



# **DACOWITS RFI 8**

# **Army Combat Fitness Test**

5 Dec 2019



# What's the problem?



- 70% of people between the age of 17-24 unqualified for military service
  - 31% due to obesity
- 56,000 Soldiers non-deployable
  - 4% medically non-available
  - 5% limited duty profile
- 52% of all Soldiers will experience injury this year
- 17% of Regular Army Soldiers are obese
  - 48% more likely to experience injury
  - 86% increased chance of being medically non-available
- Musculoskeletal Injuries (MSKI) affects 55% of Soldiers annually
  - Equates to 10M limited duty days
  - A 1% reduction of non-available rate saves
     ~\$30 million



"The capacity and capability of the Soldier on today's battlefield is threatened by poor health and lack of physical readiness" GEN Milley, 39<sup>th</sup> CSA





- The Army last changed its physical fitness test in 1980. This change coincided with the disestablishment of the Women's Army Corps (WAC) and the accession of women into the U.S. Army.
- The three events of the APFT are graded on raw score performance and converted to 100-point scale scores normed against age and gender.
- Army requires each service member to take for record, the 3-event Army Physical Fitness Test (APFT) one or two times per year (all components).
- Little or no evidence-based science was used to validate the current APFT test events or scoring scales.
- The APFT is a relatively poor predictor (~40%) of a Soldier's ability to execute high demand commonly occurring, critical Warrior Tasks and Battle Drills required of <u>all</u> Soldiers.





- In mid-2000 Army leadership identified the need for a more predictive fitness assessment to improve physical readiness that correlated to high demand Common Soldier Tasks (CSTs) and reduce injuries and unplanned attrition.
- The six-event ACFT has been scientifically validated through four years of extensive empirical research (R<sup>2</sup> ACFT-High Demand CSTs = 80%) and is a better predictor of physical fitness associated with high physical demand common Soldier tasks IOT change the culture of Army fitness and increase close combat lethality.
- Although testing standards remain under continued review; as prescribed by NDAA guidelines, ACFT standards will be gender neutral.

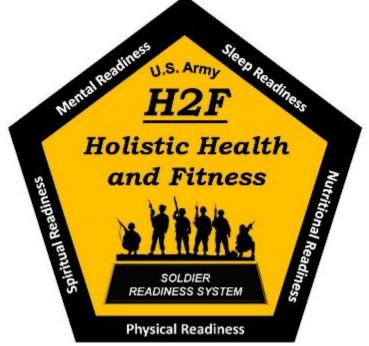
PUBLIC LAW 113–291—DEC. 19, 2014; NATIONAL DEFENSE AUTHORIZATION ACT; FOR FISCAL YEAR 2015; page 154.

SEC. 524. REMOVAL OF ARTIFICIAL BARRIERS TO THE SERVICE OF WOMEN IN THE ARMED FORCES. (a) ROLE OF SECRETARY OF DEFENSE IN DEVELOPMENT OF GENDER-NEUTRAL OCCUPATIONAL STANDARDS.





# The ACFT is an integral part of the Army Holistic Health and Fitness system.



An enterprise-wide "system" that combines all aspects of physical and non-physical human performance under a <u>single governance</u> to enable <u>commanders</u> to improve Soldier health and fitness for combat.



## Baseline Soldier Physical Readiness Requirements Study (BSPRRS)



## Phase I-II (2012-2013)

Purpose: Determine the physically demanding, commonly occurring and critical Warrior Tasks and Battle Drills (WTBD) and Common Soldier Tasks (CST).

## Phase III (2013-2014)

Purpose: Identify physical characteristics associated with each of the 11 identified physically demanding, commonly occurring, critical tasks to develop a Warrior Task Simulation Test (WTST).

Warrior Task Simulation Test (WTST)

- 1. Conduct a foot movement under load (move point to point)
- 2. Prepare a fighting position (fill, carry, and stack sandbags)
- 3. Move over, under, around, through obstacles (move O/U/A/T)
- 4. React to man-to-man contact (combatives)
- 5. Casualty extraction and drag (casualty evacuation)



#### Phase IV (2014-2015)

Purpose: Determine which industry-validated, field-expedient fitness test events were the best predictors of WTBD/CST performance on the WTST.

Eight physical fitness test events within 6 primary and 4 secondary components of fitness were found to be 73% (moderate/high) predictive of WTBD/CST performance.



