

## Tornado Safety



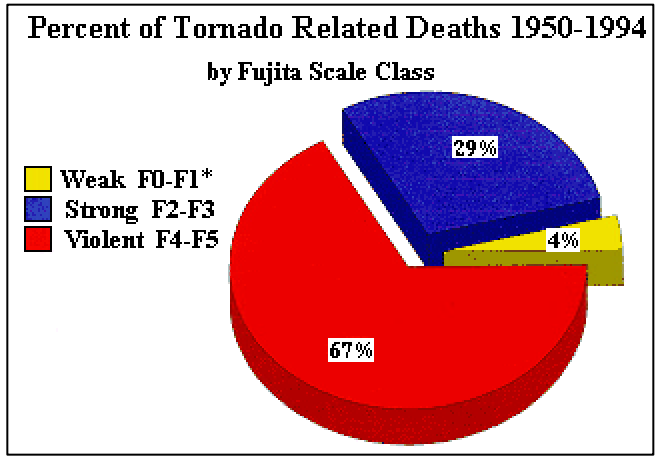
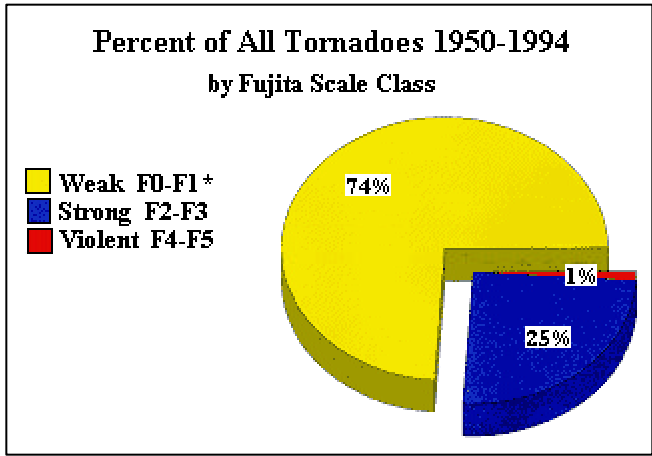
There are few words in the English language that bring about as much fear as the word *tornado*. Of all Nature's moods, this is perhaps the most violent. Though not as large-scale as a hurricane, or as long-lived as a Nor'easter, this particular severe weather event has occurred in every state in our country... including Alaska and Hawaii. It has occurred at virtually every time of the day, sometimes coming at night, sometimes in the morning, most often in the afternoon or early evening.

Tornadoes are storm-related events requiring a relatively rare combination of atmospheric conditions for them to form. Even so, there are approximately 1,000 of them each year in the United States.

Not all tornadoes are of equal intensity. The Fujita-Pearson Scale is a means of determining tornado intensity. Dr. Fujita created the original scale to categorize tornadoes according to the damage they did. Later, he and Dr. Pearson factored in tornado path width and length, and the Fujita-Pearson scale is now the standard gauge of tornado intensity. The scale is as follows:

- F0** - Wind speeds of between 40-72 mph. Branches broken, shingles lifted, possible chimney damage.
- F1** - Wind speed of between 73-112 mph. Mobile homes pushed off foundations, cars pushed off roads.
- F2** - Wind speeds of between 113-157 mph. Trees uprooted, roofs torn off houses, mobile homes demolished, trees uprooted.
- F3** - Wind speeds of between 158-206 mph. Roofs and wall demolished, cars thrown and trains overturned.
- F4** - Wind speeds of between 206-260 mph. Houses leveled and cars thrown considerable distance.
- F5** - Wind speeds of between 261-318 mph. Homes wiped completely off their foundations, trees debarked.

74% of all tornadoes are of F0 or F1 intensity. 25% are of F2 or F3 intensity. The remaining 1% are of F4 or F5 intensity. Yet this 1% is responsible for 67% of tornado deaths.



Over the years, our methods of forecasting the storms that spawn these violently rotating columns of air have made major headway. Despite people's invariable statements that the storm "just popped up out of nowhere", in most instances forecasters are aware of the initial setup of the conditions that birth the storms capable of developing tornadoes days ahead of the event.



Why, then, are there still deaths and injuries from tornadoes? People simply are either not aware that they are at risk, or disregard tornado or severe thunderstorms watches for their areas.

