A Publication of the
National Wildfire Coordinating Group

Sponsored by
United States Department of Agriculture

United States Department of the Interior

National Association of State Foresters

The New Generation Fire Shelter

PMS 411
NFES 2710

March 2003

NWCG
Fire Equipment Working Team
March 2003

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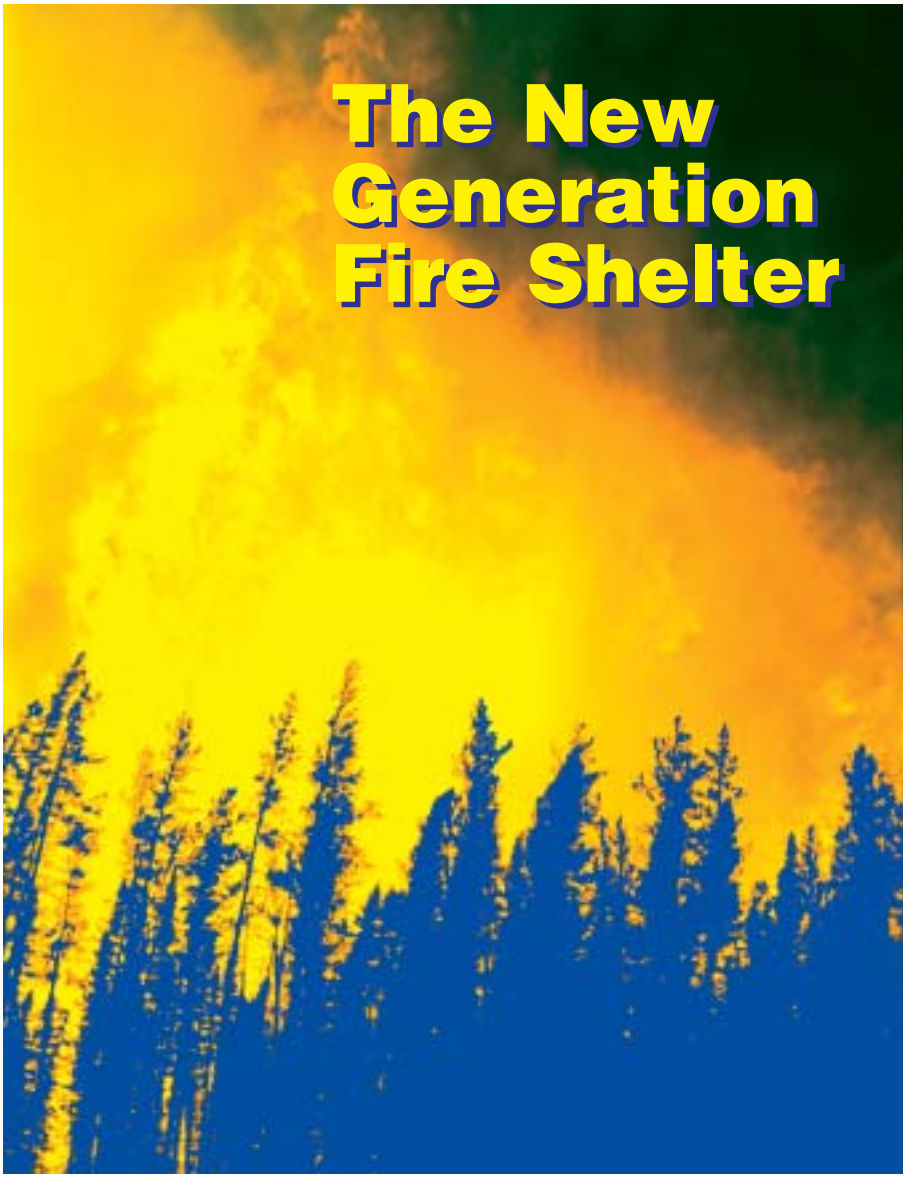

Sponsored for NWCG publication by the NWCG Fire Equipment Working Team, March 2003, in cooperation with the USDA Forest Service Technology and Development Center, Missoula, MT.

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Introduction

The fire shelter is a mandatory item of personal protective equipment for all Federal wildland firefighters and must be carried on the fireline by everyone on Federal wildland fires. State, local, and rural fire departments may have different policies regarding the fire shelter's use. However, no one who is required to carry a fire shelter should go on the fireline without reading, understanding, and practicing the recommendations in this booklet.

The fire shelter has been required equipment for wildland firefighters since 1977. Since that time, shelters have saved the lives of more than 300 firefighters and have prevented hundreds of serious injuries. A new generation of fire shelter now offers improved protection from both radiant and convective heat. Even so, the shelter will not protect firefighters under *all* fire situations.

The fire shelter should be used as a last resort if planned escape routes or safety zones become inadequate and entrapment is imminent. **Carrying a fire shelter should never be considered an alternative to safe firefighting.** If you are considering or are asked to take on a risky assignment because you have a fire shelter, it is your obligation to insist that the plans be changed. Though the new generation fire shelter offers improved protection, it is still a last resort and cannot guarantee your survival.

This booklet will help you learn how to use the new fire shelter. It:

- Explains how the fire shelter protects you

> ***I'm sure we would not have survived without them.***
>
> **Entrapment survivor**

- Explains the importance of training and knowing when and where to deploy the shelter
- Tells you what to expect during an entrapment
- Describes inspection procedures that will keep worn shelters off the fireline

What you see in this booklet may be familiar to you because much of the guidance for using shelters is unchanged. Stories related by firefighters who survived entrapments using the old shelter can still help firefighters learn how to use the new shelter.

This booklet is the reference document for fire shelters. It is not intended to stand alone. New and experienced firefighters should use the booklet as part of a comprehensive fire shelter training program that includes facilitated discussion and hands-on training.

During training, be sure you understand the following key points:

- Carrying a fire shelter is not an excuse to take risks on the fireline.
- Your highest priority is to avoid entrapment. If entrapment is imminent, escape if you can.
- During an escape or entrapment, protect your lungs and airways at all costs.
- Drop your gear as soon as you realize your escape may be compromised. Take your fire shelter and your tool, but drop all dangerous flammable objects and drop any items that may slow your escape.
- If you are entrapped, get on the ground before the fire arrives.
- Deploy your shelter where flames will be least likely to contact it.
- Once you are inside your shelter, stay there. Conditions outside the shelter will be far worse than those inside.
- Train with your fire shelter as though survival is at stake.

Know Your Fire Shelter

Understanding how the fire shelter protects you as well as the factors that limit its performance will help you decide how best to deploy your shelter.

