

BOONE COUNTY EMERGENCY MANAGEMENT



GUIDE TO DEVELOPING A TORNADO EMERGENCY PLAN FOR SCHOOLS

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The Michigan Committee for Severe Weather Awareness
A Guide to Developing a Tornado Emergency Plan for Schools (March 1999)

Table of Contents

I. INTRODUCTION

- A. Purpose of this Guide
- B. Who will develop the plan?

II. UNDERSTANDING THE DANGER: WHY AN EMERGENCY PLAN IS NEEDED

- A. Tornado
- B. Conclusion

III. DESIGNING YOUR PLAN

- A. How to receive Emergency Weather Information
- B. How will the Administration Alert Teachers and Students to take Action?
- C. "Safe Spots" in your school.
- D. When to activate your plan and when to return to normal activities.
- E. When to hold departure of school buses
- F. School Bus actions.
- G. Safety During athletic events.
- H. Need for periodic drills and Tornado Safety Instruction.

IV. BASIC TORNADO SPOTTING TECHNIQUES

APPENDICES – Reference Materials

- A. National Weather Service (Watch, Warning)
- B. Glossary of Weather terms
- C. General Tornado Safety
- D. Local Contacts
- E. Tornado Safety Plan Checklist
- F. Acknowledgements

I. INTRODUCTION

A. Purpose of this guide

The purpose of this guide is to assist school administrators with the development of a tornado emergency plan. This guide does not cover every possible situation. The guide will provide enough information to serve as a starting point and a general outline of actions to be taken. Remember that safety is always the top priority. The primary goal is to monitor the weather, immediately inform students and staff of the tornado threat and move them as quickly as possible to pre-designated shelter locations. Tornadoes occur with rapid onset and often with little or no warning. Decisions must be made fast and actions taken immediately. Schools cannot wait for storms to strike to plan what must be done to save lives. Prepare now and develop an emergency action plan for your school.

B. Who will develop the plan?

Before you begin it is recommended that one person be designated as the “Severe Weather Coordinator” (“Coordinator”). This person may be the Safety Director, an administrator or a teacher. The individual should attend training in preparedness for Severe Weather including the National Weather Service Severe Weather Spotter Training. The Coordinator is responsible for developing the plan and working with the School Board, Superintendent, administrators and teachers to implement the plan. For any plan to work efficiently it must be practiced. State law requires that schools conduct a minimum of two tornado drills per school year. Tornado safety instruction should be conducted in conjunction with the drills. It is important to develop a basic knowledge of severe weather, weather terminology, emergency preparedness and why certain actions are taken to protect students.

II. UNDERSTANDING THE DANGER: WHY AN EMERGENCY PLAN IS NEEDED

A. Tornado

It is 1:30 p.m. and the school principal hears the NOAA weather radio tone-alert and a message indicating that the National Weather Service has issued a Severe Thunderstorm Watch for Boone County. Thunderstorms are beginning to build to the west and are expected to arrive in less than an hour. The principal decides to cancel all outdoor activities, orders staff to be certain all shelter areas are unlocked and makes an announcement to inform teachers and staff.

At 2:05 p.m. it begins to get very dark outside and there is a rumble of thunder. The school’s trained weather spotter looks outside and observes that the sky looks like it is boiling and has a green tinge. The wind picks up and the trees begin to sway and a cloud of dust is blown across the parking lot. “This storm doesn’t look good”. The NOAA Weather Radio tone-alert sounds as the National Weather Service issues a Severe Thunderstorm Warning for Boone County. Suddenly, he hears a roar of wind and a crash. The storm has let loose a downburst – a sudden, strong rush of wind.

He rushes toward the source of the noise. A branch from a nearby tree has shattered a window in a classroom. A few children were injured from the flying glass. He evacuates the classrooms on the windward side and moves the children into the interior music room that has no windows. They will be safer in there.

Hail begins to fall and grows larger in size. The physical education instructor is barely heard above the roar of the hail striking the gymnasium roof and skylights. She moves the students into the locker rooms where it is safer. Large hail can impact at 100 mph. Suddenly, the skylights shatter.

The principal decides to play it safe and move all students into the interior hallways. The lights flicker and the power goes out. She can't announce it on the P.A. system so she grabs a bullhorn and begins rapidly moving through the school. The students and teachers empty out of the classrooms and are a little confused. Some children are excited by the commotion and some are scared by the storm. The hallways are noisy with anxious voices, but quiet down when a roar, similar to the sound of a train drowns them out. Teachers yell, "Get down! Drop to your knees and cover your head!" Glass is heard breaking.

