



HFD Recruit Academy - Physical Fitness

As a firefighter, it is important to understand that a high level of wellness and fitness will only be achieved by training all of the components necessary for fitness. These components are measurable and can provide you with a verifiable way to track progression. If an individual excels in one component, but not in another (for example performs high in cardio endurance but low in flexibility), it does not always add up to having a high level of fitness health. Your goal is to achieve a level of skill-related fitness for the protection of your life as well as our peers and public we serve.

The information provided here is designed to improve your overall fitness level while minimizing injury risk and preparing you to successfully perform job responsibilities as a firefighter. Job requirements dictate that firefighters have certain specific capabilities, including strength, endurance, and aerobic / anaerobic abilities. Our Recruit Academy physical training program focuses on 5 key areas of fitness: aerobic conditioning, core strength, flexibility, muscular endurance, and muscular strength.

Principles of Physical Training

For the career firefighter, it is important to maintain good health on the job and for quality of life after the job. It is critically important to have a strong fitness level in order to maintain a high degree of performance and to help stay safe and injury free on the fire ground.

There are four principles that apply to all physical training programs: overload; specificity of training; individual differences; and detraining / **FITT (Frequency, Intensity, Time and Type)**.

The **Overload principle** must be used in order to stimulate an increase in fitness level. It means that exercise must be done at a higher level than the body is accustomed to in order to bring about a training adaptation. Making changes to combinations of exercise frequency, intensity, duration, rest, and types of exercise are ways to bring about overload.

Specificity of Training (Functional Fitness) refers to the principle of training adaptations which are specific to the sport or job you are training for. Running or cycling may improve cardio respiratory fitness but it will not improve your tennis performance. Therefore, it is important to train those muscles that will specifically be used for fighting fires or doing work performance.

Everyone responds differently to an exercise program. Each firefighter has individual strengths, weaknesses, goals, and needs. Individualized programs are beneficial and necessary for a firefighter to meet their work performance, fitness standards and to maximize their individual physical ability.

Detraining will occur if the firefighter does not maintain a regular exercise program. Due to the nature of the job a firefighter must always be ready and physically able to handle any situation presented. All aspects of skill and health-related components must be developed. In order to get the most from any training program and prevent de-training it is necessary to follow the FITT principle. The number and intensity of the workout is just as important as the time spent exercising.

As you read this document, there are sections that will help you become more knowledgeable and proficient in flexibility, muscular strength, aerobic fitness, core training, and making it all come together. There are also major areas that past recruits have failed to overcome, areas in nutrition, hydration and recovery are extremely important, which will also be covered. Take the time to make every area in this handout a part of your life since YOU have chosen to apply for a career with us. Don't assume you will be able to come to the Academy to get into shape, you will fall behind not only in physical fitness but in multiple areas conducted over the course of an Academy. Poor fitness also puts you at risk and will increase your chances of injury. Remember the Candidate Physical Ability Test (CPAT) is just one step in many that gets you closer to your goal in becoming a firefighter.

What to Expect at the Henderson Fire Department Recruit Academy

Physical fitness is the responsibility of each Recruit. Preparation for the job of firefighter should start months to years prior to the first day at the Academy. Each day of training includes some form of physical fitness drill in addition to strenuous firefighting evolutions. As a candidate, if you have embraced a physical fitness mindset, you will ensure that you will be able to keep the pace in the training program, both physically and academically. **Fitness is your responsibility.**

As a Recruit, our Peer Fitness Trainers (PFTs) will intentionally induce stressful situations to help you better understand the demands of firefighting, and train you mentally and emotionally to handle work-related stressors. Mental toughness is a character trait of successful recruits.

Recruits attend the academy for 4+ months of intense training. This training consists of EMS and Fire Suppression Training, HAZMAT, Emergency Vehicle Operations, daily physical fitness training and many other educational training components. It is vital to your success to come in physically fit.

Physical Training Evaluations are conducted 2 times over the span of an Academy. The recruits can expect to have a PT evaluation within the first few weeks of the academy and at the end. This will measure the recruit's entry level of physical fitness and provide the Academy staff with a measure of recruit fitness at the end. These evaluation standards are the minimum and recruits should be well beyond these minimum standards by the end of the academy. They are merely a first step which helps us determine if you are ready to proceed in this process. We strongly recommend you take advantage of the following training information for a career with the Henderson Fire Department.

