

Maine ARES Safety Course

Developed by Bryce Rumery, K1GAX
Maine ARES Section Emergency Coordinator
(Updated 06-19-10)

Table of Contents

Introduction	2
Pre-deployment Safety Checklist	2
Personal, Team and Mission Safety	2
Hazmat Incidents	4
Weather Safety	4
Electrical Safety	7
RF Safety	10

INTRODUCTION

Safety must always be the primary concern of all ARES members. Safety must be a top priority for everyone from the management level (SEC, DECs and ECs) to the leadership level (AECs, group supervisors and team leaders) and down to all ARES responders.

This course was developed to provide ARES members with guidance regarding safety in three areas; personal, team and mission safety, electrical safety and RF safety.

Safety will affect three things; individuals, teams and mission accomplishment. Face it, we, in ARES, are not a “bottomless pit” of human resources (people). The loss of an individual ARES responder will affect the team; in affecting the team, it will ultimately affect the accomplishment of the ARES mission. They are all interconnected by safety.

This course supplies the basic information on safety to ARES responders. It is not meant to be all inclusive.

PRE-DEPLOYMENT SAFETY CHECKLIST

Before deploying to an assignment, it is important to check all of your communications and support equipment for safety. This should be accomplished on a regular basis. It is suggested that all equipment be checked quarterly and just before a deployment.

The following is a suggested checklist

- Operationally check all communications equipment
- Ensure that all equipment has all required covers and shielding
- Check all equipment power cords, patch cords, coax and extension cords for fraying and cracks (and replace all frayed or cracked cords)
- Check all connectors on all cords to ensure they are sound (replace any that are not)
- Be sure your basic safety equipment is packed with your ready kit

PERSONAL, TEAM AND MISSION SAFETY

Safety Priorities

The safety priorities are always in the following order:

- 1. You**
 - You can't be of much use if you are injured
- 2. Your team**
 - Your team can't function well if you are short members due to injury
- 3. Your mission**
 - Your mission cannot be accomplished if you or members of your team are injured

Never take chances while you are on an assignment! You are a communications volunteer. You are **not** paid to take chances.

Never accept an assignment if you feel that by doing so your safety will be threatened!

Pay attention to the weather forecast for your assignment area. The weather conditions can have a direct affect on your safety.

Upon arriving at your assignment, find out who the on scene safety officer is.

Be sure your initial briefing upon arrival includes a site safety briefing.

ARES team members should carry basic safety equipment with them to their assignment. Safety equipment will not always be available or provided on scene. Wear all appropriate safety equipment as directed by the team safety officer or on site safety officer.

Basic Safety Equipment includes:

Orange or Lime Green safety vest with reflective stripes	Hard hat	Safety goggles
Work gloves	Safety boots (steel toe)	Particle masks
Sunglasses (plastic lenses)	Coveralls	Broad brimmed hat (summer & rainy weather)
Blousing garters or thick rubber bands	Rain suit or poncho	Personal first aid kit
Prescription medicines	Flashlight and extra batteries	Leatherman type pocket survival tool
Space (emergency) blanket	Sun screen	Mosquito repellent
Clothing appropriate for the season/weather	Electrical tape	Duct tape
Flagging tape	Ground flags	

Report all unsafe conditions to your team's safety officer or the on site safety officer immediately.

All ARES Groups and Teams should have a safety officer. This may be the Group Supervisor or Team Leader or may be a member appointed by the Group Supervisor or Team Leader.

The Safety Officer will be responsible for the safety of the group or team. He or she may stop any activity which they feel is unsafe. The Group or Team safety officer may override the directives of the Group Supervisor or Team Leader in regards to safety issues.

The Safety Officer will report all unsafe conditions and practices to the on site safety officer immediately. The Safety Officer should keep a log of his or her findings for use after the incident in safety and after action reports.

All ARES responders should obey all directives of on scene public safety officials at all times.

Never enter the “Hot” zone of an incident unless instructed to do so by an authorized public safety official associated with the incident.

If asked to stop transmitting or to turn your communications equipment off by an on scene public safety official, **do so at once and without question**. There is probably a very good reason for the directive, for example, explosive detonators may be affected by RF energy and your equipment may cause an explosion if close enough to a detonator.

Do not interfere with the operations of on scene public safety officials. Although helping may seem like the thing to do, unless you are properly trained, you may put yourself and professional responders in danger by your actions; aid professional responders only when asked to. Remember, your job is communications and not public safety.

