

VALPAR COMPONENT WORK SAMPLES USES IN ALLIED HEALTH

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INTRODUCTION

First introduced in 1974, the Valpar Component Work Samples (VCWS) were designed for use in the vocational evaluation field. They have since been used in literally millions of evaluations all over the world. It has been gratifying to the Valpar Corporation that its work samples have become standard-setting vocational evaluation tools. To Valpar's delight over recent years, the work samples have been attracting the attention of professionals in other health-related disciplines. Increasingly, Valpar's work samples are becoming standard operating equipment in occupational and physical therapy contexts.

A recent book by Linda Ogden-Niemeyer and Karen Jacobs, *Work Hardening: State of the Art*, (1989) featured descriptions of 22 allied health facilities from around the United States. Of the 22 facilities described in the book, 18 use Valpar work samples for either evaluation services, treatment, or both.

The purpose of this document is to describe the work samples in terms of their purposes and advantages, and to illustrate some of their many and widely varied uses in the allied health settings.

WHAT IS A WORK SAMPLE?

The work sample definition reveals the connection of these instruments to two of the main elements of allied health services: evaluation and treatment. "A work sample is a defined work activity involving tasks, materials, and tools that are similar to those in an actual job (or occupation). It is used to appraise an individual's physical and mental abilities, interests, and other characteristics..." (Wright, 1980, p. 427). From this definition, it can be seen that a primary purpose of work samples relates to client *evaluation*. But work samples have another major purpose as well. The definition pointed out that work samples involve work-related "activity." Because humans learn, grow, and adapt through the experience of doing, and practicing *activities*, work samples are inherently *therapeutic*.

VALPAR WORK SAMPLES

For the purposes of this document, there are 21 individual work samples in the Valpar Component Work Sample (VCWS) series. Each is unique, and has its own special advantages, but they all have several qualities in common that make them particularly well-suited to allied health uses.

CRITERION-REFERENCED INSTRUMENTS

Valpar work samples are criterion-referenced instruments. The focus of criterion-referenced instruments is not on how individuals compare with others, but on whether they can perform certain tasks of interest, defined in terms of a domain of known criteria.

The work samples were designed to simulate, not specific jobs, but rather, the work factors that are required in thousands of specific jobs. Not only are there many different work-related factors, there are, in addition, different degrees of each of these factors required by any given job. The work samples are rated, therefore, not only in terms of *which factors* they require, but also in terms of the *amounts* of these factors they each require. In order to establish this, Valpar used the most widely used system of job classification and analysis in the world, that of the U.S. Department of Labor (DOL), as described in its *Dictionary of Occupational Titles*, 4th edition, (1977) (Revised, 1991), its *Handbook for Analyzing Jobs* (1972) (Revised, 1991), and related documents.

The DOL domain contains several work factor indices (See Appendix A). Some of these, like the Physical Demands factor, are commonly referenced by allied health professionals. In addition to Physical Demands, the DOL domain includes such other major work-related factors as Temperaments, Interests, Aptitudes, level of General Educational Development, and others. Each of these major factors has been divided into specific, multi-leveled subfactors, and each of the thousands of separate jobs in the *Dictionary* has its own list of required factors and the specific levels of these factors. Valpar refers to this list of factors as the Worker Qualifications Profile (WQP).

Because each work sample in the VCWS series is keyed to the DOL system, it also has its own WQP. Therefore, when a client performs a work sample according to the standard directions, and at an appropriate rate of work (see below) and accuracy level, he or she has demonstrated the capacity to perform actual jobs that require similarly rated work factors. In this sense, the work samples are *criterion-referenced* instruments, and the domain they reference is the DOL system of job analysis and classification.

MTM AND RATE OF WORK ANALYSIS

The work samples have been subjected to rate of work analyses by licensed, industrial engineers. Most of the work samples contain tasks conducive to a type of work rate analysis known as Methods-Time Measurement (MTM). The procedure is the most reliable and widely used system in the world (Prabhu and Baker, 1986, pp. 57-58 and 17), and results in a time standard for the completion of the work sample according to the standard instructions. The standard represents the time a well-trained worker would be expected to perform tasks like those of the work sample within a typical industrial setting over the course of an eight hour work day. Valpar uses the MTM standard to determine whether the individual has met the work sample WQP requirements. If the individual completes the work sample within the MTM standard, and has met the pertinent accuracy requirements, he or she has demonstrated the work factors required by the work sample, and the WQP may be confidently used as a guide in vocational exploration.

In addition to helping to establish that the individual has vocational skills at least as high as those required by the work sample, the MTM produces a *rate of work percent* score. This index is particularly useful in the treatment phase of work hardening situations in which the individual is required to perform the work sample tasks repeatedly over a period of time.

Improvements in the individual's rate of work percent score reflect improvement in the work-related factors assessed by the work sample, and others, such as range of motion, strength, endurance, and so forth.

NORM-REFERENCED INSTRUMENTS

Not only are the work samples criterion-referenced instruments, most of the VCWS series have their own normative information, which makes it possible to compare client performance on the work samples to the performance of various groups of individuals. Valpar offers free assistance to work sample users who wish to develop local norms. In these cases, users may wish to compare client performance to that of similarly disabled individuals. Or, comparisons with individuals in occupations similar to the one the client worked in before his or her injury may be helpful. Or, the therapist may wish to compare client performance to that of a group of persons in work situations like those to which the client aspires.

SECONDARY CHARACTERISTICS

The work tasks of each work sample are, like most human activities, multidimensional, involving physical, mental, and emotional aspects. Each of the work samples, therefore, provides a multidimensional view of client behavior within the special context of the work sample's tasks at their work factor ratings. These so-called "secondary characteristics" relate to the individual's emotional reactions to work, work habits, work interests, and so forth. Sometimes called "clinical observations," information related to the client's "*motivation, self-concepts, interpersonal relationships, initiative, ability to accept criticism, concentration, attention span, physical stamina emotional maturity...and the ability to improve in any of these factors*" (Wright, 1980, p. 428) are some examples of secondary characteristics that are revealed by work samples. An understanding of these elements of client behavior is crucial to a thorough work evaluation. The work sample manuals list the pertinent secondary characteristics and offer guidance to therapists in their use.

GENERAL ADVANTAGES OF THE WORK SAMPLES

The VCWS Series has a number of advantages:

- The VCWS Series simulates actual work tasks, therefore the evaluator or therapist can place more confidence in the results. Work samples require skills similar to those of actual jobs; the evaluatee can either do the work or not, and by implication, any work of a similar nature.
- Each work sample has a Worker Qualifications Profile that corresponds directly to the coded qualifications profiles of over 12,000 jobs analyzed by the United States Department of Labor. Vocational exploration is greatly enhanced by the information yielded by the VCWS Series because Valpar used the DOL methods to analyze the work samples.

- Not only do the work samples simulate “real” work situations, they also provide immediate feedback to the evaluatee on his or her performance. The evaluatee’s interest level is enhanced, and his or her confusion and frustration are reduced. A more valid estimation of the evaluatee’s true capacity is therefore obtained.
- Successful performance of work samples depends less upon verbal skills, therefore work samples tend to be less culturally biased than most paper-and-pencil tests.
- Work samples simulate actual job situations, therefore the evaluator or therapist can monitor a variety of work-related behaviors which provide crucial information. For instance, the evaluatee may be completely unsuited to the work sample tasks because of physical disability. Signs of fatigue or boredom (complaints, facial expressions, etc.) would not be revealed by a paper-and-pencil test.
- Work samples are very useful in conjunction with evaluatee interest information obtained from other sources. Work samples can confirm the evaluatee’s interest in similar work. Or, the evaluatee may discover, in performing a work sample, that he or she is actually quite uninterested in work like that of the work sample. Paper-and-pencil tests cannot reveal such information.
- Work samples can be used in work hardening situations, both as aids in vocational adjustment training, enhancing strength and endurance, and as tools to measure progress.

Beginning in October of 1990, a Valpar representative interviewed several allied health professionals to determine what they found useful in the VCWS series. The remaining portion of this section summarizes comments of these individuals, some of whom were paid consultants.

Like most jobs, work samples are *goal-directed*; their exercises have a beginning, a middle, and an end, or product. They are *face valid*. This helps to reduce client resistance, and the work sample tasks become more appealing to injured workers. The therapist can usually place greater confidence in the results of a face valid instrument because the client will have given his or her best effort.

While they are often fun to take, the work samples can also be challenging. Completing such tasks leads to the sense of accomplishment that comes from having “done the job”, or of having produced something tangible. Patients are encouraged and motivated by this.

The work samples are absorbing to clients. They hold the clients’ attention. As a result, the work samples are easier to administer, and the therapist need not spend an inordinate amount of time attending directly to clients. The therapist is freed to do other things while the client carries out a series of assigned tasks on work samples that may take them hours.

unlike norm-referenced tests, which may only be given to clients one time, Valpar's criterion-referenced work samples may be administered many times without reducing the usefulness of the results for evaluation purposes. This is so because, unlike written tests, work samples assess the skills of *direct interest*. If the skills are demonstrated by the patient, regardless of how many times he or she may have performed the work sample, the therapist may justifiably conclude that he or she is capable of similar work. There is no need to rely on inferences based on one administration only.

Repeated administration of the work samples (or individual work sample exercises) leads to client improvement in the *same dimensions the work samples were designed to evaluate*, including physical capacities, aptitudes, and secondary characteristics. Because they were designed to assess such a broad range of multidimensional, work-related behaviors and client characteristics, the therapeutic applications of Valpar's work samples are likewise numerous and varied. Some of the general therapeutic objectives for which the work samples are used are as follows:

- improve work skills
- improve work habits
- improve, and develop more realistic, self-perceptions
- increase motivation
- increase strength
- increase endurance
- increase range of motion
- increase concentration, attention span
- increase work speed and accuracy
- increase coordination

The work samples are useful in revealing symptom magnification in various ways. For instance, inconsistencies between client performance and client perceptions of his or her abilities are readily apparent. When these are pointed out to the injured worker, he or she is provided with a more realistic view of his or her true work capacities.

The work samples are highly flexible, and can be used in all sorts of nonstandard ways with all sorts of injuries and illnesses, while still providing solid, objective data on client improvement. Most of them contain work tasks which are easily graded from easier to harder, shorter to longer, lighter to heavier, and so forth.

Because they provide clear, relevant, objective information on so many aspects of client injury and recovery, the work samples are appealing to insurance carriers, attorneys, judges, and physicians. There are rarely any problems with billing or service reimbursement; evaluation results based on Valpar work samples have a great advantage in courtroom settings; and physicians naturally prefer to refer patients to therapists who provide them with concise reports which, nevertheless, efficiently describe the issues of concern.

TARGET POPULATIONS FOR USE OF WORK SAMPLES IN ALLIED HEALTH

- Industrial Rehab/Injured Workers
- Stroke Patients
- Head Injured Patients
- Psychiatric Patients

SPECIFIC WORK SAMPLES AND THEIR ALLIED HEALTH USES

The work samples will be described individually below, and some of their more common uses within allied health contexts will be discussed briefly.

