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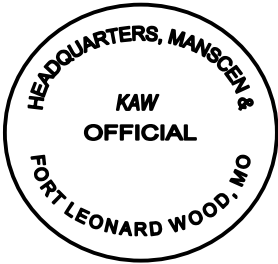
Safety  
PREVENTING WEATHER RELATED ACCIDENTS AND INJURIES

Summary. This revision provides consolidation of weather related publications as cited in References, Page 2.

Applicability. This pamphlet is applicable to all military (to include Reserves, National Guard, Reserve Officer Training Corps (ROTC), Junior Reserve Officer Training Corps (JROTC) and civilian personnel assigned to, or working on United States Army Maneuver Support Center and Fort Leonard Wood, (MANSCEN & FLW).

Suggested Improvements. The proponent agency of this pamphlet is the MANSCEN Safety Office. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to MANSCEN Safety Office, 102 Colorado Ave, Bldg 631, Fort Leonard Wood, MO 65473-8957

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	Contents	Page
Paragraph 1.	Purpose .....	2
Paragraph 2.	References .....	2
Paragraph 3.	Explanation of Acronyms and Definitions .....	2
Paragraph 4.	General .....	2
Paragraph 5.	Recognition and Prevention .....	2
Paragraph 6.	Tornado Safety Rules .....	2
Paragraph 7.	Lightning Protection .....	3
Paragraph 8.	Heat Injuries .....	4
Paragraph 9.	Heat Injury Prevention .....	5
Paragraph 10.	Cold Weather Injuries .....	6
Paragraph 11.	Cold Weather Injury Prevention .....	7
Paragraph 12.	Motor Vehicle Accident Prevention .....	7
Paragraph 13.	Preventing Personal Injuries from Slips, Trips, and Falls .....	8
Paragraph 14.	Risk Management .....	8
Appendix A.	References .....	9
Appendix B.	Lightning Protection Matrix .....	9
Appendix C.	Work/Rest Water Consumption Table .....	18
Appendix D.	Wind Chill Chart .....	18
Appendix E.	Inclement Weather Road Condition Status Policy .....	19
Glossary	.....	20

\*This pamphlet supersedes FLW Pam 385-1, 8 February 1988.

1. Purpose. This pamphlet provides commanders and directors with information that can be used to reduce the impact of weather conditions in causing accidents and injuries.

2. References. References are listed in appendix A.

3. Explanation of Acronyms and Definitions. Acronyms and definitions used in this pamphlet are explained in the glossary.

4. General. Extremes in weather conditions pose additional problems to our training efforts and increase the risk of accidents and injuries. Successfully preventing climatic casualties depends largely on educating personnel and applying methods to reduce exposure. Additionally, to prevent heat and cold injuries, commanders must develop procedures to alert individuals of heat stress and wind chill conditions and adopt techniques to reduce the susceptibility of personnel to climatic injury.

5. Recognition and Prevention. Commanders, directors, and supervisors must ensure every individual who may be exposed to environmental conditions is informed of the potential for accidents and injuries, how to recognize and prevent accidents, and how to obtain medical treatment for injuries.

#### 6. Tornado Safety Rules.

a. Commanders, directors, supervisors, and individuals should prepare for protection before they, or those for whom they are responsible, are exposed to the dangers of a tornado. Knowing what to do when a tornado is observed, or a warning is received, may mean the difference between life and death.

b. Tornado Alert. The following audible signals will be used at Fort Leonard Wood for tornado warnings utilizing the post warning sirens.

- (1) Test Pattern. One blast of 1-minute duration.
- (2) Take Cover. Steady blast of a 3-minute duration.
- (3) All Clear. Three 1-minute blasts with 20-second intervals.

#### c. In the Event of a Tornado -

- (1) Sound the alarm so others may be warned.
- (2) Take the best shelter available that will afford the greatest protection to you from flying objects or collapse of structures.
  - (a) Frame, brick, and stone structures offer poor resistance to a tornado. Basements of frame buildings, at the wall or corner nearest the approaching tornado, offer fair shelter.
  - (b) In reinforced concrete buildings, stay inside on a lower floor near an interior wall and away from windows. Avoid auditoriums and gymnasiums with poorly supported roofs.
  - (c) Concrete walls between you and the approaching tornado offer good shelter from flying objects.
  - (d) Ditches and ravines (at right angles to the path of the tornado) provide minimal protection.
  - (e) Avoid wooded areas, if possible, as tornadoes can uproot even the largest trees and convert them into deadly missiles.
  - (f) In open country in a vehicle, drive at right angles to the path of a tornado, if roads permit. If evasion is not possible, take refuge in a ditch, beneath an overpass or bridge, or lie flat on the ground.

(g) Best protection is found in storm cellars and basements.

(h) If time does not permit evacuation of a wooden building, best chance of survival is on the first floor, lying adjacent to the wall or corner nearest the tornado.

(i) If time permits, electrical circuits and fuel supply lines should be shut off.

d. Keep Calm. It will not help to get excited. Do not run from a storm. Find available shelter or lie flat on the ground. Even though a warning is issued, chances of a tornado striking one's home or location are very slight. Tornadoes cover such a small area, as a rule, that relatively few places in a warned area are directly affected. However, you should still seek shelter. Straight winds can still destroy buildings and roofs.

e. Keep tuned to your radio station for the latest tornado advisory information. Do not call the weather bureau or radio station except to report a tornado. Your individual call may tie up telephone lines urgently needed to receive special reports or to relay advice to radio stations for dissemination to other people in critical areas.

#### f. Tornado Characteristics.

(1) Tornadoes can occur any place in the United States at any time of the year. They happen most frequently in the midwestern, southern, and central states from March through September.

(2) Records show that the average number of tornadoes in the US varies from 47 per year (Kansas) to 1 in 37 years (Nevada). The national average is 800 tornadoes per year. Missouri ranks seventh in the nation with an average of 26 tornadoes each year.

(3) A tornado can be observed as a funnel-shaped cloud, spinning rapidly, and extending toward the ground from the base of a thundercloud. When close by, it sounds like the roar of hundreds of airplanes.

(4) "Tornado" weather is characterized by hot, sticky days with southerly winds and a threatening, ominous sky. However, many such days occur without tornadoes. A rapidly falling barometer indicates tornado possibilities.

(5) The cloud directly associated with a tornado is a dark, heavy cumulonimbus (the familiar thunderstorm cloud) from which a whirling funnel-shaped pendant extends to the ground.

(6) Precipitation associated with the tornado usually occurs first as rain just preceding the storm, frequently with hail, and as a heavy downpour immediately to the left of the tornado's path.

