

## 7. NATURAL DISASTERS

### 7.01 Introduction:

The world as whole regularly experiences natural disasters that result in tragic physical, emotional and economic losses. Windstorms and floods account for the majority of these losses, and it appears we are currently in a cycle of a greater severity of these weather related disasters. Many reasons are given for this trend; some based on good science and some driven by political or other agendas.

There is indication that the world is naturally warming as it comes out of the last 'little ice age'. Some scientists have very convincingly argued that this warming trend is a result of cyclical sun spot activity. For whatever reason, in the last few years the global community has experienced a great increase in the loss of life and property from weather related disasters.

Natural disasters include earthquake, drought, epidemic, extreme temperatures, famine, flood, insect infestations, slides, volcanoes, waves/surges, wild fires, lightning storms and wind storms (hurricanes, tornadoes, etc.).

Most natural disasters give little, if any warning. However, cautionary notices often precede weather related disasters. We should always heed these warnings and make preparations accordingly.

In TACDA's estimation, the ultimate preparation for all mega-disasters (except flood) is the installation of underground all-hazard shelters. TACDA is actively encouraging a federally funded national shelter program. Disasters act as a catalyst for public policy changes. The United States has experienced enough disaster in recent history to justify and support such a policy change.

### 7.02 Earthquake:

Earthquakes in 3rd world countries have resulted in massive numbers of fatalities. Most of these fatalities result from catastrophic building collapse. In the United States, however, most buildings are built to strict building codes that resist catastrophic collapse. For many years, the Federal Government has advised that the 'Duck and Cover' survival strategy be used during an earthquake. Recently, a new survival technique called 'The Triangle of Life' has emerged.

Doug Copp, Rescue chief and Disaster Manager of the American Rescue Team International (ARTI), remains firm in his belief that the safest place to take refuge during an earthquake is in a triangular shaped area next to a large, compact object. Mr. Copp has worked at every major disaster in the world since 1985.

The 'Structural Engineers Association of California (SEAPC), on the other hand, supports the 'Duck & Cover' survival technique. They maintain that the greatest danger from earthquakes in the United States is injury from falling hazards such as bookshelves, filing cabinets, chimneys, and portions of ceilings, exterior facades, and window glass; --not from overall building collapse.



From 1990 to 2006, approximately 230,000 people have died in earthquakes in 3rd world countries. During that same period, only 68 people have died in earthquakes in the United States. Statistical information from the International Data Base <http://www.em-dat.net> verifies this information.

In October 6, 2004, The Structural Engineers Association of California wrote:

“Sacramento, CA - The Structural Engineers Association of California (SEAOC) has recently learned of the 'Triangle of Life' theory and 'Ten Tips on Surviving a Building Collapse' put forth by Doug Copp which has been circulating via the Internet. The theory assumes complete building collapse and rather than the currently accepted survival strategy of 'duck and cover' under a substantial object like a desk or bed, it calls for curling up next to the object which, when it compresses under the weight of the collapse, will form a triangular survival void around it. However, this theory does not appropriately address the typical earthquake hazard that exists in the United States. The duck and cover protection approach was developed to protect occupants from falling hazards. The greatest danger to the U.S. population in the event of an earthquake is injury from falling hazards such as bookshelves, filing cabinets, chimneys, portions of ceilings, exterior facades, and window glass; not overall building collapse. Following Mr. Copp's tips puts one in greater danger from these falling hazards. And, in the rare occasions that buildings do collapse during an earthquake in the United States, survivable voids do not necessarily fit the descriptions presented by Mr. Copp.”

In SEAOC's considered opinion, the “duck and cover strategy” still represents the best way to protect one's self in an earthquake. We highly recommend visiting the Federal Emergency Management Agency's web site at <http://www.fema.gov/hazards/earthquakes/equakes.shtm>.”