Warm – Up / Stretching (Flexibility)

Warm Up – For any individual who is physically active, there is a possibility of sustaining an injury. While some injuries, such as an ankle sprain or fracture, are difficult to prevent, many other injuries are preventable. By following a few simple guidelines, injuries such as muscle strains, tendonitis, and overuse injuries can be reduced. Every workout must begin with a warm up and end with a cool down. A

warm up is necessary to prepare the body for exercise by increasing heart rate and blood flow to working muscles. The warm up should start slow and easy and consist of a general cardiovascular exercise such as walking, jogging, or biking. The goal is to break a sweat. After 10 min, the warm up should focus on muscles and movements more specific to the exercise activity planned. Creating a smooth transition from the warm up to specific activity is a great way to prevent injuries. For example, a soccer player could pass, dribble and shoot the ball; a weightlifter could lift light weights before moving onto greater resistance.

Flexibility is absolutely a part of every good warm-up. Once the muscles are warm, they become more elastic and are ready to be stretched. Whether you choose to perform static stretches (by holding each position for 10-30 seconds) or perform dynamic stretches (by moving the body through a functional range of motion) flexibility prepares the muscles, tendons and joints for work by allowing them to move freely through a full active range of motion. The more prepared the body is the less likely it is to get injured.

Flexibility is trainable – and must be trained because it is intrinsic to every skill or technique, no matter how simple/complex or power-oriented. It is also movement-specific, which is why an increase in single-joint range of motion is not our only objective. Through a combination of static and functional stretching and strengthening, your muscles and tendons can increase in length (as well as girth), elasticity and resiliency; and their ability to act in a ballistic “spring-like” manner during explosive movements. The net result: improved mechanical/metabolic efficiency, technical proficiency and injury resistance.

To achieve optimal gains in flexibility, you must:

- Stretch only once your muscles are warmed up. When muscles are cold, they are resistant to lengthening and you will not get as good of a stretch. If you can't get the muscles sufficiently warm and stretched, injury is more likely to occur during your workouts.
- Perform your exercises in a full range of motion. This improves your “active mobility”, the ability to safely and effectively use your range of motion during dynamic movements.
- Stretch before and after each workout. Doing so will result in better workouts, less soreness, and quicker recovery between workouts.

Stretching Methods:

Static Stretching

You should stretch each muscle that you will be working during your workout. When stretching, position yourself so that you feel each stretch in the belly of the muscle(s) and not in the joint(s). In order to have a beneficial effect, each stretch must begin gradually and be held long enough for this tightness to subside. Statically (without bouncing) stretch each muscle group to your comfort limit for 30 seconds, relax and repeat. You will be able to stretch a little further with each successive repetition.

Dynamic/Functional Stretching

Dynamic and/or functional stretching is taking a stretch (ideally sport or job specific) and utilizing speed of movement, momentum and active muscular effort to bring about a stretch. Dynamic involves moving parts of your body and gradually increasing reach, speed of movement, or both.

Dynamic stretching consists of controlled leg and arm swings that take you (gently!) to the limits of your range of motion. In dynamic stretches, there are no bounces or "jerky" movements. An example of dynamic stretching would be slow, controlled leg swings, arm swings, or torso twists. Dynamic stretching improves dynamic flexibility and is quite useful as part of your warm-up for an active or aerobic workout.

Dynamic stretching exercises should be performed in sets of 8-12 repetitions. Be sure to stop when and if you feel tired. Tired muscles have less elasticity which decreases the range of motion used in your movements. Continuing to exercise when you are tired serves only to reset the nervous control of your muscle length at the reduced range of motion used in the exercise (and will cause a loss of flexibility).

Once you attain a maximal range of motion for a joint in any direction you should stop doing that movement during that workout. Tired and overworked muscles won't attain a full range of motion and the muscle's kinesthetic memory will remember the repeated shorted range of motion, which you will then have to overcome before you can make further progress.

Quality - the same principle applies to all aspects of training: you get out of it what you put into it. Stretching is not a motion we go through just because some textbook says so; and it will not be limited to pre and post workout, warm up and cool down sessions.

Muscular Strength and Endurance

Muscular Fitness

To increase strength, muscles must contract repeatedly against a constant progression of relatively high resistance. This does not occur during aerobic exercise (for example jogging) alone. Strength training needs to be included in a total fitness program.

Fighting fires involves a great deal of muscular strength, power and endurance. Throwing ladders, climbing stairs in full gear, dragging or carrying victims, chopping through roofs, doors, pulling ceilings, etc. all require muscular fitness.

Strength- is the maximal force or torque a muscle or group of muscles can generate at a specified or determined velocity.

