

Protocol

Test and Measurement: US Army Combat Field Testing Protocol and Exploratory Analysis

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Abstract: The importance of resistance training (Conley & Pennington, 2022; Pennington, 2020) cardiovascular fitness (Pennington, 2015; 2016), and anaerobic power (Pennington, 2014) cannot be overstated for individuals enlisted in our country's armed forces. The Army Combat Fitness Test (ACFT) is the new branch wide fitness test designed to replace the outdated Army Physical Fitness Test (APFT) (USAPHC TG 358, n.d.). The APFT was implemented in 1980 as the measure of Service Member (SM) fitness. However, this test is very limited in scope and failed to tell unit commanders how ready their SMs were for the rigors of a combat environment (US Army ACFT Field Testing Manual, n.d.). The APFT was a gender-based test that consisted of three events: a two-minute pushup evaluation to measure upper body endurance. The second event was a two-minute sit up evaluation to measure core and hip flexor endurance. While the final evaluation was a two-mile timed run, which was designed to test aerobic endurance and leg endurance. This test was simple to set up and administer but, it was not a good metric to judge SM's actual fitness in a combat environment. If a SM had good endurance than he or she would max the test with ease. This is not a complete reflection of what is required in a combat environment. In a combat environment the SM will be loaded down with a rifle, helmet, rucksack, plate carrier, water, and ammo which often exceeds 80 pounds. The new ACFT which is still being implemented into the forces as of the writing of this paper is a much better test as it has more events to it which measure soldier strength and ability to move while under load.

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1. Introduction

Fitness performance has been shown to be highly related to skill performance in athletes. However, most of the available research has been performed in adult athletics participants. Thus, there is limited information regarding the relationship between physical fitness and performance in individuals outside of sport performance (Pennington, Cicone, Holmes, Fedewa, Sinelnikov & Esco, 2017). The importance of resistance training (Conley & Pennington, 2022; Pennington, 2020), cardiovascular fitness (Pennington, 2015; 2016), and anaerobic power (Pennington, 2014) cannot be overstated for individuals enlisted in our country's armed forces. Similarly, aerobic fitness is an important metric to consider regarding fitness performance. Accurate assessment of aerobic fitness involves expensive equipment for profiling the metabolic response to graded exercise testing, which is typically performed in laboratory settings (Pennington, Cicone, Sinelnikov & Esco, 2017). The two-mile run is often used as a surrogate of

laboratory testing for aerobic fitness in field settings and has been validated to be highly reliable.

Numerous recent studies have sought to quantify the effectiveness and value of the Army Combat Fitness Test (ACFT; Bigelman, East, Thomas, Turner, & Hertling, 2019; Palevych et al., 2021). The Army Combat Fitness Test is the new branch wide fitness test designed to replace the outdated Army Physical Fitness Test (APFT) (USAPHC TG 358, n.d.). The APFT was implemented in 1980 as the measure of Service Member (SM) fitness. However, this test is very limited in scope and failed to tell unit commanders how ready their SMs were for the rigors of a combat environment (US Army ACFT Field Testing Manual, n.d.). The APFT was a gender-based test that consisted of three events: a two-minute pushup evaluation to measure upper body endurance. The second event was a two-minute sit up evaluation to measure core and hip flexor endurance. While the final evaluation was a two-mile timed run, which was designed to test aerobic endurance and leg endurance. This test was simple to set up and administer but, it was not a good metric to judge SM's actual fitness in a combat environment. If a SM had good endurance than he or she would max the test with ease. This is not a complete reflection of what is required in a combat environment. In a combat environment the SM will be loaded down with a rifle, helmet, rucksack, plate carrier, water, and ammo which often exceeds 80 pounds. The new ACFT which is still being implemented into the forces (as of the publishing of this article) is a much better test as it has more events to it which measure soldier strength and ability to move while under load. The purpose of this article is to describe the ACFT as an exercise protocol for performance evaluation and critique.

2. Battery Assessment

The ACFT is a genderless six-event fitness evaluation with a very wide range of metrics that better assess all aspect of SM fitness. These six events are in order: (1) Hex bar dead lift, (2) overhead medicine ball throw, (3) two-minute hand release push up, (4) a sprint, sled drag, and kettlebell carry for time, (5) a dead hang leg tuck, and (6) a two-mile run.

Field-Test One. The 3 Repetition Maximum Deadlift (MDL) is a three-repetition hex bar deadlift at whatever weight the SM is comfortable at. The SM must complete three controlled deadlifts in succession to consider it a completed repetition. If the SM passes that weight, then they may go up in weight and try for that repetition. They can continue until they are unable to complete anymore repetitions. It is designed to test a SM ability to lift and carry a casualty, move under a combat load, and move heavy equipment and supplies. The MDL has a minimum passing score of 60 is three consecutive repetitions of 140 pounds and a maximum score 100 of 340 pounds for three repetitions.

Field-Test Two. The second event is the Standing Power Throw (SPT), it is an overhead 10-pound medicine ball throw for distance. It is designed to test the SM's ability to drag a casualty to cover, throw equipment over a wall, throw a hand grenade, among other tasks that require explosive movement. The minimum passing score of 60 is one throw at least 4.6 meters, with a maximum score of 100 at 13.5 meters. The third event is the Hand-Release Push-up (HRP), which is a two-minute timed event that consists of the SM starting on the ground in the front leaning rest position with the index finger of each hand inside the outer edge of the shoulder with the feet no more than a foot apart. When the event starts the SM, they will extend their arms fully until they are in a parallel line with the marching surface. This is the only authorized rest position, when the SM goes back to the ground their entire body will rest on the marching surface and extend their arms to lockout position with hands palm toward the ground. The SM will continue this cycle for the full two minutes or until they reach muscle failure. This event is designed to test the SM ability to push an opponent away during hand-to-hand combat, push a disabled vehicle, push up from the prone firing position under combat load, and the ability to low crawl under load. The minimum passing score of 60 for this event is 10

correct repetitions in two minutes with a maximum score 100 with 70 repetitions in two minutes.

