WORK SAMPLE MANUAL FORMAT
March, 1977

STOUT VOCATIONAL REHABILITATION INSTITUTE
School of Education ° University of Wisconsin – Stout ° Menomonie, Wisconsin 54751

The greatest number of requests received by the Information Service of the Materials Development Center has been for materials on work samples. The MDC Work Sample Manual clearinghouse was created to meet this growing need. Its purpose is to collect, review, and nationally disseminate work sample manuals. The goal of the clearinghouse is to provide a wide selection of work sample manuals which contain sufficient standardized information so that the users of these work samples will be able to construct, administer, and interpret the work samples which they select. In order to facilitate this idea, in 1974 the MDC published Suggested Format and Content of Work Sample Manual. This format defined and standardized the contents of work sample manuals so that manuals could be developed which contained all the necessary information needed for the construction and use of work samples. Standardization and entry of work sample manuals into the Work Sample Manual Clearinghouse has reduced the duplication of effort in work sample development.

This revision of Suggested Format and Content of Work Sample Manual is an effort to refine the elements of the format by including more detailed information on and examples of each of the elements. Detailed information and examples have been drawn from feedback received as a result of the widespread use of the original format.

This manual writing format has been developed to help you write your own work sample manuals. Examples have been included to aid you in developing work sample manuals that will be sufficiently standardized and useable by others. Regardless of the type of work sample being developed, it should be written in a short, simple, self-explanatory manner. The TABLE OF CONTENTS in this manual, starting with Section heading I, INTRODUCTION, should be used “as is” in every work sample written for the MDC Work Sample Manual Clearinghouse. The section headings in the TABLE OF CONTENTS are to be listed in the body of the work sample manual to identify content. If information is not available in a particular section, that heading should still be listed and the statement, “No information presently available” entered after the heading. For example:

E. Validity – No information presently available.

The corresponding heading in the TABLE OF CONTENTS should be followed by an asterisk (*) to denote the missing information. Using the same example:

E. Validity*

The use of asterisks will identify for the reader the specific information not included in the work sample manual. Thus, the TABLE OF CONTENTS may be used as a manual writing format in which required information, whether available or not, will be recognized.
The manual writing format contains examples drawn from several work samples currently in the Work Sample manual Clearinghouse. The examples used to illustrate the various sections were chosen as good representations of how the sections should be prepared. Each work sample developer should select the appropriate manner in which to present their material. It is not the intent of this document to limit creativity or dictate style. It is hoped that this format will encourage innovation of new ideas and successful techniques so that they may have widespread use. The main purpose of this format is to help you to help others use your work samples successfully, eliminating a duplication of effort and allowing them to spend more time working with clients. Many excellent work samples exist for which suggested content information is not available. If this is the case, the MDC still encourages the submission of the work sample manual. Hopefully, others will be able to supply information which was omitted by the originator of the work sample manual.

After you have completed your work sample manual, forward a copy of it to:

Work Sample Manual Clearinghouse  
Materials Development Center  
University of Wisconsin – Stout  
Menomonie, Wisconsin 54751

Your manual will be evaluated in terms of increasing the variety, quality, and utility of work sample manuals in the clearinghouse. If accepted, a final release form and a copy of your manual with any recommended changes will be returned to you for approval. After the signed release form is returned to the Work Sample Manual Clearinghouse, your manual will be entered into the Clearinghouse, giving full credit to the developer and developing facility. The next edition of the Work Sample Manual Clearinghouse Catalogue will carry the name of a brief description of the work sample.

The Work Sample Manual Clearinghouse Catalogue will be continually updated and mailed to evaluation facilities to keep them informed about available work sample manuals. An eligible facility may request work sample manuals from the catalogue on a five-day free loan basis. Non-eligible facilities may loan copies of the work sample manuals for five days by paying a $3.00 rental car for each manual. Permission is granted to make copies of any work sample manual in the Clearinghouse. When your request a work sample manual, MDC asks that in the interest of professionalism, you reciprocate by sending back another manual developed in this format. This is not mandatory. However, if we are to render a professional service by increasing the number and variety of available manuals in the Clearinghouse, contributions of new work sample manuals to MDC are essential. The MDC invites work sample developers to submit comments and suggestions so that the format and content manual may be further improved to more effectively meet the goals set for the Clearinghouse.

The Materials Development Center is supported in part by a Research and Demonstration Grant (12-P-55307/5) from the Rehabilitation Services Administration, Department of Health, Education, and Welfare, Washington, D.C.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>A. Title</td>
<td></td>
</tr>
<tr>
<td>B. Assessment Description</td>
<td></td>
</tr>
<tr>
<td>C. Job Listing</td>
<td></td>
</tr>
<tr>
<td>D. Related Jobs</td>
<td></td>
</tr>
<tr>
<td>E. Validity</td>
<td></td>
</tr>
<tr>
<td>II. INSTRUCTIONS TO THE EVALUATOR</td>
<td>4</td>
</tr>
<tr>
<td>A. Prerequisites</td>
<td></td>
</tr>
<tr>
<td>B. Work Sample Conditions</td>
<td></td>
</tr>
<tr>
<td>C. Administration Equipment</td>
<td></td>
</tr>
<tr>
<td>D. Setup and Breakdown</td>
<td></td>
</tr>
<tr>
<td>III. ADMINISTRATION</td>
<td>8</td>
</tr>
<tr>
<td>A. Client Orientation</td>
<td></td>
</tr>
<tr>
<td>B. Practice Session</td>
<td></td>
</tr>
<tr>
<td>C. Performance Session</td>
<td></td>
</tr>
<tr>
<td>IV. SCORING</td>
<td>17</td>
</tr>
<tr>
<td>A. Criteria</td>
<td></td>
</tr>
<tr>
<td>B. Tables</td>
<td></td>
</tr>
<tr>
<td>C. Forms</td>
<td></td>
</tr>
<tr>
<td>V. INSIGHTS</td>
<td>19</td>
</tr>
<tr>
<td>VI. DEVELOPMENTAL Date</td>
<td>22</td>
</tr>
<tr>
<td>A. Description of Analysis</td>
<td></td>
</tr>
<tr>
<td>B. Norming Method</td>
<td></td>
</tr>
<tr>
<td>C. Reliability</td>
<td></td>
</tr>
<tr>
<td>VII. CONSTRUCTION</td>
<td>26</td>
</tr>
<tr>
<td>A. Diagrams and/or Photographs</td>
<td></td>
</tr>
<tr>
<td>B. Materials List</td>
<td></td>
</tr>
<tr>
<td>C. Assembly Instructions</td>
<td></td>
</tr>
<tr>
<td>VIII. BIBLIOGRAPHY</td>
<td>29</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>30</td>
</tr>
</tbody>
</table>

*An asterisk at the end of each section or part heading in the TABLE OF CONTENTS indicates that there is “no information presently available” on the topic.*
I. INTRODUCTION
   A. Title  – Give the title of the work sample. The title should specify exactly what job(s), job skills(s) or ability(s) the work sample is to simulate and/or assess. Capitalize the WORK SAMPLE TITLE.

Example:

I. INTRODUCTION
   A. Title – STOUT U-BOLT ASSEMBLY

   B. Assessment Description - List and describe the factors such as job tasks, competencies, skills, abilities, traits, and aptitudes that the work sample is to assess. Be specific. It is best to list these factors in terms of work or job tasks performed. Avoid using technical terms for major assessment descriptors. Instead, use them to further define and support your major assessment descriptions.

Example:

   B. Assessment Description
      1. Ability to sort by number (zip codes)
      2. Ability to sort by location (state, city, street)

C. Job Listing – List all specific jobs directly related to this work sample with accompanying Dictionary of Occupational Titles (DOT) numbers, and give a detailed description of the job and the job duties on which the work sample was based. Reference to a job analysis should be made in this section, and the complete analysis included in the appendix.

Example:

   C. Job Listing – THE OGREN AUTOMOBILE WASHING WORK SAMPLE best relates to a Data-People-Things (DPT) code of .887. In the Dictionary of Occupational Titles (DOT) classification system, a .887 job requires no significant relationship with data, no significant relationship with people, and a minimal relationship with things (handling level: “using body members, hand tools, and/or special devices to work, move or carry objects or materials”). All .877 job are in the Handling Worker Trait Group Arrangement (DOT Volume II, page 360). The job on which this work sample is based (see Appendix A, JOB ANALYSIS SCHEDULE) is described in the Dictionary of Occupational Titles under “automobile washer,” (Volume I, page 33), has a DOT code of 919.887 and is found in “automobile services,” industrial code 7542.

D. Related Jobs – List all partially related jobs and job areas with accompanying DOT numbers and pages in Volume I. Related jobs are those jobs which are similar to the work sample in terms of the tasks performed, but contain other major tasks which this work sample does not assess. Therefore, to assess the remaining job tasks needed, further work sample administration
and/or other forms of assessment will be necessary to support any recommendation in related areas. Since a listing of related jobs can be rather lengthy, list only key jobs which you feel are most representative of those you could not list or of those jobs most commonly found in your geographic area.

Example:

**D. Related jobs** – Examples of related jobs would be:

<table>
<thead>
<tr>
<th>Job</th>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Card Clerk</td>
<td>(re tr.)</td>
<td>209.588</td>
</tr>
<tr>
<td>Delivery Clerk</td>
<td>(cler.)</td>
<td>222.588</td>
</tr>
<tr>
<td>Claims Clerk</td>
<td>(auto. Mfg.)</td>
<td>229.688</td>
</tr>
<tr>
<td>Traffic Clerk</td>
<td>(clerical)</td>
<td>222.588</td>
</tr>
<tr>
<td>Control Clerk, Data Processing</td>
<td>(clerical)</td>
<td>219.688</td>
</tr>
</tbody>
</table>

Supportive information regarding related jobs should be sought through the use of a clerical card sorting by letter or number work sample.

**E. Validity** - Describe the validity studies performed on the work sample giving reference to the results and their meanings. Place complete studies in the APPENDIX Section and use this VALIDITY Section in the manual to refer to the appended information. Validity information may only refer to the close structural relationship of the work sample to the job, its tasks, or job training. Brief generalizations to the type of validity are appropriate. Attach a job analysis or a detailed job description to the APPENDIX Section of the manual and cite its location in the text. Job analysis information supports work sample validity only in terms of its relationship to the job analyzed. An example of the first type of documentation can be found in the STOUT U-BOLT ASSEMBLY WORK SAMPLE.

Example:

**E. Validity** – The construct validity was investigated by correlating an earlier version of the work sample with the Finger Dexterity and Manual Dexterity Aptitude section of the General Aptitude Test Battery (GATB). Four trials of the work sample and the GATB Dexterity aptitudes were administered to 54 (20 male and 34 female) college students. Pearson’s correlation between the number of minutes to complete each trial and the dexterity aptitudes were as follows:

<table>
<thead>
<tr>
<th>Trial</th>
<th>Finger Dexterity</th>
<th>Manual Dexterity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.235</td>
<td>.429**</td>
</tr>
<tr>
<td>2</td>
<td>.271*</td>
<td>.420**</td>
</tr>
<tr>
<td>3</td>
<td>.219</td>
<td>.504**</td>
</tr>
<tr>
<td>4</td>
<td>.252*</td>
<td>.424**</td>
</tr>
<tr>
<td>Total</td>
<td>.267*</td>
<td>.455**</td>
</tr>
</tbody>
</table>

*p ≤ .05  **p ≤ .01
The results imply that the STOUT U-BOLT ASSEMBLY WORK SAMPLE is a good measure of manual dexterity and a fair to poor measure of finger dexterity.

An example of how job analysis information may be used to show content validity can be found in the SCHNECK ARC WELDING WORK SAMPLE.

