Ground Team Member & Leader

Reference

DRAFT

JULY 2002

Developed as part of the National Emergency Services Curriculum Project

TABLE OF CONTENTS

Description	Page
Table of Contents	i
Introduction	ii
Chapter 1 - SAR is an Emergency	1
Chapter 2 - Gear Types & Usage	4
Chapter 3 - Vehicle Inspection and Clearance	16
Chapter 4 - Natural Hazards, Field Sanitation, & Campsite Selection	18
Chapter 5 - Land Navigation	27
Chapter 6 - Electronic Direction Finding	42
Chapter 7 - Land Search Methods	45
Chapter 8 - Knots, Ropes, & Stretchers	58
Chapter 9 - Land Survival	66
Chapter 10 - Air-Ground Signaling	75
Chapter 11 - Helicopter Operations	82
Chapter 12 - Legal Issues in SAR	87
Chapter 13 - Emergency Services Forms	90
Chapter 14 - Interviewing Techniques	92
Chapter 15 - Scene Management	96
Chapter 16 - Bloodborne Pathogens	102
Chapter 17 - Activating the SAR System	108
Chapter 18 - Starting the Search	112
Chapter 19 - Managing the Search Process	115
Chapter 20 - Starting A Search Team	118
Chapter 21 - Computers in SAR	120
Chapter 22 - Critical Incident Stress	122
Chapter 23 - Continuing Education	124
Bibliography	126
Attachment A - Gear Fill-in form	129
Attachment B - Helicopter Marshalling Signals	130
Attachment C - Map Tools	132
Attachment D - CAP Grid System	137
Attachment E - Excerpts from AFH 36-2218 Self Aid and Buddy Care	159
Comment and Suggestions	176

INTRODUCTION

The following course material has been developed from several years of experience and knowledge. Documentation and ideas were accepted from all Civil Air Patrol Regions and Wings so that a comprehensive standardized program could be developed at a national level. The chapters included, if properly used in conjunction with a strong field program, should fulfill the minimum requirements for successful specialty qualification of basic ground team members and leaders.

The course work is presented in the following manner. Chapters are ordered so that a person builds on skills. Team members need to know certain things before going into the field out of a controlled or safe environment. Once those skills are learned, a trainee can build on that to progress through the training program and work with less guidance in an area that may not be familiar. Finally, a trainee progresses to the point of being qualified, where the person not only can but, is often expected to work autonomously. Trainees are told the topic and objectives up front. As the trainee reads and practices skills, he or she should focus on the objectives already established because this is the same material on which trainees will be tested. At the end of each chapter there are review questions. These are samples of the possible questions to be asked as part of the trainee's final evaluation. Additionally, more specific training on individual tasks is presented in the field task guides, as referenced in the text. You will work through these tasks on field exercises throughout your training.

We hope that this program suits your needs and that you will take back the knowledge and skills necessary to good ground operations within CAP. Remember though, that you will have to continue building on this knowledge. Training to orient you to your locality as well as advanced and ongoing training is always necessary. If you believe that you know everything about ground SAR by going to one training program, then you are wrong. This is just the beginning of a lifetime of training and re-training.

Good luck, and have fun.

The Emergency Services Curriculum Working Group

CHAPTER 1
SAR IS AN EMERGENCY

Chapter Objectives
1. Be Familiar with factors that make search and rescue incidents emergencies.
2. Be able to evaluate the relative urgency of a search and rescue incident.

Any SAR incident is an emergency! This means an report of an overdue person or aircraft must be treated with as much seriousness as a report of a school bus accident, multiple vehicle collision, or tornado. One or more persons' lives may be in danger - a sizeable number of victims die in SAR incidents. However, for CAP's sake you must also remember that searches can cause intense press, public, and political interest. No other type of incident, if mishandled, has so great a potential for disastrous publicity or legal liability for you.

Four Factors Making Emergency Response Necessary
There are four specific factors that make emergency response necessary to a SAR incident. They are:

1. A lag in the alert of mission personnel.
2. The odds of a victim surviving as time goes on.
3. Size of the search area.
4. Available information.

A lag in the Alert: There may be a long delay between the time someone goes missing and the time he is reported missing. Family and friends may assume the missing is late or diverted to some other activity. Finally, when the expected time of return is well past (midnight is common), realization sets in that the person may be lost. In cases of missing children in the outdoors, parents and friends will typically conduct their own search for several hours before calling for help. If the person does not have anyone waiting for them at home, an alert that something went wrong over a weekend may not come until the start of work on Monday. Organized SAR responses may not start until hours or even days after the actual incident truly began.

Victim Survival Limitations: Chances of finding a victim alive drop rapidly - 50% of the living survivors are found in the first 24 hours; over 75% are found in the first two days. Several factors contribute.

First, many SAR incidents result in severe injuries. The emergency medical system has a concept known as the "Golden Hour" - if a severely injured patient can be brought to a trauma center within one hour they have a good chance for survival. After that hour the chances start dropping dramatically. Notification of SAR personnel typically comes hours after the injury. We are behind the survival curve before we even start.

Second, people tend to get in trouble when conditions are bad. Cold weather increases the risk of hypothermia and hot weather the chances of heat illness and dehydration.

Third, there is a low level of survival awareness and knowledge of outdoor skills in an increasingly urban populations. A surprisingly large number of people go into the woods without adequate equipment.

Limitation of the Search Area: An adult male hiking through open forest on flat terrain can cover two miles an hour. If the search starts 1 hour after the person goes missing the possible search area is approximately 13 square miles. A two hour delay results in a 50 square mile area. Relatively few missing persons will go more than 3 miles in any direction once lost, but any travel at all makes the problem much harder. An emergency response helps keep the search in manageable limits.

Information is Fragile: The best way to find the objective is to find clues. Clues are very perishable. Witnesses leave the area. Tracks are destroyed by other persons, animals, or vehicles. Scents disperse. Disturbed vegetation springs back into position. A quick response helps these clues stay intact.

Matching Response with Need

There are "emergencies" and then there are "EMERGENCIES". A wife reporting a husband who is 15 minutes overdue on a fishing trip with his buddies and cooler of beer is one level of problem. A small child missing overnight is another. However, every report of a possible SAR incident must be treated as an emergency. A call with a low probability that someone is in danger may only need some telephone calls and perhaps a marina (boaters), ramp (aircraft), or parking lot check at the point of departure for the activity. A call with a high probability demands a firehouse response (you move all available resources of your own, call for mutual aid, and activate the search and rescue system).

How can you make that judgement? Experience helps, but the questions that follow may help you evaluate the situation. There are ten simple yes or no questions, and the more yes's you get the more urgently you should treat the emergency.

1. Are less than six hours of daylight left?: We search at night, and the missing person is less likely to be moving at night, but it is harder to get a search organized and moving in the dark.

2. Is the victim very young or very old?: Children and old persons have fewer resources to use in dealing with the situation, often both physically and mentally.

3. Does the victim have a known or potential medical problem?: Does the person need medicine on a regular schedule or is the person depressed suicidal, or distracted by other problems to the extent their judgement may be poor? This can influence how you deploy your personnel.

4. Is there only one person involved? Single people tend to be more vulnerable than groups - strong group leadership and pooling of resources may make the group much more survivable

5. Are weather conditions bad now, or were they when the person, boat or aircraft went missing?: Hypothermia, hyperthermia, windchill, wetchill (cold wind plus wetting from rain), avalanche potential, etc. all pose survival problems.

6. Was the victim poorly equipped to handle the environment - including the airworthiness of aircraft or seaworthiness of boats?: Lack of adequate equipment (tent, sleeping bag, food, way to start a fire, appropriate clothing) gives the person fewer resources to use in solving the survival challenge.

7. Is the subject inexperienced in the environment and/or the local area?: Inexperienced people often fail to recognize threats to themselves in the environment around them.

8. Are known hazardous conditions in the area?: These hazards (old mine shafts, swiftly running streams, dangerous animals, etc.) may be the reason the person is overdue.

9. Is the objective missing in an area in which there have been numerous SAR cases?: Some areas of the country seem to have unusually high concentrations of SAR incidents. This results from a combination of the hazardous environment and the attractiveness of the area to people. If a person is overdue in such an area, there is a heightened possibility they are in trouble.

10. Is the individual reasonably overdue, measured by standards normally used to determine that someone is overdue?: The husband mentioned above is probably not reasonably overdue; a child an hour late from an activity might well be a cause for concern. This requires evaluation of the missing person's habits, punctuality, etc.

Sanity check: Of course if you have confirmed distress (emergency signals, mayday call on the radio, distress beacon with an overdue aircraft, etc.) you really didn't need to run down the questions - roll your resources. And by definition, known body recoveries are not emergencies. The person is dead, and you aren't going to change that. Emergency thinking in this case may cause your people to get hurt taking risks

that are not necessary. However, in both cases, the above questions may help you think about some of the factors that will influence your response.

Chapter review questions

1. Over 75% of the survivors in search and rescue incidents are found in the first ____ hours.
    a. 24
    b. 48
    c. 72
    d. None of the above.

2. Sunset is two hours away. You would consider this to be a factor ____ the urgency of the incident because it is ____ to organize a search at night.
    a. decreasing; easier
    b. increasing; more difficult

3. A ____ number of yes answers to the ten urgency questions indicates that the incident requires an emergency response.
    a. larger
    b. smaller

4. True or false. If you have a confirmed distress call like a report of a distress beacon being heard with an aircraft overdue, there is no need to ask questions. Roll your available resources.
    a. True
    b. False

Supporting Tasks

Basic: No specific tasks support this chapter.
Advanced: O-1001, P-0202, P-0203, and P-0204.

CHAPTER 2
GEAR WEAR AND USAGE

Chapter Objectives
1. Describe the ideal clothing combination for a particular mission.
2. Differentiate the immediate threat of extreme hot or cold.
3. List and explain the differences between the 24-hour pack and 72-hour pack.
4. List and explain the uses for all items required to be carried or worn, as well as optional equipment.

This chapter should help you through every exercise and activity in the ground emergency services arena. Everywhere that you go, you will have gear with you, and we mean everywhere. To do that you are going to need know how to wear that equipment properly and safely. The equipment that you take with you could not only save the life of a missing person or crash survivor, but will save yours, if you use it properly and take care of it.

Problems due to Cold Weather
Cold weather clothing systems are designed to change with the wearer's needs. Cold weather clothing protection is based on the principles of insulation, layering, and ventilation. By understanding these principles, personnel can vary their clothing to regulate protection and stay comfortable.

Increased Effort Requirements: Because cold weather clothing is typically heavy and cumbersome, it greatly increases the energy required for physical activity. The increased effort can result in overheating and sweating, especially during hard work, and can contribute to fatigue. Perspiration buildup should be minimized by opening clothing and removing layers during heavy work and scheduling frequent short rest breaks.

Extremities tend to get cold first: The body has a natural defense mechanism to shift blood from the extremities to the torso to keep itself alive which causes the extremities to get cold first. Feet, hands and exposed skin must be kept dry. Feet are particularly vulnerable and extra foot care is required for cold-weather operations. Feet should be washed, dried, and dusted with a dry, anti-fungal powder daily. Socks must be changed whenever they become wet from exposure to rain or snow, or from excess sweat. This may require changing into dry socks at least 2-3 times daily. Extra socks can be air dried and then carried under BDU's to warm.

Vasoconstriction and Shivering: Humans protect themselves from cold primarily by avoiding or reducing cold exposure using clothing and shelter. When this protection proves inadequate the body's internal mechanisms to defend its temperature of vasoconstriction and shivering takeover.

> Vasoconstriction: Vasoconstriction is the tightening of blood vessels in the skin when it is exposed to cold. The reduced skin blood flow conserves body heat, but as described earlier, can lead to discomfort, numbness, loss of dexterity in hands and fingers, and eventually cold injuries.
>
> Shivering: Shivering increases heat production, which helps to offset the heat being lost. Internal heat production is also increased by physical activity, and the more vigorous the activity, the greater the heat production. In fact, heat production during intense exercise or strenuous work is usually sufficient to completely compensate for heat loss, even when it is extremely cold. However, high intensity exercise and hard physical work are fatiguing, can cause sweating, and cannot be sustained indefinitely. Moreover, most ground team activities and tasks are less vigorous than high-intensity exercise, so internal heat production will probably not be adequate to offset heat loss.

Minimizing Cold Effects: Susceptibility to cold injuries can be minimized by maintaining proper hydration and nutrition, avoiding alcohol, caffeine, and nicotine, minimizing periods of inactivity in cold conditions. Minimize the risk of cold injuries at base camp and field observation points by placing pads, sleeping bags,

tree boughs, etc. Inside these positions to allow occupants to insulate themselves from the ground or snow. High levels of physical fitness are also beneficial for personnel participating in cold-weather operations.

Cold Weather Acclimatizing: Humans do not acclimatize to cold weather nearly as well as they can acclimatize to hot weather, although repeated cold exposure does produce what is referred to as habituation. Proper training before sending personnel into cold weather regions is more important for prevention of cold injuries than repeatedly being exposed to cold temperatures. Following habituation shivering is much less vigorous. This is advantageous because shivering is inefficient, and most of the heat produced is lost. Also, shivering can interfere with sleep, causing fatigue. Also, with habituation to repeated cold exposure, humans adjust mentally and emotionally. Training outdoors in cold weather before deployment will help build confidence in team member's ability to physically, mentally, and emotionally contend with the stress of cold weather conditions.

Clothing and Layering Tips: The following are some tips to help you stay warm in cod climates:

1. Say no to cotton; go with synthetics. Cotton absorbs moisture and dries slowly, which will increase your chances for hypothermia. Experienced rescuers call jeans and T-shirts the hypothermia uniform for this reason. Additionally, cotton socks become very abrasive when moist, causing additional friction which can lead to hot spots or eventually blisters.

2. First layer - Lightweight long underwear. Polypropylene, capilene, coolmax, ZeO2, or any other similar nylon material that shed sweat rather than absorbs it (wicks) is ideal.

3. Second layer - this is your insulation layer, so it's heavier than the first. A nice, mid-weight wool or fleece sweater, expedition weight capilene or polypropylene pullover, or fleece vest works well. In colder climates, or if you're not burning a lot of calories and sweating, wear a heavier wool or fleece jacket.

4. Third layer - Wind guard. This outer shell protects against wind, rain, and snow. Think Gore-Tex, H2No, or a similar material that lets moisture pass through, creating better temperature control. But avoid damaging or scratching this layer. These materials often loose their protective qualities when scratched or worn away.

5. If you tend to get cold very easily, dress with more layers. Eat and drink more when it's cold out to keep your body fueled. More fuel = more energy and heat.

6. If you know you sweat a lot, bring an extra wicking layer with you on your next outdoor adventure. Change this layer midway through your workout.

Problems due to Hot Weather

The hot climate of many areas of the world degrades physical performance and places each member of the team at risk for heat illness. The risk of heat illness depends on physical activity, hydration, heat acclimatization, clothing, load carried, terrain, and climatic conditions. Leaders must watch their soldiers carefully for signs of distress in the heat and adjust work/rest schedules, work rates and water consumption according to conditions.

In very hot conditions, sweating is the only mechanism for heat loss. Water must be consumed to replace the body's loss of sweat. If the body water lost through sweating is not adequately replaced, dehydration will follow. Dehydration will lead to heat illness

Heat Stress Heat, high humidity and exposure to the sun all tend to increase body temperature and increase water requirements, primarily through loss of body water as sweat. Sweat rates can be high even when the skin looks and feels dry, since sweat evaporates very quickly in dry air. Dehydration cancels the benefits of heat acclimatization, increases the risk of heat illness, reduces work capacity, appetite, and alertness. The greater the dehydration the more severe the effects. Thirst is a poor indicator of dehydration. Ground team

members in the field do not sense when they are dehydrated and usually do not replace body water losses, even when drinking water is readily available. Personnel under stress in hot environments will exhibit "voluntary dehydration". They maintain themselves about 1.5 quarts below their ideal hydration status without any sense of thirst. *Ground team members must consciously remind themselves, <u>or be</u> reminded to replace water lost to sweat. Ensuring regular consumption of fluids is the responsibility of the unit leader.*

Heat degrades mental performance as well as physical performance. Rested, well-trained team members working on sedentary tasks should be able to work normally in the heat for up to four hours, after that mental performance will steadily deteriorate. Tasks which require sustained attention (e.g., site security) will be affected more quickly. Performance in the following jobs will be affected by neat stress: monotonous, repetitive, or boring tasks; tasks which require attention to detail and short-term memory (e.g., calculations, map plotting, passing formal messages, etc.); tasks which must be done quickly or according to a fixed schedule; tasks which require arm-hand steadiness; command and operations tasks where confusion and misinformation are common. Reaction times and decision times are slower in the heat.

<u>Heat Illness:</u> The following heat illnesses will be a constant risk in hotter climates:

1. Heat Rash: 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. Heat rash can be avoided by practicing good hygiene and keeping skin clean and dry.
2. Sunburn impairs body heat loss, degrades performance and increases the risk of heat casualties. Sunburn can be avoided by protecting skin with clothing and sunscreen. Emphasize the importance of hats and long sleeves.
3. Heat Cramps are severe muscle cramps primarily in the abdomen, legs, and arms, due to excessive salt and water losses. Heat cramps most often occur in personnel who are not acclimatized to the heat or during sudden heat waves. Heat cramps can be avoided by acclimatization, maintaining proper nutrition and hydration.
4. Heat Exhaustion occurs during work in the heat and appears as marked fatigue and weakness, nausea, dizziness, fainting, vomiting, mild changes in mental function (e.g., disorientation, irritability) and elevated temperature. Heat exhaustion can be avoided by employing appropriate work rest cycles and maintaining full hydration.
5. Heat Stroke can include all of the above signs and symptoms, but is more severe and can be fatal. The victim is usually disoriented or unconscious.

<u>Control of Problems due to Hot Weather:</u> The key to preventing heat illness and sustaining performance is knowledge of the environmental conditions. Leaders must have accurate weather information for their specific location. If members are not fully acclimatized, adequately fed, rested and hydrated, the amount of cooling and rest provided during each work period needs to be increased.

<u>Acclimatization & Physical Fitness:</u>

1. Attain the best possible physical fitness and heat acclimatization prior to missions. Maintain adequate levels of physical fitness after deployment with maintenance programs tailored to the environment. Physically fit personnel acclimatize to heat more rapidly than those less fit.

2. Units on alert, or identified for long term missions, should emphasize their physical training program and state of heat acclimatization (e.g., spend more time exercising in the heat where possible).

3. 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 requires that progressively more physical activity be performed each day. During the first two days of heat exposure, light activities such as recreation activities or short training missions would be appropriate. Leaders should gradually increase the intensity of exercise each day working up to an appropriate physical training schedule adapted for the environment.

4. 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. It is dangerous and inappropriate to try to reduce water consumption.

5. Personnel may have a few days of increased salt requirements upon initial deployment because sweat is salty prior to acclimatization. Complete consumption of rations with use of salt packets is essential to provide an adequate salt intake. Salt supplementation is not appropriate unless medically indicated and supervised by medical personnel.

Hydration:

1. Leaders must understand the critical importance of maintaining hydration. Almost any contingency of military operations will interfere with the maintenance of hydration.
2. Personnel should be taught that the lighter the urine color, the better hydrated; and that dark yellow urine is a sure indicator that fluid consumption should be increased.
3. Establish mandatory drinking schedules which replace water lost by sweating.
4. Plan operations to provide water re-supply points at a maximum interval of every three hours. One-hour intervals are more desirable. Carry as much water as possible when separated from approved sources of drinking water. Insure members always have at least one full canteen in reserve; know when and where water re-supply will be available. Personnel can live longer without food than without water.
5. Minimize voluntary dehydration by making flavored, cool water accessible in a comfortable place, and providing enough time to drink and eat. Before flavoring water, be sure that it is potable. Flavoring in individual canteens should be avoided; it increases the risk of contamination and illness.
6. 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.
7. Drinking water does more good than splashing it on the skin. Water splashed on the skin is wasted water; it might briefly improve comfort, but does little to sustain performance and avoid heat illness.

Clothing, Equipment and Supplies:

1. Uniforms should be worn to protect against sun, wind and insects. Wear the uniform properly, blouse trousers and roll down sleeves. Use hats, head cloths and sunscreen. Heat strain will be reduced by shielding the body from the sun. Wearing Hot Weather Battle Dress Uniform reduces water requirements by limiting heat gain.

2. Change socks when they become soaked with sweat. Prolonged wear of wet socks can lead to foot injury (e.g, increased risk of blisters). Sweat accumulation in the boot can be reduced by wearing a sock that is absorptive and thick enough to "wick" moisture away from the foot and toward the top of the boot where evaporation can occur. Find a sock combination that works well for you, but remember that cotton athletic socks are a no-no. Some people find that one pair of synthetic socks works best for them, some find that two pairs is better, some find that a tin inner sock and a thick outer sock works. Whatever you choose, make sure your boots are correctly fitted for you with the socks you will be wearing.

3. Because clean clothing protects better and prevents skin rashes, whenever possible, wash clothing and air-dry or sun-dry if in the field for extended periods.

The 24-Hour Pack

In addition to the clothing that you wear you are also going to need to bring equipment that can help you in a pinch. The 24-hour pack is meant to be used for the short haul or quick duty. These are the necessities for the job at hand. This load is set up for one day, including the possibility of an overnight stay, but this does not mean to over pack. The 24-hour pack should be replenished from the 72-hour pack at the end of

each day if in the field for an extended period. It is recommended that you establish a checklist of equipment carried on your search load so that you know what needs to be replenished or if you have lost anything (a form has been provided as attachment A). The 24-hour pack should have the following items:

Storage System: Most people use either the military LBE (Load Bearing Equipment), Aircrew Survival Vests, small backpacks or civilian rescue vest options. You will need to carry many things, as you can see the list goes on for several paragraphs, but it needs to be comfortable for you. You need to arrange and wear your gear so that you can wear it for long periods of time, and not have any major complaints. The staff will check all of your gear to make sure that you are wearing it properly and will also make suggestions for changes. This kind of equipment has been in use for years, and if worn properly, you should not have any problems. Remember though, that it is your own fault if your equipment is uncomfortable, and nobody wants to hear your complaints when you don't listen to their advice.

1 day of food: This should be food packaged for the long term so that it will last such as smaller canned goods or broken up MREs. MREs are ideal since they are high calorie and now have alternate and quicker means of heating. MREs or freeze dried foods are also much lighter than the typical canned foods, and leave less to be packed out of the wilderness. By carrying these lighter foods, you can also carry more, that way if you have that extended stay or rescue a starving survivor, you have the food to survive. In addition to MRE's, snack foods like "GORP" (Raisins, peanuts and M&M™ candies), athletic food bars (Cliff Bars, Power Bars, etc.) or granola bars, dried fruits and meats from your local grocery store, and other foods are excellent. You can pack some instant oatmeal for breakfast, beef jerky or salami for lunches, and perhaps an MRE for dinner.

Minimum of 2 quarts of water: The average person should drink much more than this per day in summer or winter, but 2 quarts normally sustains a person long enough to get replenished or find another source. If you know that you are heading into an area that there is no place to replenish you water supply, you may want to consider bringing more.

Personal survival equipment: Your survival should be your top priority. If you get stuck overnight because storm rolls in at the last minute, or you have to stay with a survivor overnight, then you will need to be prepared. God forbid you get separated from the team and need to use this equipment. The following is what most people carry to guarantee their own survival.

> Waterproof matches and other fire starting materials: Magnesium striker bars, dryer lint in a Ziploc bag, paper, or any of your typical dry materials can easily be carried to start a fire when you must. Remember though, that a fire is not necessary for your survival, but it does make it much more comfortable, so plan for it. Nobody likes to be uncomfortable. Remember though that dryer lint needs to be from natural fabrics to be effective. Synthetic lint doesn't really burn too well; it melts (and smells bad).
>
> A few square feet of heavy duty aluminum foil: Aluminum foil can be used for several things such as packaging left over food or helping to heat food over a fire.
>
> Assorted Fish hooks, line, and split shot: Fish are often easy to catch, and considering the weight of these items for the benefits derived, it is a wise idea to bring them. Also, consider trying to make a fish hook in the field. It may keep you busy, but it will normally keep you hungry rather than nourished.
>
> Assorted types and sizes of flexible adhesive bandages: It is very easy to cut yourself on briars or tree limbs or other things that you might find out in the wilderness. Bring the bandages along so that you can clean the wound and protect yourself from getting an infection. It is also recommended that personnel carry povidone-iodine pads to use as an antiseptic to clean out wounds.

Small sewing kit: Strong thread, assorted needles, and safety pins, and replacement buttons for uniform items can help you stay neat and protect yourself. If your clothes begin to fall apart then they are doing nothing to protect you. It helps to lead off problems at the pass. You can wrap a few sewing needles with thread and keep them in your match case. Also, safety pins can be removed from your first aid kit, and buttons can be salvaged from less critical areas if necessary.

Signal Mirror: A signal mirror can often help you get an aircrew's attention and can also help you locally. A mirror can help you take care of cuts that you may have to your face or in starting a fire. Glass mirrors are easily broken though. If you own a glass signal mirror already, don't throw it away, but make sure that it is packed so that it does not get damaged before you get a chance to use it. Glass signal mirrors are more effective than metal ones - they stay shiny since hey don't scratch. This is the reason that military signal mirrors are glass. But remember, any shiny object will do in an emergency, including pieces of a broken mirror.