TACDA's conclusion, after researching the number and types of deaths in the United States from earthquakes in the last 10 years, is that both the “Duck and Cover” and the “Triangle of Life” philosophy should carefully be considered when teaching earthquake survival techniques. Sixty of the 68 deaths reported in the United States in the last 12 years occurred in the California earthquake of 1994. Most of these victims were crushed inside their cars during the collapse of the freeway bridges. Many of these crushed vehicles formed a 'Triangle of Life' area. Some of the victims may have survived if they had exited their vehicles and taken cover within that area. On the other hand, many of the injured inside buildings may have ultimately been more severely injured or even killed if they had not taken the “Duck & Cover” approach. Each situation must be carefully analyzed. 'Study', 'Think', 'Observe' and 'Prepare' accordingly.

**The remaining material for this lesson has been taken from the FEMA website;  
<<http://www.fema.gov/index.shtm>>.**



## **What to do Before an Earthquake**

Earthquakes strike suddenly, violently and without warning. Identifying potential hazards ahead of time and advance planning can reduce the dangers of serious injury or loss of life from an earthquake. Repairing deep plaster cracks in ceilings and foundations, anchoring overhead lighting fixtures to the ceiling, and following local seismic building standards, will help reduce the impact of earthquakes.

## **Six Ways to Plan Ahead**

### **1. Check for Hazards in the Home**

- Fasten shelves securely to walls.
- Place large or heavy objects on lower shelves.
- Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.
- Hang heavy items such as pictures and mirrors away from beds, couches, and anywhere people sit.
- Brace overhead light fixtures.
- Repair defective electrical wiring and leaky gas connections. These are potential fire risks.
- Secure a water heater by strapping it to the wall studs and bolting it to the floor.
- Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.

### **2. Identify Safe Places Indoors and Outdoors**

- Under sturdy furniture such as a heavy desk or table.
- Against an inside wall.
- Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases or other heavy furniture could fall over.
- In the open, away from buildings, trees, telephone and electrical lines, overpasses, or elevated expressways.

### **3. Educate Yourself and Family Members**

- Contact your local emergency management office or American Red Cross chapter for more information on earthquakes. Also read the "How-To Series" for information on how to protect your property from earthquakes.
- Teach children how and when to call 9-1-1, police, or fire department and which radio station to tune to for emergency information.
- Teach all family members how and when to turn off gas, electricity, and water.

### **4. Have Disaster Supplies on Hand**

- Flashlight and extra batteries.
- Portable battery-operated radio and extra batteries.
- First aid kit and manual.
- Emergency food and water.
- Non-electric can opener.
- Essential medicines.



- Cash and credit cards.
- Sturdy shoes.

#### 5. **Develop an Emergency Communication Plan**

- In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school); develop a plan for reuniting after the disaster.
- Ask an out-of-state relative or friend to serve as the "family contact." After a disaster, it's often easier to call long distance. Make sure everyone in the family knows the name, address, and phone number of the contact person.

#### 6. **Help Your Community Get Ready**

- Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices, the American Red Cross, and hospitals.
- Conduct a weeklong series on locating hazards in the home.
- Work with local emergency services and American Red Cross to prepare special reports for people with mobility impairments on what to do during an earthquake.
- Provide tips on conducting earthquake drills in the home.
- Interview representatives of the gas, electric, and water companies about shutting off utilities.
- Work together in your community to apply your knowledge to building codes, retrofitting programs, hazard hunts, and neighborhood and family emergency plans.

### **What to do During an Earthquake**

Stay as safe as possible during an earthquake. Be aware that some earthquakes are actually foreshocks and a larger earthquake might occur. Minimize your movements to a few steps to a nearby safe place and stay indoors until the shaking has stopped and you are sure exiting is safe.

#### **If Indoors**

- DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture; and HOLD ON until the shaking stops. If there isn't a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.
- Stay away from glass, windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture.
- Stay in bed if you are there when the earthquake strikes. Hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.
- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load-bearing doorway.
- Stay inside until shaking stops and it is safe to go outside. Research has shown that most injuries occur when people inside buildings attempt to move to a different location inside the building or try to leave.
- Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.
- DO NOT use the elevators.