VCWS 1- SMALL TOOLS (MECHANICAL)

Physical Description

The work sample consists of two boxes constructed of ½" particle board covered with plastic laminate. The work box is a 12" square, five sided, hinged box. In the front panel of the work box is a 6" square opening. The tools and parts box is 3 ½" X 10" X 17" with a hinged lid that contains the tools and parts in 11 insert trays. It comes with as-sorted screwdrivers, wrenches, a nut driver, a pair of pliers, and various nuts, washers, etc.

Primary Purpose/Standard Administration

VCWS 1 helps assess the ability of the individual to work with small tools and parts in small, confined spaces, with work blocked or partially blocked from view.

The standard administration procedures take about 90 minutes, and require considerable motor coordination, manual dexterity, and finger dexterity as the worker manipulates tools and parts to fasten the parts onto the panels of the work sample. The work sample simulates light or sedentary work. It assesses reaching, handling, fingering, feeling, and the ability to see. All six of the work sample's exercises have been MTM analyzed, and may be administered together or separately.

Secondary Characteristics

The work sample, in its entirety, is rather tedious, and can be quite challenging to injured persons. It affords the opportunity to observe a number of secondary characteristics including the client's self-confidence, ability to control frustration, ability to maintain motivation, ability to follow instructions, his or her level of physical stamina, and other work-related habits and skills. Use of the Body Chart (provided with VCWS 4 and available separately) allows the therapist to chart areas of reported pain or pain and fatigue.

Uses in Work Hardening/Treatment

VCWS 1 is used to assess upper extremity and hand function (Reynolds-Lynch, 1989, p. 274), including "residual hand function following injury" (Fortenbach, 1989, p. 206). In combination with VCWS 19, it is used to assess "tolerance for work alternating between overhead tool use and lifting and carrying" (Thompson, 1989, p. 306).

The work sample has been suggested for use with carpal tunnel patients, individuals who have undergone surgery of the hand or palm, traumatic brain injured clients, and clients with psychiatric diagnoses.

It has been found that client anxiety is reduced when the client is given the choice of panels on which to work. Repeated use of the work sample improves all of the work skills the instrument was designed to assess. It is used to increase hand strength, stamina, flexibility, etc. Its use improves the understanding of and ability to work with small tools (Gow and Ryder, 1989, p. 167).

Like most of the VCWS series, the Small Tools work sample is well-suited to graded levels of difficulty, and has many nonstandard uses in work hardening treatment. One OTR, has

suggested the following innovative work hardening uses for the work sample (Thompson, 1988b).

- Place on an elevated shelf (top shelf of VCWS 19 for instance) to decrease edema in the upper extremity and increase shoulder range of motion.
- Pick up the hardware and assemble by hand to increase fine and gross coordination skills.
- Build up tools to begin light tool use/grasp activities. Start assembly with box open flat and progress to being able to assemble inside the box.
- Assemble from the open end if the client has limited range of motion in the arms/hands and progress to the small end as able.
- Use modified tools to increase stamina for tool use. Examples include the use of built up handles, power driver, ratchet screwdriver, etc.
- Administer multiple trials to increase stamina and endurance.
- Administer first at bench level and then progressively higher or lower to increase tolerances with work at varied levels.
- Use the non-dominant hand to build skill, change dominance. . Other suggested uses:
- Require work sample to remain in a fixed position so client must adjust arm/hand and work in awkward positions (as would be the case if working on stationary objects such as large appliances.)
- Allow box to be turned (panels rotated) to facilitate easier access for clients with physical limitations that do not allow them to assemble the panel in their standard positions.
- Place box on a chair or low table and require clients to bend, stoop, or squat to work.

VCWS 2 - SIZE DISCRIMINATION

Physical Description

The work sample consists of a 23 ½" X 23 ½" X 2 ½" box with 32 threaded posts of various sizes. In the front part of the box is a nut tray that contains 49 hex nuts (17 more than are needed to assemble the posts).

Primary Purpose/Standard Administration

In its standard administration, the work sample takes approximately 20 minutes. It consists of two exercises in which the individual must first affix nuts onto all of the posts, and then must remove all of the same nuts, placing them back into the nut tray. These tasks require significant levels of motor coordination and manual dexterity, and simulate jobs requiring light or sedentary strength, reaching, fingering, feeling, the ability to see.

Secondary Characteristics

Like all of the VCWS series, VCWS 2 yields information on the secondary characteristics related to the individual's work capacities. VCWS 2 reveals clues to, for example, the individual's stamina, his or her methods of coping with tedium, his or her propensity for becoming distracted, his or her ability to deal with frustration, his or her ability to follow instructions, and to maintain motivation and self-confidence.

Uses in Work Hardening/Treatment

- Varying table height to alter body position when assembling/disassembling nuts.
- Use of slant board to alter view and access to top of board.
- Assembling only large nuts first and gradually building up to medium and small sizes as grasp and manipulative skills improve.
- Completing only disassembly, in which the therapist has placed the nuts onto the bolts, to assess and/or build manipulative skills without size discrimination being a factor.
- Pre-sort nuts by size before beginning assembly.

VCWS 3 - NUMERICAL SORTING

Physical Description

The work sample consists of a box, 23 ½" X 23 ½" X 1 ¾". The box and its lid form two flat work surfaces with labeled, recessed slots arranged in alphabetical and numerical sequences.

Primary Purpose/Standard Administration

In its standard administration, the work sample takes approximately 25 minutes. The evaluatee or client must place numbered plastic chips into the corresponding slots in two separately timed exercises. The work tasks relate to occupations that involve examining, grading and sorting, keeping records and receipts, recording or transmitting verbal or coded information, and posting verbal or numerical data on stock lists. The work sample requires significant levels of the following aptitudes: clerical, form perception, finger and manual dexterity, and motor coordination. It simulates light or sedentary work, reaching, fingering, feeling, and the ability to see. Standing tolerance is also a factor.

Secondary Characteristics

The secondary characteristics revealed by VCWS 3 include communication skills, ability to follow instructions, frustration control, problem solving skills, willingness to accept supervision, self-confidence, and others.

Uses in Work Hardening Treatment

- Administer Transfer 2 (easiest) first to develop familiarity with layout of Board 1.
- Use grasping device to pick up chips.
- Place box on slant board to increase visibility and facilitate reach to back row of chips.
- Raise height of table for increased visibility and easier reach.

VCWS 4 - UPPER EXTREMITY RANGE OF MOTION

Physical Description

The work sample consists of a 12" square box, open at the back with a smaller opening in the front. The five inner panels of the box are lined with two alternating sizes of machined bolts, threads exposed. The inner box is divided into two halves, red for the right hand, and blue for the left hand.

Primary Purpose/Standard Administration

In its standard administration, which takes about 45 minutes, the evaluatee or client must pick up nuts (included in a separate box), reach through the small hole in the front of the work sample, place the nuts on proper bolts, and screw them down using fingers and thumb. The individual must also disassemble all of the bolts.

The work sample assesses upper extremity range of motion and endurance, involving shoulders, upper arms, forearms, elbows, wrists, hands, and fingers. In addition to the usual scoring sheet, it comes with a color-coded body chart on which the therapist records client responses to questions regarding his or her levels and areas of pain and/or fatigue that are asked after the various work sample exercises.

The work sample simulates light or sedentary work, assesses reaching, handling, fingering, feeling, the ability to see, and requires significant degrees of the following aptitudes: motor coordination, finger and manual dexterity.

Secondary Characteristics

Insight into several secondary characteristics is provided, including ability to follow instructions, ability to maintain motivation, ability to control frustration, his or her stamina, self-confidence, communication skills, and others.

Uses in Work Hardening/Treatment

VCWS 4 is one of the most frequently used work samples in allied health settings for evaluation and work hardening purposes. It has been recommended (with other work samples) to assess "residual hand functioning following injury" (Fortenbach, 1989, p. 206). The work sample has been described as part of an assessment battery designed to accomplish work tolerance screening (Carlton and Niemeier, 1989, p. 379).

Like all of the Valpar work samples, repeated use of VCWS 4 in treatment leads to improvement in the work-related factors the work sample was designed to assess. It is particularly useful with clients who have sensation difficulties in their hands, and with neck and shoulder injured clients.

Thompson (1988b) has suggested the following:

- Use only one hand or use both hands for the entire assembly.
- Start assembly through the open end and work toward assembly from the smaller opening.
- Place on a shelf above shoulder level to decrease edema, increase shoulder range of motion.
- Repeat on a daily basis to build stamina, range of motion, speed.
- Place further away to encourage reaching.

Other suggestions:

- Rotate box so client must assemble all panels with hand in same position.
- Pre-sort nuts by size so client does not need to search.
- Place work sample on low table or chair and require the client to bend or squat to complete.

VCWS 5 - CLERICAL COMPREHENSION AND APTITUDE

Physical Description

The work sample hardware consists of a modified typewriter, a calculator, a cassette tape recorder, a hinged box, 17" X 13" X 10 ¼", and other materials.

Primary Purpose/Standard Administration

The work sample exercises may be administered individually or in combinations, depending upon the evaluation or treatment needs. The tasks include telephone answering, mail sorting, alphabetical filing, bookkeeping, and typing. The standard administration of the work sample takes about 60 minutes. It begins with mail sorting, alphabetical filing and simultaneous telephone answering exercises. In this section, a tape plays a series of phone conversations at intervals, requiring the evaluatee or patient to stop sorting mail or filing and take the phone messages. Next, come three different bookkeeping exercises in which the individual must use a calculator and record data onto ledgers. Three typing exercises follow.

The work sample simulates sedentary and light work. It assesses reaching, handling, fingering, feeling, talking, hearing, and seeing. The work sample requires significant degrees of the following aptitudes: clerical perception, motor coordination, finger and manual dexterity, general learning ability, form perception, verbal, and numerical.

Secondary Characteristics

The secondary characteristics revealed by the work sample exercises are work quality, work methods, ability to follow instructions, concentration, communication skills, frustration control, self-confidence, and others.

Uses in Work Hardening/Treatment

- Put mail box on higher table
- Administer mail sorting and filing without the phone messages interrupting (to assess accuracy of work without distractions).
- Have messages playing throughout bookkeeping, as well as mail sorting and filing exercises to assess the effect of interruptions on performance.
- Use as a training tool to provide instruction in basic mail sorting, filing, and posting/recording skills.

VCWS 6 - INDEPENDENT PROBLEM SOLVING

Physical Description

VCWS 6 is a box, 23 ½" X 23 ½" X 3" constructed of ½" particle board covered with plastic laminate. It has a removable cover for protection during transportation and storage. There is a mounted, hinged scoring board centered in the front of the box, and one mounted master key card in the upper part of the box. The work sample includes a bound stack of 55 testing cards and a scoring stylus.

Primary Purpose/Standard Administration

This work sample assesses the ability to perform work involving visual comparison and proper selection of abstract designs. The client must compare colored, geometric shapes that are presented on a series of cards to the master key card mounted on the work sample.