Power- is the product of force and velocity. It is the rate at which an individual performs work.

Endurance- is the time limit or number of times an individual can maintain muscle contractions.

Benefits of strength: In addition to increasing physical performance, muscular fitness is also important (if not more so) for preventing injuries. Increasing the strength of the muscles around the joint allows the muscles to act as shock absorbers. If muscles are weak the shock will be absorbed by bone, joint, ligaments and tendons often leading to pain and/or injury.

Weak muscles and muscle imbalance (muscles of the front of the body are stronger than back of the body) are responsible for a high percentage of injury caused by physically demanding jobs such as firefighting and rescue.

Strength training and having stronger muscles also help to increase or maintain bone. Contraction of a muscle over the bone stresses the bone to bend. Bones respond to this stress by growing denser and stronger.

Increasing muscles mass also increases metabolism as an individual gets older. Muscle utilizes more energy (burns more calories) at rest than fat.

Strength/Weight Training Programs

Strength training is a method of improving muscular strength by gradually increasing the ability to resist force through the use of free weights, machines, or the person's own body weight. Strength training sessions are designed to impose increasingly greater resistance, which in turn stimulates development of muscle strength to meet the added demand.

It can be hard to decipher what fitness regimen will really deliver results. But truthfully, it's not difficult at all to determine what workout will provide health benefits. An easy way to get started is utilizing the F.I.T.T. principle (Frequency, Intensity, Time, Type).

Frequency: As you might expect, this refers to how often you will exercise. After any form of exercise is performed your body completes a process of rebuilding and repairing. So, determining the frequency of exercise is important in order to find a balance that provides just enough stress for the body to adapt and also allows enough rest time for healing.

Intensity: Defined as the amount of effort or work that must be invested in a specific exercise workout. This too requires a good balance to ensure that the intensity is hard enough to overload the body but not so difficult that it results in overtraining, injury or burnout.

Time: Again, this is rather self-explanatory. Time is simply how long each individual session should last. This will vary based on the intensity and type.

Type: What type of exercise will you be doing? Will an exercise session be primarily cardiovascular, resistance training or a combination of both? And, what specific exercises will you perform.

Now you know the F.I.T.T. principle so planning a workout program and getting started should be a breeze. The ACSM (American College of Sport Medicine) has F.I.T.T. guidelines both for cardiovascular work and strength training. For **cardiovascular** benefits, they recommend exercising for a frequency of 3-5 times per week, at an intensity equal to 60-85 percent of your maximum heart rate for a time of 20-60 minutes. For **strength** straining they recommend working out a minimum frequency of two times per week at an intensity that is equal to 70-85 percent of your one rep maximum (maximum weight you can use for one rep) for 8-10 reps and 1-3 sets. Planning a new fitness routine by breaking it into the four F.I.T.T. principle pieces allows you to quickly create a workout plan that will truly provide you with results.

For beginner exercisers choosing the Type of exercise may be the best place to start mapping out your routine. After all, if you have the perfect frequency, intensity and time but hate the actual exercise then you'll never do it. So, start with something you like. This may be walking, biking, swimming or something else. Next determine the Frequency. Consider how much time each week you truly will devote to this workout. Be realistic. There's no purpose in setting expectations so high that you likely will fail. Remember, the ACSM guidelines are 3-5 times per week, so a good start would be three days.

If you are very limited in your schedule then determining your Time would be the appropriate next step. Otherwise, choose your Intensity level, which will help determine how long your workout session should be. For example, a higher intensity will typically provide more benefit (such as burning more calories in a shorter amount of time). So, choosing to jog may require only 30 minutes of commitment versus walking which may require 45-60 minutes.

Here's a quick example of both a cardiovascular and resistance workout program that utilizes the F.I.T.T. principle. Walk (Type) at 4 MPH (Intensity) for 45 minutes (Time) four times per week (Frequency). Perform exercises with dumbbells (Type) at 70% of your maximum 1 rep strength (Intensity) for 8-12 reps (Time) 3 times per week (Frequency).

Modified Theoretical Model of Strength Training

Phase	Hypertrophy	Basic Strength	Strength and Power	Maintenance	Active Rest
Sets	3 - 4	3 - 4	3 - 4	3	1 - 2
Reps	8 - 12	4 - 6	2 - 3	10 - 8 - 6	15 - 20
Intensity	low	high	high	moderate	Low
Volume	high	moderate	low	moderate	High

To minimize injury it is important to have muscle balance. That means equal strength for opposing muscles groups (equal strength front and back muscles as well as equal strength left to right). Including dumbbells and bi-lateral lifts in a strength program will equalize bi-lateral strength. Examples of opposing muscle groups are chest vs. back, quadriceps vs. hamstrings, low back vs abdominals, etc.