### **If Outdoors**

- Stay there.
- Move away from buildings, streetlights, and utility wires.
- Once in the open, stay there until the shaking stops. The greatest danger exists directly outside buildings, at exits, and alongside exterior walls. Many of the 120 fatalities from the 1933 Long Beach earthquake occurred when people ran outside of buildings only to be killed by falling debris from collapsing walls. Ground movement during an earthquake is seldom the direct cause of death or injury. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

### **If in a Moving Vehicle**

- Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses, and utility wires.
- Proceed cautiously once the earthquake has stopped. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.

### **If Trapped Under Debris**

- Do not light a match.
- Do not move about or kick up dust.
- Cover your mouth with a handkerchief or clothing.
- Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout only as a last resort. Shouting can cause you to inhale dangerous amounts of dust.

### **What to Do After an Earthquake**

First of all, expect aftershocks. These secondary shockwaves are usually less violent than the main quake but can be strong enough to do additional damage to weakened structures and can occur in the first hours, days, weeks, or even months after the quake.

- Listen to a battery-operated radio or television. Listen for the latest emergency information.
- Use the telephone only for emergency calls.
- Open cabinets cautiously. Beware of objects that can fall off shelves.
- Stay away from damaged areas. Stay away unless your assistance has been specifically requested by police, fire, or relief organizations. Return home only when authorities say it is safe.
- Be aware of possible tsunamis if you live in coastal areas. These are also known as seismic sea waves (mistakenly called "tidal waves"). When local authorities issue a tsunami warning, assume that a series of dangerous waves is on the way. Stay away from the beach.
- Help injured or trapped persons. Remember to help your neighbors who may require special assistance such as infants, the elderly, and people with disabilities. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Clean up spilled medicines, bleaches, gasoline or other flammable liquids immediately. Leave the area if you smell gas or fumes from other chemicals.
- Inspect the entire length of chimneys for damage. Unnoticed damage could lead to a fire.
- Inspect utilities.





- Check for gas leaks. If you smell gas or hear blowing or hissing noise, open a window and quickly leave the building. Turn off the gas at the outside main valve if you can and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
- Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell hot insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.
- Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water by melting ice cubes.

### **7.03 Tsunami:**

Tsunamis are a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite. A tsunami can move hundreds of miles per hour in the open ocean and smash into land with waves as high as 100 feet or more.

#### **What to do Before and During a Tsunami**

- Become familiar with local emergency siren alerts.
- Turn on your radio to learn if there is a tsunami warning if an earthquake occurs and you are in a coastal area.
- Move inland to higher ground immediately and stay there.
- Stay away from the beach. Never go down to the beach to watch a tsunami come in. If you can see the wave you are too close to escape it.
- CAUTION - If there is noticeable recession in water away from the shoreline this is nature's tsunami warning and it should be heeded. You should move away immediately.

#### **What to Do After a Tsunami**

- Stay away from flooded and damaged areas until officials say it is safe to return.
- Stay away from debris in the water; it may pose a safety hazard to boats and people.
- Save yourself - not your possessions

### **7.04 Tornadoes:**

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard.

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible.



Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

**The following are facts about tornadoes:**

- They may strike quickly, with little or no warning.
- They may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel.
- The average tornado moves Southwest to Northeast, but tornadoes have been known to move in any direction.
- The average forward speed of a tornado is 30 MPH, but may vary from stationary to 70 MPH.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- Waterspouts are tornadoes that form over water.
- Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months.
- Peak tornado season in the southern states is March through May; in the northern states, it is late spring through early summer.
- Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but can occur at any time.

**Familiarize yourself with these terms to help identify a tornado hazard:**

**Tornado Watch**

Tornadoes are possible. Remain alert for approaching storms. Watch the sky and stay tuned to NOAA Weather Radio, commercial radio, or television for information.