(7) Time of day is most frequently between 1500 and 1900, but they have occurred at all hours of the day or night.

(8) In most cases, they move from southwest to northeast, but may deviate for several miles in other directions.

(9) Width of path 300 to 400 yards, but they have cut swaths over a mile in width.

(10) Length of path is usually 10 to 40 miles, but can move forward for many miles.

(11) Average speed is 25 to 40 miles per hour, but can vary from 5 to 139 miles per hour.

(12) Wind speed within the tornado has been estimated as high as 500 miles per hour, with a low-pressure center that may cause buildings to explode.

## (13) Causes of destruction.

(a) Violent winds uproot trees, destroy buildings, and create a serious hazard from objects being blown through the air.

(b) Difference in air pressure can lift automobiles and cause buildings to explode or collapse.

g. Commanders and supervisors will instruct all assigned personnel in at least three minimum procedures:

(1) Sound the alarm.

(2) Where to take shelter in the immediate vicinity, if time permits. Proper building evacuation will be clearly stated on the risk assessment (based on conditions of the individual area).

(3) When time does not permit evacuation of the building, the safest place would be on the first floor, lying against the wall or corner nearest the tornado.

## 7. Lightning Protection

a. A survey of all outdoor training facilities, ranges, firing points, and rappel sites is listed in appendix B. The results recommend a primary and secondary source of protection from being struck by lightning. Standing operating procedures (SOP), lesson plans and unit briefings should be updated to reflect this information.

b. The following types of steps to provide protection from lightning.

(1) Facilities with Lightning Protection System in place.

(2) Facilities with Grounding System in place.

(3) Ungrounded facility.

(4) Open Areas.

c. No place is safe from the threat of lightning; however, some places are safer than others.

(1) Large enclosed structures (substantially constructed buildings) tend to be much safer than smaller or open structures. The risk for lightning injury depends on whether the structure incorporates lightning protection, grounding, construction materials used, and the size of the structure.

(2) When inside a building avoid contact with conductive surfaces with exposure to the outside such as metal door or window frames, electrical wiring, telephone wiring, cable television (TV) wiring, plumbing, etc.

(3) Small open shelters are common. Many of these shelters are built to protect against rain or sun, not lightning.

(4) If you are outdoors –

(a) Wooded Areas. Seek low ground, a grove of short trees, a deep ravine, or a valley. The best location is a low, open area followed by thick underbrush or short trees in low ground. DO NOT have personnel lie down on the ground or crouch on hands and knees. Assume the "crash position", bent forward, hands on knees, in a squatting position.

(b) Open Fields. DO NOT huddle together in a group, scatter and ensure all weapons and equipment are stacked at least 50 meters away from personnel.

(c) Field Training Exercise (FTX) Sites. Personnel should ground weapons and equipment, move away from any known electrical equipment or metal objects. If tents are being used as

shelters, remove all metal objects and ensure all electrical devices are disconnected. Use radios only in extreme cases of emergency and ensure antennas on radios are collapsed. Evacuate troops away from power lines, high-tension cables, and television communication antennas.

(5) Suspend all training involving ammunition until the storm has ended.

(6) Do not ride in open vehicles. Dismount and move approximately 100 meters away from the vehicles. When inside a closed vehicle avoid contact with metal or conducting surfaces inside or outside of the vehicle.

d. A lightning protection system for an ordinary structure includes air terminals, down conductors, and ground terminals. These three elements of the system must form a continuous conductive path for lightning current, with all connections between the elements typically being accomplished by bolting or welding. The function of such a system is to intercept lightning and safely direct its current to ground. If a structure has a metal roof with a thickness of 3/16 inch or greater, the roof can play the role of the air terminals. The structural metal framework can play the role of down conductors if it is electrically continuous. Sometimes the ground terminal is made of a buried bare conductor wire encircling the structure (also called a loop conductor). Such grounding is beneficial in that it also serves to intercept ground surface or underground electrical arcs that may develop toward the structure from a nearby object, such as a tree, struck by lightning.

e. Facilities not equipped with a properly designed and installed lightning protection system may be equipped with a ground system. Although not as effective as lightning protection, these facilities are better protection than a non-grounded or non-lightning protection structure or the outside. Grounded facilities provide reasonable protection from lightning. It is essential, however, that a person inside the shelter does not touch any element of the grounding system and tries to position him or herself at approximately the same distance from all metal frames, electrical wires, down conductors and open areas or sides.

f. A small shelter, even one protected as described here, should be viewed as the last resort option. Better-protected shelters such as large buildings and all metal vehicles should be sought instead when possible.

g. Facilities not equipped with lightning protection or grounding offer very little protection from lightning. However, these facilities are better than being in the open during a storm that produces lightning.

h. If facilities are not available and personnel cannot be taken back to the barracks, the final option is to adopt the lightning safety position (LSP). LSP means staying away from other people, taking off all metal objects, crouching with feet together, head bowed, and placing hands on ears to reduce acoustic shock from nearby thunder. Do not lie on the ground or bunch up together.

i. An alternative lightning protection system consists of grounded overhead wires suspended above the shelter on separate poles. The loop conductor method may also be employed in this situation.

j. Measuring lightning's distance is a useful technique. Using the Flash/Bang (F/B) technique, for every *five seconds* from the time of seeing the lightning flash to hearing the associated thunder, lightning is one mile away. A F/B of ten = two miles; a F/B of 20 = four miles, etc. The distance from Strike A to Strike B to Strike C can be as much as five to eight miles.

k. The National Lightning Safety Institute recommends the 30/30 Rule: suspend activities at a F/B of 30 (six miles), or when

first hearing thunder. Outdoor activities should not be resumed until 30 minutes have passed from the last observable thunder or lightning. This is a conservative approach and may not be practical in all circumstances.

#### 8. Heat Injury.

a. General. Extremes in weather conditions pose additional problems for training and increase the risk of heat injuries. Successfully preventing heat injuries depends largely on educating personnel and applying methods to reduce exposure. Additionally, to prevent heat injuries, commanders must develop procedures to alert individuals of heat stress conditions and adopt techniques to reduce the susceptibility of personnel to heat injury. The following provides symptoms and treatments for some types of heat injuries:

b. Sunburn. A condition resulting from an overexposure of the skin to ultraviolet (UV) rays found in sunlight. Everyone, even dark skinned persons, are at risk for sunburn. Fair skinned, blue eyed, blondes, and redheads, are especially susceptible.

(1) Symptoms. Redness, pain, swelling, and even blistering can occur from this over exposure. Peeling usually follows several days later. The pain of sunburn is usually greatest between six and 48 hours after exposure.

(2) Prevention.

(a) Try to avoid the sun between 10 a.m. and 3 p.m. when rays are strongest.