Types of Heat

Radiant Heat: Radiant heat travels in a straight line through space without heating the space itself. It turns into heat when it contacts a cooler surface. When you stand close to a campfire, radiant heat warms you. No air movement is required for the transfer of radiant heat.

Convective Heat: Convective heat requires air movement. Think of it as a blast of hot air. When flames or hot gases move past a surface, the hot air molecules transfer their heat to that surface. The hotter the air and the faster the air movement, the greater the convective heating.

How the New Generation Fire Shelter Works

The new generation fire shelter protects primarily by reflecting radiant heat and trapping breathable air (figure 1). The new shelter has two layers. The outer layer is aluminum foil bonded to woven silica cloth. The foil reflects radiant heat and the silica material slows the passage of heat to the inside of the shelter. An inner layer of aluminum foil laminated to fiberglass prevents heat from reradiating to the person inside the shelter. When these layers are sewn together, the air gap between them offers further insulation.

The outer layer of foil reflects about 95 percent of the radiant heat that reaches it. Because only 5 percent is absorbed into the shelter materials, the temperature of the material rises slowly. Unlike radiant heat, convective heat (from flames and hot gases) is easily absorbed by the fire shelter, allowing the temperature of the material to rise rapidly. When the material reaches about 500 °F, the glue that bonds the layers begins to break down. The layers can separate, allowing the foil to be torn by turbulent winds. Without the foil, the shelter loses much of its ability to reflect radiant heat. The silica material will slow heat transfer, but offers significantly less protection without the foil.

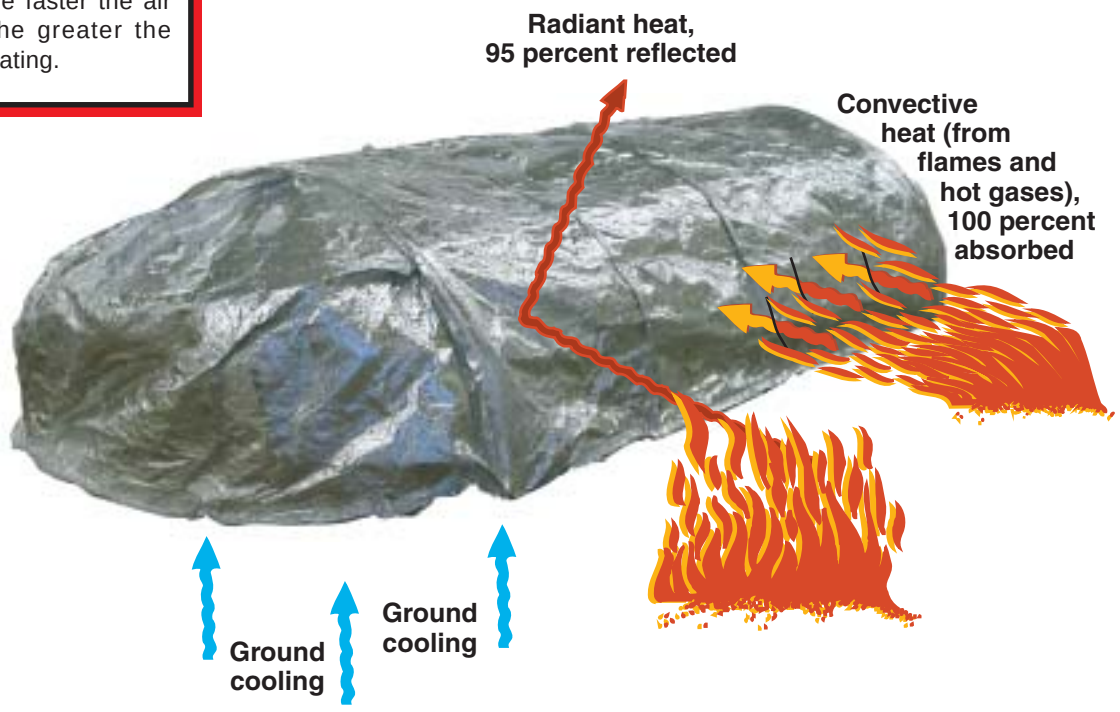


Figure 1—The new generation fire shelter reflects radiant heat and absorbs convective heat.

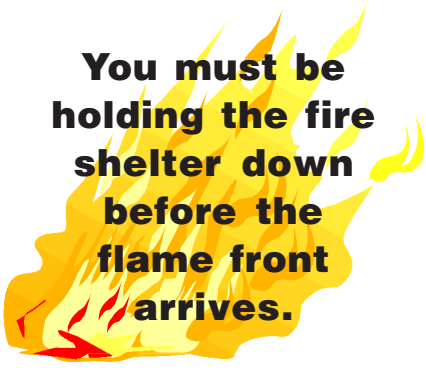
The right side of my shelter delaminated and the foil flipped over onto the left side. I really started to get burned at that point because the only thing that was on that side of my shelter was the glass mesh. [When] there was still a tremendous amount of radiant heat coming off the surrounding area, a wind blew the shelter half back on to the other side, back to where it belonged, and it was like somebody closing a door on the oven. The radiant heat difference that just that little piece of foil made was absolutely amazing.

Entrapment survivor

The shelter's shape allows you to lie flat. The ground protects the underside of your body and your airway is protected as you breathe the cooler, cleaner air next to the ground. The shelter's holddown straps and wide floor allow you to hold it down in high winds. You must be holding the fire shelter down before the flame front arrives.

The shelters really do an amazing job of reflecting that radiant heat. When that shelter lifted up and you got that radiant heat directly, and the convective heat that was coming [in], it was just an incredible change in what you felt in there.

Entrapment survivor



Escape

Deploying a fire shelter is a last resort. If entrapment seems likely, try to escape. You should always know the location of your safety zones and escape routes. Remember, in a true safety zone, you do not need your shelter to protect you from heat and smoke. Crew supervisors must identify escape routes and safety zones, and make sure they are known by their crews. Changing conditions may compromise planned escape routes and safety zones, requiring that new escape routes and safety zones be identified if work in the area is to continue.

If you are in an entrapment, protect your lungs and airway at all costs. Most firefighters who perish in fires die from heat that damages their airway, not from external burns. One breath of hot gases can damage your lungs, causing you to suffocate.

If you feel that entrapment is imminent, you will have to decide quickly whether you have time to escape. You will have to recognize when your only option is to deploy your fire shelter. Watch for deployment areas as you move. If you cannot reach a safety zone, do not pass through an effective deployment site only to get caught later in a more hazardous area. You must be decisive. If you are with a crew, follow the orders given by your supervisor. If you are in charge, be sure to give clear instructions and to make sure they are understood.

You're highest priority is to avoid entrapment.

