

Physical Fitness Program

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Since 1983, the Army's Soldier Physical Fitness School at Fort Benjamin Harrison, Indiana, has been working to improve the Army's overall physical fitness program. This involved revising FM 21-20 and reexamining the standards applied to the Army Physical Readiness Test (APRT), which many considered too easy. As part of the renewed emphasis on the word "fitness," the test has been retitled the Army Physical Fitness Test (APFT). The new test, which will include generally tougher standards, will take effect 1 October 1986.

In revising FM 21-20, the Fitness School reviewed available civilian research and literature and evaluated its applicability to the Army. One finding showed that while there was fairly good consensus about what the principles of fitness were, there was some disagreement, even among the experts, with regard to their variables. The School's staff, therefore, established guidelines for these principles on the basis of the needs of the Army and the time available for physical training.

In the past, the Army's physical fitness program was based almost entirely upon running, with little information in the manual about strength or flexibility training. The principle change in FM 21-20, accordingly, is based upon an attempt to give equal emphasis to all aspects of physical fitness—flexibility, muscular strength, muscular endurance, cardio-respiratory endurance, and body composition. (Because body composition is covered by AR 600-9, it is addressed in FM 21-20 only in the context that the training in the other four components, along with proper nutritional habits, will

contribute toward attaining the desired ratio of body fat-to-lean muscle mass.)

Flexibility seemed to be the most neglected of the components in the past. Warming up was normally done using Conditioning Drill 1, 2, or 3. In reality, however, the word "conditioning" was a misnomer in that these exercises did little to condition the body. They were actually dynamic stretching exercises and may have been injurious when used to begin an exercise session. In fact, the Surgeon General has accumulated data over the years that documents the dangers of certain conditioning drills. Thus, those that were considered potentially injurious have been eliminated and the remaining exercises are now termed *calisthenics*.

WARM-UP

Another area of concern centered on how to begin a warm-up. Some experts recommended beginning with static stretching while others said there should be some activity to warm the muscles before static stretching. The Fitness School chose the latter method.

The first activity in a warm-up period should be just strenuous enough to elevate the heart rate, raise the temperature of the muscles, and perhaps cause a little sweating. Marching from a company area to a PT field, or jogging in place for one minute, should suffice.

Static stretching means using slow, smooth movements to stretch the muscles instead of using jerky, bouncy movements. Stretching should be done to the point of mild discomfort, but it should never hurt. Flexibility varies from one

person to another and should never become a contest. Once the muscles to be used in the day's activities have been stretched, calisthenics may be performed to warm up further. The entire sequence can be completed in five to seven minutes.

The new manual presents static stretches and calisthenics in a menu-type format, allowing a commander to pick the exercises most appropriate to his unit's needs and planned activities. These are not all inclusive, but some exercises are listed for all major muscle groups.

As for muscular strength and endurance, information about these subjects was woefully lacking in the old manual. Chapter 3 in the revised manual discusses the principles of strength training (see Figure 1) and identifies the major muscle groups. Exercise programs are presented in which partner-resisted exercises, free weights, and exercise machines are used.

Partner-resisted exercise (PRE) is a form of strength training in which a person performs an exercise against a partner's resistance. With the scarcity of equipment in the Army, PRE is an excellent way of developing the necessary muscular strength and endurance. As a bonus, it can be taken to the field.

In discussing the principles of strength training, Chapter 3 defines repetitions, sets, and workloads. As a general rule, muscular *strength* is best developed using relatively heavy resistance and relatively few repetitions. On the other hand, muscular *endurance* is improved by more repetitions with less resistance. It appears that an acceptable mixture of strength and endurance will result from

doing 8 to 12 repetitions with enough resistance to cause momentary muscle failure. (Resistance can be stated as a percentage of the weight that can be lifted in one maximal effort. Momentary muscle failure occurs when it becomes impossible to perform another correct repetition through the range of motion required for the exercise.)

For any number of reasons, cardio-respiratory endurance training has been the cornerstone of most fitness programs. The running boom has been evident throughout our society for the past 10 to 15 years. Running is something that can be done almost anywhere, it requires little or no equipment, and people seem to understand the basics pretty easily. The revised FM explains how long, how hard, and how often cardio-respiratory training must be conducted to achieve a training effect. In addition, the manual discusses alternate aerobic activities such as road marching, swimming, biking, walking, and cross-country skiing.

