Department of Public Safety Standards and Training

Oregon Physical Ability Test Instructor Course

DESCRIPTION & RESEARCH SUMMARY

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OREGON DEPARTMENT OF PUBLIC SAFETY STANDARDS AND TRAINING

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ORPAT—DESCRIPTION

The Oregon Physical Abilities Test (ORPAT) is a hybrid physical ability/job sample physical abilities assessment process designed to evaluate police officer candidates on the essential physical capacities required to satisfactorily perform their job duties. ORPAT was originally based on data taken from the Canadian RCMP PARE (**P**hysical **A**bilities **R**equirement **E**valuation) research and tests as well as multiple Job Task Analysis (JTA's) for Oregon police, corrections and probation and parole officers.

The Canadian PARE program, which serves as the constructional and theoretical underpinnings of ORPAT is research-based, having been derived from the work of Mr. Doug Farenholtz of the British Columbia Justice Institute. Mr. Farenholtz, through a scientifically accepted method of task analysis, identified nine baseline physical activities required by public safety officers in the pursuit of their du-ties. These were:

Walking Running Jumping
Climbing Vaulting Lifting
Carrying Pulling Pushing

It was identified that police officers, from time-to- time, had to have the physical ability to gain and maintain physical control over suspects.

Police officers must also intervene in disputes where they have to control aggressive and/or violent behavior (pushing, pulling). They are also involved in search and rescue operations (climbing, vaulting, crawling, carrying), particularly involving motor vehicle accidents (pushing, pulling, crawling, carrying). Although not commonplace, these activities are essential and critical tasks for police officers.

ORPAT was designed to replicate critical and essential physical tasks and demands faced by police officers in the normal performance of their duties. Both specific tasks and overall physical demands are replicated in the ORPAT through the use of a carefully designed and validated, timed ―obstacle course.‖

ORPAT—DESCRIPTION (CONTINUED)

Part One—Obstacle Course – Mobility Run

Section one of ORPAT consists of a 1235-foot obstacle run where the officer must demonstrate essential, job-related physical abilities such as mobility, agility, flexibility, power and general physical endurance.

1. From the course start marker the officer runs to the outside of the marked course towards the first marker placed 20 feet out, and 10 feet from the course centerline. Before reaching the first marker the officer must cross the balance beam (centered between the start marker and first marker).
2. From this marker the officer runs diagonally towards the second marker. This marker is placed 40 feet out from the start position and 10 feet to the right of the centerline. Before reaching the second marker, the officer must jump over a five-foot obstacle (mat). On landing, the officer must turn left and proceed towards the stair-simulator.
3. The stair-simulator is placed in the center of the course in such a manner that the center of the top platform is exactly sixty (60) feet from the start marker. The officer must run up and down the stairs hitting at least one step on the way up, the top platform, and one step on the way down.
4. The third marker is set in the center of the course exactly eighty (80) feet from the start marker. The officer runs outside this marker, turns sharply right or left and runs back towards the stairs going up and down again. He/she then proceeds towards the forth marker. The fourth marker is placed exactly opposite to marker number two and is in line with marker number one. Before reaching marker four the

officer must crawl under the crawl obstacle, which is centered between the stairs and marker four. It is 29 inches high.

5. The officer runs around marker four, turns left diagonally heading toward marker five. Before reaching this marker the officer must jump over two identical obstacles (18 inches high and 10 feet apart).
6. Upon reaching the fifth marker the officer runs to the right, towards the original start marker. Before reaching this marker the officer will vault a 3-foot high railing. Officers will land in control on the opposite side of the vault obstacle, fall to their back or stomach (alternating on each lap) recover to their feet without mechanical assistance and proceed around the start marker before beginning the second lap. Six laps are completed in this manner.

Getting up without mechanical assistance means:
After a stomach fall the officers push up from the floor mat with their arms in a ―push-up‖ type manner (but more akin to actual work tasks). Their form is not a significant issue. However, the officer **is not al-lowed to roll over or use the railing for support.**

After the back fall the officer will stand up, using a sit-up/curl-up procedure. Again, form is unimportant. Officers can roll on their back and use the roll to gain momentum to stand-up. **The officer cannot use the railing for assistance.**

Six laps must be completed before starting Part 2 (fight portion) of the test. The six repetitions are designed to put the officer in an anaerobic condition before the fight portion of the test (to simulate the typical pursuit and struggle to apprehend work scenarios).

Once the sixth lap of the obstacle course is completed the officer proceeds toward the push-pull machine; which is part two of the testing process.

Part Two—Push Pull Machine

One of the more difficult aspects of standardizing physical tests involves presenting essentially identical tasks to each participant. This is one of the reasons why testing outdoors is not advisable. Weather and surface conditions are unpredictable and uncontrollable. Using a machine to simulate struggling with a person allows for absolute uniformity in testing. The push-pull machine also has the advantage of offering a more balanced exertion profile than other methods that might inadvertently emphasize upper body strength.
After completing the obstacle run the officer moves to the mechanical push/pull station, consisting of a push-pull unit and a line on the wall 39 inches from the floor. Reaching the push-pull unit after completing the sixth lap of the obstacle course should take no more than five seconds. Maximum allowed distance between the course terminus and the push-pull machine is 20 feet. Where it is physically impossible to locate the station within 20 feet of the end of the run, the amount of time equivalent to the period taken to reach the push/pull must be deducted from the officer‘s total time to maintain standardization. The officer may perform the push-pull activity in the order he/she chooses. Since the ―push‖ is more difficult to perform it is generally recommended to do this activity first.

Push Activity

Upon reaching the push-pull unit the officer grasps the machine handles and pushes the 80lbs off the floor, then moves right to left completing a 180-degree arc. Six complete arcs must be executed by bringing the bar parallel with the base of the machine. **The officer must remain in control of the machine throughout the activity.** Shoulder girdle strength and endurance are required to push the weight and maintain control.

ORPAT—DESCRIPTION (CONTINUED)

The officer‘s chest may not touch the lever arm. Arms must remain bent at the elbow throughout the performance of the activity. The degree of the bend can vary from 60 to 135 degrees. The elbows or hands must not be touching the chest or shoulders since this indicates a lack of muscular control. The officer‘s back must be straight and the contraction of the abdominal muscles to maintain pelvic tilt is essential. This part of the test normally lasts approximately 25 seconds.

It is important that the officer‘s elbows remain bent throughout the test and the arms or hands must not touch the chest or shoulders. Officers must be reminded of this throughout the performance of this push activity. If, after a reminder the officer fails to correct their technique, the specific arc should be repeated and the correct form used.

Controlled fall

Once the push activity is completed the weight is released, again while maintaining control at all times. The officer moves away from the unit, falls to his/her stomach (executing a push-up type movement) and stands up, touching the marked line on the wall 39 inches from the floor. The officer then executes a second fall; this time on their back. Once again, the officer executes a sit-up type maneuver, rising to a standing position touching the wall once again. This sequence is repeated twice (4 falls, 2 fronts, 2 back). The activity typically lasts 20 seconds. Specific form is not important. However, the officer must maintain control and come back to the ready position after each repetition.

NOTE:
Precautions must be taken in both the front and back falls. The officer should be advised to avoid a full squat position. The safe fall and stand-up procedures should be demonstrated by the administrator and practiced by the officers before the test is initiated.

Pull Activity (continued)

When the fourth fall is completed the officer grasps the rope and **pulls** the weight off the floor. Maintaining the weight in this position, he/ she moves through 180 degrees an arc by bringing the bar parallel to the base of the machine. This action is repeated six times, with the officer touching the marked line three times on each side. This portion of the test lasts approximately 20 seconds. The officer must remain in control at all times and their elbows must remain flexed.
In order to maintain proper balance a shuffle movement of the feet is suggested. Crossing the feet over weakens this position and, for less fit individuals, may cause them to drop the weight or lose their balance.
The officer‘s back must be kept straight throughout the movement as well as contracting the abdominal muscles, thus stabilizing the pelvis.

Part Three—Dummy Drag Section

After a 60-second rest period subsequent to completing the obstacle course and push-pull portions of the test, the officer must drag a 165 pound dummy a distance of 25 feet. Officers must use the under the arm technique to accomplish this. This is done by reaching under the dummy‘s arms and grasping the forearm section. The officer then drags the dummy for 25 feet. Officers must perform this task in a controlled and continuous manner.

Once motion is started the officer cannot stop if they are to pass this section of the test. Officers will have three attempts to complete task. Three unsuccessful trials will constitute a failure. Officers failing the dummy drag section fail the ORPAT examination.

ORPAT HYBRID CHARACTERISTICS—INSTRUCTOR QUALIFICATIONS

ORPAT HYBRID CHARACTERISTICS

ORPAT is a ***hybrid*** combination of conventional physical abilities and job sample testing. As such it combines elements of demonstrated job tasks (climbing stairs) with overall fitness and strength assessment (largely through the sequential combination of various task samples). Pure physical abilities tests have been criticized because it is hard to validate them against actual physical requirements of the job and they typically produce adverse impact in testing females. Pure job-sample tests are criticized because they do very little to assess overall strength, agility and endurance, and they are expensive, complicated, and potentially risky to administer.
By combining job sample and physical abilities testing, it is possible to achieve a very high validation level. While the initial focus has been on police, emerging research strongly suggests the ORPAT process and its ancillary measurement and validation is easily transferable to other law enforcement disciplines, without modification, other than using the performance norms specific to those groups.

Instructor Qualifications

There is a 12-hour certification process required to be qualified as an ORPAT instructor.
This process includes:

1. Classroom training

2. Instruction in course set up.

3. Course performance measurement methodology

4. Course demonstration/explanation

5. Course evaluation

6. Practical experience with running the course

ORPAT—EQUIPMENT REQUIREMENTS

Space

ORPAT is ***done strictly indoors*** so that a controlled environment can be maintained**.** This requires an open space, roughly equivalent to a small gymnasium or multi-purpose facility. (Please note attached ORPAT course map). The floor should be reasonably smooth and free from irregularities and hazards. Lighting must be bright and produce no significant shadows. The physical area actively used in the ORPAT should be marked off and clearly identified to make certain that observers or participants waiting their turn do not inadvertently stray into the course itself.

General Equipment Requirements

- Eight traffic cones 12”
- Four cones or chairs 18” high
- Two 3 foot cedar sticks
- Balance beam (15’ long x 6” wide x 10” high)
- Crawl Obstacle (30” high x 36” wide)
- 5’ x 3’ rubber mat
- Portable Stair-simulator (5 stairs up 5 down)
- Portable Vault and Climbing Rail (variable height 3-8 feet)
- PUSH/PULL Machine (PTM 1000- Power Training Machine)

PART ONE: OBSTACLE COURSE/MOBILITY RUN STATION—BALANCE BEAM

Station Description
From a standing start, the officer runs around a cone and jumps up on the fifteen-foot balance beam, running the entire length. If he/she falls off the beam the officer must return to the course start-point and repeat the obstacle.

Assessment Elements
Job Tasks

- Pursuing person on foot over uneven terrain
- Walking-running while balancing on narrow, elevated surfaces

Physical Abilities

- Balance
- Depth perception
- Agility
- Lower body strength

REQUIRED EQUIPMENT

- 1 - 4” x 6” x 15’ (Beam)
- 1 - 4” x 6” x 8’ (Legs)
- Paint (sand grit)
- Defensive Tactics Mat

Finished product is approximately 10”H x 2’W x 15’L

STATION—FIVE-FOOT JUMP OBSTACLE

Station Description

After completing the balance beam obstacle the officer rounds another cone and jumps the five foot obstacle (designed to simulate a ditch or other opening-type obstacle). The officer's feet (foot) cannot land within the marked obstacle perimeter.

Assessment Elements
Job Tasks

- Pursuing someone on foot
- Jumping across obstacles

Physical Abilities

- Depth perception
- Running speed
- Agility
- Lower body strength
- Core strength
- Ability to jump

REQUIRED EQUIPMENT
Tape or 5' x 3' rubber mat

STATION—STAIRS CLIMB-SIMULATOR

Station Description

After completing the jump obstacle the officer rounds another cone and runs 60 feet of the course to the stair simulator. Comprised of five steps on either side, the officer runs up one side, down the other, rounds a cone and repeats the stair obstacle. The officer must hit at least one step and the top plat-form, going up and down.

Assessment Elements
Job Tasks

- Pursuing someone on foot
- Walking/running up/down stairs

Physical Abilities

- Depth Perception
- Visual acuity
- Agility
- Coordination
- Lower body Strength
- Core strength

REQUIRED EQUIPMENT
Portable stair system—(five stairs)
Alternatives: While it is possible to construct a stair simulator from wood; weight, instability, lack of portability and other potential hazards and liabilities make this inadvisable.