50 to 100 feet of paracord: Paracord also has many uses. It can be used to tie branches together to make a shelter or hang food out of the reach of small woodland creatures for example. Paracord tend to be like gold to ground teams, so keep track of it so that it does not disappear. If you don't have it when you need it you will not be very happy. You need not have one long piece of paracord - you will probably end up cutting it anyway, so several pieces is perfectly OK.

2 Large Lawn & Leaf Trash Bags: Trash bags have great uses in survival situations also. They can be used to help protect you from the weather, on your pack, or as part of your shelter. Packing a couple of small plastic bags for storing whatever you might want to keep dry is also advisable.

Water Purification Tablets: Water is essential to your survival, but there is nor reason why you should get sick from drinking it. Bacteria and algae often carry sickness, and both are often found in free standing water and even in running water. Tablets should be iodine based (military surplus or Potable Aqua ™ brand), or Iodine crystals (Polarpure ™). Filters certified by the National Sanitary Foundation (NSF) are also acceptable. Chlorine tablets (halazone) should not be used. Iodine tablets should be gunmetal gray in color, if they turn rusty brown they have lost their effectiveness. Keep tablets sealed in their bottles until use, and keep them dry.

Personal first aid and hygiene kit: In addition to what is in your personal survival kit it would be a wise idea to carry extra items to make you more comfortable and healthy in the field. The following items are recommended:

1. Sterile gauze pads (4" x 4") and roller bandages (3" wide)
2. Two triangular bandages
3. Aspirin, Acetaminophen (Tylenol ™) or other analgesic
4. Antibiotic Ointment
5. Medical Tape, 1" wide, partial roll. Recommend waterproof tape or athletic tape
6. Povidone-Iodine (Betadine ™) Prep Pads
7. Travel Razor (Not Electric)
8. Soap - small hotel sized bar, in a plastic bag. Liquid soap in a small squeeze bottle is also good, but pick one that is not irritating if not rinsed well.
9. Travel Toothbrush and Tooth Paste
10. Tweezers, for splinters - fine sharp points
11. Nail Clippers & File Combination
12. Special or Personal Medication
13. Spare undergarments

Poncho and/or rain gear: Make sure holes are patched before returning to the field if they occur. Military rip-stop ponchos are recommended for summer use and Goretex rain gear for use in all other seasons. Ponchos are easily repaired with Duct Tape and can be used for other things like quick shelters in the

summer or helping winter shelters, but remember that as, a poncho is not the ideal year round solution to weather problems, it is a good supplement.

Compass: Get one that you are comfortable using in both day and night. Some members prefer using a military lensatic compass or an orienteering compass, there are many compasses oriented towards what we do. Don't forget that this compass will need to be used for not only simple orienteering exercises, but also map work and should come with a straight edge and easily convert for declination.

Store this compass in a location that it will not be affected by magnetic objects like a knife and where it will not get easily lost. Evaluators often see people carrying a compass in a compass pouch on their suspenders upside down so that the pocket can easily be opened and drop the compass out. This is great, but if you don't have you compass on a lanyard then that same compass could fall out on the trail and you must purchase a new one. Stow your equipment so that you have it when you need it.

Flashlight with red lens, extra batteries and an extra bulb: We recommend using a mini-mag flashlight or equivalent with the red lens attachment. These tend to be more durable than the standard military anglehead flashlight, but both work. Whatever flashlight you use, we recommend that you use Krypton bulbs in your flashlight since they tend to be much brighter than the bulbs that come with the flashlight from the factory. Finally, remember that the red lens is not an option, but a requirement. Humans are not like other animals that have permanent night vision. When exposed to white light, the typical person loses their night vision for about 30 minutes. Using a red lens allows you to keep your vision, and even if coming from white light it assists your eyes to recovery from your night blindness. The only exception to this rule should be medical personnel evaluating or treating patients. White light may be necessary to accomplish an accurate patient assessment. Non-essential team members should protect their night vision in case they are needed to lead the team out.

Where do you keep your flashlight? Most personnel keep their anglehead flashlight on their suspenders. This is a good place for it, but you need to make sure that it is secured. If you end up doing any climbing are heavy work with your gear, you might lose your flashlight or get smacked in the jab by it because it was not secured properly. Use a blousing band or tape to keep an anglehead flashlight from moving around if you want to keep it on your suspenders. Another question should be asked though. How often do we enter into situations where darkness just occurs? You can keep your flashlight and batteries stowed in your butt pack or a cargo pouch out of the way. You will still know where they are, and you don't run as much risk of getting hurt or losing your flashlight. Always have a spare bulb and spare batteries for you flashlights.

In addition to using a flashlight, many people find that using headlamps is superior to using flashlights. Headlamps leave both hands free, and are always pointing in the right direction. Think when wearing a head lamp though. Either turn it off, shade the light, or don't look directly at a person you're talking to so that they are not blinded. Like any flashlight, you should have spare bulbs and batteries for your headlamp. Some models can take two different types of batteries. Lithium batteries are excellent for cold temperatures and have a long shelf life. Some headlamps can also accept different sized batteries, for instance AA or C cells. Headlamps that have a battery compartment worn on your belt are not as useful for most rescuers because the wire is either too short or gets snagged.

Orange reflective vest: We are not doing a job where we need to be camouflaged or covert about our tasks. Being visible helps team members see each other from greater distances, as well as making sure that hunters do not shoot at you. Your vest can be substituted by a Bashaw or equivalent rescue vest that is already blaze orange and reflective, but it may be a wise idea to bring a separate small vest in case someone else does not have one, or to mark a hazard area at the scene. By the way, regulations require the wear of orange vests when performing field operations in BDUs.

Pocket knife: Swiss army type knives or Leatherman tools are recommended because of the multiple purposes and obvious advantages. Try to get a brighter colored one so that it is not as easily lost in the field.

A large survival or Rambo knife is not necessary or recommended. We are not going into combat, so your flashlight can be packed away in a cargo pouch or your pocket when it is necessary. It should not be hung on you suspenders upside down in a combat approach. This is not only unsafe, but scares the public, and we do not need to do any thing to hurt CAP's image. Your knife should always be kept clean and sharp, and should never be played with like a toy. It is a tool that should only be taken out when the tool needs to be used.

Work Gloves: This is a required piece of equipment for teams in the field. For those heavy duty jobs, it is just smart to wear heavy work gloves. Winter gloves and mittens are normally designed to do one thing, keep your hands warm. That is great, but if you must move wreckage parts to get to a survivor, you will most likely rip or tear your winter gloves or mittens. Your hands can easily be damaged, and there is no reason to expose yourself to these problems.

12 to 15 feet of 5/8" rope and a carabiner: This has many uses such as a rappelling seat or other towing functions, hoisting parts out of the way at a crash site, or helping to make a shelter for your own survival. Remember that just because you carry it does not mean that you are qualified or allowed to use it. CAP members do not rappel or perform climbing or high angle rescues without the assistance and guidance of professional instructors. If you do it and something happens to you without instructors and guidance, then you will not be covered by CAP insurance and will hence forth be on your own. Twenty feet of 1" tubular climbing quality webbing can be used to make a more secure and comfortable harness for most applications. Carabiners should be locking-D shaped.

Whistle on a lanyard: This whistle is used during practical search exercises to give voiceless commands , as well as to bring attention to yourself when necessary. This whistle should preferably be made of durable plastic so that it lasts, and does not cause you your lips to freeze to it in the winter.

Notepad, pen and pencil: Every member should be carrying a writing implement of some sort and paper when in uniform, but it is always a good idea to make sure that you have spares with your gear. You may need to record the information off of an ELT or draw diagrams at a crash site. Make sure you can document what you did.

Additional items: Local regulations, field conditions, or higher qualifications may require you or your team to carry specialized equipment. Ropes and climbing gear, shovels, and extrication equipment are just the beginning. Think about what you may need in the next few hours of a search. Some personnel may carry a small air band radio like the Radio Shack Jet Stream Mini to use to find an ELT. Mission radio operators may carry a VHF/FM radio to maintain communications with the ground team vehicle, aircrews or mission base. The ground team leader may carry an Air/Ground signal kit to establish better communications with an aircrew or to establish a helicopter landing site. Medics may carry a trauma kit appropriate for their level of certification and competence.

The possibilities can go on for several pages, just remember to take what you may need to complete the task, but don't over burden yourself so that you never reach the target. If you don't rescue the survivor because you were to slow from all of the gear you carried that could have been improvised on the site, then someone just dies because you didn't think. Carrying food for a week for the entire team to a site one mile off the road that the aircrew is leading you to is not a smart move. Think before you act.

The 72-Hour Pack

Your 72-hour pack is your life line and existence. This should be designed for the long haul of at least six or more miles; the longer and tougher assignments. Consider if you are doing this is winter or mountainous terrain. This will cause your pack to vary in size and description depending upon the user and the type of frame most suitable and comfortable for the task. In the summer you may only need a small external frame pack to store all of your items, but in the winter you may need a large internal frame pack to store the same items plus all of the items to keep you alive in the winter. Remember that this pack should be designed for a two to seven day stay possibility, but still don't over pack. People going on long trips tend to try to bring everything that they own, and often use very little of that. Consider where you might go and what you will

truly need when you are packing. With proper training and foresight many problems can be avoided and you can still be comfortable both at the site and while you are working your way there. The following should be the items that you bring in your 72-hour pack. This does not mean that you should leave your 24 hour pack behind. You should either pack it inside this pack, attach it to the outside, or take items that you feel are necessary out of it and place it in your 72-hour pack for long trips. Don't forget to consider if you will be hiking to a base camp and then searching in the local area. You may need both sets.

2 to 3 days of food: Food is a definite necessity of life, and you will need plenty of it while searching in the wilderness. Make sure that you bring food that will not only keep you going, but does not drag you down or spoil easily. You have to be able to eat it without getting sick, and be able to do your job later. Breaking down MREs or camping food to useful parts can save you a lot of room in your pack, which can be used for other items.

3 to 4 quarts of water: Water is another essential of life. Since you are obviously expecting to be away from good facilities to replenish supplies, it is a good idea to bring extra water. Purifying water or using chemicals to clean water is great, but it is normally still safer to just bring good water with you. Many personnel use 2 liter soda bottles or Gatorade ™ bottles to carry extra water in their pack, but remember to use plastic bottles to avoid breaking glass.

Spare poncho or shelter or both: A spare poncho can often be used as a shelter, but it is normally much easier to bring a shelter with you. Additionally, it is safer to bring a shelter with you. A shelter designed for the conditions you are entering is better than trying to build one from what you can find when you get there. Also, if you bring a spare poncho you can better protect the shelter you bring with you, or at least make your camp site a little more user friendly.

Another point needs to be made know also. Most tents don't work all that well when they stay wet for long periods of time, especially balled up in a bag in your closet. When you get home, air out your tent so that mold doesn't grow in it and make sure that you repair any holes or tears. A good tent can be used for many years if you take care of it.

Sleeping bag or bedroll: Rest is necessary to you performing your assigned tasks on missions. To do this you are going to need to have a dry sleeping bag or bedroll appropriate to your current conditions (keep it in a waterproof bag). In the summer you probably will not need a very heavy sleeping bag, but a summer weight bag is not designed for arctic winter temperatures. Use your brains, and don't forget that there is often snow or freezing conditions in some areas of the country year round.

Just like your shelter, you need to take care of your sleeping bag. Air it out after every use. Make sure that you repair any holes tears or other problems when they happen. There is no reason to make the problem worse by letting the filling pour out of the bag. Don't let these problems sit. The next time you go to use that sleeping bag may be during a mission, and you won't have time to get a zipper fixed or sew up a hole. Additionally, make sure that you keep your sleeping bag clean. During field activities we recommend that you roll up your sleeping bag during the day so that the inside does not get dirty, wet, and you don't have any woodland creatures waiting for you when you go to use your bag. When you come out of the field make sure that you clean the sleeping bag according to the manufacturer's instructions. A clean bag should help you feel better when you are in the field, and will also keep you healthier.

For most rescuers in most parts of the country, synthetic insulation is best for sleeping bags. It is difficult to keep your sleeping bag dry, and natural insulation like down (the small underfeathers of water birds like ducks or geese) will become useless as an insulator when wet. Synthetic insulation bags (including the US Military intermediate and cold weather bags) are much better when wet than natural insulation bags (including the older US Military mountain sleeping bags).

Whatever kind of sleeping bag you use, the most important factor in having a warm, good nights sleep is having an insulating layer under you. Your own body weight will compress the insulation in your sleeping bag so that it's essentially useless - use a foam pad for insulation. Air mattresses tend to leak, and will allow

air inside the mattress to circulate, causing you to sleep cold. Closed cell foam pads (ensolite, etc.) are not as comfortable to sleep on as open cell (sponge rubber foam) pads, but insulate much better. Open cell foam tends to absorb water. Some pads combine the features of air mattresses and both closed and open cell foam. These are self-inflating foam pads such as the Thermarest ™ brand. They are comprised of an air mattress filled with open cell foam to reduce heat loss, and a waterproof cover to prevent absorption.

Complete spare uniform and undergarments: When you work, you sweat and get dirty, and thus you will need to change into clean clothes. You should bring these clothes in your 72-hour pack out into the field. If you are out in the field for several days you are also going to need someplace to store your dirty clothes, which will probably be in the same place, your 72-hour pack. Pack things in plastic ziploc bags. Use the bags to organize things, for instance first aid materials, repair parts like spare batteries or duct tape, or clothing. You will not only keep your clothes dry, but also keep the clean clothes separated from the dirty clothes. In packing these clothes, don't forget that you may need to change more than is normally expected because of inclement weather or tears from an accidental fall or some other odd reason. Be prepared for the worst.

Mess kit: When you are involved in long term operations, you are probably going to have food delivered to you at base camp or you will need to cook some. You will need to have the necessary equipment to do this. You don't need to bring enough so that you will cook for an army, but be able to take care of yourself. Also, don't forget to bring utensils and cleaning items. Cooking is great, but not doing it properly because of the lack of utensils is not smart. Additionally, if you don't properly clean out your mess kit after each use then you will not stay happy and healthy. Grease and other food waste products are breeding grounds for germs, and there is no need to get sick because you were stupid. Bring SOS pads or scouring pads, cleaning rags and cleaning fluid to do the job right. When you are done cleaning all the utensils and mess kit, rinse them well to remove any soap residue and then rinse them in clean, boiling water to sterilize them if possible.

Optional items: Depending on the teams assigned task and the amount of weight you can feasibly carry, you may want to bring some additional items to make life easier. The following are a few of those items.

> Spare compass: It is always a good idea to have a spare compass. If one is lost or damaged, you don't want to be lost along with it. Additionally, it is always a good idea to check your compass to make sure that it is reading correctly, and this can be done by checking it against another compass. You can be reasonably sure that it is accurate if both are reading the same. If not, check it against a fellow team mate's compass.
>
> Rope gear (carabiners, rope, extra gloves): Ground teams in different places around the country may routinely work with instructors or trained high angle rescue teams. Those teams may carry extra rope gear to assist or perform extrication under guidance.
>
> Shovel, ax, saw, or other extrication tools: Aircraft are not the easiest things to get into to rescue survivors, and teams will often carry extra tools to do the job. Remember though, that you should not bring it if you don't know how to use it. Let the professionals do their job. Just because you own it or brought it with you does not mean that you should use it or are qualified to do so. In some cases, you may not even have to use them. No team should bother carrying, buying, or acquiring equipment that they themselves are not competent to use.
>
> Spare flashlight: Light is essential to night searches as well as planning for the next days events. Carrying a spare flashlight just in cases is always a good idea. Another alternative is to bring glow-sticks. These can be used to light up areas quickly and you don't have to leave your flashlight somewhere. They do have problems though. In the winter, or after a long period of sitting on the shelf, glow-sticks don't tend to work well. Remember that before you go out into the field.

Stretcher or litter: If you do find survivors you might have to move them out of the area. You are going to want to do this quickly and efficiently, and the easiest way to do this is on a litter. This can be a heavy or light piece of equipment depending upon what you are using. This is normally carried by two people since lighter and smaller litters are normally more expensive and not often available to CAP ground teams. Proper techniques for carrying a person on a litter should be discussed in your first aid course as well as during field exercises. Use the litters provided. It can save you a lot of time and energy from trying to improvise one, and if you use the techniques you will learn, it is much safer for all involved.

Additional medical equipment: Many teams will bring in additional medical equipment, and well they should. The team medic will have to take care of any survivors, and a trauma kit will normally have the necessary tools. Additionally, many teams will bring in oxygen kits or ventilation equipment if they have trained members to use it. Don't forget that you can only operate up to your training level.

Closing Remarks

It is important for you to solve your gear problems prior to going out into the field. The gear that a ground team member carries is their lifeline, and may be the one thing to save their life. Gear can also be a hazard if not set up properly. Listen to your instructors and staff. It could make your life much easier, and want you to have a good time, but also learn something at this course.

Chapter review questions

1. What color lens should you have on you flashlight to assist you in avoidance of night blindness?
   a. blue
   b. red
   c. yellow
   d. none of the above

2. True or False: Every person should wear their gear identically so that we are all standardized?
   a. True
   b. False

3. ____ is the tightening of blood vessels in the skin when it is exposed to the cold.
   a. Dehydration
   b.Vasoconstriction
   c. Habituation
   d. None of the above

4. True or False: Carbohydrate/electrolyte beverages (sports drinks) are not required, and if used should not be the only source of liquid.
   a. True
   b. False

5. True or False: Ground team members and leaders are required to use a military lensatic compass.
   a. True
   b. False

6. True or False: Team members are required to carry all of their equipment (24-hour and 72-hour packs) all the time.
   a. True
   b. False

7. True or False: NSF approved filters are an acceptable alternative to Iodine tablets purify water.
   a. True
   b. False

8. True or False: Orange vests are required when performing field operations in BDUs.
   a. True

b. False

9. True or False: Cotton is the recommended material for all SAR uniforms.
   a. True
   b. False

10. True or False: Full heat acclimatization normally takes 7-14 days to accomplish.
   a. True
   b. False

Supporting Tasks
Basic: O-0001, O-0002, O-0003, and O-0004.
Advanced: O-0005, O-0006, O-0007, O-1001, P-0202, P-0203, and P-0204.

CHAPTER 3
VEHICLE INSPECTION AND CLEARANCE

Chapter objective:
1. Insure that members can prepare vehicles being used by teams, and that they are safe and ready to be deployed.

Responsibilities
The driver is responsible for the vehicle while driving. The ground team leader should not be the driver. The ground team leader is in charge and responsible for team members, and has to insure that the team is going to be safe in the vehicle, and therefore needs to make sure that the inspection has been done every time that vehicle leaves for a mission, and that any preparations necessary are made while traveling. Responsibility for and completion of the inspection are two different things. The ground team leader can assign tasks to members of the team to get done prior to departure from mission base or even the mission briefing including all or part of the vehicle inspection. The items to be checked as part of the vehicle inspection are provided in tables 1 and 2.

1. Check the engine oil level
2. Check to make sure that the battery is properly connected and relatively clean
3. Check the tires for damage and abnormalities
4. Check to make sure that there is a spare tire and a jack
5. Check engine coolant level
6. Check to make sure that all belts and hoses look normal
7. Check to make sure that there are enough safety belts for all passengers
8. Check for leaks under the vehicle and in the engine area
9. Check to see how clean the vehicle is inside and out
10. Check for and damage both internally and externally
11. Check to make sure that the inspection sticker (if applicable) and registration is current
12. Check Power Steering Fluid, Oil, and Windshield Cleaner levels
13. Check to make sure that there is extra fuel and water in labeled containers for emergencies.
14. Check to make sure that all necessary team equipment is loaded into the vehicle.

Table 1: Before the vehicle is started

1. Check to make sure that all lights work
    a. High and low beams
    b. Front and Rear turning signals
    c. Front and Rear caution lights
    d. Reverse lights
    e. Dome lights, and panel lights
2. Check to make sure that all instruments, horn, and windshield wipers work
3. Check all safety devices again, along with warning lights
4. Check the brakes and the steering
5. Check for unusual occurrences such as noise, odors, or unusual vibrations
6. Check gas level
    a. If there is more than one tank, check both.
    b. Don’t just rely on gauges, visually check tanks, and driver records of travel.
7. Complete all Mission Paperwork necessary before leaving the mission base.
    a. Make sure that it is readable.
    b. Make sure it is signed by the approving officer, normally the Ground Branch Director or his designee.
    c. Make sure to leave a copy with the approving officer and retain a copy for yourself.

Table 2: After the vehicle is started

Mission Paperwork
As with all CAP operations, there is necessary documentation to be filled out prior to leaving mission base. While the inspection is being completed, the team leader or assistant leader should fill out two copies of the CAPF 109. This form guarantees that there is a record of all personnel on the ground team, and provides general mission information to the team. Get the Ground Team Leader's signature on the form upon completion. The ground team leader is responsible for the documentation, and needs to make sure that all information is documented correctly. Get the vehicle clearance officer's (normally the ground branch director) signature on both copies, and leave one with the clearance officer. This insures that last minute information is given to the team prior to departure, as well as there being a record of who has gone out on

what team just in case there is a question later. It is bad enough that we must search for a missing aircraft or person. We do not want to worry about our own personnel more than necessary.

Chapter review questions

1. What CAPF is used for vehicle clearance?
    a. CAPF 103
    b. CAPF 106
    c. CAPF 109
    d. None of the above

2. Who is responsible for the vehicle when it is in motion?
    a. The Ground Team Leader.
    b. The driver.
    c. The team members.
    d. None of the above.

3. How many copies of the vehicle clearance form need to be made?
    a. 1
    b. 2
    c. 3
    d. None of the above

4. Who at the mission base would normally keep a copy of the vehicle clearance form?
    a. The Ground Branch Director or his designee
    b. The Information Officer
    c. The Liaison Officer
    d. None of the above

Supporting Tasks

Basic: L-0101.

Advanced: O-1001, P-0202, P-0203, and P-0204.

CHAPTER 4
NATURAL HAZARDS, FIELD SANITATION & CAMPSITE SELECTION

Chapter objectives
1. List methods to avoid and treat blisters, insect bites, and dehydration.
2. List the signs and symptoms of Lyme Disease and describe prevention methods.
3. Identify and recognize poison plants and their prevention and treatment methods.
4. Identify and recognize the poisonous snakes and insects common to North America, and how to avoid them.
5. List the instructed points of fatigue prevention.
6. Describe an appropriate place to locate a campsite.
7. Diagram the location of necessary facilities within a campsite.

Animals
To start, ground teams should avoid any animals in wilderness areas. There are certain animals that do represent a direct hazard to humans who disturb them, like rodents.

Rodents: Raccoons, skunks, squirrels, rats and possums fall into this category. The main danger from these animals is that they carry rabies. In addition, skunks will use its scent sprayer if cornered. Know how to recognize and avoid them. Rodents are typically identified as being four legged, small and furry. Skunks are black with a white stripe down the length of their backs. They can easily be avoided by doing the following:

1. Do not put you hands or feet under logs or into holes where these animals may have nests.

2. Give all small, furry animals a wide berth. Do not attempt to pet, feed or provoke any animal in its own habitat.

Snakes: Approximately 50,000 people per year are bitten by snakes in the US, with poisonous snakes accounting for 15% of these bites. Even with over 7,500 poisonous snake bites per year, fewer than 10 people die per year (less than the number from bee and wasp stings). There are two kinds of poisonous snakes in the US: pit vipers and neurotoxic snakes. Pit vipers are distinguished by the small pit in the snake's head directly between the eyes. This pit is essentially a heat sensor that the snake uses to find warm-blooded creatures. Pit vipers have long fangs that are used to bite and inject poison into the victim. The poison is carried by the blood to other body tissues. Neurotoxic snakes are similar, but their poison affects the nervous system rather than the blood stream.

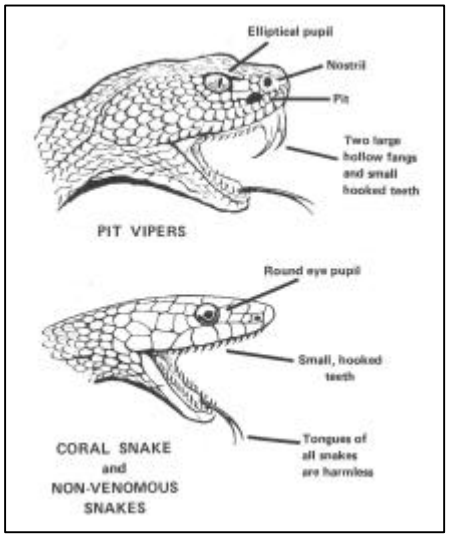


Figure 1: Snake Head Diagrams

In the US, there are three common types of pit vipers (water moccasins, rattlesnakes, and copperheads) and one neurotoxic snake (coral snake).

Water Moccasins: Water moccasins are dark snakes often called cottonmouths because of the bright white interior of their mouths when fully opened. They are usually found in lakes, ponds, swamps, and rivers.

Figures 2 and 3: Cottonmouth / Water Moccasin

Rattlesnakes: Rattlesnakes are usually dark or brown snakes noted for the rattle on the tail. The rattle is used to distract prey or as a warning when the snake is cornered. It can be easily heard when you get close to the snake. They are also known as diamondbacks because of the colored patterns formed on their backs.