Purpose: Through unit pilot testing, validate whether common physical fitness test events can accurately predict ability to execute WTBD/CSTs, are safe to perform, legally defensible, and acceptable.

Army Combat Fitness Test (ACFT) ~80% ability to predict WTBD/CST performance



## **Army Combat Fitness Test - WTBD Simulation**



#### 1- Movement to contact

2- Build a hasty fighting position



3- Move over-under-around-through obstacles on uneven terrain























4. Employ progressive levels of force (hand to hand contact)



#### 5. Extract – Evacuate a casualty







## 23 Physical Exercises – BSPRRS

reps/wgt

reps

#### Monday – 15/22 September

(1) Prowler Sled Push:	 min/sec
(2) Cadence Dips:	 reps
(3) Illinois Shuttle Test:	 min/sec
(4) 400m Sprint:	 min/sec

#### Thursday – 18/25 September

(1) Kettlebell Squat Endurance:	 reps
(2) Weighted Trunk Rotations:	 reps
(3) Cadence Pull-ups:	 reps
(4) Standing Long Jump:	 reps

#### Tuesday – 16/23 September

(1) Hex bar Deadlift:	 reps/wgt
(2) Standing Power Throw:	 m/cm
(3) 300m Shuttle Run:	 min/sec
(4) Modified Ab Rower:	 reps

#### Friday – 19/26 SEP

(1)	Sumo Squat		 reps/wgt
(2)	Bench Press Endu	irance:	 reps/wgt
(3)	Leg Tuck:		 reps
(4)	Vertical Jump:		 ht/vanes

#### Wednesday – 17/24 September

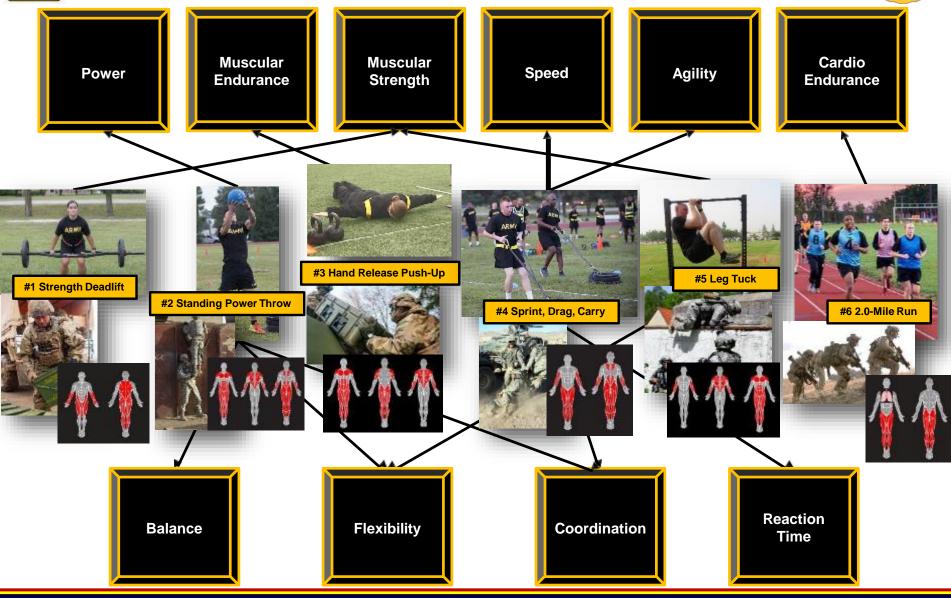
- (1) Loaded Shuttle Run: min/sec min/sec
- (2) Sandbag Drag:
- (3) Bench Press Strength:
- (4) Modified Sit-up:

Current APFT

(1)	Push-ups	 reps
(2)	2-min Sit-up:	 reps
(3)	2-mile Run:	 min:sec



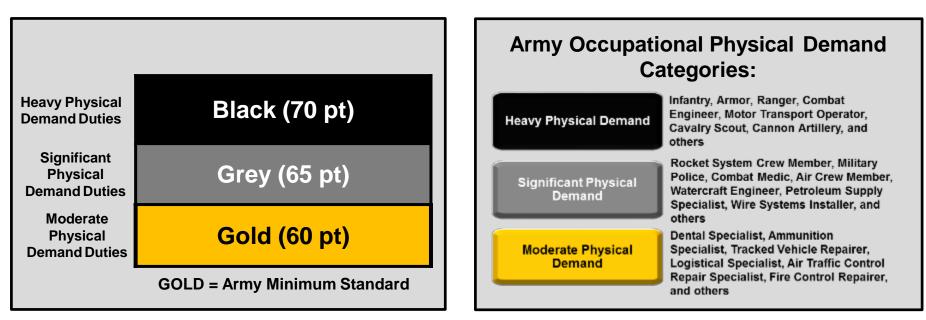








- 1. Performance standards will be gender and age neutral
- 2. Standards will be criterion-referenced, based on Common Soldier Task requirements
- 3. Physical Demand Categories (PDC) must align with OPAT PDCs



## National Defense Authorization Act (NDAA) – 2015

GENDER-NEUTRAL OCCUPATIONAL PERFORMANCE STANDARDS: "...the Secretary of Defense – (1) shall ensure that <u>qualification of members of the Armed Forces for. and continuance of members of</u> <u>the Armed Forces in. that occupational career</u> field is evaluated on the basis of common, relevant performance standards, <u>without differential standards or evaluation on the basis of gender</u>."

\*MOS – Military Occupational Specialty





- The purpose of the ACFT is to:
  - Improve individual Soldier and unit readiness.
  - Transform the culture of Army fitness.
  - Reduce preventable injuries and attrition.
  - Enhance mental toughness and stamina.
- There are three phases to ACFT implementation: Phase I Field Test, Phase II – Initial Operational Capability (IOC), and Phase III – Full Operational Capability (FOC).
- Field Test objectives were:
  - Order and ship ACFT testing equipment to the 63 Field Test units.
  - Train and validate ACFT test OIC/NCOICs and graders.
  - Refine testing protocols.
- IOC objectives are:
  - Train all Soldiers and administer a diagnostic ACFT (all components).
  - Measures testing performance across all components.
- FOC 01 OCT 2020 with the ACFT as the Army test of record.





- a. What is the physiological science on which the ACFT is based?
  - The ACFT is based on a concurrent validation study conducted by Center for Initial Military Training under the aegis of HQDA EXORD 041-13. The criterion variable was a proxy test for high physical demand Warrior Tasks and Battle Drills (WTBD) / Common Soldier Tasks called the WTBD Simulation Test (WTBD-ST). The variance accounted for between common fitness test performance (ex., push-up) and WTBD-ST performance = ~80%.
- b. What is the basis for the scoring criteria?
  - The current scoring standards are based on five factors: (1) current normative performance by known Soldier samples, (2) data collected during the Field Validation (FY18), (3) conflation with Occupational Physical Assessment Test (OPAT) standards to include the Moderate, Significant, and Heavy classifications, (4) initial predictions from Baseline Soldier Physical Readiness Requirements Study (BSPRRS) regression equations, and (5) standards from existing military fitness tests (i.e., Ranger Athlete Warrior assessments and the Air Force ALO-TCAP assessments).





- c. What data is being collected during this pilot? And how will it be used?
  - The Field Test and IOC data generally fall into two categories:
    - Procedural or administrative data (equipment order/ship, optimal test administration strategies, testing through-put, etc.)
    - Status data (where does the force currently score on the ACFT with little or no training or preparation).
  - Outside Field Test / IOC testing, several groups and agencies (Colorado State University ROTC, University of Iowa, The Citadel, University of Northern Iowa, Army MWR, West Point, etc.) are conducting training studies to determine the most efficient / effective ways to train for the ACFT.

These data may be used to:

- Refine testing protocols / procedures.
- Match performance to unit training programs.
- Analyze the effects of training on injury, attrition, and readiness.





d. Other than testing physical fitness, what are the other uses of the ACFT (i.e., promotion, selection, schools, etc.)?

• The Army is collecting data during the next Fiscal Year to inform future policy decisions. Currently, the Army has not made any policy decisions on other uses for the ACFT and it is not the test-of-record for this FY.

e. What efforts has the Army taken to address potential disadvantages to women given the physiological gender differences between men and women?

- Combat physical demands are gender- and age-neutral. Army leadership therefore
  prescribed the minimum requirements to pass the ACFT would be gender-and age-neutral.
  The refined minimum requirements will be directly correlated to a Soldier's ability to perform
  the high demand, commonly occurring Common Soldier Tasks.
- Although there are biological differences between men and women, performance on the ACFT is a function of training and commitment. A Soldier who consistently trains and focuses on improving all elements of physical fitness will perform higher on each test event.
- The maximum score for each test event does not exceed the physiological capacity of male or female Soldiers, as evidenced in the table below.