(b) Use a sunscreen with skin protection factor (SPF) 15 or greater at all times.

(c) Use a waterproof product if swimming or exercising.

(d) Beware on cloudy days, you can sustain a serious burn even though there is a cloud cover. Do not use sunlamps, reflectors, or tanning beds. They can produce high levels of ultraviolet radiation!

(e) Be informed about any medications you are taking and their side effects. Some antibiotics, such as Tetracycline and Sulfa, can produce an allergic-type rash on skin exposed to sun.

(3) Treatment.

(a) Use cool wet compresses for first 48 hours. Do not use ice.

(b) Aloe based products may be used during the first 48 hours to soothe the pain. Cool oatmeal baths (Aveeno, etc.) may also be beneficial.

(c) Aspirin taken as directed on the label may ease pain.

(d) NO lotions or petroleum jelly in the first 48 hours!! These products retain the heat!

(e) Apply moisturizing lotions after 48 hours.

(f) Seek medical attention if fever, fluid-filled blisters, dizziness or visual disturbances are present.

c. Heat Rash (also known as prickly heat).

(1) Symptoms. A skin rash most commonly found on clothed areas of the body. Heat Rash can impair body heat loss and degrade performance for many days after it's disappearance.

(2) Treatment. Cleanse the affected area thoroughly and dry completely. Calamine or other soothing lotion may help relieve the discomfort.

d. Heat Cramps. Caused from excessive salt loss from the body.

(1) Symptoms are painful cramps of the muscles of the arms, legs and of the stomach which may be severe, following exposure to heat. Heat cramps may occur alone or in the presence of heat exhaustion. Body temperature is normal unless accompanied by heat exhaustion.

(2) Heat cramps can be avoided by acclimatization, proper nutrition and hydration.

e. Heat Syncope (*fainting*) is a mild form of heat illness resulting from physical exertion in a hot environment. In an effort to increase heat loss, blood vessels of the skin dilate to such an extent that blood flow to the brain is reduced. Inadequate fluid replacement leads to dehydration and contributes significantly to the problem.

(1) Symptoms.

(a) Faintness.

(b) Dizziness.

(c) Headache.

(d) Increased pulse rate.

(e) Restlessness.

(f) Nausea and vomiting.

(g) Possibly, even a brief loss of consciousness.

(2) Treatment.

(a) The person should lie or sit down, preferably in the shade or in a cool environment.

(b) Elevate the feet.

(c) Give fluids

f. Heat Exhaustion. Occurs as the result of excessive salt and water loss.

(1) Symptoms.

(a) Profuse sweating.

(b) Headaches.

(c) Tingling sensations in the hands and feet.

(d) Paleness.

(e) Difficult breathing.

(f) Irregular heart beats or a rapid pulse rate (120 to 200 beats per minute).

(g) Blood pressure may be low.

(h) Loss of appetite, nausea and vomiting.

(i) Trembling, weakness or a visible lack of coordination.

(j) A slight clouding of the senses to momentary loss of consciousness.

(k) Skin is cool and moist.

(l) The oral temperature may be lower than normal in cases where hyperventilation (rapid breathing) is present.

(2) Treatment.

(a) If a soldier shows signs of heat exhaustion, immediately move them to a shaded area, loosen tight clothing, and apply a water spray or cool compresses to assist in lowering the body temperature.

(b) Allow the soldier to get plenty of rest and fluids before resuming a normal duty routine. The soldier may be fatigued for several hours following heat exhaustion. Allow ample recuperation time or the condition will simply reappear, perhaps even more severe.

g. Heat Stroke (Hyperthermia). Heat Stroke is a life threatening medical emergency. A victim can die within minutes if not properly treated. Immediate medical care is required!

(1) Heat Stroke is caused by an increase in the body's core temperature. Core temperatures over 105 deg, F; (41 deg; C) can lead to death. The rate of onset of Heat Stroke depends on the individual's fluid status. There are two types of Heat Stroke.

(a) Fluid depleted (slow onset): Heat Exhaustion due to fluid loss from sweating and/or inadequate fluid replacement, and;

(b) Fluid Intact (rapid onset): The body's active cooling mechanisms, even though the fluid level is sufficient, fail to protect the body from overheating. The victim ceases to perspire.

(2) Symptoms. The key to identifying Heat Stroke is hot skin. Some victims may have hot, dry skin, others may have hot, wet skin because they have just moved from Heat Exhaustion to Heat Stroke. The lack of fluid has minimized the body's active cooling capabilities to such an extent that the body's internal core temperature begins to rise. Other symptoms may include -

- (a) Increased pulse rate.
- (b) Heavy, labored or difficult breathing.
- (c) Decreased urine output.
- (d) Body temperature of 105 degrees or higher.
- (e) Skin is hot, may be wet or dry and flushed.
- (f) Severe changes in mental status and motor/sensory changes. The victim may become comatose, or suffer convulsions and seizures.
- (g) Pupils may be dilated and unresponsive to light.

(3) Treatment.

(a) If a soldier shows signs of heat stroke, immediately call for medical assistance. Permanent brain damage, stroke or death can occur in only minutes.

(b) Move the soldier to a shaded area, loosen tight clothing, and apply a water spray or cool compresses to assist in lowering the body temperature.

h. Hyponatremia. Hyponatremia is caused by an imbalance of sodium and water in the body. The sweat (salt and water) is replaced by ingested water (no salt). When sodium becomes diluted in the bloodstream, a condition known as hyponatremia results. During exercise in the heat, more salt is lost in sweat per hour than is usually replaced by food and fluids, including sports drinks. The body can tolerate a degree of imbalance for only a short period.

(1) Symptoms.

- (a) Nausea.
- (b) Muscle cramps.
- (c) Disorientation.
- (d) Slurred speech.
- (e) Confusion, and inappropriate behavior.
- (f) Seizures or coma, and death can occur.

(2) Treatment.

(a) Severe symptoms require immediate treatment by qualified medical personnel.

(b) Minor symptoms, can be treated by eating salty foods and hydrating with a high sodium sports drink.

9. Heat Injury Prevention. The key to preventing heat illness is knowledge of the environmental conditions. Leaders must have accurate weather information for their specific location.

a. Significant acclimatization to heat can be attained in 4-5 days. Full heat acclimatization takes 7-14 days with 2-3 hours per day of carefully supervised exercise in the heat. Increase physical activity each day until full acclimatization is achieved. Acclimatization does NOT reduce, and may actually increase, water requirements. Heat acclimatization increases sweating to enhance the evaporative cooling capacity of the body. Increased sweating requires additional water consumption. However, leaders must understand the critical importance of maintaining hydration. (See Table at appendix C)

(1) Monitor hydration status by noting the color and volume of a soldier's urine. Soldiers should be taught that the lighter the urine color, the better hydrated; and that dark yellow urine is a definitive sign that fluid consumption should be increased.