Figures 4: Diamondback Rattlesnake

Figure 5: Pigmy Rattlesnake

Figure 6: Canebreak Rattlesnake

Copperheads: Copperheads are brown-orange in color with alternating bands of color along their backs. Frequently, a strong "cucumber" smell is noted in the area.

Figure 7: Copperhead Snake

Figure 8: Copperhead Snake Closeup

Coral Snakes: Coral snakes are small, with alternating black and red-orange bands along their length, separated by thin yellow bands. Its mouth is small, usually only wide enough to bite on a finger or a two.

How to avoid being bitten: To avoid being bitten it is recommended that you avoid putting your hands and feet anywhere you haven't visually inspected, especially holes or under rocks and logs and to wear leather boots and gloves.

Figure 9: Coral Snake

Lyme Disease and other insect associated problems

Most ground teams will end up searching in the summer in areas where insects carrying disease and/or infection causing bacteria flourish. Some will just be an annoyance while others can cause life-long problems. In considering this, follow the recommendations below to minimize your exposure to these problems.

1. Blouse and/or tuck pants legs and T-shirts

2. Roll down sleeves when entering wooded areas

3. Spray person and clothing with bug spray with DEET base.

4. Check yourself and fellow team members often for bugs. Clean and wash yourself thoroughly and often so that you can remove any bugs already trying to take up residence.

5. Watch where you walk, sit, or overall, put your body. A little situational awareness can go a long way.

Ticks and Lyme Disease: Lyme Disease is becoming very common in the United States, especially in the east. It is normally transferred to humans through it's most common carrier, the deer tick. This tick tends to wait on branches and bushes and latches onto animals walking by, normally humans. If you are aware, the tick will probably not have time to even attach itself, but if not they can easily go undetected.

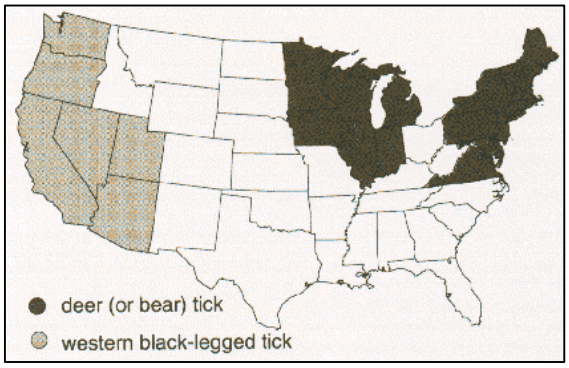


Figure 10: Known locations of Lyme Disease carrying ticks of the United States.

Figure 11: Compare the size of this tick to the blade of grass it is walking on.

If you do find a tick attached, act immediately. Either go to the medical officer or remove it yourself. Using forceps or tweezers, grasp the tick as close as possible to the mouth part, the part in the skin. Pull the tick steadily outward, not jerking, to avoid dismemberment of the insect in the skin. Avoid squeezing the tick's abdomen. It holds the infected fluid because if you do, you are basically injecting a possible disease into your body. After removal, disinfect the area of the bite with rubbing alcohol or povidone iodine. Save the tick in the event that you do have to go see a doctor. Do not attempt to burn the tick. A more in-depth discussion of this topic should be brought up in any basic first aid course. If you see any of the following signs within 30 days after being bitten, it is recommended that you see a doctor.

1. Ring shaped rashes

2. Flu-like symptoms of headache, fever, chills etc.

3. Pain and swelling of muscles or glands

Bees, wasps, mosquitoes and fire ants: Bees, wasps, mosquitoes, and fire ants are stinging insects that tend to plague searchers in the wilderness. To avoid these insects:

1. Be watchful for bees' and wasps' nests and fire ant hills, and do not disturb them.

2. Dispose of trash properly to avoid attracting insects.

3. If you are allergic to bees stings, carry your medication and ensure everyone on your team is aware of your condition and where your medication is.

4. The only way to avoid mosquitoes is with an appropriate insect repellent. Apply repellent to all areas of exposed skin, especially around wrists, ankles, arms, legs and neck. Do not spray repellent directly on your face; instead spray it on your hands and rub it on your face. Be careful with repellent on your forehead - sweat can make it drip into your eyes. You can spray repellent to the brim of your hat instead of your forehead.

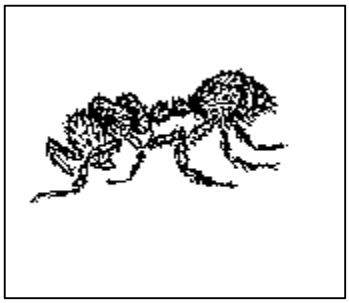


Figure 12: Fire Ant

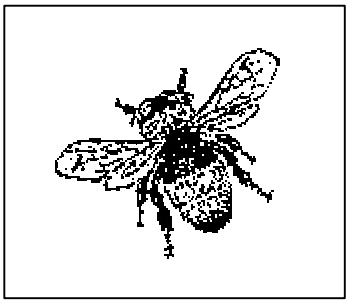


Figure 13: Honey/Bumble Bee

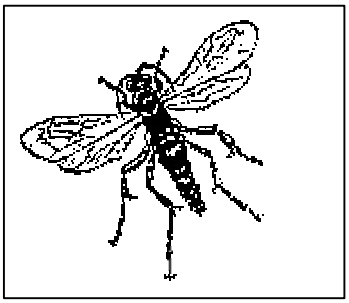


Figure 14: Wasp

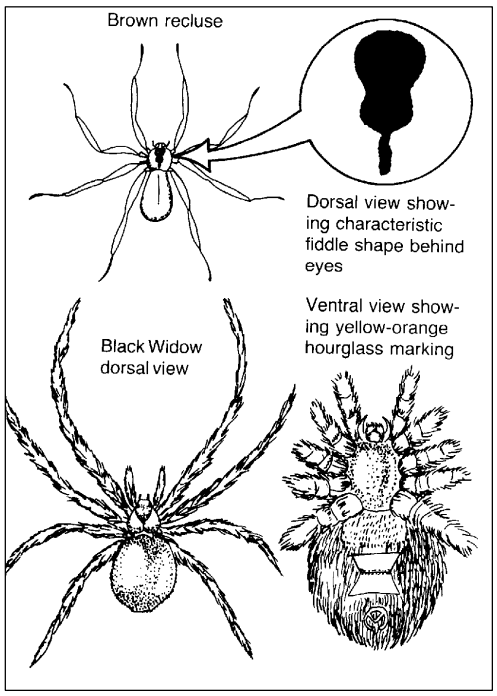


Figure 15: Identification of Brown Recluse and Black Widow.

Spiders: Spiders tend to be more of a nuisance than a danger. Only two spiders in North America are considered poisonous - the Black Widow and the Brown Recluse. The bite of either of these spiders is painful but rarely fatal. Approximately 5% of the population will have an allergic reaction to the bite and a few people may develop shock. Hypersensitive people will develop anaphylactic shock that can become life threatening. These spiders are fairly easily identified. The black widow is a ground dwelling spider found mostly in the Western United States. It is black with a yellow-orange hourglass marking on its underside. The brown recluse is another ground dwelling spider. It is furry and brown, with a dark fiddle-shape mark on it's back right between the eyes.

To avoid these spiders experts advise basic common sense. Don't put your hands anywhere you haven't looked first, and avoid contact with all spiders.

Foot Problems

Taking care of your feet is one of the most important things that you must do. If your feet hurt, you will slow down, inevitably slowing the team down. A brief discussion of the most common foot problems encountered and prevention techniques will be discussed below, but you should also listen to additional guidance given in other classes because it can save you a lifetime of pain.

Trench Foot: This often occurs when you have been walking with your feet immersed in cold water from puddles or swamps. This is recognized by your feet becoming at first cold, pale, waxy, pulse-less, and numb. After being re-warmed your feet will become hot, red, and swollen. This is typically very painful. This problem can be avoided by staying away from prolonged walking in swamps, stream beds, or the like, and not wearing tight boots.

To treat this ailment you should remove the wet boots and socks, warm your feet with a dry blanket, and avoid long-distance walking for about a day.

Blisters: Another common problem for searchers is blisters. Blisters are caused by stress on the skin. This can be avoided by wearing boots that have been properly broken in, by wearing two pairs of socks (a nylon pair under wool), and by washing the feet with soap and water at least daily and putting clean socks on. If a blister does occur, it is not recommended to pop the blister since you run the risk of infection. Place a donut pad or a piece of mole skin with a hole in it around the blistered area to relieve stress on it. If you must release pressure in the blister, poke a hole in the blister with a sterile needle (remembering not to remove the dead skin because that protects the area from infection and adds an additional barrier to friction) and press the fluid out of the blister. If you do release pressure to the blister it is still recommended to place mole skin around it, and wash your feet often with soap and water to avoid infection.

Athlete's Foot: This tends to be the last major problem for searchers. Athlete's foot is caused by your feet overheating, sweating and promoting the growth of fungus. This causes scaling and extreme itchiness, along with redness and possible swelling. To prevent this, in hot weather you should wear shoes that allow for adequate ventilation and light cotton socks. At least daily, you should wash and dry your feet gently, and apply an anti-fungal powder to soak up moisture and stop fungus growth. In cold weather you may not think your feet are sweating, but after a long hike with a full existence load, they probably are. When you stop, check your feet and treat any problems you may have.

General Foot Problem Prevention: Most problems that ground team members have with their feet can be avoided by simple preparedness and awareness. The following is a list of simple suggestions to avoid foot problems.

1. Break in footwear (this should have been done before the school ever started).

2. Wash feet often and thoroughly with soap and water.

3. Wear clean socks next to skin.

4. Change socks daily at least, if not more often.

5. Wear two pairs of sock so that the first pair on is the cushion, and the second soaks up sweat.

6. Dry out boots when wet, and try to avoid getting them wet in the first place.

7. If boots get wet and or dirty, clean them and waterproof them again. They only work for the user if you work for them.

8. Treat blisters promptly, DO NOT POP THEM, donut hole bandages like mole skin work well to let swelling go down, if applied properly.

Poison Plants

The best way to avoid these problems are to recognize the sources and avoid touching them. A diagram of what the poison plants look like is provided in figure 16. If for some reason you do not recognize the plants, you should treat the ailment by doing the following: If noticed right away, you should wash the affected areas. If not, there is not much you can do except to use calamine lotion, or apply cold compresses 3 to 4 times daily to the affected areas. you can also apply aloe to the affected areas twice daily to stop the rash spread.

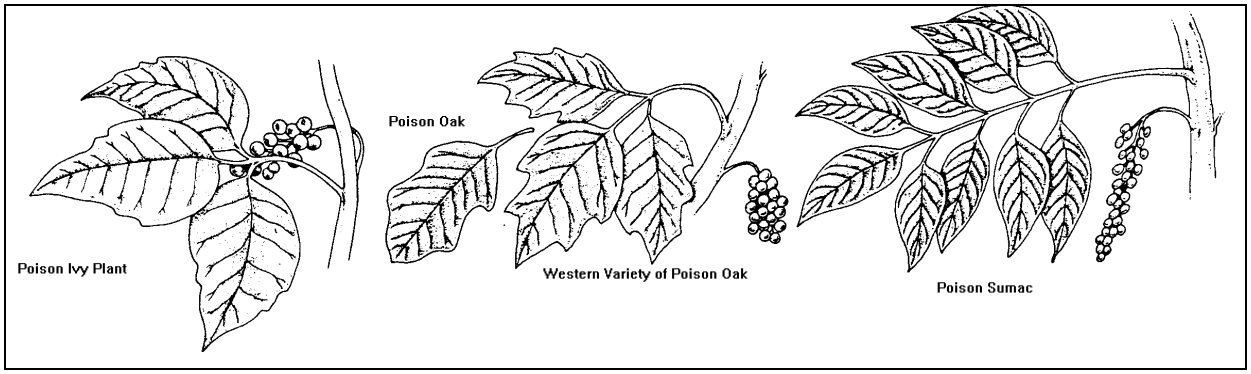


Figure 16: Poison plants

Additionally, a few other things should be remembered when dealing with poison ivy, oak or sumac.

1. Avoid all scratching because you will be spreading the rash.

2. Don’t apply anti-histamine lotions or sprays because it may aggravate the rash and spread it further.

3. Wash when coming out of the field. If you did brush against one of these plants, you run less risk of spreading the oils if you wash off quickly.

4. Clean uniforms and gear often so that residue is removed. If you got it, you gear probably has the oil and residue on it also. There is no reason for you to clean yourself off if you are just going to put the oil back on yourself.

Fatigue Prevention

Searching for missing aircraft or persons is very tiring both physically and psychologically. The following are a few tips to help you deal with these tiring situations.

1. Recognize and accept that team members get tired. We do not all operate at the same speed or level. Encouragement and assistance tends to help team members along a lot more than complaints with an inadequate solution.

2. Sleep and/or rest when given the opportunity. Additionally, replenish your body with healthy foods and drinks whenever possible. During a school like NGSAR or an actual mission is the wrong time to go on a diet or fasting routine.

3. Let someone in authority know if you can't handle a task because you are too tired. A team member that is over tired makes mistakes and could get that team member or someone else hurt. At the same time though, realize that once you are in the field it may be too late to go back. You may have to press on but at a slower than normal rate.

4. Other team members need to tell others if they should sit out, or tell someone in authority. Sometimes people don't notice if they are getting sloppy in their actions because they are too tired, or they are trying to be too heroic and won't quit until they drop. We have all tried to pull all-nighters at some activity, and you may be able to do that for a few days, but over a week or more training activity or full scale mission, you would have to stop. Don’t make anyone tell you to rest, and try to give others the opportunity to rest when it is offered.

Stress Management

Stress is a natural part of life and it hits everyone at some time or other; accept it. The following are some simple rules of thumb to avoid stress building any higher than necessary.

1. Stay calm. If a person gets worked up over a problem, then he or she will probably not handle it well, causing more future problems. Additionally, if you keep your head you are more likely to see an answer to your problem sooner, and you gain respect of your peers.

2. Vent frustration in a positive manner. If you use all of your energy being angry, then you have wasted it. Put it towards your classes or function on the mission. All temper tantrums, yelling, and kicking things does is annoy others, damage property, and cause witnesses to lose respect for you and the uniform you wear. There is always something that you can be doing other than making unnecessary noise.

3. If you have a problem with someone else, bring it up tactfully. If you don't, a resolution that everyone can live with may not ever arise, and it will be your own fault. You don't have to keep your problems to yourself, but take the time to stop and think or survey the scene. A different perspective may present itself that helps you resolve all of your current problems.

Team Deployment Safety

Before any team goes out to search, everyone needs to think about some major issues.

1. Be aware of your surroundings. If you have you head down and aren't paying attention then you are bound to have an accident, or be the cause of one.

2. Look for possible problems in planning. Don't just jump full force without looking, it can get you and your team hurt or out of the mission. Mission planners are only as good as the information provided to them and you are expected to act on their plans intelligently, not blindly.

3. Even if you are a lower person in the current echelon, don't feel that you cannot point out problems. A person should not be considered a leader if he or she doesn't accept input from above and below. We are all human, and therefore make mistakes, but less will occur if we are all watching for possible problems and make everyone aware.

Campsite Selection and Placement

For a Civil Air Patrol ground team it should not have to be said that appearance should always be good. Our image is important to the success of operations. This does only mean your uniform and person, but also includes the team site. In addition to the issues discussed below, remember that you should always leave your site better than you found it.

One major problem that many teams often run into is that the team establishes camp in a poor location. This can not only make your stay extremely uncomfortable, but could also be extremely dangerous. Before you even hit the trail, look at a map to see what kind of areas you will be traveling in, and possible areas to bed down for the evening. The following are some suggestions for points to address in selecting a camp site.

Consider what you have and who is with you: If you have a large or small group, or have limited gear, it will make a difference. Trying to fit a team of 20 into a site large enough for 10 will not make anyone happy.

Take into account the weather and time of year: Does the area that you are planning on stopping at flood at different times of year? Is it prone to avalanches in the spring? Are you prepared for rapid changes in the environment, or only the current conditions?

Don't assume that the area is the same as the map depicts: The area that is depicted on your map could have changed drastically since it was printed. Surveyors are not the most prompt people, and you can't blame them considering how little it takes to change a map. Houses established on the perimeter of the area you are in could

easily change water displacement and drainage in the area. Rock slides or larger snow fall during the winter season could leave an area unusable.

Consider your necessities: Not only will your team have to get rest, but they will most likely need to eat and thus relieve themselves. Additionally, they will want to clean themselves so that they feel better. All that means that a campfire will probably be built, toilet and washing facilities will need to be established, and don't forget about your shelters. Make sure that your site can accommodate these facilities so that team members are comfortable and happy and able to continue the next day. Figure 16 depicts the ideal campsite for a group.

Facilities within the campsite

As you should have noted in figure 17, there is a recommended layout for campsites. This is done to keep you happy, healthy and safe. Let's touch on this campsite layout. Before you do anything, determine the wind direction and survey the area. You will need to know this to lay out your site correctly, or decide to go somewhere else. Nobody wants to smell the waste from the latrine and washing areas, or to have trees or rocks fall on them while they sleep.

Shelter placement: Place your shelters approximately 200 feet from the water source (if any), down wind. You don't want to be right on the water because if there is any bad weather you may end up getting flooded out if you are too close to the shoreline. Additionally, animals tend to make their homes closer to the water, and you do not want to disturb them. While on the topic of shelters, don't leave your tent in a shambles. You may be using this as a base camp, but that does not mean that you should not be organized. It is for your own safety that you roll up sleeping bags and keep gear stowed when not in use. There is no reason to give insects and animals someplace to rest. Also, you may need to move out at a moments notice because of impending weather or orders from mission staff personnel, so don't make it any tougher than it has to be.

Washing and latrine facilities placement: Establish washing and latrine areas at least another 200 feet downwind from your shelters. Obviously you will want to keep your equipment and yourselves clean. To do this you should establish an area to clean your mess kits and other cooking supplies, as well as to relieve yourself. You should make a straddle trench latrine for each team on the site. This should last through a few days, and avoids health hazards. A straddle trench latrine is essentially a ditch, one foot wide, three feet long, and two feet deep. After each use the waste should be covered up using an entrenching tool. Once the hole is filled in to about the one foot level, it should be filled in completely and a new hole should be dug. Mark the latrine so that it can be found easily during the night; glow-sticks work well for this. Additionally, you should put some sort of tarp or cover around the latrine; just because you are in the wilderness does not mean that you should give up all of your privacy. Also, make sure that you establish some place to wash your hands close to the latrine so that you remain somewhat sanitary.

In the same area as the latrine you should also make a cat-hole to dispose of other waste products that could not be incinerated or packed out. This is where you will clean your mess kits and other cooking gear. you don't want to dispose of grease or other food remnants that can't be burned to close to the shelters since animals and insects will be curious and build up near this area. Dig a hole approximately 2 feet around and deep. As you rinse out your mess kits and other gear, do it over this hole so that you can cover up remnants and don't spread around anything unnecessarily. Left over food particles also attract bacteria that can cause sickness, so clean your things thoroughly, and make sure that everyone disposes of it in the same manner so that your exposure to it is minimized. Also, make sure that you rinse all of the soap at of the pans. Soap mixed with your food can also make you feel ill, and we obviously want to avoid that.

Campfire placement: Make campfires, if one is needed or allowed, about 200 feet downwind of the water source and about 100 feet away from your shelters. You don't want your fire too close to the shelters because the smoke can be very irritating and could be an extreme hazard if burning embers were to be blown into your tent. Fire is very dangerous, and teams should be very careful when and where it is used. If you don't need a fire, don't make one. Also, don't forget to make sure that the fire is out before you leave. If you must dump several gallons of water on the fire prior to burying the embers, then do so. You may want to use this site again, so don't risk burning it to the ground after you depart.

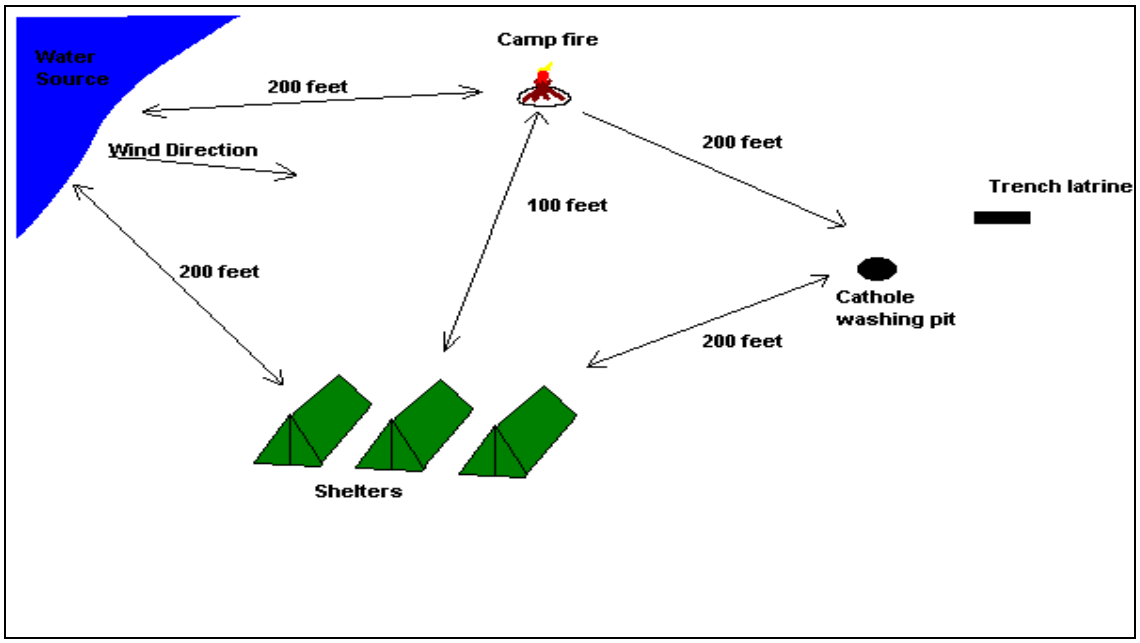


Figure 17: Recommended Campsite Layout

Chapter review questions:

1. What kind of insect is a known carrier of Lyme Disease?
    a. Deer Tick
    b. Mosquitoes
    c. Spiders
    d. None of the above.

2. True or False: The brown recluse is a non-poisonous ground dwelling spider. It is furry and brown, with a dark fiddle-shape mark on it's back right between the eyes
    a. True
    b. False

3. What is the minimum recommended distance the cathole and straddle trench latrine should be from the shelters and sleeping area?
    a. 100 Feet
    b. 200 feet
    c. None of the above.

4. True or False: Always apply anti-histamine lotions or sprays when exposed to poison ivy because it will sooth any rashes developing.
    a. True
    b. False

Supporting Tasks

Basic: O-0101, O-0102, O-0103, and O-0104.
Advanced: P-0202, P-0203, and P-0204.

CHAPTER 5
LAND NAVIGATION

Chapter objectives
1. Explain and demonstrate how to properly use the compass owned by the member in situations given.
2. Demonstrate the ability to orient the map
3. Demonstrate an understanding of how to determine your own pace count

The main focus of this chapter is to give the student the background knowledge to competently use a compass in the field as a team member after completing practical skills exercises.

Parts of the compass
There are several different types of compasses used in search and rescue. There are two types that typically used though, a military lensatic compass and a sportsman's orienteering type compass.

The military lensatic compass has several parts though it is not very complex. A diagram of the military lensatic compass is provided in figure 1, show the parts of the lensatic compass.

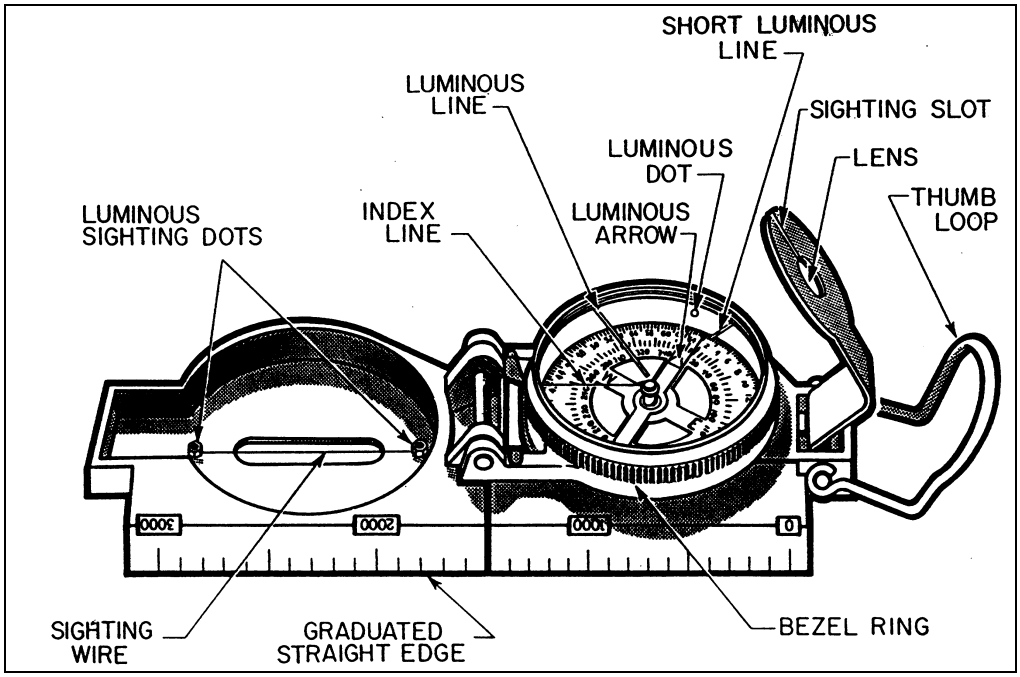


Figure 1: Parts of a lensatic compass

The modern orienteering compass also has several parts, and tends to be much simpler than the military lensatic compass. A diagram of the modern orienteering compass is provided in figure 2, showing the parts.