To answer the question of how often, how hard, and how long exercises must be done, and of what type they should be, the Fitness School teaches the use of the acronym FITT—frequency, intensity, time, and type.

Frequency. To achieve a training effect, each component must be done at least three times a week. This supports the principle of regularity. But if three

times a week is good, is seven times a week better? Probably not. Trainers must also adhere to the principle of recovery. Research indicates that muscle groups must be allowed at least 48 hours to recover from a bout of hard exercise. The School therefore advocates a hard day/recovery day concept, whereby the same muscle groups are exercised at high intensity every other day. An example might be to run at Target Heart Rate (THR) for 30 minutes on Monday, Wednesday, and Friday, with shorter, slower runs on Tuesday and Thursday. Within this structure, strength training might be done on Tuesday, Thursday, and Saturday, with Sunday a day of complete rest. Weight-lifting enthusiasts might incorporate this concept by training the upper body on Monday, Wednesday, and Friday, and the lower body on Tuesday, Thursday, and Saturday. There are many possible combinations.

Intensity. For cardio-respiratory exercise, the School teaches how to calculate and use THR (see Figure 2) to measure the intensity of exercise. For muscular strength and endurance training, intensity means resistance; for flexibility, it means stretching to the point of mild discomfort, not pain. But because it is difficult, if not impossible, to achieve the proper intensity for everyone during group physical training, the Fitness School recommends two methods to offset this problem—

ability-group running and exercise in sets.

For ability-group running, soldiers are divided into groups of as near the same ability as possible. (The soldiers' times on their most recent two-mile run can be used, for example.) For a company, three to six groups should be enough, depending on the number of leaders available and the range of ability. Each group would then run at a pace fast enough to attain THR. This would ensure that more soldiers receive the greatest possible training benefit from the run.

Much the same procedure can be followed for push-ups and sit-ups. A specific number of repetitions of each of these exercises will not result in uniform training for all of the soldiers in a company. Exercise in sets can produce good results if the concept is properly applied. There are two methods that may be used.

In the first, each soldier establishes the maximum number of push-ups and sit-ups he can do. The company commander then chooses a percentage of those numbers—usually 50 or 75 percent—for a workout. Each soldier then does three sets of that number of repetitions with a predetermined rest period between sets. As a result, everyone does *relatively* the same amount of work.

Another method is the use of timed sets. For example, everyone would do as many push-ups as possible in one minute, rest for 30 seconds, and repeat this two more times. Those who could not do push-ups for the entire minute could use their knees, or just lower themselves, but keep exercising for the specified time. These two methods help individualize training, thereby producing better training effects.

Time. With regard to cardio-respiratory endurance, THR must be maintained for at least 20 minutes. For muscular strength and endurance training, "time" translates to number of repetitions; for flexibility training, it refers to how long a stretch is held.

Type of activity. For each component of fitness, there are several different activities. Those included in FM 21-20 are intended to produce the desired training effects and to give the program variety, but commanders should not feel limited to these activities. As long as an activity

PRINCIPLES OF EXERCISE

1. **REGULARITY:** Exercise must be done on a regular basis. Sporadic exercise may do more harm than good. Regular rest, sleep, and eating habits also make it more beneficial.
2. **PROGRESSION:** The duration and intensity (overload) of the exercise should be gradually increased over time. The goal is to allow for increased fitness levels, but not to try and increase these demands too rapidly.
3. **OVERLOAD:** The muscles and systems must be given a workload that exceeds normal demands.
4. **BALANCE:** A good program includes activities that improve cardio-respiratory endurance, muscular strength, muscular endurance, flexibility, and body composition.
5. **VARIETY:** A varied exercise program prevents boredom. When it includes sports or team activities, the competition improves motivation.
6. **SPECIFICITY:** Training must be geared to the desired result. Soldiers get better at what they practice.
7. **RECOVERY:** Hard days of training should be followed by easier days to permit muscle recovery and to prevent injury. Exercising alternate muscle groups each day and allowing for sufficient rest will increase the benefits of exercise.

