

11. COLD WEATHER SURVIVAL

11.01 Cold Weather:

Winter weather poses many threats to human health and safety. Exposure to cold, vehicle accidents, fires, improper use of heaters and other winter weather hazards injure and kill many people every year.

Heavy snow can collapse roofs, close businesses, kill livestock, stop the movement of food supplies, cut off communications and damage power grids.

Large accumulations of snow can lead to avalanches. Avalanches normally occur within 24 hours of snowfall, and special caution should be taken in avalanche prone areas.

Freezing rain (also known as ice storms) is rain that falls onto a surface that has a temperature, which is below freezing. The cold surface causes the rain to freeze and become glazed with ice. Heavy accumulations of ice can topple utility poles and trees. Bridges and overpasses are particularly dangerous, as ice forms on these open surfaces before it forms on roads.

Cold weather occurs in every season of the year. Hikers, boaters and swimmers often go into the mountains or water unprepared for cool damp conditions, and succumb to hypothermia even during the summer time. Older people, in particular, are vulnerable to the effects of hypothermia.

11.02 Hypothermia:

Remember the STOP concept - STUDY, THINK, OBSERVE, AND PREPARE.

STUDY:

Everyone should be knowledgeable and alert to the signs and symptoms of hypothermia. Symptoms are observations the victim, himself, should recognize, and take action to correct. Signs are observed by others, who then should intercede in behalf of the victim.

Symptoms of hypothermia begin slowly and soon affect the person's ability to move and to think clearly. Once the core body temperature falls below 95 F, outside measures must be used to raise the body temperature to normal levels.

It is essential to keep a hypothermic person adequately hydrated and fueled. Carbohydrates are quickly released into the blood stream for a sudden brief heat surge and are recommended for quick energy intake. Sugars and sweet warm drinks are particularly helpful during the re-warming process.

THINK:

Symptoms you may experience if you are becoming hypothermic:

- Uncontrollable shivering (although, at extremely low body temperatures, shivering may stop).
- Weakness and loss of coordination



- Confusion
- Pale and cold skin
- Drowsiness – especially in more severe stages
- Slowed breathing or heart rate

Symptoms left untreated can quickly result in lethargy, cardiac arrest, shock, coma and even death.

OBSERVE:

Signs of hypothermia that can be observed by others:

- Slowing of pace, drowsiness, fatigue
- Stumbling
- Thickness of speech
- Amnesia
- Irrationality, poor judgment
- Hallucinations
- Loss of perceptual contact with environment
- Blueness of skin (cyanosis)
- Dilation (enlargement) of pupils
- Decreased heart and respiration rate
- Stupor

PREPARE:

Prevention

- Appoint an experienced person to watch the group for signs of hypothermia, and ALWAYS adhere to the hypothermia watcher's decisions.
- Get adequate rest and maintain good nutrition and hydration before and during cold weather activities.
- Consume adequate high-energy foods and liquid during cold weather activities.
- Wear well-insulated, breathable wind resistant clothing.
- Carry emergency bivouac (shelter) equipment
- Make camp early in a storm, or if lost, injured, or tired.
- Exercise to keep up the body's heat function.
- Carry proper clothing, footgear, and emergency equipment for the worst expected conditions.
- Take IMMEDIATE corrective action for signs or symptoms of hypothermia.

Treatment

To reduce heat loss:

- Shelter victim from wind and weather
- Insulate victim from the ground
- Remove any wet clothing and replace with well-insulated, breathable, wind resistant garments
- Place a warm hat or covering around the head and neck areas.



To add heat:

- Increase exercise, if possible
- Put victim in pre-warmed sleeping bag or blankets
- If the patient is conscious, give them warm drinks, followed by candy or other high-sugar foods.
- Apply heat (warm water bottles, heat packs) to neck, armpits, and groin areas.

11.03 Frostbite:

Frostbite often sets in as hypothermia progresses. It most frequently affects fingers, toes, earlobes and the tip of the nose.

Frostbite occurs when blood flow to the outer layer of skin decreases to direct the blood to the brain and other vital organs. If the core body temperature is warm, however, frostbite seldom is a problem, as circulation to the frostbite prone areas is not diminished. It is often said, "If your feet are cold, put on a hat!"

Symptoms of frostbite:

- Gradual numbness
- Hardness to the skin
- Pale color to the affected area
- Pain
- Tingling or burning
- Blisters

Treatment for frostbite:

Minor frostbite can be treated at home, provided no tissue has died or been irreversibly damaged. Mild cases of frostbite will begin to heal immediately. However, if skin color is deep purple or black or skin begins to blister, seek medical attention immediately.