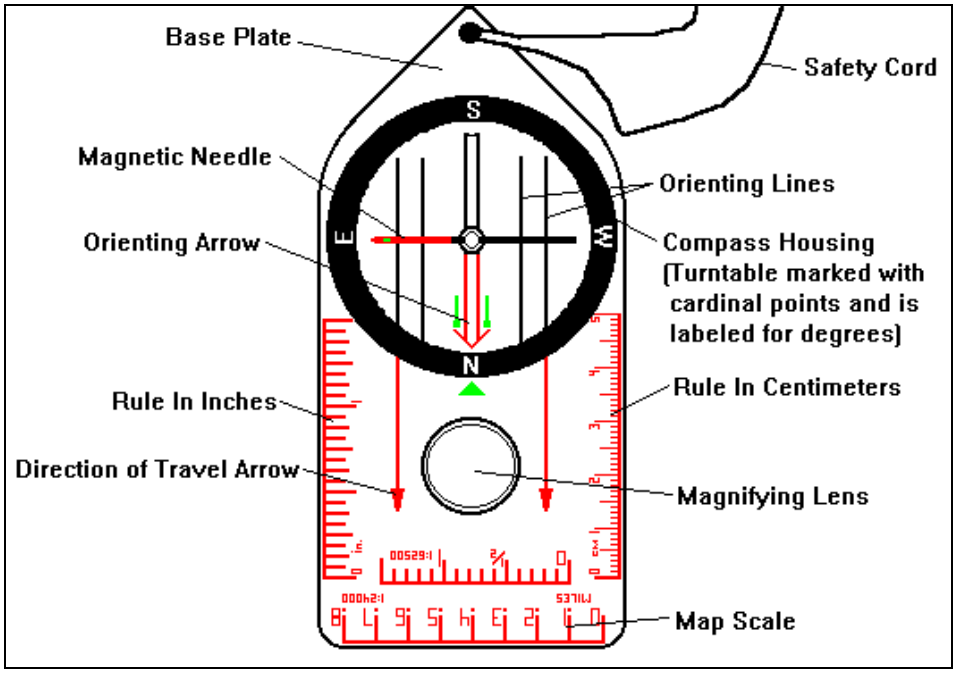


Figure 2: Parts of a modern orienteering compass

The instructors in your class will show you how to use your compass. Though there are standard part, there have been many changes or additional aids put on modern compasses that they will not be explained here. A compass is not a very complex piece of equipment, but pay attention so that you do not make mistakes. In general, all a compass does is point north; from there the additional gadgets assist you in doing more.

<u>Map legends and parts</u>
Maps are also relatively simple tools. There are several different types of maps, but the ones that we are concerned with are topographic maps.

<u>Color References:</u> Topographic maps use colors and symbols to depict the surroundings. These maps use four main colors to denote features.

1. Black - Man made or cultural features and baseline text markings
2. Blue - Water or hydrographic features
3. Green - Vegetation features
4. Brown - Elevation features, or hypsographic features

Additionally, a fifth color, red, can be utilized on maps to denote highways or other man-made changes made recently.

<u>Map symbols:</u> In the bottom left of the map you will find the symbol chart. This is a listing of the symbols utilized on the topographic map that you are reading. Thus, you don't have to memorize the several different symbols used, but it is a good idea to be familiar with them. Occasionally you will find a map that does not have all of the symbols utilized listed, and that is to be expected since the map you are reading is just a small part of the whole earth. A listing of the symbols used on maps will be provided to assist you in understanding the many symbols out there.

Map Scale: At the bottom center of the map you will find the scale of the map. This way you can measure and judge distance on the map. If you were not told, it would be very tough to tell if you had to walk a mile or ten or one hundred. A scale tells you how far. A sample scale is provided in figure 3. Note that this scale shows measurements in miles and meters. Make sure that you know which scale you are using and be consistent. We recommend using a metric scale since it is simple division by ten for most conversions, but it is your choice. Either way, make sure all teams are using the same conversion if you are trying to note distances via communications relay for example. A table of conversion factors is provided as part of figure 4.

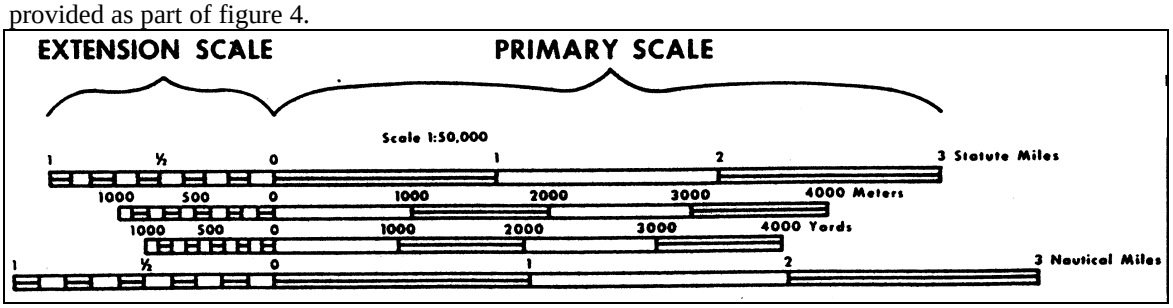


Figure 3: Sample graphic bar scale

One	*Inches*	*Feet*	*Yards*	*Statute miles*	*Nautical miles*	*Millimeters*
Inch	1	0.0833	0.0277	----------	----------	25.40
Foot	12	1	0.333	----------	----------	304.8
Yard	36	3	1	0.00056	----------	914.4
Statute Mile	63,360	5,280	1,760	1	0.8684	----------
Nautical Mile	72,963	6,080	2,026	1.1516	1	----------
Millimeter	0.0394	0.0033	0.0011	----------	----------	1
Centimeter	0.3937	0.0328	0.0109	----------	----------	10
Decimeter	3.937	0.328	0.1093	----------	----------	100
Meter	39.37	3.2808	1.0936	0.0006	0.0005	1,000
Decameter	393.7	32.81	10.94	0.0062	0.0054	10,000
Hectometer	3,937	328.1	109.4	0.0621	0.0539	100,000
Kilometer	39,370	3,281	1,094	0.6214	0.5396	1,000,000
Myriameter	393,700	32,808	10,936	6.2137	5.3959	10,000,000

One	*cm*	*dm*	*m*	*dkm*	*hm*	*km*	*mym*
Inch	2.540	0.2540	0.0254	0.0025	0.0003	----------	----------
Foot	30.48	3.048	0.3048	0.0305	0.0030	0.0003	----------
Yard	91.44	9.144	0.9144	0.0914	0.0091	0.0009	----------
Statute Mile	160,930	16,093	1,609	160.9	16.09	1.6093	0.1609
Nautical Mile	185,325	18,532	1,853	185.3	18.53	1.8532	0.1853
Millimeter	0.1	0.01	0.001	0.0001	----------	----------	----------
Centimeter	1	0.1	0.01	0.001	0.0001	----------	----------
Decimeter	10	1	0.1	0.01	0.001	0.0001	----------
Meter	100	10	1	0.1	0.01	0.001	0.0001
Decameter	1,000	100	10	1	0.1	0.01	0.001
Hectometer	10,000	1,000	100	10	1	0.1	0.01
Kilometer	100,000	10,000	1,000	100	10	1	0.1
Myriameter	1,000,000	100,000	10,000	1,000	100	10	1

Example I

Problem: Reduce 76 centimeters to (?) inches

76 cm × 0.3937 = 29 inches.

Answer: There are 29 inches in 76 centimeters.

Example II

Problem: How many feet are there in 2.74 meters?

$\frac{2.74}{.3048} = 9$ feet

Answer: There are approximately 9 feet in 2.74 meters.

Figure 4: Conversion factors

Background information and declination: At the bottom right of the map is the background information about this map. A diagram showing the declination is provided as part of this information. Declination is the difference in degrees between true north and magnetic north. True north is the north that is the map direction toward the North Pole. Magnetic north is the compass direction towards the Magnetic North Pole. Why is this important? It is important because if you follow a bearing using a compass from a true north heading for any great distance without looking at a map, you will end up in the wrong place. This declination is different wherever you are, and you need to account for it. Figure 5 shows sample declination diagrams and how to correct for it.

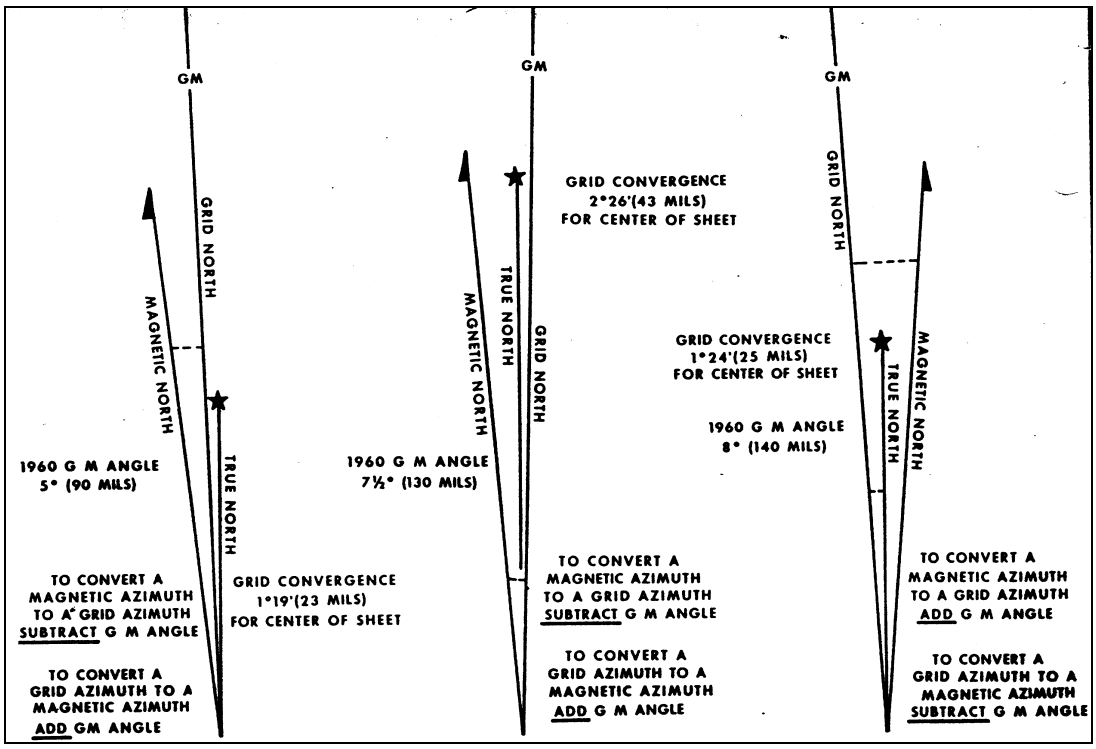


Figure 5: Declination diagrams

Figure 6 shows the lines of magnetic variation.

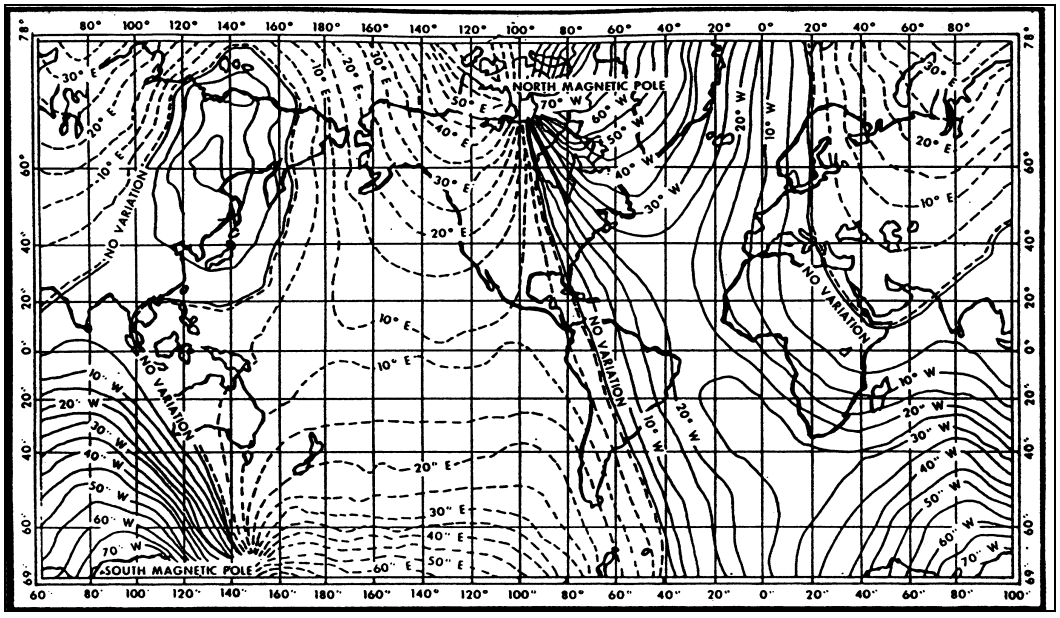


Figure 6: Lines of magnetic variation

Additionally, the bottom right of the map shows information about when the map was produced, when the land was last surveyed, and the name of the map you are using.

Map edge markings: At the edges of the actual map box you will find the latitude and longitude in degree, minutes, and seconds (latitude is listed along the sides and longitude along the bottom and top), or grid

numbers. Lines of meridian indicating longitude run from pole to pole while parallels of latitude run around the globe. This is shown in figures 7 and 8.

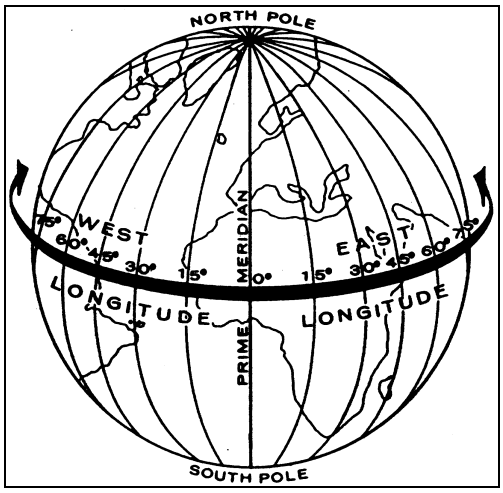


Figure 7: Meridian of longitude

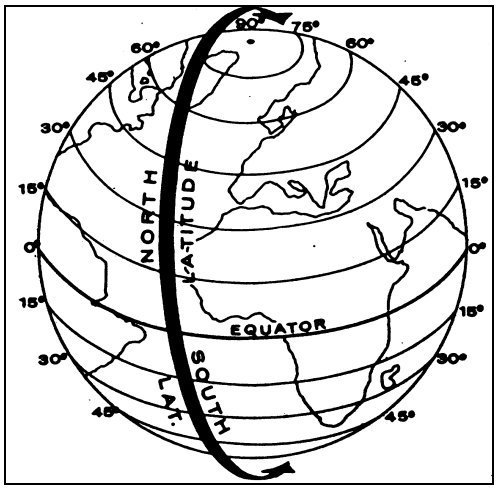


Figure 8: Parallels of latitude

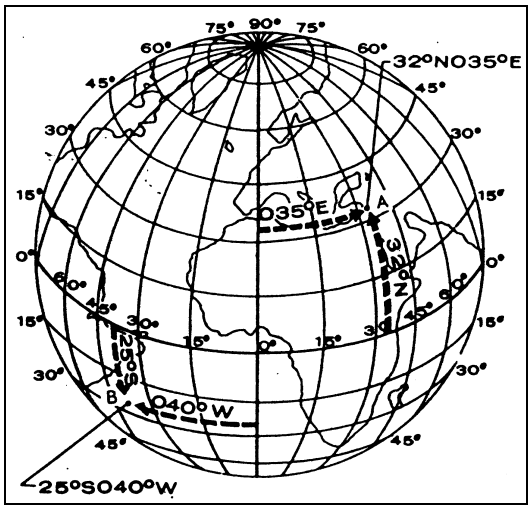


Figure 9: Latitude and longitude example

To note a location on map give the latitude and then the longitude to the accuracy desired. If you are dealing with operations bordering on the equator or the prime meridian, please be sure to note the direction if using a map noted in latitude and longitude. This will avoid confusion. Figure 9 shows how points in latitude and longitude are written off of a map to degree accuracy. If you wanted to gain more accuracy, which is definitely necessary for our work, then you would also not the minutes denoted by a ‘ and seconds denoted by a “.

Grid maps are slightly different in that you may not have the latitude and longitude given to you, but a number denoting locations is given instead, across and up the map. The Air Force and CAP have gridded the world on large aeronautical charts, but those are gridded in a different format than smaller topographical maps. Attachment D is how the United States is gridded for aeronautical charts. Topographical maps are gridded for a local area. Put simply, you read right then up giving the accuracy needed. A sample grid is provided in figure 10. Note that grid maps do not all start at 1 on either axis. There is a 1 on a map somewhere along that grid line, but it could be several maps away. If you wanted to just tell someone what grid square you are in you would just read across to determine the number of the grid on the longitude line, and then read up to determine the number of the grid on the latitude line. On most military maps that would give you 1,000 meter accuracy. An example of selecting a grid is provided in figure 11. To locate the point to the

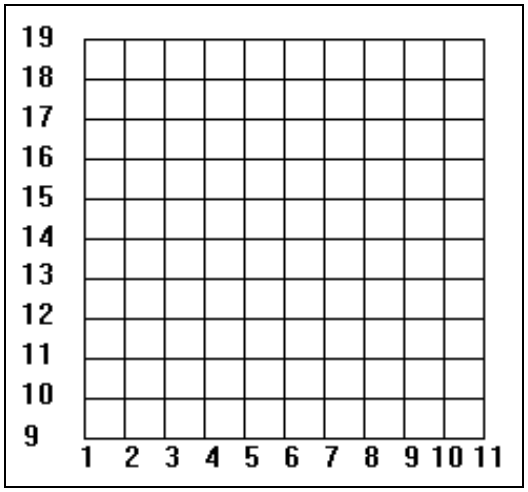


Figure 10: Sample map grid

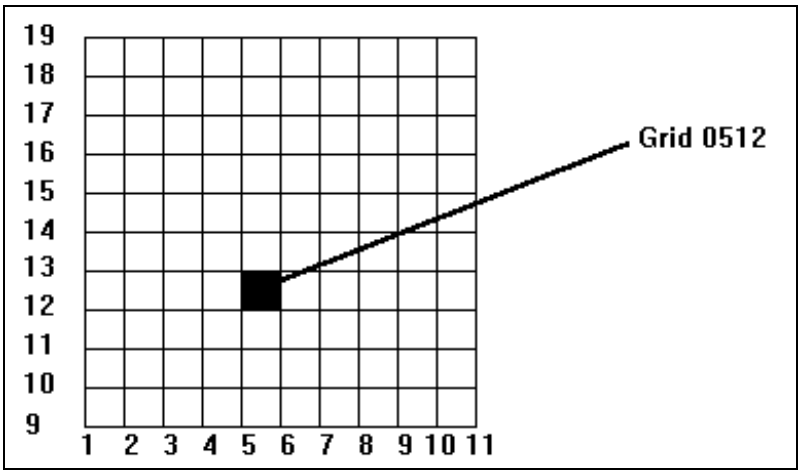


Figure 11: 1,000 meter grid coordinate example

nearest 100 meters, use estimation. By mentally dividing the grid square in tenths, estimate the distance from the grid line to the point in the same order (right and up). Give the complete coordinate right, then the complete coordinate up. This will give you a six digit coordinate. It will also give you 100 meter accuracy on a military grid square map. See figure 12 for an example. If you want to get to 10 meter accuracy, you would divide the grid box into 100 equal sections, and that gives you an 8 digit coordinate. You would normally use a grid coordinate scale (a clear plastic overlay tool) to get that accurate, since estimation at that small of a grid is very difficult. A sample grid overlay, coordinate scales, map rulers, and a compass rose that can be copied onto overhead sheets for use on maps is provided in attachment C. Many times you will be given maps that are actually photocopies with a special grid system put over the map. This is often used when you have a highly publicized search being run to minimize the interference from the media or volunteers that just jump in without talking to mission planning staff at all. This could obviously cause many problems, and this is a simple avoidance technique used to keep the mission going and reduce problems.

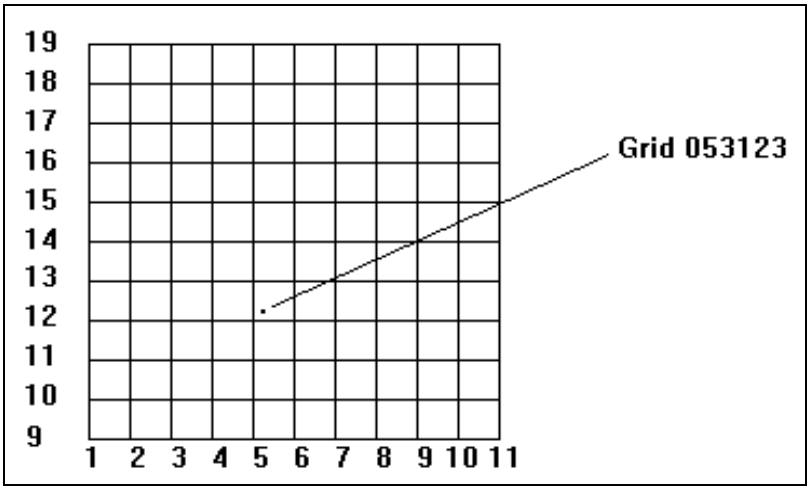


Figure 12: 100 meter grid coordinate example

The names of the maps bordering on the current map are also listed along the sides of the map. The names of these maps are based on prominent features on the map such as a city or lake. If you are lucky you will only have to use one map. Most of the time though, you are going to end up using several topographic maps. Take your time when changing from one map to another. Make sure that you are using the same grid system and scale. All it takes is a slight change, and you could be hours away from where you want to be.

<u>The map itself:</u> As we have already discussed, maps use colors and symbols to draw a two-dimensional picture of an area from the overhead view. From this view, certain features would not be recognizable if the map maker did not use certain references to show slopes, cliffs, hills or ditches. The following pages are diagrams with sample map areas to give you a visual representation of what you are truly looking at on a map. Try to be able to recognize them at a glance. It can save you a lot of time.