STATION—CRAWL OBSTACLE

Station Description

After completing the stair simulator obstacle, the officer runs to the crawl obstacle, drops down and goes under the 29” high bar.

Assessment Elements

Job Tasks

- Pursuing someone on foot
- Crawl through small opening

Physical Abilities

- Agility
- Flexibility
- Coordination
- Core Body
- Strength
- Core power
- Lower body strength

REQUIRED EQUIPMENT

- 2 - 2” x 2” - 30” long
- 1 - 2” X 2” - 36” long
- 2 - 2” X 2” - 20” long
- Paint
- Defensive Tactics Mat

STATION—EIGHTEEN INCH BARRIER JUMP (X2)

Station Description

After completing the crawl obstacle the officer traverses the center section of the course, which contains **two** eighteen-inch jump barriers. These barriers are intended to represent small obstructions, such as curbs, landscape features, etc.

Assessment Elements
Job Tasks

- Pursuing someone on foot
- Jumping over common obstacles

Physical Abilities

- Depth Perception
- Agility
- Coordination
- Balance
- Lower body strength
- Core strength
- Ability to jump

REQUIRED EQUIPMENT
4 - Traffic cones – 16”H
2 - 2” x 2” - 36” long

STATION—THREE-FOOT VAULT

Station Description

After completing the two 18-inch jump barriers the officer does a controlled vault of three feet, makes a two-footed landing, then drops to a prone position, rises without assistance and begins the obstacle course again.

Assessment Elements
Job Tasks

- Pursuing someone on foot
- Jump/climb over obstacles
- Regain feet after falling/being knocked down.
- Jump down from elevated surface

Physical Abilities

- Depth Perception
- Agility
- Coordination
- Balance
- Core power
- Upper/Lower body strength

REQUIRED EQUIPMENT

- Portable vault and climbing rail
- Defensive Tactics Mat(s)

STATION—FALL TO BACK—FRONT

Station Description

After completing the vault obstacle and returning to feet, the officer falls to their back after the first lap and then to their stomach after the second lap, recovering to their feet each time without using any assistance. The purpose of this is to simulate recovery from falling/being knocked down, after clearing an obstacle.

Assessment Elements
Job Tasks

- Physically control person
- Pursue-struggle with suspect
- Regain feet after falling/being knocked down

Physical Abilities

- Balance
- Core strength
- Upper/lower body strength

REQUIRED EQUIPMENT
Defensive Tactics Mats(s)

PART TWO: PUSH-PULL MACHINE-FALLS STATION-PUSH (FIGHT PORTION)

Station Description

After completing six laps of the obstacle course the officer moves to the push-pull machine. This machine simulates struggling with, and controlling a subject, and extracting subject from car or room. It presents a standardized "fight" obstacle to each participant.

Assessment Elements
Job Tasks

- Physically control person
- Struggle/fight with person

Physical Abilities

- Balance
- Agility
- Core strength
- Upper/lower body strength

REQUIRED EQUIPMENT

- PTM-1000 Push-Pull Machine

STATION—FALL TO BACK—FRONT

Station Description

After completing the ***push*** portion machine the officer moves to a wall and executes back and front falls to the floor, simulating being knocked down or falling to the ground in a fight scenario, and recovering to feet.

Assessment Elements
Job Tasks

- Physically control person
- Get to feet after falling/being knocked down

Physical Abilities

- Balance
- Core strength
- Upper/lower body strength

REQUIRED EQUIPMENT

- None

STATION-PULL (FIGHT PORTION)

Station Description

After completing back and front falls of the officer moves back to the push-pull machine. This machine will now simulate extracting subject from car or room. It presents a standardized "fight" obstacle to each participant.

Assessment Elements
Job Tasks

- Pull—drag person
- Struggle/fight with person

Physical Abilities

- Balance
- Agility
- Core strength
- Upper/lower body strength

REQUIRED EQUIPMENT

- PTM-1000 Push-Pull Machine

PART THREE—DUMMY DRAG

Station Description

After completing the fight portion of the test, the officer is given a sixty (60) second recovery time, and then moves to a 165- pound dummy. The dummy must be moved in a controlled manner for 25 feet.

Assessment Elements
Job Tasks

- Physically control person
- Pull/drag person
- Lift and carry person

Physical Abilities

- Balance
- Core strength
- Lower/upper body strength
- Ability to recover (the drag takes place after running the rest of the course, participants are usually quite fatigued at this point in the process)

REQUIRED EQUIPMENT

- **Survivor** Agility Training Dummy

ORPAT

General Exertion Elements

- Cardio-vascular endurance
- Muscular endurance
- Core body strength
- Explosive power
- Balance
- Agility
- Flexibility
- Coordination
- Speed
- Depth perception

ORPAT
VALIDATION RESEARCH SUMMARY

Basic Findings and Conclusions—Summary

1. Reasonable levels of physical fitness and physical ability are essential to the safe and effective performance of the job duties of a police officer.
2. Appropriate, validated medical standards and physical testing are reasonable and necessary parts of both pre-employment screening and training of prospective police officers.
3. Any process which serves the function of an employment test must meet established standards for validity, as well as ADA and EEO requirements for non-discrimination.
4. ORPAT is a new generation hybrid physical functioning test, combining elements of physical abilities and work sample testing methodologies.
5. ORPAT is based on extensive prior research and customary practices within the law enforcement community.
6. ORPAT has been in use at the Oregon Department of Public Safety Standards and Training (DPSST) and in some local Oregon police agencies for over 10 years.
7. A research sample of over 1,000 participants was used. This number represents virtually all of the officers coming through the DPSST academy over a five-year period.
8. A control group of over 100 incumbent police officers was tested using ORPAT methodology.
9. ORPAT meets all reasonable requirements for being job-related and reflective of essential physical performance requirements for police officers.
10. ORPAT meets all three employment testing validation methods (content, criterion, construct), to a reason-able degree.
11. Sufficient rationale exists for adoption of a maximum time-to-completion training standard for ORPAT.
12. Sufficient rationale exists for a maximum time-to-completion standard for performance on the ORPAT test as a pre-employment cutoff score for hiring agencies.
13. Statistical evaluation of ORPAT performance data shows, that while there is some disparate impact by gender, the level of impact does not rise to meet the first burden of proof to file an adverse impact claim. This is also true for age (40+). There is no appreciable disparate impact by ethic group.
14. ORPAT meets all non-discrimination requirements (ADA, EEO/AA).
15. In addition to police, ORPAT has been conditionally validated at the content level for entry-level corrections officers, parole and probation officers and Oregon Liquor control agents. No other validation has been undertaken at this time.
16. ORPAT research suggests a number of future avenues of continued inquiry into overall areas of public safety officer recruitment, hiring and training, and police officer health and safety issues.
17. ORPAT research results appear to contradict the long-standing assertion that, overall, females are structurally less able to perform adequately on meaningful physical standards tests for police officer positions.
18. ORPAT research supports the hypothesis that, to a significant degree, the ability to perform the physical tasks of a police officer can be achieved by most candidates who are reasonably fit and able, through efforts directed towards appropriate conditioning and skills development.
19. It is possible to completely and clearly articulate the general physical conditioning and specific physical skills that will have the most positive impact on police officer candidate performance on the ORPAT.
20. ORPAT research suggests there is a link between performance on the ORPAT and subsequent training-related injury rates for police officers.

ORPAT
VALIDATION RESEARCH SUMMARY

Data Collection

The data used in the ORPAT validation study was taken from virtually all of the police officer trainees who attended the DPSST academy during the testing period, plus over one hundred incumbent police officers who were tested at various agency field locations. No attempt was made to separate out demographic groups for analysis until the data was examined for this evaluation. Since the "sample" is, for all practical purposes, 100% of the target population, there is no discussion of sample selection, predictive validity, etc.… A database was constructed and 100% of the available testing data was entered. There was some negligible data loss due to some participants not completing both pre and post-tests, and occasional records errors. These losses are very small and of little consequence within the whole.

Population Characteristics

1,150 trainees are represented in this data. 88% of the participants were male, 12% were female, 6% were age forty and over.

Physical Tasks—Content Validation

The specific physical tasks and activities used in the ORPAT were validated using both the 1996 and 2003 Oregon Police Job Task Analysis studies. Those physical tasks that statistically rose to the level of "crucial and essential" closely parallel those used in other similar processes nationwide.

Trainee Test Performance

DPSST Health and Fitness Training Coordinator, Tara Hagen collected police trainee performance data on the ORPAT process for the period January, 2000, to July, 2004. Each trainee was timed as they ran the ORPAT and these times were recorded. Additional data was collected from regional testing sites from October, 2000 to August, 2001, where a wide range of incumbent officers were tested.

A total of 1,250 individuals were tested during this period, 1,150 at the academy and 100 at regional testing facilities. Both DPSST academy and regional testing was done under the oversight of DPSST staff.

Common Methods of Validating Employment Selection Tests—Relationship Between Employment Testing and Job Tasks

Employment testing validation is a formal process of **proving** a test procedure effectively measures a job function, skill, ability or other characteristic, which can reasonably said to be critical and essential. Once it has been demonstrated that the test in question addresses performance elements that are job-related and a business necessity, there are three commonly used methods of testing validation (to insure the test does what it is sup-posed to do, and does not have unplanned, negative or adverse consequences). These types of validation are content, criterion and construct.

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The first and most important characteristic of a valid employment selection test is a demonstrable connection between the test and essential task elements of the actual job being performed. Does the test accurately and completely reflect the actual job being done?

Whatever the mechanism of personnel selection testing in use, it must first be shown that test criteria are **―job-related**.‖ Since test criteria are most often based on meeting some sort of minimum set of qualifications it is also generally held that screening criteria must be based on 'manifest business necessity;' that is, ***there must be a clear connection between minimum requirements and what the business actually needs employees to do.*** Proving business necessity is a matter of relating job functions of a given position to the overall operation of the organization.

This process constitutes the ***reasonable person*** validation. The test is valid because it can be demonstrated that it actually tests for critical, known job skills, knowledge, and/or abilities.

Employment testing is potentially subject to several levels of scrutiny, including validation studies of testing methodology. Employment testing must be validated to be defensible. Such validation is essential in meeting ADA and other antidiscrimination requirements, as well as insuring that tests are ethically fair and accurate in what they purport to measure. These validation methods are largely drawn from the basic tools for evaluating research (statistical analysis).

A Word About Abilities Versus Job-Sample Physical Testing

There is a divergence of thought about whether physical abilities tests or work sample tests are more valid and defensible. One position is the use of a previously validated physical abilities test (such as the Cooper examination) is a better choice. This is primarily because there are correlation studies linking fitness levels to job demands and because these tests can essentially be bought ―off-the-shelf.‖ Of late, however, these correlation studies have come under some attack. Of all the basic physical abilities functions, only *strength* has been shown to have a clear positive correlation with police officer functioning (Jones, 1995).

This makes sense. Most of the tasks performed by police officers are anaerobic (short, high intensity) in nature, and probably involve reliance on coordination and speed more than on the abilities measured by a health related test.
(Thomas & Means, 2001)

In addition, setting different standards of performance for males and females on physical abilities tests (which is still being done in some states) has been found to be discriminatory.

Work sample tests tend to have more ―face‖ validity (because they look like the job). At a content level it is easier to justify having trainees vault an obstacle as a valid measurement of job-related physical ability than having them do fifty set-ups. However, standardization of work sample tests can be very difficult and the tests can be quite complicated and expensive to administer. Additionally, there is the enhanced chance for injury

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when actual tasks are used (such as pushing an automobile), as opposed to ―representative‖ tasks, such as those employed in the ORPAT.
In the physical abilities arena, pure job task based tests have proven to be problematic because of adverse impact by gender and age; however, pure physical abilities testing can also be troublesome in this regard. Setting different testing standards based on gender and age in order to mitigate or eliminate adverse impact has been held to be discriminatory.
Pure physical abilities testing is more common in police organizations than work sample testing, but there is always the issue of being able to clearly prove why being able to jump a specific vertical distance or bench press a certain weight is job-related.
Those elements of physical abilities testing that focus on upper body strength have proven to be particularly troublesome because of adverse impact on females, who tend to have lower upper body strength in comparison to males. There have been recent challenges to the validity of emphasizing upper body strength in physical testing for police as not accurately representing the demands of the job.
Finally, both testing methodologies are subject to criticism if they are not appropriately linked to critical and essential tasks actually performed on the job. In other words, neither approach appears to be a complete solution to the problem.