It is all over in just a couple of minutes. Only ten minutes had passed since the thunder began. A tornado had struck the school. The classrooms on the south side of the school were destroyed. The cafeteria and gymnasium roofs were gone. Children and teachers were shaken, but only minor injuries resulted.

B. Conclusion

About 14 tornadoes touch down in Kentucky each year. Many more storms produce downbursts and hail. Because the school in this scenario took the proper actions, lives were saved.

Tornadoes occur with rapid onset and, perhaps, little or no warning. Decisions must be made quickly and actions taken immediately. One cannot wait for the storms to strike to plan what must be done to save lives. **PREPARE NOW AND DEVELOP OR IMPROVE YOUR EMERGENCY ACTION PLAN FOR YOUR SCHOOL.**

III. DESIGNING YOUR PLAN

A. How to receive Emergency Weather Information

Tornadoes can occur with little or no warning. Minutes and even seconds can save lives! In just two minutes a tornado may travel two to four miles on the ground. From the time the National Weather Service (NWS) issues the warning to the time you receive that warning via radio or television, critical minutes may have elapsed. You must be listening when the initial warning is announced or an even greater amount of time will pass.

The fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA (National Oceanic and Atmospheric Administration) Weather Radio with battery backup and a "tone alert" feature. NOAA Weather Radio (NWR) is operated directly from the NWS Offices and is part of our country's National

Warning System. NOAA Weather Radio is also an integral part of the Emergency Alert System that includes television and radio stations. When the NWS issues a tornado warning the NWR “tone alert” is instantly sounded followed by warning information.

The NWR “tone alert” is activated when weather warnings as well as watches are issued. (See Appendix A for Watch and Warning definitions) NWR broadcasts 24 hours a day, seven days a week with current weather and forecast information, and also provides special updates about sudden weather changes and potentially hazardous weather. For more information on NWR see Appendix D.

Your NWR should be located in the main office or near the person(s) responsible for enacting the plan. Main offices are good because generally there are people around who could hear the alert and it is close to the public address (PA) system. The NWR should be left on and in the alert mode at all times.

Listen for three things: 1) the type of watch or warning; 2) where it is in effect, and how long it is in effect for. The person(s) monitoring the NWR must know what action they should take based upon this information. It is suggested that you have a map nearby for easy reference to counties and cities to locate storms and their movement in reference to your school. There is probably no need to take emergency action if the warning is not for Boone County. However, keep in mind, that even if the warning is not for your school’s immediate location, weather may change rapidly and activation of your school’s trained weather spotter(s) is advised. It is advisable for those schools near the county’s borders to monitor the weather in neighboring counties. Any watch or warning issued in an adjacent county should heighten your awareness to the potential for severe weather to affect your school.

B. How will the School Administration Alert Teachers and Students to Take Action?

Most schools utilize an alert tone and/or PA system to communicate directly to students and teachers. In some cases, electricity may be lost during a storm before you have activated your plan. Therefore, it is critical to have backup generator power and/or a back up alerting device such as a bullhorn or a compressed air horn.

If your school has mobile classrooms or detached buildings that are not part of the PA or intercom system, then special arrangements must be made to notify these areas and to evacuate to a main building before the storm arrives. Sending “runners” outside to these areas is not advisable due to the danger posed by lightening and the approaching storm. You may provide these areas with Weather Radios and direct them to report to the main building when a Severe Thunderstorm or Tornado Watch is issued. Wireless communication devices are another effective means for such communication. Two-way “walkie-talkie” radios may be the least expensive. Your plan must also address before and after school activities and provide clear instructions for guests that may not be familiar with the building.

Disabled or learning-disabled students also require special attention. You may want a teacher or staff member assigned to each student requiring special attention to see that the student is moved to the appropriate place of safety. Your emergency action plan should also provide for hearing impaired students who may not hear alert tones or special announcements.