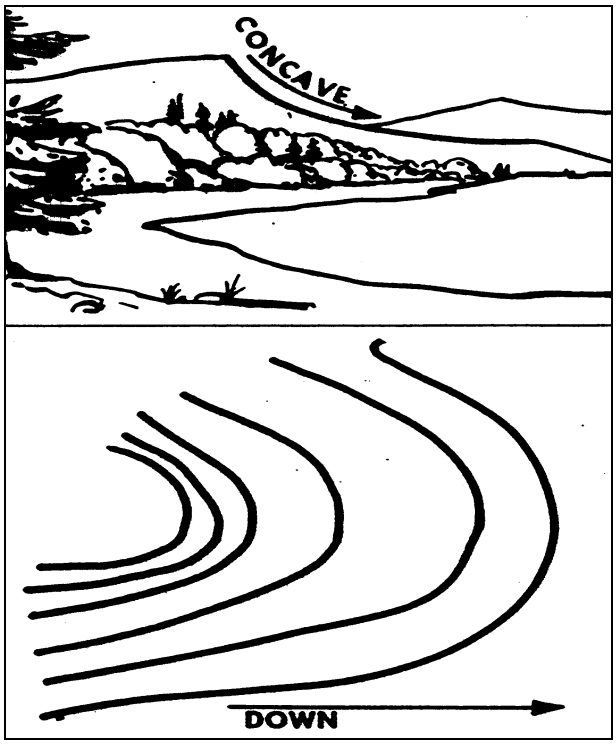


Figure 13: Concave Slope

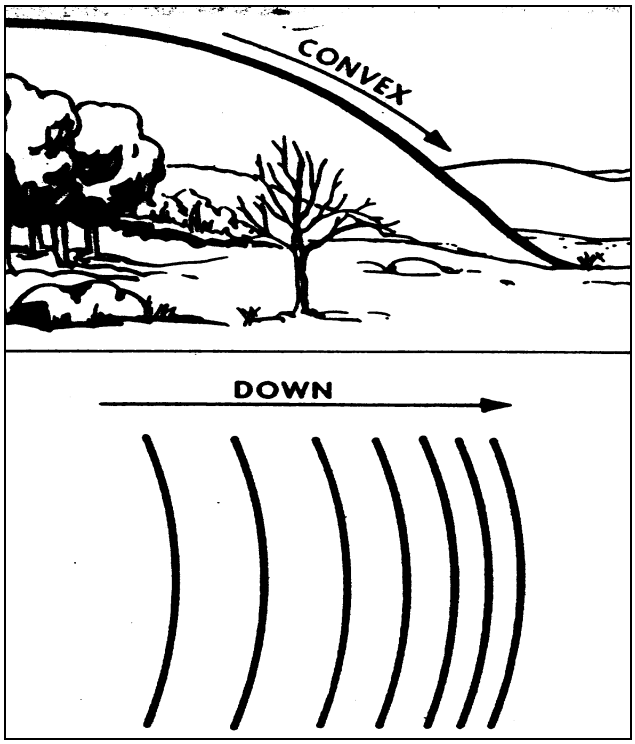


Figure 14: Convex slope

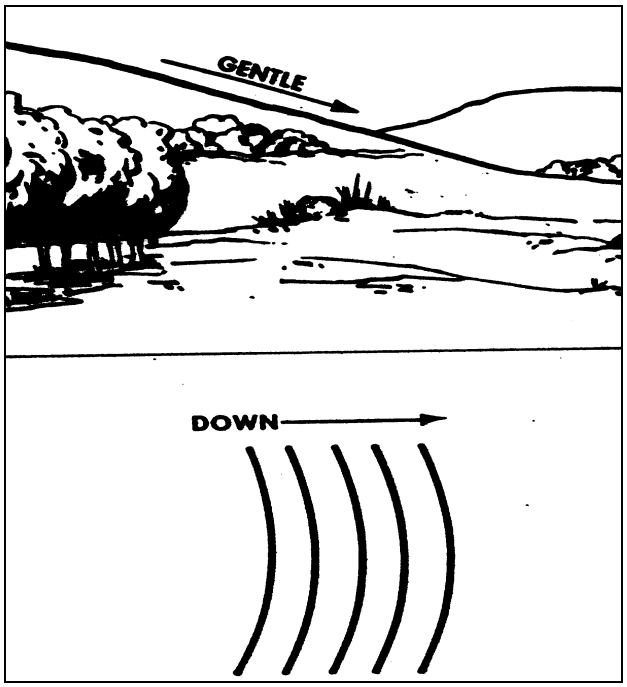


Figure 15: Uniform gentle slope

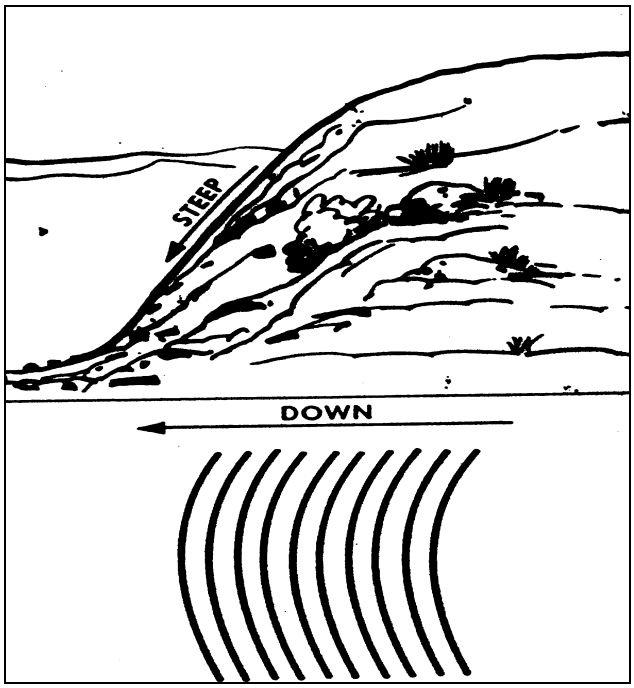


Figure 16: Uniform steep slope

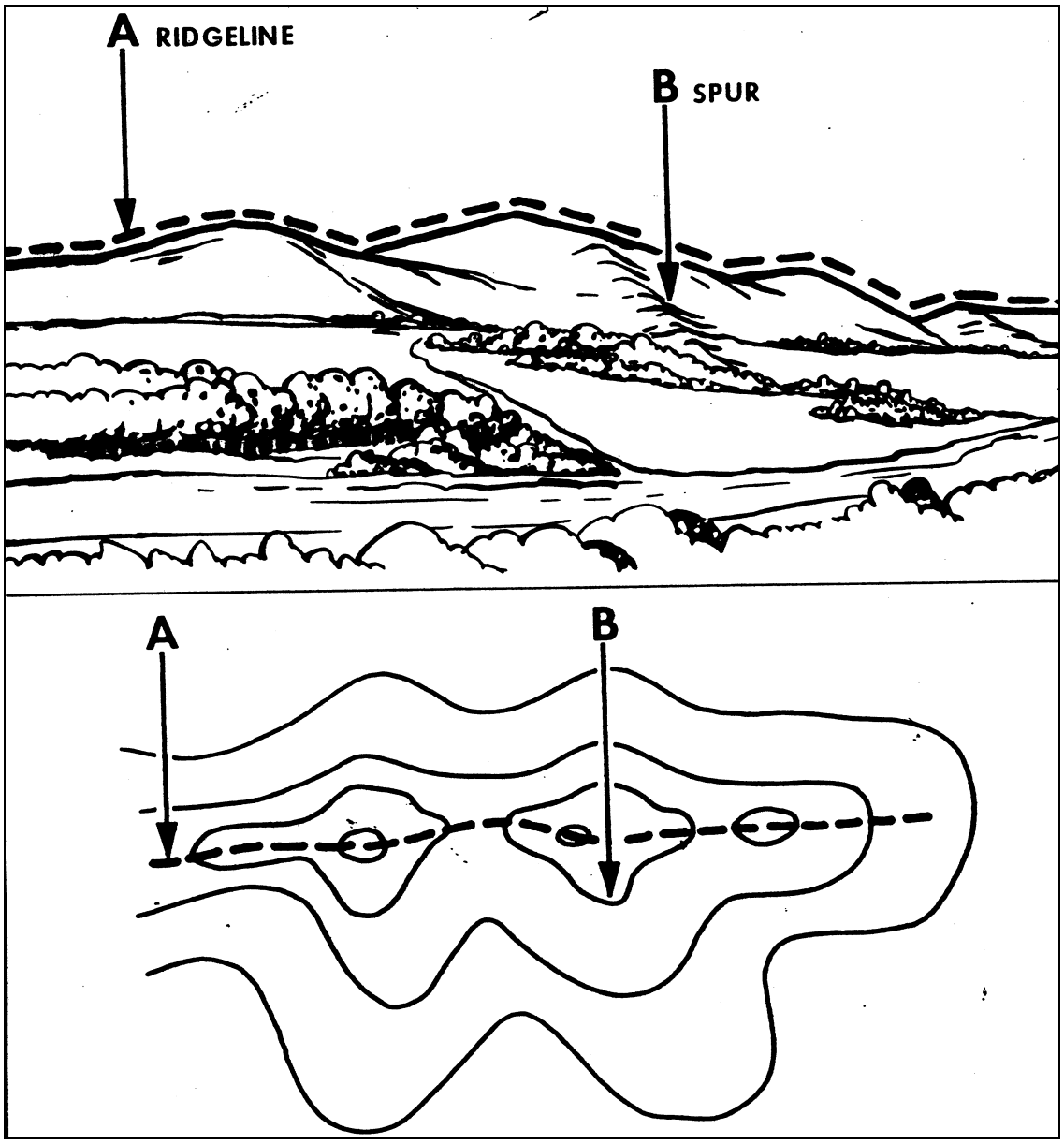


Figure 17: Ridge line (a) and finger ridge (b)

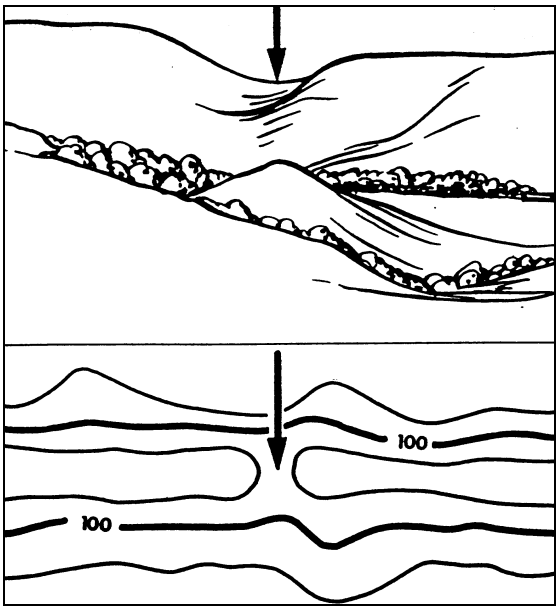


Figure 18: Saddle

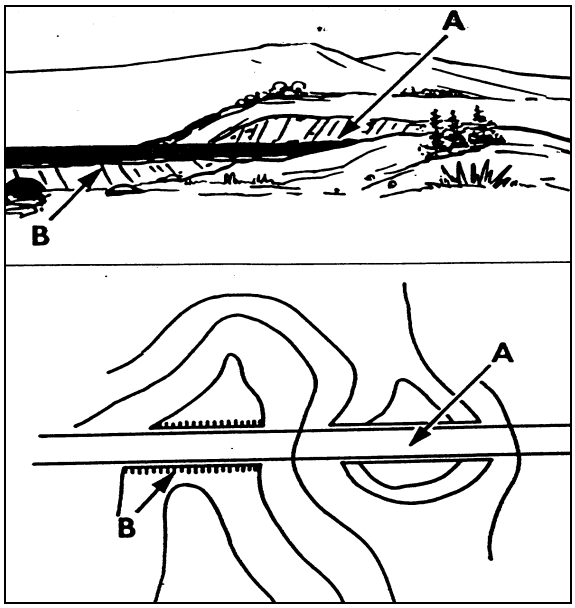


Figure 19: Cut (a) and fill (b)

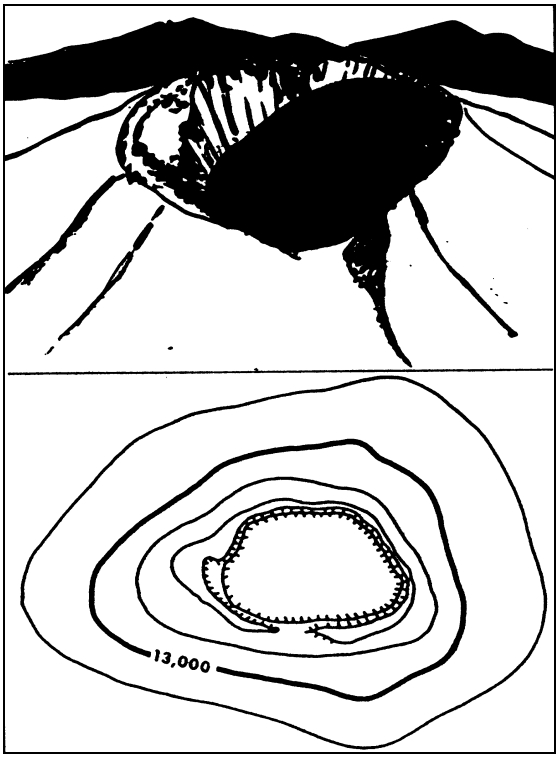


Figure 20: Depression

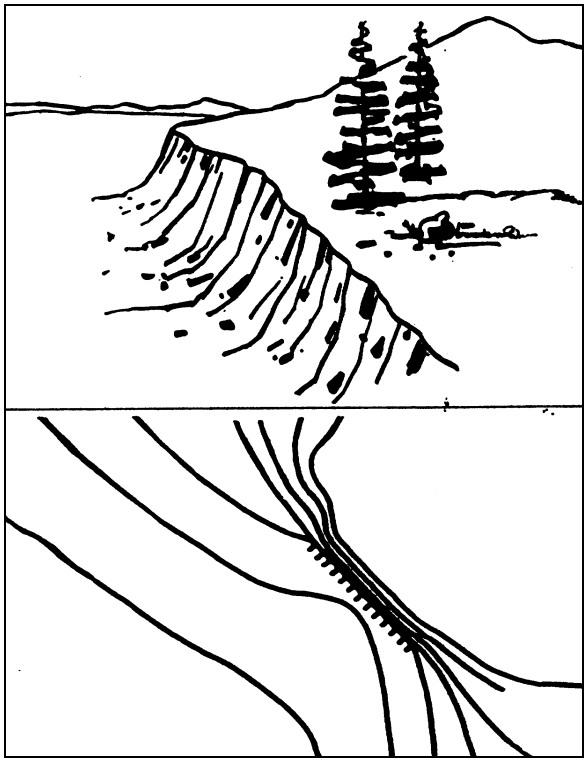


Figure 21: Cliff

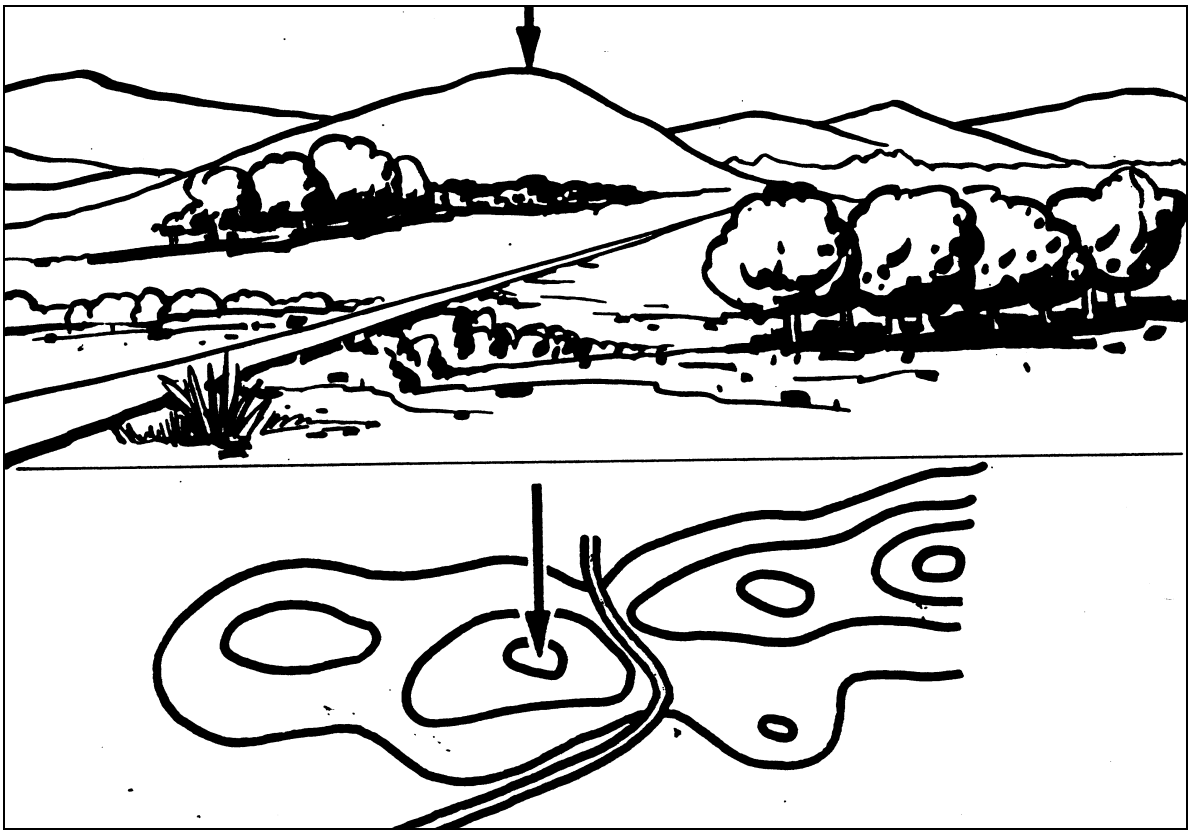


Figure 22: Hill

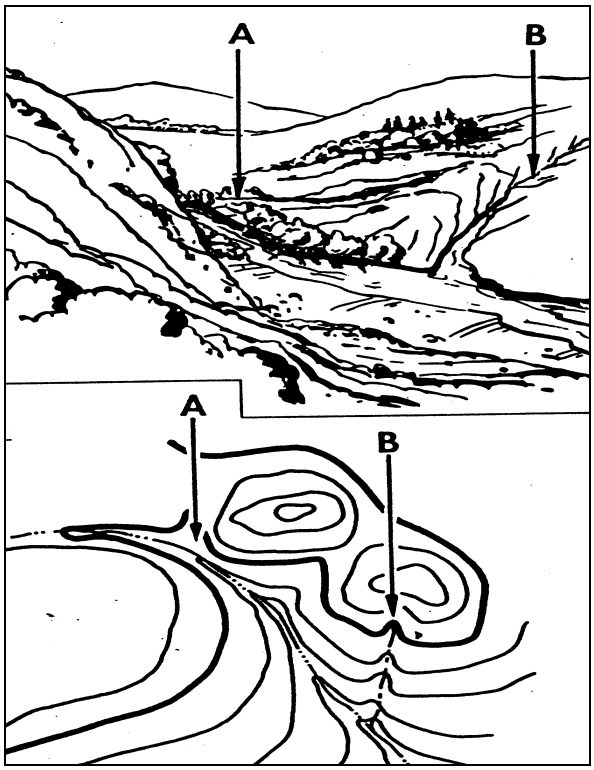


Figure 23: Valley (a) and drainage (b)

Using the map and compass together

Now that you know the basic parts of a compass and the basic parts of a map, lets put them together. The first thing that you will need to do is to properly orient the map. There are a few ways to do this. The easiest is to orient the map by visual inspection. When you can survey the area as demonstrated in figure 24, you can quickly be on your way, but you really are not using your compass or guidance techniques to their fullest. You will do exercises using this technique to become familiar with terrain association, but we will assume for future exercises that you will use a compass.

Figure 24: Map orientation by inspection

Before we discuss the technique for orienting a map with a compass, here is a subtle reminder. When orienting a map with a compass, remember that the compass measures magnetic azimuths or direction. Since the magnetic arrow points north, pay special attention to the declination diagram. If you are planning on traveling for any serious distance you will need to take into account declination.

Map orientation technique: First, you will need to determine the direction of the declination and its value from the declination diagram. Make sure that you note whether it is easterly or westerly variation so that you know whether to add or subtract the degree variation.

Next, with the map in a horizontal position, align the compass straight edge along the north-south grid line or true north line on the map. If you are using a non-gridded map you may want to actually draw a line in pencil along the true north line onto the map. This way you can see the actual placement on the map, and you can actually mark parallel lines to this to assist you. Be sure that you have your compass so that north is pointing north on the map. You may need to turn around so that you are facing in the right direction. What is often done for orienteering courses is to actually grid the map in squares along the declination line. This way the map has grids on it with declination already marked and readily available across the map.

Keeping the compass aligned as directed above, rotate the map and compass together until the magnetic arrow is below the fixed black index line, or direction of travel line. The map is now close to being oriented. Now if you had your map gridded to the declination already, you would be able to skip right to the next step. This often is not feasible though because the map has an established grid already.

Now rotate the map and compass in the direction of the declination diagram. Your map is now properly oriented. A simple diagram of how to align your map is provided in figure 25.

If you are using a military gridded map you can now check yourself. If the magnetic north arrow is to the left of the grid north, the compass reading should equal the G-M angle given at the base of the map. If the magnetic north arrow is to the right of the grid north then the compass reading will equal 360 degrees minus the G-M angle.

Once the map is oriented, which it now should be, magnetic azimuths can be determined with the compass. But the map should not be moved from its oriented position; any change in its position will move it out of line with magnetic north.

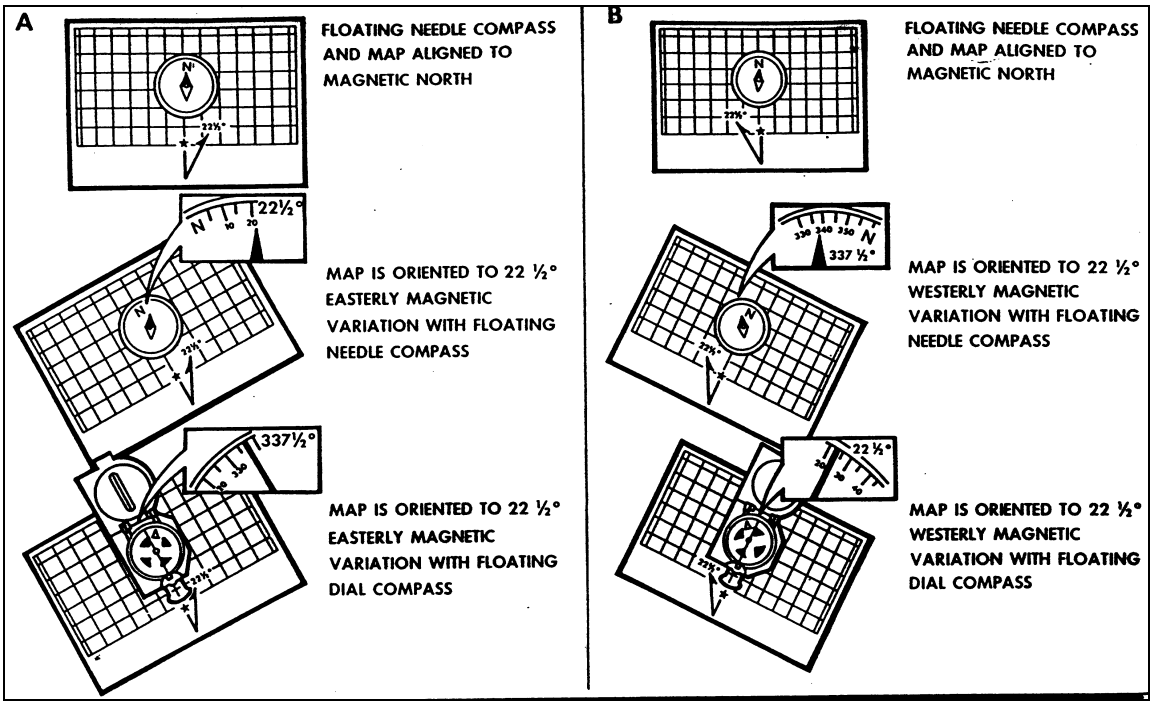


Figure 25: Map orientation

Angulation, biangulation, triangulation theory: The above methods can be utilized when you know where you are, but what if you don't. If you are lost, stop and figure out where you are. How do you do this? By terrain association and angulation theory. If you can find what you are looking at on the map, and shoot an azimuth or direction to it, then you can correct for declination and find out where you are on the map. This can be done by only recognizing one point, but it is preferable to have more than one to cross check and be sure. Essentially all that you are doing to determine you location is shooting an azimuth to a target that you are not going to. Figure 26 is a diagram of simple angulation, biangulation, and triangulation.

Determining your route: Once you know where you are, you can determine where you want to go. In establishing your route all you use is simple geometry. You establish a heading corrected for declination to the first point you want to reach. From there, you plot another heading or azimuth to your next point, and so on. You can plot out your entire route once your map is properly oriented.

Remember that the direct route is not always the best. It may be great for pilots, but strolling off of a cliff that you didn't recognize is not anyone's idea of fun. Establish your route so that it not only gets you there quickly, but also safely. Look for recognizable terrain

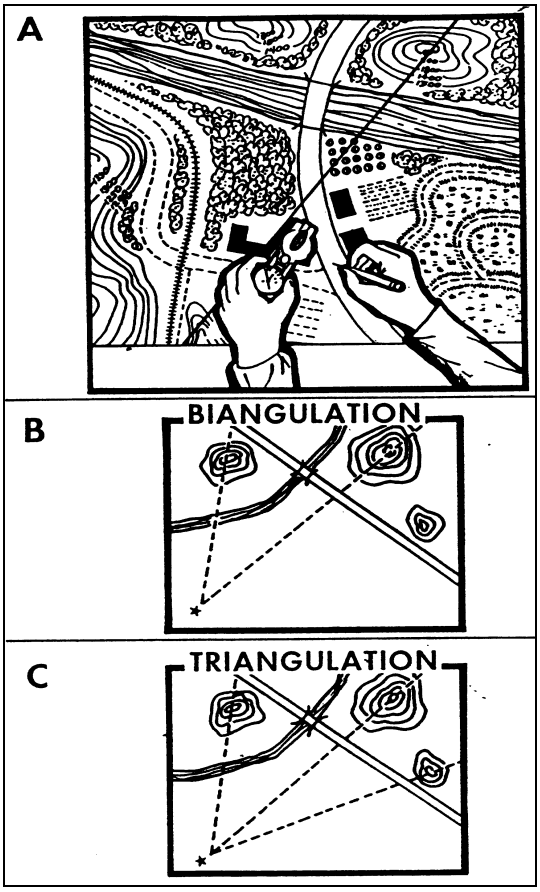


Figure 26: Angulation, Biangulation and Triangulation

features that you can easily find along the route. You may not be able to see your target.