Hazmat Incidents

1. Approach the scene cautiously - **from uphill and upwind**. If you have binoculars, use them!
2. Try to identify the material by any *one* of the following:
 - The four digit number on a placard or orange panel
 - The four digit number (preceded by the initials “UN/NA”) on a shipping paper or package
 - The name of the material on the shipping paper, placard or package
3. Call for help immediately and let the experts handle the situation. Do not attempt to take action beyond your level of training. Know what you are capable of doing.

Weather Safety

When deployed, always evaluate the situation around you; always have a way out. Don’t allow yourself to be trapped! Evacuate before the situation becomes dangerous.

Winter Weather

Be sure to dress for the season. Be sure to dress for the possible weather also. Listen to the weather forecast, because, as we know, “if you don’t like the weather in Maine, wait a minute, it’ll change”.

For the winter, carry a winter parka, down vest, waterproof pants, lined boots, a “watch” cap, ski mask and heavy gloves (and mittens – they keep your hands warmer than gloves).

In your vehicle carry a snow brush and ice scraper at all times. Some other items are to have are a shovel (regular type long handled rather than the folding type), jumper cables , a small bucket or container of sand, a plastic cover for your windshield (for icing conditions), a good flashlight, fold up safety cones, a quart of extra vehicle lubricants and fluids and an emergency tow rope.

If you are driving and break down, try to stay with your vehicle, if possible. In a storm, one can become disoriented when they leave their vehicle and try to find other shelter. Remember, that house with the light on may be further away than you think and in a storm, wind driven snow can wipe out your vision in a matter of no time.

If you are at home, do not venture out if your health or safety is at risk. If you must go out, dress for the conditions. Do not spend more time outside in winter conditions than absolutely necessary.

Flash Floods

Flash flooding is a major killer. Many flash floods occur at night, which makes them more difficult to see. As an ARES responder, you may encounter flash floods at any time. Heeding the following flash flood safety rules may save your life.

Do not attempt to drive or walk across a flooded roadway or low water crossing. Nearly half of all flash flood deaths are vehicle-related. Moving water 2 feet deep will carry away most cars.

If your vehicle becomes caught in high water and stalls, leave it immediately and seek higher ground if you can do so safely. Rapidly rising water may sweep a vehicle and its occupants away.

Be especially careful at night when flash floods are harder to recognize.

Lightning

Lightning occurs in **all** thunderstorms and is also a significant threat to life. ARES responders are especially vulnerable to being struck by lightning since they are often in prime strike locations, such as in open fields or on hilltops. The following lightning safety rules are important.

Lightning tends to strike the tallest object in an area...make sure it is not you. Remain in your vehicle or an indoor location whenever possible.

If you must go outside, crouch down to make yourself a poor lightning target. Do not lie flat on the ground since you will be more likely to be severely shocked if lightning strikes close to you.

Hail

Although large hail rarely causes fatalities, it is the most destructive element associated with severe local storms and can cause considerable property damage. If the storm you are observing produces a tornado, it will likely form very near the shaft of large hail.

These hail safety tips can help minimize damage to your vehicle and possible injury to you.

Substantial structures and highway overpasses (out of traffic lanes) offer the best hail protection.

Hard-top vehicles offer fair protection from hail up to about golf ball sized, but significant windshield and auto body damage can result with hail larger than golf balls.

Downbursts and Outflow Winds

A downburst is defined as a strong downdraft with an outrush of damaging wind on or near the ground. Downbursts are responsible for most thunderstorm wind damage. Winds may exceed 100 mph in very strong downbursts. The following downburst safety rules are important.

Keep a firm grip on your vehicle's steering wheel to maintain control. Wind speed and direction can change rapidly in a downburst.

Blowing dust or heavy rain may accompany downbursts. Be prepared for sudden changes in visibility that may create hazardous spotting conditions.

If located in a substantial building you should move away from windows as the downburst approaches.

Tornadoes

Tornadoes pose a significant threat. High winds and flying debris can result in hazardous spotting conditions and significant damage to vehicles and buildings. Be especially alert for tornadoes if a watch or warning is in effect. These safety rules could save your life.

In high visibility areas, such as open rural areas, you may be able to drive away from an approaching tornado.

Remember, this does not apply in urban areas and in low visibility locations such as in heavily wooded areas.

You should be familiar with your area and have a planned escape route.

If you can't avoid an oncoming tornado, you should take shelter in a substantial building, ditch, ravine, or other low spot (but be cautious of flash flooding).

Downed power lines

Severe weather of any kind usually results in downed power lines.