Example:

E. Validity- No information presently available. Refer to the last paragraph of IV. E. Norming Method for a suggested technique of determining validity. A JOB ANATSIS SCHEDULE has been included in the APPENDIX section of this manual.

The job analysis for this work sample shows that there is a high percentage of overlap between the work sample tasks and the tasks of the job on which the work sample is based.

II. INSTRUCTIONS TO THE EVALUATOR

A. Prerequisites – There may be minimum performance requirements from previous tests or work sample that will need to be met before the work sample may be administered. Required reading or math levels, basic sorting or filing skills, or above average dexterity may be necessary to performance on the work sample. There may also be certain physical, medical, educational or behavioral precautions, which, if not needed, could affect work sample performance, outcome, or recommendation. List all prerequisite tests or work samples and their required scores. All other necessary precautions, such as client hand dominance, vital to work sample administration and performance should be included.

Example:

A. Prerequisites – No specific prerequisites have been established for this work sample. However, it is recommended that the client have at least a sixth grade reading level in order to be able to read and understand instructions presented within the task administration. The approximate level of client functioning may be established by making use of the scores on basic achievement tests such as the Wide Range Achievement Test (WRAT).

Achievement Test (WRAT). It is recommended that eh client possess average, or above average, ability in manual dexterity, finger dexterity, spatial and form perception, and intelligence. Clients should function within the fortieth to ninety-ninth percentile (40-99%ile) in relationship to specific scores of the General Aptitude Test Battery (GATB), G score (General Intelligence), S score (Spatial Perception), P score (Form Perception), K score (Motor Coordination), F score (Finger Dexterity), and M score (Manual Dexterity).

Prior to the administration of the tasks, it is also suggested that the evaluator administer the TOWER Welding Work Sample to the client to determine if he possesses abilities to handle the welding equipment in the proper manner. The
TOWER Work Sample should be used only if time allows, or if there is some question as to whether the client can handle safely the functional equipment. Much of the material in the Schneck Arc Welding Work Sample will be covered in the TOWER Welding Work Sample.

Supplementary information that could be used with the Schneck Arc Welding Work Sample to help in assessing a person’s potential for welding work include scales on the “Kuder Preference Record – Vocational, Form C” and the “Minnesota Importance Questionnaire.” A high ranking on the “Manual Occupations, Service – Maintenance Cluster” on the “Minnesota Importance Questionnaire,” a high score on the “mechanical” scale on the “Kuder,” and good performance on the work sample could be indications that the client would be able to work as an arc welder, or in some occupation relating to similar tasks.

B. Work Sample Conditions – All work sample conditions should attempt to parallel those of the actual work environment after which the sample was designed. Although this may not always be feasible, these work sampling conditions should be described and followed as closely as possible. Work sample conditions refer to:

1. work environment (i.e. indoor – outdoor; isolated or not; lighting; noise factor)
2. standing or sitting requirements
3. appropriate dress (aprons, boots, gloves, goggles, safety hat)
4. other outstanding conditions characteristic of the job or training.

Example:
B. Work Sample Conditions – The evaluator should have the (indoor) test area prepared with a standard height table, 2 standard chairs and at least a 5’ x 30” work area. The area should be well-lighted and at a comfortable temperature. The noise level should be comparable to factory conditions. Voices, machinery, and vehicle noises should be present, or simulated. A high noise level and distractions are advantageous to testing conditions.

C. Administration Equipment – All equipment required for administration of the work sample should be designed so that it may be set up properly and completely. For example: hardware, tools, protective devices, timing instruments, scratch paper, pencils, score sheets, administration manuals, and safety equipment refer only to the equipment needed by the evaluator to administer the work sample to a client and not to construct, maintain, or repair it. Refer only to the equipment needed by the client to function at the work sample. It is not necessary to give the amount or a detailed description of all administration equipment. It serves only as a general checklist.

Example:

C. Equipment – The following equipment is required prior to administration:

1. One foam rubber mat with layout as in Figure 4
2. Five parts presentation boxes (Figure 6)
3. Four unassembled U-bolt boxes (Figure 5)
4. Four assembled U-bolt boxes (Figure 7)
5. Jig securely fastened to work table (Figure 8)
6. Two hundred U-bolts, 50 in each unassembled U-bolt box
7. Four hundred straps in the parts presentation box in front of the jig
8. Eight hundred hex nuts, 400 each in two of the parts presentation boxes to the immediate left and right of the strap box
9. Four hundred ferrules, 200 each in two parts presentation boxes to the immediate left and right of the nut boxes
10. One steady work table at least one foot longer on each side of the layout (Figure 4) and six inches wider
11. One chair or shop stool having a difference of from nine to eleven inches between the seat of the chair and the working surface of the table
12. One timing device accurate to 1/10 of a second
13. One copy of this manual
14. Client Record Sheet (Figure 2) and Client Observation Form (Figure 3)

D. Setup and Breakdown – Every work sample will require some prearrangement or setup. The setup established by the evaluator prior administration should be described in step format. For purposes of proper setup, include a tip view diagram or photograph with dimensions of the work station and the location of client and evaluator work positions. Any disassembly performed by the client or the evaluator upon completion of a work sample and any scoring that may take place during disassembly must be noted. Quite often, setup and disassembly will be one-and-the-same and an indication of when this task is to be performed should be mentioned (i.e., before, during, or after each administration or scoring). Any instructions given the client which involve sample setup or breakdown are to be written in the ADMINISTRATION Section (III).

Example:

D. Setup and Breakdown – Prior to administration, the evaluator should check the placement (see Figure 4) of all boxes and contents (see above) of the parts presentation boxes and the unassembled U-bolt boxes. The hardware should be checked to make sure that the threads on all U-bolts are not damaged.

The client must not disassemble any U-bolts until he has completed all four trials. The assembled U-bolts may then be checked for errors prior to disassembly. There are several ways to disassemble the U-bolts and the method used depends upon the evaluation unit:

1. a parallel inspection disassemble work sample could be established in which another client disassembles the U-bolts and records errors;
2. upon completion of four trials, the client could reverse the process and disassemble the U-bolts; or
3. the evaluator or evaluator aide could perform the disassembly process.

(Start a new page for the ADMINISTRATION Section)

III. ADMINISTRATION

A. Client Orientation – Prior to writing the actual administration instructions, a client orientation should be developed to provide a basis for job exploration and to help establish a close relationship of the work sample to real work. Information necessary for a thorough orientation include:

1. Job information: job title, demand, pay, qualifications, training, work conditions
2. Client information: questions regarding related work experiences the client might have had
3. Work sample information: title, description, and why it is being administered

Example:

A. Client Orientation –
Note to Evaluator: This orientation is to be presented to each client before administering the STOUT U-BOLT ASSEMBLY WORK SAMPLE. The material does not have to be read verbatim. However, all information should be covered. Deliver the presentation in an informal manner and pause to answer questions as necessary. The purpose of this orientation is (1) to inform the client about assembly and similar jobs which are related to this work sample and (2) to inform the client of specific traits or characteristics on which he is being evaluated.

The STOUT U-BOLT ASSEMBLY WORK SAMPLE that you will be taking in a few minutes will help you and me to find out several things about you. One of the things that it will tell us is how well you can do on assembly jobs and how well you like this type of work.

Let me tell you a few things about assembly jobs. Many of the things we commonly use are put together in factories by people called “assemblers.” These people put together small or large parts to make things such as: television sets, radios, toys and dolls, and household items like mops, brooms, and picture frames. If you were employed in one of these assembly jobs, you would work inside a factory and be close to other people doing jobs like yours. You would probably sit at a bench and use small tools such as screwdrivers, drills, soldering guns, and wrenches to put things together. Often the parts would be brought to you in boxes or on a conveyer belt. In many assembly jobs, you would only complete one part of the finished product. You would pass this along to the next worker so he could finish his part. Your foreman would carefully supervise your work and other people called “inspectors” would check it carefully for mistakes. People don’t have to have a lot of education to become assemblers, but they have to be good with their hands, be able to do the sample thing over and over again, enjoy working near other people, and to follow directions carefully. Sometimes people who do well in assembly jobs get promoted to more advanced jobs. Some may become foremen or inspectors themselves and others become assemblers who work on very complicated equipment.
The evaluator then tells the client of nearby factories that hire assemblers or related jobs; what the wages are; what the working conditions are; and how many of these jobs are available. If no assembly jobs are available, give information about related jobs in the handling Worker Trait Group (.887), such as packaging, dishwashers, cook helper, and custodians.

This work sample will tell us things other than how well you like assembly work. It will help us to find out how well you can move your hands and how well you can use your fingers. After you try this work sample, both of us will know how long you can do the same thing without getting mad at the job, bored, or tired.

Do you have any questions?

If the client has no questions, the evaluator begins to read the instructions and demonstrate the work sample.

B. Practice Session - One of the most critical problems in work sample administration is the separation of learning from performance. Learning involves making sure that (1) the client can perceive and understand the instructions, (2) the client has been taught the proper use of tools and equipment, (3) the steps and motions have been learned, and (4) the client is aware of the desired results.

The actual write-up of the instructions, whether they are given orally, through an audio-visual presentation, visual demonstration, or a self-administration procedure, should be written in the manual exactly as they are to be administered.

All direct instruction to the client must be well marked and distinguishable from instruction to the evaluator.

Example:

B. Practice Session

Evaluator’s Note: Read the following instructions to the client and demonstrate the operations as described. Determine if the client is right or left-handed before beginning. (See Figure 1 for a diagram of the assembled U-bolt.)

The evaluator stands in front of chair.

Your task will be to take each of the U-bolts in these four boxes (point to the stack of boxes) and to fasten these nuts (point), straps (point), and ferrules (point) onto the U-bolts. Pay close attention because you will be asked to assemble these exactly as I will show you.
The evaluator uses two hands to lift the first box of unassembled U-bolts and places it in the space indicated on the left side of the work area. With his right hand, he lifts the empty box and places it in the space indicated on the right side of the work area.

Please stand behind me and look over my shoulder while I show you how to do it.

The evaluator sits in chair.

**Insert U-Bolt in Jig**

Reach into this box and pick up one U-bolt with your left hand. (Reach and pick up U-bolt at bottom with left thumb and forefinger.) Turn it so that the threads are point up (rotate wrist while moving left arm toward jig) and place it in the jig.

**First Nuts**

Using both hands at the same time, reach into the two nut boxes and pick up one nut in each hand. (Simultaneously, move the left and right hands toward nut boxes. Pick up one nut with thumb and forefinger of each hand.) With your thumbs and forefingers start one nut on each side of the U-bolt (start the two nuts at the same time). After the nuts are started, turn them down as far as you can; spin the left nut with your left thumb and the right nut with your right forefinger. (Spin the nuts using inside of thumb and forefingers.)

**First Strap**

Use your right (say “left” if client is left-handed) hand to reach into the box, directly in front of you, pick up one strap, and place it on the U-bolt. (Pick up strap with thumb and fingers.)

**Ferrules**

Next with both hands at the same time reach into these boxes and pick up one ferrule in each hand. (Reach toward ferrule boxes. Pick up one ferrule with thumb and forefinger of each hand.) Place one ferrule on each side of the U-bolt. (Use thumb and forefinger to place the ferrules simultaneously one then ends of the U-bolts.)

**Second Strap**

Reach into the strap box with your right hand (say “left” if client is left-handed), pick up one strap and place it on the U-bolt. (Pick up strap with thumb and fingers.)

**Second Nuts**

Using both hands at the same time, reach into the nut boxes and pick up one nut in each hand. (Simultaneously, move right and left hands toward nut boxes. Pick up one nut with thumb and forefinger of each hand.) Start one nut on each side of the U-bolt with your thumbs and forefingers. (Start nuts simultaneously and turn these down.) Be sure to tighten the nuts so that the unit dies not rattle. (Tighten nuts simultaneously using thumb and forefinger to twist nuts against strap.)
Lift the completed assembly out of the jig with your right thumb and fingers and place it in this box. AT THE SAME TIME, use your left hand to reach into the box on the left, pick up another U-bolt and place it in the jig. Simultaneously, remove completed assembly with right hand and place it in the box. Reach with left hand, grasp and position the second U-bolt in the jig.