Content Validity

This refers to whether or not the content of the **test** can be demonstrated to reasonably reflect the content of the **job** (simulations, work samples, tests of performance, etc.).
There are two primary issues associated with determining content validity. The first of these is to be able to demonstrate a clear and unambiguous relationship between the test elements and the performance requirements of the job. The second is to show that the "scoring" or evaluation mechanism reflects the performance realties of the job (e.g. if trainees are expected to jump over a four-foot barrier, this must be reasonably representative of performance demands they will actually face on-the-job).
It is also very useful to be able to show a connection between test evaluation methodology and performance standards and safety issues on-the-job. For example, not only must the individual be able to jump over a four-foot fence, the inability to do this correctly and successfully constitutes a job-related safety hazard for them-selves and/or others.
Work Sample –Physical Abilities Hybrids and Validity Issues
Work Sample testing has a long and varied history, from highly sophisticated job simulations such as those used by the fire service and computer-based firing-range models for police, to management in-basket simulations.

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Properly constructed, physical work sample tests can be easier to defend than typical pure physical abilities tests (number of sit ups, timed runs, etc.) simply **because** they are more obviously related to the actual job.
Work sample tests can be combined with abilities tests but these additions require additional validation. In the case of ORPAT, combining identified work elements into a multiple-repetition timed obstacle run constitutes an "ability" aspect in the design, and is thus subjected to additional validation requirements.
For example, the choice to use six repetitions of the ORPAT obstacle course might be challenged, based on the question of **how** that specific number of repetitions was established. If there is external validation for this cardio-vascular element (repeating the course a set number of times to reach maximum heart rate and to pro-duce an anaerobic state), it is not necessary to re-validate. The primary task would be to be able to defend a specific number of repetitions of the ORPAT as actually producing those results. In the case of ORPAT, the six course repetitions are taken from PARE baseline research.

The Job Task Analysis (JTA) is the primary tool in assuring content validity. The JTA process is one of the more widely accepted methodologies for determining testing content validity. Additional content validity for the ORPAT lies in the concurrent testing and surveying of 100+ incumbent officers, where we were able to establish a 95% rate of agreement among the officers who responded, that the ORPAT closely corresponds to the actual, critical physical demands of the job of being a police officer.
To clearly demonstrate content validity, tests should be linked to critical job tasks as defined in a JTA. There should be significant potential for negative consequences if, in aggregate, the physical tasks that are being tested are poorly performed. The testing elements must also be relevant to **all** of the people performing the job. The JTA process provides both frequency and criticality data on basic job functions to achieve this validation.

There are reliable results from multiple police JTA's spanning nearly a decade, which clearly support OR-PAT content validity.

Criterion Validity

When an employment test is said to have ***criterion validity***, it successfully predicts a relationship between a testing variable (in this case, job-related physical abilities) and actual job performance levels. This type of validity requires demonstrable correlation between test scores and job task performance.
Examples of testing intended for this purpose are: work sample/physical abilities testing, reading tests, etc. The elements of the ORPAT are correlated with numerous other studies that have established the relationship be-tween physical abilities and job performance for police officers. It

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is not strictly necessary to independently re-verify these elements. The key issues here are the methodologies used for testing and setting the cut-off score (pass/fail point).
A large and heterogeneous control group of incumbent officers was used in this study. As a result, additional criterion validity for the ORPAT can be asserted because there is support for a hypothetical relationship be-tween the ORPAT performance for trainee and incumbent officers. Incumbent officer participants were also surveyed as Subject Matter Experts (SME's). The results of this survey showed those incumbents taking the ORPAT rated it as closely corresponding to the critical and essential physical tasks of the job.
The standard expectation is that incumbent officers should perform better on entry-level employment testing than trainees do because they have more knowledge and skill as a result of their experience. This proves to be the case with ORPAT.
An improvement gradient among pre and post test scores at the academy and on-the-job scores for incumbents clearly supports the hypothesis that ORPAT scores improve significantly with increased skill and conditioning.
Criterion validity is generally held to be the most difficult to achieve, but the most defensible form of validation, especially when performed within a specific work environment.

The general guidelines of criterion validity for job requirements are:

1. Demonstrable relationship to critical job behaviors
2. Testing elements appropriately weighed to job performance requirements
3. Level of difficultly reasonably similar to job task difficulty levels

Construct Validity

Typical construct validity tests include: psychological testing, personality inventories, and physical abilities testing. It is not always possible to directly observe elements that are addressed in construct validity, because it is a hypothetical relationship between a variable and an outcome, and the variables are most often ―traits‖ (honesty, motivation, reliability, etc.). A classic example of this is a hypothesized relationship between IQ and job performance. In some cases, IQ can be shown to have a positive correlation to certain categories of job performance. Construct validation is required to prove there is a direct relationship between performance on a 1.5 mile run and the physical requirements of being a police officer, since one cannot reasonably assert that police officers routinely run a mile and a half in the performance of their job duties.
There is such a preponderance of evidence demonstrating the link between work-related physical abilities and police officer performance that it is virtually a given, so long as the elements being tested are clearly job-related. The basic physical functioning constructs for law enforcement officers have all been identified previously; there is little need to re-verify these. However, it is necessary to demonstrate the relationship between the specific physical activities being tested and actual job requirements. And, it is essential to demonstrate how the testing methodology accurately reflects job requirements. Constructs are often those things that are in the category of "business necessities."

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ORPAT is a hybrid physical testing process that incorporates elements of physical abilities and work sample testing. While the use of a work sample test must be clearly verified against the JTA, this type of testing is generally easy to defend (there have been few legal challenges, and even fewer successful ones), **so long as there is demonstrable relationship to essential job functions**.

To the degree that the ORPAT is based on proven "constructs" covering physical abilities and officer performance, it can be said to have overall construct validity.

Transportability

It is not necessary to "reinvent the wheel." Where it can be demonstrated there are close similarities, external validation studies can be used in place of, or to enhance local efforts. In the case of basic employment requirements it is probably best to use external studies as a method of additional verification, rather than as a substitute. It must be emphasized that just because a test is in use elsewhere, it does not necessarily mean that the test is ***valid***. It must be established that such tests have been appropriately validated before they can be used.

Validation studies should include:

1. Review of appropriate records, data and literature, pertinent to the study
2. A formal Job Task Analysis
3. Subject matter expert review (SME)
4. Fitness/physical capabilities expert review
5. Statistical analysis of performance results

Adverse Impact

If a test is used as a determining factor in whether or not police officer trainees obtain certification (continued employment) then it is potentially subject to scrutiny for adverse impact under EEO guidelines and discrimination under The Americans with Disabilities Act (ADA).

Earlier we outlined the potential problem of disparate impact of physical testing for female police officer candidates because of the documented tendency for women to perform less well in conventional physical abilities testing.

It is important to understand that just because there is a disparate impact to any protected group, ***adverse*** impact does not necessarily exist. ***For a legal finding of adverse impact to occur the initial burden of proof lies with the plaintiff.***

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Historically, this initial burden of proof occurs when the test in question violates the ***—4/5ths rule***.‖ (Peitrus v Board of Fire Commissioners of Farmington Fire Dis. 180 F 3d 468, 473, 80 FEP Cases 307 (1999)).

> *The Uniform Guidelines require evidence of both statistical and practical significance in order to identify adverse impact--the initial burden in a disparate impact case. Section 4D introduces a rule of thumb measurement for adverse impact known as the 80 Percent Rule: "A selection rate for any race, sex or ethnic group which is less than four-fifths (4/5f or eighty percent) of the rate for the group with the highest rate will generally be regarded...as evidence of adverse impact...."*
> *However, the Guidelines immediately depict circumstances for which the so-called 80 Percent Rule of Thumb is inadequate. Smaller differences in selection rate [i.e., differences within the 80 percent limit, such as .81 or .95, etc.] may nevertheless constitute adverse impact, where they are significant in both statistical and practical terms or where a user's actions have discouraged applicants disproportionately on grounds of race, sex, or ethnic group. Greater differences in selection rate [i.e., differences outside the 80 percent limit, such as .79 or .60, etc.] may not constitute adverse impact where the differences are based on small numbers and are not statistically significant, or where special recruiting or other programs cause the pool of candidates to be atypical of the normal pool of applicants from that group.*
>
> Biddle, Richard E., **Disparate Impact Reference Trilogy for Statistics:** Labor Law Journal, November 1995)

Any aspect of the hiring and training process that results in disparate impact (regardless of intention, or methodology) **may** be considered discriminatory, **unless** the performance requirement being measured is clearly **job related**, and **essential** to the minimum performance requirements of the job.

Potential Adverse Impact—Age

It is commonly accepted that physical testing in law enforcement is likely to have a disparate impact on participants based on age. Historically, this is much more of an issue for minimum physical standards for incumbent officers rather than trainees because of the tendency for trainees to be, as a group, younger than their incumbent counterparts. In the research group, only about 6% were age forty and over.

Analysis of ORPAT testing data reflects that timed performance differences as a function of age and experience levels show potential for adverse impact, depending upon cut-off scores.

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Because of this ***disparate*** impact, our first duty is to make certain to avoid violating ***adverse*** impact rules. This means that considerable care must be exercised in setting a standard for ORPAT time-to-completion scores. Careful analysis of the data must be done to determine if the forth-fifths rule is violated (along with consideration of practical issues in such an analysis). Additionally, careful thought has to be given to the supporting documentation for any decision to establish a cut-off score.
It is possible to successfully defend cutoff scores even if there is adverse impact, **if** ―business necessity‖ can be proven. However, this is not a positive assumption from which to work. It is much better to take steps to insure that testing methods and standards do not create adverse impact (as it is defined by law), thus effectively closing the door to such challenges (which can be very expensive and unpredictable in terms of out-come).

Potential Disparate Impact—Gender

Initial analysis of data also shows a **potential** adverse impact by **gender,** again depending upon where the cut-off score is set. This is not surprising. Women trainees tend to perform less well, statistically, on the ORPAT. This is consistent with similar testing processes used in other physically intensive disciplines (fire service, military, etc.), where females tend to perform less well, overall, than men on standardized physical abilities tests.

Managing Potential Adverse Impact

First, the issue of adverse impact must be considered from a broader perspective than, "***is it defensible***?" Women are under-represented in the nation's police forces. It is an affirmative obligation to take all reason-able steps to increase the rate of female participation in policing. Removing apparent barriers is one of the most basic steps in this process.

There are two general approaches to managing the issue of disparate impact. The first lies in strictly statistical issues. **Where** a cut-off score is set (the actual time-to-completion standard) is the most critical issue. The more demanding the standard the greater the potential adverse impact and the greater the difficulty in demonstrating broad applicability to day-to-day work. The second issue is **when** is the performance measured? In the case of ORPAT, trainees take a ―pre-test‖ ORPAT on the first day of their formal training at the academy. This establishes a baseline for each individual trainee and also sets a statistical ―starting point‖ to assess the impact of training and conditioning. It also allows comparison to incumbent control group scores.

The standing hypothesis for employment testing validity is that incumbents should perform as well or better on valid employment tests than their trainee counterparts. This is one of the ways in which content validity is established. The ideal situation is a statistical trend where there is a steady improvement from pre– to post, to incumbent (control group testing) regardless of gender or age issues. The pre-test is the only logical baseline from which to make these assessments. All of the statistical comparisons in the ORPAT assessment are made against "pre-test" data.

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Setting a cut-off for time-to-completion is NOT setting a performance goal or an objective. It is not de-fining desired levels of performance for incumbents. The standard is the MINIMUM acceptable level of performance required of entry-level officers to perform the job safely and effectively.

There is also the issue of the point at which trainee performance is measured against the cut-off score. **The only reasonable place to do this is at the —post-test level**, where trainees have had the benefit of practicing the activities and developing better conditioning as an overall result of academy training activities. Since one of our fundamental assertions is that reasonable job-related physical testing for police officers tests fitness and skill levels and NOT structural capabilities, this only makes sense.

The critical test here, is the 80% (4/5th rule). If the time-to-completion cutoff standard is set at a level that violates the 80% pass rule for gender or age there is exposure to legal challenges. This is because the first bur-den of proof has been met by any potential claimant alleging discrimination, based on adverse impact from the testing. If trainee pass-rates do not violate the 80% rule, it will require extraordinary circumstances to mount a successful legal challenge because the claimant would have to find an alternative way of meeting the first burden of proof.

