



California Department of Forestry and Fire Protection

CAL FIRE

2009 FOCUS ON SAFETY



BACK to BASICS

The firefighting profession involves dangerous, complex tasks that require a diverse set of knowledge, skills and abilities. Throughout one's career there is a steady push to learn more so that we can safely and effectively respond to the next call for help. As we accept more responsibilities for public safety it is important to regularly return to that which shaped and formed the foundation of our knowledge.

The annual CAL FIRE Focus on Safety contains a "Back to Basics" module, to help ensure these building blocks do not become buried in our minds by the ever growing performance demands being placed on firefighters. Although CAL FIRE requires annual review of such basics as the "Orders" or "Situations", time and time again, the failures to adhere to the fundamentals of firefighter safety result in a direct contribution to serious injuries or the needless loss of a firefighter!

Wildland firefighting is a seductively routine effort that takes place in one of the most dynamically dangerous work environments one can encounter. The Ten Standard Fire Orders, the Eighteen Fire Situations that Shout "WATCH OUT", the Common Denominators of Wildland Fire Fatalities, and the principles of LCES are fundamental and must be reviewed before every fire season. Following these firefighter safety guidelines can be the difference between a successful mission and a catastrophic one.

Again this year, the Back to Basics Module contains a Personal Protective Equipment inspection component. While all pieces of PPE should be routinely inspected to ensure the highest level of protection possible, it is equally important to take a concentrated and thorough look at the condition of the entire PPE package at regular intervals. An inspection checklist has been provided to assist with a comprehensive evaluation.

A new component in "Back to Basics" this year is Physical Fitness. While most firefighters have personal workout routines, individual conditioning plans often times place too much emphasis on muscle strength vs. muscle endurance. This package contains information about the Fire Fit conditioning program sponsored by NIFC. This is a sample program that is customized to wildland firefighting. While any firefighter will benefit from this conditioning plan, it is particularly useful for seasonal firefighters who must ramp up their conditioning level for the fire season following a winter period of rehabilitation and potentially less physical activity.



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Ten Standard Fire Orders

FIRE BEHAVIOR

1. Keep informed on fire weather conditions and forecasts.
2. Know what your fire is doing at all times.
3. Base all actions on current and expected behavior of the fire.

FIRELINE SAFETY

4. Identify escape routes and safety zones, and make them known.
5. Post lookouts when there is possible danger.
6. Be alert. Keep calm. Think clearly. Act decisively.

ORGANIZATIONAL CONTROL

7. Maintain prompt communication with your forces, your supervisor and adjoining forces.
8. Give clear instructions and insure they are understood.
9. Maintain control of your forces at all times.

IF YOU CONSIDER 1-9, THEN

10. Fight fire aggressively, having provided for safety first.



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Eighteen Fire Situations That Shout **“WATCH OUT!”**

- 1. The fire has NOT been SCOUTED and SIZED UP**
 - a. Use aerial recon
 - b. Use ground observations
 - c. Look for:
 - i. Fire size
 - ii. Fuel types and arrangement
 - iii. Topography
 - iv. Hazards
 - v. Safety Zones and Escape Routes
- 2. YOU are in country you have NOT SEEN IN DAYLIGHT!**
 - a. Be alert for changes in fire behavior
 - b. Watch for nature's danger signals
 - c. Keep informed on weather forecasts
 - d. Maintain communications with fireline supervisors
- 3. SAFETY ZONES and ESCAPE ROUTES have not been IDENTIFIED**
 - a. Safety Zones
 - i. Void of vegetation
 - ii. Large enough to accommodate ALL personnel (4 times the flame height)
 - iii. Easy to deploy shelters (not in chimneys, saddles, or narrow canyons)
 - b. Escape Routes
 - i. Shortest distance to Safety Zone
 - ii. Relatively easy to travel
 - c. Make known to everyone
 - i. Visual markers
 - ii. Verbally
- 4. YOU are in an area where you are unfamiliar with local factors influencing FIRE BEHAVIOR!**
 - a. Be alert for changes in fire behavior
 - b. Watch for nature's danger signals
 - c. Keep informed on weather forecasts
 - d. Maintain communications with fireline supervisors