Highest Reported Score	MDL	SPT	HRP	SDC	LTK	2MR
Women	<b>350</b>	13.5	66	1:23	24	11:33
Men	<b>390</b>	16.1	80	1:02	42	<b>09:52</b>
Maximum Score	340	12.5	60	1:25	20	13:30





# Backup



## **Concept Development And Governance**



FM 7-22	FM 7-22, Holistic Health & Fitness
Holistic Health and Fitness	Part 1: System – H2F overview and planning Part 2: Design – Physical, Nutrition, Spiritual, Mental and Sleep readiness
2010	Part 3: Build – H2F program design
	Part 4: Deliver – H2F schedules
	Part 5: Test – OPAT and ACFT
DISTRIBUTION RESTRICTION: WARNING NOTICE: [Delete this line if no warning notice is required.] DESTRUCTION NOTICE: [Delete this line if no destruction notice required.] This publication supersedes FM 7-22 26 OCT 2012.	Appendices: PRT Drills and Exercises H2F Personnel H2F Equipment H2F Leader Education New Army Water Survival Training, Sleep and, Mental readiness New Army Nutrition doctrine New Army Pregnancy and Post-Partum Physical Training New Army Running Skill doctrine
Headquarters, Department of the Army	New Army Spiritual Readiness doctrine
	New Army Health Coaching instruction
	Way Ahead

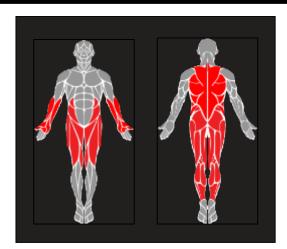
- Publish H2F Concept Paper •
- Publish Army Doctrine Publication (ADP) on H2F System ٠
- Publish FM 7-22 and other documents as required •



## **3-Repetition Maximum Deadlift (MDL)**









- **Task:** Execute the 3 repetition maximum (RM) deadlift event to assess lower-body strength
- **Condition:** Given a hexbar, weight plates, and barbell collars totaling up to 340lbs in an outdoor or indoor testing environment
- **Standard:** Conduct three (3) repetitions of the MDL maintaining proper lifting form throughout the movement IAW FM 7-22, Appendix A to meet the ACFT scoring standards

#### Component of Fitness: Muscular Strength

- <u>Definition</u>: the maximum amount of force that can be generated by a muscle or muscle group
- <u>Secondary Component of Fitness</u>: flexibility
- Anatomical Focus: knee extension, hip extension, grip, lower back

## • Application to Common Soldier Tasks (CST)

 Lifting heavy loads off the ground; casualty extraction/evacuation; carrying/transporting heavy loads (155mm artillery rounds, ammo boxes, etc.)

- Relevant Principles for Event Selection
  - 1. <u>Efficacy</u>: Highly predictive test to assess for lower body / core muscular strength
  - 2. <u>Safety</u>: Hexbar (vs Olympic bar) provides better anatomical position for proper lifting controls for injury
  - 3. <u>Ease of Administration</u>: Requires one (1) grader per lane; event time ~2:00 min per Soldier
  - 4. Grading: Simple to grade, replicate over time/space



IAW – In Accordance With

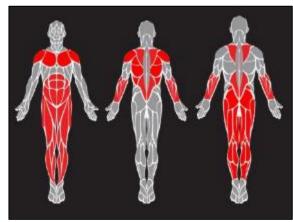


## Standing Power Throw (SPT)





- Task: Execute the SPT event to assess upper and lower body explosive power
- **Condition:** Given a 10lb medicine ball and tape measure in an outdoor or indoor testing environment
- **Standard:** Conduct two (2) record SPTs using proper movement technique IAW FM 7-22, Appendix A to meet the ACFT scoring standards
- Component of Fitness: Explosive Power
  - <u>Definition</u>: generating maximal force in the shortest time
  - <u>Secondary Component of Fitness</u>: balance, coordination, flexibility
  - <u>Anatomical Focus</u>: knee extension, hip extension, grip, lower back
- Application to Common Soldier Tasks (CST)
  - Mounting obstacles or vehicles; lifting Soldiers up/onto/over obstacles or vehicles; lifting loads off the ground and up/onto a vehicle or platform; jumping, leaping, climbing over obstacles; throwing a grenade