Time is critical during an escape. As soon as you realize your escape may be compromised, drop your gear. Take your fire shelter with you. Keep your tool if there is a chance you may need it to clear a deployment site. Drop packs, chain saws, or anything else that might slow you down. Firefighters have died carrying packs and tools while climbing a hill to escape fires. You can move up to 30 percent faster without your gear. This can easily mean the difference between life and death in an escape.

Drop any fusees you may be carrying. Fusees are the most dangerous items you carry (figure 2). When wearing shrouds and long-sleeved T-shirts, firefighters have worked close enough to radiant heat to melt goggles and hardhats. These plastics melt at around 320 °F. Fusees ignite at 375 °F. Fusees are just one of the reasons you should drop your pack as soon as you recognize danger. In an entrapment situation, you do not have time to think about items in your pack that could be dangerous.

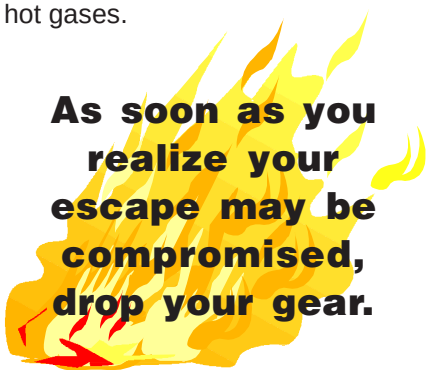
If you are in an entrapment, protect your lungs and airway at all costs.

Another reason to drop your pack is to make it easier to get into your shelter. The pack can snag on the shelter as you are getting into it. If you will be deploying your shelter nearby, make sure that you toss the

Figure 2—Never take fusees into a fire shelter.

pack far enough that it will not ignite and burn a shelter.

Face and neck shrouds offer additional protection against radiant heat during escape. Shrouds should not be used to work in areas that are so hot you could not work there without them. If shrouds are worn, they should be attached to the hardhat for quick deployment when they are needed. Do not rely on shrouds to protect your airway from hot gases.



Stay Alert

When you are escaping an entrapment, stay alert and be prepared to act. If the fire is closing in behind you, get your shelter out and partially unfold it. Use the shelter to shield you from the heat if necessary. Don't drop the shelter, allow it to blow away, or snag it on the brush. Be ready to grab the shelter by an edge and get into it.

Be alert for signs of hot gases. These gases may not be smoky or dark. Your only warning may be air movement, an increase in temperature, and embers blowing past. If gases get hot enough to burn you, it is time to get under your fire shelter.

As you move along your escape route, stay alert and talk to other crewmembers. Talking helps relieve stress and ensures that hazards are communicated quickly. Be alert for deployment areas as you move. If it becomes apparent that you are not going to reach a safety zone, keep in mind that it takes 15 to 20 seconds to deploy a shelter under ideal conditions, longer in turbulent winds or while wearing a pack (another reason to toss the pack). Leave enough time to get on the ground and under your shelter before the heat arrives. Firefighters have died or been injured because they waited too long to deploy their shelters.

While the fire shelter is considered a last resort, it can also protect you from falling embers or thick smoke. You should not hesitate to use your shelter to protect yourself. Do not worry about the cost of the fire shelter—your safety is always the highest priority.

Deployment

Selecting Your Deployment Site

The characteristics of an effective deployment site have not changed. Your goal in selecting a deployment site is to keep the fire shelter away from heat, especially flames. Practice evaluating deployment sites (figures 3 to 15) so that you can recognize them quickly under stress. Identify effective sites whenever you are on the fireline so you know where they are before you need one.

Deploy your shelter where flames will be least likely to contact it.

Figure 3—Keep away from narrow draws, chutes, and chimneys. They tend to funnel smoke, flames, and hot gases that can damage your shelter.

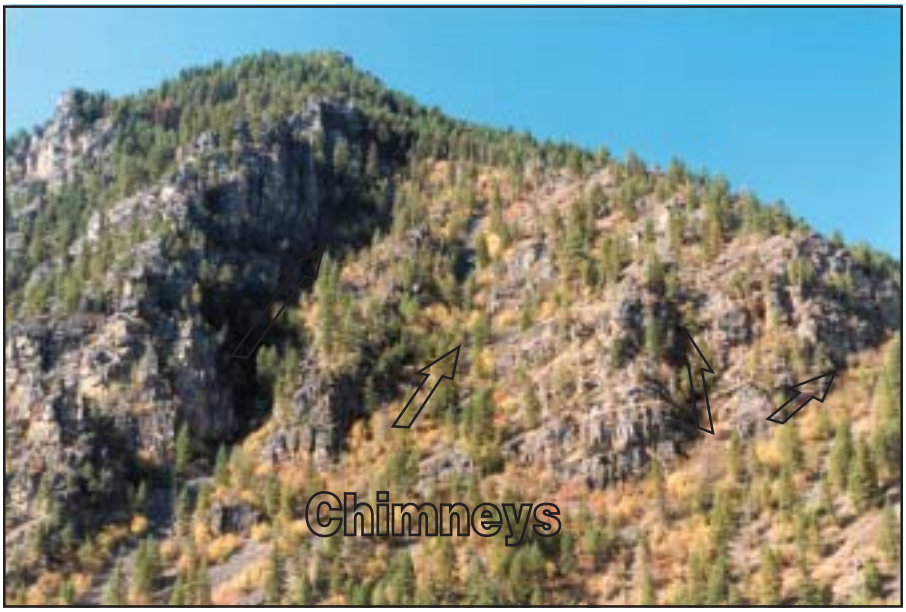


Figure 4—Avoid saddles on ridgetops. They also funnel smoke and heat.

Figure 5—Try to pick natural firebreaks such as wet meadows, wide streambeds, swampy areas, and rockslides.

Figure 6—Flat areas on slopes, such as benches or road cuts, offer some protection from radiant and convective heat. These level areas can keep you below the path of flame and convective heat. Don't deploy in the middle of a road if vehicles may be passing. A drainage ditch on the uphill side of a road cut can be an effective deployment site unless it contains fuels that could ignite and burn the shelter.

Four firefighters deployed their fire shelters on this road during a burnover. All four survived with only minor burns.

Figure 7—Stay out of draws, even when deploying on a road.

Figure 8—Do not deploy in or next to tall or thick grass, small trees, trees with low branches, brush, piles of slash, or firefighting equipment such as packs, parachutes, tools, or chain saws. Firefighters have been burned because they deployed too close to such fuels.

Large rockslides can be effective deployment sites, but you must stay away from brush and trees, and from fuels scattered in the rocks. Even though it can be difficult to seal the edges of the shelter in large, jumbled rocks, rockslides sometimes offer the largest area free of fuels and may be the best option for deployment.

