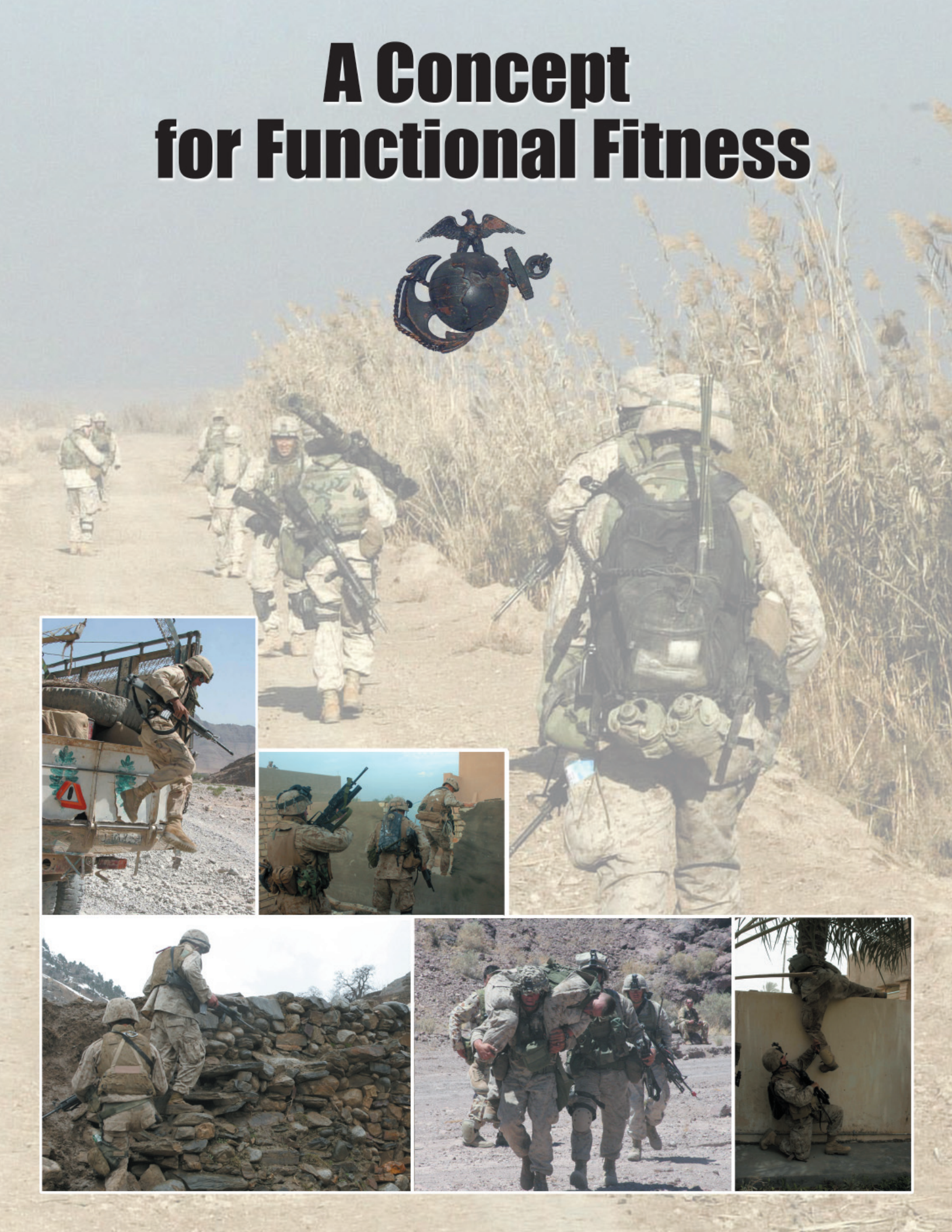


# A Concept for Functional Fitness

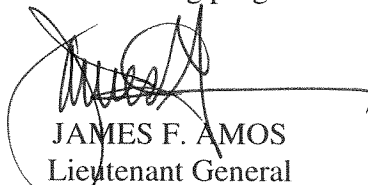




9 Nov 06

## **A Concept for Functional Fitness**

The Marine Corps is reaffirming today in combat operations that it is a premier fighting force—an organization of dedicated professionals whose warrior ethos and ability to rapidly adapt to challenging environments is second to none. Combat operations are teaching us a lesson about the individual Marine, a lesson we already knew, but are coming to understand better, and that is our best investment as a service is in our people. The process of developing the Marine Corps of tomorrow begins with a vision—a concept that speaks to a way ahead. Some of the environmental challenges of combat operations in Iraq and Afghanistan reinforce the need to ensure that our Marines, of all Military Occupational Specialties, are as well prepared physically as we can possibly make them. In recent decades, we have not maintained our focus on combat when we designed our physical fitness programs. Our physical training was not “functional” in this sense. This concept is a new kind of concept in that it is not focused on an organizational materiel capability, but rather on preparing Marines for the tough physical challenges they will inevitably face in combat and in peacetime training. *Functional Fitness* describes a new approach to physical training that, once implemented, will result in a major change in the way Marines view exercise and how units build training programs to prepare their people for combat.



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## A Concept for Functional Fitness

The United States Marine Corps has for many years taken pride in the level of physical fitness of its members. Physical fitness has been associated with professional performance, especially performance in combat. This association is correct because combat is the factor that should matter most to a fighting organization. However, the Marine Corps' Physical Fitness Program, as it is currently focused and structured, does not adequately prepare Marines for combat. In fact, other than the inherent ingenuity that some forward-thinking commanders evidence, the focus of the program seems to have only a mediocre combat focus at best. Further, most units find it difficult to follow the program as it stands, but even if the units did, they would still find that their people were insufficiently prepared for the physical rigors of combat.



Marines are athletes. Their preparation for combat is not unlike a collegiate or professional athlete's preparation for his or her sport. There are some key differences of course. Marines do not know the exact game they will be playing and they do not know the climate for the game. They do not know the rules. Marines do not even know when they will be "playing." However, these factors only make preparation more difficult for combat as compared to preparing for a season of sports. Many of the unknown (and unknowable) factors reinforce an argument that Marines need a general purpose sort of fitness—a fitness that is based on the functions of combat operations.