- Relevant Principles for Event Selection
  - <u>Efficacy</u>: Highly predictive test assessing upper and lower body power required for Common Soldier Tasks (CSTs); strong driver for upper and lower body power training
  - 2. <u>Safety</u>: A "prepatory drill" and 50% effort practice throw prior to event mitigates risk of injury
  - 3. <u>Ease of Administration</u>: Requires one (1) grader and one (1) marker per lane; event time ~2:00 min per Soldier
  - 4. Grading: Simple to grade, replicate over time/space



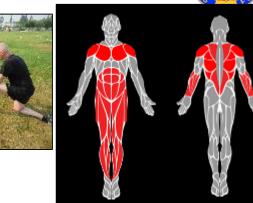


## Army Combat Fitness Test Hand Release Push-Up (HRP)









- **Task:** Execute the timed HRPU (Arm Extension) event to assess muscular endurance
- Condition: Given a stopwatch in an outdoor or indoor testing environment
- **Standard:** Conduct as many repetitions as possible in two (2) minutes utilizing proper movement technique IAW FM 7-22, Appendix A to meet the ACFT scoring standards

#### Component of Fitness: Muscular Endurance

- <u>Definition</u>: the ability of a muscle or muscle group to repetitively perform work for an extended period of time to volitional fatigue
- <u>Secondary Component of Fitness</u>: flexibility
- <u>Anatomical Focus</u>: elbow extension, shoulder flexion and extension
- Application to Common Soldier Tasks (CST)
  - Pushing loads up/onto/over obstacles; employing progressive levels of force; load carriage; dynamic balance under load

#### • Relevant Principles for Event Selection

- 1. <u>Efficacy</u>: Better predictive test assessing upper body endurance than the current APFT push-up; strong driver for upper body/core strength training
- 2. <u>Safety</u>: Minimal risk for injury with proper training program
- 3. <u>Ease of Administration</u>: Requires one (1) grader per lane; event time = 2:00 min per Soldier
- 4. Grading: Simple to grade, replicate over time/space





Sprint, Drag, Carry (SDC)





#### Relevant Principles for Event Selection

- 1. <u>Efficacy</u>: Highly predictive test assessing anaerobic power and endurance; strong driver for high intensity anaerobic training
- 2. <u>Safety</u>: Minimal risk for injury with proper training program; lateral shuttle in lap three (3) reduces the fall risk linked with lower leg muscle fatigue
- Ease of Administration: Requires one (1) grader and one (1) lane safety per two (2) lanes; event time ~3:00 min per Soldier
- 4. Grading: Simple to grade, replicate over time/space

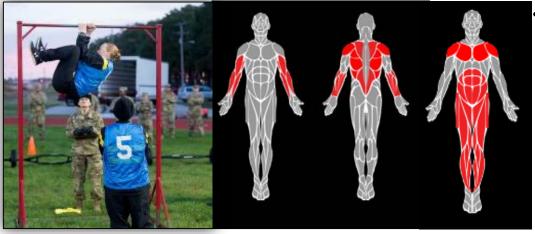
- Task: Execute the timed SDC event to assess muscular strength and endurance, and anaerobic power and endurance
- **Condition:** Given a 25m lane, one (1) drag sled, two (2) 45lb weight plates, two (2) 40lb kettlebells, and a stopwatch in an outdoor or indoor testing environment
- **Standard:** Within four (3) minutes, conduct five (5) x 50m shuttles for time in the following order 50m sprint, 50m sled drag, 50m lateral shuttle, 50m kettlebell carry, 50m sprint IAW FM 7-22, Appendix A
- Component of Fitness: Muscular Endurance and Strength, Anaerobic Power, Anaerobic Endurance
  - <u>Definition</u>: sustained moderate to high intensity muscular work over short duration
  - <u>Secondary Component of Fitness</u>: reaction time, coordination, agility, balance, flexibility
  - <u>Anatomical Focus</u>: knee extension, hip extension, grip, lower back, shoulders
- Application to Common Soldier Tasks (CST)
  - Moving quickly over uneven terrain under load; moving over/around/through obstacles; casualty extraction/evacuation; moving supplies or ammunition; 3-5 second rushes