To ensure understanding of your plan and that appropriate actions are taken following your alert you must conduct drills. (See part H of this section on drills and the need for tornado instruction)

C. Tornado “Safe Spots” in Your School

This may be the most time consuming and complex phase of designing your plan. Schools are sufficiently complex and diverse in design that it is impossible to describe an exact plan here that will apply to every school. Due to this complexity, it is recommended that this phase of your plan be accomplished with the help of an engineer or architect familiar with the school’s design. We recommend that you also contact the Boone County Emergency Management Office for assistance. What follows are a few general guidelines and basic concepts that can be discussed.

The greatest dangers from high winds (tornado, thunderstorm downburst, etc.) are –

- 1) Roof Failure
- 2) Breaking Glass
- 3) Flying Debris (airborne missiles)

The most dangerous locations are generally large rooms with large expansive roofs such as cafeterias, gymnasiums and auditoriums. The collapse of the room’s load bearing wall may lead to failure of the entire roof. Rooms with large windows that may shatter from being struck by airborne missiles or from severe winds are also extremely dangerous. While windows on the side of the school facing the storm are most susceptible, as the storm passes, any windows could potentially shatter. This is one of the reasons that it is **NO LONGER ADVISED THAT YOU OPEN ANY WINDOWS**. Greater damage may occur from this action, and valuable time is lost that should be used getting to safety.

Small interior room, bathrooms, and windowless, interior hallways that are away from exterior doors offer the best protection. Interior load bearing walls (with short roof spans) provide better protection than temporary or non-load bearing walls and structures. If your school has more than one story, evacuate the upper floors. The lowest level is always the safest.

Schools designed for the “open classroom” concept used in the early 1970’s have a difficult task of finding safe areas due to a lack of interior load bearing walls, large spanning roofs and the use of a lot of glass. You may not be able to find enough “ideal” space to occupy your entire student body. It may be a matter of determining the lesser of evils. Below is a list beginning with the **MOST DANGEROUS AREAS**:

- 1) Windows on exterior walls.
- 2) Rooms with large span roofs, mobile classrooms.
- 3) Exterior walls of upper level.
- 4) Interior walls of upper level; exterior walls of lower level and interior glass.
- 5) Interior, lower level, non load bearing walls.

Fortunately, the majority of tornadoes will not destroy well constructed buildings, and damage in about 70% of cases should not go beyond damage to mobile classrooms, rooms with large roofspans, and windows on exterior walls. Using these considerations,

you may want to rank areas according to safety. Then begin by filling the safest areas first with students and continue until you have found space for the entire student body.

AGAIN, IT IS BEST TO HAVE AN ENGINEER OR ARCHITECT ADVISE YOUR SCHOOL ON THE SAFEST AREAS SINCE SCHOOLS ARE BUILT WITH VARIED DESIGNS AND PURPOSES. THE PRIORITIES LISTED ABOVE ARE BASED ON BROAD GENERALITIES.

D. When to Activate your plan and When it is safe to Return to Normal Activities

Your severe weather safety plan may work best with phases of activation. In a tornado watch, outdoor activities should be postponed. Should storms approach, you may want to move students from the most susceptible areas such as mobile classrooms and gymnasiums as a precaution even though a warning has yet to be issued. You may want to post teachers or staff trained in spotting severe weather to watch the storms as they approach for the need to take special actions. (See section IV on basic tornado spotting techniques) Your plan should also include secondary forms of communication which would be used should power be lost. Your plan should also address the time of day. You may find it more difficult to implement your safety plan during recesses, class changes, or near the beginning or end of the school day.

If a tornado warning is issued for Boone County an immediate and complete "call to action" is needed. If the storm has not yet reached your school, begin moving students from unsafe areas as listed above and post a trained teacher or staff member to keep an eye on the storms as they approach. (From your drills you should know approximately how long it will take to move students into "tornado safe areas".) As the storm nears, move all students to tornado safe areas and have students and teachers drop immediately into the protective position.



Remember that winds may pick-up at the onset of the storm and may or may not drop off prior to the tornado, and that rain may or may not be occurring. Large hail is a signal that you are near the part of the storm in which the tornado would occur. Once the storm has past, students may return to classrooms. If your school is hit, a pre-designated safety team should assess damage and injuries and then notify appropriate law enforcement and medical personnel. Stay alert for the potential for additional storms. One special consideration would be the complication of activating a full "Call to Action" plan during class changes, when the halls are crowded and students may not know where to go. It may be best to hold classes beyond your regular dismissal time until the severe weather threat has passed. Likewise, at the end of the school day, students may need to be held from boarding buses until the danger has passed.