- **NEVER** massage an area affected by frostbite.
- **NEVER** use hot water to warm the skin once frostbite is apparent. Hot water will cause further injury.
- **NEVER** walk on frostbitten feet.
- **DO not** use stimulants if you fear frostbite. Nicotine and caffeine will only make tissue damage worse.
- **Seek shelter.**
- **After reaching shelter, remove clothing from frostbitten areas of skin.**
- **Immerse affected areas in warm water measuring 100 F.**
- **Drink warm fluids with high sugar content.**
- **After warming, cover affected areas with cloth bandages.**
- **Minor pain should be treated with over-the-counter pain relievers, such as acetaminophen.**
- **Keep the damaged area raised.**



11.04 Vehicle accidents:

The leading cause of death during winter storms is automobile and other transportation accidents.

If you are required to travel in hazardous winter weather, check the weather reports regularly and avoid traveling in a winter storm. Plan your trip carefully and notify two people of your destination, your route and your estimated time of arrival (ETA). Plan to travel during the daylight hours and take another person with you if possible.

Make sure your car has been properly winterized

- Good tires (adequate tread)
- Antifreeze
- Snow and ice removal equipment
- Chains for tires
- Full tank of gas
- Bag of sand for traction
- Disaster supply kit (72 hour kit)
- Extra supply of water
- Extra flashlight, lights and batteries
- NOAA radio receiver
- Cell phone or two-way radio (fully charged batteries)
- Extra warm clothing and blankets

If you get stuck, stay with your vehicle

- Display a trouble sign or hang a red cloth from the antenna
- If it is not snowing, raise the hood of the car.
- Clear snow from around the exhaust pipe
- Open a 'down wind' window for ventilation.
- Run the car and heater 10 minutes every hour or 5 min. every half hour to keep warm.
- Turn on an overhead light and blinker while engine is running.
- Avoid overexertion and drink plenty of fluids (avoid alcohol and caffeine)
- Exercises lightly to keep up circulation
- If you are with another person take turns sleeping (one of the first signs of hypothermia is sleepiness-if not awakened periodically to increase body temperature and circulation you may freeze to death)
- Huddle together for warmth

11.05 Prepare to survive severe cold weather and winter storms at home:

Exhaustion and heart attacks: Pace yourself carefully when shoveling walks. Be alert to the needs of elderly or handicapped neighbors.

Hypothermia and asphyxiation: Elderly people account for the largest percentage of hypothermia victims. Many older Americans literally freeze to death in their own homes after being



exposed to dangerously cold indoor temperatures, or are asphyxiated because of improper use of fuels such as charcoal briquettes, which produce carbon monoxide.

House fires: These occur more frequently in the winter because of the lack of proper safety precautions when using alternate heating sources. Fires during the winter present a greater danger because water supplies may freeze and it may be more difficult for firefighting equipment to get to the fire.

11.06 Before, During and After Winter Storms:

Remember the PEP concept - PLAN, EQUIP & PRACTICE

What to do before cold weather or winter storms arrive

PLAN:

- Proper ventilation is very important. Never operate an un-vented fuel burning appliance in any closed room.
- Make sure your home is properly insulated. Add insulation where needed (Attic, walls, etc.).
- Learn the proper procedure for shutting off the main water valves and draining the outside faucets.
- Make a plan to properly care for your pets. They will need a protected food supply and non-frozen water.
- Learn the location of public shelters in case you lose heat or power.
- Plan an evacuation route and alternative routes to your home or shelter.

EQUIP:

- Store food and water supplies for at least seven days (not including 72 hour kit).
- Purchase a battery operated radio or television or NOAA Weather Radio with the Specific Area Message Encoder feature. (SAME)
- Be sure you have an adequate supply of heating and cooking fuel.
- Purchase a warm coat, hat, gloves, boots and extra blankets for each member of the family.
- Install smoke alarms and carbon monoxide alarms.
- Keep a supply of non-clumping kitty litter for walkways and steps. Kitty litter improves traction on icy surfaces and will not damage vegetation and concrete.

PRACTICE:

- Hire a professional to inspect and clean fireplaces and wood burning stoves (chimneys) and keep an ample supply of fuel.
- Inspect your fire extinguishers for function and adequate sizing.
- Check your Disaster Supplies Kit (72 hour kit), and upgrade if necessary.
- Protect pipes from freezing by wrapping them with insulation or layers of newspaper, and then cover them with plastic to keep out the moisture.