Proper technique is a priority...Good form must always be first...Don't sacrifice form for heavier weight.

Always move weight through a full range of motion of the muscles and joints. Muscle groups will get stronger throughout the entire range of motion only if the load is applied at every position.

To maximize a strength training program it is important to use an amount of weight per number of repetitions that takes the muscle being used to muscular exhaustion. If the program calls for sets of 10 repetitions, the weight used should be heavy enough so that the 8th, 9th, and 10th repetition is a struggle to do. But not too heavy that completion of the reps cannot be accomplished.

How many sets should be done? It depends upon what result is needed. It is always good to do a warm-up set if using weight heavier than the individual is used to. The research tends to show that for 'optimum' strength gains three sets of a fairly heavy load will produce the most gains in strength.

Speed of Movement

There are two phases of lifting a weight. The initial phase is when the weight is lifted against gravity and the muscle belly shortens in response to the tension. The second phase is when the weight is lowered going with gravity to return to the starting position causing the muscle belly to lengthen with tension.

The weight should be moved as quickly as possible during the initial phase. Because this movement is against gravity as the weight increases this eventually may be hard to do. The muscle will adapt by getting stronger. The second phase where gravity is assisting with lowering the weight should be done slower than the initial phase in order to stimulate muscle tension as the muscle belly lengthens. Otherwise momentum takes over for the muscle and it will not receive the full benefit of the load.

FIRE FIGHTER SPECIFIC EXERCISES

Squat – starting from a standing position, back is straight, shoulders back, head stays level, move hips back and lower body until thigh is parallel to floor. [If you are in correct position you should be able to wiggle your toes in the down position] Keep the back straight and push through the heels to stand back up to start position.

Plyometric Box Jumps – squat w/thighs parallel to the floor; using your arms, explosively jump up to stand (entire foot) on a sturdy box 24 inches or higher, finish by stepping down.

Lunge Walks – carry a minimum of 45 lbs; keep knees over ankle, press through the heel, back straight and chest up.

Lunge Walk w/MB (medicine ball) Twist – carry a MB w/arms straight out in front of body. As you step forward and go down to lunge position rotate torso (arms remain as straight as possible) and touch MB to floor opposite bent front leg.

Single Leg Step-Ups – carry a minimum of 45 lbs; step up onto box 18 inches or higher.

DumbBell Row w/Triceps' Extension – with DB in 1 hand put opposite knee and hand on bench. Keep back straight and pull DB from down position back to hip (similar to starting a lawn mower). From that up position, w/the upper arm parallel to floor extend DB straight back. Repeat sequence backwards to return to start position.

Overhead Press (from front) – shoulder strength and endurance is essential in firefighting.

Deadlifts – Please consult a Peer Fitness Trainer or strength coach specialist if you are not familiar with this lift.

Power/Hang Clean – Please consult a Peer Fitness Trainer or strength coach specialist if you are not familiar with this lift. You can also look @ http://athleticadvisor.com/Weight_Room/power_cleans.htm

Quad Strength – run/walk backwards up a hill. Run sprints backwards. These all simulate dummy drag.

Anaerobic Training – track sprints: 2 lap warm-up, 2 minute rest, (1 lap sprint, 2 minute rest, repeat x 4), 3 minute rest, 1 lap backward run, 1 lap cool down. Don't forget to STRETCH AFTERWARD!

Stair Running – If you have access to a weight vest, use it-if not try to take 2 steps at a time. Parking garages, high school/university stadiums are best. Some hotels don't mind if you use a back stairwell.

Cardiovascular Fitness

Physical Conditioning for Cardiovascular Fitness

Some firefighters train very sporadically. They might exercise in preparation for an upcoming fitness assessment, but stop training once the assessment is over. However, physical fitness must be maintained year round, since the need to perform demanding firefighting and rescue task may arise at any time.

To increase your level of cardiovascular fitness, you must undertake a regular program of sustained aerobic exercise. As previously mentioned, this program must meet certain criteria. These criteria are collectively referred to as the "FITT principle," standing for the important characteristics of the exercise

program:

The most effective exercises for producing an improvement in cardiovascular fitness are those that are performed continuously while using large muscle groups. These exercises cause an increased volume of blood to be pumped throughout the body.