Now I have completed one assembly. Are these any questions?

Pause, answer questions.

Just so I’m sure you know how to assemble the U-bolts, let me show you again.

Repeat sequence exactly as above. Answer questions. The evaluator stands up.

Now you try it. Please sit here.

After client is sitting, the evaluator says:

You may begin whenever you are ready.

In case of a self-administration manual, all instructions for the evaluator may be listed at the end of section II D, Setup and Breakdown.

Example:

D. Setup and Breakdown – Prior to administration, the evaluator should be certain that all necessary equipment is present. The client is handed the self-instruction manual at this point.

Example continued:

E. Evaluator Checkpoints

Checkpoint #1 – At this point, the evaluator should score the participant’s worksheet #1. A score of 7 or more on worksheet #1 is required before continuing. If a score of 7 or better is attained, the client is instructed to continue. If the client does not attain the score of 7 or higher, the materials in Section I may be reviewed and make a second attempt at worksheet #1. It is up
to the discretion of the evaluator at this point whether to review the material or discontinue work sampling. There must be additional factors to consider (client interest for example), before discontinuing work sampling. A discussion with the client is suggested in this case and the evaluator should be aware that parts identified in section I are reference points for Sections II and III, and additional assistance may be required for their completion.

SCORING: SECTION I
Each correct answer counts as 1 point.
Total possible points Section I: 10 points.
Minimum acceptable number correct: 7 points.

Checkpoint #2 – At this point, the evaluator is to look into eyepiece to determine if scope has been focused correctly. It may appear fuzzy and require fine adjustment with focus knobs.

It is important that a client be required to read while trying a work sample only if the job or job training requires reading, and that the reading level of the work sample be commensurate with that of the job. Unfamiliar terminology should be defined for the client in this practice session. The method of determining the reading level for the work sample should be noted in the instructions to the evaluator and a complete reading level analysis included in the appendix. Use of non-print instructions, such as tape recorder, photographs, etc., may help alleviate the need for reading.

Safety precautions regarding the use of potentially hazardous equipment and any special safety clothing and apparatus needed must be identified and described during the practice sessions. Instructions concerning sample breakdown and cleanup performed by the client may also be included in this section.

Example:
The GED language development level for the job this work sample most closely represents is at a level 2. In the manual Relating General Educational Development to Career Planning, U.S. Department of Labor, 1971, it is stated that a GED level 2 is roughly equivalent to grades 4 to 6 reading.

The readability of this self-instructional manual has been assessed at between the fourth and fifth grade level by using the Fry Readability Formula (Fry, E., “A Readability Formula That Saves Time, “ Journal of Reading, 513-516, 11, 1968). 8.6 Sentences Per 100 words and 129 syllables Per 100 Words.

C. Performance Session - Performance is measured by the rate or time, quality or number of errors that is assessed once the client has learned the task. If the client is to be accurately assessed, the evaluator must make sure that only performance on the work sample is being measured.

In the performance session, as in the practice session, all direct instructions to the client must be well marked and distinguishable from the instructions to the evaluator.

Example:

C. Performance Session -
TIMING INSTRUCTIONS
I am going to see how long it takes you to assemble these four boxes of U-bolts. You will be timed separately on each box. Please try to work at a good pace. Put your left hand on the first U-bolt and wait until I say begin.

The evaluator pauses, checks to see if the client has left hand on first U-bolt.

Begin

Example continued:

START TIMING

The evaluator observes the client to see if he has started promptly and if he is using the correct procedure. At various times during the assembly the evaluator observes the client for the behaviors. TIMING FOR EACH BOX IS STOPPED WHEN THE CLIENT PLACES THE 50TH COMPLETED ASSEMBLY IN THE BOX.

The evaluator records the number of minutes and seconds taken to complete the trial. He moves the boxes himself or instructs the client how to move them. He then repeats the timing process, recording the minutes and seconds taken to complete all four trials.

An interview outline or questionnaire relating to client interests and reactions to the work sample related lines or work should also be included in the performance session.

Example:

Once the client has completed filling the five orders, the Post-Sample Interview form should be administered for immediate feedback. The form is located at the back of the SCORING Section with the Task Observation Record. The Post-Sample Interview will provide information on client interest as well as any personal problems which might have affected overall performance.

Post-Sample Interview (taken from back of SCORING Section)

The evaluator should present the interview orally.
Try to stimulate as much client response as possible.

1. How did you like the work sample? Why?
2. How well do you think you did?
3. Could you see yourself doing this type of work on a job?
4. Would you want to get a job in this field?

_________Never
_________Only if it was the only job that I could get
_________It’s a possibility to consider
_________Yes, I really would like to
Other comments:________________________________________________________

5. Do you think you would need further training and/or practice to do this type of work full time?

6. Do you have any further comments or questions about the sample?

(Start a new page for the SCORING Section)
IV. SCORING

A. Criteria – The SCORING Section of any work sample manual should contain all necessary information required in grading, rating, and categorizing the work sample score in useable or definable terms. The first part of the SCORING Section will describe the technique used in scoring the work sample. Whether the techniques involve scoring the time (performance), quality, quantity, errors, or any other measurable outcome, detailed instructions on the scoring procedure (what is being scored and how it is being scored) should be discussed.

Example:

IV. SCORING

A. Criteria – All scores should be recorded on the provided score sheet. The evaluatee will receive both a time score sheet and a quality score. In addition, performance and behavior observations will be recorded.

The time score is the total elapsed time to complete all four units. Once timing has begun on the job sample, any time taken for questions or further instructions must be included in the total elapsed time.

The “quality score” is based on the total number of points received on seven quality checkpoints. Each of the four completed units is scored separately and they are then totaled. All recording is done on the score sheet.

Below are the checkpoints to be scored, guidelines for scoring, and the method of scoring. Also included is a checkpoint diagram to be used as a scoring aid (see page 12).

1. Ability to obtain 4 required sheets from provided material.
Scoring: 1 point given per unit if all 4 are obtained. (If only 3 are obtained score “0” under fourth unit.) Maximum score for 4 units – 4 points

2. Wrinkle free surface.
Guideline: Plastic surface tight – evaluator unable to grasp plastic between fingers. No wrinkles seen visually.
Scoring: No wrinkles – 2 points
Maximum score for 4 units – 8 points

3. Corners drawn in tight.
Guideline: View visually through plastic to see that no large gaps exist between plastic and foam rubber.
Scoring: No wrinkles – 2 points
4. **Proper alignment of foam rubber.**
   Guideline: View visually to see that foam laps over **top** edge of plywood on all 4 sides.

   **Scoring:** 2 points for each unit with properly lapped edges. *(Maximum 2 points per unit.)*
   Maximum score for 4 units – 8 points.

5. **Proper alignment of plastic.**
   Guideline: At least ¾” overlap of plywood on all sides.

   **Scoring:** Unit properly overlapped with plastic – 2 points
   Unit improperly lapped – 0 points
   **Maximum score for 4 units – 8 points**

6. **Proper folding of plastic.**
   Guideline: 4 corners stapled first with 4 sides folded over corners.

   **Scoring:** Plastic folded properly – 2 points
   Plastic folded improperly – 0 points
   **Maximum score for 4 units – 8 points**

7. **Staples properly spaced and aligned.**
   Guideline: Staples parallel to edges (except at corners)
   Staples between ¼” and 1” from edge of plywood
   Staples no more than 2” apart (center to center) – no points subtracted for staples too close

   **Scoring:** 0-2 errors – 2 points
   3 or more errors – 0 points
   **Maximum score for 4 units – 8 points**

**TOTAL POSSIBLE QUALITY SCORE: 52 POINTS**

---

**B. Tables -** All tables and scales used in scoring the work sample and converting the raw scores into useful information such as percents, standard scores, letter or number grades, phrases, statements, etc. must be included. Each table or scale should identify what is being measured, time, quality, etc. A percentile or level category and some type of interpretive rating is important to give meaning to the percentiles or levels. If tables are longer than one page, place them in the appendix and refer readers to their location.

**C. Forms –** Copies of all forms used for responding to, observing, scoring, and rating the work sample need to be included at the end of this section. The four types of forms most often used are:

1. The Task Observation Record identifies all behaviors and work qualities to be observed and assessed during client performance. It also includes the rating
spaces and information on which to score and compute performance rate, errors, readministration outcomes, etc., from the Scoring Tables in part “B” of this section.

2. The Post-Sample Interview is given orally or in written form to the client at completion of the work sample and is designed to help obtain immediate feedback on client interest and reaction to the sample.

3. The response sheet is used by the client when a written reply or answer is required on a work sample.

4. The overlay, grading sheet (s) or keys are used in scoring the response sheet.

V. INSIGHTS

The work sample developer should indicate any consistent client behaviors noted during the norming period. Insights may or may not have an affect on the work sample outcome but could, in some way, be related to work sample performance and to future work performance. The behaviors noted during norming should be listed so that the work sample administrator will have an idea of the positive or negative behaviors to be observed. Rating levels should be established to help describe each behavior in terms of its relation to work sample performance or outcome and to future training or job performance.

After the work sample has been administered and scored, an evaluator may gain further insights in terms of the sample’s strengths and weaknesses. It can then be determined what “bugs” the work sample might have, what it does and does not actually assess, or what problems to look for and how to correct them. The insight section will allow you to evaluate your work sample in terms of what it can and cannot do and how to improve on its present form.

Finally, the insight section can be used as a depository for information you feel is in some way necessary to the work sample but you don’t quite know where to put it in the manual. For example, any professional judgments or personal feelings you may have about the relationship of your work sample or its outcomes to placement or placement precautions can be entered here.

Example:

V. INSIGHTS
The last column of the Client Observation Form reflects the fact that many variables are involved in the performance of even a simple work sample. In order, therefore, to make meaningful interpretations of observed behaviors and work sample outcomes it is absolutely essential that the evaluator make strong efforts to validate his tentative interpretations. It is important to check evaluator observations and tentative interpretations against client feelings and interpretations. The evaluator will want to have in mind a series of gentle but direct questions before him such as:

1. How did you like this task generally? Why did you like (or dislike) this task? Would you be interested in earning a living doing work like this? When (under what circumstances) would you do this?
2. What particular thing about the task did you like? Why? What particular thing about the task did you dislike? Why?

3. How do you think you did (performance) on this work sample compared to others? With whom are you comparing yourself? How do you feel you compare when you compare yourself with other clients? How do you feel you compare with people who do jobs like this for a living? Why or why not?

4. Did you learn anything about yourself when you tried this work sample? What? Will that mean anything to you or to an employer when you seek a job? What?

In conclusion, the observational and interpretational parts of this manual are not intended to provide the evaluator with sample answers and naïve interpretations of observations. Because interpretation of scores and behavioral observation must depend on the skill of the evaluator, these sections should be considered as guidelines and sources of ideas and not as specifications and standards. It is hoped that these sections have given the evaluator an additional tool and a method to be used in interpretation rather than pat answers to observations.

The four or more time scores for the work sample should be compared with the industrial norms on the left side of the Time Profile on the Client Record Sheet (Figure 2). These norms were developed using a predetermined time-motion system of analysis. Based on many years of research, industrial engineers have determined that the average work can perform certain motions in certain amounts of time. The motions required to perform one cycle of a routine job are determined and the time to complete one unit is calculated (see Appendix A). The time standard for the work sample is based on the number of seconds required to assemble one U-bolt. Under normal conditions, a trained motivated employee would be able to assemble one box of U-bolts in 21 minutes, 15 seconds (21' 15”). As seen on Figure 2, this is equal to 100%. The 100% figure does not mean that the worker must perform as fast as possible to achieve the goal of 50 assembled U-bolts in 21 minutes 15 seconds. Rather, the 100% means that the worker is performing at an efficient pace – a pace he will be able to maintain throughout the working day. Highly motivated or skilled workers frequently perform at more than 100%; new or lesser skilled workers below 100%. In short, the 100% standard is an average.