The exercise, which takes approximately 30 minutes, simulates sedentary work, and assesses the client's ability to reach, handle, finger, feel, and see. It requires significant motor coordination, form and clerical perception, reasoning, general learning ability, finger and manual dexterity, and color discrimination.

Secondary Characteristics

The work sample elicits evidence relating to the following secondary characteristics: ability to follow instructions, concentration, problem conceptualization, self-confidence, and persistence. Insight into perceptual, visual tracking, and sequencing skills can also be gained from this work sample.

Uses in Work Hardening/Treatment

like VCWS 5, the Independent Problem Solving work sample can be used to assess all of the physical capacities associated with clerical jobs (Thompson, 1988a). It is useful with lower functioning clients to assess their ability to follow multi-step, sequenced instructions.

Other suggestions:

- Stick stylus in styrofoam ball so clients with limited grasping ability can record responses.
- Use blank piece of paper to cover parts of response board below the number currently being worked on and to help keep track of test card position.
- Have client use blank sheets of paper to cover the two sections of the master key card not being used with a particular test card to decrease visual distraction.

VCWS 7 - MULTI-LEVEL SORTING

Physical Description

VCWS 7 is a box, 23 ½" X 23 ½" X 4 7/8" constructed of ½" particle board and covered with plastic laminate. The work surface of the work sample is an inclined, hinged sorting board with eight columns and seven rows of slotted plastic discs, 2" X 1". The sorting board's eight columns are arranged into two columns each of the following: color, color-letter, color-number, and color-letter-number. The bottom row of plastic discs is the practice section.

Beneath the hinged sorting board, there is a separate box divided into compartments which correspond to each of the slots on the sorting board surface. This box is also hinged so that it can be lifted to recycle the testing chips. In the front portion of the box there is a tray divided into two sections. The small section on the left contains 24 1" X 1" plastic chips used for practice. The larger tray contains 144 plastic chips used in the exercise.

Primary Purpose/Standard Administration

The Multi-Level Sorting work sample takes about 30 minutes, and assesses the ability to make decisions while performing work tasks that require physical manipulation and visual discrimination of objects with different colors, letters, numbers, and combinations of these. Seated in front of the work sample, the client must sort one inch plastic chips into the correct slots on an inclined work surface. Each chip and slot is identified in one of the following ways: color; color and letter; color and number; and color, letter, and number.

Like work samples 5 and 6, VCWS 7 is used to assess the physical capacities associated with clerical jobs (Thompson, 1988b). The work sample assesses light work and the physical demands factors, reaching, handling, fingering, feeling, and seeing. It requires significant levels of the following aptitudes: motor coordination, finger and manual dexterity, color discrimination, and form perception.

Secondary Characteristics

The work sample reveals evidence of various secondary characteristics, including the client's ability to follow instructions, concentration, motivation, problem conceptualization, decision-making, self-confidence, and others.

Uses in Work Hardening/Treatment

- Break down task into one or more sorting subsets (e.g., color only, color-letter only, etc.)
- Remove all chips except ones being used and cover all slots except those required. Start with discrimination of a single variable such as color, and gradually increase to two, then three.
- Use grasping device to allow individuals with limited use of fingers to pick up chips.

- Put box on slant board to improve visibility of slots and facilitate reach to top row of slots.

VCWS 8 - SIMULATED ASSEMBLY

Physical Description

The Simulated Assembly work sample consists of a box, approximately 28" X 24" X 11" with a hinged lid. Inside the box is an 18" diameter assembly wheel. The wheel is turned by a variable speed motor that goes up to 12.5 RPM. The front part of the work sample is divided into two work trays.

Primary Purpose/Standard Administration

The standard administration of the work sample takes approximately 30 minutes, and simulates conveyer-assembly job tasks in which the product moves toward and away from workers on an assembly line. The work sample consists of one 20 minute exercise in which the client is positioned in front of the work sample and must first place a pin on the assembly wheel, then a spacer and a cap on the pin as the wheel rotates at a constant speed.

The work sample simulates light and sedentary work (prolonged standing and sitting tolerance), and assesses the client's ability to reach, handle, finger, feel, and see. It requires significant motor coordination, finger dexterity, and manual dexterity.

Secondary Characteristics

The work sample elicits information on a variety of secondary characteristics, including distractibility, tendency to complain, stamina, ability to follow instructions, motivation, self-confidence, and ability to work alone.

Uses in Work Hardening/Treatment

Allied Health professionals have recognized the usefulness of VCWS 8 for many purposes. In evaluation, the work sample is used for job simulation (Rhomberg, 1989, p. 242), to assess "upper/lower extremity function and trunk tolerance" (Reynolds-Lynch, 1989, p. 274-275), and standing tolerance and bi-manual dexterity.

The work sample has been described as a good teaching device. It is reinforcing to clients; it provides a sense of accomplishment. Because it is so absorbing, the work sample is good at revealing inconsistencies between the client's perceived limitations, and his or her actual abilities. The work sample has been found to be useful with carpal tunnel patients and amputees.

The following innovative uses of VCWS 8 have been suggested:

- Gradually increase the period of time on the assembly task.
- Increase or decrease speed as needed.
- Perform partial assembly and work up to full assembly (either count

manually or work for a specific period of time).

- Chart productivity levels and record behaviors at intervals (e.g., every five minutes during 20 minute standard administration time) to determine consistency of work pace/production. Evaluate increases/decreases in light of behavioral observations to help determine possible causes and gain insight into potential for improvement.
- Count times assembly completed in red "warning" section--may suggest problems in complying with safety regulations.
- Raise/lower height of box to minimize strain on neck and back.
- Allow assembly to be completed in hands and then inserted onto board (for those who cannot perform three step procedure quickly enough).

VCWS 9 - WHOLE BODY RANGE OF MOTION

Physical Description

The Whole Body Range of Motion work sample consists of a two-part frame of steel tubing, 36" wide and adjustable in 3" increments from 5'9" (or lower with adjustment) to 7'3" in height. Three plastic forms are transferred and fastened to exposed bolts on four work panels with 22 plastic nuts.

Primary Purpose/Standard Administration

In its standard administration, VCWS 9 takes about 30 minutes. The client is positioned in front of the work sample with the frame adjusted to approximately six inches above his or her head. The client must first transfer the three colored shapes, one at a time, from shoulder height to overhead. The client then transfers the forms to waist level, while bending forward at the waist. The forms are next transferred to knee level while the client kneels or crouches. Finally, the forms are transferred from knee level back to shoulder height. In each case, the client must first remove a total of 22 nuts, then use them to fasten down the transferred forms, using one hand at a time.

In the standard administration, the evaluatee is asked a series of questions pertaining to areas of pain and/or fatigue after each transfer. Responses are recorded onto a color-coded body chart.

VCWS 9 assesses whole body range of motion, agility, and stamina through gross body movements of the trunk, arms, hands, legs, and fingers. The effects of kneeling, bending, stooping, repeated crouching, and overhead reaching on various work-related physical skills are assessed. The work sample simulates light work, and assesses the client's ability to balance, stoop, kneel, crouch, reach, handle, finger, feel, and see.

The work sample requires significant levels of the following aptitudes: finger dexterity, manual dexterity, motor coordination, form perception, and eye-hand-foot coordination.

Secondary Characteristics

Insight is provided into (for example) the following secondary characteristics: ability to follow instructions, communication skills, motivation, concentration, frustration control, and self-confidence.

Uses in Work Hardening/Treatment

VCWS 9 has a number of qualities that make it particularly well-suited to allied health uses. It provides information that is useful in examining consistency of client performance. The work sample exercises are somewhat tiring and therefore aversive. As a result, the work sample may be used to motivate the client to finish the treatment program.

The color-coded body charts which highlight areas of pain and fatigue after the work sample exercises provide graphic evidence of client improvement over time.

VCWS 9 is administered as part of the standard evaluation phase of many allied health programs. (See, for example, Gow and Ryder, 1989, p. 165; Holmes and Mizoguchi, 1989, p. 343.) The work sample is very adaptable and is often used in nonstandard ways to address specific evaluation issues. The work sample itself may be positioned to simulate specific job conditions, or the exercise procedures may be altered, or the equipment may be modified.

A number of nonstandard evaluation uses of VCWS 9 have been suggested:

- With neck injured clients, the work sample frame may be placed in a lower position.
- The shapes may be fastened to the panels with fewer nuts than in the standard administration, gradually building up to the complete set.
- Add weights to forearms to simulate overhead lifting.
- Add material that has to be placed on the panels rather than screwed in. For example, a drilled rubber ball can be placed on the screws of any of the panels to practice basic grasp throughout the range of motion.
- Perform with the non-dominant hand.
- Use two hands.
- Omit stooping. Remain upright.
- Sit or kneel on the floor to eliminate crouching.
- Lay the frame on the ground and use a crawler when working underneath.
- Raise upper panel to a high enough position to allow person to assemble Panel 3 (mid-panel) standing behind the frame and reaching over through the opening.
- Remove upper portion of frame and lay flat on table (or floor) to have client transfer forms from Panel 1 to Panel 2.

VCWS 10 - TRI-LEVEL MEASUREMENT

Physical Description

The work sample is a box, approximately 24" X 24" X 3", the inner surface of which is divided into several labeled compartments.

Primary Purpose/Standard Administration

The work sample takes approximately 30 minutes, and assesses the client's ability to make various inspections and measurements ranging from very simple to very precise. The client must use various measuring devices to decide whether fifty parts have been machined to various specifications.

The work sample simulates sedentary and light work and assesses reaching, handling, fingering, feeling, and sight. VCWS 10 requires significant finger dexterity, manual dexterity, form perception, spatial aptitude, general learning ability, clerical perception, and motor coordination.

Secondary Characteristics

The work sample provides insight into a number of secondary client characteristics, including ability to follow instructions, concentration, motivation, communication skills, frustration tolerance, decision-making skills, and problem conceptualization.

Uses in Work Hardening/Treatment

VCWS 10 has been described as a good teaching device. It is absorbing to the point that clients concentrate so intensely they forget their injuries and produce far more than they had thought possible. Moreover, the work sample teaches clients methods of adjustment as they must find workable hand and finger movements to complete the work sample tasks.

The following uses have been suggested:

- Use as a training/retraining tool.
- Break down tasks into subsets: Visual sorting, use of jigs, use of measuring tools as jigs, reading crude to precise measuring tools.
- Cover up decals and have client complete sorting sequence from memory.

VCWS 11- EYE-HAND-FOOT COORDINATION

Physical Description

VCWS 11 is a 21" X 21" X 4-5/16" box covered with clear plastic. Beneath the plastic cover is a ball course with 13 holes. There is a ball tray attached to the outside front of the box and a ball drawer under the box. Handles are attached to the sides of the box. The box assembly is mounted on a 3/4" tubular metal frame. Attached to the bottom of the frame is a foot pedal with a 1/4" metal rod connecting it to the box.