5. YOU are UNINFORMED on strategy, tactics, and hazards

- a. Strategy: the overall plan to achieve the fire suppression objectives
- b. Tactics: specific actions done to suppress the fire
- c. Hazards:
 - i. Heavy fuel concentrations
 - ii. Chimneys
 - iii. Snags
 - iv. Falling operations
 - v. Firing operations

6. YOU have been given an assignment or instructions UNCLEAR TO YOU!

- a. When given instructions, repeat them back, particularly if they are unclear
- b. Know what you are supposed to do, before going on the line
- c. Communicate with your supervisor
- d. When possible, write down your instructions

7. YOU have NO communication link with crew members or supervisors

- a. Stay alert to changing conditions
- b. Stay alert to problems developing
- c. Stay alert to blow up conditions
- d. Maintain control and prevent panic

8. YOU are constructing fireline WITHOUT A SAFE ANCHOR POINT!

- a. Choose a point or location not currently, or likely in the future, to be threatened by fire spread
- b. A place to begin your fireline where you're likely to hold your line

9. YOU are building a fireline downhill TOWARD A FIRE!

- a. Have Escape Routes established
- b. EXTREMELY dangerous situation
- c. Stay with your crew
- d. Post lookouts as necessary, be alert to conditions
- e. Advanced fuels on upslope are pre-heated, will rapidly burn
- f. Spot fires on upslope can be expected
- g. Fire may generate momentum upslope and jump over hoselays or constructed hand lines

10. YOU are attempting a frontal assault on a fire

- a. Watch for and suppress spot fires across road or line
- b. Have established Escape Routes
- c. Do not wander into the green at an oncoming fire, wait until it gets to where you are supposed to attack it
- d. Follow orders
- e. Be alert

11. YOU are in heavy cover with unburned fuel BETWEEN YOU and the FIRE!

- a. EXTREMELY dangerous situation
- b. Always requires that lookouts be posted at strategic points for constant observation
- c. Line should be burned out behind you as it is being constructed
- d. Be in constant communication with your fire line supervisor
- e. Be prepared to use Escape Routes immediately

12. YOU can not see the main fire and you are not in communication WITH ANYONE WHO CAN!

- a. A dangerous situation at any time
- b. Area should be thoroughly scouted
- c. Post a lookout or lookouts as necessary
- d. Be weather alert
- e. Obey your supervisor

13. YOU are fighting fire on a hillside where rolling fire can ignite fuel BELOW YOU!

- a. Properly construct trenches on slopes to hold rolling material
- b. Have established Escape Routes, know where they are
- c. Cut your way into spot fires, don't just walk through the green
- d. Post lookouts as necessary

14. YOU feel the weather getting HOTTER and DRIER!

- a. There will be a decrease in fuel moisture and humidity
- b. Fuels will burn faster
- c. Watch for increase in hot spots appearing on the fire line
- d. Be alert to changes in fire behavior

15. YOU notice that the wind begins to blow, increase, or CHANGE DIRECTION

- a. Fire may begin to spread in a different direction
- b. Your method of attacking and approach may now need to be changed
- c. Be alert, post lookouts as necessary
- d. Observe for changes in fire behavior

16. YOU are getting frequent spot fires OVER YOUR LINE!

- a. This is an indication fire conditions and weather are changing
- b. Don't become trapped between two fires
- c. If spot fires are taking off, this indicates lower fuel moisture
- d. Be alert to what is happening around you

17. YOU are away from a burned area where terrain and/or cover make travel SLOW and DIFFICULT!

- a. Know where the fire is at all times
- b. Know where you are going
- c. Stay as close to the burn as possible
- d. Don't bunch up, spread out, and be alert for rolling rocks towards firefighters below

18. YOU feel like taking a nap NEAR THE FIRELINE!

- a. Sleep in shifts if necessary
- b. Sleep as a group and sleep only with permission from your fire line supervisor
- c. Don't wander off from the crew, stay together
- d. Never sleep in the green, always in the burn
- e. Post a lookout to stay awake and protect crewmembers from fire



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Common Denominators of Wildland Fire Fatalities

WILSON-SORENSEN STUDY (1926-1974)

