 70 and 75, respectively, and the dichotomized criterion for Cold Saw Operator 6-88.651, Cold Sizing Mill Operator 4-88.315, Decambering Mill Operator 6-88.346, Flying Cut-Off Machine Operator 6-88.655, Rotary Straightener Operator 6-88.346, Straightener Machine Operator 6-88.354, Tube Straightener Operator 6-88.346, Welder 4-88.343 and Welder, Assistant 4-88.344.

TABLE IV

Validity of Test Norms for Cold Saw Operator 6-88.651, Cold Sizing Mill Operator 4-88.315, Decambering Mill Operator 6-88.346, Flying Cut-Off Machine Operator 6-88.655, Rotary Straightener Operator 6-88.346, Straightener Machine Operator 6-88.354, Tube Straightener Operator 6-88.346, Welder 4-88.343 and Welder, Assistant 4-88.344

(S-75, P-70, F-75)

N = 54	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	3	34	37
Poor Workers	16	1	17
Total	19	35	54

Phi Coefficient = .84
X^2 = 37.741
P/2 .0005

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

VII. Conclusions

On the basis of the results of this study, Aptitudes S, P and F with minimum scores of 75, 70 and 75, respectively, have been established as B-1002 norms for Cold Saw Operator 6-88.651, Cold Sizing Mill Operator 4-88.315, Decambering Mill Operator 6-88.346, Flying Cut-Off Machine Operator 6-88.655, Rotary Straightener Operator 6-88.346, Straightener Machine Operator 6-88.354, Tube Straightener Operator 6-88.346, Welder 4-88.343 and Welder, Assistant 4-88.344. Equivalent B-1001 norms are S-80, P-70 and F-80.

Determination of Occupational Aptitude Pattern

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 35 OAP's included in Section II of the Guide to the Use of the General Aptitude Test Battery, January 1962. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.