## Army Combat Fitness Test Leg Tuck (LTK)





#### Relevant Principles for Event Selection

- <u>Efficacy</u>: Highly predictive test assessing upper body/grip/core strength and endurance; greater functionality compared to alternative events; improves dynamic balance and mobility; contributes significantly to the prevention of over-use load carriage injuries
- 2. <u>Safety</u>: Minimal risk for injury since the Soldiers feet/legs remain under the base of support
- 3. <u>Ease of Administration</u>: Requires one (1) grader per lane; event time ~2:00 min per Soldier
- 4. Grading: Simple to grade, replicate over time/space

- **Task:** Execute the LTK event to assess muscular endurance
- **Condition:** Given a 7.5ft high x 5ft wide pull-up bar or climbing pod in an outdoor or indoor testing environment
- **Standard:** Conduct as many LTKs as possible utilizing proper movement technique IAW FM 7-22, Appendix A to meet the ACFT scoring standards
- Component of Fitness: Muscular Endurance
  - <u>Definition</u>: the ability of a muscle or muscle group to repetitively perform work for an extended period of time to volitional fatigue
  - Secondary Component of Fitness: flexibility
  - <u>Anatomical Focus</u>: knee flexion, hip flexion, grip, abdominals

## • Application to Common Soldier Tasks (CST)

 Climbing up/onto/over vehicles or obstacles; traversing rope/ladder bridges; load carriage; dynamic balance under load

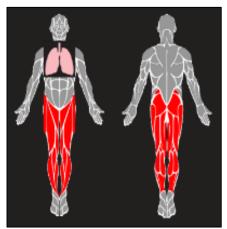




2-Mile Run (2MR)







- **Task:** Execute a timed 2MR to assess aerobic endurance
- **Condition:** Given a measured and generally flat, outdoor 2.0-mile course and stopwatch or outdoor race clock
- **Standard:** Execute the timed 2MR utilizing proper running skill IAW FM 7-22, Appendix A to meet the ACFT scoring standards
- Component of Fitness: Aerobic Endurance
  - <u>Definition</u>: the ability to exercise large muscle groups at a level somewhere between moderate and high intensity for more than a few minutes
  - Secondary Component of Fitness: None
  - <u>Anatomical Focus</u>: knee flexion-extension, hip flexionextension
- Application to Common Soldier Tasks (CST)
  - Moving long distances over uneven terrain under load; recovery from high intensity movements such as 3-5 second rushes; movement under fire



- Relevant Principles for Event Selection
  - 1. <u>Efficacy</u>: Highly predictive test assessing for measuring aerobic endurance
  - 2. Safety: Minimal risk for injury
  - 3. <u>Ease of Administration</u>: Requires one (1) grader per course; separate 2MR graders are authorized; event time ≤ 21:07 min per Soldier
  - 4. Grading: Simple to grade, replicate over time/space





## Army Combat Fitness Test Alternate event for 2-mile run (2MR)



## **Alternate Event**

## 5,000m Row

- **Task:** Execute a challenging alternate nonimpact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved horizontal rowing machine (ergometric)
- **Standard:** Execute the rowing event utilizing proper form to meet equivalent ACFT muscular and aerobic performance standards within 25 minutes
- Relevant Principles for Event Selection
  - 1. <u>Efficacy</u>: Highly predictive test assessing for measuring aerobic endurance
  - 2. <u>Safety</u>: Minimal risk for injury; appropriate for Soldiers on a lower body no / low impact profile
  - 3. <u>Ease of Administration</u>: Requires one (1) grader event time ≤ 25:00 min per Soldier \*
  - 4. Grading: Simple to grade, replicate over time/space
    - \*= remains TBD with Field Test scoring, age and genderneutral





An ergometric rower works multiple large muscle groups, to include shoulders, arms, core, and legs, at one time. The repetitive push and pull under tension provides a low-impact assessment of muscular and aerobic endurance.



## Army Combat Fitness Test Alternate event for 2-mile run (2MR)



## Alternate Event 15,000m Bike

- **Task:** Execute a challenging alternate nonimpact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved stationary bike machine (ergometric)
- **Standard:** Execute the timed bike event utilizing proper form to meet equivalent ACFT muscular and aerobic performance standards within 25 minutes
- Relevant Principles for Event Selection
  - 1. <u>Efficacy</u>: Highly predictive test assessing for measuring aerobic endurance
  - 2. <u>Safety</u>: Minimal risk for injury; appropriate for Soldiers on an upper body profile and lower body no / low impact profile
  - 3. <u>Ease of Administration</u>: Requires one (1) grader event time ≤ 25:00 min per Soldier \*
  - 4. Grading: Simple to grade, replicate over time/space
  - \*= remains TBD with Field Test scoring, age and gender neutral

An ergometric bike works large muscle groups in the legs. Repetitive movements under tension provides a low-impact assessment of lower-body muscular and aerobic endurance.