However, defensive issues aside, the objective is to have physical testing that does not produce adverse effects.

Disparate Impact—Second Level Defense

The second level of defense for claims of adverse impact is intended to provide a response should a claimant meet the first burden of proof. The most typical defense is a justification of the testing requirement based on documented, essential job performance requirements. This is where most physical testing validity defenses are mounted, because it is most common for physical testing results to violate the 80% rule.

Two comprehensive police JTA's spanning nearly a decade clearly support the connection between OR-PAT testing elements and actual, minimum job performance requirements, based on task-frequency data alone.

This means that, strictly on the basis of how **frequently** incumbent officers perform ORPAT elements on the job; the test meets content validity requirements. Analysis of criticality and cross-correlation with the ORPAT assessment control group further strengthens this assertion. Performance data from the control group cross correlates to JTA data. This means there is sufficient data to respond to virtually any challenge of the relation-ship between ORPAT testing elements and entry-level police officer physical job tasks.

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The data also supports the **essential** nature of these performance requirements (taken from **Consequences of Inadequate Performance (CIP)** data on the JTA) (risk to the officer, risk to the public, etc.). If need be, this meets the basic requirement of defending disparate impact at the second level of burden of proof (―job related and consistent with business necessity‖—Griggs v Duke Power, and CRA. 1991)

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Statistics

Statistical data is not the only way to establish practical validity for job testing, but it is very useful because much of what constitutes scientific validation is based on statistical rules. There are some basic statistical terms used in this report that require a brief explanation.

The first of these is the **mean.** ***This is the statistical average of all the scores in the data set***. In this case, the mean represents the average time-to-completion score for all participants taking the ORPAT. **The mean represents the 50th Percentile**. This score is the baseline from which to determine a potential minimum standard. The second term is **Standard Deviation**. A standard deviation is a mathematical distance from the mean (+/-) in a given data set, and is used to determine distribution in a sample. This would be roughly equivalent to the 84th percentile (first standard deviation) and the 98th percentile (second standard deviation) in a typical sample. The ORPAT mean (average score) trainee score was four minutes and forty seconds (4:40)

In the case of police participant scores on the ORPAT, **mean plus one standard deviation is equal to a maximum time-to-completion of five minutes and thirty seconds (5:30).** This figure encompasses all of the scores below (faster) than average, plus one standard deviation greater (slower) than the mean**.**

In the police group, this would include 84% of the participants. A time-to-completion score for the OR-PAT based on the first standard deviation (5:30) resulted in an average 84% pass rate for all groups. Mean plus two standard deviations is six minutes and seventeen seconds (6:17). Setting the cutoff at 6:17 would result in a combined pass rate of just under 90% for all groups.

Examining the mean and first and second standard deviation are the most commonly used and widely accepted methods of sorting a given sample of data, and understanding the basic variations within the data. It is from an analysis of variation that we can reasonably and defensibly determine cut-off scores.

We are only interested in the scores that are at **the mean or slower** (since those people who ran the course faster than the mean time [better than average] obviously exceed any potential standard based on the mean). If the mean is 5:30 and Mary B. ran the ORPAT in 5:00, she will not be effected by any minimum standard based on mean or greater values. ORPAT test scores were analyzed to first establish the mean score (average) and then the score for mean plus one standard deviation and mean plus two standard deviations.

While actual ORPAT scores ranged from just over three minutes to over seven and a half minutes, **84% of all participant scores were at or below five minutes and thirty seconds (5:30)**. **If a standard is to be set for ORPAT time-to-completion it would logically fall somewhere between 5:30 and 6:17 (first and second standard deviations)**. Since this range

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incorporates such a significant percentage of the entire testing group, a standard based on this range should be considered reasonable.

In order to clearly understand the differences in performance between male and female trainees on the ORPAT and more closely understand the issue of disparate impact as a technical term, it is essential to demonstrate clearly where each demographic group's performance falls within the overall sample. The best performing group is males who are under forty. This ―demographic‖ becomes the base against which we measure.

Distribution by Demographic Group

Males/Females

If the **mean** pre-test score of four minutes and forty seconds (4:40) were to be used as a ―cut-off‖ for pass/fail, **88% of male trainees would pass, and 68% of female trainees would pass.** Moving out to five minutes and thirty seconds (5:30) the pass ratio increases significantly, with 91% of males passing, and 81% of females passing. At the second standard deviation, six minutes and seventeen seconds (6:17) 92% of the men and 92% of the women would pass.

Age Forty and Over

Approximately 6% of the total number of trainees are forty years old, or older (protected class, by age). When looking at the 40+ demographic group, only 62% pass at the mean, 74% would pass at 5:30 and 77% would pass at 6:17.

Using the 80% rule there would be adverse impact for both females and +40 males using the post-test mean as a cut-off, but within compliance at both the first and second standard deviations.

Control Group

The relationship of these scores is critical to determining potential adverse impact; however, trainees scores are not the entire picture. We also have scores from one hundred (100) incumbent officers who form our control group. The primary purpose of this control group is to have a meaningful basis for comparison of trainee performance to officers who are actually doing the work in the field.

The expectation is that experienced officers should perform as well or better on a pre-employment test than their trainee counterparts, if the test is valid.

In the control group at 5:30, 97% of males, 90% of females, and 87% of 40+ participants would pass. At 6:17, 99% of men, 100% of females and 97% of 40+ participants pass. Using the 80%

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rule, there is no adverse impact at either the 5:30 or 6:17 levels, for either females or 40+ participants.

The differences between males and females and older participants fade steadily from the pre to post and then with on-the-job experience, especially as we move out to the 5:30 level. This supports the criterion validity element that, with a properly designed employment test, incumbents should perform measurably better than trainees.

Structural Versus Skill and Conditioning Differences

We see a significant trend that supports one of our major hypotheses on the etiology of performance differences between males and females. Conventionally, it is assumed that differences in performance in physical testing of police officers are based on actual structural physical differences and limitations; males are simply physically stronger than females. However, it is essential to keep in mind that any such conclusion must be based on the actual job tasks, not on general characterizations. The only valid question is ***can females adequately perform the necessary physical tasks to be a police officer***?
If females can successfully perform the job but not the job testing, this suggests a problem with the testing.

We have two hypotheses with respect to female police officer applicants and physical testing. The first is that females frequently enter training to be a police officer less prepared physically, and with a lack of (or inaccurate expectations for) the physical demands of the training.

This hypothesis is supported by the fact that female scores improve significantly more than do those of their male and 40+ counterparts (men improve by an average of 26 seconds, women by 48 seconds and 40+ participants by 30 seconds).

Our second hypothesis is that test design (and real-life job applicability of testing elements and methodologies) is problematic in many, if not most physical testing programs. Our data shows that the ORPAT, which we can incontrovertibly state is clearly job-related, does NOT produce the levels of gender and age discrepancies of most other physical abilities testing processes.

We believe it is the very fact the test is so meticulously job-related that these problems do not appear. At any reasonable cut-off score there is no disparate impact by age or gender, in either the trainee or incumbent groups.

Setting Valid Cutoff Scores

As stated earlier, once performance standards are incorporated into job testing, validation of the testing has to be more rigorous. In general it is expected that testing standards will be reasonable

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and consistent with normal expectations for performance within the general workforce, as well as meeting all reasonable validation requirements.

There are three typical methods that are used to determine a specific cutoff score. Performance norms, contingency tables, and expectancy tables. Of these three possible methods, **performance norms are the only logical choice for our purposes here.** Using this methodology requires thorough analysis of trainee test performance data.

The Control Group

We assert that the 100+ 'control' group represented in the original ORPAT assessment data is sufficiently representative of typical police officer performance, and the group is sufficiently heterogeneous to meet any reasonable standard for a usable comparison. We also assert that data from this control group not only validates ORPAT normative data, it validates element selection and addresses potential disparate impact for female and older officers.

Any ORPAT cut-off score, which falls between 5:30 and 6:17 will be in compliance with any known external validation requirements, and can be shown to be reasonable and clearly and demonstrably job-related.

There is a gentle caveat here; while a specific cut-off score may be **defensible**, this should not be the only criterion used to make the determination.

Affirmative Improvements

It is reasonable to expect that improved awareness of the physical requirements, and some pre-employment preparation and testing will have a positive effect on trainee performance on the ORPAT. However, there is a much more significant reason to engage in an affirmative process. It may also be that such efforts will reduce training-related injuries. Additionally, if there is clear, useable information about how all candidates can more successfully perform the physical requirements of being a police officer it should help with recruiting a more representative demographic mix of officers into training and employment as police officers.

Based on the draft of a study of occupational injuries for police officers in the state of Oregon (2001-2003) conducted by Steve Winegar, PhD, it appears that while most on-the-job injuries occur in arrest/custody situations, police officers are significantly more likely to be seriously injured in training than in physical confrontations in the field.

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Most on-the-job officer injuries occur within the first five years of employment (64%). Dr. Winegar writes,

> *The job of police officer requires a unique combination of physical and mental abilities beyond that of most jobs. The physical challenges of the job are unique in that a police officer is not required to perform the most physically challenging tasks of the job on a frequent basis, but when they are called upon to perform physically the situation often poses a risk to the personal safety of the officer (low frequency/high risk activities). To survive as a police officer, a person must always be physically able to perform the required low frequency/high risk job tasks.*
>
> *In this context, the issue of police officer physical fitness has long been discussed, and various approaches to entry level and in-service fitness and fitness testing have been proposed and used. The question when it comes to police officer physical fitness is "When necessary, can the officer perform the essential physical functions of the job?" One of the underlying concerns is safety; can the officer perform essential physical job functions without sustaining a serious injury? Police officers engage in high risk activities – everything from driving a vehicle in hazardous conditions to physically restraining people. The potential for injury to the officer while he or she is engaged in these activities is greater than for people performing the job functions of most occupations.*
>
> *It is clear from the data that an officer must have a minimal fitness just to perform the more routine physical job tasks, and the more fit an officer is the easier it is for them to perform their job and effectively accomplish their job tasks.* ***An unfit officer poses an officer safety hazard to themselves and their fellow officers****. There were a number of on-the-job injuries which, based on the description of the circumstances surrounding the injury, reflect the need for a minimal level of fitness to perform routine physical job tasks.*

The study concluded that **less than 30%** of all serious injuries actually occurred in arrest/physical custody situations. Statistically, an officer is more likely to be seriously injured in activities that involve **no** physical confrontation.

The majority of the ORPAT elements are **not** focused on physical confrontations, but rather on more commonly occurring physical job tasks. Dr. Winegar's research suggests these areas hold the greatest potential for injury. Dr. Winegar's work provides additional support for the validity of the ORPAT process; not only are the elements verifiable as critical job skills, but the

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emphasis of the ORPAT process is appropriately focused on those areas most likely to result in injuries in the field.

Independently obtained, objective data, taken from analysis of injuries to police officers within the state of Oregon clearly supports the need for testing for task-relevant fitness and ability level requirements for police officers. Dr. Winegar‘s findings also support the design and emphasis of the current ORPAT process.

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Meaningful, valid and non-discriminatory physical abilities tests for police officers are possible.

The new generation of hybrid job-sample, physical abilities tests offer a standardized comprehensive, valid, and defensible method for pre-employment and training physical testing.

The ORPAT, as an example of this type of testing, is a viable solution to the issue of meaningful, non-discriminatory physical capabilities testing for police officers. With further validation it may also prove to be equally useful for entry level corrections officers.

Initial indicators are there may be a demonstrable connection between setting specific pre-employment ORPAT scores and ultimately reducing the rate and severity of training-related injuries.