Remember also, that straight-line winds from severe thunderstorms can approach 110mph and can cause as much damage as a moderate tornado. If a severe thunderstorm warning is issued for your county, at a minimum, move students out of mobile classrooms and away from windows.

You should have at least several people who know how to shut off the main power (electricity) and gas. After a tornado or severe thunderstorm, it may be necessary to shut off the gas and electric supply to the building if damage has occurred to the school.

E. When to hold departure of school buses

You will want to consider holding the departure of students to buses whenever watches or warnings are in effect. There are three primary considerations:

- Upon departure, how long before ALL the students are safely at home? Include time for the students to walk from their bus stop to their home.
- How much time do you have before the storms are expected to arrive? Tornado watches are sometimes issued a couple hours in advance of thunderstorm development. Watches are generally issued for large areas, so even once storms have developed, it may be a couple hours before the storms reach you. *On the other hand, it may be a rapidly developing situation with less than an hour before the storms arrive. If you feel that severe weather is not imminent, buses may depart... but notify the drivers about the severe weather threat.*
- If a *warning* is in effect for your county at dismissal time, delay departure of the buses. Escort students that have been already loaded onto the buses back into the school.

If the storm is expected to arrive before all students can be transported safely home then a delayed departure is recommended. Buses provide no protection from severe storms.

If a *Watch* is in effect at dismissal time, your decision becomes a bit more difficult. Watches are normally issued hours before severe weather is expected to hit but, on some occasions, it may be for rapidly developing situations with less than an hour before the storms arrive. Your decision will be based upon a judgement call. If you feel the severe weather is not imminent, then buses may depart...but drivers should be notified about the weather situation and instructed to be especially alert to the potential for dangerous weather. If you have any indication that the storm will arrive before students arrive safely at home, then bus departure should be delayed. *It is best to err on the side of caution, because school buses provide no protection from severe storms.*

Another consideration may be if a large number of children from your district live in mobile homes. Mobile homes are extremely susceptible to high winds even when properly anchored and tied down, and a storm that would produce minor damage to a school could completely destroy a mobile home. The school provides a much safer environment than a mobile home, and this should be taken into account when deciding whether to send students home or shelter them at school.

Finally, it must be conveyed to parents that they should not pick up their children at school during severe weather. They need to understand that the child is far safer at the school with the severe weather plan in place than on the road when a severe storm strikes. The next section will discuss what bus drivers should do if faced with a tornado approaching.

F. School Bus Actions:

All school bus drivers should be trained on how to handle severe weather situations. Although tornadoes are the primary concern here, large hail, high winds and flooding also pose significant threats. Bus drivers should be able to react quickly and take charge of a severe weather situation. **NEVER ATTEMPT TO OUTFRAN A TORNADO!** If a bus driver has reason to believe a tornado is approaching, the following steps should be taken.

- If you have the time to get to a designated tornado shelter or well-constructed building that you can unload students into, then certainly do so as fast as possible. In a building, move them into the interior or basement of the building away from windows and doors.
- If no sturdy shelter is available, look for a ditch or low-lying area (preferably without water). Make sure the bus is parked well away (preferably downwind) from the location you have selected. Unload the students to the low-lying area and have them get in position with their hands over their head (See diagram 1 above).

G. Safety During Athletic Events

Protecting athletes and spectators once severe storms or tornadoes begin moving into an area is essentially impossible because there is so little time to act and because safe shelter is much more difficult to find for tornadoes than for other types of severe weather. Suggesting that everyone go home when there is an imminent tornado is not acceptable, because automobiles are not safe shelters under these conditions.

The single most effective tornado precaution an athletic program can take is to obtain accurate, current weather information and shut down athletic events when violent weather threatens.

For tornado safety, athletic programs should:

1. Designate a chain of command for making the decision to remove individuals from an athletic site.
2. Designate an individual who will obtain a weather forecast each day before a practice or event and monitor the weather forecast and NOAA Weather Radio constantly when there is any threat of severe storms or tornadoes.
3. Athletes and coaching staff should know where the closest "safe shelter" is. Safe shelter for tornadoes is defined as the basement of a sturdy building, away from windows, glass doors and chimneys. If a basement is not available, an interior hallway on the lowest floor is best. Rooms with large, free-span roofs like gymnasiums should be avoided. The inside of an automobile is not a safe place if a tornado is imminent. If no safe building is nearby, individuals should seek shelter in a ditch, ravine, or other place below ground level and stay as low as possible.
4. Tornado Watch or Severe Thunderstorm Watch: NOAA Weather Radio should be monitored. If a watch is issued during a practice, practice can continue, as long as

coaching staff and athletes know how to get to nearby safe shelter and NOAA Weather Radio is being continually monitored.