Figure 9—Ground fuels, such as grass or tree litter, can ignite rapidly. Clear the deployment site to mineral soil if at all possible. If time is critical, pick a site with the sparsest fuels.

Figure 10—Deploy fire shelters well away from thick vegetation such as the shrubby understory and the trees in this photograph.

Figure 11—Objects such as large rocks, dozers, or structures such as cabins, can act as barriers to heat. But, if the objects themselves ignite, you may have to move. Testing shows that flames funnel underneath vehicles. Do not deploy under your vehicle.

Figure12—Avoid areas where rocks or logs can roll on you or snags can fall on you.

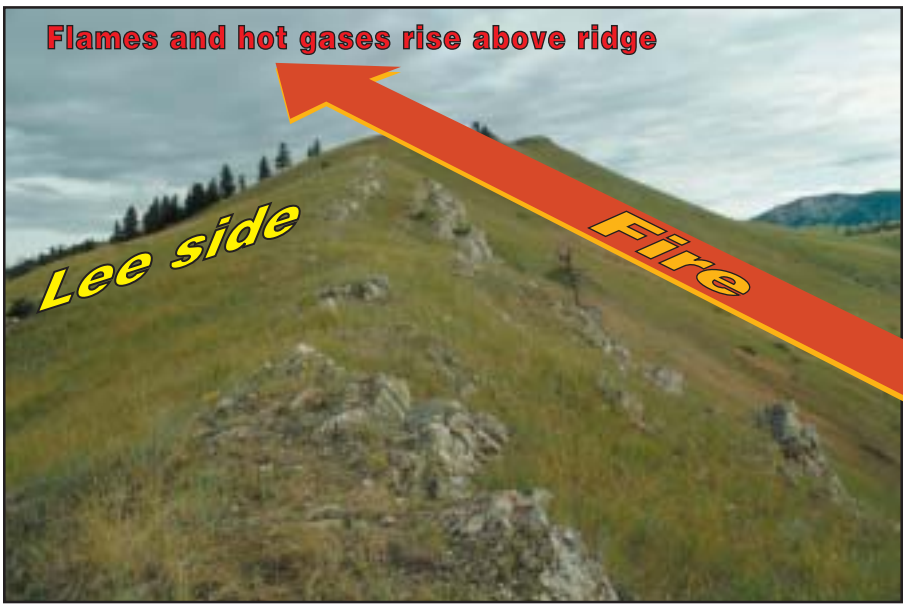


Figure 13—The lee side of a ridgetop can be an effective deployment site because the flames and hot gases tend to rise above the ridge. Fire intensity usually drops when fire reaches a ridge. But be alert for the possibility that firebrands might ignite fires below you on the lee side of the ridge.

Figure 14—Wide areas that have been cleared of fuel, such as dozer lines or roads, can be good deployment sites, depending on the size of the area that has been cleared and the behavior of the fire.

Figure 15—Burned-out areas can be effective deployment sites if there is no fuel left to reburn.

Deployment Procedures

It is important to carry the fire shelter properly. The case should be vertical if it is worn on your side or horizontal if it is worn in the small of your back under your pack. The shelter may be carried in the fire shelter pouch that is a feature of some field packs. A chest harness is available that allows persons operating machinery to carry the shelter on their chest (figure 16). Never carry your shelter inside the main body of your field pack.

If you are part of a crew, your supervisor will decide where and when to deploy fire shelters. Follow orders. If you are not in a crew or have become separated from your crew, you must rely on your own judgment.

Figure 16—The chest harness is preferred by some operators of engines and heavy equipment.

After removing your shelter from its case (figure 17), throw your pack and any flammable objects, such as fusees or gasoline, far from the deployment area. Don't throw them near others who are deploying their shelters.

Scrape away ground fuels if time permits. Clear an area 4 by 8 feet (larger if you have time) down to mineral soil. An area cleared of fuels minimizes flame contact with the shelter. Never deploy your shelter immediately downwind or uphill from a large concentration of fuel. The heavier the fuel loading, the larger the fuel break needs to be. Although the new shelter offers better protection from direct flame, you will be more likely to survive if flames do not contact it.

Pull either red ring on the plastic bag down to the bottom and up the other side (figure 18). Remove the shelter.

Figure 17—Use the pull strap to remove the shelter from its case.

Figure 18—Pull either red ring to remove the plastic bag.

Pick your deployment site. The lowest depression on the site is best. It should be as free of fuels as possible.

Grasp the shake handles that extend from the folded shelter. The handles are marked, **RIGHT HAND** in red and **LEFT HAND** in black (figure 19). When you have the shake handles in the proper hands, the shelter will unfold with the opening toward your body. Grasping the wrong handles will not prevent you from entering the shelter, but it may slow your deployment by 1 to 2 seconds.

Shake out the shelter (figure 20).

Figure 19—Grasping the correct shake handles will speed your deployment.

Figure 20—Holding the shake handles, shake out your shelter.

Lie face down so your feet are toward the oncoming flames. The hottest part of the shelter will be the side closest to the advancing fire. Keep your head and airway away from these high temperatures (figure 21).

The holddown straps on the new shelter are sewn into the floor panels. As soon as you are under your shelter, slip your arms through the straps up to your elbows (figure 22).

It is critical to be on the ground and under the shelter before the fire arrives.

The new shelter is narrower than the old shelter and will feel smaller.

Once you are on the ground, push out the top and sides of the shelter so it holds as much air as possible. The air between you and the sides of the shelter is excellent insulation. Be sure that the shelter is fully unfolded and not bunched beneath you when you deploy.

You do not want to pull your shelter against you as you would a blanket. Instead, push the shelter material away from your body so it won't burn you. As you push the shelter material away from your body, you also leave more space for cool air.

Hold the shelter down with your feet, legs, elbows, and hands.

Keep your nose and mouth on the ground. Temperatures just a few inches off the ground are dramatically higher than those at the surface. Breathing through a dry bandanna or a shroud will help reduce the heat and smoke you inhale.

Figure 21—Lie face down with your feet toward the oncoming flames.

Figure 22—Slip your hands through the holddown straps up to your elbows.

Wear gloves inside the shelter. Without them, you may burn your hands and be unable to hold down the shelter. In 1979, a firefighter in Idaho was killed after his hands were burned and he was unable to hold down his shelter.

Wear your hardhat to protect your head from burns.