- A. Most Incidents Occur on Relatively Small Fires or Isolated Sections of Large Fires.
- B. Unexpected or Unpredicted Winds are Often Given as the Major Cause of "Erratic Behavior".
- C. Most Fires are Innocent in Appearance (in some cases the mop-up stage) Prior to a Flare-up or Blow-up.
- D. Flare-ups Occur in Deceptively Light Fuels.
- E. Fires Run Uphill in Chimneys, Gullies, or on Steep Slopes.
- F. Suppression "Tools" Can Adversely Modify Fire Behavior (helicopter and air tanker vortices have been known to cause flare-ups).
- G. There Are No Fire Behavior Situations. The Inability to Predict Fire Behavior Causes Us to Fall Back on the Term "Erratic".

USFS STUDY (1926-1976) ANALYZING CAUSE OF DEATHS AND NEAR MISSES ON WILDLAND FIRES

(Study based on 125 wildland fires accounting for 236 fatalities and 66 Near Miss situations)

- A. Fire Ran Upslope.....29.0%
- B. Sudden Wind Shift20.8%
- C. Head Made Fast Run.....13.6%
- D. Fire Spotted Across Line9.6%
- E. Fire Ran Downslope6.4%
- F. Concentrated Fuel Flare-up.....4.8%
- G. Gusty Cumulus Clouds Overhead4.0%
- H. Aircraft Turbulence0.8%
- I. Equipment Failure.....0.8%
- J. Other (heart attack, electrocution, etc.)9.6%



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LCES

LCES- A system for Operational Safety. In the wildland fire environment, where four basic safety hazards confront the firefighter - lightning, fire-weakened timber, rolling rocks, and entrapment by running fires - LCES is key to safe procedure for firefighters. LCES stands for "lookout(s)", "communication(s)", "escape routes", and "safety zone(s)" - an interconnection each firefighter must know. Together the elements of LCES form a safety system used by firefighters to protect themselves. This safety procedure is put in place before fighting the fire: select a lookout or lookouts, set up a communication system, choose escape routes, and select safety zone or zones. (See diagram)

In operations, LCES functions sequentially - it's a self-triggering mechanism: lookouts assess - and reassess - the fire environment and communicate to each firefighter threats to safety; firefighters use the escape routes and move to safety zones. Actually, all firefighters should be alert to changes in the environment and have authority to initiate communication.

Key Guidelines. LCES is built on two basic guidelines:

Before safety is threatened, each firefighter must be informed how the LCES system will be used.

The LCES system must be continuously reevaluated as fire conditions change.

How to make LCES work

Train lookouts to observe the wildland fire environment and to recognize and anticipate fire behavior changes.

Position lookout or lookouts where both the hazard and the firefighters can be seen. (Each situation - the terrain, cover, and fire size - determines the number of lookouts that are needed. As stated before, every firefighter has both the authority and responsibility to warn others of threats to safety.)

Set up communications system - radio, voice, or both - by which the lookout or lookouts warn firefighters promptly and clearly of approaching threat. (Most often the lookout initiates a warning that is sub-

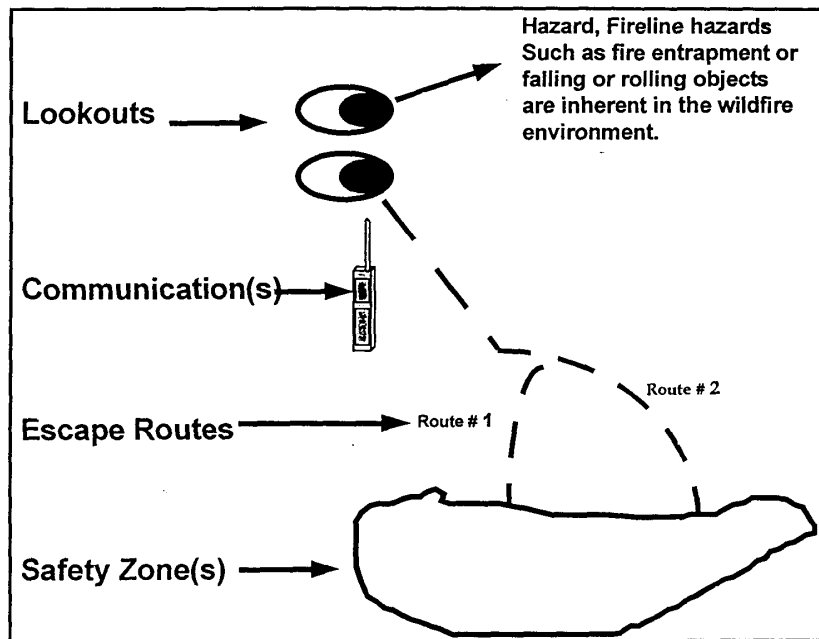
sequently passed down to each firefighter by "work-of-mouth". It is paramount that every firefighter receive the correct message in a timely manner.)