Don't touch downed power lines or any object or water that is in contact with the lines. Don't drive over downed power lines or through standing water if power lines are in the water. Don't take someone else's word that a fallen electrical wire is dead. Rely only on the utility company's statement that it is turned off. If a power line falls across your car, stay inside the car and continue to drive away from the line. If the engine stalls, do not turn off the ignition. Ask someone to call the local utility company and emergency services.

Building safety

If located in a building, be sure you always have two exits available to you for escape. Be sure to identify these in advance. **Do not** stay in a building if it is unsafe.

Setting up your station

If you are setting up a station at a deployed location, observe the following safety tips:

- If possible, locate your station outside of a high traffic area
- Do not block exits from rooms or the building
- Keep wires, such as coax and extension cords off the floor. If they must go across the floor in a traffic area, tape them down with duct tape
- Keep tripping hazards (such as batteries) under your operating desk or table and out of the flow of traffic
- If coax or extension cords must go out a door, secure the door and identify it as “Door Blocked”
- Ensure that your station can be secured if you are going to be away from it for a period of time
- Ensure that outside antennas are well secured (guy lines, if necessary)
- In setting up antennas, be sure masts and guy lines are marked with flagging tape and mark coax runs outside with ground flags

ELECTRICAL SAFETY

General

Electrical safety is important to you, other disaster workers and the general public in a deployed location.

The two main hazards encountered at deployed locations are fire hazards due to the overloading of electrical outlets and the use of extension cords. Other hazards include the frayed or cracked electrical cords (both AC and DC), use of portable generators and large capacity batteries.

In checking for overloaded circuits, if at all possible, check the capacity of the circuit breaker or fuse associated with the outlet or outlets you will be using. Ensure that they meet or exceed the capacity of all equipment you plan to be running off the outlet.

Fire Hazards

One of the primary concerns with electrical outlet safety is fire safety. Most of the fires that occur are due to overloading the circuits. Additionally, the following things should be avoided in order to prevent an outlet fire:

- Running cords under rugs or through high traffic areas;
- Cords and plugs and using extension cords that are too long, and;
- Incorrect wiring of the circuits.

By taking measures to check cords and plugs, you will be taking the steps to prevent a fire from starting in your outlet.

How to Avoid Problems

In order to avoid the issues with safety, there are some simple steps to take. First and foremost, avoid overloading the circuits. Second, you should check your equipment and wires frequently and use outlets properly. For example, don't try to force a three prong plug into a two prong outlet or break off the grounding plug in order to make them work in the two prong socket.

Finally, replace frayed, cracked, or sparking cords or plugs. If your equipment overheats or shorts, it should be replaced to prevent future problems or even a fire.

Safe Use of Extension Cords

Safety Suggestions:

The following are recommendations for the purchase and safe use of extension cords:

- Use extension cords only when necessary and only on a temporary basis.
- Use polarized extension cords with polarized appliances.
- Make sure cords do not dangle from the operating desk or table where they can be pulled down or tripped over.
- Replace cracked or worn extension cords with new. #16 gauge cords that have the listing, of a nationally-recognized testing laboratory, safety closures, and other safety features.
- With cords lacking safety closures, cover any unused outlets with electrical tape or with plastic caps to prevent the chance of a child making contact with the live circuit.
- Insert plugs fully so that no part of the prongs are exposed when the extension cord is in use.
- When disconnecting cords, pull the plug rather than the cord itself.
- Use only three-wire extension cords for appliances with three-prong plugs. Never remove the third (round or U-shaped) prong, which is a safety feature designed to reduce the risk of shock and electrocution.
- Check the plug and the body of the extension cord while the cord is in use. Noticeable warming of these plastic parts is expected when cords are being used at their maximum rating, however, if the cord feels hot or if there is a softening of the plastic, this is a warning that the plug wires or connections are failing and that the extension cord should be discarded and replaced.
- Never use an extension cord while it is coiled or looped. Never cover any part of an extension cord with newspapers, clothing, rugs, or any objects while the cord is in use. Never place an extension cord where it is likely to be damaged by heavy furniture or foot traffic.
- Don't use staples or nails to attach extension cords to a baseboard or to another surface. This could damage the cord and present a shock or fire hazard.
- Don't overload extension cords by plugging in equipment that draws a total of more watts than the rating of the cord.
- Use special, heavy duty extension cords for high wattage equipment.