(2) Establish mandatory drinking schedules to allow soldiers to replace water lost through sweating. Plan operations to provide water points at a maximum of every three hours. One-hour intervals are more desirable.

(3) To ensure voluntary hydration, provide plenty of cool water. Provide a comfortable place and enough time to drink and eat.

(4) Carbohydrate/electrolyte beverages (sports drinks) are not required, and if used should not be the only source of liquid. For healthy soldiers, these beverages generally provide no advantage over water, however, they can promote greater drinking because of their flavor.

(5) Ensure soldiers maintain a normal diet. Skipping meals and relying on liquids alone can compound medical problems for soldiers during periods of extreme heat.

b. Work/Rest Cycles. Guidelines for the management of work/rest cycles and the critical need for maintaining adequate water consumption are provided in appendix C.

(1) In very hot and humid conditions, reducing physical activity may be the only way to prevent dangerous rises in body temperature.

(2) Uniforms should be worn to protect against sun, wind and insects. Wear the uniform properly, tuck in the trousers and roll sleeves down. Use hats, head cloths and sunscreen.

c. The following actions should be emphasized by the commander to reduce the risk of heat injury:

(1) Training. Annually, give classes to cadre and soldiers in training on heat injury recognition, treatment, and preventive measures. Classes will stress the causes of heat injury, the potentially serious result, first aid treatments, and the importance of water consumption in preventing heat injury. Briefings by commanders and supervisors should include discussions on the following topics:

(a) Past experience with heat injury at the installation.

(b) The need for acclimatization and careful scheduling of physical activities.

(c) The recognition of personnel who are at increased risk of heat injury (e.g., those with prior heat injury, current illness, recent immunization, obesity, and those who take medication).

(d) For detailed information in the use of the wet bulb globe temperature (WBGT) indexes in relation to work, rest, and water consumption, see appendix C.

(2) Use of the buddy system. Soldiers do not always recognize or react to their own early symptoms of heat injuries. They must be taught to observe their buddies for evidence of heat stress.

(3) Acclimation to heat. Acclimation is acquired by working in hot environments for gradually increased periods on a daily basis over a period of about 2 weeks. Schedule training programs to provide for increasingly longer periods with alternating rest periods for personnel who are climatically unaccustomed to heat. Commanders should take advantage of the cooler hours of the day to accomplish work during the acclimation period.

(4) Water intake. Adequate water intake is the single most important factor in avoiding heat injury. An individual subjected to high heat stress may, through sweating, lose water in excess of one quart per hour. Water loss must be replaced, preferably by periodic intake of small amounts of water throughout the work period. Thirst is not an adequate indicator for water intake. Therefore, commanders must require soldiers to drink water to prevent dehydration.

(5) Salt replacement is not necessary. A good diet will contain adequate amounts of sodium. Commanders should monitor soldiers' eating habits to ensure a proper diet is being provided and consumed.

(6) Scheduling work/training. Commanders should schedule activities to fit the climate, the physical condition of personnel, and the military situation. Schedule intense physical activity during the cooler hours of the early morning.

(7) Physical conditioning. The general physical condition of the individual has a significant bearing on the reaction to heat stress. The risk of heat injury is much higher in overweight, unfit persons than in those of normal weight. Commanders should exercise special care where such persons are exposed to high temperatures. One attack of either heat stroke or severe heat exhaustion may predispose an individual to a second attack. Commanders should identify individuals who have experienced previous heat injury and exercise caution in exposing them to subsequent heat stress.

(8) Clothing. Clothing reduces the exposure of the skin to solar radiation. However, it also restricts the movement of air over the skin. To take full advantage of its benefits and minimize its disadvantages, clothing should be loose fitting, especially at the neck and wrists. Commanders may authorize exceptions to the prescribed wear of the battle dress uniform (BDU) to protect

troops and maintain efficiency. During heat condition yellow (see GTA 5-8-12, Individual Safety Card), commanders should have soldiers unbutton trousers during strenuous physical activity or exposure to heat. Commanders will require soldiers to remove their jackets during strenuous physical activity or exposure to heat in heat categories red and black. However, commanders must avoid exposing soldiers to intense solar radiation for extended periods (greater than one hour).

d. Do not use water sprays to cool down soldiers in training (except as a first aid treatment for heat stroke casualties). The temporary cooling effect achieved through water sprays does not prevent heat injuries. The action may actually increase core body temperature and intensify heat injuries.

e. Evacuation. Commanders should establish a liberal policy of evacuation of injured personnel to the nearest medical treatment facility.

f. Reporting. Commanders should report all heat injuries in accordance with AR 385-40 (Accidents Reporting and Records) and FLW Reg 385-6 (Safety Programs).

#### 10. Cold Weather Injuries.

a. General. Extremes in weather conditions pose additional problems to our training efforts and increase the risk of cold weather injuries. Successfully preventing cold weather injuries depends largely on educating personnel and applying methods to reduce exposure. To prevent cold weather injuries, commanders should develop procedures to alert individuals of cold stress conditions and adopt techniques to reduce the susceptibility of personnel to cold weather injuries.

b. Cold injuries are classified as nonfreezing (trench/immersion foot and hypothermia) and freezing (frostbite). Symptoms and treatments for cold injuries are -

(1) Trench/immersion foot. An injury resulting from long term exposure of the feet to wet conditions at temperatures from approximately 50 to 32 degrees Fahrenheit. When a soldier wears wet socks and boots, or tightly laced boots, blood circulation can be impaired, making the soldier even more susceptible to injury. Prolonged exposure can cause the feet to swell. Pressure closes blood vessels, cuts off circulation, and can lead to loss of parts of the feet.

(a) Symptoms. Feet are cold and reddish in color and have swelling, blistering, bleeding, and numbness.

(b) Treatment. Individuals with immersion foot injury should elevate and re-warm their feet, *gradually*, by exposing them to warm air. Do not moisten, massage, or apply heat or ice to feet with immersion injuries. Covering the patient with several layers of warm coverings is preferable to using extreme heat. Evacuate patients as soon as possible.

(2) Hypothermia. Hypothermia is a medical emergency requiring prompt medical treatment. Hypothermia is a state in which the core body temperature is below normal because body heat is being lost at a faster rate than it can be produced. General cooling of the entire body to a temperature below 95 degrees Fahrenheit is caused by continued exposure to low or rapidly dropping temperatures, cold moisture, snow, or ice.

