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ABSTRACT

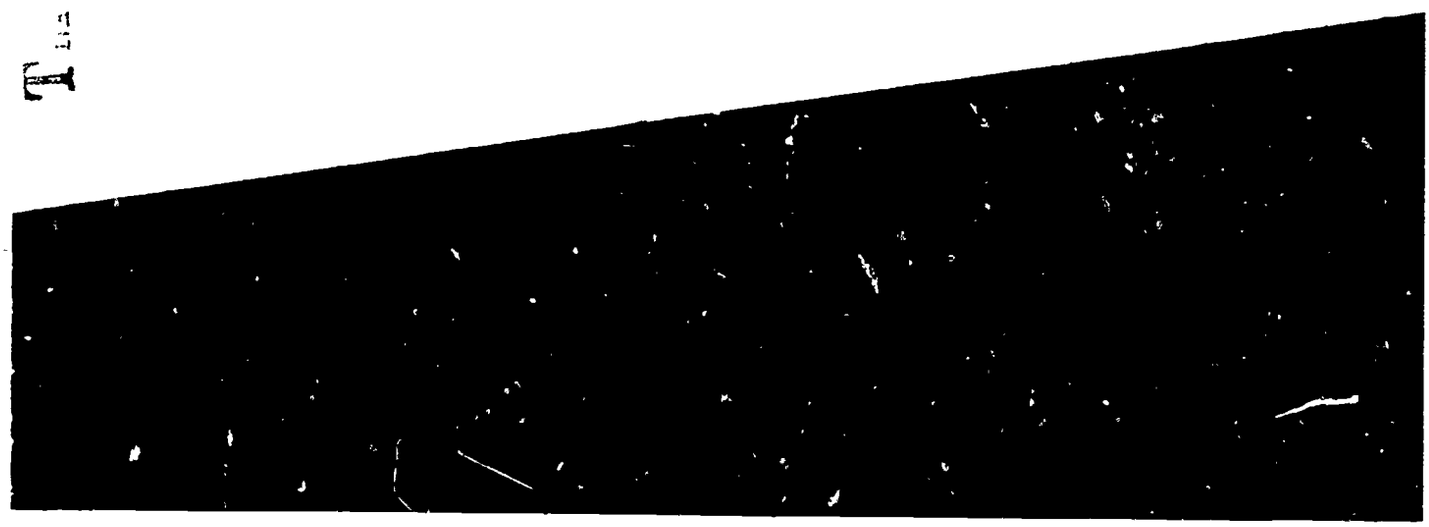
The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General 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 and a personnel evaluation form are also included. (AG)

S-346 United States Employment Service Technical Report August 1966

Development of USES Aptitude Test Battery for

Hand Sewer, Shoes

(boot & shoe) 788.884



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 .....

Hand Sewer, Shoes (boot and shoe) 783.884

S-346

U. S. Employment Service
in Cooperation with
Maine, Pennsylvania and Wisconsin State Employment Services

August 1966

GAT3 # 2550, 2553, 2600

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Hand Sewer, Shoes (boot and shoe) 788.884

S-346

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Hand Sewer, Shoes (boot and shoe) 788.884. The following norms were established:

GATB Aptitude	Minimum Acceptable GATB, B-1002 Scores
S - Spatial Aptitude	80
F - Finger Dexterity	75
M - Manual Dexterity	90

RESEARCH SUMMARY - VALIDATION SAMPLE

Sample:
64 male Moccasin Hand Sewer trainees enrolled in a five week training program under MDTA in Maine.

Criterion:
Supervisory ratings

Design:
Longitudinal (test data were collected after one to two weeks training and criterion data were collected at the end of the five week program).

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

Predictive Validity:
Phi Coefficient = .52 ($P/2 < .0005$)

Effectiveness of Norms:
Only 70% of the non-test-selected trainees used for this study were good trainees; if the trainees had been test-selected with the above norms, 86% would have been good trainees. 30% of the non-test-selected trainees used for this study were poor trainees; if the trainees had been test-selected with the above norms, only 14% would have been poor trainees. The effectiveness of the norms is shown graphically in Table 1:

TABLE 1

Effectiveness of Norms

	Without Tests	With Tests
Good Trainees	70%	86%
Poor Trainees	30%	14%

VALIDATION SAMPLE DESCRIPTION

Size: N = 64

Occupational Status: MDTA trainees

Work Setting: Trainees were enrolled in a five-week training program under the Manpower Development and Training Act.