Participation in combat operations should cause the Marine Corps to examine all aspects of the organization for continued relevance. Recent combat operations have highlighted the need to pay particular attention to our Fitness Program. Marines are being required to wear body armor and combat equipment an even greater percentage of the time. The mean weight for that body armor has increased, especially with the addition of the SAPI plates. The helmet puts an unnatural load on the neck and the flak jacket puts a load on the lower back specifically and the entire body generally. These facts are not going to change anytime soon. Additionally, extreme climates often require Marines to wear this organizational equipment in 120+ degree heat while performing physical tasks that would be tough, even in the most temperate climates. These, and other environmental factors, only serve to exacerbate the super-human demands (physical stress) that combat will place on a Marine's body.

When a Marine is injured in training, the Marine usually misses subsequent training—and his or her level of fitness declines. When a Marine is injured in combat, depending on the nature of the injury, he or she may spend months (or years) recovering. Physical therapy plays an important role in recovery. However, physical therapy without an integrated physical training program will not be optimized.



## **The Military Problem**

Physical preparedness is a job requirement (enabler) for Marines. Unfortunately, the Marine Corps' current Physical Fitness Program may not meet the needs of the organization. Current orders and doctrine may not optimally support a complete fitness program that follows combat function. The program over-emphasizes aerobic training (long distance running) and gives very little attention to strength training. Combat demands a fitness that follows function, based on core strength and total body stamina. An unsophisticated exercise routine based almost entirely on mono-structural metabolic conditioning cannot provide the sort of training stimulus necessary to build General Physical Preparedness (GPP). Further, the current program, unlike sports programs, places little attention on "injury-proofing" Marines or on training around an injury during "active recovery."<sup>1</sup>

## **Central Idea**

Marines, as combat athletes, need a comprehensive fitness program that will develop the physical skills necessary for combat; including core strength, endurance, speed, and coordination. The Marine athlete should be prepared for the physical challenges of combat with a program that develops both GPP and Specific Physical Preparedness<sup>2</sup>—a program that integrates strength training based on functional, compound movements with multi-disciplinary speed, agility, and endurance training. The program should be intense and infinitely varied. The program must also be interesting—we want Marines to stick with it.