Field-Test Three. The hand release push up is a two-minute timed event that measures upper body muscular endurance and represents repetitive and sustained pushing used in combat tasks. The HRP tests a Soldier's ability to push an opponent away during man-to-man contact, push a disabled vehicle, and push up from the ground during evasion and maneuver. It also engages upper back muscles used when reaching out from the prone position when shooting, taking cover, or low crawling. The Soldier must make a continuous effort to push up and cannot rest on the ground. While the exercise cadence may vary during the two-minute test event, the grader will ensure the Soldier is not resting on the ground. The grader will exercise their judgment, but a Soldier will generally be considered "at rest" if their efforts to perform a repetition stop for longer than five seconds. The HRP event is terminated if the Soldier rests in any position other than the front leaning rest position, fails to exhibit continuous effort, lifts a foot off the ground, or places a knee on the ground. The number of successfully completed repetitions in two minutes will be recorded as the raw score.

Field-Test Four. The Sprint-Drag-Carry (SDC) is the most complex test in this battery with five parts to this event. The event is staged in a 25-meter lane with a sled loaded with 90 pounds of weight, and two 40-pound kettlebells. When the event starts, the SM will sprint to the 25-meter line, touch the line with their foot and touch the line with the palm of their hand then return to the start line. They will then pick up the staged sled, drag the sled backwards until the entire sled crosses the 25-meter line then they will return the sled fully across the start line. The SM will then perform a lateral movement without crossing their feet toward the 25-meter line, touch the line with hand and foot then return facing the same way to the start line. The SM will then pick up the pre staged 40-pound kettle bells and run to the 25-meter line, cross the line then run back to the start line and gently place the kettlebells back on the start line. The SM will then sprint to the 25-meter line and back again which will conclude the test. The purpose of this test is to assess the SM ability to conduct high intensity tasks for several minutes under combat load conditions. The minimum passing score of 60 is three minutes and 35 seconds while the maximum score of 100 is 1 minute 40 seconds.

Field-Test Five. The fifth event in the test battery is the two-minute Leg Tuck (LTK) which is essentially a modified pull up to include core muscles. At the start of the test the SM will assume a dead hang from a pull up bar with one hand touching the other in an alternating grip while their body is perpendicular with the bar. When given the command the SM will flex their elbows, knees, hips, and waist to lift their knees toward their elbows. For the repetition to be counted the SM must bring their knees into contact with their elbows and return to the dead hang position. The SM will complete this cycle until the two minutes expire or they, under control, drop from the bar. If at any time their feet touch the ground then the last completed repetition is what is counted, the SM cannot swing to establish momentum to complete the repetition. The purpose of this test is to assess the SM ability to climb or descend a wall, rope, or some other kind of obstacle. The minimum passing score of 60 is one repetition in two minutes, while the maximum score of 100 is 20 repetitions in two minutes.

Field-Test Six. The final event in the ACFT is the timed two-mile run, this test must be completed on a track or improved road. This test is to assess the SM aerobic endurance and ability to move dismounted from vehicles or forced ruck marches. The minimum passing score of 60 is 21 minutes and seven seconds with a maximum score of 100 set at 12 minutes and 45 seconds.

3. Conclusion

That is the new ACFT for the US Army, a much better test all around versus the old APFT. However, there is one part of the test that is not up to date at all. That is the height and weight standards, which were last updated in 1986 and do not reflect at all how fit the SM actually is. When the SM is finished with the ACFT they are measured for their height and weight, which is then compared to a table laid out in Army Regulation 600-9. If the SM breaks that weight, then they are taped at the neck and waist for males, while females are taped at the neck, waist, and hips over the buttocks. The SM measurements are then compared to an estimated body fat table in the same regulation. This is meant to tell unit commanders what soldiers are overweight and need to be put on the Army Body Composition Program. However, these standards are not a good metric because of how narrow the standards are. For example, a SM that is 71 inches tall can only weigh 185 pounds, if they weigh more than that they are taped. If their ratio comes to more than 23 then they are considered overweight and are not able to be promoted. But that SM could be a body builder or power lifter or simply have a small neck to waist ratio. That table is out of date and does not show how fit the SM is and needs more modern methods of judging the total BMI of the SM.

Table 1. Presents five example SM data, with names removed for PERSEC reasons.

Name	Gender	Age	Height	Weight	MDL	SPT	HRP	SDC	LTK	2 MR
SM1	M	21	71	185	300lb	10.2M	50	2:15	6	15:54
SM2	M	25	65	173	340lb	12.3M	60	2:25	19	19:33
SM3	M	30	72	245	340lb	12.4M	10	2:15	3	19:15
SM4	F	19	64	125	230lb	6.4M	25	2:35	1	16:15
SM5	F	25	62	115	190lb	6.0M	15	2:45	1	20:35

In conclusion, the ACFT is highly useful, valuable, and has merit for field-based training. Nevertheless, former studies have shown that physical readiness, as determined by the Army Physical Fitness Test (APFT) – which may involve more than physical capabilities and is about more than physical performance – demonstrates that the highest physical readiness is achieved among those with high physical, cognitive, and emotional performance (Bigelman, East, Thomas, Turner, & Hertling, 2019). Both assessments have value and should be used in conjunction.

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