Activities that meet these criteria include jogging, brisk walking, cycling, aerobics, cross country skiing, swimming, etc. As long as you keep moving at an adequate intensity for a sufficient period of time, the type of exercise you choose is really not that important.

Progression

A vital element of an effective cardiovascular exercise program is progression. After several weeks of regular sustained aerobic exercise, your cardiovascular system will adapt by improving itself somewhat, bringing you to a slightly higher level of cardiovascular fitness.

To improve further requires that you do one or more of three things: exercise more frequently, exercise a little longer during each workout, or exercise at a slightly higher intensity. By making incremental changes in your workout every few weeks, your level of cardiovascular fitness will steadily increase. Once you stop making these increments, your level of fitness cannot improve any more--no further stimulation means no further adaptation.

With respect to increments in intensity, you'll notice as the weeks go by that you have to exercise at a higher intensity just to maintain the same "feel" to your workout. In other words, the level of intensity you once maintained no longer feels very difficult; thus, you naturally exercise a little more intensely to get the same effect. This is a sure sign that you're getting in better shape!

Increments in exercise intensity- be it strength or conditioning- MUST occur gradually. The body cannot adjust instantly to sudden leaps in workload, which often results in INJURY. Improving your level of fitness should be approached as a long-term project that requires dedication, discipline, and patience.

Depending upon an individual's current fitness level, the greatest amount of improvement in cardiovascular fitness is usually experienced in the first six-to-eight weeks of the exercise program. After this initial time period, improvements continue to occur, but at a slower rate. Remember: most machines wear out with repeated use. The human body is the only machine that gets better with use. Regular exercise keeps the body youthful and functioning well.

Warm-up

On the next page there is a sample beginning aerobic exercise program. It is important before beginning the aerobic workout to prepare your body first by doing 5 – 10 minutes of light aerobic activity followed by doing some of the stretches earlier. Warming-up prior to aerobic exercise is important for two reasons. Firstly, warming-up and light stretching of the muscles reduces the risk of injury. Secondly, your aerobic system is not equipped to "instantly" meet the sudden increase in demand for fuel. It is important to gradually "gear up" to a higher capacity and this process will take a few minutes. Warming-up allows the aerobic system to keep up and maintain a constant flow of oxygen and fuel. Otherwise, the anaerobic system may take over to make up the difference and put you into an "oxygen deficit" that may prematurely end your aerobic workout due to exhaustion.

Sample Beginning Aerobic Exercise Programs

Week 1 & 2	Week 3 & 4	Week 5 & 6	Week 7 & 8
15 minutes	20 minutes	25 minutes	30 minutes
Exercise at a Moderate Intensity			
Week 9 & 10	Week 11 & 12	Week 13 & 14	Week 15 & 16
30 minutes	30 minutes	35 minutes	35 minutes
Gradually increase the intensity of each workout			
Week 17 & 18	Week 19 & 20	Week 21 & 22	Week 23 & 24
40 minutes	40 minutes	45 minutes	45 minutes

After six months of sticking to this program, you will see a significant improvement in your aerobic fitness level. Once you have achieved a level of cardiovascular fitness you should begin to prepare yourself for the challenges that face you in the academy. You can make your timed runs into distance and challenge yourself on time. Rule of thumb is not to increase your mileage total by any more than 10%. Another avenue to increase cardiovascular fitness is with Interval training. Unless you have been performing cardiovascular exercises for several weeks' interval training or speed work is not recommended. If you have been participating in a cardiovascular training for several weeks (at least 10 weeks) you may want to incorporate Interval training into your routine. Limit your interval training days to one session per week.

Cooling down

During aerobic exercise, the repeated contractions of large muscle groups act as a secondary pump to circulate blood throughout your body. If you stop exercising suddenly, the secondary pumping action of the muscles ceases abruptly, leading to "pooling" of blood in the extremities of the lower body. This means less blood returning to the heart and brain, which can result in passing out or fainting. Therefore, cooling down is just as important as warming-up. So keep moving and gradually slow down your movements over several minutes.

Monitoring Exercise Intensity

What level of intensity is right for you? The ability to monitor and adjust exercise intensity is essential to the safety, effectiveness, and enjoyment of aerobic exercise. "High" levels of intensity may contribute to injury, fatigue, and exercise burnout. "Low" levels will produce little or no cardiovascular effect. Monitoring intensity also helps exercisers document their increasing levels of fitness, which serves as an insensitive to keep working out.

