APPENDIX F

CALCULATION OF $\dot{V}O_2$max

This appendix gives a step-by-step example of how a soldier can calculate $\dot{V}O_2$max using his all-out, 2-mile-run time. This lets interested soldiers compare their fitness levels with others such as athletes whose $\dot{V}O_2$max values are published in magazines or journals.

The two equations below convert the 2-mile-run times of males and females to maximum oxygen uptake values. The $\dot{V}O_2$max values obtained are shown as the maximum amount of oxygen in milliliters used per kilogram of the person's body weight in one minute during maximum aerobic exercise. $\dot{V}O_2$max values are generally expressed more succinctly as ml O_2/kg x min.

For males, the following equation is used to calculate $\dot{V}O_2$max:

$\dot{V}O_2$max = 99.7 - [3.35 x (2-mile-run time in decimal form)].

For females, the following equation is used:

$\dot{V}O_2$max = 72.9 - [1.77 x (2-mile-run time in decimal form)].

The example below shows how to use the equation for males. The data is for a 21-year-old male whose all-out, 2-mile-run time is 12 minutes and 36 seconds.

STEP 1. Express the 2-mile-run time as a decimal, and insert it into the equation. When 12 minutes 36 seconds is written as a decimal, it becomes 12.60 minutes. (To determine what fraction of a minute 36 seconds is, divide 36 seconds by the number of seconds in one minute, that is, 60 seconds. Thus, 36/60 = 0.60. This fraction is added to the minute value to give 12.60 as the run time expressed as a decimal.) After putting the decimal form into the equation, the equation should resemble the one below.

$\dot{V}O_2$max = 99.7 -[3.35 x (12.60)]

STEP 2. Multiply the decimal form of the 2-mile-run time by 3.35. In this case, we get [3.35 x (12.60)], which equals 42.21. At this point, the equation should resemble the one below.

$\dot{V}O_2$max = 99.7 -[42.21].

STEP 3. Subtract the product obtained in Step 2 from 99.7. For our example, we make the following subtraction: 99.7 -[42.21]. This gives a value of 57.49. Thus, the equation should look like the one below.

$\dot{V}O_2$max = 57.49

This calculation reveals that a male whose all-out, 2-mile-run time is 12 minutes 36 seconds will have a $\dot{V}O_2$max of approximately 57.49 ml O_2/kg x min.

To determine how this value or others translates into fitness ratings, refer to Table F-1. It presents information for finding one's level of CR fitness based on $\dot{V}O_2$max. By matching a soldier's value for maximum oxygen uptake with those in the table corresponding to his age group and sex, one gets an adjectival rating (fair, good, superior, etc.).

$\dot{V}O_2$max AND CR FITNESS CLASSIFICATIONS

CATEGORY	SEX	AGE				
		20-29	30-39	40-49	50-59	60+
SUPERIOR	MALE	54.0+*	52.5+	50.4+	47.1+	45.2+
	FEMALE	46.8+	43.9+	41.0+	36.8+	37.5+
EXCELLENT	MALE	48.2-51.4	46.8-50.4	44.1-48.2	41.0-45.3	38.1-42.5
	FEMALE	41.0-44.2	38.5-41.0	36.3-39.5	32.1-35.2	31.2-35.2
GOOD	MALE	44.2-47.0	42.4-45.3	39.9-43.9	36.7-39.5	33.6-36.7
	FEMALE	36.7-39.5	34.6-37.4	32.3-35.1	29.4-39.9	27.2-30.9
FAIR	MALE	41.0-43.9	38.9-41.6	36.7-39.5	33.8-36.1	30.2-32.4
	FEMALE	33.8-36.1	32.1-33.9	29.5-31.6	26.9-28.7	24.5-26.5
POOR	MALE	37.1-40.3	35.4-38.1	33.0-35.6	30.2-32.5	26.5-29.4
	FEMALE	30.6-32.7	28.7-31.9	26.5-29.4	24.3-26.1	22.8-24.0
VERY POOR	MALE	27.1-36.7	26.5-34.0	24.2-32.3	22.1-29.4	18.3-25.1
	FEMALE	22.6-29.4	22.5-28.0	20.8-25.6	21.1-23.7	17.9-22.1

*$\dot{V}O_2$max is expressed in ml O_2/kg x min.

Table F-1

Table F-1 lists some values for $\dot{V}O_2$max along with their associated CR fitness levels. This table was obtained from the Institute for Aerobic Research in Dallas, Texas. These values can be used to classify a soldier's level of CR fitness based on his $\dot{V}O_2$max.