Observe the following safety tips:

- If at all possible, ensure your station (all equipment) is properly grounded
- Use a fused power strip (for AC or DC connections)
- Keep extension cords as short as possible
- Check all cords, both AC and DC, for fraying or cracks and replace the cord(s) if fraying or cracking are found
- Have an emergency kill switch for your station

Batteries

Large Batteries

- Do not store large batteries on top of your operating desk or table
- Store large batteries on the floor and under your operating desk or table
- Keep large batteries in an approved battery box
- Always use fused lines to your equipment
- Keep batteries in a well ventilated area

Small Batteries

- Do not mix battery types
 - Rechargeable, Non-rechargeable, etc.
 - Each type of battery has different capacities and discharge characteristics
 - Mixing different types can result in extreme heat buildup and potential fire
 - Always use the same types of batteries together and, if at all possible, in the same state of charge

Generators

- Locate your generator outside the building and in a well ventilated area
- Have a cover (small open air cover, such as roof) for your generator outside
- Ground your generator
- If using an extension cord, have an in-line circuit breaker
- Mark the extension cord run with ground flags
- Store fuel for the generator in a safe, well ventilated location away from the generator
- When the generator is running, have an “ABC” fire extinguisher stored near the generator

RF SAFETY

By now, we should all be aware of our responsibility to keep the public, and ourselves, safe from excessive exposure to RF energy. On January 1, 1998, new FCC regulations dealing with this issue went into effect for the Amateur Radio service. The specific wording can be found in the FCC Rules and Regulations, Sections §1.1307b, §1.1310, §2.1093, §97.13c, and §97.503.

Disaster deployments present a different problem for RF safety. We might be reasonably expected more transmitting than would be done in usual operations. Since a disaster deployment site is usually temporary, it is likely that antennas will not be mounted as high as we would normally put them. Many disaster deployment sites operate two or more transmitters simultaneously. Disaster deployment sites are often set up in public places, where it is possible for passersby to come in close proximity to actively transmitting equipment. Thus, a certain amount of preparation is necessary to ensure that a disaster deployment site will be operated safely and legally.

RF Awareness Guidelines

- Although antennas on towers (well away from people) pose no exposure problem, make certain that the RF radiation is confined to the antennas' radiating elements themselves. Provide a single, good station ground (earth), and eliminate radiation from transmission lines. Use good coaxial cable, not open-wire lines or end-fed antennas that come directly into the transmitter area.
- No person should ever be near any transmitting antenna while it is in use. This is especially true for mobile or ground-mounted vertical antennas. Avoid transmitting with more than 25 W in a VHF mobile installation unless it is possible to first measure the RF fields inside the vehicle. Avoid using indoor and attic mounted antennas if at all possible.
- Don't operate high-power amplifiers or other transmitting equipment with the covers removed, especially at VHF/UHF.
- In the UHF/SHF region, never look into the open end of an activated length of waveguide or point it toward anyone. Never point a high-gain, narrow-bandwidth antenna (a paraboloid, for instance) toward people.
- With hand-held transceivers, keep the antenna away from your head and use the lowest power possible to maintain communications. Use a separate microphone and hold the rig as far away from you as possible.
- Don't work on antennas that have RF power applied. Avoid exposing the general public to antennas that they may touch when RF power is applied. These can cause painful RF burns.
- Don't stand or sit close to a power supply or linear amplifier when the ac power is turned on. Stay at least 24 inches away from power transformers, electrical fans and other sources of high-level 60-Hz magnetic fields.

Another part of RF safety is antenna placement. Not only is there a potential RF radiation hazard, but the physical placement of antennas should be done with physical safety in mind. That is, what hazards might be presented if an antenna were to fall or break loose from its support.

In any deployed location, RF safety for yourself and the general public is all important. No one should be put at risk due to improperly installed RF equipment.

- All outside antennas should be mounted at least 10 feet from any electrical lines
- All outside antennas should be high enough to avoid becoming hazards
- Dipoles should be at least 10 feet high
- Antennas should not be mounted over access roads
- VHF and UHF antennas (verticals and directional antennas) should be mounted a minimum of 15 feet above the ground
- Ground mounted HF antennas (verticals) should be roped off (with flagging tape) a minimum of 20 feet from the antenna to avoid access by the general public
- If a dipole is mounted in an inverted V configuration, the ends should be at least 10 feet in the air or if they are at ground level, they should be roped off (with flagging tape) a minimum of 20 feet from the ends to prevent access by the general public
- Ensure that outside antennas are well secured (guy lines, if necessary)
- In setting up antennas, be sure masts and guy lines are marked with flagging tape and mark coax runs outside with ground flags
- Keep the covers on all RF equipment
- Turn equipment off when not in use
- Ensure that all coax is in good condition (no cracks or frays)