## Army Combat Fitness Test Alternate event for 2-mile run (2MR)

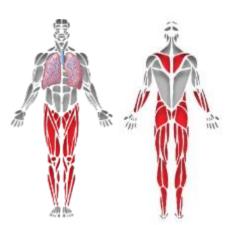


## **Alternate Event**

## 1,000m Swim

- **Task:** Execute a challenging alternate nonimpact aerobic event for permanent profile Soldiers who cannot perform the 2-mile run
- **Condition:** Given a standardized and approved 25-50m swimming pool
- **Standard:** Execute the timed swim event utilizing proper form to meet equivalentACFT muscular and aerobic performance standards within 25 minutes
- Relevant Principles for Event Selection
  - 1. <u>Efficacy</u>: Highly predictive test assessing for measuring aerobic endurance
  - 2. <u>Safety</u>: Minimal risk for injury; appropriate for Soldiers on an upper body profile and lower body no / low impact profile
  - 3. <u>Ease of Administration</u>: Requires one (1) grader event time ≤ 25:00 min per Soldier \*
  - 4. <u>Grading</u>: Simple to grade, difficult to replicate over time/space v. pool requirements
    - \*= remains TBD with Field Test scoring, age and gender neutral







The swim works multiple large muscle groups, to include shoulders, arms, core, and legs, at one time. The repetitive pull, kick and recover under

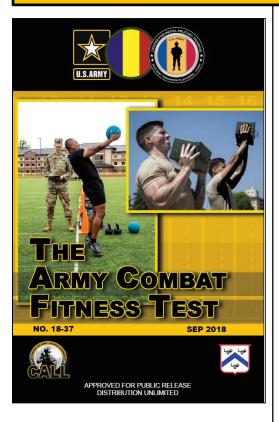


## Army Combat Fitness Test Training



### **Army Combat Fitness Test (ACFT) Training Products**

The Army Physical Readiness Training (PRT) doctrine, FM 7-22 (October 2012), Army PRT application for smart devices (iOS and Android), and Combined Arms Lessons Learned (CALL) ACFT Guide can assist with the complete training program.



A digital version of this CALL publication is available to view or download from the CALL website: <u>http://call.army.mil</u>

## Example garrison and field exercises for the 3RM Deadlift









## **3 Repetition Maximum Deadlift**

Top Exercises	<ol> <li>Sumo Squat</li> <li>Alternate Staggered Squat Jump</li> <li>Forward Lunge</li> </ol>	
Top PRT Drill	Strength Training Circuit	
Standard Equipment	60 lb trap bar and plates	
Alternate Equipment	Ammo cans Duffle bag Rucksack 5 gallon water cans	Tow bars PVC pipe Wooden handle MRE box







## Comparative Military Physical Fitness Tests



Fitness Domain	Air Force Tactical Air Control Party Test	Danish Armed Forces Physical Test	Army RAW Assessments	Army Combat Fitness Test	
Agility/Speed	3-Cone drill	20yd shuttle sprint	5-10-5 shuttle run	Sprint-drag-carry	
Explosive Power	Medicine ball toss (20lb)		Standing long jump	Standing power throw	
Muscular Strength	Deadlift / Grip strength	Deadlift	Deadlift	Deadlift	
Anaerobic power	Farmers carry 2x50x100			Sprint-drag-carry	
			Pull-up		
Upper Body Endurance	Pull-ups	Pullp-ups	2-min/cadence push-up	Hand release push-up	
Lower Body Endurance	Weighted lunges	Loaded lunges			
		9-item core test	2-min sit-ups	_	
Core Endurance	Cross knee crunch	Planks	Heel-claps	Leg tuck	
Anaerobic endurance		20yd shuttle sprint	300-yd shuttle run	Sprint-drag-carry	
Aerobic endurance	1.5-mile run	12-min run / Beep test	2-mile & 5-mile run	2-mile run	