Two factors must be considered in interpretation of the time profile. First, industry will usually consider a 70% performance as the minimal acceptance level for employment. A client who can assemble one box of U-bolts in 27' 38” is performing at the 70% level and is likely to have the ability to perform routine bench .887 assembly jobs. If referral to assemble jobs is considered as a result of this work sample, the evaluator should state that a client performed on an industrially normed work sample and the percentage of industrial norm that he reached. The second factor is the profile which indicates constant, increasing, or decreasing performance. The most important indication of ability and interest for the type of work this work sample represents is a steadily increasing performance profile. Thus, a profile showing a steady increase on four trials from 40% (34’00”) to 65% (28’ 41”). A decreasing profile usually indicates a lack of interest, boredom, or fatigue.
If a client is interested in assembly jobs and shows a steady increase in performance over the first four trials, the evaluator should consider several subsequent administrations of the work sample, providing additional information of the following:

1. An estimate of the client’s ability to perform tasks at the competitive level.
2. An understanding of the client’s ability to improve based on repetition.
3. The strength of a client’s stated interest in assembly work may be assessed by giving a number of additional trials to see if the profile begins to level out. Constant increases in performance many indicate a liking for this type of work; decreases in production may mean a disinterest after the novelty of the task has worn off.

If the client is to be recommended for employment, training, or other services as a result of the work sample trials, the evaluator may want to use the Interpretation Information (Figure 3) to summarize the reasons for such a decision.

V. DEVELOPMENTAL DATA
A. Description of Analysis - The work sample developer should indicate the need which the work sample was designed to fulfill. The analysis which led to the selection of the specific tasks should be clarified in this section and the complete analysis should be included in the APPENDIX. It is important to include developmental information so that others using the work sample manual may adopt and modify it to meet their own specific needs. This information is also helpful to others in the selection of work samples for use in their facility.

Examples:

The RADIO ANNOUNCING WORK SAMPLE was developed after a review of employment outlooks; both local and national indicated a reasonable job market for persons in the broadcast field. After a job analysis schedule (see APPENDIX A) was completed, it was apparent that the tasks involved in broadcast work could be performed by a large number of our clients. Courses relative to radio announcing are available at our local vocational technical school and it was felt that a RADIO ANNOUNCING WORK SAMPLE would be a useful exploratory experience for clients who are considering taking such course work.

Note: See Appendix A, page 31
B. Norming Method - Identify and describe the norming technique or procedure used. Include industrial norms, standardized statistical methods, percentile groupings, any of the Methods-Time-Measurement processes, etc. If a norm group is used, a description of the norm group should include: the type of group normed such as deaf, blind, orthopedic, staff, students, industrial workers, minority group, sex, and age; where the norming took place; size of norm group; and any unusual group characteristics which may have a bearing on norming outcome. Norm group information provides a basis for comparison of scores between clients who take the work sample and the group on which the work sample was normed (see Example). If the information takes more than one page, it should be appended and reference given as to its new location.

Example:

B. Norming Method – Master Standard Data. Because the work sample was developed using Master Standard Data technique, no norm group per se was involved.

Or

B. Norming Method – The test was administered to each client two times to determine reliability. Using the time-per-unit-to-assemble-score, the reliability of the work sample was determined to be .86. Thus, the work sample appears to be reliable and consistent. The number of errors per rating category (Above Average/Competitive Level, Average/Workshop Level, or Below Average/Below Workshop Level) was not developed from the norm group. Industrial standards were used and they are as listed on the Recording Sheet:

<table>
<thead>
<tr>
<th>RATING</th>
<th>ERRORS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Average/Competitive Level</td>
<td>0</td>
<td>1:00 – 2:30*</td>
</tr>
<tr>
<td>Average/Workshop Level</td>
<td>1-2</td>
<td>2:31 – 4:30*</td>
</tr>
<tr>
<td>Below Average/Below Workshop Level</td>
<td>3 or more</td>
<td>4:31 – Up*</td>
</tr>
</tbody>
</table>

*In minutes

Example continued:

Since these norms were established on only 22 clients, precautions must be exercised by the evaluator. It is not only a small population; it is also a client and not a normal or random population. Therefore, it is suggested that the evaluator consider this and establish his own norms or add to these norms in order to have a larger and more pertinent population.
The norm group used to develop norms for this work sample was the incoming client population at the Saginaw Valley Rehabilitation Center, Saginaw, Michigan. The norm group was used for several reasons. One, it was relatively easy to obtain scores from this population; two, the population provides a wide range in terms of age, occupational experience and educational background; and three, the population is the only population actually producing the fish lamp in our community.

There were 22 clients tested as a norm group; these clients have either a mental, physical or emotional disability and were referred to our agency by the Saginaw Vocational Rehabilitation Services office for evaluation. The age range was from 16 to 49 years old. The educational background range was from a tenth grade to college-plus education, B.S. degree, plus additional graduate classes. The occupational categories for most recent jobs included the following:

- 2 Mechanics
- 1 Teacher
- 3 Assembly Line Workers
- 1 Secretary
- 1 Clerk Typist
- 9 Students
- 2 Car Wash Attendants
- 1 Bus Boy
- 1 Sales Clerk
- 1 Never Employed

All clients were Saginaw residents for at least six months at the time of testing. Disabilities used to justify referrals were as follows for clients used in norming:

- 3 Emotional
- 11 Mental Retardation
- 2 Mental Illness
- 6 Physical – including: 1 Paraplegic  
  - 3 Back Injury
  - 1 Heart Failure
  - 1 Loss of Normal Use of Lower Limbs

(See Appendix C)

Note: See Appendix C, page 34

C. Reliability - List and describe the reliability studies which have been initiated. Give reference to type and size of sample groups. Indicate the results of such studies and interpret the meanings of the results. If the results necessitate more than one page, appendix them and refer to their new location.

Example:
C. Reliability – Test-retest reliability was indicated at .863 on the norm group. It appears that the work sample is reliable (see Appendix E).

VII. CONSTRUCTION

A. Diagrams and/or Photographs - Three-dimensional drawings and/or photographs, black and white preferred, or color, as needed, showing specifications and measurements of the work sample equipment should be included to emphasize work sample size, color, if necessary for administration, and equipment location at the work station. Drawings indicating work sample measurements should also be drafted to aid as construction diagrams for the work sample. Scaled cutaway views of the top and sides of the work sample, and its major parts and equipment would aid in construction, repair and periodic maintenance.

B. Materials List - A construction materials list should be compiled to help locate and purchase the correct type and amount of construction parts and materials. Information including part names, quantities, purchase order numbers, shipping weights, sizes and descriptions such as color, grade, etc., purchase source and address, and total quantity price are necessary. If equipment and parts are ordered from a catalog or require shipping, it would be advisable, in terms of scheduling reorder time, to approximate how long it took to receive the order once it was placed.

VII. CONSTRUCTION

A. Diagram -

Figure 1 – Initial Work Sample Layout (page 6)
Figure 2 – Work Sample Layout Prior to Taping (page 15)

B. Materials List – The materials required to complete THE RADIO ANNOUNCING WORK SAMPLE are as follows:

1. One (1) Sony Model TC-110 Cassette Recorder with microphone. $109.95
2. One (1) C-30 Audio-Cassette blank tape (15 minutes per side). $1.00
3. One (1) roll “Scotch” transparent tape, 1 ½” x 750” (20.83 yards). $.67
4. One (1) tablet of Penworthy legal Pad – M1654, 50 sheets, 8 1/2” x 11. $.36
5. Fifteen (15) to twenty (20) segments of standard news teletype (U.P.I. or A.P.). Each segment should be at least five (5) lines and not more than fifteen (15) in length. Total should be at least one hundred (100) lines. Each segment should be plastic coated to prevent wear and tear. Must include at least fifteen (15) lines of weather news and at least twenty (20) lines of sports news. In addition, twenty-five (25) lines of state-regional news and forty (40) lines of international – national news must be included in the total. Teletype should be changed periodically to update news items used.
6. Two (2) commercial scripts of from sixty-five (65) to eighty-five (85) words in length each. Each should include a business name and its location, as well as promotional material, to simulate an advertisement as found on the radio. Can be fictional or real but must be typed.
7. Two (2) ad lib station I.D. ‘s (written form). Should contain station call letters, time of
day and frequency at which station operated. The format should be informal, simple
giving a descriptive statement of the station (approximately 25 words total).

8. Two (2) number 2 lead pencils (sharpened). $0.10
9. One (1) Westclox Model 20291 electric alarm clock. $2.99
10. One (1) RADIO ANNOUNCING WORK SAMPLE SCORING FORM.

The estimated cost of this work sample is approximately $115.00; however, materials may
already be available at a facility which could reduce the cost.

D. Assembly Instructions - Special assembly instructions, tool settings or detailed
measurements may be necessary for proper work sample construction. The order in
which the work sample parts are put together may also require description. Such
information should be detailed and well described if the construction is to be accurate.

Example:

C. Assembly Instructions – The ¾” ferrules were cut with a pipe cutter from 3/8 inside diameter
copper tubing. They were then reamed on both ends and the outsides were filed to remove sharp
edges and burrs.

The layout was made of one piece of 1/8” art foam rubber 24” x 48” (Figure 4). The placement
of the boxes was outlined and these outlines as well as the names of the boxes were sprayed with
blue paint over stencils. The foam layout mat was fastened to the work table with rubber cement.

The following storage/presentation boxes were constructed:
1. Four unassembled U-bolt boxes (Figure 5)
2. Five parts presentation boxes (Figure 6)
3. Four assembled U-bolt boxes (Figure 7)

All storage/presentation boxes were constructed of ¼ inch, three ply interior plywood. The
wood was cut and then sanded until smooth; all boxes were then assembled with white glue
and tacks. The U-bolt racks (Figure 5 C) were made by splitting a pine 2x4 and then
planning it to the appropriate dimensions. The assembled boxes were first covered with
wood sealer, sanded and finally brush painted with two coats of light blue interior enamel. The jig (Figure 8) was made of hardwood (B) and fiber board (A and C) and fastened
together using white glue. A 1/8” piece of foam rubber was cemented on the bottom of the
jig.

(Start a new page for the BIBLIOGRAPHY Section)

VIII. BIBLIOGRAPHY
Information used in your manual which should be cited for reasons of credit or interest is
to be listed in a separate BIBLIOGRAPHY Section utilizing the Publication Manual of
VIII. Bibliography


(Start a new page for the APPENDIX Section)
APPENDIX

The length and type of information to be appended is described at the appropriate points throughout the manual. When using the APPENDIX Section, cite the title, APPENDIX, and the page number in your TABLE OF CONTENTS and on the first page of appended information at the back of the manual, and enter all necessary information in this section in the order it is cited in the manual. If the APPENDIX contains more than one entry (e.g., job analysis sheets, scoring tables, reliability information, etc.), each entry should be listed by letter and title in the TABLE OF CONTENTS.

Example:

Appendix ..................................................................................................................31

A. Job Analysis
B. Reading Level Determination Study
C. Work Sample Norm Results
Example
Appendix A

U.S. Department of Labor
Manpower Administration

OMB 44-R0722
Estab. & Sched. No. 000-15-1-1

JOB ANALYSIS SCHEDULE

1. Estab. Job Title  THE RADIO ANNOUNCING WORK SAMPLE


3. S.I.C. Code(s) and Title(s)

   4832 Radio Broadcasting

4. JOB SUMMARY: Coordinates information for broadcasting over radio. Reads script material into microphone, introduces guests and programs, plays tapes and records.