Establish the escape routes (at least two)- the paths the firefighters take from threatened position to area free from danger- and make them known. (In the Battlement Creek 1976 fire, three firefighters lost their

not imply that a shelter would not be deployed if needed, only that if there is a deployment, the safety zone location was not truly a safety zone.)

A Final Word

The LCES system approach to fireline safety is an outgrowth of my analysis of fatalities and near misses for over 20 years



lives after retreat along their only escape route was cut off by the advancing fire.)

Reestablish escape routes as their effectiveness decreases. (As a firefighter works along the fire perimeter, fatigue and distance increases the time required to reach a safety zone.

Establish safety zones - locations where the threatened firefighter may find adequate refuge from the danger. (Fireline intensity, air flow, and topographic location determine a safety zone's effectiveness. Shelter deployment sites have sometimes been termed, improperly and unfortunately, "safety zones". Safety zones should be conceptualized and planned as a location where no shelter will be needed. This does

of active fireline suppression duties. LCES simply refocuses on the essential elements of the standard FIRE ORDERS. Its use should be automatic in fireline operations. All firefighters should know LCES, the Lookout-Communication-Escape routes-Safety Zone interconnection.

Paul Gleason, North Roosevelt Fire Management Officer, USDA Forest Services, Arapaho and Roosevelt National Forests, Redfeather Ranger District, Fort Collins, CA, *Fire Management Notes*, 1991 Volume 52, Number 4



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Physical Conditioning



Are You Fire Fit?

Physical conditioning plays a major role in injury prevention. CAL FIRE policy #1833 requires all firefighting personnel to develop and use an individual physical conditioning plan. In 2008, California firefighters faced an unprecedented beginning to the fire season. Many new firefighters, and some veterans too, were simply not mentally and physically prepared for the events that were about to occur. By July, an alarming rate of serious injuries and near miss incidents were being reported and multiple Safety Stand Downs were issued.

Wildland firefighting routinely requires arduous work for very long periods of time. During fire season a physical conditioning plan that emphasizes muscular endurance is the best choice for reducing the frequency and severity of firefighter injuries. Seasonal firefighters face the greatest challenge when they work 3 to 4 months during peak season, and then return to school, or to a less physically demanding job for the winter period. The National Interagency Fire Center (NIFC) Fire Fit program is customized for the unique demands of wildland firefighting. It is designed to prepare the mind AND body for the upcoming fire season and to allow for rehabilitation afterwards. After a 6 week strength building period, the plan shifts to strength maintenance and muscle endurance. Too much muscle mass can work against the wildland firefighter. Overall mental health and physical fitness is far more important in terms of injury prevention and work productivity. The information in this package originated on the NIFC Fire Fit website, and can be used to supplement CAL FIRE physical fitness policy and guidelines.

References

CAL FIRE Physical Fitness Policy

<http://cdfweb/Pubs/Issuance/1700/1833.pdf>

CAL FIRE Physical Fitness Links (Intranet)

<http://cdfweb/employeeinfo/humanresources/physicalfitness.htm>

NIFC Fire Fit Program

<http://www.nifc.gov/FireFit/>

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Physical Conditioning



INFORMATION SHEET – NIFC Fire Fit Program

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 (Cardiovascular, Strength, and Flexibility). When developing a fitness program, its 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.