(a) Symptoms. As the body cools, progressive stages of discomfort and impairment occur; shivering, faint pulse, mental confusion, slurred speech, glossy eyes, slow or shallow breathing, uncoordinated movements, unconsciousness, and irregular heart beat.

(b) Treatment. The victim's body must be re-warmed with an external heat source because the victim cannot generate heat. Perform cardiopulmonary resuscitation (CPR), if necessary. Keep

the victim dry, protected from the elements, and evacuate promptly to a medical facility.

(3) Frostbite. Frostbite is an injury to tissue caused by freezing temperatures. Severe frostbite can result in the loss of extremities such as fingers, toes, ears, hands, or feet.

(a) Symptoms. Frostbite starts with a discoloration of the skin, followed briefly by a tingling sensation, and then numbness. The skin may appear red for light skinned individuals, or grayish for dark skinned individuals, and then become pale or waxy white.

(b) Treatment. Remove tight clothing or boots from the injured area. Warm the frozen body part by placing it next to the skin of another person. Keep the victim warm and covered to prevent further injury. Do not massage, expose to open fire, rub with snow, or soak injuries in cold water. Evacuate the victim to a medical treatment facility as soon as possible.

#### 11. Cold Weather Injury Prevention.

a. Prior planning and adequate training are essential to minimizing cold injury casualties. Commanders, cadre, and other responsible officers and noncommissioned officers (NCOs) should be familiar with environmental conditions (temperature, wind, humidity, and ground surface conditions) that influence the risk of cold injury.

b. Commanders should establish appropriate guidelines for training/physical activity, uniform wear, and troop support requirements to conform with the precautions for each wind chill, see appendix D.

c. Effective cold injury prevention programs should include the following:

(1) Training. At least annually conduct classes for all personnel on cold injury recognition, first aid, and preventive measures. Document all training provided.

(2) Conduct briefings before each training event or mission where cold injury is a concern.

d. Use the buddy system. Soldiers do not always recognize or react to their own early symptoms of cold injuries. They must be taught to observe their buddies for evidence of overexposure to cold.

#### e. Clothing.

(1) Commanders should ensure that soldiers are issued serviceable, properly fitting clothing and footwear for cold weather.

(2) Commanders should emphasize that preventing cold injuries depends on wearing clothing properly. Soldiers should be encouraged to wear as little as possible, consistent with the weather. (It is better for the body to be slightly cold and generating heat than excessively warm.)

(3) Clothing should be clean, dry, loose fitting, and worn in layers. Layering clothing provides layers of air to insulate the body and permits good circulation of the blood. Dirty clothes conduct heat more rapidly and afford less protection from the cold. Moisture causes clothing and footwear to lose their insulating qualities.

(4) Encourage soldiers to remove some layers when they are exposed to heat or performing any physical activity to prevent perspiration and subsequent chilling.

f. Scheduling work/training. Commanders should tailor schedules to fit weather conditions by scheduling activities to minimize exposure to cold weather and by providing warm-up breaks. Monitor weather conditions closely to ensure the latest

information regarding current temperature, wind-chill, etc. is on hand.

g. Physical condition. The general physical condition of soldiers has a significant bearing on their susceptibility to cold injury. Physical fatigue contributes to apathy, inactivity, personal neglect, and carelessness. These lead to loss of heat production and retention, increasing the risk of cold injury. Soldiers with prior cold injuries have a higher than normal risk of subsequent cold injuries. Commanders should ensure soldiers maintain their self-discipline in cold weather to protect them from cold injury. Additionally, commanders must identify soldiers with previous cold injuries and exercise caution in exposing them to hazardous wind chill conditions.

h. Exercise. Commanders should encourage physical activity in cold weather. Activity of large muscle groups of the shoulders, trunk, and legs is required in order to generate and maintain body heat. When the situation prohibits such activities, frequent changes of positions; moving toes, feet, legs, fingers, arms, and hands; and, to a lesser extent, isometric contractions are less satisfactory alternatives. In such situations, sitting or standing on insulating material rather than on cold can accomplish some delay in heat loss or wet ground.

i. Evacuation. Commanders should establish a liberal policy of evacuation of injured personnel to the nearest medical treatment facility.

j. Reporting. Commanders will report all cold injuries in accordance with AR 385-40 and FLW Reg 385-6.

#### 12. Motor Vehicle Accident Prevention.

a. Weather Conditions. Adverse weather conditions can occur at any time of the year, suddenly, and without warning. (See appendix E.)

b. Commanders should ensure that all personnel who will drive a motor vehicle in inclement weather have received winters driver training not later than 15 October of each year. Personnel arriving after this date should be trained as soon as possible after arrival but before they drive a motor vehicle. The Maneuver Support Center Safety Office will provide a standard one-hour lesson plan and play winter driver safety tapes on the installation television channels each year starting 1 August.

c. Hazards associated with winter driving include:

- (1) Reduced visibility due to fog, rain, snow,
- (2) Extended hours of darkness.
- (3) Ice, snow or rain slick highways or roads requiring longer braking and stopping distances.
- (4) Black ice on bridges or overpasses.
- (5) Leaves causing slippery road surfaces.
- (6) Ice or frost on windows of motor vehicles.
- (7) Cold sluggish operating vehicles.
- (8) Pedestrians with reduced visibility caused by bulky clothes, hats, and scarves

d. Control measures include:

- (1) Instruct drivers how to identify winter driving hazards and provide hands-on training as needed.
- (2) Clear all vehicle windows and outside mirrors to ensure visibility.

- (3) Increase following distances from car in front.
- (4) Ensure vehicle heater works so windows can be defrosted when necessary.
- (5) Allow vehicles to warm up and allow more time for turning into traffic.
- (6) Pay close attention to pedestrians who may not be paying attention to vehicle traffic.
- (7) Always expect black ice on bridges and overpasses and slow down before reaching these areas.

### 13. Preventing Personal Injuries from Slips, Trips and Falls.

a. Personal injuries can occur at anytime during the year. However, they can be very dangerous when snow and ice are present.

b. Preventive measures include:

- (1) Building managers and coordinators must ensure that sufficient quantities of sand or ice melt are available prior to 1 September each year.
- (2) Building managers and coordinators must be prepared to clear snow and ice from sidewalks around their building shortly after snow begins to stick or collect and as ice begins to develop.
- (3) Throughout the day, snow and ice may need to be removed repeatedly to ensure that the walking surfaces are safe.
- (4) Caution should be used when selecting employees and soldiers to participate in snow and ice removal. Do not select someone who has a medical problem that could be worsened by the exertion of this activity.
- (5) It is better to have several personnel to take turns than just a few personnel who work continuously until job is done.

c. Report all accidents. If personnel fall because of a slip on ice or snow, it is best if they seek medical attention to ensure the fall did not result in serious injury.