Selection Requirements:

Education: No requirement

Previous Experience: No requirement

Tests: None

Other: Interest and related past experience

Principal Activities: The job duties for each worker are those shown in the job description in the Appendix.

Minimum Experience: All trainees had completed one to two weeks of training before they were tested.

TABLE 2

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

	Mean	SD	Range	r
Age (years)	30.5	13.3	16-60	.117
Education (years)	9.0	2.0	6-14	.040

EXPERIMENTAL TEST BATTERY

All twelve tests of the GATB, B-1002 were administered to the validation sample during the period July 1963 through June 1964.

CRITERION

The criterion data consisted of instructors' ratings of job proficiency made at the end of the training program.

Rating Scale: An adaptation of USES Form SP-21, Descriptive Rating Scale (see Appendix). The scale contained eight items covering different aspects of job performance with five alternatives for each item.

Reliability: No measure of criterion reliability was obtained but the usual rate-reliability for this scale is about .90.

Criterion Score Distribution:

Possible Range:	9-45
Actual Range:	12-33
Mean:	23.0
Standard Deviation:	5.0

Criterion Dichotomy: The criterion distribution was dichotomized into high and low groups by placing 30% of the sample in the low group to correspond with the percentage of trainees 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 21.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data.

TABLE 3

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

Aptitude	Rationale
P - Form Perception	Required to visualize setup of shoe and perceive detail in order to accurately sew around vamp and tip of shoe.
K - Motor Coordination	Required to coordinate eye and hand movements in sewing accurately and rapidly; required to punch holes with awl at angle and distance to make even stitches.
F - Finger Dexterity	Required to manipulate needles and tools and to execute a variety of stitches.
M - Manual Dexterity	Required to use hand tools in shaping and skiving of leather in making moccasins.

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	
G - General Learning Ability	90.1	16.3	48-143	.246*
V - Verbal Aptitude	86.7	13.9	61-129	.078
N - Numerical Aptitude	86.4	18.8	36-123	.197
S - Spatial Aptitude	100.0	19.0	58-156	.352**
P - Form Perception	94.7	18.7	34-140	.148
Q - Clerical Perception	93.1	13.5	57-129	.198
K - Motor Coordination	95.4	18.6	41-136	.189
F - Finger Dexterity	98.5	25.1	37-154	.363**
M - Manual Dexterity	113.8	25.3	69-164	.329**

*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
Relatively Low Standard Dev.		X				X			
Significant Correlation with Criterion	X			X				X	X
Aptitudes to be Considered for Trial Norms	G			S				F	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, F and M at trial cutting scores were able to differentiate between the 70% of the sample considered good workers and 30% 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 one-third of the sample with three-aptitude norms. For two aptitude norms, minimum cutting scores of slightly higher than one standard deviation below the mean will eliminate about one third of the sample; for four

aptitude trial norms, cutting scores of slightly lower than one standard deviation below the mean will eliminate about one-third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of S-80, F-75, and M-90 provided the highest degree of differentiation for the occupation of Hand Sewer, Shoes (boot and shoe) .788.884. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .52 (statistically significant at the .0005 level).

TABLE 6

Predictive Validity of Test Norms, S-80, F-75, and M-90

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Trainees	7	38	45
Poor Trainees	13	6	19
Total	20	44	64

Phi Coefficient (ϕ) = .52
Chi Square (X^2) = 17.37
Significance Level = P/2 < .0005

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.

S-346 GATB Study #2553

Hand Sewer, Shoes (boot and shoe) 788.884

Check Study #1 Research Summary

Sample:
39 on-the-job trainees (14 male and 25 female) employed at the Keystone State Shoe Company in Mildred, Pennsylvania.

TABLE 7

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with Criterion (r) for Age and Education-Cross-Validation Sample #1.

	Mean	SD	Range	r
Age (years)	24.4	7.2	16-43	.020
Education (years)	10.4	1.7	7-14	.016

Criterion:
Supervisory ratings

Design:
Longitudinal (test data were collected at the beginning of training and criterion data was collected after completion of training).

Principal Activities:
The job duties for each worker are those shown in the job description in the Appendix.