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. The table below can be used to estimate your personal THR training zone. Additional info: <http://www.briancalkins.com/HeartRate.htm>

Karvonen Training Stimulus Formula

(Example: Age = 30, Intensity = 50-85%, HR = 70)

Determine your resting HR for one minute. It is best to take this first thing in the morning prior to getting out of bed.

Example = **70**

Determine your maximum HR by subtracting your age from 220.

220 - 30 = **190**

Subtract your resting HR from your maximum HR. **This is your heart rate reserve.**

190 - 70 = **120**

Calculate your training HR zone.

(Heart rate reserve x .50) + resting HR = lower end of training zone.

(120 x .50) + 70 = **130**

(Heart rate reserve x .85) + resting HR = upper end of training zone.

(120 x .85) + 70 = **172**

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. 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 that add variety, and help to avoid boredom with 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 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 (i.e. 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:

Rest the affected injured area immediately.

Ice the injured area immediately to minimize pain and swelling.

Compression bandage on the injured area to minimize swelling.

Elevate the injured area to minimize blood flow to the injured area thus minimizing swelling and pain.

Fire Fit Conditioning Program for Wildland Firefighters General Guidelines

Pack Hike: Use a pack that is comfortable, fits snug and the weight is evenly distributed. Start with 10-15 lbs and gradually increase weight to 25-30 lbs. Use a variety of terrain and courses. Train 3 – 6 days a week.

Cross-Training: use a variety of aerobic activities avoiding “impact” exercise everyday. Running, biking, aerobics classes, are good examples. Wear the appropriate PPE for the specific activity.

Upper Body Exercises: use large muscle groups (shoulders, upper back, chest, biceps, triceps). Use moderate weight, 12-20 reps x 1-3 sets with 60 second interval. Alternate days with 24-48 hours rest between workouts. Work opposing muscles equally!

Lower Body Exercises: use larger muscle groups (quads, hamstrings, abs, lower back, calves, lower leg). Use moderate weight, 12-20 reps x 1-3 sets with 60 second interval. Alternate days with 24-48 hours rest between workouts. Abs and calves can be worked everyday. Work opposing muscles equally!

Stretch prior to workout and stretch afterwards (minimum 5 minutes), no bouncing

REST: Rest and relaxation is recommended a minimum of 1 day a week to optimize training, reduce stress and fatigue and avoid overuse injuries.

Glossary of Terms

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 level 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.

Glossary of Terms (cont.)

Overtraining – When an exercise activity(s) is overdone resulting in physical and mental exhaustion.

Overuse Injury – An injury(s) that is a direct result of overdoing specific exercises.

Perceived Exertion – A method of gauging exercise intensity.

Plyometrics – Activities that include jumping, hopping, and skipping to increase agility and speed.

R.I.C.E. – First aide treatment for common injuries = Rest, Ice, Compression, Elevate.

Target Heart Rate (THR) – A calculation used to determine an individuals 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 Hardening – A gradual progression of work-specific activities designed to bring you to the job ready to deliver a good day's work.

Physical Fitness FAQ's

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. 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.



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Personal Protective Equipment Inspection

SOURCES: CAL FIRE HB 1700; CAL FIRE IIPP PPE Plan;
CalOSHA CCR, Title 8, Division 1, Chapter 4, Subchapter 7, General Industry Safety Orders

The 2009 Focus on Safety is again comprised of multiple components directly related to the day to day operations of our employees. Of these components, the Personal Protective Equipment (PPE) Inspection is one of the most important. All employees must have a high level of confidence in the PPE they use on a day to day basis. PPE inspections should be conducted at regular intervals in order to ensure the highest level of protection possible. This component of the 2009 Focus on Safety is intended for employees to take a concentrated and thorough look at all PPE upon which their safety and well being depend.