What to do Immediately Before & During the Storm

- Listen to NOAA weather radio or local radio or television for updated weather reports. The reports may not be exact for your particular area.



- Bring companion animals inside before the storm starts.
- Eat regularly and drink liquids to keep the body hydrated.
- Conserve fuel. Winter storms can last for days. Electric and gas services may be disrupted when many people demand large amounts at the same time.
- Lower the thermostat to 65 F (18 C) during the day and 55 F (13 C) at night.
- Dress warmly in layers.
- Stay inside if possible and stay informed.

What to do after the storm

- Avoid overexertion. The strain from the cold and hard labor could cause a heart attack. Sweating could lead to chilling and hypothermia.
- If you must go outside, protect yourself. Wear layered clothing, gloves and a hat. Half of you body-heat loss is from the head and neck area.
- Walk carefully on stairs and sidewalks, as they may be icy. Cover your mouth to protect your lungs.
- Check on relatives, friends and neighbors, particularly if they are elderly or live alone.
- Remember the dangers of wind chill. Wind chill is not the actual temperature, but rather how wind and cold feel on the exposed skin. As the wind increases, heat is carried away from the body at a faster rate, driving down the body's temperature. For example, at 2 F, with a 15 MPH wind it will feel and act like minus10 F.
- Use caution if power has been lost. Carefully inspect perishable foods. If in doubt, throw it out.
- Do not re-freeze foods that have totally thawed.
- Refrigerated foods should be eaten first, then food from the freezer as it thaws, and then packaged or canned foods.

11.07 Cold Weather Clothing:

Jim Phillips of Spring City, Utah has designed a system of cold weather clothing, which can easily be constructed from open cell polyurethane foam. This system of clothing has been tested to sub-zero temperatures.

In 1987, former Apollo astronaut James A. Lovell Jr. wore a suit of Jim's design as his primary clothing during a trip to the North Pole, where the typical wind chill was minus 90 F. "It worked very nicely," Lovell reported, "but sometimes it got too warm, especially if I hiked a long way."

Jim has shared his technology with survival minded folks all over the world. Many people make their own clothing and boots.

The foam should be lined with a synthetic material such as nylon or polyester mesh. This lining should cover both sides of the foam. Otherwise, the foam becomes uncomfortable to the skin. Any pattern can be used. Choose a pattern one size larger than normal for the foam. Make sure the sleeve holes are cut generously. The outer shell should be unlined and constructed of a breathable material, which acts as a wind barrier. It should not be waterproofed, as this would



trap moisture inside. Test for waterproofing of the outer shell by holding it to your mouth and breathing through it. You should be able to force air fairly easy if it is not waterproofed.

For most sub-zero winter wear, a 3/4-inch layer of foam is adequate for the body and 1/2 inch for the sleeves. Hats should also be made from 3/4-inch foam. For arctic conditions, Jim suggests a 1-inch layer of foam for the entire body.

Sleeping bags requires 2 inches of foam and must include a closed cell polyurethane mat underneath the open celled layer. These closed cell mats can be purchased in any store where camping items are sold.

Boots should be made of 1-inch foam with the closed cell mat underneath. Old 'moon boots' can be taken apart and the bottom used for the sole. The outer layer is constructed from a tube shaped piece of lightweight canvas. It should reach about 12 inches above the sole. Holes should be punched in the sides of the rubber sole and the canvas should then be hand-stitched to the sole. The lined foam is pushed into the boot and the boot is closed with Velcro straps.

In an emergency, foam mattress pads (egg carton style) can be used. Keep a mattress pad rolled up in your car trunk for cold weather emergencies, with heavy-duty scissors and duct tape to build the emergency clothing.

Open cell polyurethane foam, unlike conventional fibrous insulating materials (which tend to catch moisture wherever neighboring fibers cross each other) allows the escape of moisture from the body. We call this 'the ability to breathe'.

Moisture transfers heat 25 times as fast as dry air. Cotton holds moisture and is the worst available insulation. Wool and down hold moisture. Layers of clothing have a moisture accumulation problem as moisture accumulates between the layers.

Open cell polyurethane is the best possible insulator. Closed cell polyurethane does not breathe. The pockets of still, dry air contained in the foam insulation retain the wearer's body heat while allowing perspiration moisture to escape quickly. This outward flow is driven by a differential vapor pressure that the suit sets up between its warm moist inner lining and its cold, dry outer shell.