5. Tornado Warning or Severe Thunderstorm Warning: NOAA Weather Radio should be monitored at all times. If a warning is issued during either a practice or game, athletic activity should be suspended and all participants moved as rapidly as possible to safe shelter. Athletic activity should not be resumed until the National Weather Service suspends the warning.

Extreme weather conditions threaten the health of athletes, staff and spectators. Before any athletic season begins, policies should be defined for modifying or canceling practices and games under conditions of lightning, Severe Thunderstorms, Tornado Watch and Tornado Warning, extreme heat and extreme cold. There are no national standards for such policies.

Each athletic program should work with medical advisors, athletic trainers and administrators to come up with a policy that is scientifically valid and acceptable in the community.

H. Need for Periodic Drills and Tornado Safety Instruction

In order to have an effective severe weather emergency plan, you must have periodic severe weather drills and severe weather safety training. Kentucky law requires a minimum of two tornado drills each school year. Drills not only teach students and staff the actions they need to take, but will allow you to evaluate effectiveness of your plan. Did everyone hear the message, did they understand what to do, and were they able to get to the designated areas of safety in a reasonable amount of time? It is suggested that you conduct such drills in conjunction with a severe storms and tornado education and awareness program so that students and teachers understand the dangers of severe storms and tornadoes and better comprehend the actions that they are asked to take.

The Kentucky Division of Emergency Management coordinates an annual statewide "Severe Storms Preparedness Month" campaign in March. Boone County Emergency Management participates in this campaign. An important component of the campaign is the Statewide Tornado Drill usually held the last Tuesday of March. This is an opportune time for your school to conduct a drill and a severe storms and tornado education program. You can contact Boone County Emergency Management if you would like a speaker to come to your school and discuss severe storms and tornado safety.

It is also recommended that a drill be conducted as close to the beginning of the school year as possible. This will familiarize new students with your procedures and act as a refresher for returning students. While tornadoes are often advertised as a "springtime" event, tornadoes can occur at any time of the year.

IV. BASIC TORNADO SPOTTING TECHNIQUES

Boone County Emergency Management arranges for the National Weather Service to conduct an annual Severe Weather Spotter training generally in March. Spotter training is provided free of charge with the request that when you do encounter severe weather, you report it to the National Weather Service. The spotter training class includes slides and videos that help you learn how to pick out visual clues from clouds to help determine the severity of a storm. It is highly recommended that at the least one person from your school, including the "Severe Weather Coordinator" for your school emergency plan, take the training. Contact Boone County Emergency Management for spotter training information.

The following information is not a substitute for official training.

Color: A very dark (black) thunderstorm or one taking an eerie look (brownish, green, or yellow cloud colors) may be an indication of a severe thunderstorm. The colors and darkness of the cloud are caused by the storm's massive size and the blockage of sunlight. This storm may bring hail, very heavy rain, and damaging winds.

Sound: The sound of a freight train is the roar of wind as it moves through trees and buildings. It may indicate an approaching tornado or severe downburst. You should take protective action immediately.

Funnel / Tornado: A funnel is a small rotating funnel-shaped cloud. It does not touch the ground. If the funnel-shaped cloud is touching the ground, it is a tornado. Only a very small percentage of funnels turn into tornadoes. It is possible for the rotating column of damaging winds from a tornado to be on the ground with the visible funnel only extending half-way to the ground. Look for debris, leaves and dust rising into the air and listen for the sound of a freight train. People often confuse low clouds, commonly called "scud", for tornadoes or funnel clouds. It is important to look for organized, counterclockwise rotation about a vertical axis.

Squall lines: Sometimes thunderstorms form a solid line of storms called a "squall line". The squall line thunderstorm can also become severe and is unlike the supercell thunderstorm. The supercell storm has its updraft on the right-rear quadrant of the storm. With a squall line, the warm air feeding the storm is all out ahead of it, so the updraft on the front (approaching) portion of the storm dominates. When a squall line approaches, you may see a shelf cloud which denotes the leading edge of the storm. Tornadoes rarely occur with squall lines and they tend to be less severe than those with supercell storms. Still, winds can reach in excess of 100 mph which is enough to damage roofs, break windows and drop trees. If a tornado were to occur with a squall line, it would be found in the updraft region of the storm behind the shelf cloud.

