

Introduction to FireFit

Anima Sana In Corpore Sano

“A sound mind rests in a sound body” - ASICS Quote

What is Fitness?:

Fitness is defined as, “the body’s ability to perform physical activity without distress or injury.” Although most people rarely engage in arduous physical activity as part of their daily jobs, wildland firefighters know that physical fitness plays an important role in our personal wellness and job performance. It’s a proven fact that by incorporating a balanced fitness program into our daily work life, we enhance our health and safety, while mitigating our risk of injury and illness and increasing our ability to do work.

Having said that, fitness continues to be one of the most important components of a well balanced wellness program. Like its counterparts, including nutrition and stress management, fitness has a life of its own, especially when it comes to the job performance of wildland firefighters. According to Dr. Brian Sharkey in his book, “Fitness and Work Capacity, 2nd Edition”, *for prolonged arduous work, fitness is the most important determinant of work capacity (the ability to accomplish production goals without undue fatigue, and without becoming a hazard to oneself or coworkers)..*

Getting Started – Before You Begin:

In preparation for exercise, it’s important to incorporate a ‘mental checklist’ of correct procedures to make sure that you prepare yourself physically and mentally for the associated tasks. Most interagency wildland firefighters will have completed a medical screening questionnaire and had some level of medical exam prior to engaging in wildland firefighting activities. **It is important to make sure you complete some form of health screening and get clearance to participate from a medical practitioner prior to beginning training.**

The following checklist will help to guide you in preparation for all levels of fitness activities:

- Consult with your physician
- Establish goals
- Make the commitment to yourself and your crew
- Get educated – the more you know, the healthier and safer you will be
- Have the appropriate footwear and apparel for exercise
- Adhere to your agency procedures for fitness and medical clearance

It is important to use appropriate apparel and foot wear for your activity. In other words, you should be discouraged from wearing basketball sneakers when running on the track or trail. The reason is due to the fact that all shoes are made differently and specific to the activity to be performed. It’s equally important to wear clothing that is appropriate for the conditions. Additional items may include sunscreen, bug spray, eye protection, or a hat as appropriate for the conditions.

Now – let's get started!

Commonly Asked Questions From the Field:

1. *Why is fitness so important for wildland firefighters?*
 - Allows one to perform the arduous tasks required of a wildland firefighter.
 - Improves overall health and safety both on and off the fireline.
 - Improves personal attitudes and crew cohesion.
 - Helps decrease absenteeism and increase productivity in the workplace.
 - Improves your chances of surviving a catastrophic incident.
2. *What do wildland firefighters do that requires them to sustain good fitness levels?*
 - Work long hours, utilizing muscle strength, muscle endurance, and cardiovascular capacity with little recovery time.
 - Endure stress, fatigue, dehydration, and poor nutrition for long periods at a time.
 - Work at optimal performance levels in poor environmental conditions.
 - Understand the importance of working safely.
3. *Why can't I run in my fire boots?*
 - Fire boots are not designed for running. All foot wear are designed for specific activities based on the foot movement (lateral, forward, etc.). By wearing shoes that are not designed for that specific foot motion, you can injure yourself, even seriously.
4. *Isn't it best to run everyday for PT to get in shape for fire season?*
 - While running is a component of P.T., it should not be the only element. Running everyday, especially if you are running on hard surfaces, may lead to overuse injuries, but can also conflict with overall conditioning and lead to boredom and decreased morale. Running is considered an 'impact' exercise – every step you take while running, you are placing approximately 3.7 times your body weight on the joints of your body! Increase your mileage by 10% weekly to avoid overuse injuries and remember to cross train.
5. *Why are there so many injuries early in the fire season – especially knees and backs?*
 - This is directly attributed to poor training programs and overuse – doing 'too much' too soon'.
 - Contributing factors include: lack of adequate warm up and stretching, improper shoe wear, and imbalance of muscle strength (a result of improper muscle strength/endurance workouts).
6. *Why do wildland firefighters need a special fitness program designed for them?*
 - Wildland firefighters are a special breed of professionals that deal with complex, high stress situations that require not only muscular strength but also muscular endurance, cardiovascular conditioning, and flexibility for prolonged periods of time while under duress.