## **Fitness**

Physical fitness is oriented on an ability to perform physical work. Combat poses an infinite variety of physical tasks, many of which are foreseeable, some of which are not. This varied nature of physical requirements and the fact that some aspects defy predictability, place any preparation effort that is overly specialized at risk of irrelevance. Stated differently, the physical demands real life—and combat operations in particular—support the argument that a preparation effort should promote a strong foundation of general fitness based on function.

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<sup>1</sup> *Injury-proofing* is a term to describe efforts to reduce the Marine's risk of movement-related injury in training or in combat. *Active recovery* involves recuperation from intense exercise, overtraining, or even injuries using low intensity exercises to increase healthy circulation, reduce the muscle soreness associated with lactic acid build-up in the muscles and to maintain fitness. Active recovery can also aid psychologically in the healing process as the Marine athlete benefits from taking positive steps toward a restored physical condition.

<sup>2</sup> Specific Physical Preparedness (SPP) emphasizes exercises that prepare the athlete for the challenges unique to a particular activity. In this, the commander prepares the Marine athlete for his or her unique mission or occupational specialty.

## **Functional Fitness Defined**

Functional fitness can be described as the ability to perform a broad array of natural or realistic physical work. For Marines, that work involves all the tasks associated with performance in combat. The demands on the Marine's body will vary with load and duration (factors of intensity). A physical fitness that enables Marines to perform maximal combat-related work would be ideal. In this sense, we are arguing that fitness should follow function—that combat fitness should be functional for combat. A preparation effort in which a program based on functional movements executed with representative intensity of combat should be most effective.

“Functional exercise” involves multiple planes and multiple joints. Most human action (work) seems to involve a relatively limited number of fundamental movements (such as lifting, pushing, pulling, throwing, and locomotion). However, many exercise routines (especially weight training or body building as it is popularly practiced) follow a “reductionist” approach that strives to de-construct a movement in order to apply focused stress on a singular joint and muscle group. Unfortunately, the human body does not work that way. The body works together as a system and exercises that serve to de-construct what are essentially irreducible (though admittedly complex) movements, can create imbalance, unnatural stress on muscles and joints, do not generate an ideal adaptive response, and most importantly do not mimic the reality that the Marine athlete will experience. "The key to functional exercise is integration. It's about teaching all the muscles to work together rather than isolating them to work independently."<sup>3</sup>



## **General Physical Preparedness**

General Physical Preparedness (GPP) is a preparatory phase of training that, "...is intended to provide balanced physical conditioning in endurance, strength, speed, flexibility and other basic factors of fitness..." GPP exercises should involve as many muscle groups as possible. Therefore, the cardiovascular demand will be greater and the performance of more muscle groups will increase.<sup>4</sup> General Physical Preparedness involves the formation, strengthening or restoration of physical skills which enable athletic or sports performance.<sup>5</sup>

<sup>3</sup> Gina Shaw, *Working Out for Real Life Functions* <http://www.webmd.com/content/article/72/81694.htm>

<sup>4</sup> Chad Waterbury, *Increase General Physical Preparedness*, Dragondoor.com, Quote of Dr. Mel Siff.

