Unit Leader's and Instructor's Risk Management Steps for Preventing Cold Casualties

Risk Management is the Process of Identifying and Controlling Hazards to Protect the Force

Possible Outcomes of Inadequate Climatic Cold Management:

- **Chilblain** (due to bare skin exposed to cold, humid air)
- **Immersion Foot (Trench Foot)** (due to wet feet)
- **Frostbite** (freezing of tissue and body parts)
- **Hypothermia** (whole body temperature dangerously low)
- **Dehydration**
- **Snow Blindness**
- **Carbon Monoxide Poisoning**

The Five Steps of Risk Management Are:

1 Identify Hazards

- Cold (temperature 40º F and below)
- Wet (rain, snow, ice, humidity) or wet clothes
- Wind (wind speed 5 mph and higher)
- Lack of adequate shelter/clothing
- Lack of provisions/water
- Other Risk Factors include:
  - Previous cold injuries or other significant injuries
  - Use of tobacco/nicotine or alcohol
  - Skipping meals/poor nutrition
  - Low activity
  - Fatigue/sleep deprivation
  - Little experience/training in cold weather
  - Cold casualties in the previous 2-3 days

2 Assess Hazards

Follow the Wind Chill Temperature Table to Determine the Danger Level

Do individuals have adequate shelter/clothing?

- Are clothes clean without stains, holes or blemishes (which could decrease heat-retaining function)?

Have meals been consumed?

- Are meals warm?

Are there other circumstances?

- Is there contact with bare metal or fuel/POL (petroleum, oils or lubricants)?
- Is the environment wet? Is there contact with wet materials or wet ground?
- Can soldier move around to keep warm?
- Are feet dry and warm?
- Is the soldier with a buddy who can assist/watch over to prevent cold injures?

2 Assess Hazards continued

Using the Wind Chill Temperature Table

The wind chill index (see table below) gives the equivalent temperature of the cooling power of wind on exposed flesh.

- Any movement of air has the same effect as wind (running, riding in open vehicles, or helicopter downwash).
- Any dry clothing (mittens, scarves, masks) or material which reduces wind exposure will help protect the covered skin.

Trench foot injuries can occur at any point on the wind chill chart and -

- Are much more likely to occur than frostbite at "LITTLE DANGER" wind chill temperatures, especially on extended exercises/missions and/or in wet environments.
- Can lead to permanent disability, just like frostbite.

Wind Chill Temperature Table

Wind Speed (mph) ↓	Air Temperature (°F) 40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
0	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95

GREEN LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW INCREASED DANGER (frostbite could occur in 45 minutes or less in dry exposed skin)
RED GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Wind Chill Category (see Wind Chill Temperature Table above)

Work Intensity	Little Danger	Increased Danger	Great Danger
High Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C);	ECWCS* or equivalent; Mittens with liners; No facial camouflage; Exposed skin covered and kept dry; Rest in warm, sheltered area; Vapor barrier boots below 0°F (-18°C) Provide warming facilities	Postpone non-essential training; Essential tasks only with <15 minute exposure; Work groups of no less than 2; Cover all exposed skin, Provide warming facilities
Low Walking, marching without rucksack, drill and ceremony	Increased surveillance; Cover exposed flesh when possible; Mittens with liner and no facial camouflage below 10°F (-12°C); Full head cover below 0°F (-18°C). Keep skin dry - especially around nose and mouth.	Restrict Non-essential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel Outdoor Training
Sedentary Sentry duty, eating, resting, sleeping, clerical work	See above; Full head cover and no facial camouflage below 10°F (-12°C); Cold-weather boots (VB) below 0°F (-18°C); Shorten duty cycles; Provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; Work groups of no less than 2 personnel; No exposed skin	Cancel Outdoor Training

*ECWCS – Extended Cold Weather Clothing System

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

3 Control Hazards

Main Points to Stress to Soldiers

When using Cold-Weather Clothing, Remember . . .