Predictive Validity:
Phi Coefficient = .33 ($P/2 < .025$)

Effectiveness of Norms:
Only 62% of the non-test-selected trainees in this sample were good trainees; if they had been test-selected with the S-346 norms, 76% would have been good trainees. 38% of the non-test-selected trainees used for this study were poor trainees; if they had been test-selected with the S-346 norms, only 24% would have been poor trainees. The effectiveness of the norms when applied to this independent sample is shown graphically in table 8.

TABLE 8

Effectiveness of B-626 Norms of Check Study #1

	Without Test	With Test
Good Trainees	62%	76%
Poor Trainees	38%	24%

Check Study Sample #1 (Pennsylvania)

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 39

Aptitude	Mean	SD	Range	r
G - General Learning Ability	95.2	15.1	68-128	.224
V - Verbal Aptitude	95.6	12.8	70-125	.071
N - Numerical Aptitude	97.7	16.2	72-135	.366*
S - Spatial Aptitude	94.0	17.0	61-130	.187
P - Form Perception	102.5	16.6	70-149	.132
Q - Clerical Perception	102.2	14.7	67-135	.247
K - Motor Coordination	101.8	17.3	68-132	-.008
F - Finger Dexterity	101.2	20.5	63-141	.250
M - Manual Dexterity	102.4	19.3	65-153	.416**

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

Predictive Validity of Test Norms
(S-80, F-75, M-90)
Check Study Sample #1 (Pennsylvania)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Trainees	8	16	24
Poor Trainees	10	5	15
Total	18	21	39

Phi Coefficient (ϕ) = .33

Chi Square (X^2) = 4.134

Significance Level = P/2 $<$.025

S-346 GATB Study #2600

Hand Sewer, Shoes (boot and shoe) 788.884

Check Study #2 Research Summary

Sample:
53 MDTA trainees (41 female and 12 male) employed in Wisconsin.

TABLE 9

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)	24.5	8.9	18-49	.208
Education (years)	11.3	1.4	8-13	-.122
Experience (months)	4.8	1.4	1-7	.430**

**Significant at the .01 level

Criterion:
Supervisory ratings

Design:
Longitudinal (tests were administered at the beginning of the training period; criterion after completion).

Principal Activities:
The job for which all trainees received training is comparable to that described in the job description in the Appendix.

Predictive Validity:
Phi Coefficient = .37 ($P/2 < .005$)

Effectiveness of Norms:
Only 60% of the non-test-selected trainees used for this study were good workers; if the trainees had been test-selected with the S-346 norms, 75% would have been good workers. 40% of the non-test-selected trainees used for this study were poor workers; if the trainees had been test-selected with the S-346 norms, only 25% would have been poor workers. The effectiveness of the norms is shown graphically in Table 10.

TABLE 10

Effectiveness of Norms

	Without Tests	With Tests
Good Trainees	60%	75%
Poor Trainees	40%	25%

Check Study Sample #2 (Wisconsin)

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 53

Aptitude	Mean	SD	Range	r
G - General Learning Ability	97.7	15.7	62-134	.203
V - Verbal Aptitude	95.5	14.8	68-135	.084
N - Numerical Aptitude	98.0	15.7	61-127	.130
S - Spatial Aptitude	102.6	16.2	68-133	.151
P - Form Perception	112.9	18.1	79-148	-.049
Q - Clerical Perception	111.8	15.6	71-165	.040
K - Motor Coordination	104.2	18.3	68-155	.219
F - Finger Dexterity	99.6	19.2	31-127	.129
M - Manual Dexterity	104.6	19.0	69-159	.448**

**Significant at the .01 level

Predictive Validity of Test Norms
(S-80, F-75, M-90)
Check Study Sample #2 (Wisconsin)

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Trainees	8	24	32
Poor Trainees	13	8	21
Total	21	32	53

Phi Coefficient (ϕ) = .37

Chi Square (X^2) = 7.213

Significance Level = $P/2 < .005$

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

Course Outline
Validation Sample

A - Familiarization with use of tools. Safety habits and [illegible]ent prevention measures. Sewing of straps will accomplish this.	40 hrs.
B - Introduction to set up of shoe and sewing around vamp and tip of shoe, with emphasis upon correct procedure and accurate work. Skiving procedure will be demonstrated and practice time allowed.	40 hrs.
C - Final step in complete sewing of the shoe and continued practice, first emphasizing accuracy and quality of work, and then developing speed.	40 hrs.
D - Continued practice in complete sewing of the shoe, utilizing quality leather-actual production type leather.	40 hrs.
E - A variety of stitches will be practiced by trainees using production type leather, and continued practice in sewing.	40 hrs.
Total training time	200 hrs.