Tornadoes are relatively rare, and the average life cycle of one is only 8 minutes. Conditions may be favorable for tornadic development over a few states for several hours, but an actual tornado only impacts a portion of a county... or even a town. Currently, there are two stages of alert in place. A **tornado watch**

means that conditions are favorable for the formation of a tornado. A **tornado warning** means that a tornadic event has been detected, either by radar or by trained storm spotters on the ground relaying information to the National Weather Service on actual conditions. The National Weather Service is cautious about issuing tornado watches, as false alarms tend to make people hold such watches with little regard. Most people in a "watch box" may not even get a storm, let alone a tornado. If this happens enough times, folks get slack with their precautions. And of course, once a warning is issued, those in the path of the storm have very little time to react.



In this country, it is not unusual for people to know which football team is playing on any given day and where, which movie stars are getting divorced, when their favorite shows are on, what is happening on their favorite soap opera... but ask most people "what's happening in the atmosphere today?" and you will most assuredly be greeted by incredulous stares and hidden smiles and giggles. However, the atmosphere surrounds us all and affects us all. It's there every day, in a state of constant flux, providing us with the air we breathe, safe sunlight to play in, and the rain that feeds our crops and our streams and lakes. It is capable of bringing life; it is capable of taking life, and it is deserving of more respect than it gets.

Even those not living in areas where severe weather is commonplace should be aware of possible weather events on any given day. Know the potential for severe weather. The first step to disaster preparedness is knowing what the potential is for it.



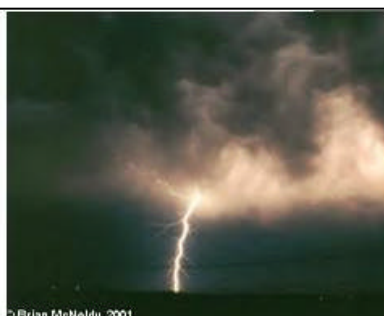
A quick glance at The Weather Channel lets this MESO member know that though she may be under fair skies, folks at home are at high risk. A phone call home alerts her family to the potential for severe weather.

Knowing that there is even a remote possibility that your town may one day be hit by a tornado predicated the need of knowing what to do if such an event were to occur. Most people have little interest in learning meteorology or forecasting, choosing to leave that to the weather experts. Be aware of what they are saying the potential is for severe weather. Be aware of your local warning systems. Also, a NOAA weather radio is an easily affordable and easily acquired appliance that emits a warning tone when watches and warnings are issued for your area.

Awareness of the events that may indicate a severe storm or tornado is also of critical importance. Though dark clouds, rotating or converging clouds, clouds with a greenish tint, high winds, hail, and frequent lightning are relatively overwhelming indicators that a severe thunderstorm is imminent, not all of these conditions have to be present for a tornado to occur. Any single factor should be considered as a possible harbinger of a tornadic event, and a combination of all those factors doesn't necessarily bring a tornado. They should, however, put one in a heightened state of alert.



**Hail**



**Frequent lightning**



**a lowering from the storm's base (wall cloud)**

**All these conditions may be the precursors of a tornado.**

## Prepare

The most important factor in disaster survival is disaster preparedness. It is of paramount importance that families have a disaster plan, and that each and every member of the family know it by heart. Of equal importance to educating members of the family is to do so without fostering undue fear in your children. The tone for such discussion should be upbeat and positive, with all members able to contribute thoughts and input.

Such discussion might begin with planning out a family disaster kit. The disaster kit should contain things that you feel you would need should you be confined to shelter for any period of time. It might contain:

- \* A first aid kit
- \* Blankets
- \* Bottled water (replace every 6 months or so)
- \* Canned goods and nonperishable food stuffs
- \* A few flash lights... and remember to periodically check those batteries
- \* A battery operated radio
- \* Prescription medications (check with your doctor or pharmacist on shelf life)
- \* Emergency cash
- \* A list of important phone numbers and emergency contacts
- \* Flares and matches in a zip lock bag.
- \* Eyeglasses... possibly a good use for the "old ones" you just replaced.
- \* A change of clothes for each family member
- \* A box of handiwipes
- \* A porta-potty... or even a bucket.
- \* Additional batteries for whatever you use that requires batteries: hearing aids, radios, wheelchairs, flashlights, cell phones, etc.
- \* A fire extinguisher

This can be a fun family activity, especially if you respect the input of all involved, even the little guys. Kids are wonderfully candid, and great for thinking up those seemingly inconsequential things that you cannot live without, like disposable diapers, Kleenex, lighters, etc.

## Shelter

After your disaster pack is planned, discussions as to where to put it follow naturally; in other words, determine where you will seek shelter. In homes that have them, basements or storm shelters are the logical choice. If you have no basement, the most interior room without windows on the lowest floor possible, or an

interior hallway would be a good choice. Put as many walls between you and the outside as possible, and opt for a room with a short span ceiling if possible. Put the disaster kit as near to the shelter as possible.

