

# Toolbox Talks

## Lightning Awareness Part 1

### LIGHTNING STRIKES

**The average bolt of lightning carries over 100,000,000 volts & can reach out over 100 miles.** According to the National Oceanic & Atmospheric Administration (NOAA), lightning is one of the leading weather-related causes of death & injury in the United States. It is estimated that the Earth is struck by this incredible electric force more than **100 times every second**. The odds of being struck by lightning in your lifetime are 1 in 3,000.

**There is a great deal of misunderstanding & misinformation regarding this powerful natural phenomenon. Let's explore some of the facts:**

- Some forms of lightning originate & release from high up in the thunderstorm cloud. This lightning can strike far away from the actual rain storm – up to 5–10 miles in front or behind the storm. Many people are struck by lightning without realizing they are in a lightning risk area.
- If you can hear thunder, you are within 10 miles of a storm & are within reach of lightning. This is the time to seek shelter.
- Rubber-soled shoes provide absolutely no protection from lightning.
- Buildings that are not equipped with grounded plumbing or electrical wiring are unable to conduct electrical current & do not offer protection from lightning. This means that you are still vulnerable if you seek shelter in a bus stop, shed, golf hut, park pavilion, etc.
- Stay away from tall objects if caught in a storm. **Trees are one of the worst forms of shelter from lightning.** They offer a false sense of security &, if anything, attract lightning.
- An automobile can offer protection by acting like a Faraday cage, provided that the occupants do not touch the metal of the car while inside.
- When lightning strikes it can easily travel through electrical wire. Avoid using electrical devices (computers, hair dryers, etc.) during a storm to prevent injury.

**So, what if you are caught in a vulnerable place during a storm?**

- If you begin to feel the hair on your body or head begin to rise, this could be a sign that the positive charge of your body is reaching up to the negative charge of the sky. A strike could be imminent. Stay low & seek shelter. If caught in the open, crouch low. **Do not lie on the ground.** You are more apt to receive a secondary shock from the ground if lightning strikes near you.
- If someone is struck, they do not contain an electric charge. Provide first aid immediately & be prepared to provide CPR. Call emergency response services.

**Let's go back to the beginning of July 2008 when 5 young lives were taken by lightning in just one week:**

1. Landon Dillard, 16, of Macon, Ga., was riding a bicycle at a summer camp in Colorado when he was struck down on July 3.
2. Two days later, 19-year-old Korey Moore of Swansea, S.C., was riding a personal watercraft when hit.
3. The next day lightning claimed Stephanie Dawn Kirpes, 23, of Woodbridge, Va., while she was jogging along the shore in Virginia Beach.
4. & 5. On July 7, two 16-year-olds were killed by lightning: Ben Richter on his family farm at Watertown, Wis., & Lucian Ellis of Sampson County, N.C., who was in a beach hut sheltering from a storm.

All information found at [safetytoolboxtalks.com](http://safetytoolboxtalks.com), [srh.noaa.gov](http://srh.noaa.gov), & [safety.cat.com/toolbox](http://safety.cat.com/toolbox)

"In terms of safety, the most important thing for people to know is if the sky looks threatening or they hear thunder, they need to get inside a substantial building — one with wiring & plumbing — or a hard-topped metal vehicle immediately," said John Jensenius, a lightning safety expert at the National Weather Service.

According to the Weather Service, a safe building has a roof, walls & floor, such as a home, school, office building, or a shopping center. They provide safety because lightning will usually travel through the wiring or the plumbing into the ground. That means stay away from showers, sinks, hot tubs, & electronic equipment such as TVs, radios, & computers.

**The National Weather Service's advice for folks threatened by lightning when there is no safe building or automobile available:**

- Do not seek shelter under tall isolated trees. The tree may help you stay dry but will significantly increase your risk of being struck by lightning.
- Do not seek shelter under partially enclosed buildings.
- Stay away from tall, isolated objects.
- Know the weather patterns of the area. For example, in mountainous areas, thunderstorms typically develop in the early afternoon, so plan to hike early in the day & be down the mountain by noon.
- Know the weather forecast. If there is a high chance of thunderstorms, curtail your outdoor activities.
- Do not place your campsite in an open field on the top of a hill or on a ridge top.
- Keep your site away from tall isolated trees or other tall objects. If you are in a forest, stay near a lower stand of trees. If you are camping in an open area, set up camp in a valley, ravine, or other low area. A tent offers no protection from lightning.
- Wet ropes can make excellent conductors. If you are mountain climbing & see lightning & can do so safely, remove unnecessary ropes extended or attached to you. If a rope is extended across a mountain face & lightning makes contact with it, the electrical current will likely travel along the rope, especially if it is wet.
- Stay away from metal objects, such as fences, poles, & backpacks. Metal is an excellent conductor. The current from a lightning flash will easily travel for long distances.