On the Job Training Outline
Check Study #2

A - Orientation and indoctrination 1. Characteristics and properties of leather and thread 2. Demonstration and explanation of overall production operations	5 hrs.
B - Soaks leather parts (vamp and plug)	5 hrs.
C - Assembly and fitting 1. Assembles vamp and plug on last to produce uniform punching around edge of shoe 2. Attaches leather parts to last using hammer, tacks, and lasting pincer.	50 hrs.
D - Hand Sewing 1. Prepares needle and thread for hand sewing 2. Pierces holes in top with awl 3. Stitches plug to vamp 4. Sets stitches by knotting and pulling threads to proper tension.	65 hrs.
E - Shaping 1. Shapes seams by clamping with pincers 2. Pounds out wrinkles and marks with hammer	10 hrs.
F - Finishing 1. Applies rubbing stick to rub out marks and gives seam a sharp finish.	5 hrs.
G - Set up work	20 hrs.
Total training time	160 hrs.

RATING TRAINEES

DESCRIPTIVE RATING SCALE

(For Aptitude Test Development Studies)

Score _____

RATING SCALE FOR _____
(DOT Title and Code for Training Course)

Directions: Please read "RATING TRAINEES - SUGGESTIONS TO RATERS" and then complete this rating scale. In making your ratings, only one box should be checked for each question.

Name of trainee (print) _____
(Last) (First)

Sex: Male _____ Female _____

A. How much aptitude or facility does he have for the vocational training? (Trainee's adeptness or knack for performing the work easily and well.)

☐ 1. Has great difficulty doing the work. Not at all suited for the training.

☐ 2. Usually has some difficulty doing the work. Not too well suited for the training.

☐ 3. Does the work without too much difficulty. Fairly well suited for the training.

☐ 4. Usually does the work without difficulty. Well suited for the training.

☐ 5. Does the work with great ease. Exceptionally well suited for the training.

B. How much ability does he have for maintaining adequate production in the vocational activity for which he was trained?

☐ 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.

C. How good was the quality of his work during the vocational training?

☐ 1. Performance was inferior and almost never met minimum quality standards.

☐ 2. Performance was usually acceptable but somewhat inferior in quality. The grade of his work could stand improvement.

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

☐ 4. Performance was usually superior in quality.

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

D. How quickly did he learn the instructional units of the vocational training?

- ☐ 1. Learned the work very slowly. Needed careful and repeated instructions.
- ☐ 2. Learned the work somewhat slower than most.
- ☐ 3. Learned most of the work in the usual amount of time.
- ☐ 4. Learned most of the work quickly.
- ☐ 5. Learned all of the work very rapidly. Needed only the minimum amount of training or instructions for even the difficult aspects.

E. How much ability does he have for using the equipment of the vocational training?

- ☐ 1. Has very limited ability. Cannot use the equipment adequately.
- ☐ 2. Has little ability. Can use the equipment to "get by."
- ☐ 3. Has a moderate amount of ability. Can use the equipment to do fair work.
- ☐ 4. Has high ability. Can use the equipment to do good work.
- ☐ 5. Has very high ability. Can use the equipment to do excellent work.

F. How large a variety of job duties can he perform efficiently?

- ☐ 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 unusuallly large variety of different operations efficiently.

G. How resourceful is he in coping with work situations that are different or out of the ordinary?

- ☐ 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. Considering all the factors already rated, and only these factors, how acceptable was his performance during vocational training?

- ☐ 1. Performance was unsatisfactory.
- ☐ 2. Performance was not completely satisfactory.
- ☐ 3. Performance was satisfactory.
- ☐ 4. Performance was good.
- ☐ 5. Performance was outstanding.

S-346 August 1966

FACT SHEET

Job Title: Hand Sewer, Shoes (boot and shoe) 788.884

Job Summary: Hand stitches the plug to the vamp with waxed dacron or nylon thread and smooths the seam with a rubbing stick.