If you don't have a basement, consider making a safe room. Most homes built today are known as "stick" homes. That is they use 2x4 framing covered with fiberboard and cover the outside with a half brick facade or aluminum siding. This combination actually provides very little resistance to high winds and no protection against tornadoes. The only saving factor is that almost all foundations are built from concrete, are at least partially underground, and have the ability to withstand some very serious conditions.

In high-risk areas, the addition of a concrete room can mean the difference between life and death. In houses that have no basement, the room can be added at ground level, and should be as far from the outside walls as possible. In homes with a basement, it can be added in a corner to the existing structure. The room can be poured for minimal cost and should include a ceiling of concrete to complete the weatherproof structure. If built during the original construction of the home, this special shelter can be used as a storage area, an extra closet, etc.

Nothing is full proof but with today's concrete additives and pre-form concrete panels, a heavy-duty structure can be built as a multi purpose area and a safe area. Most tornadoes only touch a house for a few seconds and cause incredible damage to the normal structures. With a little warning and the addition of a "safe room", you have the ability to get your family out of danger.

FEMA (Federal Emergency Management Agency) offers a guide to building safe rooms. It can be ordered by calling 1-888-565-3896 and requesting a copy of publication FEMA 320.

## **Mobile Homes**

Mobile homes provide no shelter from tornadoes. Many mobile parks have addressed this issue by making a community shelter. If your mobile park offers this, ask to inspect it before hand, making sure it's safe and offers sufficient protection. If your mobile park does NOT offer a shelter, find out where there is a public shelter or a building you and your family can take shelter in. If you are in a high risk area, you may consider actually building a shelter. However, it is critical that in a tornado, you leave the mobile home immediately and seek some sort of alternate shelter... even if it's a ditch. You will be safer there than in your home.



## Discuss

Make a family disaster plan, and run shelter drills. Let each person know that the most important thing is to get to the pre-designated shelter site as soon as possible. Delaying seeking shelter to find a missing pet, photo album, or a school ring can be a fatal decision.

Part of any good disaster plan is to allow for as many possibilities as is possible. Things to discuss might be:

- \* Can you make improvements to increase safety? Weigh risks, and take measures to insure that you have done all you should to provide a safe structure. There are valid arguments for anchoring roofs, reinforcing doors, and using storm shutters for the windows.

- \* How safe is your property? Lawn furniture, barbecue grills, and garden tools become missiles in high winds. If there is a chance for severe weather, stash them in the garage or tool shed. Dead limbs on trees and loose shingles also become projectiles. Take care of them.

## What to do when you're not at home.

Never leave safe shelter to try to make it home. Stay put. If a tornado is imminent, and it becomes necessary to seek emergency shelter, it is important to be able to determine quickly which options are the

best. Never try to outrun a tornado in your car. Cars are relegated to predetermined paths known as roads. Tornadoes are not. Leave the car and seek shelter immediately.

Shelter in a short span building with little glass is the best choice if available.

Seeking shelter under sturdy furniture is not ideal, but better than nothing.

Should structural shelter be unavailable, a recessed or low point on the ground is a last resort. Protect your head from flying debris with one hand, and try to anchor yourself to a small well-rooted bush with the other hand. Tornadic thunderstorms often bring flash flooding. Be alert to the risks of flash flooding if you seek shelter in a recessed area on the ground.



A family in an Oklahoma motel taking precautions. After a brief briefing from MESO members, they have prepared to shelter in the bathroom with pillows and blankets (the innermost room and with no windows and a short span roof) and are turning OFF the TV as tornado warning sirens blare outside.





A worried Mom and her baby wait out a tornado warning sheltering in a convenient store... that was 85% glass. Moments later, MESO members showed her to safe shelter: an interior room free of windows, with sturdy walls and a short span roof.

It is now a known fact that seeking shelter in an underpass is unwise. Winds actually intensify when forced through a relatively small opening like an underpass. You can feel this effect by walking between two buildings when there's high wind. Notice how it intensifies between the buildings? A doubling of the intensity is reasonable. Now apply that formula to 200 mph winds.

## Other ways to prepare

- \* An out-of-area friend to use as an emergency contact should family members become separated.
- \* Select a place everyone is familiar with to meet after the storm if you become separated.
- \* Know where and how to turn off gas, water, and power. Make sure other adults and older children have this information as well.
- \* Store important documents in a safe place. Safety deposit boxes and safes stand up to weather damage much better than shoeboxes and dresser drawers.

## After the storm

Too often, people think that after the storm has passed, so has the danger. Nothing could be further from the truth. There are conditions resulting from severe weather that are just as dangerous and devastating as the storms themselves.