**Tornado Warning**

A tornado has been sighted or indicated by weather radar. Take shelter immediately.  
Preparing a Safe Room

**Guidelines and instructions for building a safe room:**

Extreme windstorms in many parts of the country pose a serious threat to buildings and their occupants. Your residence may be built "to code," but that does not mean it can withstand winds from extreme events such as tornadoes and major hurricanes. The purpose of a safe room or a wind shelter is to provide a space where you and your family can seek refuge that provides a high level of protection.

You can build a safe room in one of several places in your home.

- Your basement.
- Atop a concrete slab-on-grade foundation or garage floor.
- An interior room on the first floor.

Safe rooms built below ground level provide the greatest protection, but a safe room built in a first-floor interior room also can provide the necessary protection. Below-ground safe rooms must



be designed to avoid accumulating water during the heavy rains that often accompany severe windstorms.

To protect its occupants, a safe room must be built to withstand high winds and flying debris, even if the rest of the residence is severely damaged or destroyed. Consider the following when building a safe room:

The safe room must be adequately anchored to resist overturning and uplift.

- The walls, ceiling, and door of the shelter must withstand wind pressure and resist penetration by windborne objects and falling debris.
- The connections between all parts of the safe room must be strong enough to resist wind.
- Sections used as walls of the safe room must be separated from the structure of the residence so that damage to the residence will not cause damage to the safe room.

### **What to do Before a Tornado**

- Be alert to changing weather conditions.
- Listen to NOAA Weather Radio or to commercial radio or television newscasts for the latest information.
- Look for approaching storms
- Look for the following danger signs:
  - Dark, often greenish sky
  - Large hail
  - A large, dark, low-lying cloud (particularly if rotating)
  - Loud roar, similar to a freight train
- If you see approaching storms or any of the danger signs, be prepared to take shelter immediately.

### **What to Do During a Tornado**

#### **If you are under a tornado WARNING, seek shelter immediately!**

If you are in a structure (e.g. residence, small building, school, nursing home, hospital, factory, shopping center, high-rise building):

- Go to a pre-designated shelter area such as a safe room, basement, storm cellar, or the lowest building level.
- If there is no basement, go to the center of an interior room on the lowest level (closet, interior hallway) away from corners, windows, doors, and outside walls. Put as many walls as possible between you and the outside. Get under a sturdy table and use your arms to protect your head and neck. Do not open windows.
- A vehicle, trailer, or mobile home Get out immediately and go to the lowest floor of a sturdy, nearby building or a storm shelter. Mobile homes, even if tied down, offer little protection from tornadoes.

If you are outside with no shelter:

- Lie flat in a nearby ditch or depression and cover your head with your hands. Be aware of the potential for flooding.





- Do not get under an overpass or bridge. You are safer in a low, flat location.
- Never try to outrun a tornado in urban or congested areas in a car or truck. Instead, leave the vehicle immediately for safe shelter.
- Watch out for flying debris. Flying debris from tornadoes causes most fatalities and injuries.

### **What to Do After a Tornado**

- Listen to a battery-operated radio or television. Listen for the latest emergency information.
- Use the telephone only for emergency calls.
- Open cabinets cautiously. Beware of objects that can fall off shelves.
- Stay away from damaged areas. Stay away unless your assistance has been specifically requested by police, fire, or relief organizations. Return home only when authorities say it is safe.
- Help injured or trapped persons. Remember to help your neighbors who may require special assistance such as infants, the elderly, and people with disabilities. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Clean up spilled medicines, bleaches, gasoline or other flammable liquids immediately. Leave the area if you smell gas or fumes from other chemicals.
- Inspect the entire length of chimneys for damage. Unnoticed damage could lead to a fire.
- Inspect utilities.
- Check for gas leaks. If you smell gas or hear blowing or hissing noise, open a window and quickly leave the building. Turn off the gas at the outside main valve if you can and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
- Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell hot insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.
- Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets and call a plumber. If water pipes are damaged, contact the water company and avoid using water from the tap. You can obtain safe water by melting ice cubes.

### **7.05 Hurricane:**

A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface.