For safe and effective cardiovascular workouts, many experts recommend exercising at the intensity equal to 60 – 90% of your maximum heart rate or 50 – 85% of heart rate reserve (Karvonen formula). Both of these methods for determining your target heart rate will be described later. Although heart rate can provide a helpful guide, people are different, so sometimes general rules do not apply.

Several other limitations exist:

- Fitness gains depend to some extent on your current level of fitness. If you are unfit, you will begin to achieve cardiovascular benefits at intensity levels below 60 percent maximum heart rate. If you are in great shape, you may need to work at higher intensity levels to show improvement.
- Some people--including hypertensive, cardiac patients, diabetics, and pregnant women--do not have a "normal" heart rate response to exercise.
- Antihistamines, cold medications, antidepressants, and tranquilizers have an effect on the heart rate that might make monitoring inaccurate.
- Caffeine and nicotine affect heart rates in ways that can influence this type of monitoring technique.

For these reasons, it is recommended that you use a simple "talk test" or "exertion awareness check" to ensure that you maintain a moderate level of intensity during workout.

Talk Test

You should be able to breathe comfortably, deeply, and rhythmically during aerobic exercise--even be able to carry on a conversation. But, if you are gasping or are short of breath, or cannot talk or answer a question, you probably should reduce your exercise intensity.

Exertion Awareness Check:

During exercise, use any simple method to evaluate on a "gut level" how hard you are working. A numerical scale such as the "Rate of Perceived Exertion" (Borg scale) might be used.

Rate of Perceived Exertion Borg Scale		
6		
7	Very, very light	Little or no effort. Relaxed, sitting in a chair
8		
9	Very light	
10		
11	Fairly light	
12		Target range during exercise or activity
13	Somewhat hard	
14		
15	Hard	
16		
17	Very hard	The hardest work you have ever done.
18		
19	Very, very hard	Don't work this hard!
20	Maximum exertion	

Calculation of a Target Heart Rate

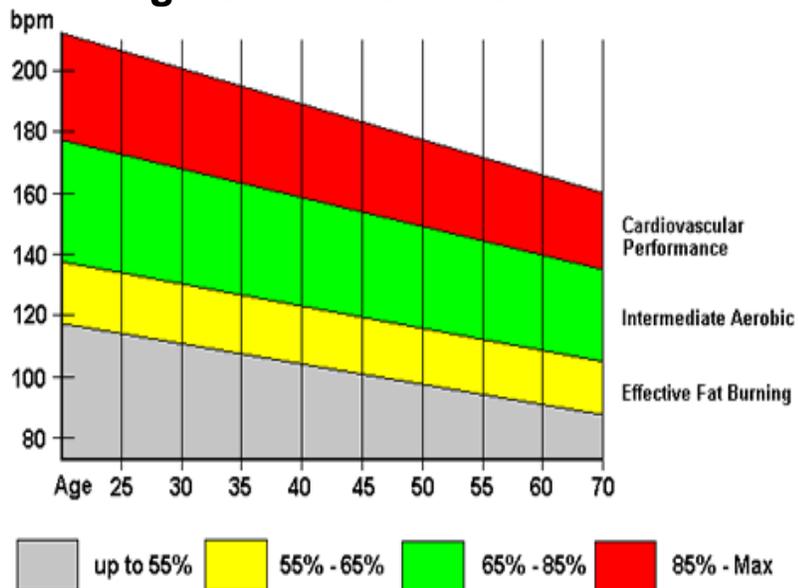
[For a 30 year old man with a resting heart rate of 60 beats per minute (bpm)]

Process	Example
Step 1: Calculate your predicted maximum heart rate	$220 - 30 = 190$
Step 2: Take your resting heart rate	60
Step 3: Subtract your resting heart rate from your predicted maximum	$190 - 60 = 130$
Step 4: Multiply the figure calculated in Step 3 by percent of intensity desired (50% or .5 to 85% or .85)	$130 \times .5 = 65$
Step 5: Add the figure calculated in Step 4 to your resting heart rate	$65 + 60 = 125$
Step 6: This is your estimated target heart rate	<i>125 (at 50%)</i>
Step 7: Repeat steps 4 & 5 using .85 to get a target heart rate for 85%.	$130 \times .85 = 111$ $111 + 60 = 171$
	<i>171 (at 85%)</i>

Exercise heart rate range for 30 year old man with resting heart rate of 60 bpm is: **125 bpm (at 50%) to 171 bpm (at 85%)**

You can also use this chart to determine your training heart rate zone.