<sup>5</sup> Bryan Mann, *General Physical Preparedness: The missing link in strength training*, EliteFTS.com

## Important Elements of Marine Functional Fitness

- Fitness should follow combat function.
- A Functional Fitness Program must be balanced in approach so that the Marine athlete develops power, strength, flexibility, speed, endurance, agility and coordination.
- A Functional Fitness Program must have intensity and great variety. It is characteristically general and balanced. The intensity leads to positive physical adaptation and the variety keeps the stimulus fresh and helps avoid over-training related injuries. Repetitive exercise routines can actually serve to limit motion and stimulus and this limitation can lead to dysfunction and injury.<sup>6</sup> The great variety also helps to keep the training interesting for Marines.
- A Functional Fitness Program must be *scalable*, allowing for the range of fitness levels of various unit members. This scalability is an acknowledgement that Marines will have different starting points in their personal fitness level and also allows the individual Marine to progress at his or her own pace. The program itself must be deliberately *progressive*, working to improve physical skills and advance the Marine athlete's physical condition.
- Emphasis must be placed on making Marines "injury proof." That is, by strengthening the muscles and joints and increasing bone density (another physical adaptation to exercise), Marines are less likely to sustain a debilitating injury resulting from physical stress--either in training or once deployed. The Functional Fitness Program, in this sense, focuses on "*prehabilitation*"<sup>7</sup> rather than waiting for an injury to actually occur and thereby having to resort to rehabilitation. Likewise, a Functional Fitness Program must have an educational aspect in which Marines are taught efficient biomechanics for functional movements like running, lifting, jumping (and landing). The use of efficient biomechanics in movement serves to reduce the incidence of injury and make the athlete faster and more agile. Essentially, the athlete is instructed on how to become a more efficient machine—a machine that can perform optimally in the rigors of combat with less likelihood of injury.<sup>8</sup>
- When a Marine is injured through physical stress, he or she is more likely to recover more rapidly if the body has been exposed to functional fitness exercise.<sup>9</sup> Moreover, being injured is not a time to relax. A Functional Fitness Program will seek to minimize

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<sup>6</sup> Pete Egoscue, *Pain Free, a Revolutionary Method for Stopping Chronic Pain*, (1998, New York, Bantam Books), p. 273-274

<sup>7</sup> Prehabilitation is a sports training term that acknowledges the role of injury prevention measures incorporated into athletic training.

<sup>8</sup> This admonition is based on a October 2006 interview with Walt Cline, M.S., C.S.C.S., U.S.A.W., Director of Athletic Development for *Velocity Sports Performance*, Alexandria, VA

<sup>9</sup> William J. Kremer and Keijo Hakkinen, *Strength Training for Sport*, (2002 London, Blackwell Science, Ltd.), p.43

the period a Marine athlete spends in *passive recovery*<sup>10</sup> and rapidly transition into some sort of *active recovery*. Marines can work around most injuries and continue training in a somewhat modified manner. In fact, the period of recovery from injury should be an opportunity to learn a new physical skill and become stronger in a new area. The body will tend to heal faster and the Marine will be stronger in the long run.

- When a Marine is injured in combat, he or she may face a daunting task of rehabilitation. Ideally, we want the Marine to be able to return to duty. However, even if that is not possible, we want to restore the Marine to the optimal level of physical functionality that he or she can achieve. Physical therapy and physical fitness can work almost seamlessly here to speed recovery. A Marine Functional Fitness Program must include this role in rehabilitation of injured warriors.
- The link in humans between the physiological and the psychological realms has been well established in science and medicine. This link has particular relevance to the development and preparation of Marines for battle. Combat stress is both physical and mental—and very real. Marines can sustain both physical and mental injuries in combat. Rigorous exercise can prepare Marines for these forms of battlefield stress by making them physically and mentally tougher. The stress of functional fitness can elicit both physiological and psychological adaptation. The principle here is that body can be conditioned to better handle combat stress. A Functional Fitness Program can play an important role in this pre-combat conditioning by applying a “combat-like” form of stress on the human system—using rigorous exercise that mimics or mirrors combat function.
- The Functional Fitness Program is the commander’s program. The program must be flexible--adaptive to individual and unit requirements. The program must acknowledge the need both for base fitness (GPP) and occupational or mission specific training. A commander will adapt his program to integrate training based on the mission and operating environment as he knows more about these. For instance, an infantry battalion commander who knows he will be deploying to a mountainous area (such as Afghanistan) will elect to place more emphasis on developing the physical skills related to this mission. Coaches do something similar with off-season training that prepares the athletes to make a smooth transition into pre-season and in-season training. Of course, Marines have no off-season, but sometimes commanders will have advance notice of their mission specific challenges and will plan accordingly.