14. Risk Management. Weather conditions are vital considerations when preparing FLW Form 661 (Risk Management Worksheet). Ensure that individuals responsible for the formulation and implementation of the risk management process have a working knowledge of the mission.

## Appendix A REFERENCES

### Section I. Required References.

- (1) AR 385-40, Accidents Reporting and Records. Cited in paragraph 9f and 11j.
- (2) FLW Reg 385-6, Safety Programs. Cited in paragraph 9f and 11j.
- (3) GTA 5-8-12, Individual Safety Card. Cited in paragraph 9c(8).

### Section II. Related References.

- (1) NFPA 780, Standard for the Installation of Lightning Protection Systems, National Fire Protection Association, Quincy MA.
- (2) UL 96A, Installation Requirements for Lightning Protection Systems, Underwriters Laboratories, Northbrook IL.

(3) NFPA 70, National Electrical Code, National Fire Protection Association, Quincy MA.

(4) AR 40-5, Preventive Medicine.

(5) FM 21-10, Field Hygiene and Sanitation.

(6) FM 21-11, First Aid for Soldiers.

(7) TB Med 81, Cold Injury.

(8) TB Med 507, Occupational and Environmental Health: Prevention, Treatment, and Control of Heat Injury.

(9) TRADOC Reg 350-6, Enlisted Initial Entry Training Policies and Administration.

(10) FLW Reg 210-14, Installation Ranges and Training Areas.

Section III. Referenced forms. FLW Form 661 (Risk Management Worksheet) is a referenced form.



Appendix B

LIGHTNING PROTECTION MATRIX

1. Location	2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.	3. Secondary area of refuge in the event of a lightning storm and a facility is not available.
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DARPA	Small Guard Shack	Go to vehicles or disperse to low lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Forney Drop Zone	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 1	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 2	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 3	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 4	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 5	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 6	None	Disperse into low-lying area. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 7	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 8	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 9	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 10	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
Firing Point No. 11	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 1	Cadre Office, Bldg 5300 Classroom, Bldg 5301	Windscreen, Bldg. 5306 (grounded - only to be used as last resort)
RANGE 4	Classroom, Bldg. 5334 Office, Bldg 5336	Windscreen, Bldg. 5338 (grounded - only to be used as last resort).
RANGE 5	Office, Bldg. 5344 Classroom, Bldg. 5346	.
RANGE 6	Classroom, Bldg. 5350 Office, Bldg. 5352	

LIGHTNING PROTECTION MATRIX		
<i>1. Location</i>	<i>2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.</i>	<i>3. Secondary area of refuge in the event of a lightning storm and a facility is not available.</i>

RANGE 8	Classroom, Bldg. 5374	Windscreen, Bldg. 5371 (grounded - only to be used as last resort).
RANGE 9	Classroom, Bldg. 5380 Office, Bldg. 5386	.
RANGE 10	Office, Bldg. 5390 Classroom, Bldg. 5391	.
RANGE 11	Classroom, Bldg. 5500	.
RANGE 12	Classroom, Bldg. 5511	.
RANGE 13	Classroom, Bldg. 5531 Office, Bldg. 5530	
RANGE 14	Classroom, Bldg. 5531 (on Range 13) Office, Bldg. 5530 (on Range 13)	
RANGE 15	Classroom, Bldg. 5531 (on Range 13) Office, Bldg. 5530 (on Range 13)	
RANGE 16	Classroom, Bldg. 13601 Classroom, Bldg. 13602	
RANGE 17	Classroom, Bldg. 5585	Windscreen, Bldg. 5585 (LPS - only to be used as last resort).
RANGE 18	Office, Bldg. 5593 Classroom, Bldg. 5592 Classroom, Bldg. 5596	Windscreen, Bldg. 5595 (LPS - only to be used as last resort).
RANGE 19	Classroom, Bldg. 5712	Windscreen, Bldg. 5709 (LPS - only to be used as last resort).
RANGE 20	Office, Bldg. 5734 Classroom, Bldg. 5732	
RANGE 21	Office, Bldg. 5748 Classroom, Bldg. 5743	
RANGE 22	Classroom, Bldg. 5760	
RANGE 24	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 25	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26C	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26D	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26E	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26F	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

**LIGHTNING PROTECTION MATRIX**

1. Location	2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.	3. Secondary area of refuge in the event of a lightning storm and a facility is not available.
RANGE 26 G	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 26H	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 27	Classroom, Bldg, 5451 Office, Bldg. 5452	
RANGE 27A	Windscreen, Bldg 5456	
RANGE 29	Classroom, Bldg. 5431 Windscreen, Bldg. 5433	
RANGE 30	Classroom, Bldg, 5441 Office, Bldg. 5442	
RANGE 31	Classroom, Bldg 5231 Classroom, Bldg 5230	
RANGE 33	Classroom, Bldg 5270	
RANGE 36	Classroom, Bldg. 5270	
RANGE 38	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
RANGE 50	Classroom, Bldg. 5660	
TA 2	Use MOTO Classroom	
TA 3	Use Bldgs. 652, 654, 660	
TA 61	Classroom, Bldg. 10380	
TA 74A	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 74B	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 75	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 77	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 88	Return to barracks	
TA 90	Return to barracks	
TA 91	Return to barracks	
TA 93	Metal PT Shelter/Barn, Bldg 648	Return to barracks.

LIGHTNING PROTECTION MATRIX		
<i>1. Location</i>	<i>2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.</i>	<i>3. Secondary area of refuge in the event of a lightning storm and a facility is not available.</i>

TA 94	Return to barracks	
TA 95	Metal PT Shelter Barn, Bldg 648 (on TA 93)	Return to barracks
TA 97	Use Classroom of Bldg. 6150	Return to barracks
TA 98	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 99	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 100	Classroom, Bldg. 6131 Classroom, Bldg. 6130 Covered Bleachers, Bldg. 6133	Classroom, Bldg. 6050 (on TA 101)
TA 101	Classroom, Bldg. 6050	Classroom, Bldg. 6131 (on TA 100) Classroom, Bldg. 6130 (on TA 100)
TA 103	None	Metal shelter/, Bldg. 767 (on TA 107)
TA 106	Metal shelter, Bldg. 6026	
TA 107	Metal shelter, Bldg. 767	
TA 108	Metal PT Shelter/Barn, Bldg. 785	
TA 113	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 114	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 115	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 116	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 122	Metal PT Shelter/Barn, Bldg. 1627	
TA-123	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-125	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-126	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-128	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