5. WORK PERFORMED RATINGS:

   Worker Functions
   
<table>
<thead>
<tr>
<th>Work Field</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Giving</td>
<td>282</td>
</tr>
<tr>
<td>Radio Services</td>
<td>862</td>
</tr>
</tbody>
</table>

6. WORKER TRAITS RATINGS:

   GED  1 2 3 4 (5) 6
   SVP  1 2 3 4 (5) 6 7 8 9

   Aptitudes  G 2 V 2 N 2 S 1 A 1 P 1 A 1 G 1 A 1 E 1 E 1 S 1 S
   Temperaments D F I (J) M (P) R S T (V)
   Interests  la (Ib) 2a 2b 3a 3b 4a 4b (5a) 5b
   Phys. Demands (S) L M H V 2 3 4 (5) 6
   Environ. Cond. (1) 0 B 2 3 4 5 6 7

   MA 7-36
7. General Education
   a. Elementary _______ High School _______ Courses _____________
   b. College _______ None _______ Courses _____________

8. Vocational Preparation
   a. College _______ None _______ Courses _____________
   b. Vocational Education _______ 1 year _______ Courses _____________
   c. Apprenticeship _______ None
   d. In-Plant Training _______ None
   e. On-The-Job Training _______ 1 month to 6 months depending on previous _______ experience
   f. Performance on Other Jobs _______ None

9. Experience _______ None
10. Orientation _______ 1 month

11. Licenses, etc. _______ Third class F.C.C. Radiotelephone Operator

12. Relation to Other Jobs and Workers
    This is an _______ Promotion: From _______ entry job _______ to _______ NEWS DIRECTOR, MUSIC DIRECTOR
    Transfers: From _______ None _______ to _______ None
    Supervision Received: _______ STATION MANAGER
    Supervision Given: _______ None

13. Machines, Tools, Equipment, and Work Aids Equipment: Transmitter Controls - meters and gauges which indicate the functioning level of transmitter sending signal. Broadcast Control Studio - console consisting of dials, microphone, tape players switches, and wires connecting all necessary broadcast components; tape recorders; tapes; records; turntable; program log (schedule); scripts; teletype machines.

14. Materials and Products: None
15. Description of Tasks:

1. Reads script into microphone: Reads advertisements, news teletype, public service announcements, and other items of information from script book into microphone for broadcast (25%).

2. Plays records and tapes: Follows Program Log to play records and prerecorded commercials, programs and interviews for airing over radio. Selects proper materials from files and cabinets to play by turntable or tape player (25%).

3. Organizes news programs: Tears updated Teletype from news copy machines and selects newsworthy stories to produce five minute newscasts. Chooses international, national, state and local news according to station format. Proofreads and marks teletype to insure correct pronunciation and timing during broadcast (20%).

4. Tapes programs for later broadcasts: Records programs from network telecasts to play over station at scheduled time. Tape records interviews with local personalities, and commercials for future broadcasts (15%).

5. Introduces programs and guests: Does ad lib introductions for tapes and records to be played. Identifies radio station by call letters and frequency numbers periodically to meet F. C.C. requirements. Introduces and interviews guests (10%).

6. Monitors transmitter controls; Checks gauges and meters on control panel to insure proper functioning of transmitter and other electronic components (5%).

16. Definition of Terms

Program Log - Listing of each tape, recorded or live segment according to schedule. Name of segment corresponds to exact times during broadcasts.

Teletype - Continues information fed from the wire service(s) to a machine located at the station. Contains weather and sports as well as news stories.

17. General Comments

None

18. Analyst Kevin M. Boland Date 11/14/74 Editor Joe Piccari
Date 11/29/74 Reviewed By ______________________ Title, Org. ___________
National Office Reviewer ________________________________
### Appendix C

**WORK SAMPLE NORM RESULTS**

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>AGE</th>
<th>EDUC.</th>
<th>DISABILITY</th>
<th>OCCUPATION</th>
<th>TRIALS</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33</td>
<td>12</td>
<td>E</td>
<td>Mechanic</td>
<td>1:52</td>
<td>1:51</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>12</td>
<td>P</td>
<td>Mechanic</td>
<td>1:57</td>
<td>1:51</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>10</td>
<td>P</td>
<td><em>ham.</em> Line</td>
<td>2:01</td>
<td>1:56</td>
</tr>
<tr>
<td>4</td>
<td>41</td>
<td>12</td>
<td>P</td>
<td><em>ham.</em> Line</td>
<td>2:11</td>
<td>2:38</td>
</tr>
<tr>
<td>5</td>
<td>35</td>
<td>13</td>
<td>P</td>
<td>Secretary</td>
<td>2:29</td>
<td>2:38</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>12</td>
<td>P</td>
<td>Assem. Line</td>
<td>2:40</td>
<td>2:46</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>12</td>
<td>E</td>
<td>Clerk Tpyst</td>
<td>2:58</td>
<td>2:49</td>
</tr>
<tr>
<td>8</td>
<td>18</td>
<td>17</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>3:10</td>
<td>3:00</td>
</tr>
<tr>
<td>9</td>
<td>17</td>
<td>11</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>3:16</td>
<td>3:20</td>
</tr>
<tr>
<td>10</td>
<td>18</td>
<td>12</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>3:32</td>
<td>3:15</td>
</tr>
<tr>
<td>11</td>
<td>17</td>
<td>11</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>3:47</td>
<td>3:38</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>10</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>3:52</td>
<td>3:42</td>
</tr>
<tr>
<td>13</td>
<td>35</td>
<td>12+</td>
<td>MR</td>
<td>Teacher</td>
<td>4:09</td>
<td>3:45</td>
</tr>
<tr>
<td>14</td>
<td>17</td>
<td>11</td>
<td>MR</td>
<td>Student</td>
<td>4:15</td>
<td>4:20</td>
</tr>
<tr>
<td>15</td>
<td>21</td>
<td>10</td>
<td>MR</td>
<td>Can Wash</td>
<td>4:22</td>
<td>4:05</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>10</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>4:55</td>
<td>4:28</td>
</tr>
<tr>
<td>17</td>
<td>49</td>
<td>12</td>
<td>P</td>
<td>Sales Clerk</td>
<td>5:42</td>
<td>6:08</td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>72</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>5:22</td>
<td>5:47</td>
</tr>
<tr>
<td>19</td>
<td>17</td>
<td>11</td>
<td>(SEd) MR</td>
<td>Student</td>
<td>6:20</td>
<td>5:58</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>11</td>
<td>MR</td>
<td>Bus Bus</td>
<td>6:22</td>
<td>7:02</td>
</tr>
<tr>
<td>21</td>
<td>46</td>
<td>12</td>
<td>MR</td>
<td>Never Empl.</td>
<td>7:09</td>
<td>8:02</td>
</tr>
<tr>
<td>22</td>
<td>20</td>
<td>12</td>
<td>E</td>
<td>Can Wash</td>
<td>8:58</td>
<td>8:36</td>
</tr>
</tbody>
</table>
REFERENCES


Pages 1, 3, 5, 6, 7, 8, 10, 14, 20, 24, 26, 28, 29

Pages 1, 2

Page 1
Ogren, K.E. Ogren Automobile Washing Work Sample, Duluth Sheltered Workshop, Duluth, Minnesota, 1974.

Pages 3,4
Schneck, G.R. Schneck Arc Welding Work Sample, Ind. School dist. #1, Anoka, Minnesota, 1971.

Pages 4, 24

Page 12

Page 14

Page 15

Page 17

Pages 23, 27
Stout U-Bolt Assembly

Work Sample

Developed by:

Karl Botterbusch, Ph.D., Development Specialist
Materials Development Center
University of Wisconsin - Stout

June, 1974
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>II. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>A. Title</td>
<td></td>
</tr>
<tr>
<td>B. Assessment Description</td>
<td></td>
</tr>
<tr>
<td>C. Job Listing</td>
<td></td>
</tr>
<tr>
<td>D. Related Jobs</td>
<td></td>
</tr>
<tr>
<td>E. Validity</td>
<td></td>
</tr>
<tr>
<td>II. INSTRUCTIONS TO THE EVALUATION</td>
<td>3</td>
</tr>
<tr>
<td>F. Prerequisites</td>
<td></td>
</tr>
<tr>
<td>G. Work Sample Conditions</td>
<td></td>
</tr>
<tr>
<td>H. Administration Equipment</td>
<td></td>
</tr>
<tr>
<td>I. Setup and Breakdown</td>
<td></td>
</tr>
<tr>
<td>III. ADMINISTRATION</td>
<td>5</td>
</tr>
<tr>
<td>D. Client Orientation</td>
<td></td>
</tr>
<tr>
<td>E. Practice Session</td>
<td></td>
</tr>
<tr>
<td>F. Performance Session</td>
<td></td>
</tr>
<tr>
<td>IX. SCORING</td>
<td>11</td>
</tr>
<tr>
<td>A. Criteria</td>
<td></td>
</tr>
<tr>
<td>B. Tables</td>
<td></td>
</tr>
<tr>
<td>C. Forms</td>
<td></td>
</tr>
<tr>
<td>X. INSIGHTS</td>
<td>14</td>
</tr>
<tr>
<td>XI. DEVELOPMENTAL DATA</td>
<td>15</td>
</tr>
<tr>
<td>A. Description of Analysis</td>
<td></td>
</tr>
<tr>
<td>B. Norming Method</td>
<td></td>
</tr>
<tr>
<td>C. Reliability</td>
<td></td>
</tr>
<tr>
<td>XII. CONSTRUCTION</td>
<td>19</td>
</tr>
<tr>
<td>A. Diagrams and/or Photographs</td>
<td></td>
</tr>
<tr>
<td>B. Materials List</td>
<td></td>
</tr>
<tr>
<td>C. Assembly Instructions</td>
<td></td>
</tr>
<tr>
<td>XIII. BIBLIOGRAPHY</td>
<td>25</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>26</td>
</tr>
</tbody>
</table>
I. INTRODUCTION

A. Title - STOUT U-BOLT ASSEMBLY WORK SAMPLE

B. Assessment Description - The purpose of the STOUT U-BOLT ASSEMBLY WORK SAMPLE is to provide vocational evaluators with an accurate device for assessing the client's ability, interest, and work personality necessary to perform on low level bench assembly and related jobs.

The STOUT U-BOLT ASSEMBLY WORK SAMPLE consists of four separately timed trials in which the client fastens nuts, straps, and ferrules on 200 U-bolts (50 per trial). The use of separately timed trials enables the evaluator to obtain at least four performance measures of a routine task and to compare these measures with the industrial standards given in this manual. The work sample was designed to be fairly lengthy and to be very routine, so that client behaviors indicating boredom, frustration tolerance, and fatigue may be observed.