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<sup>10</sup> *Passive recovery* or rest recovery involves the Marine athlete refraining from physical activity to allow healing to occur. While this type of recuperation is important, current studies indicate that the period should be judiciously minimized. The body is “designed to move” and movement stimulates recovery.



## **What is new?**

In the past couple decades there have been many advancements in the fields of kinesiology (study of movement), exercise science, sports training and athlete development, and physical therapy. There have been fairly recent improvements in the understanding of human physiology—most of this emanating from college and professional sports. As sports teams look for ways to improve their athletes' performance, “new” techniques are discovered for improving individual human performance more generally. While the importance of core strength and stability is not new, the emphasis is rather new. Sports as seemingly diverse as football, volleyball, and basketball are all seeing the advantages of developing core strength and stability through functional, compound movement exercises. We know that strength originates from the core and extends to the extremities. Stability of the core provides the solid foundation that is essential for athletic movement, especially dynamic non-linear movement.

What does this mean for Marines preparing for combat? Marines will be called upon to conduct forced marches and patrols with heavy gear. They will have to cross obstacles of many types, especially in urban environments. Marines do a great deal of lifting, pulling, throwing, and movement. In other words, they execute basic functional movements, and they do it under the most extreme circumstances—including being under fire. It is not an overstatement to say that a Marine's life may revolve around his or her ability to move his weight—and maybe the weight of another Marine—around the battlefield. Conversely, though endurance is critically important for a Marine's fitness, experience in recent combat operations has reinforced the idea that short, fast runs, normally under heavy load, are more the norm than long, endurance-type runs. Marines in combat service support are also called upon to work in rigorous situations in which core strength is an enabling capability. This principle applies to all Marines.

## **What about the PFT?**

The current Marine Corps Physical Fitness Test (PFT) is aimed at giving individuals and units an indication of their respective level of physical fitness. As stated in the Marine Corps Order, Marines are in no way encouraged to train for the test, but rather to let the test demonstrate their current physical state. If a Marine trains specifically and singularly for the test, his or her physical fitness will likely be unbalanced because the exercises that are part of the PFT do not by themselves develop functional fitness. A Marine could score well on a PFT and strain his or her back while lifting a pack or carrying a 155mm projectile to the loading tray. The problem here is not with the PFT, but with the training. A Functional Fitness Program will have other tests as well as the PFT. Individual Marines and groups of Marines will “test” themselves regularly during the course of their workouts. Commanders will develop physical training that stresses their unit members to the point that genuine and meaningful evaluation is possible. In the same manner that the Known Distance (KD) course establishes a baseline of proficiency, commanders will continue to use the PFT to assess baseline physical fitness—and then they will press on with more advanced and mission-focused training and assessment. In this, commanders will be developing their own mission-focused test(s) and using these for the purpose of learning how effective their Functional Fitness Program is.

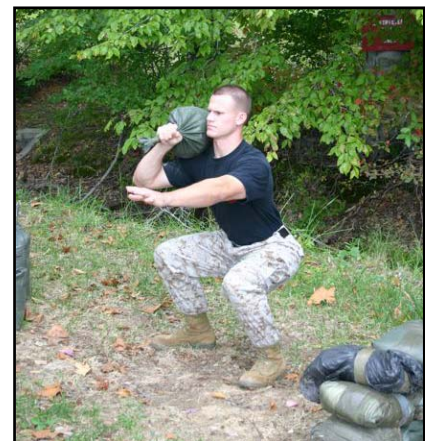


## Implications for Combat Development

In order for a Functional Fitness Program to be of utility—to really support the needs of commanders and their Marines—it must *fit* the culture and organizational limitations of the Marine Corps. The philosophy and essence must be easily understandable, especially to Marine leaders who will be responsible for the program’s ultimate implementation, and for integrating the elements of the program into unit training. Commanders are always faced with time constraints, so the Functional Fitness Program must absorb no more time than the current program. The Functional Fitness Program must be so practical, that commanders can, with a little creativity, integrate elements into other training events as well. Some commanders may incorporate combat fitness into their command philosophy. Likewise, units always face budgetary realities which limit them to the purchase of mission essential equipment. A new fitness program must be affordable.