**LIGHTNING PROTECTION MATRIX**

1. Location	2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.	3. Secondary area of refuge in the event of a lightning storm and a facility is not available.
TA-131	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-132	Classroom, Bldg. 6135	
TA-133	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-135	Windscreen, Bldg 6120 Office, Bldg. 6125	
TA-136	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-137	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-147	SAPPER Leader Course Bldg 6030 and 6022	Go to buildings.
TA-153	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-155	Motor Pool Bay #1, Bldg. 950	
TA-162	Bldg. 1134	
TA-164	Bldg. 1230	
TA-183	Overhead shelter, Bldg. 1447,	
TA-185	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA-186	Bldg. 5400	
TA-187	Go to classrooms across street.	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 190 Robotics	Bldg 1588 Maintenance / Supply Bldg 1590 Office and work area. Bldg 2435 Classroom / Work area	
TA 191	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 192	Return to barracks	Remain in classroom.
TA 193	Return to barracks	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

LIGHTNING PROTECTION MATRIX		
<i>1. Location</i>	<i>2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.</i>	<i>3. Secondary area of refuge in the event of a lightning storm and a facility is not available.</i>
TA 194	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 199	Return to barracks	.
TA 200	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 204	Classroom, Bldg 4190 Classroom, Bldg 4191 Office, Bldg 4193 Classroom, Bldg 4194 Latrine, Bldg 4192 Shelter, Bldg 4195	
TA 209	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 210	Classroom, Bldg. 5153 Maintenance, Bldg. 5156	
TA 211 B	Classroom, Bldg. 5130 Office, Bldg. 5136	
TA 211 M	Pole Barn	Go to classroom, Bldg. 5130 (on TA 211 B)
TA 219	Bldg. 5251 Classroom Bldg. 5259	
TA 220	None.	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 221	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 222	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 223	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 224	Bldg. ??	
TA 225	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 227	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 228	Classroom, Bldg. 5285 Covered Bleachers, Bldg. 5284 Maintenance Shed, Bldg. 5286	
TA 229	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

**LIGHTNING PROTECTION MATRIX**

1. Location	2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.	3. Secondary area of refuge in the event of a lightning storm and a facility is not available.
TA 232	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 233	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 234	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 236	Classroom, Bldg. 5295  Classroom, Bldg. 5294 Warm Up House, Bldg 5289 Small Class Room  Covered Bleachers, Bldg 5297 Large Covered Picnic Area, Bldg. A5295	Go to Bldg 5295
TA 237	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 238	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 239	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 240N	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 240S	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 241	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 242B	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 243	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 245	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 247	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

LIGHTNING PROTECTION MATRIX		
<i>1. Location</i>	<i>2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.</i>	<i>3. Secondary area of refuge in the event of a lightning storm and a facility is not available.</i>
TA 248	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 249A	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 249B	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 250A	Use Bldg. 4971 (on TA 250R)	
TA 250R	Bldg. 4971	
TA 250V	Use Bldg. 4971 (on TA 250R)	
TA 251	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 253	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 254	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 256	Bldg. 10320 Bldg. 10321 Bldg. 10330 Bldg. 10332	
TA 257		Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 259	Bldg. 10300 Bldg. 10301 Bldg. 10302 Bldg. 10303	
TA - 266	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 271	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 272	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 273	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 275	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.



**LIGHTNING PROTECTION MATRIX**

1. Location	2. Existing facilities (e.g. classrooms, wind shelters, etc.) that may offer protection in the event of a severe weather warning to troops. If no facilities are available, go to the secondary area listed in column 3.	3. Secondary area of refuge in the event of a lightning storm and a facility is not available.
TA 337	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 400	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 401 Smoke Training	Classroom, Bldg 5464	
TA 402	None	Use Bldg 5464, Classroom (on TA 401)
TA 403	None	Use Bldg 5464, Classroom (on TA 401)
TA 601	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 602	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 603	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 605	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 606	None	
TA 607	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 610	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.
TA 611	None	Disperse into low-lying areas. Ground weapons and equipment, move away from electrical equipment or metal objects. Avoid open spaces, water, high ground, wire fences, and single trees. Crouch down, feet together, and hands over ears. Don't lie flat or place hands on ground.

Appendix C  
WORK/REST/WATER CONSUMPTION TABLE

HEAT CAT	WBGT INDEX (FAHRENHEIT)	EASY WORK		MODERATE WORK		HARD WORK	
		WORK/REST (MIN)	WATER INTAKE (QT/HR)	WORK/REST (MIN)	WATER INTAKE (QT/HR)	WORK/REST (MIN)	WATER INTAKE (QT/HR)
1	78-81.9	NL	½	NL	¾	40/20	¾
2 (GREEN)	82-84.9	NL	½	50/10	¾	30/30	1
3 (YELLOW)	85-87.9	NL	¾	40/20	¾	30/30	1
4 (RED)	88-89.9	NL	¾	30/30	¾	20/40	1
5 (BLACK)	>90	50/10	1	20/40	1	10/50	1

The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specific heat category. Individual water needs will vary ± ¼ quart per hour.

NL= No limit to work time per hour. Rest means minimal physical activity (sitting or standing) and should be accomplished in shade if possible.

CAUTION: Hourly fluid intake should not exceed 1½ quarts. Daily fluid intake should not exceed 12 quarts.

If wearing body armor, add 5 degrees F to WBGT Index.

If wearing MOPP over garment, add 10 degrees F to WBGT Index.

EXAMPLES (Taken from GTA 5-8-12, 25 Feb 99)		
EASY WORK	MODERATE WORK	HARD WORK
Weapon Maintenance  Walking on a hard surface at 2½ mph carrying a load of 30 pounds or more.  Manual of arms  Drill and Ceremony	Walking in loose sand at 2½ mph carrying no load.  Walking on a hard surface at 3½ mph carrying 40 pounds or less.  Calisthenics  Marksmanship training  Patrolling	Walking in loose sand at 2½ mph with any size load.  Walking on a hard surface at 3½ mph carrying a load of 40 pounds or more.  Individual movement techniques; i.e., low crawl, high crawl.  Defense position construction  Field assaults  Rifle bayonet training  Road march greater than 4 mph

Source: Memorandum, Office of the Surgeon General (DASH-HSZ), dated 29 Apr 98, subject: Policy Guidance for Fluid Replacement During Training.

Appendix D  
WIND CHILL CHART

WIND CHILL (Degrees Fahrenheit)	PRECAUTIONS
30 and Below	Alert personnel to the potential for cold injury.
25 and Below	Leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas and hot beverages.
0 and Below	Leaders inspect personnel for cold injuries and emphasize that buddies must also check each other. Increase the frequency of rotating soldiers to warm up areas.
-20 and Below	Curtail all but mission essential operations where soldiers are exposed to wind chill conditions.