> ***(With) any change in elevation inside the shelter, there was a drastic change in the temperature. If you look at the burn injuries that I received, anything that was off the ground and certainly the things that were higher up in the shelter (were) the areas (where) I received the most significant burns.***
>
> **Entrapment survivor**

If you use a face and neck shroud, pull it into place.

If you have a radio, keep it with you in the shelter so you can communicate during and after the entrapment.

Get On the Ground

If time runs out while you are attempting to escape, you must get on the ground before the fire arrives and finish deploying on the ground. Keep your face next to the ground as you pull the shelter over you. Death is almost certain if the fire catches you off the ground. The optimal survival zone with or without a fire shelter is within a foot of the ground. Once you are entrapped, your highest priority is to protect your lungs and airway.

Water Can Make the Difference

It is extremely important that you stay well hydrated when fighting fire. Drink water often, during your shift and when you are off duty. If you are well hydrated, your body can sweat and cool itself more effectively. This is particularly important during an entrapment.

Do not use your water to wet your clothing or your bandanna inside the fire shelter. Wet clothing conducts heat to the skin more quickly than dry clothing, so burns are more likely. As the water on the clothing evaporates, it increases the humidity inside the shelter. Moist air will cause more damage to your airway than dry air at the same temperature.

The best way to use your water is to drink it. Take canteens into your fire shelter if you have time. Continue to sip the water to replace lost fluids.

Sharing a Shelter

Never plan to share a shelter unless someone is without one. The shelter is designed for one person. Sharing a shelter greatly increases your risk of injury because it reduces the amount of insulating airspace and increases the chances your body will contact hot shelter material. If you can't avoid getting into someone else's shelter, yell at them so they know you are coming in. Always enter from the side away from the flames or hot air, so you don't expose the occupant to the full force of the wind and heat. Your head should be by the other occupant's head.

Group Deployment

If you are with a group, deploy your shelters close together. Adjacent shelters can provide added protection from radiant heat. In addition, it will be easier to communicate when the shelters are close together. Optimal shelter placement depends on the conditions. Select the best deployment sites available.

Keep These Items Out of Your Fire Shelter

Some flammable items, such as fusees and gasoline, should not be taken into the shelter. Throw them as far away as possible when you deploy your shelter. Fusees burn at temperatures approaching 3,000 °F. The temperatures inside the shelter would rise quickly to fatal levels. You should also keep tools, such as pulaskis and shovels, away from the shelter so they do not cut the shelter material.

Throw your pack far away from the shelter. The pack may contain dangerous items, such as fusees.

Do Not Delay Deployment

If you are entrapped, do not delay your deployment—prepare for the worst.

If you have extra time, but cannot escape to a safety zone, use the time to increase your chances for survival. Make sure that:

- Everyone's shelter is out and ready.
- Everyone is wearing appropriate personal protective equipment including gloves, hardhat, flame-resistant clothing, boots, and if available, face and neck shrouds. If anyone lacks equipment, survey the crew for extra equipment.
- Everyone knows where to deploy. Use the extra time to clear deployment sites to mineral soil or to remove fuels near the deployment area.

During an Entrapment

> ***This was like a nuclear blast occurring right over you and you're lying in tinfoil.***
>
> **Entrapment survivor**

Once you are in your shelter, you must focus on two things: staying on the ground in the shelter no matter what, and protecting your lungs and airway by keeping your mouth as close to the ground as possible. No matter how bad it gets inside the shelter, it will be much worse outside. If you panic and leave the shelter, one breath of hot gases can cause you to suffocate. Turbulence can lift a shelter's edge, letting in hot gases. Fires can generate winds of 50 miles per hour or more, so you must hold the shelter down firmly.

> ***When the first fire front came across us, I would estimate that the winds were probably in excess of 70 miles per hour. The sense of power that you had around you, that energy release that we had around us was just absolutely incredible. It was a very humbling experience. I mean you felt very small and very insignificant at that point.***
>
> **Entrapment survivor**

Entrapment can be extremely frightening and may lead to panic. Panic can cause firefighters to leave their shelters and make a run for it—a far more hazardous gamble than staying put. Control such feelings so you can think clearly. Keep yourself calm by concentrating your attention on your breathing or on an object, person, or religious symbol that is meaningful to you. Mentally recite a chant or phrase. These techniques of meditation will help quiet your mind. They can help reduce panic while you remain alert.

You may be able to help calm other trapped firefighters by shouting back and forth, or by radio communication. If someone yells at you, try to let that person know you're okay. If someone doesn't respond to your shouts, do not leave your shelter. During the fire's peak, the noise will be deafening. You may be unable to hear anyone. Keep calm. As soon as the noise subsides, resume talking to each other.

> ***One of the other firefighters began to pray out loud, and it had almost a soothing effect at that point, listening to him do that.***
>
> **Entrapment survivor**

Moving Your Shelter

You may want to move your shelter when the flame front changes position or to be closer to someone in trouble. With your arms in the holddown straps, move by crawling on your belly, keeping the shelter edges close to the ground. When the shelter is not firmly on the ground, your lungs will be vulnerable to hot gases. Try not to breathe until your face is against the ground. If you are wearing a shroud, keep the front of the shroud fastened to protect you if heat enters the shelter.