Work Performed: Prepares to sew: Opens plastic bag and removes parts for the number of shoes to be prepared at one time. Takes thread one strand at a time from hank on bench, grasps the thread with the left hand about six inches from the end, picks up a piece of hand-sewing wax from the bench, and pulls the tapered end of the thread through, between wax and thumb six or seven times until there is sufficient wax on end of thread. Picks up trimming knife, snips off the very tip of the thread, inserts tip through eye of needle and pulls needle down only until it starts to tighten. Grasps thread with left hand about three inches below eye of needle while holding needle with right hand. Holds thread very tightly with thumb and forefinger of left hand and turns needle with right thumb and forefinger toward body about five times so that a corkscrew-like twist is given the thread, taking care that twisting occurs only between the point held by the fingers. With left thumb and forefinger grasps the thread protruding through the eye of needle and bends this end down into the twists just made in main body of the thread, grasps needle with left thumb and forefinger at eye of needle, with right thumb and forefinger grasps needle tightly and twists away from body and pulls slightly at same time so as to twist thread only between left thumb and right thumb, being sure the rest of thread does not turn. Repeats with other end of thread and hangs on hook for use along with whatever number of threaded needles he desires to prepare at one time.

Sets up shoes: Takes lasts, a pair at a time, from rack on which floor boy delivers both lasts and a plastic bag of vamps and plugs and sets the last into the vamp of one shoe. Tacks shoe back, at proper height, to the last by tacking through the back stay. Pulls front center of vamp up over last with pincers, using judgment as to how hard to pull since each hand sewer uses a slightly different technique, and tacks in place. Pulls up sides of vamp on either side and tacks about one and one-fourth inches from tack in toe to hold leather for band sewing. Pulls up vamp at collar edge on either the outside or inside of the shoe, depending on where the stitching is to end, and tacks in position so that the leather of the vamp will touch the leather of the plug when it is inserted. Takes one plug and inserts it in opening so that the bevel of the plug extends over the vamp leather at toe. Taking care that the plug is straight, drives a tack through the leather and into the last about one inch back from tip, close to edge of bevel. Centers rear of plug with the cone of the last and tacks again on opposite side of shoe from the starting side. Clamps shoe in jack attached to the work bench with a twisting motion so that

the shoe is firmly held but may be swung to different angles. This attachment is known as a hand-sewn moccasin jack. Turns moccasin so that the toe points toward the worker's mid-section.

Hand-sews: Picks up from bench a moccasin hand-sewing awl, sharpened by hand with a flat file kept on the work bench, and keeps this awl in the right hand at all times when sewing. Punches holes through the vamp and plug with one motion, judging how far down from the edge and at what angle to insert the awl so that the seam will run neatly along the base of the 45 degree level on the plug and at an even level on the vamp. Punches holes so that the distance will be greater on the vamp than on the plug, since the vamp leather is "gathered" when stitches are pulled tight. Punches holes so that the right number of stitches per inch are produced and that they are of uniform size, using care since there are no markings to follow for hole locations, except the base of the bevel. Stitches by punching a hole through both layers of leather with the awl held in the right hand, inserting a needle with the right hand and away from the operator and the needle in the left hand along side the first needle and while needles are side by side, lays thread of right needle over left needle towards the operator and thread of left needle over right needle, pulls needle through, wraps threads around hands and pulls to set stitch. Pulls thread wrapped around left hand a bit harder and with a "snap" to gather the leather of the vamp, thus bringing the vamp up tightly against the last and forming a smooth hand-sewn moccasin. Continues sewing around the toe to end of seam. Pulls tacks when encountered, with either tack puller or thumb and awl. Takes and then locks two back stitches by wrapping the thread around the needle and pulling into the holes punched by the awl. Cuts thread with knife at last back stitch and lays needle on bench or sticks in wax to be rethreaded later.

Rubs seam: Rubs tapered end of rub stick along seam to straighten and rubs grooved end over top of thread on the vamp and the plug to lay stitches and make a slight impression along the lower edge of the seam.

Unloads jack: Twists shoe to remove from jack and lays on rack. Continues sequence until rack of shoes is completed and removed to drying room by floor boy.

(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.)