Appendix E  
INCLEMENT WEATHER ROAD CONDITION STATUS POLICY

<b>Table I-1 Road Condition Status Characteristics</b>						
<b>Road Condition</b>	<b>Road Surface</b>	<b>Snow</b>	<b>Ice</b>	<b>Snow Depth</b>	<b>Visibility</b>	<b>Temperature</b>
Green	Dry	None or blowing powder	None	None	More than 50 meters	Above 35F (+2C)
Amber	Wet	*Packed*Slush	*Patches*Black ice*Slush	*Less than 4 inches	*Between 20 and 50 meters	Between 30F (-1C) and 35F (+2C)
Red	*Flooded	*Drifting	*Sheet ice	*Between 4 and 8 inches	*Between 15 and 20 meters	Between 10F (-12C) and 30F (-1C)
Black	*Heavilyflooded	*Heavy drifting	*Extreme sheet ice	*More than 8 inches	*Less than 15 meters	Less than 10F (-12C)
*When one or more of the road conditions marked with an asterisk are noted, the corresponding road condition status must be declared.						

**GREEN**

Unrestricted vehicle dispatches are authorized. Ideal road, visibility, and temperature conditions exist. Drivers will observe normal precautions and speed limits (Table I-1).

**AMBER**

Ideal road, temperature, and visibility conditions do not exist (Table I-1). If a road condition marked with an asterisk in the Amber category is reported, commanders will declare Amber road conditions. Drivers must increase driving times, Slow to 10 MPH below the posted speed limit to maintain traction and a safe stopping distance during hazardous road conditions. Driver experience will be considered in dispatching vehicles under Amber conditions, privately owned vehicles (POV's) will be restricted travel to essential trips only. Military and Non Tactical Vehicles (NTV) vehicle dispatches will be approved by unit commanders (captains and above) or 1SG and above will authorize dispatches under Amber conditions for their vehicles. Director of Public Works (DPW) or Director of Logistics (DOL) will authorize transportation motor pool (TMP) vehicles and dispatches under Amber conditions for their vehicles.

**RED**

Only mission-essential and emergency-essential vehicle dispatches are authorized. Road, temperature, and visibility conditions are equal to or worse than those noted in Table I -1. Driving above 10-15 MPH causes vehicles to lose traction and safe stopping distance are significantly increased, if one or more of the conditions marked with an asterisk in the Red category are reported, commanders must declare road conditions Red. The dispatch record for mission- and emergency- essential vehicles will be marked "mission- and emergency-essential." Military and NTV vehicles dispatches will be approved by Brigade-level commanders (O-6 or Above) may authorize dispatch of mission-essential vehicles. General Services Administration (GSA) and TMP vehicles not assigned to a unit must be approved by the Installation Transportation Officer (ITO) or Motor Transportation Officer (MTO). The DPW and chiefs of building and grounds and operation maintenance may approve mission-essential dispatches during Red road conditions to provide emergency support and for snow and ice removal. A risk assessment will be completed before dispatch. Commanders, Directors, and staff will restrict amount of duty related POV travel.

NOTE: Drivers of military vehicles passing through declared Red road conditions should contact their chain of command and evaluate the risk of continuing the mission. Weather and road conditions will be part of all mission risk-management decisions.

**BLACK**

Only emergency-essential vehicle dispatches are authorized. Road, temperature, and visibility conditions are equal to or worse than those noted in table Table I-1. If one or more of the conditions marked with an asterisk in the Black category are reported, commanders must declare road conditions Black. The dispatch record for emergency-essential vehicles (police, fire, ambulance, and emergency engineer) will be marked "emergency-essential." Chiefs of appropriate offices (provost marshal, fire, medical activity, and DPW) may authorize dispatch of emergency vehicles. Installation Commanders (Commanding General or Authorized Delegated General Officer) may authorize dispatch of their military, NTV, GSA, and TMP vehicles for emergency services only. Risk assessment will be completed before dispatch. There will be "NO" POV travel until road condition decreases, this will allow for SNAIR operations maximize snow removal and safety on the installations roads.

NOTE: Drivers of military vehicles passing through declared Black road conditions should contact their chain of command and evaluate the risk of continuing the mission. Weather and road conditions will be part of all mission risk-management decisions.

## Glossary

## Section I. Acronyms.

AR

Army regulation

BDU

battle dress uniform

CPR

cardiopulmonary resuscitation

DOL

Director of Logistics

DPW

Director of Public Works

F/B

flash/bang

FLW

Fort Leonard Wood

FM

field manual

FTX

field training exercise

GSA

General Services Administration

GTA

Government training aid

ITO

Installation Transportation Officer

JROTC

Junior Reserve Officer Training Corp

LSP

lightning safety position

MANSCEN &amp; FLW

United States Army Maneuver Support Center and Fort Leonard Wood (same as MANSCEN)

Med

medical

MPH

miles per hour

MTO

Motor Transportation Officer

NCO

noncommissioned officer

NFPA

National Fire Protection Association

NTV

non-tactical vehicle

POV

privately owned vehicle

PT

physical training

Reg

regulation

ROTC

Reserve Officer Training Corp

SPF

skin protection factor

TA

training area

TB

technical bulletin

TMP

transportation motor pool

TRADOC

United States Army Training and Doctrine Command

TV

television

UL

Underwriters Laboratories

UV

ultraviolet rays

WBGT

Wet Bulb Globe Temperature

## Section II. Terms

Flash/Bang (F/B) technique - a technique used to measure lightning's distance. For every five seconds from the time of the lightning flash to hearing the associated thunder, lightning is one mile away.

Hyperthermia – caused by an increase in the body's core temperature. Core temperatures over 105 deg, F; (41 deg; C) can lead to death.

Hyponatremia - caused by an imbalance of sodium and water in the body. The sweat (salt and water) is replaced by ingested water (no salt).

Hypothermia – caused by body heat being lost at a faster rate than it can be produced. Core body temperature is below normal.

Lightning Protection System – for an ordinary structure includes air terminals, down conductors, and ground terminals. These three elements of the system must form a continuous conductive

path for lightning current, with all connections between the elements typically being accomplished by bolting or welding.

Lightning Safety Position (LSP) – individual safety precaution to protect yourself from lightning. Stay away from other people, take off all metal objects, crouch with feet together, head bowed, and place hands on ears to reduce acoustic shock from nearby thunder.

Skin Protection Factor (SPF) – the level at which a substance can reduce the affects of the harmful rays from sunlight. Higher numbers indicate a greater degree of protection.