Training Heart Rate Zone



General Body Fat Percentage Categories

Classification	Women (% fat)	Men (% fat)
Essential Fat	10 – 13%	2 – 4%
Athletes	14 – 20%	6 – 13%
Fitness	21 – 24%	14 – 17%
Acceptable	25 – 31%	18 – 25%
Obese	32%+	25%+

Core strength Training

The core region consists of far more than just the abdominal muscles. In fact core strength training aims to target all the muscles groups that stabilize the spine and pelvis. It's these muscle groups that are critical for the transfer of energy from large to small body parts during many activities.

The muscles of the trunk and torso act to stabilize the spine, pelvis and shoulder girdle. From this solid, balanced base the limbs can be moved powerfully and under control. In fact before rapid movements of the extremities can take place, the central nervous system stabilizes the spine in anticipation (1). The rate at which the core muscles stabilize the spine may have a direct effect on the power of limb movement (2).

Core strength training differs from many traditional weight training routines by working both the lower back and abdominals in unison. The same is true for the upper and lower body. All athletic movements incorporate the core in some way. Very few muscle groups are isolated. Instead the whole body works as a unit and core strength training endeavors to replicate this.

What are the benefits of core strength training to us?

- Greater efficiency of movement
- Improved body control and balance
- Increased power output from both the core musculature and peripheral muscles such as the shoulders, arms and legs
- Reduced risk of injury (the core muscles act as shock absorbers for jumps and rebounds etc.)
- Improved balance and stability
- Improved athletic performance!

Objective – to train the core muscles in a functional manner to prevent injuries and improve performance in firefighting tasks as well as improving the foundation for all movements to occur from.

Method – perform a series of exercises daily utilizing the major muscle groups of the core which includes your abdominals and your back mainly: rectus abdominis, transverse abdominis, external oblique, internal oblique, multifidus, erector spinae (minor core muscles gluteus maximus, trapezius and latissimus dorsi).

Exercises – core work can be done daily, focusing on muscle endurance and exhaustion.

18 week program - Core strength training

Week 1:

Perform basic test to determine baseline – 1 minute sit up test and plank for time

Learn proper technique for main exercises. Focus on form over speed to prevent injury and ensure proper execution.

Learn and Use proper breathing technique of blowing all the air out on the exhale and contraction phase, inhale on the rest and inhale phase (focuses attention on the transverse abdominal)

Week 2 – 6:

Going for time: perform exercises, varying the order, for 5 – 10 minutes each day

Exercises: Basic sit ups, criss cross, hip lifts w/legs extended straight up, double leg lower lift, double leg hold varying height, planks, planks with toe taps to the side, planks with arm extension, roll ups, swimming

Week 7 – 12:

Perform progress test to determine level of fitness – 1 minute sit up test and plank for time

Going for time: perform exercises, varying the order, for 10 minutes each day

Exercises: Basic sit ups, criss cross, hip lifts w/legs extended straight up, double leg lower lift, double leg hold varying height, planks, planks with toe taps to the side, planks with arm extension, roll ups, swimming

Adding – spider mans, mountain climbers, plank knees in and out, medicine ball side to side, medicine ball side to side with legs extended, chops

Week 13 - 18:

Perform progress test to determine level of fitness – 1 minute sit up test and plank for time

Going for time: perform exercises, varying the order, for 10 minutes each day, increasing intensity and duration of harder exercises

Exercises: Basic sit ups, criss cross, hip lifts w/legs extended straight up, double leg lower lift, double leg hold varying height, planks, planks with toe taps to the side, planks with arm extension, roll ups, swimming

Add more advanced exercises spider mans, mountain climbers, plank knees in and out, medicine ball side to side, medicine ball side to side with legs extended, chops, walking push-ups, alternating sliding arms and legs in plank with a push up, teasers.