S-346 August 1966

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Job Title: Hand Sewer, Shoes (boot and shoe) 788.884

Job Summary: Hand stitches the plug to the vamp with waxed dacron or nylon thread and smooths the seam with a rubbing stick.

Work Performed: Prepares to sew: Opens plastic bag and removes parts for the number of shoes to be prepared at one time. Takes thread one strand at a time from hank on bench, grasps the thread with the left hand about six inches from the end, picks up a piece of hand-sewing wax from the bench, and pulls the tapered end of the thread through, between wax and thumb six or seven times until there is sufficient wax on end of thread. Picks up trimming knife, snips off the very tip of the thread, inserts tip through eye of needle and pulls needle down only until it starts to tighten. Grasps thread with left hand about three inches below eye of needle while holding needle with right hand. Holds thread very tightly with thumb and forefinger of left hand and turns needle with right thumb and forefinger toward body about five times so that a corkscrew-like twist is given the thread, taking care that twisting occurs only between the point held by the fingers. With left thumb and forefinger grasps the thread protruding through the eye of needle and bends this end down into the twists just made in main body of the thread, grasps needle with left thumb and forefinger at eye of needle, with right thumb and forefinger grasps needle tightly and twists away from body and pulls slightly at same time so as to twist thread only between left thumb and right thumb, being sure the rest of thread does not turn. Repeats with other end of thread and hangs on hook for use along with whatever number of threaded needles he desires to prepare at one time.

Sets up shoes: Takes lasts, a pair at a time, from rack on which floor boy delivers both lasts and a plastic bag of vamps and plugs and sets the last into the vamp of one shoe. Tacks shoe back, at proper height, to the last by tacking through the back stay. Pulls front center of vamp up over last with pincers, using judgment as to how hard to pull since each hand sewer uses a slightly different technique, and tacks in place. Pulls up sides of vamp on either side and tacks about one and one-fourth inches from tack in toe to hold leather for band sewing. Pulls up vamp at collar edge on either the outside or inside of the shoe, depending on where the stitching is to end, and tacks in position so that the leather of the vamp will touch the leather of the plug when it is inserted. Takes one plug and inserts it in opening so that the bevel of the plug extends over the vamp leather at toe. Taking care that the plug is straight, drives a tack through the leather and into the last about one inch back from tip, close to edge of bevel. Centers rear of plug with the cone of the last and tacks again on opposite side of shoe from the starting side. Clamps shoe in jack attached to the work bench with a twisting motion so that

the shoe is firmly held but may be swung to different angles. This attachment is known as a hand-sewn moccasin jack. Turns moccasin so that the toe points toward the worker's mid-section.

Hand-sews: Picks up from bench a moccasin hand-sewing awl, sharpened by hand with a flat file kept on the work bench, and keeps this awl in the right hand at all times when sewing. Punches holes through the vamp and plug with one motion, judging how far down from the edge and at what angle to insert the awl so that the seam will run neatly along the base of the 45 degree level on the plug and at an even level on the vamp. Punches holes so that the distance will be greater on the vamp than on the plug, since the vamp leather is "gathered" when stitches are pulled tight. Punches holes so that the right number of stitches per inch are produced and that they are of uniform size, using care since there are no markings to follow for hole locations, except the base of the bevel. Stitches by punching a hole through both layers of leather with the awl held in the right hand, inserting a needle with the right hand and away from the operator and the needle in the left hand along side the first needle and while needles are side by side, lays thread of right needle over left needle towards the operator and thread of left needle over right needle, pulls needle through, wraps threads around hands and pulls to set stitch. Pulls thread wrapped around left hand a bit harder and with a "snap" to gather the leather of the vamp, thus bringing the vamp up tightly against the last and forming a smooth hand-sewn moccasin. Continues sewing around the toe to end of seam. Pulls tacks when encountered, with either tack puller or thumb and awl. Takes and then locks two back stitches by wrapping the thread around the needle and pulling into the holes punched by the awl. Cuts thread with knife at last back stitch and lays needle on bench or sticks in wax to be rethreaded later.

Rubs seam: Rubs tapered end of rub stick along seam to straighten and rubs grooved end over top of thread on the vamp and the plug to lay stitches and make a slight impression along the lower edge of the seam.

Unloads jack: Twists shoe to remove from jack and lays on rack. Continues sequence until rack of shoes is completed and removed to drying room by floor boy.

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