Employee protection is designed around a three tiered approach. The preferred method of protection is through Engineering Controls which minimize or eliminate hazards by such actions as repairing, replacing, or redesigning. For example, a tripping hazard in the parking lot can be eliminated by repairing the parking lot or isolating the area from employees. The next tier for protection would involve Work Practice Controls such as providing an alternative route around the tripping hazard until it is repaired and communicating the hazard to all employees. The third and last tier of employee protection is that of PPE. Employees, who must work around the tripping hazard and be exposed to its potential hazards, need to wear appropriate PPE to prevent injury should they trip over the hazard. **Keep in mind, no article of PPE can fully protect an employee who does not first rely on such things as education, training, common sense, and situational awareness. Employees must know the limitations of their PPE and take every precaution to never exceed those limitations as the resulting consequences can be disastrous.**

The attached PPE Inspection Checklist is meant to be a guiding document for all employees to utilize in evaluating the various components of their PPE. It is not necessarily a complete list of what to look at or for but provides a prompt for those key areas which should be evaluated. Some Units and Programs may have specialized PPE not included on the list such as HAZMAT, Technical Rescue, or other specialized PPE. Those Units and Programs are encouraged to build upon this checklist so that it encompasses all applicable PPE being utilized by employees.

The daily inspection of PPE is the responsibility of every employee. Most manufacturers of PPE provide Selection, Care, and Maintenance Programs (SCAM) for their products. Employees should become very familiar with how to inspect, care, and maintain their assigned PPE based upon those manufacturers programs. The real potential exists for employees to damage their PPE if care and maintenance is performed inappropriately or incorrectly. Similarly, employees must only wear and utilize their PPE for its designed and intended purposes.



PERSONAL PROTECTIVE EQUIPMENT INSPECTION CHECKLIST

EMPLOYEE NAME: _____

DATE: _____

ASSIGNMENT: _____

INSPECTED BY: _____

COMPONENT	SUB-COMPONENT	INSPECTION POINTS	PASS	FAIL	COMMENTS
STRUCTURAL PPE					
HELMET <u>Brand Name:</u> <u>Model Number:</u>	SHELL	Melting, Bubbling, Dents, Cracks, etc.			
	GOGGLES/SHIELD	Visibility, Cracks, Warping, Attachment, etc.			
	SUSPENSION	Fit, Missing parts, Cracks, Tears, Installation, etc.			
	SHROUD	Proper installation, Burns, Tears, etc.			
	CHIN STRAP	Proper installation, Slides, Closures, etc.			
	LABELING	Manufacturer label, NFPA compliance, etc.			
	LOCAL REQUIREMENTS	Local Unit policy (i.e. name, rocker, magnets, etc.)			
HOOD <u>Brand Name:</u> <u>Model Number:</u>	HOOD	Burns, Tears, Elasticity, Seams, Fit, etc.			
	LABELING	Manufacturer label, NFPA compliance, etc.			
COAT <u>Brand Name:</u> <u>Model Number:</u>	OUTER SHELL	Closures, Pockets, Seams, Burns, Tears, etc.			
	MOISTURE BARRIER	Delamination, Seams, Tears, Attachment, etc.			
	THERMAL LINER	Delamination, Seams, Tears, Attachment, etc.			
	WRISTLETS	Elasticity, Seams, Tears, Shrinkage, etc.			
	LABELING	Manufacturer label, NFPA compliance, etc.			
LOCAL REQUIREMENTS	Local Unit policy (i.e. name, shoulder patches, etc.)				
PANT <u>Brand Name:</u> <u>Model Number:</u>	OUTER SHELL	Closures, Pockets, Seams, Burns, Tears, etc.			
	MOISTURE BARRIER	Delamination, Seams, Tears, Attachment, etc.			
	THERMAL LINER	Delamination, Seams, Tears, Attachment, etc.			
	SUSPENDERS	Elasticity, Tears, Fastening System, Fit, etc.			
	LABELING	Manufacturer label, NFPA compliance, etc.			
	LOCAL REQUIREMENTS	Local Unit policy			