Figure 1

is safe and produces a training effect, it has a place in the program, and if soldiers enjoy it, this is all the more reason for including it.

An often neglected part of an exercise session is the cool-down. The key is to prevent the pooling of blood in the lower extremities and help to return it to the heart. Walking and stretching are good exercises for the cool-down. Soldiers should walk until their heart and breathing rates have slowed to near pre-exercise levels, while stretching may reduce stiffness and soreness the next day. Four to six minutes should be enough for the cool-down period.

In addition to these various aspects of physical training, there are also special programs to meet special needs. In the past, little effort has been made to differentiate between unfit and unmotivated soldiers. In fact, "remedial" PT squads have often included soldiers who were overweight, over 40, or on profiles. But each of these groups has different needs and should not be summarily lumped together for physical training. Many overweight soldiers, for example, can do quite well on the APFT. What they need is counseling on diet and nutrition, not necessarily extra push-ups. Other soldiers may do quite well on the two-mile run but have trouble with push-ups. They may respond best to running for five minutes less and devoting those five

minutes to additional, supervised push-up improvement drills.

The Fitness School contends that these special programs should be conducted at the same time as regular PT, with careful attention to their development. Addressing these various needs requires careful management. But the soldiers will recognize that their special needs are being considered, and their motivation should improve because of it. Master Fitness Trainers (MFTs) are well qualified to develop these special programs, and FM 21-20 contains information on them.

The School also found that, in the past, planning for physical training had been generally neglected. Planning for PT, however, is just as important as planning for field training, and each session should be planned so that it contributes to the combat readiness of the unit. Master Fitness Trainers can also help commanders develop short-, medium-, and long-range fitness plans for their units.

A typical company physical training session might look like this: Led by the MFT, the company starts out with five minutes of static stretching, with emphasis on the muscle groups that will be used in that day's conditioning period. The company does eight partner-resisted exercises (16 minutes) and then breaks down into ability groups for a 30-minute run at target heart rate. Those who have failed push-ups and sit-ups on the APFT

run for only 25 minutes and use the other five minutes to work on push-ups or sit-ups, supervised by the MFT. Soldiers with profiles exercise within their stated limits. Those who cannot run can swim or ride a stationary bike for 30 minutes at target heart rate.

This exercise period is conducted in running shoes and is considered a "hard day." The next day is a recovery day, when there will be a company run with drills for improving push-ups and sit-ups.

APFT

The overall tougher standards on the new APFT were based on a number of obvious deficiencies in the old standards. For one thing, a two-mile run is the one event in which an estimate of the energy cost can be made—for each speed, the amount of oxygen required per minute for unit of body weight can be estimated. (This is called VO₂.) Under the old standards, the VO₂ required of men in the 17 to 25 age group at the 60-point level was less than that required of the average 40-year-old man. We certainly expect our youngest and theoretically fittest soldiers to be in better condition than the average 40-year-old. (Even the new standards require a fitness level no higher than that of the average college-age male, but the School did not want to move too fast on this issue.)

Another deficiency in the test was the age groupings. When APFT scores were examined on an age basis, it appeared that we were unfairly asking 25-year-old soldiers to compete against the same standards as 17-year-old soldiers. Close inspection indicated that more homogenous groupings would result from dividing the population at five-year intervals. The new age groupings are 17-21, 22-26, 27-31, 32-36, 37-41, 42-46, 47-51, and 52+.

Along with the realignment of age groups, standards were developed for soldiers 40 years of age and older. Previously, the extremely low pass/fail standards may have been telling the older soldiers that fitness was no longer important. In fact, however, a high level of fitness may be even more important to our command sergeants major and battalion and brigade commanders than to

TARGET HEART RATE

To calculate your THR, you must know your Resting Heart Rate (RHR). RHR is best determined by adding your pulse for a full minute immediately upon waking in the morning. You can also estimate it by taking your pulse for one full minute after sitting quietly for at least five minutes.

You must also decide on the level of intensity you want on your workout on the basis of your level of conditioning:

- 60% Unfit
- 70% Fairly Fit
- 80% Very Fit
- 90% Exceptionally Fit

Obviously, the higher the percentage, the more intense the workout. Therefore, the more fit you are, the higher percentage you should choose for a workout. A very fit person may do workouts at 80% on hard days and 60% on recovery days.