C-O-L-D

Keep it…….. **C**lean

Avoid……. **O**verheating

Wear it……. **L**oose in layers

Keep it …….. **D**ry

Main Points to Stress to Leaders

Follow these **Wind Chill Preventive Medicine Measures based on Wind Chill Temperature**

30°F and below	Alert personnel to the potential for cold injuries
25°F and below	Leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas/hot beverages.
0°F and below	Leaders inspect personnel for cold injuries. Increase the frequency of guard rotations to warming areas. Discourage smoking.
-10°F and below	Initiate the buddy system. Have personnel check each other for cold injuries.
-20°F and below	Consider modifying or curtailing all but mission-essential field operations.

NOTE: TRENCH FOOT can occur at any temperature - Always Keep Feet Warm and Dry

General Guidance for all Cold-Weather Training

Skin: Exposed skin is more likely to develop frostbite, therefore cover skin. Avoid wet skin (common around the nose and mouth). Inspect hands, feet, face and ears frequently for signs of frostbite.

Clothing: Soldiers must change into dry clothing at least daily and whenever clothing becomes wet. Soldiers must wash and dry feet and put on dry socks at least twice daily.

Nutrition: 4500 calories / day / soldier. Equivalent to 3 meal packets in meal-cold weather (MCW) or 3-4 MRE's.

Hydration: 3-6 Liters (canteens) / day / soldier. Warm, sweet drinks are useful for re-warming.

Camouflage: Obscures detection of cold injuries; consider not using below 32º F; not recommended below 10°F.

Responsibilities: Soldiers are responsible for preventing individual cold injuries. Unit NCO's are responsible for the health and safety of their troops. **Cold injury prevention is a command responsibility.**

3 Control Hazards continued

Personal Protection

Ensure Appropriate Clothes and Proper Wearing of Clothes –

- Wear clothing loose and in layers.
- Ensure all clothing is clean.
- Ensure proper boots are worn and are dry.
- Ensure clothes do not have holes, broken zippers, etc.
- Ensure hands, fingers, and head are covered and protected.
- Avoid spilling liquids on skin or clothes. Liquid stains will reduce clothing's protective efforts.
- Change wet, damp clothes ASAP.

Keep Body Warm

- Keep moving.
- Exercise big muscles (arms, shoulders, trunk, and legs) to keep warm.
- Avoid alcohol use (alcohol impairs the body's ability to shiver).
- Avoid standing on cold, wet ground.
- Avoid tobacco products which decrease blood flow to skin.
- Eat all meals to maintain energy.
- Drink water or warm non-alcoholic fluids to prevent dehydration.

Protect Feet

- Keep socks clean and dry.
- Wash feet daily, if possible.
- Carry extra pairs of socks.
- Change wet or damp socks ASAP; use foot powder on feet and boots.
- Avoid tight socks and boots; do not over-tighten boot or shoes.
- Wear overshoes to keep boots dry.

Protect Hands

- Wear gloves, mittens, or gloves/mittens with inserts.
- Warm hands under clothes if they become numb.
- Avoid skin contact with snow, fuel or bare metal. Wear proper gloves when handling fuel or bare metal.
- Waterproof gloves by treating with waterproofing compounds.

3 Control Hazards continued

Personal Protection continued

Protect Face and Ears

- Cover face and ears with scarf. Wear insulated cap with flaps over ears or balaclava.
- Warm face and ears by covering them with your hands. Do NOT rub face or ears.
- Consider not using face camouflage when wind chill is 32º F or below; not recommended below 10º F.
- Wear sunscreen.
- Exercise facial muscles.

Protect Your Eyes

- Wear sunglasses to prevent snow blindness.
- If sunglasses are not available, protective slit goggles can be made from cutting slits in cardboard (e.g., MRE cardboard box).

Protect Each Other

- Watch for signs of frostbite and other cold weather injuries in your buddy.
- Ask about and assist with re-warming of feet, hand, ears or face.

Prevent Carbon Monoxide Poisoning

- Use only Army-approved heaters in sleeping areas.
- Do not sleep near exhaust of a vehicle while vehicle is running .
- Do not sleep in enclosed area where an open fire is burning.

Leadership Controls

- Discontinue/limit activities/exercise during very cold weather (see chart page 2).
- Use covered vehicles for troop transport.
- Have warming tents available.
- Have warm food and drink on hand.