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Cary Abe Gilman, (former) Health & Fitness Training Coordinator

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INFORMATION RESOURCES

POPAT/PARE Information

http://www.umanitoba.ca/faculties/physed/recreation/popat/
http://www.rcmp-grc.gc.ca/recruiting/pare_e.htm
http://www.justice.gov.nl.ca/rnc/physical_abilities_requirement_e.htm (**PARE participant guidelines**)
http://www.cprc.org/tr/tr-1997-03.pdf

Differences in Physical Performance between Men and Women
http://www.dps.state.ok.us/policecorps/forms/physicalassessment.doc
http://mailhub.ci.ottumwa.ia.us/Police/TestingProcess.htm

Overview of "physical abilities testing"
http://www.calgarypolice.ca/recruiting/pdf/pare.pdf (Canadian PARE testing, similar to POPAT and ORPAT)
http://www.ci.austin.tx.us/fire/cpathome.htm (illustrated example of ―job sample‖ physical abilities test for firefighters)
http://www.torontopolice.on.ca/careers/infosessions.php (another ―hybrid‖ physical abilities test description)
http://www.umanitoba.ca/faculties/physed/recreation/popat/physrelease.pdf (POPAT)
http://www.cooperinst.org/lawstand.pdf (overview of Coopers Abilities Testing)

Issues and Research on Physical Testing and Disparate Impact on Females
http://www.womenandpolicing.org/pdf/PhysicalAgilityStudy.pdf
http://www.ipmaac.org/conf00/bell.pdf (statistically oriented presentation on validity studies)
http://www.hr-guide.com/data/G902.htm (link to federal policies)
http://www.usdoj.gov/crt/emp/documents/eriecomp.htm (City of Erie Penn, successfully sued for adverse impact of physical testing for police officers

Health – Safety and Occupational Risk Factors for Police Officers
http://www.safetynet.mun.ca/pdfs/Occupational%20H&S.pdf
http://www.calea.org/newweb/newsletter/No87/healthfitness.htm
http://www.cophealth.com
http://fbilibrary.fbiacademy.edu/Templates/B=physicalfitnessinLE.htm (FBI Bibliography on fitness and health issues)

Gender Issues in Police Work (general)
http://www.theiacp.org/documents/pdfs/Publications/ACF830.pdf
http://llr.lls.edu/volumes/v34-issue2/benson.pdf
http://www.communitypolicing.org/publications/comlinks/cl16/cl16_lonsw.htm
http://www.ncjrs.org/policing/fem635.htm
http://www.cpc.gc.ca/research/women_e.htm#p123

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INFORMATION RESOURCES

Female Police Officers: Performance Issues
http://www.womenandpolicing.org/PDF/2002_Excessive_Force.pdf
http://www.policefoundation.org/docs/policewomen.html
http://www.womenandpolicing.org/kstestimon.html

Employment Testing – Discrimination in Testing
http://www.hr-guide.com/data/G362.htm
http://www.aptitude-testing.com/brogden.htm (perfect illustration of the assumption that women always do worse on physical testing)

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REFERENCES AND BIBLIOGRAPHY

The intent of this appendix is to provide the reader with supporting data for the ORPAT study, in the form of literature summaries, as well as specific citations. Where bold text is seen, this emphasis is added to the original text. Ellipses are used to denote when portions of the original text have been edited out.

Testing Documentation

TITLE 29—LABOR COMMISSION
PART 1607--UNIFORM GUIDELINES ON EMPLOYEE SELECTION PROCEDURES (1978)

Sec. 1607.**5** General standards for validity studies.

A. Acceptable types of validity studies. For the purposes of satisfying these guidelines, users may rely upon criterion-related validity studies, content validity studies or construct validity studies, in accordance with the standards set forth in the technical standards of these guidelines, section 14 below. New strategies for showing the validity of selection procedures will be evaluated as they become accepted by the psychological profession.

B. **Criterion-related, content, and construct validity. Evidence of the validity of a test or other selection procedure by a criterion-related validity study should consist of empirical data demonstrating that the selection procedure is predictive of or significantly correlated with important elements of job performance**. See section 14B below. **Evidence of the validity of a test or other selection procedure by a content validity study should consist of data showing that the content of the selection procedure is representative of important aspects of performance on the job for which the candidates are to be evaluated**. See 14C below. **Evidence of the validity of a test or other selection procedure through a construct validity study should consist of data showing that the procedure measures the degree to which candidates have identifiable characteristics which have been determined to be important in successful performance in the job for which the candidates are to be evaluated.** See section 14D below.

C. Guidelines are consistent with professional standards. The provisions of these guidelines relating to validation of selection procedures are intended to be consistent with generally accepted professional standards for evaluating standardized tests and other selection procedures, such as those described in the Standards for Educational and Psychological Tests prepared by a joint committee of the American Psychological Association, the American Educational Research Association, and the National Council on Measurement in Education (American Psychological Association, Washington, DC, 1974) (hereinafter ``A.P.A. Standards'') and standard textbooks and journals in the field of personnel selection.

D. Need for documentation of validity. For any selection procedure which is part of a selection process which has an adverse impact and which selection procedure has an adverse impact, each user should maintain and have available such documentation as is described in section 15 below.

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E. Accuracy and standardization. Validity studies should be carried out under conditions which assure in-so-far as possible the adequacy and accuracy of the research and the report. Selection procedures should be administered and scored under standardized conditions. \

F. Caution against selection on basis of knowledges, skills, or ability learned in brief orientation period. In general, users should avoid making employment decisions on the basis of measures of knowledges, skills, or abilities which are normally learned in a brief orientation period, and which have an adverse impact.

G. Method of use of selection procedures. The evidence of both the validity and utility of a selection procedure should support the method the user chooses for operational use of the procedure, if that method of use has a greater adverse impact than another method of use. Evidence which may be sufficient to support the use of a selection procedure on a pass/fail (screening) basis may be insufficient to support the use of the same procedure on a ranking basis under these guidelines. Thus, if a user decides to use a selection procedure on a ranking basis, and that method of use has a greater adverse impact than use on an appropriate pass/fail basis (see section 5H below), the user should have sufficient evidence of validity and utility to support the use on a ranking basis. See sections 3B, 14B (**5**) and (6), and 14C (8) and (9).

H. **Cutoff scores. Where cutoff scores are used, they should normally be set so as to be reasonable and consistent with normal expectations of acceptable proficiency within the work force**. Where applicants are ranked on the basis of properly validated selection procedures and those applicants scoring below a higher cut-off score than appropriate in light of such expectations have little or no chance of being selected for employment, the higher cutoff score may be appropriate, but the degree of adverse impact should be considered.

I. Use of selection procedures for higher level jobs. (**not applicable**)

J. Review of validity studies for currency. Whenever validity has been shown in accord with these guide-lines for the use of a particular selection procedure for a job or group of jobs, additional studies need not be performed until such time as the validity study is subject to review as provided in section 3B above. There are no absolutes in the area of determining the currency of a validity study. All circumstances concerning the study, including the validation strategy used, and changes in the relevant labor market and the job should be considered in the determination of when a validity study is outdated.

Code of Federal Regulations] [Title 29, Volume 4, Parts 900 to 1899][Revised as of July 1, 2000] From the U.S. Government Printing Office via GPO Access: [**CITE**: **29CFR1607**.**15**]

TITLE 29--LABOR COMMISSION

PART 1607--UNIFORM GUIDELINES ON EMPLOYEE SELECTION PROCEDURES

Sec. 1607.**15** Documentation of impact and validity evidence.

(2) Information on impact--(a) Collection of information on impact. Users of selection procedures other than those complying with section 15A(1) above should maintain and have available for each job records or other information showing whether the total selection process for that job has an adverse impact on any of the groups for which records are called for by sections 4B above. **Adverse impact determinations should be made at least annually for**

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each such group which constitutes at least 2 percent of the labor force in the relevant labor area or 2 percent of the applicable workforce. Where a total selection process for a job has an adverse impact, the user should maintain and have available records or other information showing which components have an adverse impact. Where the total selection process for a job does not have an adverse impact, information need not be maintained for individual components except in circumstances set forth in sub-section 15A(2)(b) below. If the determination of adverse impact is made using a procedure other than the ``four-fifths rule,'' as defined in the first sentence of section 4D above, a justification, consistent with section 4D above, for the procedure used to determine adverse impact should be available.

(b) (**not applicable**).

(c) (**not applicable**).

(3) Documentation of validity evidence--(a) Types of evidence. Where a total selection process has an ad-verse impact (see section 4 above) the user should maintain and have available for each component of that process which has an adverse impact, one or more of the following types of documentation evidence:

(i) Documentation evidence showing criterion-related validity of the selection procedure (see section 15B, below).

(ii) Documentation evidence showing content validity of the selection procedure (see section 15C, below).

(iii) Documentation evidence showing construct validity of the selection procedure (see section 15D, below).

(iv) Documentation evidence from other studies showing validity of the selection procedure in the user's facility (see section 15E, below).

(v) Documentation evidence showing why a validity study cannot or need not be performed and why continued use of the procedure is consistent with Federal law.

(b) Form of report. This evidence should be compiled in a reasonably complete and organized manner to permit direct evaluation of the validity of the selection procedure. Previously written employer or consultant reports of validity, or reports describing validity studies completed before the issuance of these guidelines are acceptable if they are complete in regard to the documentation requirements contained in this section, or if they satisfied requirements of guidelines which were in effect when the validity study was completed. If they are not complete, the required additional documentation should be appended.

If necessary information is not available the report of the validity study may still be used as documentation, but its adequacy will be evaluated in terms of compliance with the requirements of these guidelines.

(c) Completeness. In the event that evidence of validity is reviewed by an enforcement agency, the validation reports completed after the effective date of these guidelines are expected to contain the information set forth below. Evidence denoted by use of the word

``Essential'' is considered critical. If information denoted essential is not included, the report will be considered incomplete unless the user affirmatively demonstrates either its unavailability due to circumstances be-yond the user's control or special circumstances of the user's study which make the information irrelevant. …

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B. Criterion-related validity studies. Reports of criterion-related validity for a selection procedure should include the following information: (1) User(s), location(s), and date(s) of study. Dates and location(s) of the job analysis or review of job information, the date(s) and location(s) of the administration of the selection procedures and collection of criterion data, and the time between collection of data on selection procedures and criterion measures should be provided (Essential). If the study was conducted at several locations, the address of each location, including city and State, should be shown.

(2) Problem and setting. An explicit definition of the purpose(s) of the study and the circumstances in which the study was conducted should be provided. A description of existing selection procedures and cutoff scores, if any, should be provided.

(3) Job analysis or review of job information. A description of the procedure used to analyze the job or group of jobs, or to review the job information should be provided (Essential). Where a review of job information results in criteria which may be used without a full job analysis (see section 14B (3)), the basis for the selection of these criteria should be reported (Essential). Where a job analysis is required a complete description of the work behavior(s) or work outcome(s), and measures of their criticality or importance should be provided (Essential). The report should describe the basis on which the behavior(s) or outcome(s) were determined to be critical or important, such as the proportion of time spent on the respective behaviors, their level of difficulty, their frequency of performance, the consequences of error, or other appropriate factors (Essential). Where two or more jobs are grouped for a validity study, the information called for in this subsection should be provided for each of the jobs, and the justification for the grouping (see section 14B (1)) should be provided (Essential).

(4) Job titles and codes. (**not applicable**)

(5) Criterion measures. The bases for the selection of the criterion measures should be provided, together with references to the evidence considered in making the selection of criterion measures (essential). A full description of all criteria on which data were collected and means by which they were observed, recorded, evaluated, and quantified, should be provided (essential). If rating techniques are used as criterion measures, the appraisal form(s) and instructions to the rater(s) should be included as part of the validation evidence, or should be explicitly described and available (essential). All steps taken to insure that criterion measures are free from factors which would unfairly alter the scores of members of any group should be described (essential).

(6) Sample description. A description of how the research sample was identified and selected should be included (essential). The race, sex, and ethnic composition of the sample, including those groups set forth in section 4A above, should be described (essential). This description should include the size of each subgroup (essential). A description of how the research sample compares with the relevant labor market or work force, the method by which the relevant labor market or work force was defined, and a discussion of the likely effects on validity of differences between the sample and the relevant labor market or work force, are also desirable. Descriptions of educational levels, length of service, and age are also desirable.

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(7) Description of selection procedures. Any measure, combination of measures, or procedure studied should be completely and explicitly described or attached (essential). If commercially available selection procedures are studied, they should be described by title, form, and publisher (essential). Reports of reliability estimates and how they were established are desirable.

(8) Techniques and results. Methods used in analyzing data should be described (essential). **Measures of central tendency (e.g., means) and measures of dispersion (e.g., standard deviations and ranges) for all selection procedures and all criteria should be reported for each race, sex, and ethnic group which constitutes a significant factor in the relevant labor market (essential).** The magnitude and direction of all relationships between selection procedures and criterion measures investigated should be reported for each relevant race, sex, and ethnic group and for the total group (essential). Where groups are too small to obtain reliable evidence of the magnitude of the relationship need not be reported separately. Statements regarding the statistical significance of results should be made (essential). Any statistical adjustments, such as for less than perfect reliability or for restriction of score range in the selection procedure or criterion should be described and explained; and uncorrected correlation coefficients should also be shown (essential). Where the statistical technique categorizes continuous data, such as biserial correlation and the phi coefficient, the categories and the bases on which they were determined should be described and explained (essential). Studies of test fairness should be included where called for by the requirements of section 14B (8) (essential). These studies should include the rationale by which a selection procedure was determined to be fair to the group(s) in question. Where test fairness or unfairness has been demonstrated on the basis of other studies, a bibliography of the relevant studies should be included (essential). If the bibliography includes unpublished studies, copies of these studies, or adequate abstracts or summaries, should be attached (essential). Where revisions have been made in a selection procedure to assure compatibility between successful job performance and the probability of being selected, the studies underlying such revisions should be included (essential). All statistical results should be organized and presented by relevant race, sex, and ethnic group (essential).