C. Job Listing - The job analysis performed on this work sample resulted in assigning a Data-People-Things (DPT) code of .887 to the sample. In the Dictionary of Occupational Titles (D.O.T.) classification system, an .887 job requires “no significant relationship” with data or people and a minimal relationship with things (i.e., physical objects) (U.S. Department of Labor, 1965). All .887 jobs are in the Handling Worker Trait Group (WTG) and require little or no previous training. Work activities consist of "performing routine, non-machine tasks involving little or no latitude for judgment (U.S. Department of Labor, 1965, Vol. II, p. 360). Workers who are employed in these jobs need to have "physical stamina; an inclination toward routine, repetitive activities; some dexterity with the fingers and hands . . . and the ability and willingness to follow directions (ibid, p. 360).” Some of the assembly jobs in this WTG are given below:

1. 737.887 Assembler (Ammunition)
2. 733.887 Assembler (Pen and pencil)
3. 739.887 Assembler Dressmaker Form (Model and pattern)
4. 731.887 Assembler , Toy Voices (Toys and games)
5. 715.887 Dial Brusher (watch and clock)

"In 1970, approximately 865,000 assemblers were employed in manufacturing plants; the great majority were in plants that made fabricated metal products, electrical and non-electrical machinery and motor vehicles (U.S. Department of Labor, 1972, p. 529). It About half of all assemblers are women who are typically employed as bench assemblers "because such work is relatively light and often involves handling delicate objects (ibid p. 529). Men are employed as floor or line assemblers where the work is physically harder. "Information from a limited number of union-management contracts indicated that wages ranged from $2.15 to $3.75 an hour in 1970 (ibid, p. 530). It is estimated that there will be 44,000 average annual openings to 1980. The occupational outlook is described as follows:
Moderate long-run increase despite continuing automation of assembly processes. Employment sensitive to changes in business conditions and national defense, particularly in plants that produce automobiles, aircraft and other durable goods (Rosenthal, 1972, p. 31).

D. Related Jobs - Examples of other handling jobs which are not assembly jobs are:

1. 371.887 Cook, Helper (Hotel and rest.) I
2. 421.887 Farm Hand, General (Agric.) I I
3. 788.887 Last Puller, Hand (Shoe and boot)
4. 920.887 Dental Floss Packer (Surgical appl.)
5. 920.887 Tobacco Wrapper (Tobacco)

As may be seen from the above examples, jobs in this WTG include packaging, laboring, and jobs in assisting higher skilled workers. Although this work sample is designed for .887 bench assembly jobs, the evaluator may be able to extend the results to cover additional handling jobs.

J. Validity - Construct validity was investigated by correlating an earlier version of this work sample with the Finger Dexterity and Manual Dexterity aptitudes of the General Aptitude Test Battery. Four trials of the work sample and the GATB Dexterity aptitudes were administered to 54 (20 male and 34 female) college students. Pearson r correlations between the number of minutes to complete each trial and the dexterity aptitudes were as follows:

<table>
<thead>
<tr>
<th>Trial</th>
<th>Finger Dexterity</th>
<th>Manual Dexterity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.235</td>
<td>.429**</td>
</tr>
<tr>
<td>2</td>
<td>.271*</td>
<td>.420**</td>
</tr>
<tr>
<td>3</td>
<td>.219</td>
<td>.504**</td>
</tr>
<tr>
<td>4</td>
<td>.252*</td>
<td>.424**</td>
</tr>
<tr>
<td>Total</td>
<td>.267*</td>
<td>.455**</td>
</tr>
</tbody>
</table>

*p

The results imply that the STOUT U-BOLT ASSEMBLY WORK SAMPLE is a good measure of manual dexterity and a fair to poor measure of finger dexterity.

III. INSTRUCTIONS TO THE EVALUATOR

A. Prerequisites - No tests or other work samples are required prior to the administration of this work sample. However, the evaluator should be aware of any upper extremity handicaps which would interfere with the range of motions required in this work sample.
Because the administration instructions differ slightly for right and left handed clients, it is important to determine the handedness of the client prior to administration.

B. **Work Sample Conditions** - The work sample should be set up indoors in a well lighted area. The client sits during administration and is not required to wear any special clothing or use any safety equipment.

It is important that the evaluator follow the instructions carefully. Each time the work sample is administered, the instructions should be read (NOT RECITED) to insure that administration will be identical for each client. During the orientation to the work sample, the evaluator and client should both stand near the work sample. The orientation does not have to be read verbatim by the evaluator; all the information should be presented in a casual and relaxed manner. If the client appears confused, provide elaborations or additional explanations or examples. Answer any questions during and after the orientation. The evaluator is to sit facing the work sample while giving the administration instructions to the client. The client is to stand behind him so that he can clearly see the evaluator's motions. If the client is unable to stand, he should sit to one side of the evaluator. Following the evaluator's demonstration, the client sits and practices the assembly until he completes three successive correct assemblies. During this practice trial the evaluator should ascertain if the client understands how the task is performed. The evaluator should watch closely for deviations from the standard procedures and make whatever corrections are necessary. The client then disassembles all assembled practice units so that there are 50 U-bolts in the first box.

The norms for this work sample were developed using the Master Standard Data method of predetermined time study. These industrial standards assume that the sample is set up, administered, and timed in the exact manner described in this manual. Each trial is timed separately and begins after the client has learned how to assemble the U-bolts and after the boxes have been arranged for assembly. For each trial the evaluator is to start timing the client when his left hand touches the first unassembled U-bolt; timing is to be stopped when the 50th completed assembly is placed in the box. The industrial standards don't include allowances for activities such as moving the boxes and walking to a time clock. IF THE EVALUATOR WISHES TO USE THE INDUSTRIAL STANDARDS PRESENTED IN THIS MANUAL, HE MUST CAREFULLY AND ACCURATELY TIME ONLY THE ACTUAL ASSEMBLY PROCESS.

C. **Administration Equipment** - The following equipment is required prior to administration:

1. One foam rubber mat with layout as indicated in Figure 4
2. Five parts presentation boxes (Figure 6)
3. Four unassembled U-bolt boxes (Figure 5)
4. Four assembled U-bolt boxes (Figure 7)
5. Jig securely fastened to work table (Figure 8)
6. Two hundred U-bolts, 50 in each unassembled U-bolt box
7. Four hundred straps in the parts presentation box in front of the jig
8. Eight hundred hex nuts, 400 each in two of the parts presentation boxes to the immediate left and right of the strap box
9. Four hundred ferrules, 200 each in two parts presentation boxes to the immediate left and right of the nut boxes
10. One steady work table at least one foot longer on each side of the layout (Figure 4) and six inches wider
11. One chair or shop stool having a difference of from nine to eleven inches between the seat of the chair and the working surface of the table
12. One timing device accurate to 1/10 of a second
13. One copy of this manual
14. Client Record Sheet (Figure 2) and Client Observation Form (Figure 3)

D. Setup and Breakdown - Prior to administration the evaluator should check the placement (see Figure 4) of all boxes and contents (see above) of the parts presentation boxes and the unassembled U-bolt boxes. The hardware should be checked to make sure that the threads on all U-bolts are not damaged.

The client must not disassemble any U-bolts until he has completed all four trials. The assembled U-bolts may then be checked for errors prior to disassembly. There are several ways to disassemble the U-bolts and the method used depends upon the evaluation unit:

1. a parallel inspection-disassembly work sample could be established in which another client disassembles the U-bolts and records errors;
2. upon completion of four trials, the client could reverse the process and disassemble the U-bolts; or
3. the evaluator or evaluator aide could perform the disassembly process.
III. ADMINISTRATION

A. Client Orientation –

Note to Evaluator: This orientation is to be presented to each client before administering the STOUT U-BOLT ASSEMBLY WORK SAMPLE. The material does not have to be read verbatim. However, all information should be covered. Deliver the presentation in an informal manner and pause to answer questions as necessary. The purpose of this orientation is (1) to inform the client about assembly and similar jobs which are related to this work sample and (2) to inform the client of specific traits or characteristics on which he is being evaluated.

The STOUT U-BOLT ASSEMBLY WORK SAMPLE that you will be taking in a few minutes will help you and me to find out several things about you. One of the things that it will tell us is how well you can do on assembly jobs and how well you like this type of work.

Let me tell you a few things about these assembly jobs. Many of the things we commonly use are put together in factories by people called "assemblers". These people put together small or large parts to make things such as: television sets, radios, toys and dolls, and household items such as: mops, brooms, and picture frames. If you were employed in one of these assembly jobs, you would work inside a factory and be close to other people doing jobs like yours. You would probably sit at a bench and use small tools such as screwdrivers, drills, soldering guns, and wrenches to put things together. Often the parts would be brought to you in boxes or on a conveyer belt. In many assembly jobs you would only complete one part of the finished product. You would pass this along to the next worker so he could finish his part. Your foreman would carefully supervise your work and other people call “inspectors” would check it carefully for mistakes. People don't have to have a lot of education to become assemblers, but they have to be good with their hands, be able to do the same thing over and over again, enjoy working near other people, and to carefully follow directions. Sometimes people who do well in assembly jobs get promoted to more advanced jobs. Some may become foremen or inspectors themselves and others become assemblers who work on very complicated equipment.

The evaluator is then to tell the client of nearby factories that hire assemblers or related jobs; what the wages are; what the working conditions are; and how many of these jobs are available. If no assembly jobs are available, give information about related jobs in the Handling Worker Trait Group (.887), such as packaging, dishwashers, cook helper, and custodians.
This work sample will tell us other things about you besides how well you like assembly work. It will help us to find out how well you can move your hands and how well you can use your fingers. After you take this work sample, both of us will know how long you can do the same thing without getting mad at the job, bored, or tired.

Do you have any questions?

If the client has no questions, the evaluator begins to read the instructions and demonstrate the work sample.

B. Practice Session –

Evaluator's Note: Read the following instructions to the client and demonstrate the operations as described. Determine if the client is right or left handed before beginning. (See Figure 1 for a diagram of the assembled U-bolt.)

The evaluator stands in front of chair.

INTRODUCTION

Your task will be to take the U-bolts in these four boxes (Point to the stack of boxes) and to fasten these nuts (Point), straps (Point), and ferrules (Point) unto the U-bolts. Pay close attention because you will be asked to assemble these exactly as I will show you.

The evaluator uses two hands to lift the first box of unassembled U-bolts and places it in the space indicated on the left side of the work area. With his right hand, he lifts the empty box and places it in the space indicated on the right side of the work area.

Please stand behind me and look over my shoulder while I show you how to do it.

The evaluator sits in chair.

INSERT U-BOLT IN JIG.

Reach into this box and pick up one U-bolt with your Left hand (Reach and pick up U-bolt at bottom with left thumb and forefinger). Turn it so that the threads are pointing up. (Rotate wrist while moving left arm toward jig) and place it in the jig.
FIRST NUTS

Using both hands at the same time, reach into the two nut boxes and pick up one nut in each hand. (Simultaneously, move the left and right hands towards nut boxes. Pick up one nut with thumb and fore-finger of each hand.) With your thumbs and fore-fingers start one nut on each side of the U-bolt (start the two nuts simultaneously). After the nuts are started, turn them down as far as you can; spin the left nut with your left thumb and the right nut with your right forefinger. (Spin the nuts using inside of thumb and forefingers.)

FIRST STRAP

Use your right (Say "left" if client is left handed) hand to reach into the box, directly in front of you, pick up one strap, and place it on the U-bolt. (Pick up strap with thumb and fingers.)

FERRULES

Next with both hands at the same time reach into these boxes and pick up one ferrule in each hand. (Reach toward ferrule boxes. Pick up one ferrule with thumb and forefinger of each hand.) Place one ferrule on each side of the U-bolt. (Use thumb and forefinger to place the ferrules simultaneously on the ends of the U-bolt.)

SECOND STRAP

Reach into the strap box with your right hand (say "left" if client is left handed), pick up one strap and place it on the U-bolt. (Pick up strap with thumb and fingers.)

SECOND NUTS

Using both hands at the same time, reach into the nut boxes and pick up one nut in each hand. (Simultaneously, move right and left hands toward nut boxes. Pick up one nut with thumb and forefinger of each hand.) Start one nut on each side of the U-bolt with your thumbs and forefingers. (Start nuts simultaneously and turn these down.) Be sure to tighten the nuts so that the unit does not rattle. (Tighten nuts simultaneously using thumb and fore-finger to twist nuts against strap.)
REMOVE COMPLETED ASSEMBLY

Lift the completed assembly out of the jig with your right thumb and fingers and place it in this box. AT THE SAME TIME, use your left hand to reach into the box on the left, pick up another U-bolt and place it in the jig. (Simultaneously, remove completed assembly with right hand and place it in the box. Reach with left hand, grasp and position the second U-bolt in the jig.)