All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes or tropical storms. Parts of the Southwest United States and the Pacific Coast experience heavy rains and floods each year from hurricanes spawned off Mexico. The Atlantic hurricane season lasts from June to November, with the peak season from mid-August to late October.



Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Winds can exceed 155 miles per hour. Hurricanes and tropical storms can also spawn tornadoes and microbursts, create storm surges along the coast, and cause extensive damage from heavy rainfall.

Hurricanes are classified into five categories based on their wind speed, central pressure, and damage potential. Category Three and higher hurricanes are considered major hurricanes, though Categories One and Two are still extremely dangerous and warrant your full attention.

### **Saffir-Simpson Hurricane Scale**

The Saffir-Simpson Hurricane Scale is a scale classifying most Western Hemisphere tropical cyclones that exceed the levels of "tropical depression" and "tropical storm" and thereby become hurricanes; the "categories" it divides hurricanes into are distinguished by the intensities of their respective sustained winds. The classifications are intended primarily for use in gauging the likely damage and flooding a hurricane will cause upon landfall. The Saffir-Simpson Hurricane Scale is used only to describe hurricanes forming in the Atlantic Ocean and northern Pacific Ocean east of the International Date Line. Other areas label their tropical cyclones as "cyclones" and "typhoons", and use their own classification schemes.

The scale was developed in 1969 by civil engineer Herbert Saffir and Bob Simpson, at that time the director of the U.S. National Hurricane Center (NHC - [www.nhc.noaa.gov](http://www.nhc.noaa.gov)). The initial scale was developed by Saffir while on commission from the United Nations to study low-cost housing in hurricane-prone areas. While performing the study, Saffir realized there was no simple scale for describing the likely effects of a hurricane. Knowing the utility of the Richter magnitude scale in describing earthquakes, he devised a scale based on wind speed that showed expected damage to structures. Saffir gave the scale to the NHC, and Simpson added in the effects of storm surge and flooding.

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf and the shape of the coastline, in the landfall region.

The scale does not take into account rainfall or location, which means a Category 2 hurricane that hits a major city will likely do far more damage than a Category 5 hurricane that hits a rural area.

Only 3 Category Five Hurricanes have made landfall in the United States since records began:

- The Labor Day Hurricane of 1935 struck the Florida Keys with a minimum pressure of 892 mb--the lowest pressure ever observed in the United States.
- Hurricane Camille (1969) struck the Mississippi Gulf Coast causing a 25-foot storm surge, which inundated Pass Christian.
- Hurricane Andrew (1992) made landfall over southern Miami-Dade County, Florida causing 26.5 billion dollars in losses--the costliest hurricane on record.



### Saffir-Simpson Hurricane Scale

Scale # (Category)	Sustained Winds (MPH)	Damage	Storm Surge (above normal)
1	74-95	Minimal: Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Some coastal road flooding and minor pier damage.	4-5 ft.
2	96-110	Moderate: Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center.	6-8 ft.
3	111-130	Extensive: Structural damage to small residences and utility buildings. Damage to shrubbery and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near coast destroys smaller structures. Larger structures damaged floating debris.	9-12 ft.
4	131-155	Severe: More roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km).	13-18 ft.
5	More than 155	Extreme: Complete roof failure on many residences and industrial buildings. Small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas within 5-10 miles (8-16 km) of shoreline may be required.	18 ft. & greater



## Before a Hurricane

To prepare for a hurricane, you should take the following measures:

- Make plans to secure your property. Permanent storm shutters offer the best protection for windows. A second option is to board up windows with 5/8" marine plywood, cut to fit and ready to install. Tape does not prevent windows from breaking.
- Install straps or additional clips to securely fasten your roof to the frame structure. This will reduce roof damage.
- Be sure trees and shrubs around your home are well trimmed.
- Clear loose and clogged rain gutters and downspouts.
- Determine how and where to secure your boat.
- Consider building a safe room.

