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**TECHNICAL INFORMATION BULLETIN No. 33**

**To: Members, Arizona School Risk Retention Trust, Inc.**

**Re: Monsoon season**

**Purpose**

The purpose of this Technical Information Bulletin (TIB) is to inform members of the Arizona School Risk Retention Trust, Inc. (the Trust), of the dangers and hazards associated with a monsoon, and to provide tips on preparing for and responding to monsoon storms.

**What is a Monsoon?**

The word “monsoon” comes from the Arabic word *mausim*, which means “season.” This is because the monsoon refers to a specific, seasonal weather pattern.

During most of the year, winds over Arizona blow from the west or northwest. During the months of the monsoon, however, the wind flows from a more southerly or easterly direction. These winds bring with them moisture from the Pacific Ocean, the Gulf of California, and the Gulf of Mexico. As these moist winds encounter the extreme daytime heat of the summer desert, cumulonimbus clouds form, and intense monsoon storms often result.

The monsoon is more pronounced in southern Arizona than northern Arizona, and usually lasts longer in the south. Though the monsoon officially begins on June 15 each year, the most severe storms do not arrive until July. The official end of the monsoon each year is on September 30.

**Planning for Monsoon Season**

District and school personnel should take the following steps to prepare for monsoon season:

## General preparations

- Stay abreast of weather reports on radio and television, and familiarize yourself with the various categories of weather watches, warnings, and advisories (see attached **Exhibit 1** for a summary).
- Have an evacuation plan in place, and train all employees who have responsibilities under that plan.
- Know where all utility shut-offs are located and how they operate.
- Check windows and doors, and reinforce them if needed; replace any missing panes, and nail down loose frames and brace them with wood boards or cleats.
- Consider the fall zones of all trees, and remove or properly trim trees that could fall onto: (1) buildings; (2) paths used for emergency response; or (3) utilities.
- Address the possibility of fires caused by monsoon storms and lightning; clean up dead foliage and debris, and confirm that fire-fighting equipment is in proper operating condition.
- Verify that loose coverings or other loose objects on the roof are nailed down, and that drains are unobstructed.
- Ensure that any loose objects on the ground (e.g., outdoor furniture, garbage cans, etc.) are secured in place or brought indoors.
- Prepare alternate lighting and communication methods in the event that a loss of power occurs. (See further discussion immediately below.)

## Emergency lighting

Emergency lighting during a monsoon can help keep you safe and make execution of contingency plans easier. Facility emergency lights should activate if the power fails, but they may not provide adequate illumination to all indoor areas. As additional sources of backup lighting, therefore, consider the following:

- working flashlights with fresh batteries;
- battery-powered lanterns;
- emergency lights powered by a gas-fueled generator (use only if the generator can be operated safely out of doors); and
- chemically-activated “glow sticks.”

Do not use candles, torches, or gas lanterns as an indoor light source, as these can create a serious fire hazard.

## Emergency communications

During severe monsoon weather, it is important to maintain open channels of communication and information—even in the event of a power loss. To this end, the following steps should be part of your monsoon preparedness plan:

Keep a charged mobile phone on hand.<sup>1</sup> Calling cards, coins, and a map with nearby payphone locations (increasingly rare) will give you additional options.

Pre-program your emergency phone(s) with important contact information, or keep a hard copy of this information together with your emergency phone(s). Phone numbers and addresses stored electronically—on a computer, for example—will be unavailable if the power is down.

If possible, use a smartphone with Internet access as your emergency telephone. This will allow you to stay abreast of news and weather information.

Keep a car charger in the same place that you keep your charged cellular telephone. If the battery in your phone runs down before building power comes back on, you can recharge the phone in your vehicle.

Finally, keep a working, battery-operated radio on hand so that you can access weather reports, public safety notices, evacuation plans, etc., via AM or FM radio.

### **Monsoon Winds**

Monsoon wind gusts can range from 40 to 100 miles per hour. Debris being carried by such winds can cause severe injuries, so if you are outdoors during a monsoon storm, move inside immediately. While making your way to shelter, stay away from trees and downed power lines. Once indoors, move into a central interior room if possible, away from windows. (Windows may shatter as a result of flying debris.)

### **Lightning**

If you are able to hear thunder during a storm, you are close enough to be in danger from lightning. Accordingly, if you are indoors during a lightning storm, remain there for at least 30 minutes after the last thunderclap. Additionally: (1) do not handle electrical equipment, plumbing, or wired telephones, as these may conduct electricity; (2) make sure that all computers, appliances, etc., are turned off and unplugged; and (3) avoid sitting near windows.

If you are in a vehicle during a lightning storm: (1) pull safely onto the shoulder of the road, away from any trees or power lines that could fall onto the vehicle;<sup>2</sup> (2) avoid contact with any metal surfaces within the vehicle; (3) avoid flooded roadways; and (4) remain in the vehicle and out of the flow of traffic until the storm subsides.

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<sup>1</sup> Cordless telephones rely on electricity and so will not work if the power goes out. A traditional, corded telephone may work in a power outage, assuming there is no damage to phone lines. Phone lines can conduct electricity during a lightning storm, however, so use of corded telephones is not encouraged when there is danger of a lightning strike.

<sup>2</sup> If an electrical line does fall onto your vehicle, remain inside until emergency crews indicate that it is safe to exit.

If you are outdoors and *not* in a vehicle when a lightning storm hits:

- Seek shelter in a building, hard-topped vehicle, or other enclosed structure as quickly as possible.
- If no enclosed structure is available, get to a low spot away from towers, trees, armadas, porches, fences, and telephone or power lines. Be aware, however, of the possibility of flooding in low-lying areas.
- Stay away from rivers, lakes, pools, and other bodies of water.