Primary Purpose/Standard Administration

There are three trials, each using nine steel balls. The work sample takes about 20 minutes. The client sits in front of the box and must move the nine steel balls, one at a time, through the course. To move the balls, the box is tilted left and right with the hands, and forward and backward with the foot pedal. The object of the work sample is to obtain as many points as possible. The farther along the course a ball gets before falling into a hole, the more points it earns.

The work sample simulates sedentary and light work and assesses reaching, handling, fingering, feeling, and seeing. It requires significant levels of eye-hand-foot coordination, motor coordination, finger dexterity, general learning ability, and spatial aptitude.

Secondary Characteristics

The work sample affords the opportunity to observe various secondary characteristics related to work skills, including frustration tolerance, concentration, motivation, communication skills, problem conceptualization skills, and self-confidence.

Uses in Work Hardening/Treatment

The game-like nature of VCWS 11 makes it very popular with clients. The work sample is often viewed as a reward by clients, and it can be used to motivate them to maximize their efforts in treatment (Wright, 1988). The therapist may assign time on number 11 as a rest period of sorts for clients who have tired after working on more physically demanding tasks, but who still need to maintain time on work tasks. VCWS 11 is also an absorbing work sample that tends to take the mind off one's injuries. As such, it can elicit performance beyond client expectations, thereby serving as a learning device.

Gow and Ryder have reported using VCWS 11 in treatment, to improve the ability to use the eyes, hands, and feet "simultaneously, and in a coordinated manner" (1989, p. 167).

The following innovative adaptations for VCWS 11 have been suggested:

- Use non-dominant foot.
- Use two feet.
- Perform untimed.
- Repeat administrations to increase skill/stamina.
- Perform work sample from standing position.

VCWS 12 - SOLDERING AND INSPECTION (ELECTRONIC)

Physical Description

There are several parts to VCWS 12. Part 1 is a 23-1/2" X 16" X 4" hinged box that opens to provide a flat work surface with three fixtures. The fixtures are used to complete the work sample exercises. Part 2 is a soldering iron unit which can be removed from the work surface. Part 3 is a tool box that contains all of the necessary tools and supplies.

Primary Purpose/Standard Administration

The work sample is composed of three exercises which have been separately analyzed, and may be administered alone or in combination. Taken together, the three exercises take about 50 minutes. The work sample is designed to assess the client's ability to acquire and apply the skills necessary to perform soldering tasks of varying complexity. In the standard administration, the client must first cut two equal lengths of wire, strip the same amount of insulation from each wire, mechanically splice the wire together within specific tolerances and apply solder to the splice. Next, the client must place six terminals on a printed circuit board and fasten them in place using the soldering iron and solder. Finally, the client must use all of the skills learned so far in order to connect the wire splice to the terminals on the circuit board.

The work sample simulates sedentary and light work and assesses reaching, handling, fingering, feeling, and seeing. Significant levels of the following aptitudes are required by the work sample: motor coordination, manual dexterity, general learning ability, spatial, form perception, and finger dexterity.

Secondary Characteristics

The work sample exercises tend to elicit information relevant to the following work-related, secondary characteristics: ability to follow instructions, concentration, motivation, communication skills, ability to deal with frustration, and self-confidence.

The work sample also provides the opportunity to observe compliance with safety rules and behavior in dealing with hazardous situations. The work tasks are challenging and absorbing, providing immediate feedback on performance.

Since the work tasks are not routine or repetitive, inconsistent performance can indicate malingering.

Uses in Work Hardening/Treatment

- Use soldering gun instead of soldering iron (different grasp, heavier).
- Repeat administration after additional instruction and evaluator demonstration to determine effect on quality/productivity.
- Administer untimed to remove pressure to work quickly observe impact on quality.

VCWS 14 - INTEGRATED PEER PERFORMANCE

Physical Description

VCWS 14 consists of a three-legged, five-sided table, 29" high, with a 3-tiered work surface that includes a rotating assembly turntable. In each of five work stations is a bin which holds the assembly pieces. The lower work surface area of each work station holds pattern booklets that guide the clients' work. The work sample includes a locking storage cabinet used to store all of the hardware needed to administer the work sample.

Primary Purpose/Standard Administration

VCWS 14 is unique in that it is administered to three to five clients simultaneously. It has three separate exercises that increase in difficulty. The work sample usually takes about 30 minutes. Clients must work together to complete the work sample exercises as they sit at their individual work stations. Positioned in front of the clients are colored assembly pieces and an assembly pattern booklet to follow. Assembly boards are placed on the table by an "inspector" (either the evaluator or one of the clients) and moved from one client to the next automatically every 20 seconds. Each client follows the pattern booklet to perform a portion of the assembly and then waits for the next assembly board. As the assembly boards pass, the "inspector" checks each board and informs the appropriate client of any errors. Errors are removed and it is allowed to go around again until the exercise has been correctly completed. Eighteen different boards are arranged in three levels of difficulty for this work sample.

The work sample simulates sedentary work and assesses reaching, handling, fingering, feeling, and seeing. It requires significant finger dexterity, manual dexterity, and motor coordination.

Secondary Characteristics

The secondary characteristics typically revealed by the work sample include various work-related social skills, the ability to follow instructions, concentration, motivation, communication skills, ability to cooperate with others, and self-confidence.

Uses in Work Hardening/Treatment

VCWS 14 provides information relevant to the assessment of a variety of client capacities, including sitting tolerance, use of arms, ability to pinch, and sensation in fingers.

Interpersonal skills are among the most important work-related skills, and are often the most important factors in determining both job success and failure. VCWS 14 not only assesses these important skills, its repeated use can be tailored to specific skills deficits. Clients may be paired together on number 14 for specific therapeutic purposes. For example, a client with a specific interpersonal skill deficit might be paired on the work sample with a skilled client who would serve as a model.

For the group to succeed on number 14, all of the participants must meet their individual responsibilities. The work sample fosters teamwork and cooperation while providing the important rewards of the esteem of one's peers and of knowing one has contributed to the success of one's group. There is, of course, the potential for negative reinforcement as well.

Other suggested uses:

- Administer only one difficulty level. Determine which levels to administer based upon the group makeup.
- For groups with severe perceptual deficits, do not use pattern cards. Clients simply place as many pins as they can prior to buzzer. Record count for each client separately.
- Alternate inspectors to allow each client in group to assume supervisory role.

VCWS 15 - ELECTRICAL CIRCUITRY AND PRINT READING

Physical Description

The work sample consists of a box, 23 ½" X 23 ½" X 3 ½" that has been divided into sections. The top section is a storage area for batteries, score sheets, wires, resistors, diodes and needlenose pliers. The middle section is a panel on which red and black probes, meter, light, power cord, counter, and schematic are mounted.

Primary Purpose/Standard Administration

VCWS 15 has three separate exercises, each of which has been individually analyzed according to the Labor Department system of job analysis and therefore has its own separate WQP. The exercises may be administered together or individually. Taken together, the exercises take about 30 minutes.

In its standard administration, the client sits in front of an electrical work board and parts tray. The appropriate components and tools are contained in the parts tray. The electrical circuits to be tested range from simple to complex, and the evaluatee is required to test each circuit with probes, record malfunctions, and repair circuits or build new circuits.

The work sample assesses the client's ability to understand and apply principles of electrical circuits and to use materials such as blueprints, drawings, and schematics in simulated work activities. It simulates sedentary work and assesses the client's ability to reach, handle, finger, feel, and see. Significant amounts of the following aptitudes are required to perform the work sample satisfactorily: general learning ability, spatial, form perception, motor coordination, manual dexterity, and finger dexterity.

Secondary Characteristics

VCWS 15 typically allows the evaluator to obtain insight into the following secondary characteristics: Concentration, ability to follow instructions, motivation, problem conceptualization, self-confidence, ability to respond to change, frustration control, and communication skills.

Uses in Work Hardening/Treatment

The tasks involved in this work sample are tedious and require continuous fine motor control, as well as bimanual coordination. The tasks allow the therapist an opportunity to observe the effect of hand tremors or lack of sensation on speed and accuracy. The challenging, absorbing nature of the tasks and the immediate feedback they provide might result in inconsistencies in performance when compared with less absorbing work samples that involve similar physical motions.

VCWS 16 - DRAFTING

Physical Description

The work sample is a box, 23 ½" X 23 ½" X 3 ½". The hinged lid serves as the drafting surface. Inside the box is a 22" X 23-3/16" surface with diagrams which is mounted in an upright position on the back of the box during work sample administration.

Primary Purpose/Standard Administration

VCWS 16 consists of six separately analyzed exercises that, taken together, require about 30 minutes. The work sample assesses the client's potential for success in jobs which involve drafting and blueprint reading. In the first exercise, the client must accurately perceive and measure objects in terms of inches and centimeters. The second exercise, Line Perception, involves free hand pattern duplication. The client must learn the use of drafting tools such as the T-square, compass, a circle template and triangles. Next, the client must read a blueprint. Finally, the client is required to produce three orthographic projections of wooden blocks.

The work sample simulates sedentary work and assesses the client's ability to reach, handle, finger, feel, and see. It requires significant amounts of the following aptitudes: spatial, general learning ability, verbal, form perception, motor coordination, manual dexterity, finger dexterity, clerical perception, and numerical.

Secondary Characteristics

Insight into the following secondary characteristics is typically afforded by VCWS 16: Ability to follow instructions, ability to concentrate, communication skills, motivation, frustration control, problem conceptualization, decision-making, self-confidence, and tolerance for long periods of sitting while bending over a table.

Uses in Work Hardening/Treatment

The work sample is challenging and absorbing. It may provide an opportunity to observe inconsistencies in stamina or sitting tolerance when compared to information obtained from simpler, more repetitive work samples.

Other suggested uses:

- Administer individual sections only.
- Use as training tool. Provide detailed instructions/demos and monitor effect on quality/productivity.

VCWS 19 - DYNAMIC PHYSICAL CAPACITIES

Physical Description

The work sample consists of a storage unit, 67" X 54" X 20" with three shelves. The work sample takes about 45 minutes. It has a scale, a 3-step ladder, nine shipping bins of various weights, two cases of 12 hexagon-shaped weights, and 12 round weights, a clip-board, and a six foot cloth tape.

Primary Purpose/Standard Administration

Work sample number 19 is designed to simulate the work tasks of a shipping clerk. The work sample contains 28 individual exercises, and measures the strength levels of the Department of Labor's Physical Demands factors. It assesses both physical capacities and endurance for climbing, balancing, lifting, carrying, reaching, pulling/pushing, and variations in whole-body position. Once the client's lifting capacity has been established the work sample assesses the client's work endurance and rate of work at his or her capacity level.

The client must read invoices, locate a shipping carton, remove the carton from a shelf by climbing one step on the ladder, pack the carton correctly, weigh it, and place it in a simulated shipping or receiving area.

The work sample requires significant levels of the following aptitudes: clerical perception, motor coordination, manual dexterity, and eye-hand-foot coordination.

Secondary Characteristics

The work sample typically affords the evaluator the opportunity to observe the following secondary characteristics: ability to follow instructions, physical stamina, concentration, motivation, communication skills, decision-making, frustration control, and self-confidence.