Facility Controls

- Use only Army-authorized heaters. (i.e., no kerosene or propane heaters).
- Ensure heaters are in working order and adequately ventilated.
- Ensure integrity of shelters for maximum protection from the cold.

4 Implement Controls

- Identified controls are in place
- Controls are integrated into SOPs
  - Educate soldiers of hazards and controls (including newly arrived soldiers)
  - Implement buddy system to check clothes/personal protection
- Decision to accept risk is made at appropriate level
- Buddy System to check each other
- Self Checks

5 Supervise and Evaluate

- Ensure all soldiers are educated about prevention, recognition and treatment of cold weather injuries.
- Delegate responsibilities to ensure control measures have been implemented.
- Monitor adequacy/progress of implementation of control measures.
- Do frequent spot checks of clothes, personal protection and hydration.
- Record and monitor indicators of increasing cold risks, for example:
  - Increasing number of cold weather injuries
  - Increased complaints/comments about cold
  - Observations of shivering, signs of cold weather injuries
- Evaluate current control measures and strategize new or more efficient ways to keep warm and avoid cold injuries

2002

See http://chppm-www.apgea.army.mil/coldinjury
for electronic versions of this document and other resources

Cold Weather Casualties and Injuries Chart

✍ Train soldiers on the proper use of cold weather clothing
✍ Remember the acronym C-O-L-D when wearing clothing in cold weather
(C: keep it Clean; O: avoid Overdressing; L: wear clothing Loose and in layers; D: keep clothing Dry)
✍ Maintain adequate hydration and ensure nutritional requirements are met