### **Flooding**

Another major concern during monsoon season is flooding—especially flash floods. Because people and vehicles can be swept away by even small amounts of rapidly moving water, please take note of the following precautions during a flood:

*If you are indoors:* (1) stay calm; (2) listen to a battery-operated radio or television for the latest emergency information; and (3) if told to evacuate, do so immediately.

*If you are outdoors:* (1) move to high ground and stay there; and (2) avoid walking through floodwaters. At a depth of only six inches, swiftly moving water can sweep a person off his or her feet.

*If you are in a vehicle:* (1) turn back if you find yourself approaching a flooded area (as little as two feet of fast-moving flood water can carry a car away); and (2) abandon your vehicle if it stalls, and move immediately to higher ground. Many deaths have resulted from attempts to move stalled vehicles during a flood.

### **Monsoons and District Construction Projects**

Monsoon weather produces high winds, which can cause materials to shift and fall. This poses a potential hazard to persons and property below. Accordingly, contractors need to secure materials to the roof properly, or remove them from the roof altogether.

Additionally, if schools are undertaking construction projects that involve penetration into the exterior portion of the building (e.g., roofing or HVAC), the district should verify that the contractor has properly secured the area to prevent water intrusion.<sup>3</sup> The Trust recommends that contractors or district personnel use plywood and/or reinforced plastic sheeting at least .004" thick (commonly referred to as blue poly-tarp). At least 90 percent of the perimeter of the sheeting needs to be secured. This can be done with sandbags or with wood (two-by-fours, for example, secured with 16-penny nails).

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<sup>3</sup> Please note that if water intrusion or other damage requiring emergency services should occur during a monsoon storm, the district should contact the Trust immediately in order to discuss loss mitigation and repair work (if necessary).

These and other guidelines can be found in *Minimum Roofing Requirements for Contractors for Work in Process and Completed Projects*, created by Augspurger Komm Engineering, Inc., and BTI Consultants to assist in the prevention of losses related to improper roof protection. The document is available at the following URL: <http://tinyurl.com/m3htvk>.

### **Stay Calm, Stay Smart, Stay Safe!**

In addition to taking the preceding measures before and during the monsoon season, the Trust urges you to review its *Property Loss Prevention Guidelines* and *Emergency Response Plan Manual*, which are available at <http://www.the-trust.org>.

Remember, though, the best safety tip during a monsoon storm is to stay calm and use common sense.

If you have any questions regarding preparation for and protection during monsoon storms, please contact Member Services at (800) 266-4911.

### **Additional Reading**

Arizona Vacation Planner: Guide to Arizona Weather and Monsoon Season, available online at [http://www.articlecity.com/articles/travel\\_and\\_leisure/article\\_4246.shtml](http://www.articlecity.com/articles/travel_and_leisure/article_4246.shtml).

National Weather Service Forecast Office; Tucson, Arizona; Monsoon Information Index; available online at [http://www.wrh.noaa.gov/twc/monsoon/monsoon\\_info.php](http://www.wrh.noaa.gov/twc/monsoon/monsoon_info.php).

National Weather Service; Flagstaff, Arizona; Monsoon Safety Video Series, available online at <https://goo.gl/rgz7c2>.

## EXHIBIT 1. SUMMARY OF NATIONAL WEATHER SERVICE WEATHER WATCHES, WARNINGS, AND ADVISORIES

**Severe Thunderstorm Watch:** Conditions are favorable for widespread thunderstorms with damaging winds and even large hail to develop. These are usually issued only when an especially active day is expected. Watch weather reports and conditions closely.

**Severe Thunderstorm Warning:** A thunderstorm with damaging winds of 60 mph or greater is about to occur, or is already underway. These winds could also produce a dust storm with visibilities below ¼ mile. Hail over 3/4" in diameter or larger is also possible. Take cover now! Note that heavy rain doesn't always accompany a severe thunderstorm.

**Dust Storm Warning:** A dust storm, with visibilities of ¼ mile or less, is about to strike, or has already developed. Pull off the road now! Wind gusts between 40 and 60 mph are also likely. If winds associated with a dust storm are 60 mph or greater, then a Severe Thunderstorm Warning is issued instead.

**Tornado Warning:** A tornado has been sighted and is still on the ground, or is about to develop based on radar information. Take cover now!

**Flash Flood Watch:** Conditions are favorable for flash flooding over large or multiple areas of the region. These are usually issued only when an especially active day is expected. Watch weather reports and conditions closely.

**Flash Flood Warning:** Life-threatening, rapid flooding is about to occur, or is already underway. Move to higher ground now! It is particularly dangerous to be in a low lying area or near a wash.

**Urban and Small Stream Flood Advisory:** Minor flooding is expected or underway in low lying and flood prone areas. While it may not be life threatening, extreme caution is advised, particularly for motorists. The same flash flood safety rules apply.

**Hazardous Weather Outlook:** Issued anytime there is a risk of strong winds, heavy rain, flash flooding, and/or dust storms. These outlooks provide advanced and detailed information on what the main thunderstorm hazards are expected to be, how widespread, and when.

Source: National Weather Service Forecast Office; Tucson, Arizona; Monsoon Safety; available online at [http://www.wrh.noaa.gov/twc/monsoon/monsoon\\_safety.pdf](http://www.wrh.noaa.gov/twc/monsoon/monsoon_safety.pdf) (see p. 7).