Uses in Work Hardening/Treatment

The work sample has been incorporated into the evaluation phases of numerous allied health facilities. One author writes that VCWS 19 is used to assess "lifting, twisting and bending for a variety of diagnoses" (Reynolds-Lynch, 1989, p. 274).

Very commonly, the work sample is used in the treatment phase of work hardening programs. The work sample is typically used in these situations to increase strength and endurance. (See, for example, Thompson, 1989, pp. 305, 312 - 313; Holmes and Mizoguchi 1989, pp. 351 - 352; Holmes and Heires, 1989, p. 359).

The work sample is very adaptable. The following nonstandard uses have been suggested:

- Progressive lifting and carrying program (vary levels and weight).
- Perform repetitive lifting from shelf to shelf.
- Combine with other work samples for situational assessment. For example, add VCWS 1 to a shelf and alternate between lifting/carrying and completing a panel of VCWS 1.
- Load the parts one at a time directly into the bins while on the shelf to provide lower weight lifting and carrying throughout more range of motion.
- Alter the height of any portion of the task (raised table, shelf for scale) to eliminate stooping, bending, etc.
- Remove the top bins without using the ladder.

Barbara Thompson described the case of an injured worker for a large soft drink company. The worker's duties included moving flats of soft drink cases using a dolly. "We used the bins of VCWS 19 to simulate six-pack flats. He used the shelves to simulate his truck and the unloading destination and he basically loaded the bins onto and off of the dolly."

VCWS 201 - PHYSICAL CAPACITIES AND MOBILITY SCREENING EVALUATION

Physical Description

The work sample consists of a weight scale, a standing platform, lifting apparatus, hinged climbing board, measuring tape, and body charts. The work sample takes about 30 minutes to complete.

Primary Purpose/Standard Administration

There are two parts to the work sample. Part one, Dynamic Strength, consists of six exercises: Lifting, Continuous Lifting, Two-Handed Grip, Palm Press, Horizontal Press, and Vertical Press. Part two, Mobility Evaluation, first asks the client to demonstrate balancing, walking, heel to toe, walking on the toes, walking on the heels and squatting. The client must then perform a series of stepping exercises and demonstrate the ability to kneel, crawl, step, stoop and crouch.

VCWS 201 was designed specifically to be a non-medical screening of the seventeen Physical Demands factors of the Department of Labor (VCWS 201 is not as comprehensive in scope as VCWS 19 - Dynamic Physical Capacities):

- | | |
|-------------|--------------------|
| - Climbing | - Lifting |
| - Balancing | - Reaching |
| - Stooping | - Handling |
| - Kneeling | - Fingering |
| - Crouching | - Feeling |
| - Crawling | - Pushing |
| - Walking | - Pulling |
| - Standing | - Seeing - Talking |

In addition, the work sample screens non-Department of Labor physical factors:

- | | |
|--------------------|--------------------------------|
| - Hand Grip | - Walking (Heel-Toe) |
| - Palm Press | - Walking (Toes) |
| - Horizontal Press | - Walking (Heels) |
| - Vertical Press | - Squatting - Walking Backward |

After each exercise, the evaluator may ask the client to indicate any areas of pain or pain and fatigue. Client responses are recorded on a color-coded body chart.

Secondary Characteristics

As with all Valpar work samples, VCWS 201 typically reveals information pertaining to a number of work-related secondary characteristics, including, in this case, stamina, frustration control, ability to follow instructions, concentration, motivation, communication skills, and self-confidence.

VCWS 202 - MECHANICAL ASSEMBLY/ALIGNMENT AND HAMMERING

Physical Description

The work sample consists of the following parts: a hard rubber assembly block, a tools case, a rubber mat, an ink pad, a ball peen hammer, a claw hammer, a rubber mallet, an alien wrench, a 5.1" driving bar, a 6.6" driving bar with a metal pin, a 5.3" punch bar, a 12" driving bar with five metal pins, a 6" adjustable wrench, two 6" box end/open end wrenches, four 6" bolts, 1/2" nuts, springs, assorted washers, illustration cards, and hammering sheets.

Primary Purpose/Standard Administration

The work sample contains four, short, independent exercises: Assembly, Alignment/Driving, Disassembly, and Hammering. Taken together, the exercises require approximately 30 minutes to complete. VCWS 202 assesses the client's ability to work with a variety of small hand tools. In the Assembly exercise, the client uses wrenches to assemble two halves of a hard rubber block using bolts, springs, washers, and nuts. In the Alignment/Driving exercise, the client drives several bars through holes in the rubber block, using a rubber mallet, punch, wrench, and ball peen hammer. In the Disassembly exercise, the client disassembles the parts and puts them into their proper containers. In the Hammering exercise, the client uses a claw hammer and ink pad to rapidly tap small targets on three hammering sheets.

VCWS 202 simulates sedentary work, and assesses reaching, handling, fingering, feeling, and seeing. It requires significant degrees of the following aptitudes: motor coordination, finger dexterity, and manual dexterity. The tasks require a certain degree of upper body strength.

Secondary Characteristics

The work sample typically provides insight into the following secondary characteristics: stamina, ability to follow multi-step, sequential instructions, concentration, motivation, communication skills, frustration control, problem conceptualization and the ability to work alone.

Uses in Work Hardening/Treatment

The following uses have been suggested:

- Assembly block with only bolts and nuts (no washers or springs) to simplify task.
- Use lighter weight hammer on hammering exercise.
- Allow use of hands to turn bar on alignment/driving exercise.

VCWS 203 - MECHANICAL REASONING AND MACHINE TENDING

Physical Description

The work sample contains a four-legged platform that has three 11 ¾" X 11 ¾" partitions, a machine tending board, a felt marker, an allen nut driver, an allen wrench, and 10 sets of erasable machine tending cards.

Primary Purpose/Standard Administration

VCWS 203 consists of five separate exercises and takes approximately 35 minutes to complete. It assesses the client's ability to perform work tasks requiring various degrees of mechanical reasoning and machine tending.

Sections one and two, Assembly and Disassembly (Screws), require the client to fasten and unfasten a panel to one end of a platform using hand screws. These tasks assess the ability to solve basic assembly problems as well as the ability to work with the hands and eyes together.

Sections three and four, Assembly and Disassembly (Bolts), require the client to fasten the same panel using bolts and allen nut driver. Section five, Machine Tending, requires the client to attach a pen and holder to the platform. The client then moves four cards under the pen to trace the patterns on each card.

VCWS 203 simulates sedentary work and assesses reaching, handling, fingering, feeling, and seeing. It requires significant degrees of the following aptitudes: motor coordination, finger dexterity, manual dexterity, and general learning ability.

Secondary Characteristics

The work sample affords the evaluator information on a variety of work-related secondary characteristics, including stamina, steadiness, ability to follow instructions, concentration, motivation, communication skills, frustration control, problem conceptualization, and ability to work alone.

VCWS 204 - FINE FINGER DEXTERITY

Physical Description

The work sample is a 12" X 12" X 3 ¼" box. The flat work surface of the box contains 20 holes. Each hole contains a captive eyelet. A 27" nylon wire is attached to the left of the 20 holes. In the back of the box is a 10 ¾" X 1-7/8" X 1 ½" bar in which are five 2-1/8" metal rods. A 4-1/8" reverse tension tweezers is housed inside the box.

Primary Purpose/Standard Administration

VCWS 204 consists of three separate exercises that require approximately 20 minutes to complete. The first exercise, Fine Finger Dominant, requires the client to turn each of the five rods using his or her dominant hand. In section two, Wiring, the evaluatee must thread the nylon wire through each of twenty captive eyelets. The captive eyelets must be lifted and held by the reverse tension tweezers for the wire to be threaded. The third exercise, Fine Finger Non-Dominant, requires the client to turn the same five metal rods with the non-dominant hand until they reach their original starting position.

The work sample simulates sedentary work and assesses reaching, handling, fingering, feeling, and seeing. It requires significant degrees of the following aptitudes: motor coordination, finger dexterity, and manual dexterity.

Secondary Characteristics

The work sample typically provides insight into the following secondary characteristics: steadiness, frustration control, concentration, ability to follow instructions, motivation, communication skills, problem conceptualization, and self-confidence.

Use in Work Hardening/Treatment

The following suggestion has been offered:

- Allow box to stand upright on the table with captive eyelets sticking out of holes to make wiring easier.

VCWS 205 - INDEPENDENT PERCEPTUAL SCREENING (SPATIAL APTITUDE)

Physical Description

The work sample includes a hinged screen/assembly board, two parts bins, a laminated illustration card, various washers, hitch pin clips, hex bolts, and a steel flange.

Primary Purpose/Standard Administration

VCWS 205 consists of four exercises that take about 30 minutes and assess the client's ability to think visually of geometric forms and to comprehend the two-dimensional representation of three-dimensional objects.

The work sample uses a screen with two holes through which the client works. Following visual aids, the client performs the exercises without being able to see the work. The first exercise, Pin Placement, requires the client to place pins in nine holes following a pattern on the illustration card. The second exercise, Pin Assembly, requires the client to assemble a specified part on each pin using the illustration card as a guide. In the third exercise, Beginning Assembly, the client must build a complex assembly in a specific order on a hitch pin. The fourth exercise, Advanced Assembly, requires the client to build a complex assembly in a specific order using 21 separate parts.

The work sample simulates sedentary work and assesses reaching, handling, fingering, feeling, and seeing. It requires significant degrees of the following aptitudes: spatial, general learning ability, form perception, motor coordination, finger dexterity, and manual dexterity.

Secondary Characteristics

The work sample typically provides insight into several work-related secondary characteristics, including ability to follow instructions, concentration, motivation, communication skills, decision-making skills, frustration control, problem conceptualization, self-confidence, and self-reliance.

Uses in Work Hardening/Treatment

The following uses have been suggested:

- Allow client to look at photo of completed exercise #4 rather than using diagram.
- Provide instructions on how to read diagram for exercise #4.

SUMMARY AND CONCLUSION

This document has described the Valpar Component Work Samples specifically with regard to their uses in allied health settings. Examples of actual work sample uses by allied health professionals were provided. The document made much use of articles featured in a book on work hardening by Linda Ogden-Niemeyer and Karen Jacobs (1989) and the contents of interviews and other correspondence with occupational therapists and other allied health experts.

Valpar Component Work Samples have been used widely and successfully in allied health settings with many different kinds of disabilities, in standard administrations and in innovative, nonstandard approaches. Valpar has been gratified that its work samples have been so useful to allied health professionals, and is confident this will continue to be the case. As new approaches become known, Valpar will expand this document. Users of the work samples who have applied the instruments in nonstandard ways that have proved useful in allied health situations are encouraged to contact Valpar.