This completes one assembly. Are there any questions?

Pause, answer questions.

Just so I'm sure you know how to assemble the U-bolts, let me show you again.

Repeat sequence exactly as above. Answer questions.
The evaluator stands up.

Now you try it. Please sit here.

After client is sitting, the evaluator says:

You may begin whenever you are ready.

The evaluator carefully observes that the client follows proper sequences, holds the parts correctly, and completes three correct assemblies in a row before stopping him. During this time the evaluator is observing the client's dexterity and speed of learning. He records the number of assemblies required to reach the criterion of three correct in a row. Then he says:

Now that you have learned to assemble these U-bolts, please take them apart so that I can begin timing you.

Wait for the client to disassemble U-bolts.

C. Performance Session -

TIMING INSTRUCTIONS

I am going to see how long it takes you to assemble these four boxes of U-bolts. You will be timed separately on each box. Please try to work at a good pace. Put your left hand on the first U-bolt and wait until I say begin.

The evaluator pauses, checks to see if the client has left hand on first U-bolt.
Begin.

START TIMING

The evaluator observes the client to see if he has started promptly and if he is using the correct procedure. At various times during the assembly the evaluator observes the client for the behaviors.

TIMING FOR EACH BOX IS STOPPED WHEN THE CLIENT PLACES THE 50TH COMPLETED ASSEMBLY IN THE BOX.

The evaluator records the number of minutes and seconds taken to complete the trial. He moves the boxes himself or instructs the client how to move them. He then repeats the timing process, recording the minutes and seconds taken to complete all four trials.
1 = U-BOLT
2 = STRAP
3 = FERRULE
4 = NUTS
IV. SCORING

A. Criteria - The time score for each trial is the number of minutes and seconds required to assemble the 50 U-bolts in that trial. These are recorded in the time score column on the Client Record Sheet (Figure 2). These scores are then plotted on the time profile at the bottom of Figure 2. The "Time to Complete Task" column contains the minutes and seconds; the time scores are plotted according to these numbers. Figure 2 (Client Record sheet) can be used to plot the time profile when more than four trials are administered. Although this form allows for five separate administrations of four trials each, there is no set number of administrations; this depends upon the abilities and interests of the client. In using the Client Record Sheet, the times in minutes and seconds are entered for each trial and for each administration are recorded in the grid at the top of the sheet. These are then plotted on the graph.

During the administration of the work sample, the evaluator should make numerous relevant observations about the client's work personality (Neff, 1968; Lofquist and Dawis, 1969). These observations must be handled with extreme caution, and the evaluator should constantly check his observations against: (1) observations made in similar situations, (2) observations made in dissimilar situations, (3) observations made by other evaluators, and (4) the feelings and interpretations of the client. A serious problem arises in three and four above when communicating to other evaluators and to the client. It is for this reason that simple definitions must be set down, contexts described, possible interpretations suggested, and this information communicated clearly with depth and with feedback to and from other evaluators and the client. Since it is not wise to mix observations and interpretations, the Client Observation Form (figure 3) was developed to help overcome these problems and to help accomplish the goal of accurate, objective work personality assessment.

It is particularly important to observe the client during evaluation and then to discuss his performance as it relates to his emotional state, general health, and tension. For example, a client will not perform optimally if he is not in good health. A client may, however, incorrectly state that he did not feel well during the administration of the work sample. Such statements should be carefully considered and checked for accuracy either by readministration of this work sample or by observation of the client in other similar situations.

It must be emphasized that it is easy for the evaluator to become "carried away" in his observations and in his interpretation of these observations. An observation noted only once may be atypical and not typical. It is for this reason that the last column in the form is headed "Possible Interpretations"; it is the responsibility of the evaluator to support or refute these tentative interpretations by being aware of nonverbal communications, observation in similar and dissimilar situations, client functioning with a different evaluator and by in-depth client questioning.
### STOUT U-BOLT ASSEMBLY WORK SAMPLE
Client Record Sheet

<table>
<thead>
<tr>
<th>Client Name</th>
<th>Date First Administered</th>
<th>Date Evaluated</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TRIAL</th>
<th>First Administration</th>
<th>Times in Minutes and Seconds</th>
<th>Second Administration</th>
<th>Third Administration</th>
<th>Fourth Administration</th>
<th>Fifth Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Time Profile**

<table>
<thead>
<tr>
<th>Time</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>19' 11&quot;</td>
<td>110</td>
</tr>
<tr>
<td>20' 0&quot;</td>
<td>105</td>
</tr>
<tr>
<td>21' 15&quot;</td>
<td>100</td>
</tr>
<tr>
<td>22' 19&quot;</td>
<td>95</td>
</tr>
<tr>
<td>23' 23&quot;</td>
<td>90</td>
</tr>
<tr>
<td>24' 26&quot;</td>
<td>85</td>
</tr>
<tr>
<td>25' 30&quot;</td>
<td>80</td>
</tr>
<tr>
<td>26' 34&quot;</td>
<td>75</td>
</tr>
<tr>
<td>27' 38&quot;</td>
<td>70</td>
</tr>
<tr>
<td>28' 41&quot;</td>
<td>65</td>
</tr>
<tr>
<td>29' 45&quot;</td>
<td>60</td>
</tr>
<tr>
<td>30' 49&quot;</td>
<td>55</td>
</tr>
<tr>
<td>31' 52&quot;</td>
<td>50</td>
</tr>
<tr>
<td>32' 56&quot;</td>
<td>45</td>
</tr>
<tr>
<td>33' 5&quot;</td>
<td>40</td>
</tr>
<tr>
<td>35' 4&quot;</td>
<td>35</td>
</tr>
<tr>
<td>36' 8&quot;</td>
<td>30</td>
</tr>
<tr>
<td>37' 11&quot;</td>
<td>25</td>
</tr>
<tr>
<td>38' 15&quot;</td>
<td>20</td>
</tr>
<tr>
<td>39' 19&quot;</td>
<td>15</td>
</tr>
<tr>
<td>40' 22&quot;</td>
<td>10</td>
</tr>
<tr>
<td>41' 26&quot;</td>
<td>5</td>
</tr>
</tbody>
</table>

---

Trial Administration

<table>
<thead>
<tr>
<th>Trial Administration</th>
<th>First</th>
<th>Second</th>
<th>Third</th>
<th>Fourth</th>
<th>Fifth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>

**Figure 2**
Client Observation Form  STOUT U-BOLT ASSEMBLY WORK SAMPLE

Evaluator:

Client: ________________________________

Date: ________________________________

The following items are some of the behaviors which can be observed during the assembly of the work sample: (1) appearance, (2) attendance and punctuality, (3) stamina, (4) gross body movements, (5) work rhythm, (6) fatigue, (7) manipulation, (8) attention, (9) tension, and (10) interest.

<table>
<thead>
<tr>
<th>Behavior and Observations</th>
<th>Positive</th>
<th>Negative</th>
<th>Situational Factors</th>
<th>Possible Interpretations (hypotheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
B. Tables - The table required for the recording and converting of the time scores is presented in Figure 2.

C. Forms - The Client Observation Form (Figure 3) contains three major headings: Behavior and Observations, Situational Factors, and Possible Interpretations. The Behavior and Observations headings contain two columns for critical observations of a positive or negative nature. Definitions or illustrations are given to suggest types of statements to be entered in these two columns.

The Situational Factors column is to remind the evaluator to always be alert to and skeptical of factors that may bring about atypical functioning on this work sample, especially in the behaviors listed in the first two columns. In recording data in this column the evaluator should be aware of factors affecting the results which may not be obvious in the immediate situation. Thus, the evaluator will be concerned about and ask discerning questions about the following: (1) interest and life goals and how they relate to this particular work sample; (2) pressures from home, friends, and other important people in the client's life; (3) adequacy of rest and nutrition; (4) recent traumatic experiences; and (5) fatigue from a previous work sample or test.

The Interpretation Information Form is provided for the evaluator's use. This form should be completed by the evaluator after this work sample is completed and the client demonstrates adequate ability. This form's primarily used as a guideline in making decisions concerning the client in relation to his performance on this work sample.

V. INSIGHTS

The last column of the Client Observation Form reflects the fact that many variables are involved in the performance of even a simple work sample. In order, therefore, to make meaningful interpretations of observed behaviors and work sample outcomes it is absolutely essential that the evaluator make strong efforts to validate his tentative interpretations. It is important to check evaluator observations and tentative interpretations against client feelings and interpretations. The evaluator will want to have in mind a series of gentle but direct questions before him, questions such as:

1. How did you like this task generally? Why did you like (or dislike) this task? Would you be interested in earning a living doing work like this? When (under what circumstances) would you do this?
2. What particular thing about the task did you dislike? Why? What particular thing about the task did you like? Why?
3. How do you think you did (performance) on this work sample compared to others? With whom are you comparing yourself? How do you feel you compare when you compare yourself with other clients? How do you feel you compare with people who do jobs like this for a living? Why or why not?
4. Did you learn anything about yourself when you took this work sample? What? Will that mean anything to you or to an employer when you seek work? What?
In conclusion, the observational and interpretational parts of this manual are not intended to provide the evaluator with sample answers and naive interpretations of observations. Because interpretation of scores and behavioral observation must depend on the skill of the evaluator, these sections should be considered as guidelines and sources of ideas and not as specifications and standards. It is hoped that these sections have given the evaluator an additional tool and a method to be used in interpretation rather than pat answers to observations.

The four or more time scores for the work sample should be compared with the industrial norms on the left side of the Time Profile on the Client Record Sheet (Figure 2). These norms were developed using a predetermined time-motion system of analysis. Based on many years of research, industrial engineers have determined that the average worker can perform certain motions in certain amounts of time. The motions required to perform one cycle of a routine job are determined and the time to complete one unit is calculated (see Appendix A). The time standard for this work sample is based on the number of seconds required to assemble one U-bolt. Under normal conditions, a trained motivated employee would be able to assemble one box of U-bolts in 21 minutes, 15 seconds (21.25 min). As seen on Figure 2, this is equal to 100%. This 100% figure does not mean that the worker must perform as fast as possible to achieve the goal of 50 assembled U-bolts in 21 minutes 15 seconds. Rather, the 100% means that the worker is performing at an efficient pace - a pace he will be able to maintain throughout the working day. Highly motivated or skilled workers frequently perform at more than 100%; new or lesser skilled workers below 100%. In short, the 100% standard is an average.

VI. DEVELOPMENTAL DATA

A. Description of Analysis - Because this work sample was developed using Master Standard Data techniques, no norm group per se was involved.

B. Norming Method - Master Standard Data

C. Reliability - The immediate test-retest reliability of the work sample was estimated on an earlier version of this work sample by intercorrelating the time scores of 54 college students on four trials. The means, standard deviations, and Pearson r correlations for each trial were as follows:

<table>
<thead>
<tr>
<th>Trial</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26.592</td>
<td>3.579</td>
<td>.890</td>
<td>.828</td>
<td>.770</td>
</tr>
<tr>
<td>2</td>
<td>24.944</td>
<td>3.444</td>
<td></td>
<td>.871</td>
<td>.827</td>
</tr>
<tr>
<td>3</td>
<td>24.500</td>
<td>3.580</td>
<td></td>
<td>-</td>
<td>.907</td>
</tr>
<tr>
<td>4</td>
<td>23.759</td>
<td>3.173</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*p ≤ .01 for all correlations

These results indicate that the work sample is highly reliable when trials are administered in rapid succession.