NAME: _____

DATE: _____

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COMPONENT	SUB-COMPONENT	INSPECTION POINTS	PASS	FAIL	COMMENTS	
STRUCTURAL PPE (cont.)						
GLOVES <u>Brand Name:</u>	GLOVE	Tears, Burns, Holes, Seams, Flexibility, Liner, etc				
	<u>Model Number:</u>	LABELING	Manufacturer label, NFPA compliance, etc.			
BOOTS <u>Brand Name:</u>	BOOTS	Fit, Tears, Punctures, Waterproof, Steel Toe, etc.				
	<u>Model Number:</u>	LABELING	Manufacturer label, NFPA compliance, etc.			
WILDLAND PPE						
HELMET <u>Brand Name:</u>	SHELL	Melting, Bubbling, Dents, Cracks, etc.				
	GOGGLES	Visibility, Cracks, Warping, Attachment, etc.				
	SUSPENSION	Fit, Missing parts, Cracks, Tears, Installation, etc.				
	SHROUD	Proper installation, Fit, Closure, Burns, Tears, etc.				
	<u>Model Number:</u>	CHIN STRAP	Proper installation, Slides, Closures, etc.			
		LABELING	Manufacturer label, NFPA compliance, etc.			
	LOCAL REQUIREMENTS	Local Unit policy (i.e. name, rocker, magnets, etc.)				
NOMEX SHIRT <u>Brand Name:</u>	SHIRT	Tears, Burns, Seams, Pockets, Closures, Fit, etc.				
	SLEEVE LINER	Tears, Burns, Seams, etc.				
	<u>Model Number:</u>	LABELING	Manufacturer label			
		LOCAL REQUIREMENTS	Local Unit policy (i.e. name, markings, etc.)			
NOMEX PANT <u>Brand Name:</u>	PANT	Tears, Burns, Seams, Pockets, Closures, Fit, etc.				
	<u>Model Number:</u>	LABELING	Manufacturer label			
		LOCAL REQUIREMENTS	Local Unit policy (i.e. name, markings, etc.)			

NAME: _____

DATE: _____

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COMPONENT	SUB-COMPONENT	INSPECTION POINTS	PASS	FAIL	COMMENTS
WILDLAND PPE (cont.)					
GLOVES <u>Brand Name:</u>	GLOVE	Tears, Burns, Holes, Seams, Flexibility, Liner, etc			
	<u>Model Number:</u>	LABELING	Manufacturer label		
BOOTS <u>Brand Name:</u>	BOOTS	Fit, Tears, Leather, Steel Toe, Lug soles, etc.			
	<u>Model Number:</u>	LABELING	Manufacturer label		
FIRE SHELTER <u>Brand Name:</u>	FIRE SHELTER	Size, Cracks, Deposits, Case, Liner, etc.			
	<u>Model Number:</u>	LABELING / SELECTION	Manufacturer label		
WEB GEAR <u>Brand Name:</u>	WEB GEAR	General condition, Fit, etc.			
	<u>Model Number:</u>	CANTEENS	Half gallon minimum, General condition, etc.		
HEADLAMP <u>Brand Name:</u>	Headlamp	General condition, Wiring, Attachment, Power, etc.			
	<u>Model Number:</u>				

NAME: _____

DATE: _____

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COMPONENT	SUB-COMPONENT	INSPECTION POINTS	PASS	FAIL	COMMENTS
MISCELLANEOUS PPE / ACCESSORIES					
SCBA <u>Brand Name:</u>	MASK	Fit, Lens clarity, Spider Straps, Exhalation valve, etc.			
	<u>Model Number:</u>	SCBA	Harness, Bottle, PASS, Gauges, Cleanliness, etc.		
EMS PACK <u>Brand Name:</u>	HEPA MASK	Fit, Tears, Holes, Strap elasticity, Rating, etc.			
	<u>Model Number:</u>	POCKET MASK	Seal, Damage, One-way valve, Case, etc.		
	ISOLATION GOWN	Fit, Tears, Holes, Closures, Rating, etc.			
	MEDICAL GLOVES	Fit, Tears, Holes, Latex allergies?, etc.			
	EYE PROTECTION	Fit, Lens clarity, ANSI certified, Non-vented, etc.			
	LOCAL REQUIREMENTS	Local Unit policy			
HEARING <u>Brand Name:</u>	EAR PLUGS	General condition, Fit, Rating, etc.			
	<u>Model Number:</u>	EAR MUFFS	General condition, Fit, Rating, etc.		
	LOCAL REQUIREMENTS	Local Unit policy			
BEE VEIL <u>Brand Name:</u>	BEE VEIL	Holes, Tears, Closures, Fit, Rating, etc.			
	<u>Model Number:</u>	LOCAL REQUIREMENTS	Local Unit policy		
<u>Brand Name:</u>					
<u>Model Number:</u>					