Pace count: Now that you have established where you want to go, or someone has done that for you, you will need to be able to hit the wilderness. To do that you need to know how far you walk in your step or pace. Taking paces rather than determining actual line distance that everyone knows like meters is idiotic. 120 paces could be 100 meters of 75 meters depending upon the person. Know how to properly convert your pace count into true distances. This is easily accomplished. All you must do is walk a set distance in different terrain types a few different times, and determine what you average pace is. 100 meters is normally the established distance. Now you will need to walk with your equipment in the four common terrain: highway, open fields, clear or open woods, and dense woods or mountainous terrain. You will need to walk 100 meters in each and then walk back along the same route. You then take the average over each type. This will tell you how far it takes. You may also want to do this wearing your search load, and then adding your existence load. Your pace count will probably be different for each. The following chart should help you determine your pace count for each type of terrain.

24 Hour Pack

	Highway	Open Fields	Open Woods	Dense Woods
Trial 1	_____	_____	_____	_____
Trial 2	_____	_____	_____	_____
Sum	_____	_____	_____	_____
Average	_____	_____	_____	_____

72 Hour Pack

	Highway	Open Fields	Open Woods	Dense Woods
Trial 1	_____	_____	_____	_____
Trial 2	_____	_____	_____	_____
Sum	_____	_____	_____	_____
Average	_____	_____	_____	_____

Now that you know how many paces it takes to walk a set distance, you can convert that pace count into any distance that you are walking. This is relatively simple to do. All that is done is simple cross multiplication and division. For example, if it takes me 58 paces to walk 100 meters then how many paces would it take me to walk 150 meters.

$$\frac{58}{100} = \frac{x}{150}$$

Solve for x. Multiple 150 times 58. That gives you 8700. Divide 8700 by 100. That gives you 87, and the number of paces it will take me to walk 150 meters.

If you are unsure, then ask an instructor for help. This is not too tough, but it is better to be safe than to press on thinking that you have it, and you don't.

Three man theory:
Now you are ready to actually hit the trail. You will do this in teams of three made up of a point person, pace counter, and navigator.

The navigator decides on the direction of travel for the point to walk. The point walks in that direction until the navigator, still standing at the starting point, tells the point to stop. Obviously everyone needs to know the course since if the leg is only 100 meters, you don't want the point person to walk 200. Everyone needs to be aware so that nobody gets lost. The navigator should tell the person to stop based on the distance needed to travel and if the navigator can see the point person. The point person should also keep track of their own pace count so that he or she can let the navigator know if they think they have gone far enough.

Once the point person is told to stop, the navigator adjusts the point left or right by voice, hand or whistle signals previously determined. Remember that if you are doing this in conjunction with a search, you will need to be very clear. You don't want to confuse your team or anyone else's unnecessarily.

Once the navigator is satisfied that the point person is in the right place, the pace counter walks a relatively straight line to the point person. Obviously the pace counter will need to go around objects on the path, but the pace counter will need to mentally correct for these objects. When you are trying to establish distance it is a wise idea not to always walk around objects in the same direction. If you go around one tree to the left, go around the next to the right. This will help counter for any favoring you might have to one leg or the other. Since the pace counter knows the distance to be walked and knows the proper conversion to distance for where he or she is going, then the pace counter may stop prior to reaching the point person if the leg distance is already covered. The point will often have to go farther or higher up a hill so that the navigator and pace counter can see the point and walk towards the point person. The point may do some extra walking, but that is better than going the wrong distance.

Now that the pace counter has reached the stopping point, the navigator should follow along the same path, keeping track of his or her own pace count. Cross checking the distance covered with the pace counter is always a wise idea.

This method can also be modified for night use by the team. Each member should be wearing a reflective vest. If each of the team members uses their flashlight as a pointer, then teams can stay on line by simply lining up on the reflective surface or flashlight of the point person. Having team members wear glow-sticks during these operations is also a good idea. This way you can always see the person walking, and batteries are not wasted on standing around waiting for a person to reach the point person.

Closing
You should now know enough theory to be ready to hit the trails as a team member. Be confident and trust your equipment. Staff members will assist you as necessary.

Chapter review questions
1. What color depicts man made or cultural features on a topographic map?
    a. blue
    b. black
    c. green
    d. none of the above

2. What color depicts vegetation features on a topographic map?
    a. blue
    b. black
    c. red
    d. none of the above

3. True of False: All grid coordinate maps start with 1 as the first number on the latitude and longitude axis.

a. True
b. False

4. True or False: Every member of the team must have the same pace count. Otherwise you would never know how far you went on an orienteering course.

a. True
b. False

Supporting Tasks

Basic: O-0201, O-0202, and O-0203.

Advanced: O-0204, O-0205, O-0206, O-0207, O-0208, O-0209, O-0210, O-0211, O-0212, O-0213, O-0214, O-0215, O-0216, O-0217, O-0218, O-0219, O-0304, P-0202, P-0203, and P-0204.

CHAPTER 6
ELECTRONIC DIRECTION FINDING

Chapter objectives
1. List the primary and training frequencies used for distress beacons, as well as who uses it.
2. List the information that needs to be recorded off of distress beacons for the Mission Coordinator.

The main point of this chapter is to provide the background information that is not normally provided as part of training texts on electronic direction finding, and not to explain all of the theories of the same. There are already several established training documents that do this like the L-Tronics DF Course.

How the mission starts
Before searchers are actually called out many things happen, the ELT, set off by a plane crashing or accidentally being set off, or EPIRB that goes off when a ship sinks or, again, when it is accidentally set off begins a long chain of events. Keep in mind that 97 to 99 percent of all ELT/EPIRB missions are false alarms, though people are allowed and encouraged to test their transmitters to make sure that they are working properly. A satellite several miles above the transmitter receives the signal. Those satellites, SARSAT (Search And Rescue Satellite Aided Tracking) or COSPAS (the Russian version of SARSAT) transmit the mirror locations of the target to a Local User Terminal (LUT). The LUT forwards the information to the Mission Control Center so that the appropriate Rescue Coordination Center can be notified. In our case, the Air Force Rescue Coordination Center (AFRCC) at Langley AFB calls the mission coordinator or state designee who proceeds with the callout of trained personnel and resources. From there, we go out and find the transmitter and close the mission. This chain of events is depicted in figure 1.

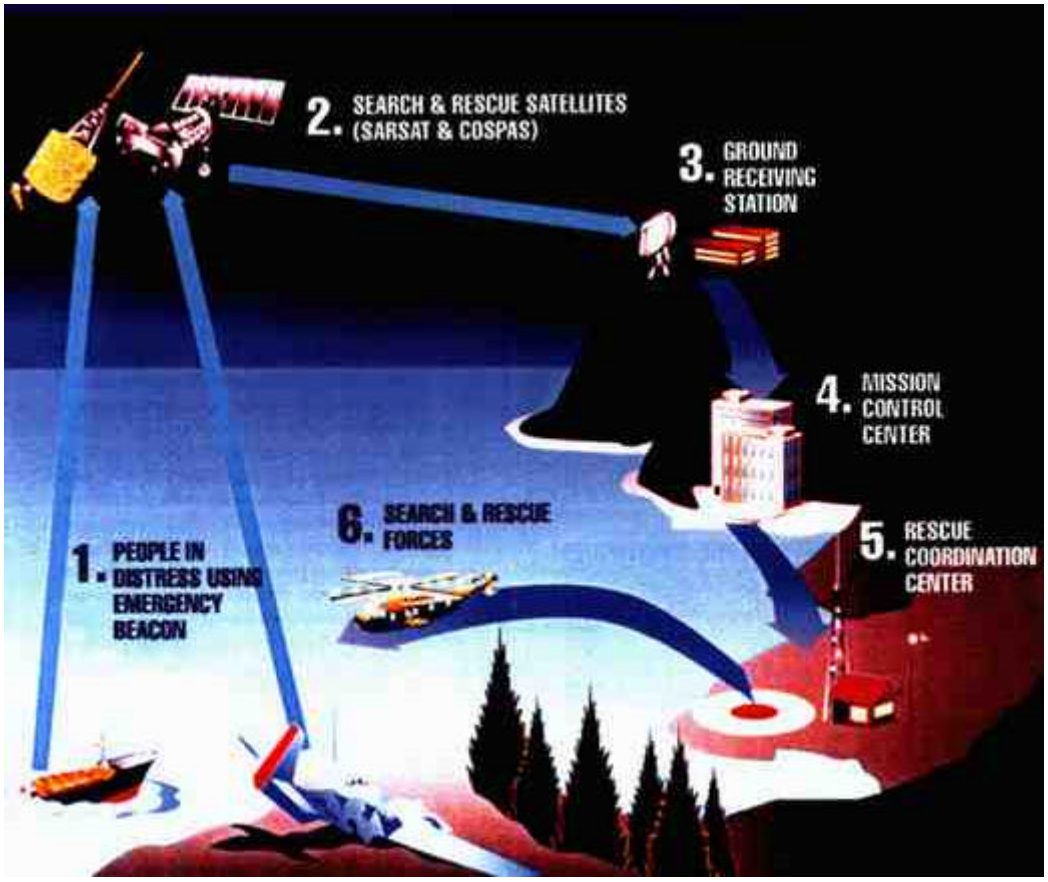


Figure 1: Distress beacon chain of events

Transmitter frequencies

ELTs and EPIRBs have dedicated frequencies for emergencies. 121.5 MHz, and its harmonics (243 Mhz) are the primary frequencies for these transmitters. 243 MHz is typically used by the military, but civilian transmitters can be heard on this frequency because of the law of harmonics and radio waves. A radio transmitting at a set frequency can also be heard on the higher harmonics or doublings of this frequency. This does not work in reverse, though there may be some bleed over when the receiver is close to the transmitter. Additionally, 406 Mhz transmitters are now becoming available. 406 transmitters are considered to be the next generation ELT, transmitting location, tail number, and other basic information about the aircraft.

The dedicated frequency for practice beacons with the United States is 121.775 MHz. As of January 31st, 1998, the frequency utilized previously, 121.6 MHz is no longer authorized for training.

What has to be copied off of an ELT or EPIRB for the Mission Coordinator

The MC is expected to forward as much of the following information to the AFRCC prior to closing the mission successfully as possible. This allows the AFRCC personnel to track missions and look for commonality to possibly minimize these missions in the future. If for some reason you are not able to get certain information, don't worry. The AFRCC staff understands that we will not break any laws to get information off of a distress beacon on a search, and that sometimes certain information is unavailable. Just do your best.

1. Make
2. Model and Serial #
3. Manufacturer
4. Location Description
5. Approximate location in Latitude and Longitude
6. Owner
7. Tail Number or Boat Name and Number
8. Time Found and Time Shut-off
9. Switch Position on ELT or EPIRB: ON, OFF, or ARM
10. Manufacture Date
11. Battery Expiration Date
12. Information which could indicate reason for accidental or justified activation of ELT or EPIRB

Helpful Hints

Remember that every mission is different: You may go to the same marina or airport several times, but very rarely will you shut off an EPIRB or ELT in the same vehicle, location or position. The transmitter may also be located in a very peculiar or tough to locate position. There are many stories of transmitters found in garbage dumpsters, in closets or garages of people knowing nothing about them, and even being turned on purposefully. Don't assume anything is always true. Trust your equipment and treat it well; it can save you a lot of time.

Know what you are looking for: Stay abreast of the common equipment in use in your area, as well as suppliers or dealers of this equipment. There are many different types of ELTs and EPRIBs, as depicted in figure 2, and by knowing how each works, you can often make finding distress beacons simpler.

Figure 2: Common ELTs and EPIRBs

Keep the local law enforcement aware of your presence: A county sheriff knocking on doors at three o'clock in the morning makes a better impression than you in your BDUs, and avoids any unnecessary nasty confrontations with the same officers. Additionally, police officers tend to know the area, and can often provide background information not readily apparent to a ground team foreign to the area being searched. For example, many people have small airstrips on their property that may not be on any map, but the community knows about it because the land

owners may have “grand-fathered” rights to fly off of their property. Little tid-bits like that can save you from tromping through the woods for no reason.

Keep track of where you are: The most dangerous thing that you can do is to walk into a hazardous area with your head down. Being situationally aware keeps everyone happy, healthy, and out of trouble. Also, communicate your location and findings to the mission base and other teams often. It helps all involved to plan and locate the target faster. Friendly competition is great, but there is no place for a totally individualistic attitude on a search. Survivors don’t appreciate being left in the woods longer than is absolutely necessary, and neither do their lawyers.

Don’t assume that this is just another false alarm or the only alarm: Take your equipment with you and follow the rules of the game. Check to make sure that there are no other transmitter going off before completely closing up shop. Additionally, don’t just leave once the first transmitter is shut off. The MC might have further instructions for you. The AFRCC often calls in teams already in motion to work other missions even in neighboring states because the response time is quicker and the resources are readily available.

Chapter review questions

1. Approximately what percentage of ELT/EPIRB missions are false alarms?
    a. 25-30 percent
    b. 50-60 percent
    c. 75-80 percent
    d. 97-99 percent

2. What is the order of agencies in the callout chain for ELT/EPIRB missions to a CAP team?
    a. SARSAT => LUT => RCC => MCC => CAP
    b. SARSAT => LUT => MCC => RCC => CAP
    c. SARSAT => RCC => LUT => MCC => CAP
    d. None of the above

3. True of False - CAP is the only organization that searches for ELTs or EPIRBs.
    a. True
    b. False

4. What is the training frequency utilized for practice beacons in the United States?
    a. 121.5 MHz
    b. 121.6 MHz
    c. 121.775 MHz
    d. None of the above.

5. What is the frequency utilized for distress beacons in the United States?
    a. 121.5 MHz
    b. 121.6 MHz
    c. 121.775 MHz
    d. None of the above.

Supporting Tasks

Basic: O-0301 and O-0302.
Advanced: O-0303, O-0304, P-0202, P-0203, and P-0204.

CHAPTER 7
LAND SEARCH METHODS

Chapter objectives
1. Understand and explain the difference between the three types of SAR dogs.
2. Understand and explain the basic guidelines for dealing with canine SAR teams.
3. List the steps involved in conducting vehicular search.
4. List and explain the core whistle signals.
5. Be aware of the different characteristics of missing persons.
6. Demonstrate a practical knowledge of the instructed search formations and patterns in a variety of terrain.
7. Understand and demonstrate the proper method of clue identification, marking and possible retrieval.
8. Understand explain the different methods used to establish a perimeter.
9. Understand and explain the practical uses of a tracking stick.
10. Understand and explain the reasons for standardized communications systems for reporting tracking information.
11. Demonstrate a basic knowledge or familiarization of man-tracking in various terrain and through various problems using the tools on-hand.
12. Understand and explain the purposes of CERT training and PSAR.

Canine Search
The point to this section is not teach everyone how to start a canine search team. It is to familiarize the student with the terminology used in canine searches, and allow the student to develop an understanding as to how other types of search teams work.

What is a canine search team: A canine search team is made up of a dog trained to follow the scent of a person or object to its origin by a handler. CAP does not normally sponsor dog teams, but CAP has worked with canine or dog teams on many searches.

These teams range in qualifications. Some are over zealous volunteers with little experience and a dog to run. Most good teams are well-trained and practiced teams from known search organizations or law enforcement divisions.

To trace the scent to it's origin, the dog follows a trail left by the missing person that is invisible to our senses, but readily apparent to a dog's. A living person is constantly replacing dead skin cells, and search dogs follow the trail of these dead cells. The types of search dogs are divided by the way they follow this trail.

Search dogs fall into three categories: tracking, trailing and air-scenting.

> Air-scent dogs: There are specialized air-scent dogs for underwater, avalanche, cadaver, drug, and weapons searches. The rules for working with any specialized dog teams are the same. Air-scent dogs are deployed downwind of the search area and are trained to detect human scents traveling on the wind. These dogs may also work at times in the tracking or trailing mode. These dogs are usually the preferred resource.
>
> Tracking dogs: Tracking dogs are trained to follow a specific scent and are not necessarily affected by other humans. An article of the missing person's clothing is held under the dogs nose until he 'gets the scent'. The dog is then capable of tracking that scent on the ground through the woods to the missing person. They can be confused by "additional scents " that mask the target scent. These dogs may also be confused by a broken track. For this reason that this type of dog is deployed early in the missing person search, i.e. before the target scent fades or the search area is filled with other search resources.
>
> Trailing dogs: Trailing dogs are similar to tracking canines, but pick up scent that originates in a addition to the original track. A person brushes against items and leaves a trail of dead skin cells and other items fallen off from the body.

Working with the Canine Team: In dealing with the canine team, a ground team should realize that any disturbance of evidence will hurt or destroy the possibilities of the team finding the missing person. Listen to what the handler tells you to do. These dog teams can save you a lot of time in a search if you allow and help them to.

Five rules for working with canine SAR teams: When your team is working with a canine SAR team follow these rules at a minimum:

1.Coordinate your team's actions with the dog handler including the handling of evidence. If you don't know how to handle it, then don't. Evidence should be put in clean, new bags without the person handling the evidence touching the inside of the bag or the evidentiary scent article.

2.Clear the upwind search area of any personnel and stay downwind of the dog and handler at all times. (especially important when working with air-scent dogs).

3. When searching or traveling with an air-scent team, keep a good distance behind the dog and handler (as defined by the handler) and allow them to work unimpeded.

4. When in doubt, follow the instructions of the dog handler.

5. Unless the handler specifically allows it, keep all personnel away from search dogs in the field and at base camp. Do not allow anybody to feed or play with the dogs or smoke around them. Keep all motor vehicles away from the dogs as the exhaust deadens the scent and sense of smell.

Vehicular search

Vehicular search is an important part of a ground team's mission. Vehicles may perform hasty searches along roads and trails. Also, a team driving to a search area might be able to detect clues or even the search target while still in the vehicle. During disaster relief operations, damage assessment can often be done from a vehicle.

Besides performing a vehicle search and scan when told to do so, it's good practice to do it whenever in the area when the search target might possibly be. More than one missing person or aircraft has been within sight of a road. Additionally, you should perform vehicle search and scan whenever driving in a disaster area. You might be able to spot damage that needs to be reported.

Vehicular search and scan isn't simply driving along and looking out the windows. Much like scanning while walking, certain techniques can be followed to increase the probability of detection. The few basic steps to vehicular search are described below

Step one - Personnel assignments: The first step in vehicular search is to identify the personnel who will perform the scanning. This should be those team members who can see out of the vehicle and don't have an important task to perform in the vehicle, such as driving or navigating. These team members cannot be dedicated scanners and still safely perform their other tasks.

Step two - Sectors of Observation: The second step to vehicular search is to assign *sectors of observation*. This means that each person in the vehicle is look in a different direction. The team leader will assign each person in the vehicle an arc, or *sector*, to watch for clues. For example, the person in the back right seat might be told to search from the front right fender to the back left fender. These sectors should overlap, to make sure that no area goes unobserved. Just as in search while on foot, it's important that you search 360 degrees. So, some sectors of observation should be to the rear. An example of this can be found in figure 1 of this chapter.

Step three - Vehicle Preparation: The next step is to prepare the vehicle. Make sure each scanner has an unobstructed view of his/her sector. Secure loose equipment, especially things that might fall over onto someone (such as a pile of rucksacks stacked to the roof in the back). Clean the windows and windshield to help improve vision. From here you can move on to actually conducting the search.

Step four - Conducting the Search: The driver chooses a speed that allows for good observation by the scanners, without being so slow as to obstruct traffic (when on roads with other vehicles). Each scanner should follow these rules while scanning:

1. Scan the entire sector from left to right and then from right to left, while near to far and far to near.

2. Observe vehicle safety. Keep your seat belt fastened, and do not distract or startle the driver.

3. Don't distract other team members who are also scanning. Keep talking to a minimum.

4. Remember that clue-consciousness is critical. Look for the clues that will lead you to the target, not just the target itself.

5. Let the driver know if he is driving too fast for you to adequately search your area.

6. If you think you see a search clue or the search target let the team leader (or the ranking person in the vehicle) know immediately, but do not shout or otherwise startle the driver.

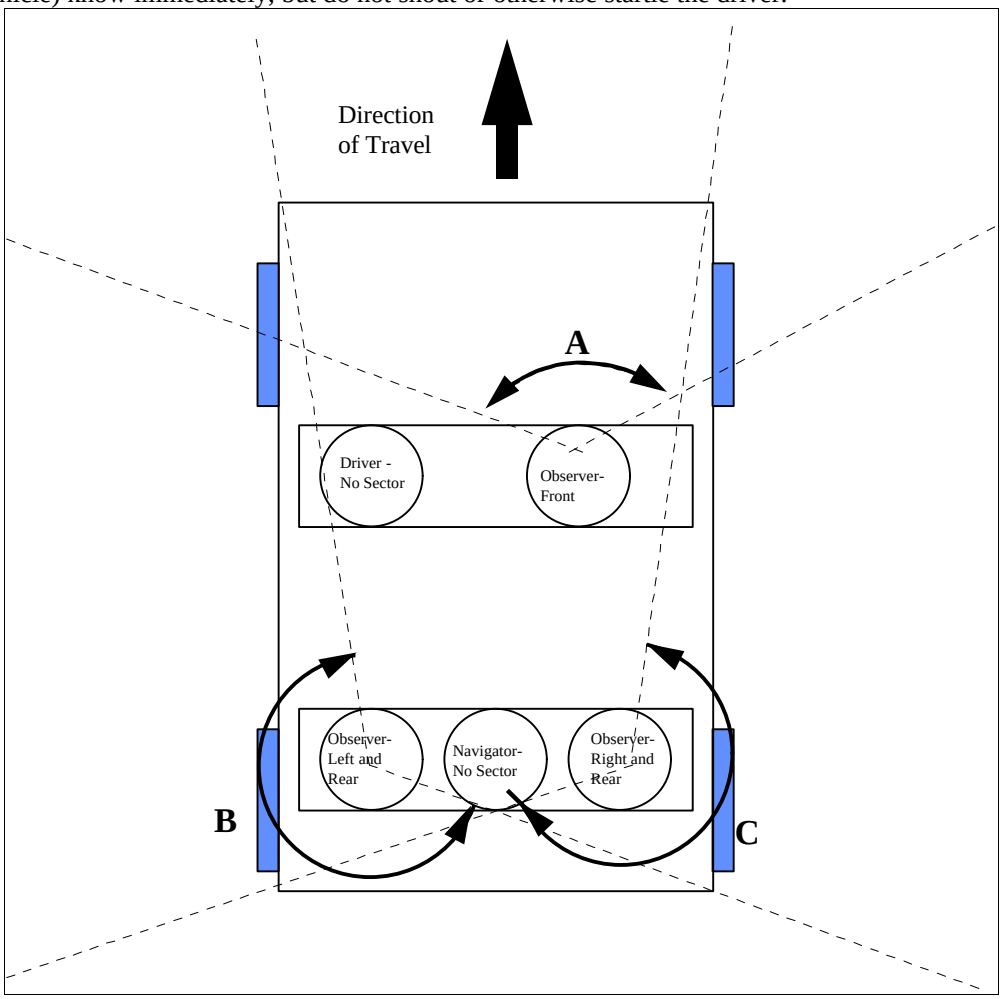


Figure 1: Sectors of Observations - The front right seat observer has a sector of observation from the front right fender to the front left fender (sector A). The back left seat observer has a sector of observation from the front left corner of the vehicle to the back right corner (sector B). The back right seat observer has a sector of observation from the front right corner of the vehicle to the back left corner (sector C).

Line Search

This section is focused on the layout or formations used by search and rescue teams in CAP, the kinds of searches or patterns used by those teams in formation, and the primary background information that team members will need to properly conduct a search.

Search Formations: Teams should have defined formations or positions to establish standards and organization for the team. Everyone can't do every job on every search. That would lead to chaos and confusion, and survivors turning into fatalities while we get our act together. Typically a SAR team in CAP is made up of the following personnel:

Wilderness members or Woodsmen: These members blaze trails, keep bearings, and help keep track of general searchers. This team position is denoted by a "W" in diagrams. An "N" may be used to denote a woodsmen or wilderness member strictly dedicated to being a navigator or point for the team.

General searchers: These personnel are basically warm bodies used in the search; more eyes when there are only a few available are better than none. This team position is denoted by an "X" in diagrams.

Communications Officer: This member keeps track of communications for the team between the team and the next higher echelon, as well as aiding in coordination of incoming teams if a crash site/survivor is found. Crash-site operations are further discussed in the crash site management chapter. This team position is denoted by a "C" in diagrams.

Medical Officer: This team member keeps track of the health and welfare of the team as well as survivors found. This position is denoted by a "+" in diagrams.

Ground Team Leader: The team leader is responsible for safety, health and welfare of all members under his or her charge as well as accomplishing the assignment at hand. The leader will also manage scenes if the first arrival on site at crash sites or survivor find scenarios. This position is denoted by an "L" in diagrams. An "A" may be used in place of the "L" to designate an assistant in charge of the team while the leader is involved with other duties.

Each of the above positions should be represented in the typical ground team of 6 to 12 members. Those positions are an integral part to the use of the our search formations: line, wedge, and hasty team.

Option 1:	W	X	X	X	C	L	+	X	X	X	W
Option 2:	W	X	X	X	C	A	+	X	X	X	W
						L					

Table 1: Line formations

Line: In this formation, the woodsmen are both using their compasses to guide the team if it is on a specific course heading (which it should be), and also marking the edges of the area searched with streamers or tissue/toilet tissue since neither will damage the environment and it should stay up long enough for a search of a few days or more. This formation is often used when a lot of area must be covered, and the vegetation is not too thick, so that members of your team do not disappear during the search. Team leaders and mission planners should note that this should be used as a last resort because it is time consuming and wastes manpower. The only time that this is truly practical is to search a small area for clues, and even then teams have to be well disciplined so that evidence is not damaged or overlooked. Table 1 depicts the typical line formations.