APPENDIX A REFERENCES

- Carlton, R.S. & Niemeyer, L. (1989). Employment and Rehabilitation Institute of California, Anaheim, California. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.373-391). Thorofare, NJ: Slack.
- Fortenbach, M. (1989). Mills-Peninsula Hospitals Work Capacity Center. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp. 203-208). Thorofare, NJ: Slack.
- Gow, L. & Ryder, W. (1989). The Return to Work Program at New England Memorial Hospital, Stoneham, Massachusetts. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.163-174). Thorofare, NJ: Slack.
- Holmes, M.B., & Heires, G. (1989). Northwest Therapy and Rehabilitation, Inc., Tacoma, Washington. In L. Ogden-Niemeyer & K. Jacobs (Eds.) Work hardening: State of the art. (pp.357- 372). Thorofare, NJ: Slack.
- Holmes, M.B., & Mizoguchi, J.T. (1989). Professional Services for the Injured, Tacoma, Washington. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.336 - 356). Thorofare, NJ: Slack.
- Ogden-Niemeyer, L., & Jacobs, K. (1989). Definition and history of work hardening. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.1-11). Thorofare, NJ: Slack.
- Prabhu, V. & Baker, M. (Eds.). (1986). Industrial engineering; Techniques for improving operations. London: McGraw-Hill.
- Reynolds-Lynch, K. (1989). Return to Work Centers, Henry Ford Rehabilitation, Detroit, Michigan. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.267- 282). Thorofare, NJ: Slack.
- Rhomberg, S. (1989). Irene Walter Johnson Institute of Rehabilitation. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art. (pp.231- 249). Thorofare, NJ: Slack.
- Thompson, B. (1988a). Individual evaluation plan. In Valpar International Corporation, The use of standardized work samples in physical capacities evaluation and work hardening programs: The work evaluation process: Referral to exit. Unpublished manuscript.
- Thompson, B. (1988b). Physical capacities evaluation: Sample physical capacities evaluation tools. In Valpar International Corporation, The use of standardized work samples in physical capacities evaluation and work hardening programs: The work evaluation process: Referral to exit. Unpublished manuscript.
- Thompson, B. (1989). Sharp Memorial Hospital's Injured Worker Center, San Diego, California. In L. Ogden-Niemeyer & K. Jacobs (Eds.), Work hardening: State of the art.

(pp.294- 313). Thorofare, NJ: Slack.

United States Department of Labor, Employment and Training Administration. (1977). Dictionary of occupational titles (4th ed.). Washington, D.C.: U.S. Government Printing Office.

United States Department of Labor, Employment and Training Administration. (1991). Dictionary of occupational titles (4th ed., revised). Washington, D.C.: U.S. Government Printing Office.

United States Department of Labor, Manpower Administration. (1972). Handbook for analyzing jobs. Washington, D.C.: U.S. Government Printing Office.

United States Department of Labor, Employment and Training Administration. (1991). The revised handbook for analyzing jobs. Washington, D.C.: U.S. Government Printing Office.

Wright, M. (1988). Use of standardized work samples in work hardening. In Valpar International Corporation, The use of standardized work samples in physical capacities evaluation and work hardening^s programs: The work evaluation process: Referral to exit. Unpublished manuscript.

Wright, G. N. (1980). Total rehabilitation. Boston: Little, Brown.

APPENDIX B DOL FACTORS

This section describes the factors that are used to classify jobs by the *Dictionary of Occupational Titles* (DOT) and *The Revised Handbook for Analyzing Jobs* (RHAJ). Both of these volumes are published by the U.S. Department of Labor.

WORKER FUNCTIONS - Data, People, Things

DATA: Information, knowledge, and conceptions related to data, people or things obtained by observation, investigation, interpretation, visualization, and mental creation. Data are intangible and include numbers, words, symbols, ideas, concepts, and oral verbalization.

- 0 **SYNTHESIZING:** Integrating analyses of data to discover facts or develop knowledge concepts or interpretations.
- 1 **COORDINATING:** Determining time, place, and sequence of operations or activities on the basis of analysis of data; executing determinations or reporting on events.
- 2 **ANALYZING:** Examining and evaluating data. Presenting alternative actions in relation to the evaluation is frequently involved.
- 3 **COMPILING:** Gathering, collating, or classifying information about data, people, or things. Reporting or carrying out a prescribed action in relation to the information is frequently involved.
- 4 **COMPUTING:** Performing arithmetic operations and reporting on or carrying out a prescribed action in relation to them. Does not include counting.
- 5 **COPYING:** Transcribing, entering, or posting data.
- 6 **COMPARING:** Judging the readily observable functional, structural, or compositional characteristics (whether similar to or divergent from obvious standards) of data, people or things.

PEOPLE: Human beings; also animals dealt with on an individual basis as if they were human.

- 0 **MENTORING:** Dealing with individuals in terms of their total personality in order to advise, counsel, or guide them with regard to problems that may be resolved by legal, scientific, clinical, spiritual, or other professional principles.

- 1 NEGOTIATING: Exchanging ideas, information, and opinions with others to formulate policies and programs or arrive jointly at decisions, conclusions, or solutions.
- 2 INSTRUCTING: Teaching subject matter to others, or training others (including animals) through explanation, demonstration, and supervised practice; or making recommendations on the basis of technical disciplines.
- 3 SUPERVISING: Determining or interpreting work procedures for a group of workers, assigning specific duties to them, maintaining harmonious relations among them, and promoting efficiency.
- 4 DIVERTING: Amusing others, usually through the medium of stage, screen, television, or radio.
- 5 PERSUADING: Influencing others in favor of a product, service, or point of view.
- 6 SPEAKING/SIGNALING: Talking with and signaling people to convey or exchange information. Includes giving assignments and directions to helpers or assistants.
- 7 SERVING: Attending to the needs or requests of people or animals or the expressed or implicit wishes of people. Immediate response is involved.
- 8 TAKING INSTRUCTIONS/HELPING: Attending to the work assignment instructions or orders of supervisor. (No immediate response required unless clarification of instructions or orders is needed.) Helping applies to "non-learning" helpers.

THINGS: Inanimate objects as distinguished from human beings; substances or materials; and machines, tools, equipment, work aids, and products. A thing is tangible and has shape, form and other physical characteristics.

- 0 SETTING UP: Preparing machines (or equipment) for operation by planning order of successive machine operations, installing and adjusting tools and other machine components, adjusting the position of workpiece or material, setting controls, and verifying accuracy of machine functions and work produced, applying knowledge of machine capabilities, properties of materials, and shop practices. Uses tools, equipment, and work aids, such as precision gauges and measuring instruments. Workers who set up one or a number of machines for other workers or who set up and personally operate a variety of machines are included here.
- 1 PRECISION WORKING: Using body members and/or tools or work aids to work, move, guide, or place objects or materials in situations where ultimate responsibility for the attainment of standards occurs and selection of appropriate tools, objects, or materials, and the adjustment of the tool to the task, require considerable judgment.
- 2 OPERATING-CONTROLLING: Starting, stopping, controlling, and adjusting the progress of machines or equipment. Operating machines involves setting up and

adjusting the machine or material(s) as the work progresses. Controlling involves observing gauges, dials, etc. and turning valves and other devices to regulate factors such as temperature, pressure, flow of liquids, speed of pumps, and reactions of materials.

- 3 **DRIVING-OPERATING:** Starting, stopping, and controlling the actions of machines or equipment for which a course must be steered or which must be guided to control the movement of things or people for a variety of purposes. Involves such activities as observing gauges and dials, estimating distances and determining speed and direction of other objects, turning cranks and wheels, and pushing or pulling gear lifts or levers. Includes such machines as cranes, conveyor systems, tractors, furnace-charging machines, paving machines, and hoisting machines. Excludes manually powered machines, such as handtrucks and dollies, and power-assisted machines, such as electric wheelbarrows and handtrucks.
- 4 **MANIPULATING:** Using body members, tools, or special devices to work, move, guide, or place objects or materials. Involves some latitude for judgment with regard to precision attained and selecting appropriate tools, object, or material although this is readily manifest.
- 5 **TENDING:** Starting, stopping, and observing the functioning of machines and equipment. Involves adjusting materials or controls of the machine, such as changing guides, adjusting timers and temperature gauges, turning valves to allow flow of materials, and flipping switches in response to lights. Little judgment is involved in making these adjustments.
- 6 **FEEDING-OFF BEARING:** Inserting, throwing, dumping, or placing materials in or removing them from machines or equipment which are automatic or tended or operated by other workers.
- 7 **HANDLING:** Using body members, hand tools, or special devices to work, move, or carry objects or materials. Involves little or no latitude for judgment with regard to attainment of standards or in selecting appropriate tool, object, or materials.

GENERAL EDUCATIONAL DEVELOPMENT

General Educational Development (GED)...embraces those aspects of education (formal and informal) which contribute to the worker's (a) reasoning development, ability to follow instructions, and (b) acquisition of "tool" knowledge, such as language and mathematical skills. This is education of a general nature which does not have a recognized, fairly specific occupational objective. Ordinarily, such education is obtained in elementary school, high school or college. However, it derives also from experience and self study.

REASONING DEVELOPMENT:

- 6 Apply principles of logical or scientific thinking to a wide range of intellectual and practical problems. Deal with nonverbal symbolism (formulas, scientific equations, graphs, musical notes, etc.) in its most difficult phases. Deal with a variety of abstract and concrete variables. Comprehend the most abstruse classes of concepts.
- 5 Apply principles of logical or scientific thinking to define problems, collect data, establish facts, and draw valid conclusions. Interpret an extensive variety of technical instructions in mathematical or diagrammatic form. Deal with several abstract and concrete variables.
- 4 Apply principles of rational systems to solve practical problems and deal with a variety of concrete variables in situations where only limited standardization exists. Interpret a variety of instructions furnished in written, oral, diagrammatic, or schedule form.
- 3 Apply commonsense understanding to carry out instructions furnished in written, oral, or diagrammatic form. Deal with problems involving several concrete variables in or from standardized situations.
- 2 Apply commonsense understanding to carry out detailed but uninvolved written or oral instructions. Deal with problems involving a few concrete variables in or from standardized situations.
- 1 Apply commonsense understanding to carry out simple one or two step instructions. Deal with standardized situations with one or no variables, in or from these situations encountered on the job.

MATHEMATICAL DEVELOPMENT:

- 6 **ADVANCED CALCULUS:** Work with limits, continuity, real number systems, mean value theorems, and implicit function theorems.

MODERN ALGEBRA: Apply fundamental concepts of theories of groups, rings, and fields. Work with differential equations, linear algebra, infinite series, advanced operational methods, and functions of real and complex variables.

STATISTICS: Work with mathematical statistics, mathematical probability and application, experimental design, statistical inference, and econometrics.

5. ALGEBRA: Work with exponents and logarithms, linear equations, quadratic equations, mathematical induction and binomial theorem, and permutations.

CALCULUS: Apply concepts of analytic geometry, differentiations, and integration of algebraic functions with applications.

STATISTICS: Apply mathematical operations to frequency distributions, reliability and validity of tests, normal curve, analysis of variance, correlation techniques, chi-square application and sampling theory, and factor analysis.