Two factors must be considered in interpretation of the time profile. First, industry will usually consider a 70% performance as the minimal acceptable level for employment. A client, who can assemble one box of U-bolts in 27' 38" is performing at the 70% level, most likely has the ability
to perform routine bench assembly jobs. If referral to assembly jobs is considered as a result of this work sample, the evaluator should state that a client performed on an industrially normed work sample and the percentage of industrial norm that he reached. The second factor is the profile, indicating constant, increasing, or decreasing performance. The most important indication of ability (and interest) for this type of work is a steadily increasing performance profile. Thus, a profile showing a steady increase on four trials from 40% (34' 00") to 65% (28' 41"). A decreasing profile usually indicates a lack of interest, boredom, or fatigue.

If a client is interested in assembly jobs and shows a steady increase in performance over the first four trials, the evaluator should consider several subsequent administrations of the work sample. This will provide additional information on the following:

1. An estimate of the client's ability to perform tasks at the competitive level.
2. An understanding of the client's ability to improve based on repetition.
3. The strength of a client's stated interest in assembly work may be determined by giving a number of additional trials to see if the profile begins to level out. Constant increases in performance may indicate a liking for this type of work; decreases in production may mean a disinterest after the novelty of the task has worn off.

If the client is to be recommended for employment, training, or other services as a result of this work sample, the evaluator may want to use the Interpretation Information (Figure 3) to summarize the reasons for this decision.
STOUT U-BOLT ASSEMBLY WORK SAMPLE

Interpretation Information Form

Name_____________________ Date_________________ Evaluator________________

Work Sample Tasks - Assemble the following parts in the following sequence onto a U-bolt: two hex nuts, one strap, two ferrules, one strap, and two hex nuts. Tighten final two nuts with fingers. Remove assembly from jig with right hand and place in container while simultaneously reaching with left hand for next U-bolt. Four boxes of 50 U-bolts each (200 U-bolts total) are assembled. No tools are used.

Task Requirements - Bench assembly jobs in the Handling (.887) Worker Trait Group have the following job requirements: (1) speed and stamina to keep pace for 8 hour day, (2) ability to learn job in short period of time, (3) sufficient manual and finger dexterity to manipulate parts and use common tools.

Education (or training) requirements  __________Yes _________ No  
_________________________________Possibility for improvement

Physical (strengths, dexterity, or disabilities, limitations) requirements  
_________Yes _________N o  
_________________________________Possibility for improvement

Insights
Need for work adjustment  __________Yes _________ No  
If "yes" please justify:

Behavior Precautions: This section should be used to note any behavior which might affect the outcome of your recommendation. Particular work environments or work needs (close supervision, isolated work area, etc.) could be stated and qualified here.

Client Interests:  On-the-job training available?

First job choice__________ Yes__________ No__________
Second job choice__________ Yes__________No__________
Third job choice__________Yes__________No__________

Is job choice available in client’s locale? Yes________ No________ Where________
Past training and/or work related experience __________Yes ________________N o
If "yes" please explain:

Work Sample Outcome:

Number of trials administered______.
Standard reached on first trial_______ %
Standard reached on last trial_______ %

General rating of client ability in this job area:

1 \quad 2 \quad 3 \quad 4
Above Average   Average   Below Average   Poor

Explain:

Jobs which best match the description of the work sample duties (tasks) in order of their relationship. This information can be obtained from a job analysis form or the DOT.

1. Job title and DOT number
2. Job title and DOT number
3. Job title and DOT number
VII. CONSTRUCTION

A. Diagrams

LAYOUT

Boxes are within a 12" radius of the center of the jig.

Figure 4
UNASSEMBLED U-BOLT BOX

PCS      L   W   H
A  2 - 7\(\frac{3}{4}\)" x \(\frac{3}{4}\)" x 3\(\frac{3}{4}\)"
B  2 - 8\(\frac{1}{2}\)" x \(\frac{3}{4}\)" x 3\(\frac{3}{4}\)"
C  2 - 7\(\frac{3}{4}\)" x 1\(\frac{1}{2}\)" x 1\(\frac{1}{2}\)"
D  1 - 8\(\frac{1}{2}\)" x \(\frac{3}{4}\)" x 7\(\frac{1}{4}\)"

SCALE: 1" = 1"

Figure 5
PARTS PRESENTATION BOX

<table>
<thead>
<tr>
<th>POS.</th>
<th>L</th>
<th>T</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>5&quot;</td>
<td>3/4&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>F</td>
<td>8&quot;</td>
<td>3/4&quot;</td>
<td>3 1/4&quot; bottom</td>
</tr>
<tr>
<td>G</td>
<td>9&quot; top</td>
<td>3/4&quot;</td>
<td>3 3/4&quot; top</td>
</tr>
<tr>
<td></td>
<td>8&quot; bottom</td>
<td>3/4&quot;</td>
<td>2&quot; bottom</td>
</tr>
<tr>
<td>H</td>
<td>7&quot;</td>
<td>3/4&quot;</td>
<td>3 3/4&quot;</td>
</tr>
</tbody>
</table>

Figure 6

21
ASSEMBLED U-BOLT BOX

<table>
<thead>
<tr>
<th>PART</th>
<th>QUANTITY</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>2</td>
<td>2-7(\frac{1}{4}) x 1(\frac{1}{4}) x 7(\frac{1}{2})</td>
</tr>
<tr>
<td>K</td>
<td>1</td>
<td>8&quot; x 1(\frac{1}{4}) x 7(\frac{1}{4})</td>
</tr>
</tbody>
</table>

SECTION D

SECTION E

SCALE: \(\frac{1}{4}\) = 1"

Figure 7

22
JIG

SEE DETAIL A BELOW

A 2-4\(\frac{1}{4}\)" x \(\frac{1}{4}\)" x 2"
B 2-2" x 2" x 4\(\frac{3}{4}\)"
C 1-4\(\frac{1}{4}\)" x \(\frac{1}{4}\)" x 2"

SCALE: \(\frac{1}{2}\)" = 1"

DETAIL A
(Part C)

SCALE: 1" = 1"
Figure 8
B. Materials List - The STOUT U-BOLT ASSEMBLY WORK SAMPLE consists of 200 U-bolts, 800 nuts, 400 ferrules, 400 straps, a jig, and storage/presentation boxes. There are four unassembled U-bolt boxes, three parts bins, and four assembled U-bolt boxes. All materials in the work sample are common hardware items and should be readily available, thus making it possible for evaluation units to make an exact reproduction of the work sample.

Hardware

The specifications for the hardware are as follows:

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Description</th>
<th>Dimensions</th>
<th>No. Required for Assembly</th>
<th>Total No. Required*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. U-bolt</td>
<td>standard U-bolt</td>
<td>5/16 x 2 x 3 ¼</td>
<td>1</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Course threaded</td>
<td>1 3/8” threaded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hexagon Nut</td>
<td>standard hexagon Nut coarse threaded</td>
<td>5/16”</td>
<td>4</td>
<td>800</td>
</tr>
<tr>
<td>3. Strap</td>
<td>zinc plated bar with 2 holes 1/8” from Each end, holes 3/8” x 5/8”</td>
<td>3/4 x 3 1/16 x 1/8”</td>
<td>2</td>
<td>400</td>
</tr>
<tr>
<td>4. Ferrules</td>
<td>rigid copper tubing</td>
<td>3/4” long, 3/8” inside diameter</td>
<td>2</td>
<td>400</td>
</tr>
</tbody>
</table>

TOTAL 9 1,800

C. Assembly Instructions - The 3/4” ferrules were cut with a pipe cutter from rigid 3/8! inside diameter copper tubing. They were then reamed on both ends and the outsides were filed to remove sharp edges and burrs.

The layout was made of one piece of 1/8” art foam rubber 24 x 48” (Figure 4) The placement of the boxes was outlined and these outlines as well as the names of the boxes were sprayed with blue paint over-stencils. The foam layout mat was fastened to the work table with rubber cement.

The following storage/presentation boxes were constructed:
1. Four unassembled U-bolt boxes (Figure 5)
2. Five parts presentation boxes (Figure 5)
3. Four assembled U-bolt boxes (Figure 7)

All storage/presentation boxes were constructed of 1/4 inch, three ply interior plywood. The wood was cut and then sanded until smooth; all boxes were then assembled with white glue and tacks. The U-bolt racks (Figure 5, C) were made by splitting a pine 2 x 4 and then planning it to
the appropriate dimensions. The assembled boxes were first covered with wood sealer, sanded and finally brush painted with two coats of light blue interior enamel.

The jig (Figure 8) was made of hardwood (8) and fiber board (A and C) and was fastened together using white glue. A 1/81' piece of foam rubber was cemented on the bottom of the jig.
VIII. BIBLIOGRAPHY


# M.S.D. ANALYSIS SHEET

**Department or Activity:** Stout U-Bolt Assembly  
**Operation:** Assemble U-Bolt, Nuts, Ferrules, and Straps  
**Conditions:** All supply boxes 12" from the subject

<table>
<thead>
<tr>
<th>Seq</th>
<th>Description</th>
<th>Code</th>
<th>Time</th>
<th>Freq.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Get (1) U-Bolt from supply box</td>
<td>012S1</td>
<td>17</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Remove from box and place in jig</td>
<td>P12L1</td>
<td>21</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>Get (2) Nuts from supply boxes</td>
<td>012H2</td>
<td>38</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>Remove from boxes and place to U-Bolt</td>
<td>P12C2</td>
<td>57</td>
<td>1</td>
<td>57</td>
</tr>
<tr>
<td>5</td>
<td>Engage (2) Nuts to U-Bolt</td>
<td>RHF</td>
<td>9</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>Run down Nuts to bottom of U-Bolt</td>
<td>UL</td>
<td>8</td>
<td>20</td>
<td>160</td>
</tr>
<tr>
<td>7</td>
<td>Grasp (2) Nuts</td>
<td>02S2</td>
<td>8</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Secure to U-Bolt</td>
<td>EF</td>
<td>11</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>Get (1) Strap from supply box</td>
<td>012H1</td>
<td>25</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>Remove from box and place to U-Bolt</td>
<td>P12L2</td>
<td>36</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>11</td>
<td>Place Strap down on U-Bolt</td>
<td>P2G</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>Get (2) Ferrules from supply boxes</td>
<td>012H2</td>
<td>38</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>13</td>
<td>Remove from boxes and place on U-Bolt</td>
<td>P12L2</td>
<td>36</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>14</td>
<td>Place Ferrules down on U-Bolt</td>
<td>P2G</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>Get (1) Strap from supply box</td>
<td>012H1</td>
<td>25</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>16</td>
<td>Remove from box and place on U-Bolt</td>
<td>P12L2</td>
<td>36</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td>17</td>
<td>Get (2) Nuts from supply boxes</td>
<td>012H2</td>
<td>38</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>18</td>
<td>Remove from boxes and place on U-Bolt</td>
<td>P12C2</td>
<td>57</td>
<td>1</td>
<td>57</td>
</tr>
<tr>
<td>19</td>
<td>Engage (2) Nuts to U-Bolt</td>
<td>RHF</td>
<td>9</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>20</td>
<td>Run down Nuts to Strap</td>
<td>UL</td>
<td>8</td>
<td>40</td>
<td>320</td>
</tr>
<tr>
<td>21</td>
<td>Grasp (2) Nuts</td>
<td>02S2</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Secure to U-Bolt</td>
<td>EF</td>
<td>11</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Get U-Bolt assembly</td>
<td>02S1</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>24</td>
<td>Remove from jg</td>
<td>P2G</td>
<td>5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>Aside assembly to assembly box</td>
<td>P12G</td>
<td>13</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

Items 23, 24, and 25 are done simultaneously to Items 1 and 2.

\[
\text{Work Time} = 4248 \text{ min.} \\
= 25.5 \text{ sec.} \\
= 141.24 \text{ pcs/hr.}
\]

\[
\text{Total:} = 706
\]

---

GENE GAGNON and ASSOCIATES