Many personnel often ask how to properly place team members so that the intervals between personnel are the same or at least close. This can be accomplished through several means, but there are two common

methods. The first is by the ground team leader or assistant placing personnel where the member is supposed to start the search. This very well, but often takes more time than should be allowed. The second is to have members actually march out the number of steps between personnel on the team and sounding off or blowing their whistles upon reaching their position. The team leader may need to make minor adjustments, but this tends to work faster for trained teams than trying to place each individual.

Wedge: This formation is used when a selected area, such as a path or trail, and the area around it must be searched. A woodsmen is dedicated as the navigator or point person for the team to lead the way and notify the team of any apparent threats or dangers. Woodsmen mark the edge of the area searched and survey danger areas to the sides of the trail. This pattern is also used when following a man-tracker or canine search time to look for any clues possibly missed. Table 2 shows the typical wedge formations. The size of this team is also relatively flexible since basic searchers may not be necessary for searches of this type.

Option 1:					Option 2:				
		N					N		
	X		X			X		X	
X		X		X	X		X		X
W	C	L	+	W	W	C	A	+	W
							L		

Table 2: Wedge formations

Hasty Team: This formation is normally used to perform quick searches or to scout the area ahead for a larger team. A good example of a use for this team would be to establish a triage point or evacuation point for survivors. Since the team is made up of the team leader or assistant, a communications officer and a medic/first aider, the team should have the ideal personnel for this task: a manager to plan for incoming and outgoing personnel, a communicator to facilitate the same, and a first aider to handle initial categorizing and treatment on site.

A description of where these people should work or be positioned in a true formation is not given because they should never really be out of each other's sight, and will be assigned tasks to handle together.

Search Patterns: There are three basic search patterns used within CAP: the parallel sweep, the expanding square or circle, and the contour search. Each will be discussed in the following sections.

Parallel Sweep: This pattern is normally used on level terrain in a line formation. The team covers a specific distance and then pivots or shifts and goes in the opposite direction from which they came parallel to the search area. Using this pattern allows easier assignment of grids to teams, but can be very redundant or boring for members, especially in very similar surroundings such as thin brush or ferns. The parallel sweep pattern is depicted in figure 2.

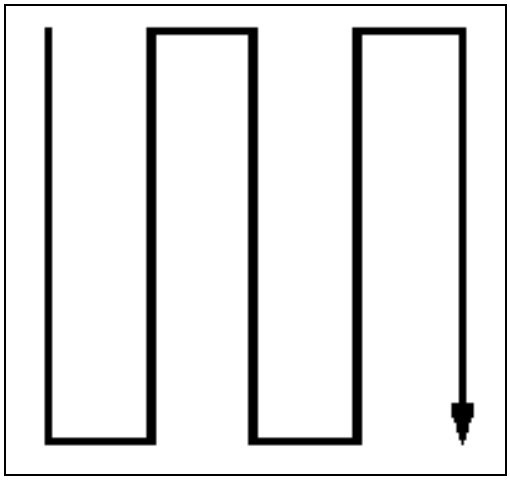


Figure 2: Parallel sweep pattern

Expanding Square or Circle: This pattern is basically restricted to a search that is meant to cover a small area with fewer team members, and under the assumption that the target is close by. A line or hasty team formation is normally used as the team pivots after completely encircling the point last seen (PLS) (in an expanding circle) or pivots at corners (in an expanding square) to cover more area. Both the expanding square and circle are depicted in figure 3.

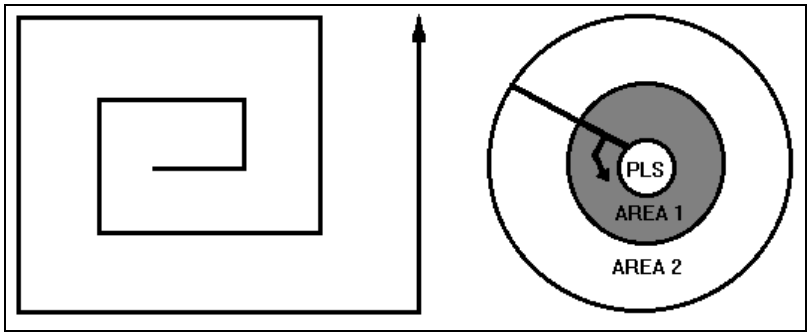


Figure 3: Expanding square and circle patterns

Contour: This pattern is used in rougher terrain and allows for turning and avoidance of objects. The premise behind this is to work from the highest probability area to the lowest. Hikers go up mountains and hills, so working your way up is not necessarily a bad idea. Planes must crash coming downward on the other hand, so trying to get to the top first may be a good idea, either by helicopter or hiking up to work your way down. This does not sound like one of the most logical techniques, but in performing a contour search you must take into account many variables. What kind of person are you searching for? Would the person climb the hill, or follow the stream down? What kind of terrain is in the search area? Are there typically accidents in this are? You may want to refer to the personality types referenced later in this chapter to help you in making your decisions to use a contour search pattern. Wedge formations or hasty teams are normally used on contour searches to check trails and surrounding terrain. A drawing is not provided for this pattern because it simply follows the trails or paths typically, and the direction is stipulated in the teams orders or plans.

Whistle Signals: The drawings used for search formations and patterns often make the idea of a search seem small, but it is not. You may be able to see the person in the position next to you in the line formation, but hearing them is another story, never mind the team leader if you are a woodsmen. To solve this problem, four simple commands have been implemented that are blown through a whistle. Whistle signals tend to carry greater distances, and allow the team leader or assistant to save their voices for commands given once the missing person or crash survivor are found. The four commands are as follows:

1 short - Go

2 short - Stop

3 short - Danger, but keep moving unless you encounter a problem that you must stop for.

1 long - Assemble on the team leader

Only one person on the team should be giving whistle signals at a time. This avoids confusion. There are few exceptions to this rule though. Members finding the target or some other form of clue are supposed to yell “Find!” and stop where they are. The team leader or assistant will come and investigate while other members of the team stay where they are. After inspection the Ground Team Leader will either disregard the object and continue or mark the object, commonly referred to as “bagging, tagging, and flagging” it. Sometimes though, the rest of the team may not understand your yell of “Find!” over sounds in the area or a person on the team calling out to

possible survivors, and the rest of the team may actually continue moving. Using your whistle to blow the command for stop will alert the team leader to your situation, and stop the team. The only other time team members should blow their whistle is if they encounter a danger area or become hurt themselves. We do not want to have to search for missing team members or have more than one person get hurt, so announcing these areas or problems is completely justified.

Confinement methods: Boundaries for searchers as well as survivors should be established to avoid unnecessary overlap as well as make search areas visible for survivors to find. Survivors may come across your markings, and try to follow them out of the wilderness. There are five general ways used to establish perimeters to search areas.

> Road or trail blocks: Establish road block and patrols on all roads and trails leading into and out of the confinement perimeter.
>
> Look-outs: By placing personnel in strategic locations with good visibility a perimeter can be established.
>
> Track traps: Checking for foot prints or other markings in specifically cleared areas allows searchers to find out if the subject has passed through the perimeter. This is often beneficial to use when dealing with subjects that are disoriented or simply do not want to be found.
>
> String lines: Spools of string are mounted on a backpack. As the search team member carrying the pack walks through the area, the string unrolls leaving a very visible trail. Other members following along tie the string at waist height on brush and place paper arrows on the string pointing towards the base camp.
>
> Line marking or trail blazing: surveyor's tape, crepe or tissue paper used to mark edges of search lines and paths taken by search teams. This marks the area searched for the subject to follow out if he or she walks through the area later as well as assisting teams. Planners can even color code the markers so that they know what has been done in each area and by whom.

An example of a utilization of confinement methods is shown below in figure 4.

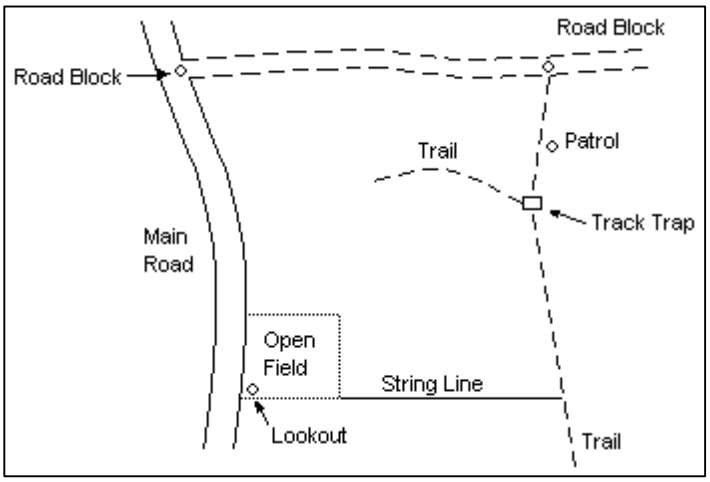


Figure 4: Implementing confinement methods

Man Tracking

The main point of this chapter is not to teach man-tracking, but rather introduce it. Man-tracking is a skill that takes many years to learn and do well, and one chapter in a book could not possibly show you everything that you would need to accomplish the task. What we hope you get out of this chapter and the field exercises performed in conjunction with this class is an idea as to how tough this is, but how, if trackers and man-tracking skills, are used effectively, missions could be more successful.

Step-By-Step Methodology: Man-tracking takes slightly different forms depending upon which side of the Mississippi River one is searching. The Step-By-Step system developed for the United States Border Patrol is employed quite rigidly in the sparsely vegetated areas of the west. In the east, the most successful technique includes the Step-By-Step system without as much emphasis on the use of the Tracking Stick.

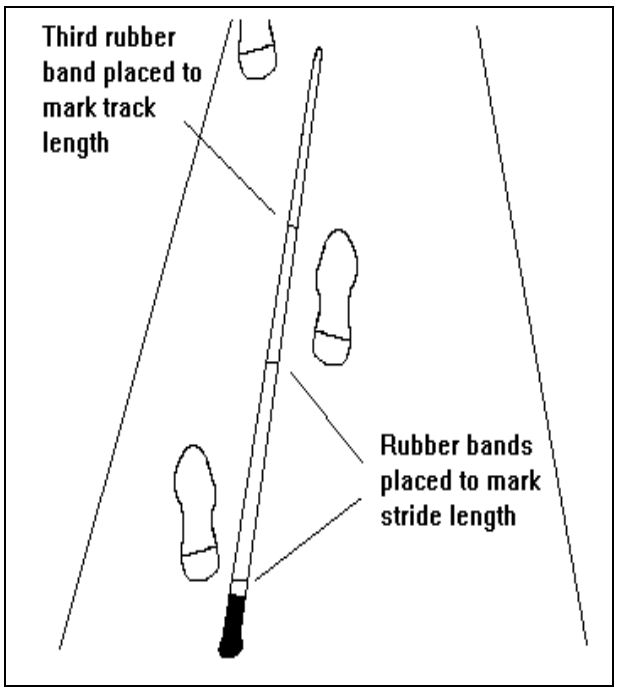


Figure 5: Step-By-Step with a tracking stick

The tracking stick is usually a stick four to six feet long which is used to approximate both the length of the subject's shoe or track and the subject's average stride. The stick allows the searcher to focus on the next most probable area to find the subject's next step, as depicted in figure 5. In both the east and west, the beginning man-tracker uses the tracking stick to find every clue left on the ground by the subject. As the eastern man-tracking student progresses through the series of exercises designed to help him find more and more subtle clues, the tracking stick is used less and less on the more blatant evidence. It is not until the very last exercises on very old tracks that the eastern student returns to the exclusive use of the stick. The eastern tracking student often has the advantage of having a great deal more flora to be disturbed and therefore to be sighted than does the western tracking student. The disadvantage that the eastern tracking student must bear is the fact that the changing seasons are more dramatic, and therefore require a more intimate knowledge of the flora in each season in order to find patterns of disturbance.

In using the tracking stick, students need to realize that you may not see a track for several feet. This may be the result of the type of terrain, or possibly weather conditions after the track was made. Using the stick in conjunction with common sense and observation allows the man-tracker to make an educated guess as to which direction the person went. Thus, the man-tracker is allowed to skip tracks and still follow the trail. Just because you don't see a track does not mean that the person did not step there. All it means is that the person did not leave any clues that you can recognize. Don't always look for foot prints. Foot prints may not be left on the terrain, but some definite marks probably were. Look to see if rocks, leaves or grass have been moved out of what appears to be normal. Look for broken branches or stripped leaves at normal hand height along the path; the person may have broken them off as they walked through.

Consider the kind of person that you are looking for. Different personality types and objectives tend to make people do different things. Children see things differently than full-grown adults, and a path to them may appear to be a wall of bushes to adult searchers. Hunters and berry pickers often go off the beaten path to conquer their objective, but then can't get back. Be very observant and try to find out as much about who you are looking for as possible. It could help you to plan accordingly.

Man-tracking is most useful very early on in the search. The advantage that the Mission Coordinator (MC) has in calling in man-tracking teams first is that there are potentially more man-tracking teams available than other searching assets. Many police and sheriff departments have personnel trained and well seasoned in man-tracking, and could reduce the large workload spread onto so few ground teams. Even if a man-tracking team is only able to determine the subject's direction of travel, the MC can use this information to cut the total search area in half. The worst thing that can happen is a narrowing of the search area. The best thing that can happen is to find the missing subject.

Team members and coordinators need to understand that a properly trained man-tracker can eliminate wasted search time, and may get you much closer to the missing person quicker than basic search patterns and guess work. Listen to what a man-tracker has to say; it could make the search go by much quicker and end in better results.

Track Identification: Teams often come across tracks in the field, but because they have not been properly trained, it either goes unnoticed, is damaged, or is simply reported poorly or incorrectly. When you find a track during a perimeter cut or a hasty search, you should draw a detailed sketch. You may have to describe the track to the mission base or to other teams. This may be done face to face, or even over the radio. If so you should describe the track in such a way that anyone listening can draw the same sketch as you have drawn. The following questions represent the current ideas about how a track can best be described over the radio. If you are able to answer these questions, you can probably accurately describe the pattern noticed to anyone.

1. Are the right and left prints mirror images? In most cases the answer will be no, but this is not necessarily a problem. The differences between them may actually make it easier to distinguish this print from others in the area, and make it easier to find overall.

2. What is the basic type? Is it a track of a flat shoe (no heel)? Does the person appear to be wearing footwear that has a distinct heel or toe? Does it appear that the person is barefoot?

3. What is the shape of the track in terms of the toe, heel, and instep? Is the toe of the track pointed, rounded, box or square shaped? Is the leading edge of the heel straight or curved? Is the instep high or low?

4. What are the overall dimensions of the track in terms of the following? Refer to Figure 6 for a visual description.

a. overall length

b. sole width

c. heel width

d. heel length (if any)

e. stride (heel to heel (e))

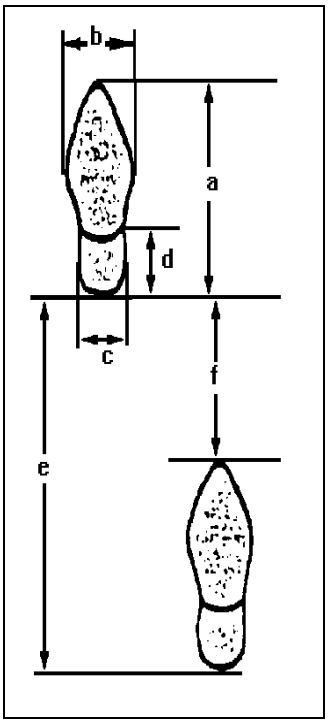


Figure 6: Track and stride measurements

Note: When working with other teams, be sure to state whether stride is stated in terms of heel to heel (e), toe to toe (f + a), heel to toe (e + a), or toe to heel (f). It is recommended to use heel to heel since heel prints are usually easier to see than toe prints because of where a person's weight is focused on the foot.

5. Is there a pattern shown on the track? The tracker should consider many things for this.

a. Are there any distinguishing marks on the borders of the track? Does it appear to have a sewn or stitched edge? Does the border appear to have divets along the edge possibly showing where nails are used to secure the sole of footwear to the shoe bottom.

b. Are there any distinguishable labels, trademarks, or numbers shown in the track?

c. Does the track appear to show a pattern transferred from the person's shoes? Is it plain (no pattern), regular, irregular, or mixed?

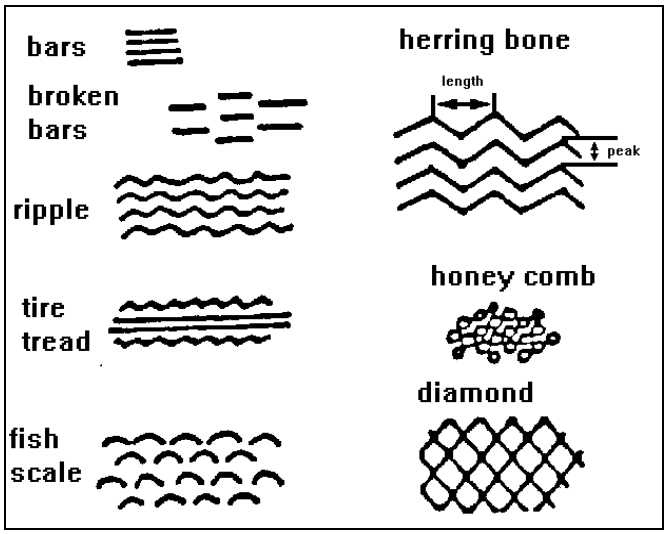


Figure 7: Regular shoe sole patterns

1) Regular markings are those that are generic symbols typically found in manufactured shoes. Names and drawings of regular markings are depicted in Figure 7.

2) Irregular markings are considered to be patterns such as diamonds, concentric circles, semicircles, arcs, bars, diamonds, or stars. If the markings are irregular, note the location and direction on the track for each marking. Measure locations of these markings as accurately as possible so that they can be distinguished from similar varieties or styles at another location.

3.)Mixed markings are a exactly that, a mixture of markings. Multiple patterns of regular, irregular, or both types of markings could be found on the same track.

Note: A fine or worn pattern may appear to be plain if the ground surface is too coarse.

6. Is there a distinct heel pattern, noting the outline, nail holes, and whether edges are slanted, rounded or straight?

Note: Nailed heels will generally have either 8 holes (having three across the leading edge) or 13 holes (having 4 across the leading edge).

7. Does the track have any unique features that will make it different from others like it? Are there cuts, worn spots, or heel plates noted on the track?

8. Does the person appear to have a pattern demonstrated in the track? Does the track show that the person toes in or out? Does the track indicate that person makes deep toe marks or heel marks? Does the person drag one or both feet in walking, noted by scuff marks? Does the person appear to be favoring one leg, possibly noting a limp?

The following types of tracks occur often enough that they have been named. As long as everyone uses these names to mean the same thing, much time can be saved in describing a track.

1. Sneaker: Molded heel and toe, usually plain (because fine patterns don't show), or else fine regular pattern without any border. Many times these are also referred to as deck shoes or tennis shoes..

2. Gym Shoe: Flat (no heel); coarse pattern, usually irregular geometric shapes with a definite border.

3. Lug Boot: Separate heel and toe; coarse lug and star pattern. Many times these are referred to as Montagna Vibram, Security Vibrams, or Klettershuhs. At the same time you should also try to learn how to recognize different types of military and/or hiking boots popular in your area; it could save you some time.

<u>Missing Person Characteristics</u>

People can normally be classified under one or just a few of the following personality types with certain characteristics. This can aid searchers in deciding what areas should be searched primarily, and what areas would be less likely for the person to be found in. Knowing what type of person you are looking for can make or break

the search. Studies have been done as to how different people will react if put into a situation such as an airplane crash. Pilots are told to stay near the aircraft so that they may be found readily. Not all people aboard aircraft are pilots though, and some pilots will also fall back on other skills or react as though any other person would. The following is a standard personality type listing and what each type of person is like when lost in the wilderness used by most incident commanders and other search planning staff.

Children (1 to 3 years):
1. Unaware of the concept of being lost.
2. Navigational skills and sense of direction are practically non existent
3. They tend to wander aimlessly with no specific objective
4. They will seek out the most convenient location to lie down and go to sleep.
    a. inside a log
    b. under a thick bush
    c. under an overhanging rock
    d. under a picnic table

Children (3 to 6 years)
1. These children are more mobile and capable of going further than those in the one to three year-old category.
2. They have a concept of being lost and will generally try to return home or go back to someplace they are familiar with.
3. They have definite interests and may be drawn away by animals, following older children, or just exploring.
4. When tired, they generally will try to find a sleeping spot.
5. Some have been instructed to stay away from strangers and as a result will not answer or talk to searchers when called by name.

Children (6 to 12 years)
1. There navigational and direction skills are much more developed.
2. They are generally oriented to their normal, familiar surroundings and become confused in a strange environment.
3. They may intentionally run away to avoid punishment, gain attention, or sulk.
4. Whether it is intentional or accidental circumstances, they often will not answer when called.
5. Darkness usually brings on a willingness to accept help and be found.
6. Children this age suffer from the same fears and problems that adults would, but with a greater sense of helplessness. The circumstances of loss often reflect their being transplanted into a foreign environment or surroundings by parents or other adults.

Elderly (above 65 years)
1. Often the person is suffering from senility or Alzheimer's disease.
2. They are easily attracted by something that strikes their fancy.
3. Their orientation is to past environments rather than the present.
4. Many pose the same supervision problems that children do.
5. The more active and lucid ones are likely to over-extend and exhaust themselves rapidly which can result in heart attack or other fatal complications.
6. They are often hard of hearing or deaf which presents problems with detection.

Mentally Retarded (all ages)
1. They act and react much the same as children from the age of 6 to 12.
2. They generally will not respond to their spoken name.
3. They most often will be hidden from view as a result of fright or seeking shelter from the elements.
4. Many times they will hold up for days in the same location.
5. They really have not physically impairments except that they will do nothing to help themselves.

Despondents
1. Most often they are seeking solitude.

2. Generally they will not respond to searchers as they feel it is an intrusion on their solitude.
3. They will generally be within sight and sound of civilization.
4. They tend to be found near prominent locations, such as:
    a. lake or scenic hill
    b. lookout or area with a view
    c. seldom, if ever, found in the underbrush

Hikers
1. Generally, they will rely on trails with a set destination in mind.
2. Problems or complications usually arise with navigation when trail conditions change or become obscure.
    a. slide over trail
    b. trail not maintained
    c. trail covered intermittently with snow in the spring (poorly defined junctions)
3. Often times hiking parties are mismatched in abilities and one person falls behind, becomes disoriented and ultimately lost.
4. Cutting switch backs will many times lead to disorientation or going down the wrong hill or drainage.
5. They are very dependent on travel aids and trails for navigation.

Hunters
1. They tend to concentrate on game more than on navigation.
2. In the excitement of pursuing game, they are often lead into deadfall areas, boulder fields, underbrush, and deep snow with little regard for exhaustion or navigation.
3. They tend to over-extend themselves into darkness and push beyond their physical abilities.
4. They are typically unprepared for extremely foul weather. (Heavy storms in the fall often signify the movement of animals and consequently an improvement in hunting.)

Cone pickers, berry pickers, mushroom pickers, rock hounds, photographers, etc.
1. Their intentions are to stay in one location.
2. They usually carry no provisions or survival-type gear.
3. They go in good weather and as a result do not wear anything but light clothing.
4. Because their attention is focused on or near the ground, they are often mislead by subtle terrain changes.
5. Attempts to return to familiar ground only puts them further out of contact because of their complete disorientation.
6. These circumstances usually put them at a high risk for survival.

Fisherman
1. Generally, they are very well oriented direction wise because of the directional flow of a river or the position of a lake.
2. The reason they are overdue is most often accident related such as slipping into the water, falling over cliffs while trying to move up and down stream, or being swept off of their feet in fast moving water.
3. A very high percentage of this mission category is boat related.
4. Often this will be a recovery mission.

Climbers
1. The individuals in this category are generally well equipped and self-sufficient.
2. They tend to remain on or near designated routes.
3. A primary factor for these incidents is weather or hazardous conditions which limit an individual's abilities. Other major factors are falling debris and avalanche.
4. Technical expertise is generally needed both for search and recovery.

CERT & PSAR
Up to this point we have discussed SAR methods that involve us helping survivors as an organization. There is another aspect to SAR though, and that is prevention and helping those who can help themselves. The Community Emergency Response Team (CERT) program conducted according to standards established by the Federal

Emergency Management Agency (FEMA) and Preventative SAR teaches people what to do should they be involved in an incident requiring SAR. Let's talk about each in a little more depth.

CERT: The CERT program was established after several disastrous earthquakes hit California, and local rescue personnel were not always there to help right away. Much of the Urban Search and Rescue that happens following a disaster like an earthquake is accomplished by untrained members of the local population. The CERT program teaches members of the community how to safely assess the damage, help themselves, and help others as necessary before trained professionals arrive. It combines basic damage assessment training with first aid and triage skills as well as low-tech rubble extrication and shoring skills to make members of the local community capable of safely helping themselves following a disaster. Contact your local or state emergency management for courses being conducted near you. Student and instructor guides for this program are available from FEMA's web site.