- 4 ALGEBRA Deal with system of real numbers; linear, quadratic, rational, exponential, logarithmic, angle and circular functions, and inverse functions; related algebraic solution of equations and inequalities; limits and continuity and probability and statistical inference.

GEOMETRY: Deductive axiomatic geometry, plane and solid, and rectangular coordinates.

SHOP MATH: Practical application of fractions, percentages, ratio and proportion, measurement, logarithms, practical algebra, geometric constructions, and essentials of trigonometry.

- 3 Compute discount, interest, profit, and loss; commission, markup, and selling price; ratio and proportion; and percentage. Calculate surfaces, volume, weights, and measures.

ALGEBRA Calculate variables and formulas; monomials and polynomials ratio and proportion variables; and square roots and radicals.

GEOMETRY: Calculate plane and solid figures, circumference, area, and volume. Understand kinds of angles and properties of pairs of angles.

- 2 Add, subtract, multiply, and divide all units of measure. Perform the four operations with like common and decimal fractions. Compute ratio, rate, and percent. Draw and interpret bar graphs. Perform arithmetic operations involving all American money units.

- 1 Add and subtract two-digit numbers. Multiply and divide 10's and 100's by 2, 3, 4, 5. Perform the four basic arithmetic operations with coins as part of a dollar. Perform operations with units such as cup, pint, and quart; inch, foot, and yard; ounce and pound.

LANGUAGE DEVELOPMENT:

6 Content the same as that of Level 5, only more advanced.

5 **READING:** Read literature, book and play reviews, scientific and technical journals, abstracts, financial reports, and legal documents.

WRITING: Write novels, plays, editorials, journals, speeches, manuals, critiques, poetry, and songs.

SPEAKING: Conversant in the theory, principles, and methods of effective and persuasive speaking, voice and diction, phonetics, and discussion and debate.

4 **READING:** Read novels, poems, newspapers, periodicals, journals, manuals, dictionaries, thesauruses, and encyclopedias.

WRITING: Prepare business letters, expositions, summaries, and reports, using prescribed format and conforming to all rules of punctuation, grammar, diction, and style.

SPEAKING: Participate in panel discussions, dramatizations, and debates. Speak extemporaneously on a variety of subjects.

3 **READING:** Read a variety of novels, magazines, atlases, and encyclopedias. Read safety rules, instructions in the use and maintenance of shop tools and equipment, and methods and procedures in mechanical drawing and layout work.

WRITING: Write reports and essays with proper format, punctuation, spelling, and grammar, using all parts of speech.

SPEAKING: Speak before audience with poise, voice control, and confidence, using correct English and well-modulated voice.

2 **READING:** Passive vocabulary of 5,000-6,000 words. Read at rate of 190-215 words per minute. Read adventure stories and comic books, looking up unfamiliar words in dictionary for meaning, spelling, and pronunciation. Read instructions for assembling model cars and airplanes.

WRITING: Write compound and complex sentences, using proper end punctuation and employing adjectives and adverbs.

SPEAKING: Speak clearly and distinctly with appropriate pauses and emphasis, correct pronunciation, variations in word order, using present, perfect, and future tenses.

1 **READING:** Recognize meaning of 2,500 (two- or three-syllable) words. Read at rate of 95-120 words per minute. Compare similarities and differences between words and between series of numbers.

WRITING: Print simple sentences containing subject, verb, and object, series of numbers, names, and addresses.

SPEAKING: Speak simple sentences using normal word order and present and past tenses.

APTITUDES

Aptitudes are the capacities or specific abilities which an individual must have in order to learn to perform a given work activity.

The aptitudes are:

- G- General Learning Ability
- V- Verbal Aptitude
- N- Numerical Aptitude
- S- Spatial Aptitude
- P- Form Perception
- Q- Clerical Perception
- K- Motor Coordination
- F - Finger Dexterity
- M - Manual Dexterity
- E- Eye-Hand-Foot Coordination
- C -Color Discrimination

Aptitudes are rated according to a scale of 1 (highest) to 5 (lowest). Beneath the definitions of each aptitude, we have listed brief, illustrative examples from the RHAJ for each of the scale levels, except for level 5, which, in all cases, simply indicates an insignificant or negligible amount.

G - GENERAL LEARNING ABILITY: The ability to “catch on” or understand instructions and underlying principles; the ability to reason and make judgments. Closely related to doing well in school.

- 1 Conducts research in fundamental mathematics; diagnoses and treats diseases; writes original plays, receives individual applications for insurance to evaluate degree of risk involved.
- 2 Renders general nursing care to patients; applies principles of accounting to devise and implement system for general accounting; plans layout, installs, and repairs wiring; rents, buys, and sells property for clients on commission basis.

- 3 Takes dictation in shorthand; repairs, maintains, and installs electrical systems and equipment; prepares and compiles records in hospital nursing unit; drives truck over established route to deliver, sell, and display products or render services.
- 4 Assists in care of hospital patients; makes womens' garments, such as dresses, coats, and suits, according to customer specifications; sorts agricultural produce, such as bulbs, fruits, nuts, and vegetables; feeds of removes metal stock from automatic fabricating machines.
- 5 No illustrations.

V - VERBAL: The ability to understand the meaning of words and to use them effectively. Ability to comprehend language, to understand relationships between words, and to understand the meanings of whole sentences and paragraphs.

- 1 Conducts research in fundamental mathematics; attends to variety of medical cases in general practice; designs chemical plant equipment; directs editorial activities of newspaper; conducts criminal and civil lawsuits.
- 2 Converts symbolic statement of business problem to detailed logical flow charts for coding into computer language; instructs students in one or more subjects, edits motion picture film and sound track; schedules and assigns motor vehicles and drivers for the conveyance of freight.
- 3 Operates switchboard to provide answering service for clients; types letters, reports, stencils, forms; supervises and coordinates activities of workers engaged in assembly of electronic equipment; repairs and overhauls automobiles.
- 4 Mixes and bakes ingredients according to recipes and production order to produce breads; welds metal parts together, as specified by layout, diagram, work order, or oral instructions; services automobiles, buses, trucks, and other automotive vehicles with fuel, lubricants, and accessories as requested by customer.
- 5 No illustrations.

N - NUMERICAL APTITUDE: The ability to perform arithmetic operations quickly and accurately.

- 1 Conducts research in fundamental mathematics and in application of mathematical techniques to science, management, and other fields; collects, analyzes, and interprets data on problems of public finance; reviews applications for casualty insurance to evaluate degree of risk involved, following company's underwriting policies.
- 2 Applies principles of accounting to install and maintain accounting system; draws and

corrects topographical maps from source data; repairs electronic equipment; directs operation of retail, self-service food store according to overall organization-al policies.

- 3 Sells tickets for transportation agencies; grows shrubs, rootstocks, cut flowers, or flowering bulbs; designs and prepares decorated foods and artistic food arrangements for buffets in formal restaurants.
- 4 Makes womens' garments; inspects loaded freight cars; mixes and bakes ingredients according to recipes to produce bread, pastries, and other baked goods; records business transactions in journals, ledgers, and on special forms and transfers entries from one accounting record to another.
- 5 No illustrations.

S - SPATIAL APTITUDE: The ability to think visually of geometric forms and to comprehend the two-dimensional representation of three-dimensional objects. The ability to recognize the relationships resulting from the movement of objects in space.

- 1 Diagnoses and treats disease, injuries, and malformations of teeth; plans and designs private residences, office buildings, theatres, etc.; draws and paints illustrations for advertisements, books, magazines, posters, billboards, and catalogs.
- 2 Prepares working plans and detail drawings from rough or detailed sketches or notes, for engineering or manufacturing purposes according to specified dimensions; performs dances alone, with partner, or in groups to entertain audience; repairs and adjusts radios and television receivers.
- 3 Installs, adjusts, and maintains electrical wiring, switches, and fixtures in airplanes; constructs and repairs dental appliances according to prescription; makes womens' garments, such as dresses, coats, and suits.
- 4 Inspects electronic units and subassemblies, such as radio transmitters, computer circuits, and cables, for conformance to specifications; tends film cutter and mounting press to mount color-film transparencies; joins and reinforces parts of articles, such as garments, curtains, parachutes, stuffed toys, hats, and caps.
- 5 No illustrations.

P - FORM PERCEPTION: The ability to perceive pertinent detail in objects or in pictorial or graphic material. Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

- 1 Conducts studies of all nonmetallic minerals used in horological industry; performs chemical, microscopic, and bacteriologic tests to provide data for use in treatment and diagnosis of disease;

- 2 Draws and corrects topographical maps from source data, such as surveying notes, aerial photographs, or other maps; changes undesirable details of illustrations which are to be reproduced by lithographic process; repairs radio receivers, phonographs, recorders, and other electronic-audio equipment, using circuit diagrams and test meters.
- 3 Grades cured tobacco leaves preparatory to marketing or processing into tobacco products; repairs and services office machines, such as adding, accounting, and calculating machines; cuts and trims meat to size for display or as ordered by customer.
- 4 Operates cylinder press to score and cut paperboard sheets into box or container blanks; receives, stores, and issues equipment, materials, supplies, merchandise, foodstuffs, or tools; welds metal parts together, as specified by layout, diagram, work order, or oral instructions.
- 5 No illustrations.

Q - CLERICAL PERCEPTION: The ability to perceive pertinent detail in verbal or tabular material. Ability to observe differences in copy, to proofread words, and numbers, and to avoid perceptual errors in arithmetic computation. A measure of speed of perception is required in many industrial jobs even when the job does not have verbal or numerical content.

- 1 Conducts research in fundamental mathematics and in application of mathematical techniques to science; reads and corrects proof while original copy is read aloud; converts symbolic statement of business problems to detailed logical flow charts for coding into computer language.
- 2 Performs variety of clerical duties, such as filing correspondence, records, and reports; typing letters and reports; preparing bills; computing payrolls; compiling reports addressing, sorting, and distributing mail; performs chemical, microscopic, and bacteriologic tests to provide data for use in treatment and diagnosis of disease.
- 3 Prepares and compiles records in hospital nursing unit; drives truck over established route to deliver, sell, and display products or render services; operates cash register to compute and record accurately amount of sale on cash register, to compare sales slip with price tickets on merchandise.
- 4 Coordinates and expedites flow of materials, parts, and assemblies within or between departments in accordance with production and shipping schedules; inspects finished glassware or flat glass for conformance to quality standards; sells furniture, beds, and mattresses in department store or furniture store.
- 5 No illustrations.

K - MOTOR COORDINATION: The ability to coordinate eyes and hands or fingers rapidly and

accurately in making precise movements with speed. Ability to make a movement response accurately and swiftly.

- 1 No illustrations.
- 2 Types letters, reports, stencils, forms, addresses, or other straight copy material from rough draft or corrected copy; diagnoses and treats diseases, injuries, and malformations of the teeth; installs, repairs, adjusts, and calibrates pneumatic, electrical, and electronic instruments.
- 3 Operates telephone switchboard to establish or assist customer in establishing local or long distance telephone connections; drives gasoline-powered forklift truck to haul or stock materials and objects in or about establishment; cuts, trims, and bones meats to prepare them for cooking, using knives, saw, and cleaver.
- 4 Performs tasks to finish and press household linens; sets up and operates machine tools, and fits and assembles parts to make or repair metal parts, mechanisms, tools, or machines; assembles various aluminum or steel components of trailers; harvests fruit, working as crewmember.
- 5 No illustrations.