Essential Components of a Balanced Fitness Program:

In order to implement a balanced fitness program, it's important to include all of the essential components of fitness. When developing a fitness program, it's good practice to incorporate the F.I.T. Prescription = Frequency, Intensity, and Time. Utilizing the F.I.T. Prescription allows you to exercise safely while achieving steady improvements. In his book, *"Fitness and Work Capacity, 2nd Edition"*, Dr. Brian Sharkey has developed an Aerobics Fitness Index (page 9) that provides a good calculation for determining your level of aerobic fitness which is based on your level of physical activity.

Cardiovascular Fitness:

Cardiovascular Fitness is the backbone of a general fitness program. The primary purpose of aerobic conditioning is to make the heart stronger and work more efficiently, while improving one's health and enhancing the quality of life. Cardiovascular fitness includes both aerobic (moderate intensity) and anaerobic (vigorous intensity) activities. The word 'aerobics' means 'with oxygen' and refers to the continuous moderate activity that puts an increased demand for oxygen on the heart, lungs, and body systems. The purpose of aerobic conditioning is to train the heart and other muscles to use oxygen more efficiently allowing activity to continue longer.

A variety of exercises (typically using larger muscle groups) can be done to create an increased demand for oxygen over a period of time while maintaining the heart rate at 55%-85% of the estimated maximum heart rate. (THR = target heart rate) Good examples of aerobic activity include running a marathon or digging fireline where there is energy exerted over a longer duration at less intensity than anaerobic activities.

Anaerobic activity (vigorous intensity) occurs *"when a muscle exceeds its capacity to produce energy aerobically. The (production of) lactic acid interferes with muscles' contractile force and energy production, leading to reduced work output and fatigue."* Good examples of anaerobic activities include running sprints where you have short intense bursts of energy and speed. However, continued reliance on anaerobic energy rapidly leads to fatigue.

In order for wildland firefighters to achieve optimal fitness, it's important to include both moderate and vigorous activities in their fitness program. This can also mitigate the occurrence of overuse injuries by providing less repetition and encouraging cross training and muscle balance.

Muscular Strength and Muscular Endurance:

Muscular strength and muscular endurance are essential components of wildland firefighting. According to Dr. Brian Sharkey in his book, *"Fitness and Work Capacity, 2nd Edition"*, *"Some jobs require more muscular fitness than others. Our studies have shown that muscular fitness is highly related to performance of the tasks involved in wildland firefighting. Firefighters with more strength and muscular endurance are better able to carry the loads and use the tools than those with lower levels."* Muscle strength is a primary factor in work capacity when heavy lifting is involved, when using heavy tools, or when heavy loads must be moved. When repetitious lifting is utilized such as using hand tools, muscular endurance plays an important role in work capacity.

Some of the known benefits of establishing a good fitness program that incorporates muscular strength and endurance activities are as follows:

- Promotes positive changes in bone density
- Promotes positive changes in body composition (increase in lean muscle tissue, decrease in body fat)
- Plays an important role in injury prevention
- Improves job and sports performance
- Increases lean body mass
- Increases metabolism which can lead to a healthy body weight through the increased caloric use
- Increases the body's balance and coordination
- Maintains the muscle mass needed to burn fat.

Muscle fitness can be developed and maintained using calisthenics, free weights, weight machines, or a combination of all three. When developing a muscular strength and muscular endurance program, it is important to factor in variety in order to maintain interest and utilize the muscles in different ways. Recuperation time between muscle workouts is also important in order to minimize injuries and overuse.