Once you know your RHR and have chosen a level of intensity, you can calculate THR as follows:

- Step 1: 220 - Age = Maximum Heart Rate (MHR)
- Step 2: MHR - RHR = Heart Rate Reserve (HRR)
- Step 3: Desired Intensity (%) x HRR + RHR = THR

A very fit person may do workouts at 80% on hard days and 60% on recovery days.

Figure 2

younger leaders at lower levels. Furthermore, under the new test all soldiers will be tested the same—against the standards. (In addition, the Fitness School in its research found no physiological reasons to prevent women from doing as many sit-ups as men can. In fact, the data showed that women in the field were doing as many sit-ups as men and in some cases more.)

Under the new standards, soldiers will no longer be able to pass the APFT without training for it, and these standards require fitness levels that are more in line

with the fitness required of soldiers on the battlefield.

Fitness is a dynamic subject with new ideas always being developed. The Fitness School therefore continues to evaluate all new research and literature for its applicability to the task of improving combat readiness. We pass these ideas on to the field through the Master Fitness Trainers and through various briefings and presentations.

It is equally essential to this effort that the School receive feedback from the field on physical fitness—what works and

what does not, for instance, and what alterations get better results in war weather locations or what adaptations must be made for cold weather.

In all these efforts, our overriding concern is to improve combat readiness. Together we can do it.

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SWAP SHOP



LOST MAN DRILL

An individual soldier (or an element) sometimes becomes separated from a small patrol, usually when crossing linear danger areas or natural obstacles that slow individuals in the rear of the formation while those in the lead continue at a normal pace.

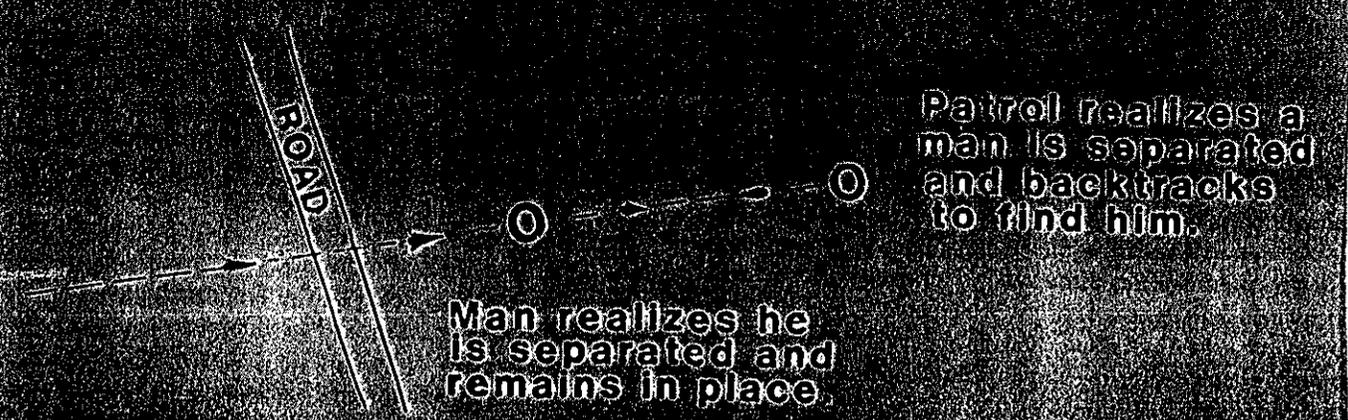
When a soldier realizes he has become separated and there is no one in front of him, he must halt *immediately* (in a concealed site), listen for the patrol's return, and challenge it quietly.

When the lead element (even if it is just one man) discovers a man has separated, it should immediately halt and listen for

sounds of the man's movement or for foul play. If the separated man does not link up within one or two minutes, the entire patrol (to prevent further separations) should retrace its route until it is challenged by the separated man. Once all personnel are accounted for, the patrol can continue its mission.

Unit SOPs should specify what the separated man will do if linkup does not occur within 15 to 20 minutes—proceed to designated rally point or return to friendly lines, for example.

This drill will work only if all patrol members are familiar with it and have rehearsed it and if both elements conduct the prescribed procedures.



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