F - FINGER DEXTERITY: The ability to move the fingers and manipulate small objects with the fingers rapidly or accurately.

- 1 Plays organ in recital, as accompanist, or as member of orchestra, band, or other musical group; performs surgical operations upon the human body.
- 2 Sets up and operates coil-winding machine to wind multiple coils used in manufacture of electrical and electronic components; adjusts watch movements to comply with mechanical and timing specifications; packages pharmaceutical products by hand, working at production pace.
- 3 Takes dictation in shorthand and transcribes dictated materials, using typewriter; installs, maintains, and services sound and communication systems; operates battery of looms to weave yarn into cloth; packs agricultural produce.
- 4 Mixes and bakes ingredients according to recipes to produce breads, pastries, and other baked goods; sews fasteners and decorative trimmings to articles, and hold articles in place while sewing; repairs and maintains physical structures of commercial and industrial establishments.
- 5 No illustrations.

M - MANUAL DEXTERITY: The ability to move the hands easily and skillfully. Ability to work with the hands in placing and turning motions.

- 1 No illustrations.
- 2 Entertains audience by juggling and balancing objects; inspects eggs to ascertain quality and fitness for consumption or incubation according to prescribed standards; constructs and repairs metal-forming tools, dies, jigs, fixtures, and gauges, shaping parts with various metalworking machines and fitting them together, using handtools.
- 3 Repairs and rebuilds upholstered furniture; drives gasoline- or electric-powered industrial truck, equipped with forklift, to push, pull, lift, stack, or tier material in warehouse, storage yard, or factory; sorts and segregates fruit, working as a crewmember.
- 4 Harvests fruit, working as a crewmember, repairs and maintains physical structures of commercial and industrial establishments, using handtools and power tools; sorts rags and old clothing.
- 5 No illustrations.

E - EYE-HAND-FOOT COORDINATION: The ability to move the hand and foot coordinately with each other in accordance with visual stimuli.

- 1 Performs gymnastic feats of skill and balance while swinging on a trapeze; performs ballet dances alone, with partner, or in group to entertain audience; creates or interprets music on drum, as member of orchestra, band, or other musical group.
- 2 Pilots airplane to transport passengers; operates several types of powered construction equipment, such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers, or graders; raises, positions, and joins girders, columns, and other structural steel members to form completed structures or frameworks.
- 3 Attends to beef cattle on stock ranch; drives gasoline- or diesel-powered tractor-trailer truck combination, usually over long distances on highways, to transport and deliver goods; renders variety of personal services conducive to safety and comfort of airline passengers during flight.
- 4 Parachutes from airplane into forests to suppress forest fires; operates pressing machine to smooth surfaces, flatten seams, or shape articles, such as garments, drapes, slipcovers, and hose.

- 5 No illustrations.

C - COLOR DISCRIMINATION: The ability to match or discriminate between colors in terms of hue, saturation, and brilliance. Ability to identify a particular color or color combination from memory and to perceive contrasting color combinations.

- 1 Develops color formulas for printing textile and plastic materials and plans; paints portrait of person, in oil, on canvas, using living subject; reweaves damaged areas of oriental or other expensive rugs.
- 2 Mixes stains, paints, and other coatings for use in painting according to formulas; plans and designs artistic interiors for homes, hotels, ships, commercial and industrial structures, and other establishments; studies effects of drugs, gases, dusts, and other materials on tissues and physiological processes of animals and human beings.
- 3 Examines and grades pieces of leather to make articles, such as garments, gloves, and mittens; tests temperature of glass melting furnaces and regulates gas and air supply to maintain specified temperature; displays and sells cotton, linen, rayon, silk, and wool yard goods.
- 4 Performs various tasks in a fish hatchery; inspects furniture and parts for defects; cuts and trims meat to size for display or as ordered by customer, using handtools and power equipment.
- 5 No illustrations.

PHYSICAL DEMANDS

(The following definitions were taken from the RHAJ, pp. 12-1 - 12-20. The definitions are not necessarily complete, and no illustrative examples are given.)

- 1 **STRENGTH:** This factor is expressed by one of five terms: Sedentary, Light, Medium, Heavy, and Very Heavy. In order to determine the overall rating, an evaluation is made of the workers' involvement in the following activities:

Position

Standing: Remaining on one's feet in upright position at a work station without moving about.

Walking: Moving about on foot.

Sitting: Remaining in a seated position.

Weight/Force

Lifting: Raising or lowering an object from one level to another (includes upward pulling).

Carrying: Transporting an object, usually holding it in the hand or arms or on the shoulder.

Pushing: Exerting force upon an object so that the object moves away from the force (includes slapping, striking, kicking, and treadle actions).

Pulling: Exerting force upon an object so that the object moves toward the force (includes jerking).

Controls: Hand-Arm and Foot-Leg

Controls entail use of one or both arms or hands (hand-arm) or one or both feet or legs (foot-leg) to move controls on machinery or equipment.

Sedentary Work

Exerting up to 10 pounds of force occasionally (up to 1/3 of the time) or a negligible amount of force frequently (from 1/3 to 2/3 of the time) to lift, carry, push, pull, or otherwise move objects, including the human body. Sedentary work involves sitting most of the time, but may involve walking or standing for brief periods of time.

Light Work

Exerting up to 20 pounds of force occasionally, or up to 10 pounds of force frequently, or a negligible amount of force constantly (2/3 or more of the time) to move objects. Physical demand requirements are in excess of those for Sedentary Work.

Medium Work

Exerting 20 to 50 pounds of force occasionally, or 10 to 25 pounds of force frequently, or greater than negligible up to 10 pounds of force constantly to move objects. Physical demand requirements in excess of those for Light Work.

Heavy Work

Exerting 50 to 100 pounds of force occasionally, or 25 to 50 pounds of force frequently, or 10 to 20 pounds of force constantly to move objects. Physical demand requirements are in excess of those for Medium Work.

Very Heavy Work

Exerting in excess of 100 pounds of force occasionally, or in excess of 50 pounds of force frequently, or in excess of 20 pounds of force constantly to move objects. Physical Demand requirements are in excess of those for Heavy Work.

- 2 CLIMBING: Ascending or descending ladders, stairs, scaffolding, ramps, poles, and the like, using feet and legs or hands and arms. Body agility is emphasized.
- 3 BALANCING: Maintaining body equilibrium to prevent falling when walking, standing, crouching, or running on narrow, slippery, or erratically moving surfaces; or maintaining body equilibrium when performing gymnastic feats.
- 4 STOOPING: Bending body downward and forward by bending spine at the waist, requiring full use of the lower extremities and back muscles.
- 5 KNEELING: Bending legs at knees to come to rest on knee or knees.
- 6 CROUCHING: Bending body downward and forward by bending legs and spine.
- 7 CRAWLING: Moving about on hands and knees or hands and feet.
- 8 REACHING: Extending hand(s) and arm(s) in any direction.
- 9 HANDLING: Seizing, holding, grasping, turning, or otherwise working with hand or hands. Fingers are involved only to the extent that they are an extension of the hand, such as to turn a switch or shift automobile gears.
- 10 FINGERING: Picking, pinching, or otherwise working primarily with fingers rather than with the whole hand or arm as in handling.
- 11 FEELING: Perceiving attributes of objects, such as size, shape, temperature, or texture, by touching with skin, particularly that of fingertips.
- 12 TALKING: Expressing or exchanging ideas by means of the spoken word to impart oral information to clients or to the public and to convey detailed spoken instructions to other workers accurately, loudly, or quickly.
- 13 HEARING: Perceiving the nature of sounds by ear.
- 14 TASTING/SMELLING: Distinguishing, with a degree of accuracy, differences or similarities in intensity or quality of flavors or odors, or recognizing particular flavors or

odors, using tongue or nose.

- 15 NEAR ACUITY: Clarity of vision at 20 inches or less.
- 16 FAR ACUITY: Clarity of vision at 20 feet or more.
- 17 DEPTH PERCEPTION: Three-dimensional vision. Ability to judge distances and spatial relationships so as to see objects where and as they actually are.
- 18 ACCOMMODATION: Adjustment of lens of eye to bring an object into sharp focus. This factor is required when doing near point work at varying distances from the eye.
- 19 COLOR VISION: Ability to identify and distinguish colors.
- 20 FIELD OF VISION: Observing an area that can be seen up and down or to right or left while eyes are fixed on a given point.

APPENDIX C

NOTE FROM BARBARA KNOTHE, MOT, OTR/L

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Work oriented evaluations are used to establish the initial plan and goals in a work hardening program and/or define the individual's functional/vocational disposition. The Commission on Accreditation of Rehabilitation Facilities states that the evaluation process should include, but not be limited to one or more of the following functional capacity evaluations:

- a. Baseline evaluation - a baseline assessment of functional ability to perform work activities which include the physical demand factors on which the Dictionary of Occupational Titles is based. This type of evaluation is approximately four hours in length and is not job or occupational group specific.
- b. Job capacity evaluation - an assessment of the match between the individual's capabilities and critical demands of a specific job. This type of evaluation needs a job analysis, assesses endurance and/or repetition, and may take one to two days to complete.
- c. Occupational capacity evaluation - an assessment of the match between the individual's capabilities and the critical demands of an occupational group. This also is a longer evaluation, but is more broad based, requiring the analysis of a job category.
- d. Work capacity evaluation - an assessment of the match between the individual's capabilities and the demands of competitive employment. This evaluation is geared toward the chronic, long term patient dealing with 'can he/she return to work at all?' The evaluation process here defines the transferable skills and may need to include psychology/psychiatry and/or vocational assessments.

During the work oriented evaluation process, documentation of the applicable physical status evaluations and environmental conditions of the work place should be considered. The clinical reports concerning work oriented evaluation should describe the content of the evaluation, state the time used and be completed upon discharge within seven days. Additionally during the evaluation process, documentation of attitudinal and behavioral components which impact upon the individual's ability to return to work or need for extended rehabilitation and/or vocational services are concurrently recorded. Time management constraints focus on acquiring/interpreting the raw data and decreasing report time documentation in either computer or preprinted written format. Ease of converting raw data into normative data can be a major factor in time management. Additionally, by

reducing report writing time by computer or pre-printed formats, the evaluation process becomes user friendly:

The preprinted report formats enclosed, along with the physical status, environmental conditions and behavioral component report forms, can be used during the evaluation process, photostated and enclosed with the conclusions and recommendation top sheet.

The major factors in work oriented evaluations today is the standardization of the evaluation process and ease of documentation of the data achieved in the clinical setting.

Barbara Knothe, MOT, OTR/L

*(Examples of VCWS report forms in allied health setting are available upon request.
Send e-mail to info@valparint.com)*