(9) Alternative procedures investigated. The selection procedures investigated and available evidence of their impact should be identified (essential). The scope, method, and findings of the investigation, and the conclusions reached in light of the findings, should be fully described (essential).

(10) Uses and applications. **The methods considered for use of the selection procedure (e.g., as a screening device with a cutoff score, for grouping or ranking, or combined with other procedures in a battery) and available evidence of their impact should be described (essential).** This description should include the rationale for choosing the method for operational use, and the evidence of the validity and utility of the procedure as it is to be used (essential). The purpose for which the procedure is to be used (e.g., hiring, transfer, pro-motion) should be described (essential). If weights are assigned to different parts of the selection procedure, these weights and the validity of the weighted composite should be reported (essential). **If the selection procedure is used with a cutoff score, the user should describe the way in which**

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normal expectations of proficiency within the work force were determined and the way in which the cutoff score was determined (essential).

(11) Source data. Each user should maintain records showing all pertinent information about individual sample members and raters where they are used, in studies involving the validation of selection procedures. These records should be made available upon request of a compliance agency. In the case of individual sample members these data should include scores on the selection procedure(s), scores on criterion measures, age, sex, race, or ethnic group status, and experience on the specific job on which the validation study was conducted, and may also include such things as education, training, and prior job experience, but should not include names and social security numbers. Records should be maintained which show the ratings given to each sample member by each rater.

(12) Contact person. The name, mailing address, and telephone number of the person who may be contacted for further information about the validity study should be provided (essential).

(13) Accuracy and completeness. The report should describe the steps taken to assure the accuracy and completeness of the collection, analysis, and report of data and results…

(Approved by the Office of Management and Budget under control number 3046-0017)

(Pub.) L. 96-511, 94 Stat. 2812 (44 U.S.C. 3501 et seq.) [43 FR 38295, 38312, Aug. 25, 1978, as amended at 46 FR 63268, Dec. 31, 1981

The use and validation of physical ability tests as a means of job selection, placement, and retention are relatively contemporary issues in the American workforce (Arvey, Nutting, & Landon, 1992a, p. 301). Much of the early work in this field was conducted by Fleishman, (1964). Fleishman's book, *Structure and measurement of physical fitness*, is still considered a benchmark study of the primary components of selected physical fitness tests, and this work is still used as the foundation of many contemporary studies (Hogan, 1991; Arvey et al. 1992a; Baumgartner & Jackson, 1995). Fleishman also developed the theory of *basic physical abilities--a concept that promotes the idea that many specific motor skills require the same underlying motor abilities. …* (Baumgartner & Jackson, 1995, pp. 196-7). Even though physical ability and fitness testing are relatively re-cent research topics, their use is likely to increase as the methodology and quality of the tests continues to improve (Arvey et al. 1992a, p. 311; Hogan & Quigley, 1994, p. 85).

Current use of the term *construct validity* refers to efforts to justify a particular interpretation of a test score (Cronbach, 1969; Moss, 1992) as compared to knowing what a test actually measures.

More than predictive validity depends upon construct validity. Cronbach and Meehl (1955) maintained that construct validity was the approach investigators needed to take when they could not operationally define their variables of interest. Similarly, if no adequate criteria or universe of content were available to validate a test against, Cronbach and Meehl suggested that construct validity was the necessary approach.

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Untitled and unfinished PhD Dissertation text – origin unknown

Construct validity: how accurately an operational definition represents a construct. Example: your construct of abusive parents includes the assumption that they perceive their neighbors as unfriendly. You develop a screening questionnaire to identify parents who are likely to abuse their children and administer it to a sample of parents. If high scorers rate their neighbors as less friendly than low scorers, then the screening tool has construct validity. ***Dr. Fred Shaffer – Course Notes – Graduate Statistics***

To understand the traditional definition of construct validity, it is first necessary to understand what a construct is. A construct, or psychological construct as it is also called, is an attribute, proficiency, ability, or skill that happens in the human brain and is defined by established theories. For example, overall English language proficiency is a construct. It exists in theory and has been observed to exist in practice.
Construct validity has traditionally been defined as the experimental demonstration that a test is measuring the construct it claims to be measuring. …

The concept of construct validity is very well accepted. Indeed, in educational measurement circles, all three types of validity discussed above (content, criterion-related, and construct validity) are now taken to be different facets of a single unified form of construct validity. This unified view of construct validity is considered a new development by many of the language testers around the world. …Either the traditional view of construct validity or the unified view is held by virtually all psychometricians inside or outside of language testing. Thus, construct validity can be said to be well-accepted, one way or the other. … Regardless of how construct validity is defined, there is no single best way to study it. In most cases, construct validity should be demonstrated from a number of perspectives. Hence, the more strategies used to demonstrate the validity of a test, the more confidence test users have in the construct validity of that test, but only if the evidence provided by those strategies is convincing.

In short, the construct validity of a test should be demonstrated by an accumulation of evidence. Shi-ken:JALT Testing & Evaluation SIG Newsletter Vol. 4 No. 2 Autumn 2000. (p. 7 - 10).

Sources of Test Validity Evidence

Inferences made from the results of a selection procedure to the performance of subsequent work behavior or outcomes need to be based on evidence that supports those inferences. Three sources of evidence will be described: namely, evidence of validity based on relationships with measures of other variables, evidence based on content, and evidence based on the internal structure of the selection procedure. ...

Evidence of Validity Based on Relationships with Measures of Other Variables

The *Principles* and the *Standards* view a construct as the concept a selection procedure is intended to measure. At times the construct is not fully understood or well-articulated. However, relationships among variables reflect their underlying constructs. For example, a

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predictor generally cannot correlate with a criterion unless to some extent one or more of the same constructs underlie both variables. Consequently, validation efforts based on constructs apply to all investigations of validity. ...

Criterion-Related Evidence of Validity

Personnel selection procedures are used to predict future performance or other work behavior. **Evidence for criterion-related validity typically consists of a demonstration of a relationship (via statistical significance testing or establishing confidence intervals) between the results of a selection procedure (predictor) and one or more measures of work-relevant behavior or work outcomes (criteria).** The choice of predictors and criteria should be based on an understanding of the objectives for test use, job information, and existing knowledge regarding test validity.

A standardized procedure is one that presents and uses consistent directions and procedures for administration, scoring, and interpretation. Standardized predictors and criterion measures are preferred. ...

Feasibility of a Criterion-Related Validation Study

The availability of appropriate criterion measures, the representativeness of the research sample, and the adequacy of statistical power are very important in determining the feasibility of conducting a criterion-related study. Depending on their magnitude, deficiencies in any of these considerations can significantly weaken a criterion-related validation study.

A relevant, reliable, and uncontaminated criterion measure(s) must be obtained or developed. Of these characteristics, **the most important is relevance. A relevant criterion is one that reflects the relative standing of employees with respect to important work behavior(s) or outcome measure**(s).

If such a criterion measure does not exist or cannot be developed, use of a criterion-related validation strategy is not feasible.

A competent criterion-related validation study should be based on a sample that is reasonably representative of the work and candidate pool. … differences between the sample used for validation and a candidate pool on a given variable merit attention when credible research evidence exists demonstrating that the variable affects validity.

A number of factors related to statistical power can influence the feasibility of a criterion-related study. Among these factors are the degree (and type) of range restriction in the predictor or the criterion, reliability of the criterion, and statistical power.

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Sample size, the statistic computed, the probability level chosen for the confidence interval, and the size of the predictor-criterion relationship determine the confidence interval around the validity estimate. ...

Design and Conduct of Criterion-Related Studies

… In predictive designs, data on the selection procedure are typically collected at or about the time individuals are selected. After a specified period of time (for survival criteria) or after employees' relative performance levels have stabilized (for performance criteria), criterion data are collected. In concurrent designs, the predictor and criterion data are collected, usually on incumbents, at approximately the same time.

...**Designs also may differ with respect to the population sampled. For example, the design may use an applicant population or a population of recently hired employees, recent employees not yet fully trained, or employees with the full range of individual differences in experience.** …

Criterion Development

In general, if criteria are chosen to represent work-related activities, behaviors or outcomes, **the results of an analysis of work are helpful in criterion construction**. ... Some considerations in criterion development follow.

Criteria should be chosen on the basis of work relevance, freedom from contamination, and reliability rather than availability. This implies that the purposes of the validation study are (a) clearly stated, (b) supportive of the organization's needs and purposes, and (c) acceptable in the social and legal context of the organization. ...

Criterion relevance. **Criteria should represent important organizational, team, and individual outcomes** such as work-related behaviors, outputs, attitudes, or performance in training, as indicated by a review of information about the work. Criteria need not be all-inclusive, but **there should be clear rationale linking the criteria to the proposed uses of the selection procedure**.

Criteria can be measures of overall or task-specific work performance, work behaviors, or work outcomes. ... Regardless of the measure used as a criterion, it is necessary to ensure its relevance to work.

Principles for the Validation and Use of Personnel Selection Procedures Fourth Edition: Society for Indus-trial and Organizational Psychology, Inc.

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Physical Abilities Testing

In Ward's Cove the Supreme Court said: Once Disparate Impact is shown, the employer needs to show that the challenged practice serves in a significant way the legitimate employment goals of the employer.

Four Standards
1 Manifest Relationship
2 Spurlock Doctrine (safety)
3 Close Approximation to job (Content Validity)
4 Minimum Qualifications (*Lanning v. SEPTA*)

Untitled Internet Document

In the context of a hiring exam with a cutoff score shown to have a discriminatory effect, the standard that best effectuates this mission is implicit in the Court's application of the business necessity doctrine to the employer in Griggs, i.e., that **a discriminatory cutoff score is impermissible unless shown to measure the minimum qualifications necessary for successful performance of the job in question. Only this standard can effectuate the mission begun by the Court in Griggs; only by requiring employers to demonstrate that their discriminatory cutoff score measures the minimum qualifications necessary for successful performance of the job in question can we be certain to eliminate the use of excessive cutoff scores that have a disparate impact on minorities as a method of imposing unnecessary barriers to employment opportunities.**
The use of physical ability testing as a reemployment and employment qualification is very common among occupations that place significant physical demands on the worker such as, steel workers, fire-fighters, freight handlers, telephone and electrical tradesmen, and military personnel (Baumgartner & Jackson, 1995, pp. 199-200). Even as American business moves from the traditional manufacturing based industry to the service sector, there are indications that the use of physical ability testing as an assessment tool in the workplace will continue to grow (Hogan & Quigley, 1994, p. 85).
However, as physical ability testing grows in use and application, it continues to face several issues that question the legitimacy of physical fitness testing as a means of selecting, promoting, and maintaining employees. **These issues include accusations of gender bias, ethnic bias, age bias, and disability bias. Challenges of validity are likely the biggest obstacle that physical fitness testing must overcom**e (Arvey et al. 1992a; Hogan & Quigley, 1994; Hogan,1991; Hoover, 1992; Peak, Farenholtz, & Coxey, 1992).

One of the difficulties of establishing validity in physical fitness testing lies in the fact that it is a relatively con-temporary issue and little research has been done on this topic. However, the limited research that is available establishes an empirical link between physical ability tests and various employment criteria (Arvey, Nutting, Landon, & Maxwell, 1992b, p. 996; Hogan, 1991,

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p. 495). Some of the problems connected to establishing valid physical ability tests include declarations that job and task analysis fail to adequately address relevant physical duties and performance responsibilities; suggestions that physical fitness tests tend to unfairly weight relevant aspects of a task or job; and concerns that results of performance on a test will not extrapolate to the same performance results on the actual requirements of the job. **Task analysis is the foundation for developing and validating physical ability tests. In this analysis, a connection must be made to show that the requirements of the task are accurately measured by the requirements of the performance test** (Arvey et al. 1992a; Baumgartner & Jackson, 1995; Hogan, 1991).