Cold Weather Casualties and Injuries			
Chilblain			
Cause	Symptoms	First-Aid	Prevention
✍ Repeated exposure of bare skin for prolonged periods from 20°-60°F with high humidity (for those not acclimated to cold weather).	✍ Swollen, red skin (or darkening of the skin in dark-skinned soldiers). ✍ Tender, hot skin, usually accompanied by itching.	✍ Warm affected area with direct body heat. ✍ Do not massage or rub affected areas. ✍ Do not wet the area or rub it with snow or ice. ✍ Do not expose affected area to open fire, stove, or any other intense heat source.	✍ Use contact gloves to handle all equipment; never use bare hands to handle equipment, especially metal. ✍ Use approved gloves to handle all fuel and POL* products. ✍ In the extreme cold environment, do not remove clothing immediately after heavy exertion (PT); until you are in a warmer location. ✍ Never wear cotton clothing in the cold weather environment.
Immersion foot (trench foot)			
Cause	Symptoms	First-Aid	Prevention
✍ Prolonged exposure of feet to wet conditions 32°-60°F. Inactivity and damp socks and boots (or tightly laced boots that impair circulation) speed onset and severity.	✍ Cold, numb feet may progress to hot with shooting pains. ✍ Swelling, redness, and bleeding.	✍ If you suspect trench foot, get medical help **immediately!** ✍ Re-warm feet by exposing them to warm air. ✍ Do not allow victim to walk on injury. ✍ Evacuate victim to a medical facility. ✍ Do not massage, rub, moisten, or expose affected area to extreme heat.	✍ Keep feet clean and dry; change wet or damp socks as soon as possible. ✍ Wet or damp socks should be dried as soon as possible to allow them to be re-used. ✍ The inside of Vapor Barrier boots should be wiped dry once per day, or more often as feet sweat. ✍ Dry leather boots by stuffing with paper towels.
Frostbite			
Cause	Symptoms	First-Aid	Prevention
✍ Freezing of tissue. e.g.: fingers, toes, ears, and other facial parts. ✍ Exposure to bare skin on metal, extremely cool fuel and POL*, wind chill, and tight clothing - particularly boots - can make the problem worse.	✍ Numbness in affected area. ✍ Tingling, blistered, swollen, or tender areas. ✍ Pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers). ✍ Frozen tissue that feels wooden to the touch.	✍ **Frostbite can lead to amputation! Evacuate immediately!** ✍ Start first-aid immediately. Warm affected area with direct body heat. ✍ Do not thaw frozen areas if treatment will be delayed. ✍ Do not massage or rub affected areas. ✍ Do not wet the area or rub it with snow or ice. ✍ Do not expose affected area to open fire, stove, or any other intense heat source.	✍ Use contact gloves to handle all equipment; never use bare hands to handle equipment. ✍ Use approved gloves to handle fuel and POL*. ✍ Never wear cotton clothing in the cold weather environment. ✍ Keep face and ears covered and dry. ✍ Keep socks clean and dry. ✍ Avoid tight socks and boots.
Hypothermia			
Cause	Symptoms	First-Aid	Prevention
✍ Prolonged cold exposure and body-heat loss. May occur at temperatures well above freezing, especially when a person is wet.	✍ Shivering may or may not be present. ✍ Drowsiness, mental slowness or lack of coordination. Can progress to unconsciousness, irregular heartbeat, and death.	✍ This is the most serious cold exposure medical emergency and can lead to death! Get the soldier to a medical facility as soon as possible! ✍ Even if a victim is cold and is not breathing, never assume someone is dead until determined by medical authorities! ✍ Strip off wet clothing and wrap victim in blankets or a sleeping bag. ✍ Place another person in sleeping bag as an additional heat source. ✍ For the person with unconsciousness and very low heartbeat, minimize handling of the victim so as to not induce a heart attack.	✍ Never wear cotton clothing in the cold weather environment. ✍ Anticipate the need for warming areas for soldiers exposed to cold, wet conditions.
Additional Medical Considerations in the Cold Weather environment:			
Dehydration			
Cause	Symptoms	First-Aid	Prevention
✍ Depletion of body fluids.	✍ Dizziness. ✍ Weakness. ✍ Blurred vision.	✍ Replace lost water. Water should be sipped, not gulped. ✍ Get medical treatment.	✍ At a minimum drink 3-6 quarts of fluid per day.
Snow Blindness			
Cause	Symptoms	First-Aid	Prevention
✍ Burning of the cornea of the eye by exposure to intense UV rays of the sun in a snow-covered environment.	✍ Pain, red, watery or gritty feeling in the eyes.	✍ Rest and total darkness; bandage eyes with gauze. ✍ Evacuate if no improvement within 24 hours.	✍ Use sunglasses with side protection in a snow-covered environment. ✍ If sunglasses are not available use improvised slit glasses.
Carbon Monoxide Poisoning			
Cause	Symptoms	First-Aid	Prevention
✍ Replacement of oxygen with carbon monoxide in the blood stream caused by burning fuels without proper ventilation.	✍ Headache, confusion, dizziness, excessive yawning. ✍ Cherry red lips and mouth, grayish tint to lips and mouth (in dark-skinned individuals). ✍ Unconsciousness.	✍ Move to fresh air . ✍ CPR if needed. ✍ Administer oxygen if available. Evacuate.	✍ Use only Army-approved heaters in sleeping areas and ensure that personnel are properly licensed to operate the heaters. ✍ Never sleep in running vehicles. ✍ Always post a fire guard when operating a heater in sleeping areas.

*POL – Petroleum, oil or lubricants

ARMY COLD INJURY PREVENTION PROGRAM

Avoid Cold Casualties!

When using Cold-Weather Clothing, Remember C-O-L-D

C ~ Keep it...Clean

O ~ Avoid...Overheating

L ~ Wear it...Loose and in layers

D ~ Keep it...Dry

How to Spot Trouble

Notify an instructor if you or your buddy experience:

- Dizziness, weakness or blurred vision
- Swollen red or darkened skin
- Painful, tender, hot or itchy skin
- Numbness or tingling
- Bleeding or blistered skin
- Numb, gray or waxy skin that feels "wooden" to the touch
- Vigorous shivering
- Lack of coordination and impaired judgment
- Painful, red, watery or gritty feeling in the eyes (snow blindness)

Enclosed areas where heaters are used:

- Excessive yawning, cherry red lips or grayish tint to lips and mouth
- Confusion, disorientation or mental slowness
- Drowsiness, lack of coordination or unconsciousness

Army Values:
Loyalty
Duty
Respect
Selfless - Service
Honor
Integrity
Personal Courage

2002

See http://www.apdcs.army.mil/publications for electronic versions of this document and other resources