## During a Hurricane

If a hurricane is likely in your area, you should:

- Listen to the radio or TV for information.
- Secure your home, close storm shutters, and secure outdoor objects or bring them indoors.
- Turn off utilities if instructed to do so. Otherwise, turn the refrigerator thermostat to its coldest setting and keep its doors closed.
- Turn off propane tanks. Avoid using the phone, except for serious emergencies.
- Moor your boat if time permits.
- Ensure a supply of water for sanitary purposes such as cleaning and flushing toilets. Fill the bathtub and other large containers with water.

You should evacuate under the following conditions:

- If you are directed by local authorities to do so. Be sure to follow their instructions.
- If you live in a mobile home or temporary structure—such shelters are particularly hazardous during hurricanes no matter how well fastened to the ground.
- If you live in a high-rise building—hurricane winds are stronger at higher elevations.
- If you live on the coast, on a floodplain, near a river, or on an inland waterway.
- If you feel you are in danger.

If you are unable to evacuate, go to your safe room. If you do not have one, follow these guidelines:

- Stay indoors during the hurricane and away from windows and glass doors.
- Close all interior doors—secure and brace external doors.
- Keep curtains and blinds closed. Do not be fooled if there is a lull; it could be the eye of the storm - winds will pick up again.
- Take refuge in a small interior room, closet, or hallway on the lowest level.
- Lie on the floor under a table or another sturdy object.

## After a Hurricane:

- Stay away from damaged areas. Stay away unless your assistance has been specifically requested by police, fire, or relief organizations. Return home only when authorities say it is safe.
- Listen to a battery-operated radio or television. Listen for the latest emergency information.



- Use the telephone only for emergency calls.
- Help injured or trapped persons. Remember to help your neighbors who may require special assistance such as infants, the elderly, and people with disabilities. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Check for gas leaks. If you smell gas or hear blowing or hissing noise, open a window and quickly leave the building. Turn off the gas at the outside main valve if you can and call the gas company from a neighbor's home. If you turn off the gas for any reason, it must be turned back on by a professional.
- Look for electrical system damage. If you see sparks or broken or frayed wires, or if you smell hot insulation, turn off the electricity at the main fuse box or circuit breaker. If you have to step in water to get to the fuse box or circuit breaker, call an electrician first for advice.

### **After returning home:**

The following are guidelines for the period following a flood:

- Listen for news reports to learn whether the community's water supply is safe to drink.
- Avoid floodwaters; water may be contaminated by oil, gasoline, or raw sewage.
- Water may also be electrically charged from underground or downed power lines.
- Avoid moving water.
- Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car.
- Stay away from downed power lines, and report them to the power company.
- Return home only when authorities indicate it is safe.
- Stay out of any building if it is surrounded by floodwaters.
- Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are serious health hazards.
- Clean and disinfect everything that got wet. Mud left from floodwater can contain sewage and chemicals.

### **7.06 Wildfire:**

The threat of wildfires for people living near wild land areas, or using recreational facilities in wilderness areas, is real.

Dry conditions at various times of the year and in various parts of the United States greatly increase the potential for wild land fires. Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wild land fire.

There are several safety precautions that you can take to reduce the risk of fire losses. Protecting your home from wildfire is your responsibility. To reduce the risk, you'll need to consider the fire resistance of your home, the topography of your property and the nature of the vegetation close by.





### **What to do Before a Wildfire:**

If you see a wildfire, call 9-1-1. Don't assume that someone else has already called. Describe the location of the fire, speak slowly and clearly, and answer any questions asked by the dispatcher.