One of these dangers is structure damage. A seemingly safe structure that may have survived the storm intact may in fact be extremely unstable. Signs of structure instability may be cracks in the walls, sagging floors, and uneven ceilings. Never assume that because a building hasn't collapsed YET that it isn't in danger of collapsing. Leave any damaged premises as soon as you can, but only after the storm threat has passed. Do not return to a premise that you suspect may have sustained structural damage until qualified authorities have given the building the "all clear"



Other post-storm dangers in structures are broken water mains, ruptured gas lines, downed power lines, and broken glass.

Some of the hidden dangers after the storm are those arising from power outages. Perishable food, in general, must be discarded after being exposed to temperatures over 40°F for over 2 hours. However, it is possible for food to remain safe for longer periods of time if you limit your access to the refrigerator, possibly as long as 6 hours. If any food, regardless of storage temperature, has an unusual odor or texture, discard it immediately. "When in doubt, throw it out." If you live in areas where power outages are frequent, keep bottled water on hand and keep freezer packs in your freezer for use with a cooler or other thermal storage unit.

It is also possible that water stores may become tainted after a weather-related disaster. Water with a strange odor, color, or taste should be considered a potential risk and discarded. Generally, boiling water for 10 minutes is sufficient to make it safe. In the event of a power outage, water can of course be boiled over a barbecue pit, a sterno stove, or a camper stove (only after establishing that there are no chemical spills or gas leaks), and of course only outside...not in an enclosed building.

It is the general tendency for people to want to help others in times of need or shared disaster. Trying to help the trapped and wounded is a wonderful human tendency, but too often results in even more tragedy. In cases of serious injury, every effort should be made to keep someone safe, but unmoved until trained professionals can assist in stabilizing the victim and preventing further trauma caused by improper extrication. If someone is hurt and/or trapped, notify the authorities. Keep a cool head and weigh the risks before you take them.

It is very common for survivors of a tornadic event to have post-stress trauma. There is no shame in seeking professional help after experiencing a weather-related disaster. It is important that having survived the storm, you also survive the aftermath.



## A Word on Pets



Pets are a vital part of the family, are loved and cherished by your family and your friends. The following suggestions were recommended by FEMA and are an excellent way to add to family severe weather preparedness plans. A little prep will save a lot of worry and heartache, something no one needs during a disaster.

Plan how to take care of your pets. If you must evacuate, it is best to take your pets with you. However, pets (other than service animals, such as Seeing Eye dogs) are not permitted in public shelters, according to many local health department regulations and The American Red Cross Shelter Management Protocol.

Contact hotels and motels outside of your immediate area to check their policies on accepting pets and restrictions on the number, size, and species. Ask if "no pet" policies could be waived in an emergency.

Ask friends, relatives, or others outside of the affected area whether they could shelter your animals. If you have more than one pet, they may be more comfortable if kept together, but be prepared to house them separately.

Prepare a list of boarding facilities and veterinarians who could shelter animals in an emergency; include 24-hour phone numbers. Ask local animal shelters if they provide emergency shelter or foster care for pets in a disaster. Animal shelters may be overburdened, so this should be your last resort.

Keep a list of "pet friendly" places, including their phone numbers, with other disaster information and supplies. If you have notice of an impending disaster, call ahead for reservations.

Carry pets in a sturdy carrier. Animals may feel threatened by some disasters and become frightened or try to run. Have identification, collar, leash, and proof of vaccinations for all pets. Veterinarian

records may be required by some locations before they will allow you to board your pets. If your pet is lost, identification will help officials return it to you.

Assemble a portable pet disaster supplies kit. Keep food, water, and any special pet needs in an easy-to-carry container. Have a current photo of your pets in case they get lost.

As a last resort, if you absolutely must leave your pets behind, prepare an emergency pen in the home that includes a three-day supply of dry food and a large container of fresh water.

Pets are often forgotten about in an emergency. Don't forget they are loved as family members and consideration must always be given to them. Most emergency operation plans (EOPs) have an emergency pet care annex. As is seen over and over again, some plans need to be altered during crisis, and priorities be set. The best way to be sure your loved pet is safe, is to plan ahead.

## **Acknowledgements and Resources**

The tornado frequency and tornado-related deaths figures were provided by the Tornado Project Online (<http://www.tornadoproject.com/>). Photographs throughout the document are courtesy of various MESO members and are not to be reproduced without written permission.

Relevant websites:

- \* NOAA Weather Radio <http://205.156.54.206/nwr/index.html>
- \* Federal Emergency Management Agency (FEMA) <http://www.fema.gov/>
- \* National Weather Service (NWS) <http://www.nws.noaa.gov/>

***MESO, October 2001***

<http://www.mcwar.org/>