Marines should be introduced to Functional Fitness during entry level training and all follow-on training and education should include greater exposure to this practical, real-life form of fitness training. Noncommissioned officers, SNCOs, and young officers should gain sufficient proficiency in Functional Fitness so that they are able to lead group and unit training and to manage program development for their sections and platoons. Commanders should designate a Fitness Coordinator for their units and these Coordinators (probably an experienced NCO or SNCO) will need to receive specialized training in the Functional Fitness Program.

In a logical application of the “train the trainer” concept, there will need to be some initial centralization of the program—probably at Quantico. In concept, trainers who receive more extensive instructor trainer certification will need to travel out to bases and installations to teach and certify unit trainers. Major Subordinate Commands (such as Division Schools) may provide an ideal venue and structure for Functional Fitness trainers who can then in turn teach unit coordinators down to at least the battalion/squadron level and thereby perpetuate the program. This concept of training trainers is not without precedent in that it is much akin to the Marine Corps Martial Arts Program (MCMAP). Similarly, the British Royal Marines have a system of unit Physical Training Instructors (PTI) that coordinate unit physical training and advise their unit commanders on physical training. Of note, these seasoned NCOs have other primary jobs within their units. The PTI is an additional competency and responsibility.<sup>11</sup> Unit Fitness Coordinators, in the same fashion as the Royal Marine PTI, could develop and manage a unit program based on mission guidance



<sup>11</sup> This information is based on an interview conducted by the author with Color Sergeant Chris Richards of the Royal Marines in July 2006.

from his or her commander. The Fitness Coordinator is the commander's principal advisor on Function Fitness and should be well-schooled on how to "customize" the unit's program to prepare for anticipated combat requirements as a unit ramps up for anticipated deployment. Additionally, unit Fitness Coordinators should be able to teach Marines correct movement mechanics; therefore, these coordinators must be instructed themselves in proper technique.

### **What about facilities and equipment?**

The Functional Fitness Program, as envisioned, does not require a great deal of sophisticated equipment. Most of the exercises can be conducted with basic weight equipment such as barbells, dumbbells, and medicine balls, chin-up and dip bars, jump ropes, boxes for box jumps, and some "cardio" equipment such as rowers and bikes. Running remains an important part of the program—but does not require equipment anyway. In fact, it should ideally require the acquisition only of a limited amount of basic, multi-use fitness equipment. Most of the movements associated with the Functional Fitness Program, since they imitate combat function, can be performed with a filled sandbag, a rock, a filled 5-gallon water jug, a tire, or an ammo can filled with sand. Once unit leaders understand the philosophy of the program and they become creative, they will find all sorts of equipment" available to them. The whole argument about necessary equipment was recently informed by an experiment conducted by the Canadian School of Infantry who conducted a program similar to the one described in this concept using "austere" equipment. In this experiment, they used ammo cans of various sizes filled with sand, large rocks, sand bags, and water jugs filled with water. The results they obtained indicated convincingly that a quality functional fitness program can be conducted using materials at hand in any unit in any conceivable location.<sup>12</sup> Marines will be deploying on lengthy combat tours and must maintain their fitness while in combat. Marines can easily continue the Functional Fitness program, even in austere combat environments, and that fact makes the program particularly useful and practical.