#### **Before the Fire Approaches Your House:**

- Evacuate. Evacuate your pets and all family members who are not essential to preparing the home. Anyone with medical or physical limitations and the young and the elderly should be evacuated immediately.
- Wear Protective Clothing.
- Remove Combustibles. Clear items that will burn from around the house, including wood piles, lawn furniture, barbecue grills, tarp coverings, etc. Move them outside of your defensible space.
- Close/Protect Openings. Close outside attic, eaves and basement vents, windows, doors, pet doors, etc. Remove flammable drapes and curtains. Close all shutters, blinds or heavy non-combustible window coverings to reduce radiant heat.
- Close Inside Doors/Open Damper. Close all doors inside the house to prevent draft. Open the damper on your fireplace, but close the fireplace screen.
- Shut Off Gas. Shut off any natural gas, propane or fuel oil supplies at the source.
- Water. Connect garden hoses. Fill any pools, hot tubs, garbage cans, tubs or other large containers with water.
- Pumps. If you have gas-powered pumps for water, make sure they are fueled and ready.
- Ladder. Place a ladder against the house in clear view.
- Car. Back your car into the driveway and roll up the windows.
- Garage Doors. Disconnect any automatic garage door openers so that doors can still be opened by hand if the power goes out. Close all garage doors.
- Valuables. Place valuable papers, mementos and anything "you can't live without" inside the car in the garage, ready for quick departure. Any pets still with you should also be put in the car.

#### **Preparing to Leave:**

- Lights. Turn on outside lights and leave a light on in every room to make the house more visible in heavy smoke.
- Don't Lock Up. Leave doors and windows closed but unlocked. It may be necessary for firefighters to gain quick entry into your home to fight fire. The entire area will be isolated and patrolled by sheriff's deputies or police.

### **What to do During a Wildfire:**

#### **Survival in a Vehicle:**

- This is dangerous and should only be done if there is no other alternative. You may be able to survive the firestorm if you stay in your car. It is much less dangerous than trying to run from a fire on foot.
- Roll up windows and close air vents. Drive slowly with headlights on. Watch for other vehicles and pedestrians. Do not drive through heavy smoke.
- If you have to stop, park away from the heaviest trees and brush. Turn headlights on and ignition off. Roll up windows and close air vents.



- Get on the floor and cover up with a blanket or coat.
- Stay in the vehicle until the main fire passes.
- Stay in the car. Do not run! Engine may stall and not restart. Air currents may rock the car. Some smoke and sparks may enter the vehicle. Temperature inside will increase. Metal gas tanks and containers rarely explode.

**If You Are Trapped at Home:**

- Stay calm. As the fire front approaches, go inside the house. You can survive inside. Douse yourself with water. The fire will pass before your house burns down. If your house catches fire, stay low and leave as quickly as it is safe to do so.

**If Caught in the Open:**

- The best temporary shelter is in a sparse fuel area. On a steep mountainside, the back side is safer. Avoid canyons, natural "chimneys" and saddles.
- If a road is nearby, lie face down along the road cut or in the ditch on the uphill side. Cover yourself with anything that will shield you from the fire's heat.
- If hiking in the back country, seek a depression with sparse fuel. Clear fuel away from the area while the fire is approaching and then lie face down in the depression and cover yourself. Stay down until after the fire passes!

**What to do After a Wildfire**

- Check the roof immediately. Put out any roof fires, sparks or embers. Check the attic for hidden burning sparks.
- If you have a fire, get your neighbors to help fight it.
- The water you put into your pool or hot tub and other containers will come in handy now. If the power is out, try connecting a hose to the outlet on your water heater.
- For several hours after the fire, maintain a "fire watch." Re-check for smoke and sparks throughout the house.

**7.07 Conclusion:**

TACDA encourages all members to remember the PEP concept; - PLAN, EQUIP AND PRACTICE. Each one of these natural disasters is survivable if we make the proper preparations. Planning, Equipping and Practicing must be done during the 'Before' stage of the disaster.

Underground shelters, if placed above the flood plane, provide protection for every natural and man-made disaster. Few lives will be lost if shelters are accessible and properly equipped.

Think through the steps of the 'STOP' concept.

- Study the information you have been given. The FEMA web site provides excellent content on these and other natural disasters.
- Think about the consequences for 'non-action'.
- Observe the areas of risk within your proximity.
- Prepare accordingly.

There is no need to fear any of these disasters if we have properly prepared.