Assuming that a complete and accurate task analysis is conducted, there are still obstacles to overcome to prove the validity of a specific test or test battery for specific skills. **The validity of a physical fitness or ability test is still determined by the relationship and relevance of the performance test and actual job requirements.** For example, it could be reasoned that a job simulation test (a test that simulates or models actual job requirements in actual working conditions) would be the most reliable and valid means of fitness performance testing. However, the job simulation test has at least two drawbacks. It could pose safety risk if it is modeling a risky task--particularly for untrained individuals. Also, the job simulation test may not be feasible to conduct due to time, facility, and monetary resources. **Since job simulation tests are often impractical, ability tests may be based on only part of the major job requirements of a position or on a substitute test procedure that may only be correlated to job performance rather than directly part of it** (Hoover 1992)

Another issue concerning physical ability testing involves the setting of criterion or cutoff scores to determine the passing or failing of a test. Often, a participant must meet minimum standards or scores in a particular test. But how are the minimum standards established? **Logic would indicate that cutoff scores for pass or fail of a test would mirror the minimum performance standard needed to successfully perform a specific job or task**. However, physical fitness and ability standards are often norm referenced--a standard that evaluates performance in relation to the performance of other participants in a specific population. Norm referenced data used to determine minimum standards may be useful in comparing individuals within a group, but it does not necessarily indicate required standards (Baumgartner & Jackson, 1995; Hoover, 1992). An additional question concerns the use of norm referencing according to age and gender.

Using double standards based on an individual's age, size, or gender would seem to contradict the whole concept of a performance test based on actual job requirements. "Since all officers must ultimately be able to perform the same in-service work, why should an older or smaller person be allowed to meet lower standards in a physical abilities test than one who is younger or more muscular?" (Peak et al. 1992).

The validating of physical fitness and ability tests is also an important issue. It is a process that determines the accuracy of how well a test measures the major work requirements that have been

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established during the task analysis (Baumgartner & Jackson 1995). Baumgartner & Jackson (1995, p. 202) have identified three different validation strategies that can be used. **(1) Criterion-related validity uses data that shows a physical fitness or ability test is correlated with important components of task performance; (2) Content validity uses a reasoning process that involves the collection of data that shows a logical connection between tests and major job responsibilities and duties; (3) Construct validity is a theoretical approach that identifies constructs deemed to be important for task performance success and attempts to identify important characteristics needed for effective job performance**. All of the above validation strategies have advantages and disadvantages. Many physical ability and fitness tests are based on content validity methods; but **construct validity is gaining more support in the private sector, and it may stand up to litigation better than criterion based validity and content based validity** (Arvey et al 1992a, p. 306; Hogan, 1991, p. 503).

The military has also started to take a closer look at their physical fitness testing and its relevance to actual job performance. For example, a recent DOD report indicated that the armed services are not required to test the ability of members to carry out military tasks. This lack of mission-oriented testing has shown the potential to have adverse effects on military operations. The report called for the implementation of mission-oriented physical fitness programs and testing (Gebicke, 1994). **The premise that general fitness does not guarantee the ability to successfully perform actual job requirements in real-life situations is also noted by Peak et al.** (1992, p. 51). It is apparent that the military services are aware of this problem by the focus of many recent studies (Prusaczyk, Stuster, Goforth, Sopchick-Smith, & Meyer, 1995; Vickers 1995; Bourne, Conway, & Co-ben, 1993; Beckett & Hodgdon, 1987).

Even the Marine Corps, generally known for some of the most rigorous physical fitness testing, is taking a closer look at its current physical fitness test (PFT) including present standards and test components (Fuentes, 1996, p. 3). It is also noted by Fuentes (1996, p. 3) that the current Marine Corps PFT is similar in concept to other armed services physical fitness tests in that it only assesses general physical fitness rather than mission-oriented fitness. Several articles in a recent issue of the *Marine Corps Gazette,* the professional journal of Marines, have also identified this short-coming of the PFT. Molofsky (1997, p. 17) contends that current physical fitness training and testing is more useful in helping Marines perform successfully on the PFT than it is in pre-paring Marines for effective physical performance in a combat environment. Bean (1997, p. 16) concurs that the current PFT and physical training programs are not adequately preparing Marines for physical performance needed for combat-oriented missions. Meyer (1997, p. 18) argues that changes made to the Marine Corps PFT could improve the survivability of Marines in combat situations. While there appears to be widespread support for revamping the current Marine Corps PFT, this researcher has been unable to locate studies that have identified the major physical fitness and ability components needed for Marines to perform successfully in a combat environment.

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While physical fitness and ability testing has a relatively short history and contains many issues that need to be addressed, there is evidence that fitness testing will continue to be an important element of job selection, pro-motion, and retention. "It is our belief that physical ability or fitness testing will begin to take on greater scope and proportions in the next few years building from developments both methodologically as well as from important court decisions. It is well worth keeping abreast of these developments" (Arvey et al. 1992a, p. 311).

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The Uniform Guidelines for Employee Selection Tests clearly require that, to be valid, physical fitness tests, standards, and programs must be job related and consistent with business necessity. **Without data to document that job-relatedness, case law indicates that physical fitness tests, standards, and programs are at risk**. **Tests and standards must be significantly correlated with, and predictive of, performing essential functions of the job.**

Standardized Validation Study Method

... Construct and criterion validation are two of the three acceptable methods that the Uniform Guidelines accept as proof for a job-related test and standard.
...to identify which physical fitness areas predicted safe and effective performance of those physical tasks. The steps for each study were as follows. Critical and frequent tasks were operationalized into three basic events containing the specific tasks:

- Roadway clearance, involving lifting, carrying, and dragging debris, and pushing a car
- Victim extraction, involving sprinting to a disabled vehicle and lifting and dragging a dummy to safety
- Sustained foot pursuit, involving running up stairs, dodging, jumping, climbing a fence, crawling, vaulting obstacles, striking and moving a dummy, and simulated cuffing using resistance bands

Approximately 95 percent of participating officers rated each scenario as being either a situation they have personally performed or would be expected to perform. These officer ratings, along with the job-task analysis data, provided concurrent validation that the scenarios are representative of the physical tasks officers must perform, and, as a result, the job-task simulation tests have content validity.
Correlation: A Pearson Product Moment Correlation Coefficient (r) is a statistic that displays the strength of a relationship between two variables. It is expressed as a number that ranges between +1.00 and -1.00. The closer the r is to either +1.00 or -1.00, the stronger the implication that one factor is predictive of the other. Negative correlations indicate an inverse relationship. For example, a faster time (lower number) on the 1.5-mile run indicates a better level of cardiovascular fitness (higher number). Correlations do not imply direct causation but do imply a strong enough relationship so that some level of predictability exists. Let's assume that the push-

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up had an r equal to -.61 with the roadway clearance scenario. That tells us that there is a strong relationship be-tween the ability to do push-ups and clearing the roadway more quickly.

Regression: Multivariate analyses are statistical procedures to clarify the underlying structure of many variables. This type of analysis is especially useful for demonstrating validity because it evaluates relationships among a group of fitness tests, rather than individual fitness tests and the job-task simulation tests. **If the criterion test represents the ability to do the job, and the regression analysis indicates that a group of test items predict the ability to perform the job-task simulation tests, it follows that the fitness tests predict the ability to do the job**. If a fitness test emerges as a significant factor in a regression analysis, that fact further supports the theory that the test is an underlying and predictive factor.

Specificity and sensitivity: These two terms reflect how accurately a score on a particular test predicts performance. The value of any fitness test cut point depends on how well it correctly identifies which individuals have an ability and how well it controls for the measurement error associated with any test. Specificity and sensitivity are defined as follows:

- Specificity: the percentage of individuals who fail the fitness test and also fail the job-task simulation tests
- Sensitivity: the percentage of individuals who pass the fitness test and also pass the job-task simulation tests

That means for a fitness test score to become a standard, it had to predict with at least 70 percent accuracy which officers could perform the job-task simulation tests at the effective level and who could not. Having both

70 percent specificity and sensitivity results in a standard that is highly predictive and, as such, is acceptable as being job related.

- Statistical significance: This is a term relating to the degree of confidence one can have that the results obtained are not due to chance but are due to a true relationship. Specific statistical procedures are applied to test for the significance of any finding. Usually the .05 level is accepted as the lowest level of confidence of a true finding. It means that the probability of the results being due to chance is five out of a 100. A .01 level is one out of 100, and .001 is one out of a 1000. How high the correlation must be to be significant depends on the size of the sample. For example, with a large enough number of tested individuals, it is possible to obtain a statistically significant correlation at the .05 level between two factors with an r of only .19. In our studies, we usually required a correlation of at least r = .50 to suggest a moderately high relationship.

"Fitness is very important for two reasons: one is the fit for duty aspect," says Lt. Arnold G. Walker, Fitness Director, Buffalo Police Department Academy. "We need to be fit enough to perform the kinds of duties we are hired to do (chase a suspect, go into a bar and break up a brawl), and the second aspect is longevity--there is a great disparity between the longevity in civilian population and in law enforcement. **The average American male lives to be 72 years**

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old, while the average law enforcement officer lives to be 59.5. It's because of poor lifestyle habits, and these habits are associated with aspects of the job (irregular hours, short meal periods). It's also a high stress job, and you don't get a lot of exercise through the actual job, or very stressful exercise.

"Officer fitness has a tremendous effect on the bottom line," says Dr. Jim Hilyer, Professor in School of Medicine, University of Alabama, Birmingham, Department of Preventive Medicine, Director of City of Birmingham Health and Fitness Initiative, Health and Fitness Center, in charge of project with the city of Birmingham Police. "We have an extensive database where we have interlocked our fitness data with the medical costs and loss time costs, and unfit officers cost about two to three times more than fit officers. Bottom line data: injury related costs over a five year period, for those that did not pass the annual fitness testing, the average injury cost per person was $619.50. The injury cost per person for the group that did pass was $301.14. Those people were injured and did not pass, the total medical care cost was $1,755.17 per person. For those who were injured and did pass, $863.33.

"The total annual HMO cost for people who did not pass was $1,367.64," continues Hilyer. "If they did pass, the cost was $464.87. If you start at the excellent category and go down to very poor, it's a straight line graph. This just emphasizes how important it is to keep your law enforcement people physically fit. When you move a person up from very poor just to poor, you are reducing the risk tremendously. Everyone in the country should be doing this. You **can** do it cost effectively."

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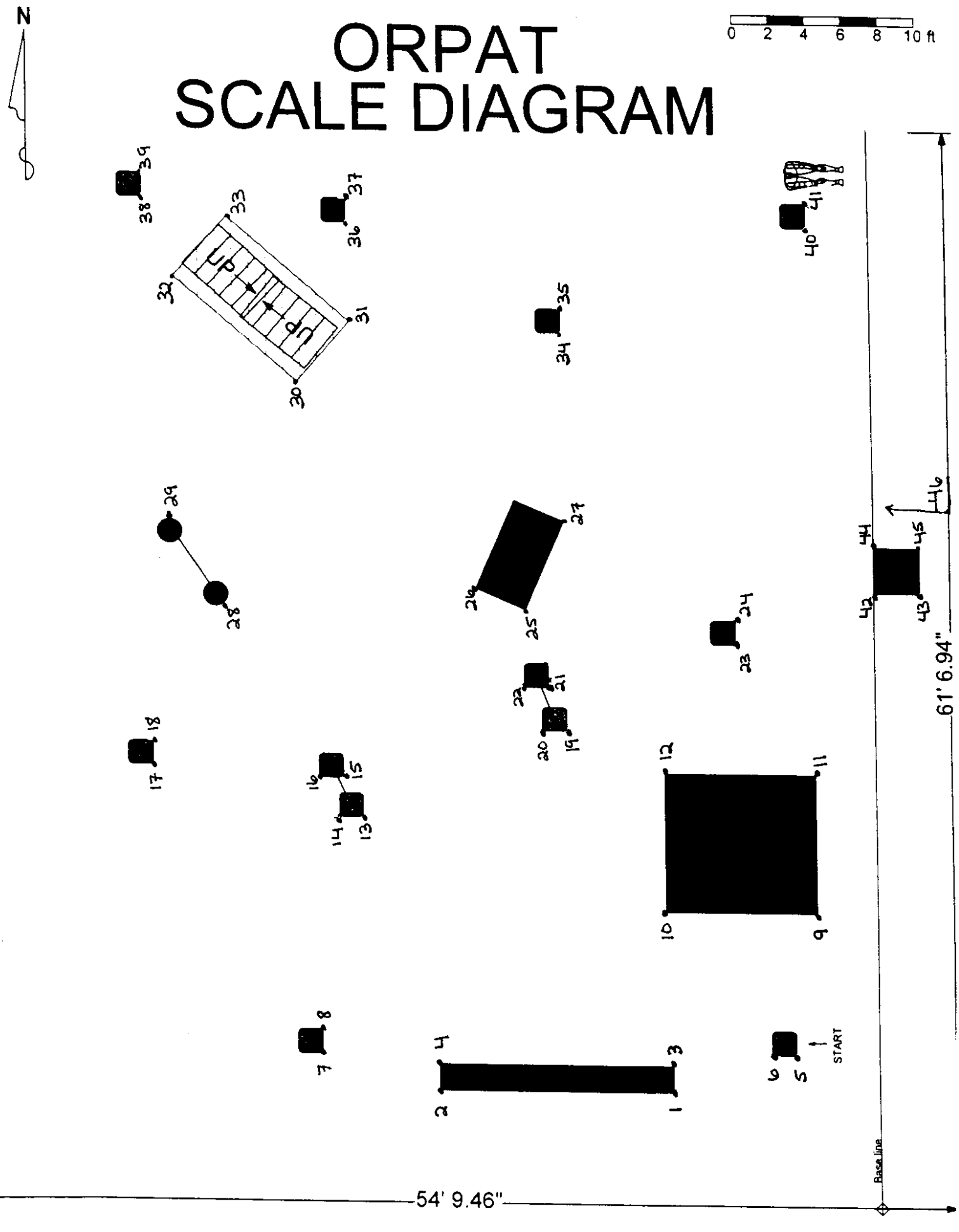
ORPAT SCALE DIAGRAM