### **Summary**<sup>13</sup>

Now, after several years of participation in intense combat operations, is a good time to re-examine the Marine Corps Physical Fitness Program with an eye to revamp it to meet the emerging needs of the organization. This re-invigorated focus on combat-oriented fitness will certainly be energized by Marines of all grades who have recently participated in combat

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<sup>12</sup> Reference to the Crossfit experiment conducted in the spring of 2006 by the Canadian School of Infantry

<sup>13</sup> Special thanks to Coach Gregg Glassman and his Crossfit organization. Coach Glassman was instrumental in the development of the principles of this concept. There are many authorities who are now advocating the functional fitness method, but Coach Glassman's Crossfit organization is probably the best single source representation of the ideas in this concept. Many Marines are already trying his method and realizing results. For more information on Crossfit, go to [www.crossfit.com](http://www.crossfit.com).

operations and who sense a need to make their training more relevant for what they experienced. The effort will not be without difficulty as change is never easy. This Functional Fitness Program will be, for many Marines, significantly more challenging than anything they have previously experienced. Although the average time expended is equal to or less than what many



Marines are already accustomed to, the intensity and nature, being sufficiently stressful to cause adaptation, will seem initially intimidating to many. However, the program, properly administered, will achieve the kind of results Marines need in order to optimally perform in combat. The key components of functional movement exercises of infinite variety, executed with intensity will lead to the core strength, system endurance, speed and coordination that best enables combat effectiveness. As with any new initiative, there will be “costs” associated, but the results will speak for themselves—on the battlefield.



## Glossary of Terms

**Endurance**--the ability to sustain a prolonged stressful effort or activity

**Strength**--the ability to generate or apply force. Strength in the athletic sense that Marines are concerned with, is a learned skill, requiring the development of muscle coordination—involving a complex interaction of muscles that contract and relax in cooperative, but opposite actions.<sup>14</sup>

**Power** is related to strength in that it is measured in terms of force over time. It is the rate at which work is performed.

**Speed**—the swiftness or rate of performance or action or the ability to perform a movement in as short a time as possible

**Coordination**--the harmonious functioning of muscles or groups of muscles in the execution of movements

**Agility**--ability to move the body quickly and easily or to transition from one movement to another

**Aerobic training**—“with oxygen”—physical work performed at a level of intensity that the metabolic system can keep up with the demand. Most “cardio” conditioning such as long distance running, swimming, cycling, and road marches fall in this category.

**Anaerobic training**—“without oxygen”—physical work performed at a level of intensity that exceeds the metabolic capacity of the body, placing the body in oxygen debt. High intensity training such as sprinting, weight lifting and many sports involve activities which fall in this category.

**Compound movements** are “...multi-joint movements consisting of two or more joints moving and therefore many muscles are involved. One example is the **Dumbbell Bench Press**. In this exercise you are moving at the shoulders, elbows, and wrists. You are utilizing the muscles of the chest, shoulders, triceps and a number of other muscles (i.e. synergists, stabilizers, antagonists, neutralizers, fixators) to complete the movement.”<sup>15</sup>

**Scalability**—principle of taking a “standard” workout and making it more or less intense in order to be appropriate for a wider audience of participants.

**Progressive exercise**—concept that acknowledges the human body’s improved physical condition as a result of adaptation to physical stimuli. To maintain the positive adaptive stimuli, the exercise must be varied, particularly in terms of intensity.

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<sup>14</sup> Kremer and Hakkinen, *Strength Training for Sport*, p.11

<sup>15</sup> By George Stavrou, *Back to the Basics: Big Movements for Better Results!*  
<http://www.intensefitness.co.uk/training01.html>

**Flexibility**—is the ability of your muscles, tendons and ligaments to stretch which allow your joints to have a larger range of movement. This component is important to avoid injuries during physical activities.<sup>16</sup> Of equal significance to athletes, flexibility allows the body to move through a greater range of motion with less internal resistance. This aspect is particularly important for athletes in developing optimal speed, agility, and efficient athletic function. Flexibility can be improved through various forms of static and dynamic stretching. *Static or passive stretching* involves holding a position. That is, the athlete stretches to their farthest point and holds the stretch. In contrast, *dynamic stretching* involves deliberately moving the body through a full range of motion—usually during a warm-up session. To be effective, flexibility training should be conducted on a regular basis and should be incorporated into the exercise routine.

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<sup>16</sup> Wikipedia encyclopedia

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