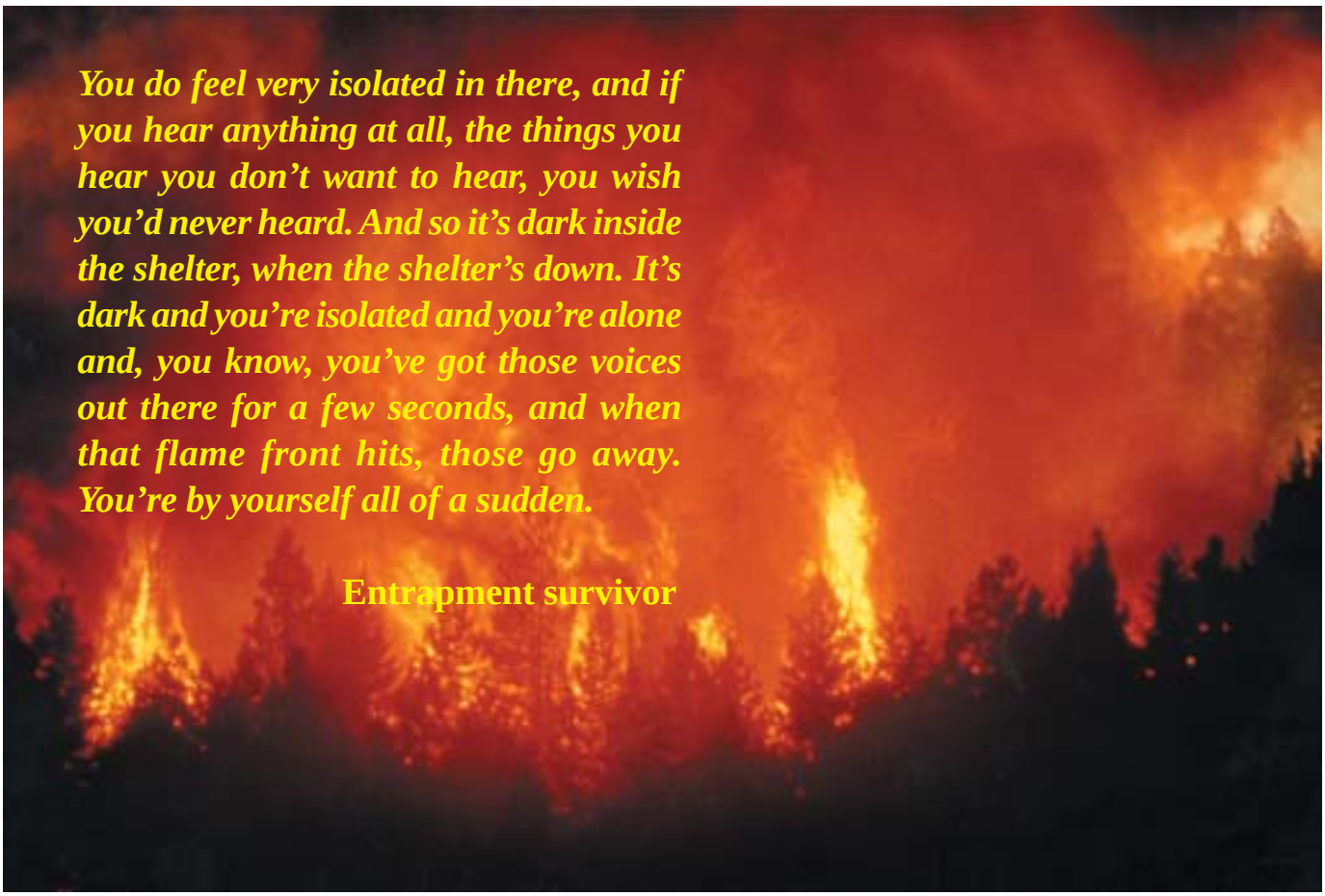
Moving is risky. It may expose your airway and lungs to hot flames and gases. It may allow the shelter to fill with smoke. There's a chance of losing your shelter in high winds because it's hard to hang onto it when you're moving. You can do little to help another person during the peak of an entrapment. Do not move unless it is absolutely necessary.

Conditions Inside the Shelter

In a prolonged entrapment or when flames contact the shelter, temperatures inside can rise to uncomfortable, even dangerous, levels. Your best chance for survival is to stay calm and breathe the layer of fresh air found at ground level. Take short, shallow breaths.

The new fire shelter has fewer pinholes than the old shelter. Even so, firelight passing through pinholes may appear to be hot coals or embers on your clothing. These openings do not reduce your protection. No matter how big a hole or tear your shelter may have, you are better off inside the shelter.

In longer entrapments, or when flames contact the shelter, the shelter material can be hot enough to burn you. This is why you should be wearing a hardhat, flame-resistant clothing, and gloves. Use your



gloves to push the shelter material away from your body, maintaining a protective air gap. Shelter material is most likely to contact your feet,

When the flame front hit, the shelter was unbearable. I cannot put in words what it was like. It was just totally unbearable. The only reason I didn't get up and get out was because I had enough sense to realize it was a lot worse on the outside.

Entrapment survivor

buttocks, head, elbows, and hands. It is best to gently shift the points of contact, especially around your feet and elbows, because prolonged contact will cause burns.

If flames contact the shelter, the outer fabric heats up rapidly. The adhesive may start to break down allowing the foil on the outside of the shelter to peel away and reducing the shelter's effectiveness. The inner layer of foil prevents gases produced by adhesive from getting inside the shelter. Stay in your shelter with your nose pressed to the ground. Your flame-resistant clothing will provide some protection.

We need to emphasize that to people, that they may receive injuries, but their greatest hope is staying inside that shelter and protecting themselves, no matter what they hear, no matter what they see or feel, that they have to make just an absolute commitment to staying with that shelter if they want to go home.

Entrapment survivor

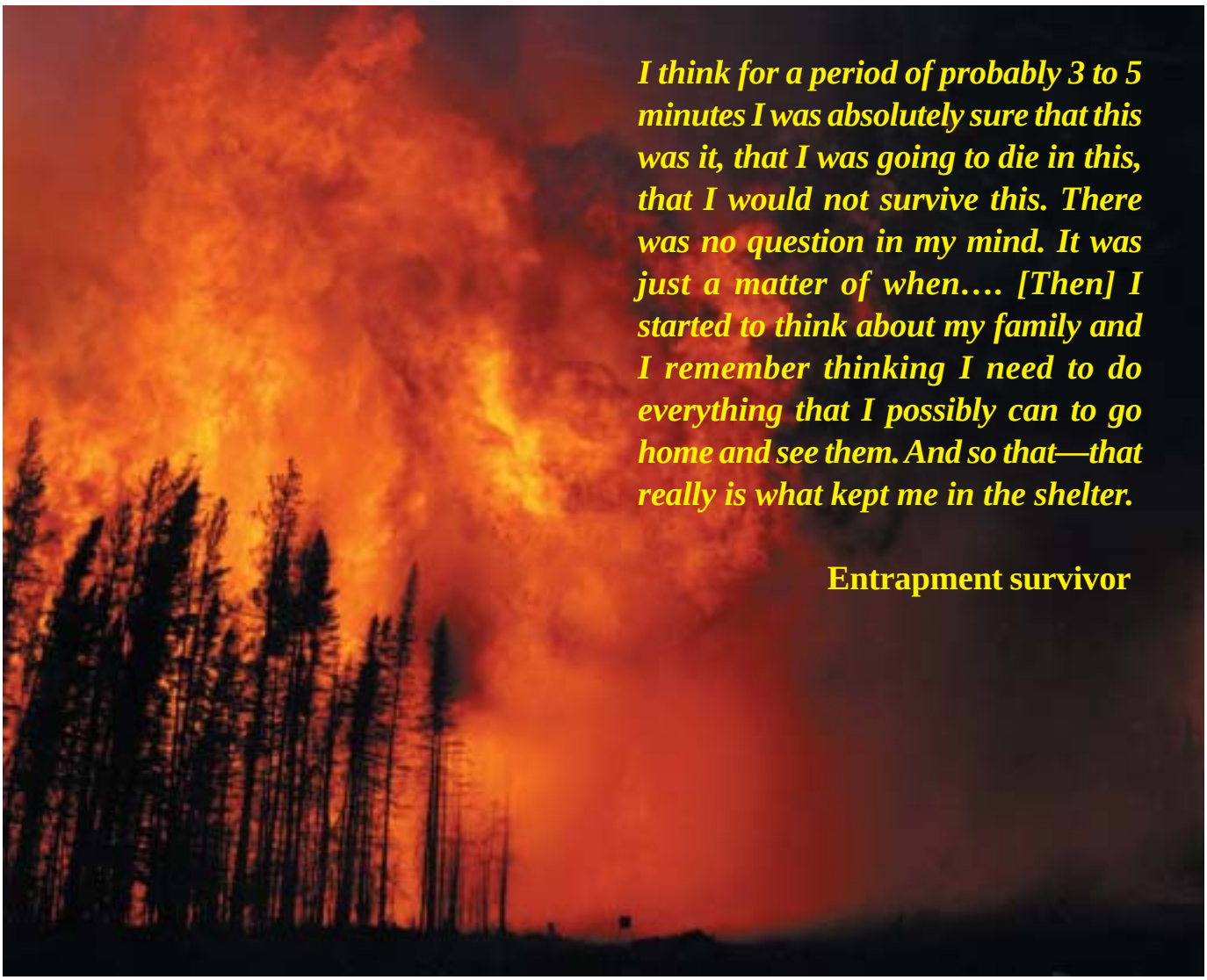
It was extremely painful. Things that were going through my head were, "I'm going to die, this is going to kill me." Afterwards, I remember thinking that because my legs were burned on the back of both calves and the backs of my thighs and it was so painful and it had gone on for such a long period of time that they were probably going to have to amputate my legs.