1	N 6’ 3 ½”	W 11’ 3”
2	N 6’ 3 ½”	W 24’ 2”
3	N 8’	W 11’ 3”
4	N 8’	W 24’ 2”
5	N 9’ 4 ¾”	W 4’ 9 ½ “
6	N 9’ 4 ¾”	W 5’ 6”
7	N 9’ 2 ½”	W 30’ 11 ½ “
8	N 9’ 2 ½”	W 31' 8"
9	N 16' 10 1/4 "	W 3' 3 1/2 "
10	N 16' 10 1/4 "	W 11' 6 3/4"
11	N 24' 9 3/4"	W 3' 3 1/2 "
12	N 24' 9 3/4"	W 11' 6 3/4"
13	N 22' 9 3/4"	W 28' 4"
14	N 22' 9 3/4"	W 29' 7"
15	N 25' 1 1/4"	W 29' 5 3/4"
16	N 25' 1 1/4"	W 30' 9"
17	N 25' 3 3/4"	W 40' 7"
18	N 26' 1"	W 40' 7"
19	N 27' 10 3/4"	W 17' 1/2"
20	N 27' 10 3/4"	W 18' 3 1/2"
21	N 30' 4 3/4"	W 17' 10 1/4"
22	N 30' 4 3/4"	W 19' 1"
23	N 32' 7 1/8"	W 8' 3 1/2"
24	N 33' 3 1/2"	W 8' 3 1/2"
25	N 34' 1 1/8"	W 19' 4"
26	N 35' 4 3/4"	W 22' 2"
27	N 38' 9 3/4"	W 17' 2"
28	N 34' 9 1/2 "	W 36' 5 1/4 "
29	N 38' 3 1/2"	W 38' 11"
30	N 46' 7 1/4"	W 32' 2 1/2"
31	N 50' 2 1/2"	W 29' 2 3/4"
32	N 52' 10 3/4"	W 38' 8"
33	N 56' 3 1/2"	W 35' 8"
34	N 50' 3 1/2"	W 17' 10"
35	N 51"	W 17' 10"
36	N 56' 3 1/2"	W 29' 8 1/2"
37	N 57' 3 1/4"	W 29' 8 1/2"
38	N 57' 8 1/2 "	W 41' 1/2"
39	N 58' 4 3/4"	W 41' 1/2"
40	N 56' 3 1/2"	W 4' 1 1/8"
41	N 57' 1 3/4"	W 4' 1 1/8"
42	N 35' 3 3/4"	W 0
43	N 35' 3 3/4"	E 2' 6"
44	N 37 10 1/2"	W 0
45	N 37 10 1/2"	E 2' 6"
46	N 0	E 3' 3 1/2"

Oregon
Kate Brown, Governor

Department of Public Safety Standards and Training
4190 Aumsville Hwy SE
Salem, OR 97317-8983
503-378-2100
www.oregon.gov/dpsst

ORPAT

Name: **DPSST#** **Class** **Gender:**

Age:_____ Law Enforcement experience:_____

*Pre-Test Date:*_____

INSTRUCTOR NAME:_____

Course Time	*Raw Time*		*Final Time*	
Penalty	2 Sec warning		2 Sec	
Penalty	5 Sec warning		5 Sec	
Dummy Drag	Demo		No Demo	

Back	Front	Back	Front	Back	Front

Wall

Push
2 Back Falls
2 Front Falls
Pull

*Post-Test Date:*_____

INSTRUCTOR NAME:_____

Course Time	**Raw Time**		**Final Time**	
Penalty	2 Sec warning		2 Sec	
Penalty	5 Sec warning		5 Sec	
Dummy Drag	Demo		No Demo	

Back	Front	Back	Front	Back	Front

Wall

Push
2 Back Falls
2 Front Falls
Pull

Acknowledgement and Waiver

I affirm I have met the health and fitness qualifications attested to on my Medical Form (F-2). I also affirm that I currently meet those qualifications. I understand I will be required to participate in fitness training as well as other physical activities, including, but not limited to, defensive tactics. I understand that I am responsible for my health and safety and I will notify an instructor immediately if I cannot perform the requirements.

_____

Signature of Recruit **Date**

ORPAT COURSE

Name:_____ Date:_____

STAGE 1	Warning		Penalty	Added Time
Balance Beam (start over)				
5-Foot Jump (5 seconds)				
Stair Climb (redo)				
Obstacle Crawl (2 seconds)				
18" Jumps (2 seconds)	1st	2nd		
3-Foot Vault (redo)				

LAP 1	LAP 2	LAP 3	LAP 4	LAP 5	LAP 6
Back	Front	Back	Front	Back	Front

STAGE 2	180° ROTATION						WALL			
	1	2	3	4	5	6	B	B	F	F
PUSH										
PULL										

STAGE 3	Pass	Fail
Dummy Drag		

Score	Raw Time	Penalty Time	Final Time

Instructor's Name: _____ Date:_____

OREGON PHYSICAL ABILITY TEST
Informed Consent, Waiver and Release

I understand that participation in the physical fitness evaluations, which I am about to undergo, are an integral part of the selection process for the position of officer with the (Your Agency Here). I have voluntarily requested to become a candidate for the aforementioned position and I voluntarily desire to undergo the ensuing physical ability evaluations.

EXPLANATION OF THE PHYSICAL ABILITY TEST

The evaluation will include performing an obstacle course and push-pull machine for time of not more than 5 minutes and 30 seconds, and a 165-pound "Dummy Drag" for 25' after 60 seconds of rest. **The obstacle course will include:**

1) 207' run
2) Crossing a balance beam 15' long, 6" wide and 10" high
3) Jumping over an obstacle 5' long by 3' wide
4) Climbing up and down 5 of stairs
5) Crawling under a obstacle 30" high and 36" wide
6) Jumping over two obstacles 18" high
7) Vaulting over a 3' high object
8) Falling to your back or stomach multiple times and stand back upright

This course must be completed a total of six times

Push-Pull Machine: You must push 80 pounds in a complete 180 arc six times
You must pull 80 pounds in a complete 180 arc six times

POSSIBLE RISKS AND DISCOMFORTS OF THE PHYSICAL ABILITY TEST

I am further aware that there is a risk of certain changes/hazards occurring during or following any physical activity involving maximum exertion. These changes/hazards may include muscle strains, ligament sprains, falls, contusions, abrasions and abnormalities of blood pressure or heart rate or cardiac complications in rare instances. A physician will not be present during the evaluations, however instructions regarding the signs and symptoms of adverse reactions or responses to exercise have been provided to me. I also recognize that should I experience any adverse reactions, I may immediately terminate my participation in the physical ability evaluation process. Personnel trained in emergency first-aid/CPR will be available.

I acknowledge that I have had ample opportunity to ask questions regarding the physical ability test. Having been adequately informed of the procedures and possible risks, I, the undersigned, acknowledge that my participation is voluntary in the physical ability process for the position of Officer with the (Your Agency Here). It is my express intent in signing this form to release D.P.S.S.T., the City of (Your City), (Your Agency Here), and their employees from any claims whatsoever or costs incurred in connection with said claims, which may arise as a result of my participation in the physical ability evaluation process. This waiver and release is granted freely, without coercion or any other inducement.

_____ _____
Signature of Applicant Date Signed

_____ _____
Signature of Witness Date Signed

(Print) NAME:	**AGE:**	**SEX: (M) (F)**

LAST FIRST

COMPLETED LAPS:

BACK	FRONT	BACK	FRONT	BACK	FRONT

PENALITY: 2-Seconds (Warning) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )

PENALITY: 5-Seconds (Warning) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )

RAW TIME:

FINAL TIME:

"DUMMY DRAG: PASS: ( ) FAIL: ( )

INSTRUCTOR SIGNATURE:

X_____ Date:_____

Preparing for ORPAT

In preparation for the Oregon Physical Abilities Test (ORPAT); individuals should take into consideration many factors that will influence their training. Among these are: current training routines; knowledge of training modalities; specific goals for training; and an understanding of the components of fitness. Individuals that currently exercise regularly and across all components of fitness should be prepared for the test with possibly some minor adjustments to their routine. **Before beginning any exercise program, it is important to consult a physician about your current state of health and any problems that arise during your selected form of exercise.**

Components of Fitness

Flexibility – The ability to elongate muscles and move joints through a normal range of motion.

Cardiovascular Endurance – The ability to elevate the heart rate and maintain that elevated heart rate for extended periods of time.

Muscular Endurance – The ability of a muscle or muscle group to perform repeated movements for extended periods of time (sub-maximal).

Muscular Strength – The greatest amount of force a muscle or muscle group can exert in a single effort (maximal).

Warm-Up and Dynamic Flexibility

A good warm-up is key in developing flexibility and preventing injury. In order for muscles to elongate they must be warm. To make this happen “Just Move.” No matter your preferred movement; jogging, back-pedaling, side shuffles, skipping, jumping rope, shadow boxing; “Just Move” for 3-5 minutes to warm-up before beginning dynamic stretching.

Dynamic stretching is the elongation of muscles through movement. While slowing from the warm-up you should continue to move during dynamic stretching. The following some examples of dynamic stretches that could be utilized during a warm-up.

1. Walking Lunge – Step forward with a long stride, keeping the front knee over the ankle. Drop back knee toward the ground without touching the ground. Stand up and walk a couple of steps and repeat on the other leg.

2. Knee Hug to a Lunge – Bring one knee to the chest; release into a lunge; walk a couple of steps and repeat on the other leg.

3. Alternating Side Lunge – Long stride to the side. Squat down keeping the back leg straight and entire sole of the foot planted on the ground. Stand up and walk a couple of steps, face opposite direction and repeat on the other leg.

4. Lunge with a Twist – Same as a walking lunge with the addition of an upper body rotation over the forward leg at the bottom of the lunge.

5. Walking Toe Grab – Reach down and grab toes on same side, keeping leg straight. Stand up and walk a couple of steps and repeat on the other leg.

6. Straight-Legged March – Keeping legs straight, kick one up in front of body as high as possible. Reach out with opposite side hand and try to touch the toes. Walk a couple of steps and repeat on other leg.

7. Bent Knee Glute Sit – Keeping one leg straight, bend other at the knee across straight leg just above the knee. Put slight downward pressure on the knee while at the same time putting slight upward pressure at the heel. From this position sit down until you feel a stretch through the glutes. Stand up and walk a couple of steps and repeat on the other leg.

8. Ankle Pick to a Toe Touch – Keeping one leg straight, bend other at the knee and behind the straight leg. Grab foot with opposite side hand. Bend over and touch toes with available hand. Walk a couple of steps and repeat on the other leg.

Training

The best means of training for the ORPAT is powerful, short-burst movements. H.I.T.T. style interval training will help to prepare you. Resistance training will help you to sustain some of the impact created by the obstacles. Movements requiring you to change elevation, go to the ground and get back up or navigating stairs will be very beneficial. Again, try to create programs that incorporate all components of fitness. If you have a preferred training modality (ex. running or resistance training) continue with it. Simply add exercises that correlate to the obstacles presented by the course.