If you spot severe weather and are reporting it to your local National Weather Service office, remember the acronym "TEL", which stands for Time, Effects, and Location. Note the *time* you observed it, its *effects* (damage you witnessed), and its *location* and movement.

APPENDIX A

NATIONAL WEATHER SERVICE (What to listen for)

1. WATCH – Conditions are favorable for a particular weather event in the area identified by the watch. Watches generally cover larger areas than warnings. Monitor NOAA Weather Radio and local media for additional information.

2. WARNING - The hazard is already occurring or is imminent in the warning area. Warnings are issued based on eyewitness reports or clear signatures from remote sensing devices such as radar and satellite. All safety precautions and plans of action must be exercised immediately.

APPENDIX B

GLOSSARY OF WEATHER TERMS

Anvil - The spreading out (by strong winds) of the upper portion of the thunderstorm. It usually has a fibrous or smooth appearance. With long lasting thunderstorms, the anvil may spread 100 miles downwind

Downburst - A sudden rush of cool air toward ground that can impact with speeds over 70mph and produce damage similar to that of a tornado. It usually occurs near the leading edge of the storm or may occur in heavy rain.

Downdraft - A column of cool air that sinks toward the ground. It is most often accompanied by rain.

Funnel cloud - a funnel-shaped cloud extending from a towering cumulus or thunderstorm. It is associated with a rotating column of air that has condensed to form a cloud.

Gust front - the leading edge of the thunderstorm's downdraft of air as it spreads out away from the storm. It is usually felt as a change to gusty, cool winds and may precede the thunderstorm's rain by several minutes

Hail - Precipitation in the form of balls or clumps of ice.

Severe thunderstorm - A thunderstorm producing damaging winds or winds greater than 58 mph and/or hail three-quarter of an inch or greater.

Shelf cloud - a low-level, wedge-shaped cloud attached to the thunderstorm. It forms above the gust front as warm air ahead of the storm rides over the cool outflow from the thunderstorm.

Squall line - a solid line or band of active thunderstorms.

Thunderstorm (cumulonimbus) - the towering cumulus cloud has continued to grow in height and width and now lightning is occurring. The storm may extend 5 to 10 miles high into the atmosphere and 5 to 25 miles across. Heavy rains and gusty winds often accompany the storms.

Tornado - a violently rotating column of air in contact with the ground and extending to the thunderstorm base often seen extending from near the wall cloud. It can be a few yards across to a mile wide.

Wall cloud - this cloud appears as an abrupt lowering of the cloud base from the relatively flat rain-free base. It is attached to a thunderstorm and may be rotating. This is the portion of the thunderstorm from which the tornado often descends.

Updraft - Warm, moist, rising air. As the air rises, it condenses into a visible cumulus or cumulonimbus cloud. The updraft fuels the storm. In an ordinary thunderstorm, air rises at 40 mph and in a severe thunderstorm speeds may reach over 100 mph.

APPENDIX C

GENERAL TORNADO SAFETY

The greatest danger is from flying debris (airborne missiles) and the collapse of a building's roof and/or wall structure. The following actions are designed for protection from these dangers. Take action if a tornado approaches or a tornado warning is issued.

In a building (home, school, etc.) move to the basement. If no basement, move to a small, interior room or hallway on the lowest level. Stay away from windows and exterior doors. If at all possible, get under something (such as a table) and place something over your head (such as a pillow, mattress, blanket, or coat) for added protection.

DO NOT STAY IN A MOBILE HOME OR ANY TYPE OF TEMPORARY SHELTER. If in a mobile home or temporary shelter, get out. Move away from the shelter so that the debris does not fall on you. Look for a low area, preferably a ditch or ravine if nearby. Take the protective position on your elbows and knees with your hands over your head.

DO NOT TRY TO OUTFRAN A TORNADO IN A CAR, BUS OR TRUCK. If in a car, truck or bus, STOP. Get out. Move away from the vehicle so it does not topple on you. Find a low area, preferably a ditch or ravine if nearby. Take the protective position on your elbows and knees with your hands over your head.