Firefighter Specificity Training (Functional Fitness)

“We play how we train”. We should obviously incorporate tools to train at a functional firefighter fitness level? Most work done at fire incidents is short duration in length with possible repeated bouts at a high level of output. Workouts should be done at an intensity equal to being on the fire ground. You should not begin at this level of training if you have not completed a basic workout program or unable to perform exercises in proper form. Here are some of the most basic movements performed by firefighters and mimicking these exercises should increase all levels of your performance:

1. Crawling
 - Great fore core stability and strengthening shoulder joint.
 - Can be used in a variety of directions and positions (forward, lateral, w/sled)
 - Keep hands under shoulders to avoid shoulder impingement
 - Tighten core muscles during exercise

2. Getups/Burpee
 - Total body agility

3. Power sled/dragging
 - Useful in developing strength, power, and simulating fire ground activities
 - Very little eccentric component so there is little residual soreness
 - Use bilateral or unilateral (one-sided) movements
 - Minimum distance for results is 100 yards per exercise

4. Cable and band pulls
 - Trains the pulling system: grip forearm, biceps, back muscles
 - Pull from a variety of angles to simulate fire ground activities
 - Vary grip positions and implement for overall effectiveness
 - Cables develop strength while bands are better for assistance and conditioning

5. Core series
 - Helps train the core musculature in a functional manner to prevent injuries and improve performance in tasks and sports
 - Improves foundation for all movements to occur from
 - Use multiple positions: plank, side plank, and bridge

6. Chop
 - Trains abdominal muscles in true functional manner including deceleration during back extension to prevent low back injuries
 - Can use different implements (DB,KB, hose, weight plates, sandbags) to perform exercises
 - Can safely chop from different angles and patters to train entire low back, hip, core, and shoulder areas.

7. Pushups
 - Great for developing core stability, wrist flexibility, upper body muscle endurance and strength
 - Use variety of hand positions
 - Feet can be placed on ground, on box/step up, or stability ball for added stability challenge.

8. Deadlift
 - Aids in developing lower body, core, grip and back strength
 - Can use barbell, hex bar, DB, KB, sandbags, hose, plates

9. Lunge
 - Aids in developing lower body strength, stability, balance, and power
 - Can lunge in various directions and multiple planes of motion (sagittal, frontal, and transverse

10. Step ups
 - Useful in developing lower body strength, balance, stability, and power
 - Helps improve job specific endurance when wearing PPE, or weight vest
 - Can step at various heights and in different directions for total leg and hip development

11. Overhead press
 - Useful in developing shoulder and upper body strength, balance and stability
 - Improves job specific tasks on fire ground.

12. Equipment carry
 - Useful in developing upper body strength, arm strength, balance and stability
 - Improves job specific tasks on fire ground.

Workouts in this area are 20 minutes or less of compound functional movements done at a high intensity with possible repeated bouts. These workouts can be done with little or no equipment, depending on what you or your gym can provide. Obviously with more equipment there is more flexibility in the workouts. Training at this level teaches you to push past your comfort level and to dig deep inside to finish the workout. As you increase your strength, stamina, endurance and commitment you can begin to incorporate more weight with your exercises. You can also begin to mimic certain firefighter tasks into your workouts. Here are a few examples Body Weight workouts to review.

Basic Body Weight Workouts

7 minutes of Burpees – Proper form, do not cheat, be consistent and strong during your movements. Count total number of burpees. Try to implement this in your total fitness program set your goals and improve on your numbers.

20 minute workout of AMRAP (AS MANY ROUNDS AS POSSIBLE) – Count the number of rounds and improve on your number. Completion of all exercises equals one round.

1. 5 pull ups
2. 10 push ups
3. 15 squats

20 minute AMRAP workout example (advanced): Adding an equipment carry, an over-head press, or a core series will change the intensity of your routine. Structured as follows: 5 pull ups, carry two 40-pound dumbbells 50 feet, 10 push-ups, overhead press 30 pound dumbbells, 15 squats, 15 V-ups (core). Again, this will be more advanced. Do not attempt if you are beginning your program for the first time.

50- 40- 30- 20- 10- reps of Mountain climbers and high knee jumps. Remember to be explosive and strong in your movements and range of motion. Do not sacrifice proper form for quickness. As you get stronger and more consistent with your workouts these will become easier.

Max reps in 2 minutes of Sit ups, rest 1 minute, back extensions, rest 1 minute. Remember, your range of motion.

Take the time to get your form down, run through the basic workouts and as you increase in your fitness level begin to challenge yourself. Become creative within your fitness program and routine. You can see proper form on exercises and videos at www.crossfit.com/cf-info/exercise.html. Criteria for exercises should include: safe and effective, ability to scale up and down, high transfer of effect, ability to train multiple planes of motions, and movement-based (general or specific). Remember to include all areas into your training. To become a well-rounded and fit individual, we have to work on our weaknesses no matter how difficult they are for us.

As a firefighter, it is important to understand that a high level of wellness and fitness will only be achieved by training all of the components within both the skills and health-related groups. There are many ways to train; add as many tools as possible to help you achieve goals.

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