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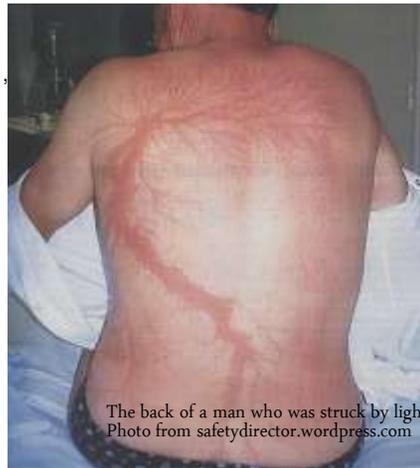
# Toolbox Talks

## Lightning Awareness Part 2

### Medical Impacts of Lightning

An average of 54 lightning fatalities per year were reported nationally between 1982 & 2011. Lightning fatalities are probably under reported by 30%. About 10% of the people struck by lightning are killed, leaving the other 90% with various degrees of disability. The primary cause of death from lightning is cardiac arrest. Unlike high voltage electrical injuries with which massive internal tissue damage may occur, lightning seldom causes substantial burns. In fact, most lightning burns are caused by objects such as rainwater, sweat, metal coins, & necklaces being heated up & causing the burn.

Lightning tends to cause nervous system injury & may affect any or all parts of the nervous system. If the brain is affected, the result is often difficulty with short term memory. Coding new information, accessing old information, slower reaction time, intense headaches, ringing in the ears, depression, seizures, & personality changes can occur among many other immediate symptoms & long term symptoms to those who have been struck by lightning. An organization which has been of tremendous help to survivors, their families, their physicians, & other professionals is lightning strike & Electric Shock Survivors International. Most lightning injuries & deaths can be prevented with advance planning. Staying abreast of the developing weather situation, & good common sense are two of the best preventatives from lightning strikes. NOAA weather radio can help keep you informed with the latest thunderstorm information & safety reminders.



The back of a man who was struck by lightning. Photo from safetydirector.wordpress.com

### The Myths & Truths of Lightning Safety

1. Some think that lightning never strikes the same place twice. This is a myth, & lightning often does strike the same place repeatedly, especially if that location is a tall & isolated object. For example the Empire State Building in New York City is hit nearly 100 times per year!

2. It is a myth that rubber tires on a car protect you from lightning by insulating you from the ground. Most cars are safe from lightning, but it is actually from the metal roof & metal sides that protect you – not the rubber tires. This is why convertibles, motorcycles, bicycles, open-shelled outdoor recreational vehicles, & cars with fiberglass shells offer no protection from lightning. When lightning strikes a vehicle, it goes through the metal frame to the ground, so do not lean on car doors during a thunderstorm.

3. The most chilling of lightning myths is that if you touch a lightning victim you will be electrocuted. The truth is that the human body does not store electricity. It is perfectly safe to touch a lightning victim to give them first aid.

4. It is a myth that if you are outside in a thunderstorm, you should seek shelter under a tree to stay dry. The reality is that being underneath a tree is the second leading activity for lightning casualties. Getting wet is far less dangerous than being struck by lightning!

5. While being in a house is a safe place to shelter from lightning, there are still some ways you are vulnerable from lightning. A house is a safe place to be as long as you avoid anything that conducts electricity. This means staying off corded phones, electrical appliances, wires, TV cables, computers, plumbing, metal doors, & windows. Windows are hazardous for two reasons. The first is the wind generated during a thunderstorm can blow objects into the window, breaking it & causing glass to shatter. Secondly, in older homes, in rare instances lightning can come through cracks in the sides of the windows.

6. Some think that if you are trapped outside & lightning is about to strike, you should lie flat on the ground. This is a myth, & lying flat on the ground actually increases your chance of being hit by a ground current. If you are caught outside in a thunderstorm keep moving toward a safe shelter or crouch down on the balls of your feet & become the smallest object you can become.