If on foot with no well-constructed shelter nearby, find a low area, preferably a ditch or ravine if nearby. Take the protective position on your elbows and knees with your hands over your head.

After the storm, if a tornado has struck your neighborhood, turn off gas at the main switch to your building. If live electrical wires are down, turn off power at the main switch. Instruct people not to touch loose electrical wires or broken utility lines. Do not touch electrical equipment in wet areas until it has been dried and tested. Food, clothing, shelter, and first aid will be available at Red Cross shelters.

Remember that straight-line winds from severe thunderstorms can also produce winds over 100mph, equal to the strength of a moderate tornado. At a minimum, when severe thunderstorm warnings are issued for your area, remain indoors and stay away from windows.

APPENDIX D

LOCAL CONTACTS:

NATIONAL WEATHER SERVICE

For weather information, preparedness materials, and NOAA Weather Radio coverage contact the National Weather Service Office in Wilmington, Ohio. This is the office with "warning responsibility" for Boone County. The office is open 24 hours a day, 7 days a week. Other preparedness and safety brochures can also be obtained through Boone County Emergency Management.

National Weather Service
1901 South State Route 134
Wilmington, Ohio 45177
Phone (937) 383-0428
Fax (937) 383-0033

BOONE COUNTY EMERGENCY MANAGEMENT

6024 Rogers Lane 2nd Floor
P.O. Box 900
Burlington, KY 41005

Phone (859) 334-2279
Fax (859) 334-3601

APPENDIX E

TORNADO SAFETY PLAN CHECKLIST

Use the following checklist for the evaluation or design of a tornado safety plan for your school. The plan should be designed so that teachers and students anywhere on the school grounds can be quickly alerted and follow a preset plan of action to maximize safety.

- A. Who is responsible for activating the plan? Is there a back up?
- B. Means of receiving watches and warnings: NOAA Weather Radio with a "tone alert" feature and battery backup is recommended.
- C. What method do you employ to alert teachers and students? Is there a back up that does not require electricity? (Electricity may be lost as the storm approaches).
- D. Make provisions for the following problem areas:
 - 1. Students that are in mobile classrooms that may be far from the main building and that may be disconnected from an intercom system.
 - 2. Students that may be in the cafeteria or gymnasium during the storm.
 - 3. Learning-disabled students, or any other students who may be in a position to not hear the warning or alert or be able to respond on their own accord. Assign a teacher to each student with special needs, ensuring that the student arrives at a place of safety.
 - 4. Students who are outside, including after-school activities. Remember, if you are close enough to hear thunder, then you are close enough to be struck by lightning. Also, students who are outside are at risk from the dangers of large hail and severe thunderstorm winds.
 - 5. Before and after school events.
- E. Four main problems for schools in a tornado:
 - 1. Forces caused by winds and the airflow around the building.
 - 2. Forces caused by other objects (debris) impacting school walls.
 - 3. "Wind Tunnel Effect" - When blown by tornado-strength winds, debris (such as fragments of glass, wood, and metal) can cause serious injury when accelerated by relatively narrow hallways in schools.
 - 4. Gas leaks and electrical hazards after the storm.

F. Safest places to be in a school: (assuming no underground shelter)

1. Interior hallway on the lowest level away from windows
2. Small room (i.e. bathroom) with load bearing walls without windows.
3. In a room without small objects that can serve as projectiles

G. Some other aspects of designing a plan:

- Practice your plan. Have drills semi-annually (Fall and Spring).
- Include tornado safety instruction as part of drill preparations.
- Encourage teachers and administrators to develop a plan for their families at home. The knowledge that their families know what to do at home will enable them to focus their attention on the students.
- Educate school administrators about the structure of tornadoes and the basic sequence of events as storms approach. Also explain the concepts of wall clouds, rotating wall clouds, and the locations for these features within the storm. (It is recommended they attend the severe weather spotter training class). Emphasize the variability that may exist with each storm and the need to understand basic storm structure to assist in determining the degree of threat at a school.
- For optimum planning purposes, an engineer and the local school board should participate in the design of an emergency plan. The emergency plan should respond to increasing severity of weather.
- Administrators may contact Boone County Emergency Management or the National Weather Service Office in Wilmington, Ohio for assistance and answers to ANY questions that may arise in developing a plan.

APPENDIX F

Acknowledgments

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