Muscle strength is achieved when you are able to lift loads in excess of 70% of your maximal strength as many times as possible (more weight and fewer reps). In order to develop a muscle strength routine, start by selecting a weight that you can lift 6-12 repetitions. Once you are able to lift that weight for 12 reps for 3 sets, increase the weight. Of course, muscle strength training is most important during the pre-season phase and should be transitioned to muscle endurance for fire season.

There are alternate options to include to add variety and avoid boredom to your program. These include splitting upper body and lower body weight workouts, increasing sets, changing exercises, and using circuit training.

Muscle endurance is developed when you are able to lift up to 70% of your one rep maximum, repeatedly (less weight and higher reps). In order to develop a muscle endurance routine, start by selecting a weight (up to 70% of max rep) that you can lift 12-20 repetitions. Once you are able to lift that weight 20 reps for 3 sets, increase the weight. You can also use your body weight with 12 reps or more per set to the point of muscular failure. As you approach fire season, training should focus on muscle endurance to ensure specificity and work hardening.

Guidelines for Weight Training

- Always warm-up and stretch prior to weight training
- Use the 'buddy system' and have a partner when using weights
- Breathe out on exertion when lifting – don't hold your breath
- Utilize opposing muscle groups as to provide muscle balance
- Allow appropriate recovery time – at least 48 hours rest between weight workouts
- Keep a log of your workouts

Flexibility:

Flexibility is one of the most important components of a balanced fitness program as it provides the 'glue' that holds that program together. Stretching is to the body what reading is to the mind!

When a good stretching routine is incorporated into a balanced fitness program, it has many benefits which include:

- Enhances/optimizes performance
- Increases mental/physical relaxation
- Promotes body awareness
- Reduces the risk of injury
- Reduces the risk of muscle soreness and tension

A balanced flexibility program includes both a warm up before exercise and a complete cool down after exercise to allow the heart rate to slow down and muscles to relax. Stretching is important to maintain the range of motion and may reduce the risk of repetitive trauma injuries. Continued flexibility should be a lifelong pursuit if you wish to maintain a continued range of motion, and avoid injuries and other related problems. The use of Yoga and Pilates encourage flexibility and range of motion.

Too little and too much stretching are also thought to increase the risk for injury. Stretching is encouraged most days of the week and should be done only once the muscles are warmed up. Stretching should never be painful; however you can stretch to the point of mild discomfort. Hold each stretch for at least 20 while practicing good breathing.

Mental Fitness/Preparation – just as the body is strengthened for physical challenges, preparing the mind for the obstacles, frustrations, and challenges of the fire environment enhances overall performance. Your workout routine is a great place to begin to challenge your mental toughness. As Dr. Jim Loehr, sports psychologist explains, *“There are four key elements to “toughness”: strength, flexibility, responsiveness, and resilience. Each component has a mental, physical, and emotional aspect to it – it’s not just mental toughness.”* *Mental Strength - you have strong concentration skills. You are physically strong. You can resist buckling under great emotional pressure. Mental Flexibility – the more rigid you are (inflexible), the easier it is to be thrown off by your opponent. The more physically flexible you are, the better you are physiologically to compete. Toughness does not mean being hard or mean. Basketball great Michael Jordan is an example of a responsive athlete. Michael is alive and spirited. Responsiveness is a sign of healthy competitiveness. Resilience refers to speed of recovery – mentally, emotionally, and physically. Great competitors have a great capacity to handle failure with grace. They are able to bounce back from disappointments or mistakes and keep competing.”*

Common Injuries: (during wildland firefighting, most injuries are a direct result of overuse)

- Shin Splints
- Tennis Elbow
- Carpel Tunnel Syndrome
- Lumbar Pain (lower back)
- Knee problems
- Foot problems
- Ankle Sprains/Strains
- Blisters
- Bone Bruises

Overuse Injury Common Causes:

- Not stretching – lack of warm up, cool down, and adequate stretching routine
- Exercising too much, too soon
- Improper exercise techniques
- Repetition of exercises (without adequate muscle recovery)
- Anatomical factors (ie: tilted pelvis and flat feet)
- Being overweight
- Improper shoe wear (should be specific for the activity)
- Training surfaces (i.e. running on concrete)
- Imbalance in muscle strength (between opposing muscles – i.e. abs/lower back)
- Machismo (in both men and women)

Emergency Medical Concerns: - * get immediate medical attention

- Difficulty breathing *
- Dizziness/lightheadedness
- Shortness of breath *
- Chest pain and/or discomfort *
- Severe headache
- Unusual fatigue
- Loss of consciousness *
- Allergic reaction *
- Rapid heart rate
- Nausea/vomiting
- Loss of muscle control *
- Slurred speech *
- Impaired vision *
- Disorientation
- Unexplained Euphoria
- Profuse bleeding *

First Aid Treatment for Common Injuries:

Basic first aid treatment is essential for minor injuries sustained from exercise. The following R.I.C.E. method should be used:

- R – rest the affected injured area immediately.
- I – apply ice immediately to the injured area to minimize pain and swelling.
- C – put a compression bandage on the injured area as to minimize swelling.
- E – elevate the injured area to minimize blood flow to the injured area thus minimizing swelling and pain.

Glossary:

- *Aerobics* – (with oxygen) Continuous activity that puts an increased demand for oxygen on the heart, lungs, and body systems.
- *Anaerobics* – When a muscle exceeds its capacity to produce energy aerobically.

- *Borg Scale of Perceived Exertion* – ('talk test') A measurement used to determine how hard one is working during exercise activities. It is calculated on a scale 1-5 with 1 being the easiest and 5 being the hardest level. At 1, the individual is able to talk easily without any hesitation or labored breathing. At level 5, the individual is unable to speak clearly while doing the activity with very labored breathing.
- *Calisthenics* – A type of exercise performed using body weight such as push ups and abdominal crunches.
- *Cardiovascular* – Referring to the functioning of the heart and lung system together.
- *Fitness* – The body's ability to perform physical activity without distress or injury.
- *Fitness Assessments* – Assessments used to determine an individual's baseline fitness capabilities based on absolute power, dynamic strength, cardiovascular fitness, and flexibility.
- *F.I.T. Principle* – Frequency, Intensity, and Time (duration) of activities
- *Flexibility* – The range of motion through which the limbs are able to move.
- *Mental Fitness* – Preparation of the mind for the obstacles, frustrations, and challenges of the fire environment.
- *Muscle Endurance* – Measured by the muscle's ability to lift a load repetitively.
- *Muscle Strength* – The maximal weight that can be lifted by a specific muscle group.
- *Overtraining* – When an exercise activity (s) is overdone resulting in physical and mental exhaustion.
- *Overuse Injury* – Injury (s) that is a direct result of overdoing specific exercises.
- *Perceived Exertion* – A method of gauging exercise intensity.
- *Pylometrics* – Activities that include jumping, hopping, and skipping to increase agility and speed.
- *R.I.C.E.* – First aid treatment for common injuries = Rest, Ice, Compression, Elevate.
- *Target Heart Rate (THR)* – A calculation used to determine an individual's preferred heart rate range to be accomplished during exercise for the most benefits.
- *Visualization* – A process used by elite athletes to visualize themselves doing the perfect athletic endeavor. It is performed by closing the eyes, relaxing, and visually seeing oneself perform an activity to perfection using all the senses.
- *Work Capacity* – Ability to accomplish production goals without undue fatigue, and without becoming a hazard to oneself or coworkers.
- *Work Capacity Test* – The fitness test utilized by wildland fire agencies to determine the fitness level of personnel supporting wildland fires.
- *Work Hardening* – A gradual progression of work-specific activities designed to bring you to the job ready to deliver a good day's work.

Are You Fire Fit?