You believe that you're being burned to death or that you're being burned to the point that you'd never be able to use those limbs again, when in fact [my injuries] were deep third degree burns. But I ended up being able to fully recover and not have any really serious disability.

[We need to] make sure that people know what they might encounter, what it might be like, what they might hear and see around them, and to know above all else that if you get up, you die.

I think people need to know that you're going to think you're dying lying there on the ground, but in fact it's probably not as bad as you really think it is, and as long as you can protect your respiratory tract, you're probably going to walk away from this. People have to know that up front, going into this, or they're just going to be surprised by it when they get in there and they start feeling these things and they go, "Oh, my God, I'm dying. What do I do now?" You have to condition them to know what the response to that should be, "Oh, my God, I'm dying. Well, they told me I would. And, so I need to stay here."

Entrapment survivor



I think for a period of probably 3 to 5 minutes I was absolutely sure that this was it, that I was going to die in this, that I would not survive this. There was no question in my mind. It was just a matter of when…. [Then] I started to think about my family and I remember thinking I need to do everything that I possibly can to go home and see them. And so that—that really is what kept me in the shelter.

Entrapment survivor

When to Leave the Shelter

There is no fixed time to stay under your shelter. Don't move until the flame front has passed. A drop in noise, wind, and heat, and a change in the color of light passing through the shelter are tipoffs that it's safe to leave the shelter. Stay put until temperatures have cooled significantly or a supervisor tells you it's safe to come out. Leaving a shelter too soon can expose your lungs to superheated air or dense smoke. Typical entrapments have lasted from 10 to longer than 90 minutes. Entrapments don't last as long in light, flashy fuels as they do in dense, heavy fuels. Firefighters have died when they came out of their shelters too soon. Stay inside a little longer if you have any doubt about leaving the shelter.

When you leave your shelter, make sure that your supervisor knows the deployment occurred. Leave your shelter and other equipment in place if you can do so safely. A great deal can be learned from reviewing the circumstances of entrapments and the performance of protective equipment. Learning all we can from each shelter deployment can help us improve procedures and equipment for all firefighters.

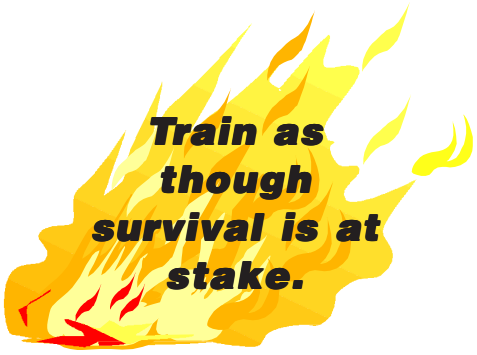
Training

Seconds are critical. Repeated hands-on training in shelter deployment is an essential part of fire shelter training. Firefighters have died when they were unable to deploy their shelters in time. Each year, every firefighter should practice fire shelter drills repeatedly. Drill until each step, from dropping your gear to deploying your shelter, can be done automatically. Practice should allow you to deploy the new shelter in 15 to 20 seconds.

Firefighters who have been through entrapments have reported that deploying the shelter had a calming effect—they were doing something they had been trained to do. The more you practice using your shelter, the more likely you are to react correctly in an emergency.

> ***It was obvious that [the firefighters] had [trained] and that they were comfortable with the task, and it seemed to sort of calm everybody down.***
>
> **Entrapment survivor**

> ***I didn't say, "Start talking to each other," because I was thinking "Well, I need to calm these people down." I was thinking that because I was trained to do that. I had been told that in the training, "Once you're in the shelters, begin to talk to each other immediately."***
>
> **Supervisor and entrapment survivor**



Training Scenarios

Each individual should practice deploying the fire shelter under the following six scenarios. It is best to train in realistic field conditions. Remember, always train wearing gloves, a hardhat, a full pack, and if you have one, a face and neck shroud.

1. **Standard deployment, clearing a 4- by 8-foot site.**

   Practice a standard deployment, first clearing a 4- by 8-foot site to mineral soil. Practice preparing the site so you can do so quickly. Some firefighters have found that the best way to deploy the new shelter is to step in, sit down, and roll over (figure 23).

2. **Proper use of shake handles.**

   The handles that extend from the end of the folded shelter allow the shelter to be unfolded quickly. When you grasp the handles correctly, the shelter's opening will be toward your body, allowing you to get inside quickly. Practice looking at the shake handles and grasping them with the correct hands before shaking.

3. **Deploy your shelter while lying on the ground.**

   If a fire approaches before you are fully deployed, your most important action is to get flat on the ground. Practice deploying your shelter from the ground by opening the shelter and pulling it over you.

4. **Drop your gear and remove your shelter while escaping.**

   When speed is essential for escape, drop your gear and run with just your fire shelter and your tool. You are more likely to remember these steps when stress and fear set in during an escape if you practice them each year.

   You can strip off the shelter's plastic bag as you are escaping. A partially unfolded shelter can be used as a heat shield and can be fully deployed in a matter of seconds. Be careful not to catch the shelter on brush or rocks.

5. **Deploy your shelter in a strong wind.**

   Because fires are accompanied by high winds and turbulence, it is important to practice in these conditions. Some people find it easier to deploy from the ground in strong winds. Try a variety of deployment techniques to find one that works for you. Always remove your pack at the earliest stage of deployment—it is extremely difficult to deploy a fire shelter in the wind while you are wearing a pack.

   While windstorms provide the most realistic training, you can get a good feel for wind deployments by using one or more strong fans, such as the positive ventilation fans used by fire departments.

Figure 23—Some firefighters have found that the best way to enter the new shelter is to step in, sit down, and roll onto your stomach.

6. **Lie in your shelter**.

   Lie in your shelter and picture yourself in an actual entrapment situation. Fear of confined spaces and the dark, combined with extreme heat, turbulence, and noise, can cause you to panic. Imagine the sounds, heat, and fear. Imagine steeling yourself to pain and staying in your shelter no matter what. Some firefighters have suffered claustrophobia while inside their shelters. Spend enough time inside a shelter to find out whether you're claustrophobic. If you are, gradually increase the time you spend inside a shelter to help you adapt.

Practice Fire Shelters

The new generation practice fire shelters are made from green plastic and can be reused many times. The practice shelter's carrying case is orange. *Never* mix practice and real fire shelter components. If you did, someone could carry a practice shelter to the fireline. This is another reason to inspect your fire shelter when you first receive it.

Realistic Training Is Best

> ***Training should not be done [under] controlled circumstances. Catch [firefighters] when they're tired; catch them when they are off guard; it may be more similar to what it's like in the real world.***
>
> **Supervisor and entrapment survivor**

The best training locations are in the field where different deployment site selections can be discussed. Practice evaluating possible deployment sites when out on the fireline so you can recognize deployment sites quickly, even when you are under stress. Remember, deployment requires removing your pack, clearing a site, removing your shelter, getting inside the shelter, and deploying on the ground.

Never Train in Live Fire

For more realism in training, some crews have occupied shelters near burning brush piles. This is unacceptable. Such training is extremely dangerous and risks firefighters' lives. ***NEVER*** use live fire for fire shelter training.

Visualization

In addition to hands-on training, visualize yourself practicing the deployment scenarios. Think of visualization as a dress rehearsal. It is a form of practice that allows you to experience events before they happen. Images have a powerful effect on us. The mind treats an imagined entrapment as if it were real. If you ever do have to drop your pack and deploy your shelter, visualization makes it more likely that you'll react correctly, quickly, and without panic. Visualization should be used only to supplement—never to replace—hands-on training.

Picture yourself in different entrapment situations. Think your way through the entrapments and imagine yourself reacting correctly to each situation. The most important actions to visualize are:

- Dropping your pack and tools to escape more quickly
- Dropping dangerous items like fusees and gasoline
- Dropping to the ground before the fire arrives
- Getting under your shelter
- Staying completely under your shelter even if you are being burned or the shelter starts to fail
- Protecting your airways and lungs by remaining prone, with your face to the ground

Inspection and Care

Inspection

The shelter has an indefinite shelf life because its materials do not degrade in normal storage at the fire cache. Nevertheless, all shelters should be inspected when they are issued and every 14 days during the fire season. Only serviceable fire shelters should be taken to the fireline. Don't assume that a new carrying case contains a new shelter. Shelters with the oldest manufacture dates should be issued first.

Inspect the carrying case, liner, plastic bag, and shelter (figure 24). Do not open the plastic bag. All opened shelters should be removed from service.

Check the plastic bag to ensure that the quick-opening strip is unbroken and the two red pull rings are intact.

If any item is broken, remove the shelter from service.

Abrasion is the most common damage to a fire shelter. Abrasion can be spotted through the plastic bag. Typically, the aluminum foil is rubbed from the fiberglass cloth on the outer surface or the outside edges of the shelter. Remove the shelter from service if you see extensive edge abrasion, if aluminum particles have turned the clear plastic bag dark gray or black, or if the bottom of the bag has debris. All of these problems are signs of serious abrasion. Look for tears along the folded edges. Remove shelters from service when tears are longer than ¼ inch.

Shelters that have been removed from service make excellent training aids, but should be clearly marked "For Training Only" so they do not reach the fireline.

Care of the Fire Shelter

Firefighting is rough on equipment, so the fire shelter is expected to have a limited service life. A little care can extend that life—even on the fireline.

The shelter is an important piece of protective equipment. Treat it accordingly:

- Always keep the shelter in its hard plastic liner.
- Avoid rough handling. Do not lean against objects when you are wearing the shelter. Do not use the shelter as a pillow.
- Don't load heavy objects on top of the shelter.
- Keep your shelter away from sharp objects that may puncture it.

Figure 24—Inspect your shelter regularly.

Conclusions

As a firefighter, your highest priority is to stay out of situations that can lead to entrapment. You must take responsibility for your own safety. You have an obligation to speak up if you see something that is wrong, and you have the right to be heard without criticism. Remember, the fire shelter does not guarantee your safety. It is a last resort.

Take your training seriously. Practice deploying your shelter until deployment is, in the words of one entrapment survivor, "like tying your shoe." Think of training as life insurance—insurance that if the unthinkable ever occurs, you will have every possible chance to survive.

Feedback

We will continue to improve the fire shelter and the fire shelter training aids. Ideas for improvements come primarily from you, the users. Please send your ideas for improvements to us.

Send comments and suggestions to:

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About the Author

Leslie Anderson has been a project leader for the fire shelter and fire clothing projects since 1998. She has a bachelor's degree in forestry from the University of California, Berkeley, and a master's degree in forestry from the University of Montana. She has worked in wildland fire since 1979, including stints as a smokejumper and as a district assistant fire management officer on the Bitterroot National Forest.

Library Card

Anderson, Leslie. Project leader. 2003. The new generation fire shelter. NWCG PMS 411. Boise, ID: National Wildfire Coordinating Group, Fire Equipment Working Team, National Interagency Fire Center. 30 p.

An improved fire shelter—an emergency tent made of reflective material—is now available for wildland firefighters. The heavily illustrated report describes how firefighters should use their new fire shelter when they are entrapped by fire. The report includes information on training, techniques to prevent entrapments, and steps to take in case of an entrapment. In addition, it contains information on the care and inspection of fire shelters.

Keywords: firefighting, personal protective equipment, safety at work

0351-2803-MTDC