PSAR: Preventative SAR, like CERT, also teaches untrained members of the community how to help themselves should they ever become lost. This is especially helpful to them and the sponsoring agency. PSAR allows the search agency, often times CAP, to tell the community what they need to do to survive should they become lost as well as make it easier for trained searchers to find them alive. It also allows the sponsoring agency to put forth a positive image to the community, and can foster a beneficial ongoing relationship with local officials. Several PSAR programs are available like "Lost in the Woods" and "Hug-A-Tree" for both instructors and students.

Chapter review questions

1. True or False: Picking up evidence with the bare hands will not damage it's value as a scent article unless it is put into a dirty bag.
    a. True
    b. False

2. True or False: The vehicle driver is actually searching as well during a vehicular search.
    a. True
    b. False

3. Which of the following whistle signals means to stop.
    a. One Short
    b. Two Short
    c. Three Short
    d. One Long

4. True or False: Tracks are the only marks normally left by a person when travelling on foot.
    a. True
    b. False

5. True or False: PSAR or Post SAR is the concept of reviewing all available information about an incident after the mission is complete to learn from it.
    a. True
    b. False

Supporting Tasks

Basic: O-0401, O-0402, O-0403, O-0404, O-0405, O-0406, O-0407, O-0408, O-0409, O-0410, O-0411, O-0412, and O-0413.

Advanced: O-0219, O-0414, O-0415, O-0416, O-0417, O-0418, O-0419, O-0420, O-0421, O-0422, P-0202, P-0203, and P-0204.

CHAPTER 8
KNOTS, ROPES, & STRETCHERS

Chapter objectives:
1. Demonstrate the five basic knots
2. Demonstrate how to properly tie a Swiss seat.
3. Be aware of the proper methods for care and maintenance of ropes.
4. Demonstrate how to properly load and tie-in a patient into a stokes litter or stretcher.
5. Demonstrate how to traverse an obstacle with a stokes stretcher.

Rope characteristics
Before you do anything using a rope, you need to know the parts or labels for ropes. A rope has five main parts:

1. Running end, is the free end of the rope.

2. Standing end, is the static end of the rope.

3. Bight, is a bend of 180 degrees in the rope.

4. Loop, is formed when the running end and the standing end of a bight cross.

5. Coil, is made of two or more loops.

The above noted parts can be seen in figure 1.

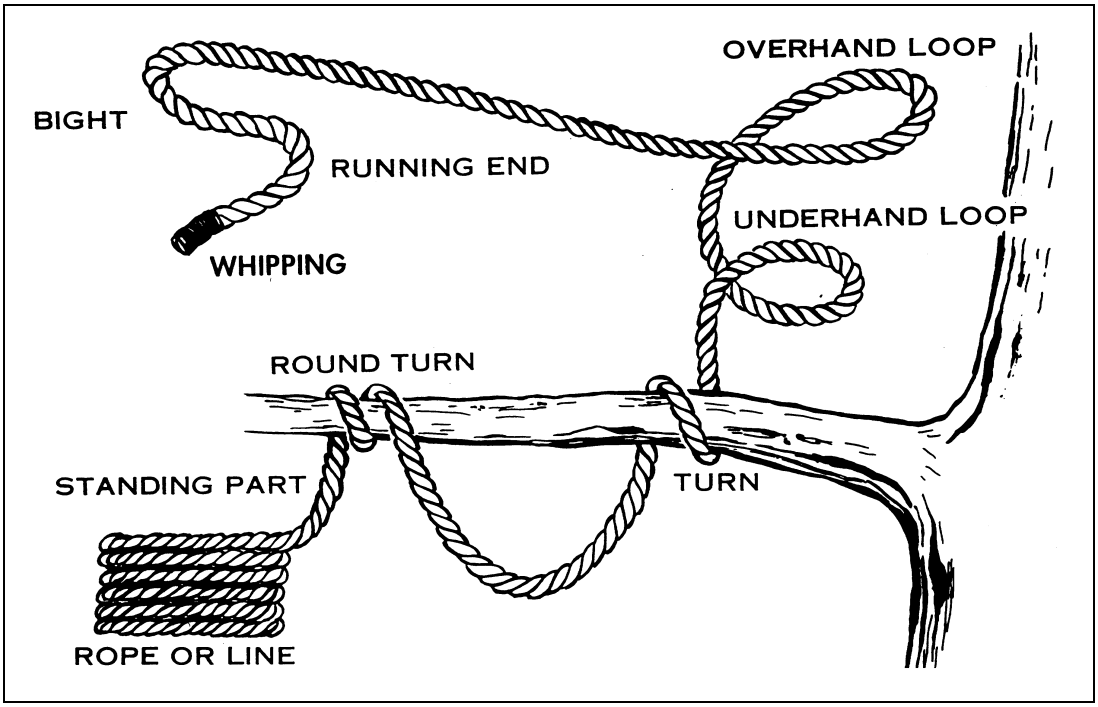


Figure 1: Elements of ropes and knots

Care and maintenance of rope
Once you know the parts of the rope, you need to know how to take care of it so that it takes care of you. The following is a list of things that you should do to take care of your ropes.

1. The ends of rope should be whipped so that the ends do not fray or split. Figure 2 is a diagram of how to whip the ends of your ropes.

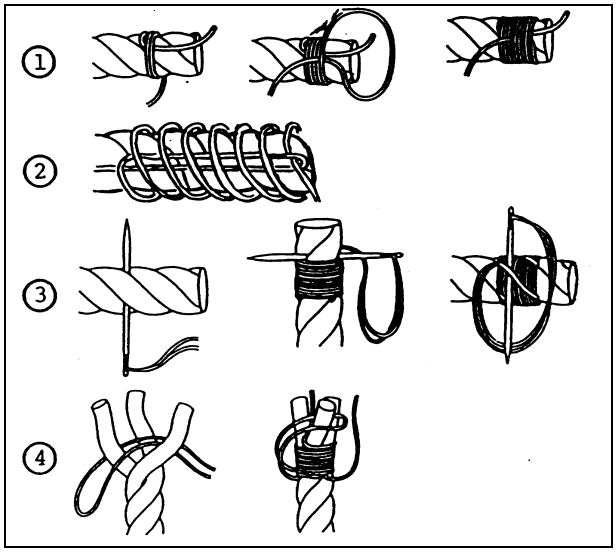


Figure 2: Techniques used to whip the end of a rope

2. Mark the center of the rope so that it is easy to find.

3. Inspect all ropes before use for cuts, excessive fraying, abrasion, and mildew. These are all signs of wear and tear on your rope, that may cause it to break at the worst possible time.

4. Keep ropes coiled when not in use. Figure 3 shows a few methods of how to coil rope.

5. Keep rope as dry as possible at all times. As previously noted, ropes do not react well with water over time. If one of your ropes has been exposed to water or snow for extended periods it may be a wise idea to retire it. Do not use the same rope to cross rivers as you would to climb mountains. Ropes used for mountaineering are exposed to a lot more weight and stress, and should not be used for anything else.

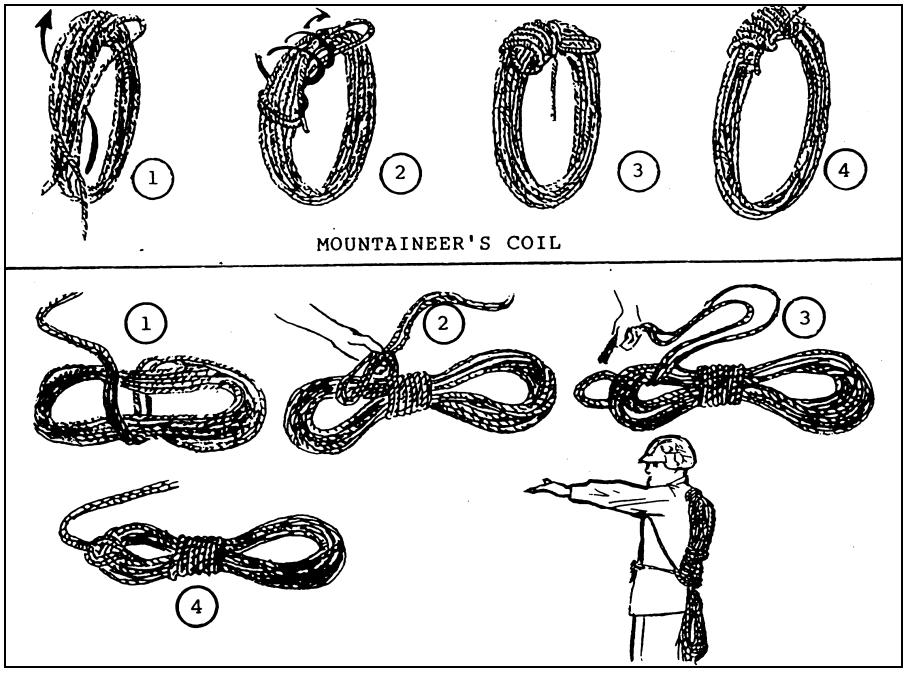


Figure 3: Coil tying

6. When ropes get wet, coil them, and hang them up to drip dry at room temperature. Do not apply heat to dry the rope. Ropes can be used after being wet, but there is a good way and a bad way to dry them out to be used again. Heat only damages the rope causing it to weaken.

7. Do not step on the rope! Whenever you step on rope you are grinding pebbles and other dirt fragments into the meshing of the rope. When you do this you are creating a weak point that slowly works itself into your rope.

8. Avoid running rope over sharp edges or corners, and pad these sharp areas if necessary to protect your rope. If you fall while on a vertical climb, the tension on that rope goes up drastically from when it was just your weight. If you put that on top of a sharp edge, you might as well have cut your rope with a pair of scissors.

9. Avoid rubbing ropes together under tension. Ropes are normally designed to work alone or next to each other, not crossing. When you cross lines under tension they begin to wear on each other causing a weak point in both lines. Keep your lines separated if at possible.

10. Do not leave rope knotted or tightly stretched longer than is necessary. One of the worst things that you can do to a rope is put a knot in it, but that is a necessary evil. That does not mean that you should not try and avoid that stress though. Make sure when you are not using a rope that any knots are removed to avoid creating a weak point in the line.

11. Consider retiring your rope. When should a rope be retired from service? Ask yourself the following questions. If the answer is yes or you don't know the answer, then you should consider retiring your rope.

a. Is the core visible?

b. Are there flat spots in the core?

c. Is the rope beginning to fray?

d. Has someone take a fall on the rope recently?

e. How long has the rope been in use, and how often?

Knots

Knots fall into four broad categories, as described below.

Tying into a Rope: This type of knot is used to connect personnel into the rope.

Backup Knots: This type of knot is used to secure a primary knot.

Tying ropes or cord together: These knots are used to tie two ropes or cords together into one length.

Anchors: These knots are used exactly as they are named to anchor the rope to a fixed point or to connect items such as packs or other gear to a fixed anchor point in a moving line.

CAP as well as many organizations have standardized the minimum knots that a team member must know. The following are those knots. Diagrams have been provided to show students how to tie each knot, and students should practice and learn them.

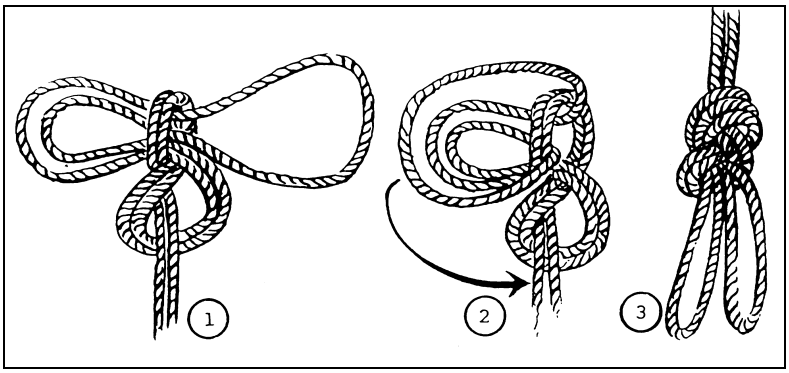


Figure 4: Figure eight on a bight

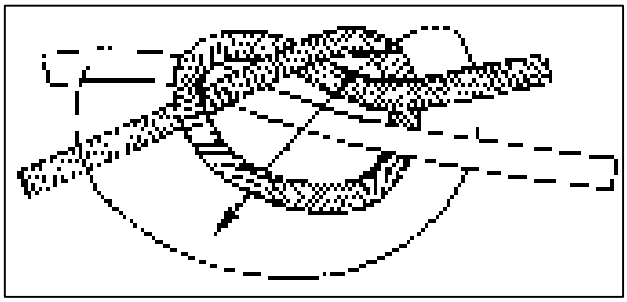


Figure 5: Water knot

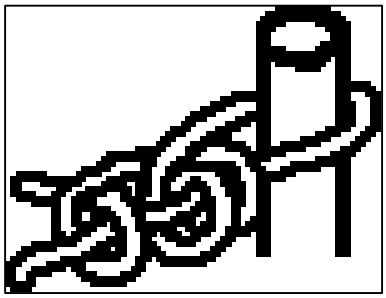


Figure 6: Tautline Hitch (Used commonly to tie down aircraft)

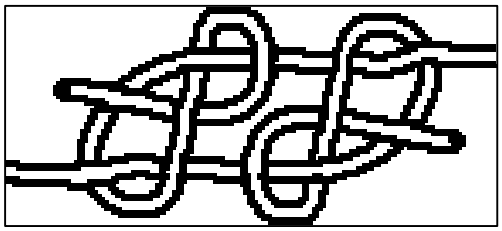


Figure 7: Double eight bend to connect two ropes

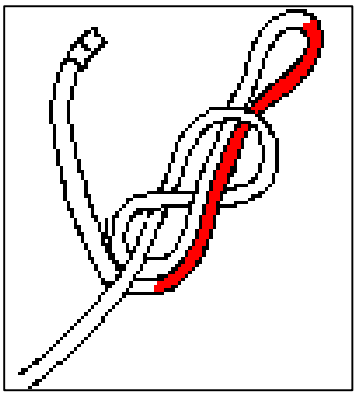


Figure 8: Figure-of-eight re-threaded (Often used around a person's waste for rescue or belay anchor).

Specialty Rope Work

There are several areas that ropes can be used for search and rescue work. CAP does not often actually do this type of technical rescue. We are volunteers, and we can't be proficient in every area that paid professionals train daily for. This does not mean that we should not be familiar with their procedures to assist them or, when under proper guidance and instruction, do some of these types of rescue. Realize though, that because you read something in a book or have even done something once in your ES career does not make you a master, or allow you to break regulations and do something that you are probably not qualified to do. That said, we will touch on a few areas, Rappelling and utilization of the Stokes litter.

Rappelling:

Rappelling is a controlled descent to another location. This can either be done at a low angle such as in figure 9, or at a high angle as in figure 10. CAP members will not do this while on a CAP mission unless under the guidance of a certified military instructor other trained professional.

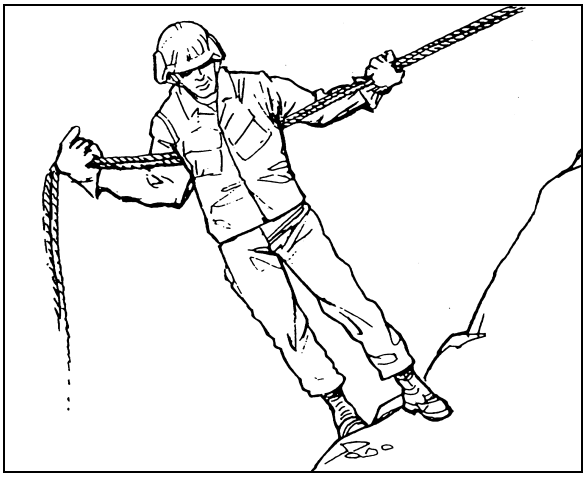


Figure 9: Hasty rappel

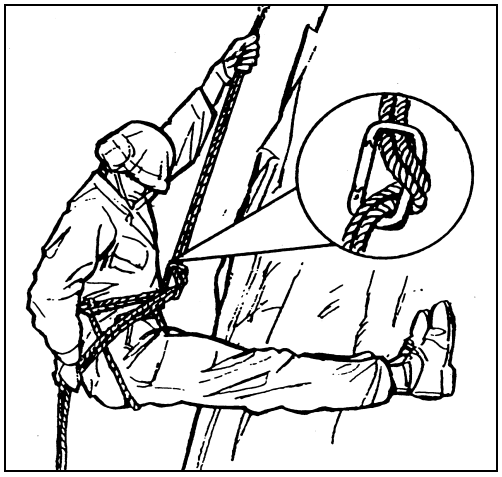


Figure 10: Seat hip rappel

Swiss Seat/Modified Swiss Seat: To rappel at a high angle, a person must either use a harness or a rappelling seat tied out of webbing or rope. I would recommend the use of a harness to rappel since harnesses are specifically designed for that task, and are also quality tested for the task, unlike a rappelling seat tied from webbing or rope. The most commonly tied rappelling seat is a Swiss seat. The following diagram, figure 11, demonstrates how to tie a Swiss Seat.

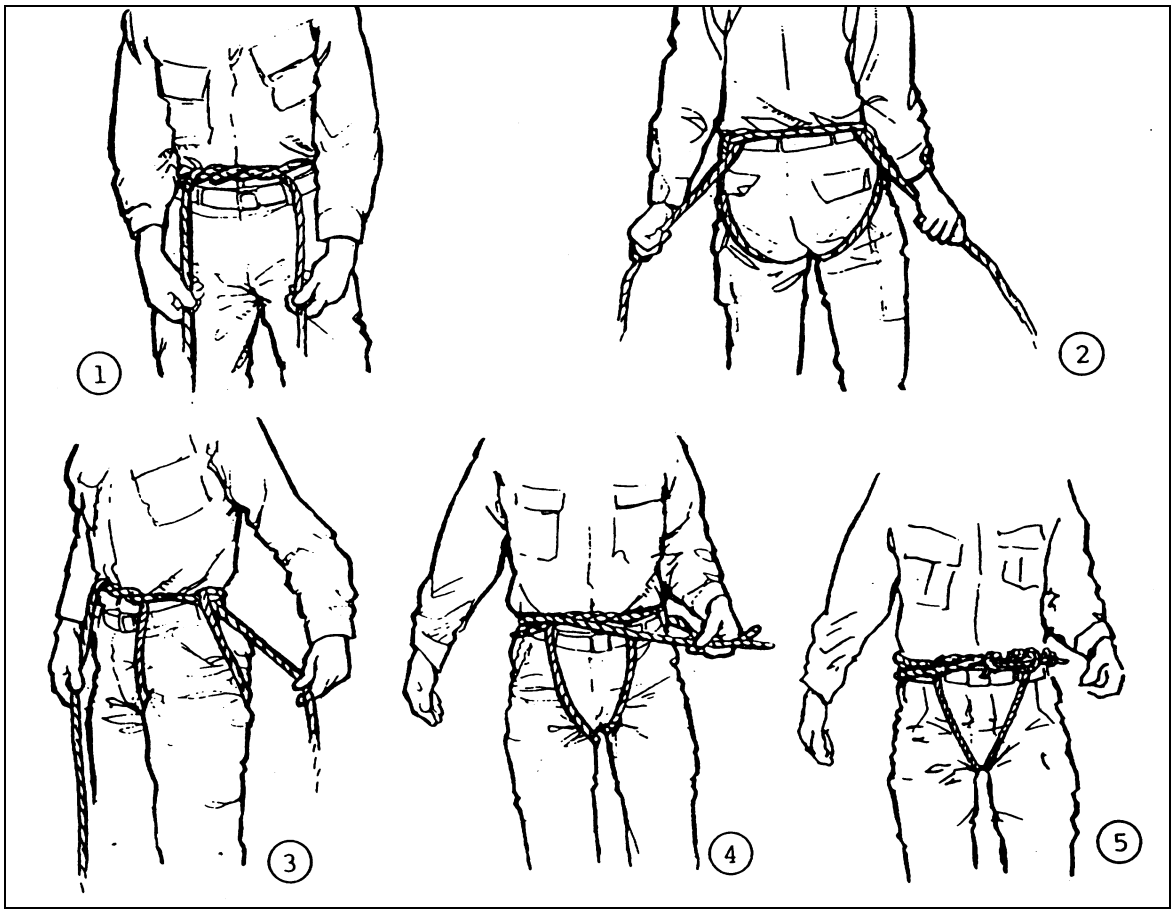


Figure 11: Rappel seat

Belaying and Rappelling: When a person is rappelling or acting as the belay and safety person, there are standard commands utilized to make sure that everyone is on the same sheet of music. The following is the basic sequence of events to rappelling.

1. Check to make sure that all ropes are properly connected.

2. The person rappelling connects onto the rope. How the rope connects into the carabiner can be seen in figure 10.

3. After connecting onto the rope the person rappelling yells to the belay person "ON RAPPEL". The belay person should then reply "ON BELAY". If there is no response from the belay person, the person rappelling should not move, but yell "ON RAPPEL" again. Once the person rappelling hears the correct response, then he or she should proceed, and not any sooner.

4. The person rappelling will work their way out to the edge, slowly letting out rope until perpendicular to the slope in an "L" shaped position.

5. The person rappelling should then test the brake by bouncing on the line. It is too late not to commit, but this is a reassurance to all involved that the system is working and the belay can let up a little.

6. Now the person rappelling can work their way down the obstacle by releasing friction and throwing out short amounts of line with the brake hand, without ever completely letting go of the rope. The person

rappelling stops by bringing the rope to the small of their back, again causing enough friction to stop the descent.

7. Once reaching the bottom of the obstacle, the person rappelling should walk backwards off the line, making sure to never step on the rope. Once off the line he or she should yell “OFF RAPPEL” and then the belay person can relax and yell “OFF BELAY”.

That is rappelling in a nut shell, but remember that this should not be done without qualified professionals assisting in the operation.

Using a Stokes Litter: A stokes litter is a specialized piece of rescue equipment that many CAP teams do have access to. There is a certain way to use this piece of equipment also. The following diagrams in figures 12 to 13, will show you how to basically use the stokes litter. As a side note, just because you own a piece of equipment does not mean that you know how to use it, and diagrams to not give justice to complete instruction. This text is meant to be used as partner to practical training, so please do not consider yourself qualified to use this equipment by simply reading this text or looking at a few pictures. Teams will need to be familiar with the following:

1. Tying patient into the litter

2. Hooking Ropes onto the litter

3. Horizontal evacuation

4. Carrying the litter

The following figures diagram the above noted techniques.

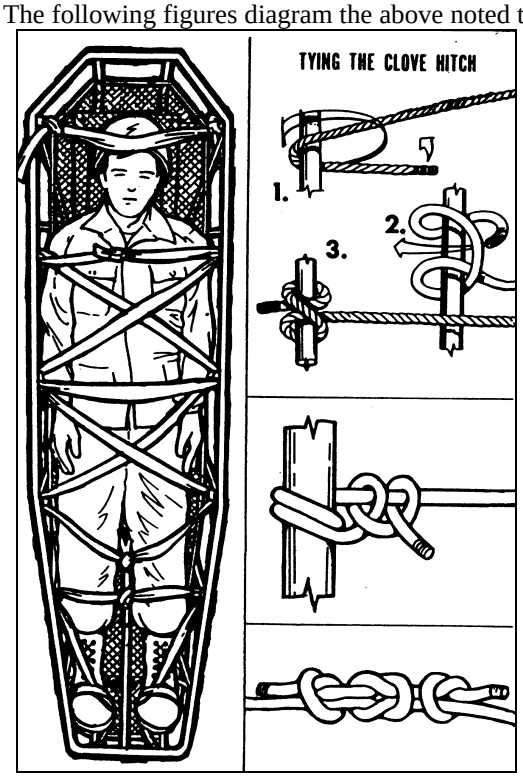


Figure 12: Tying the patient into a Stokes litter

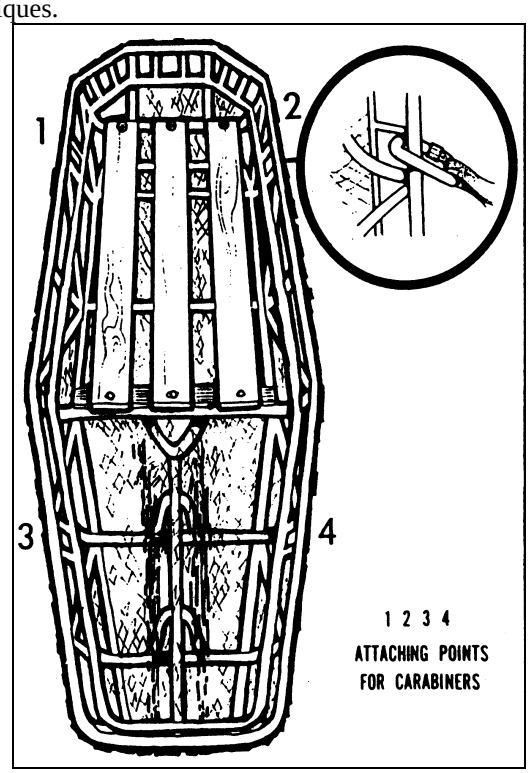


Figure 13: Attaching points for carabiners

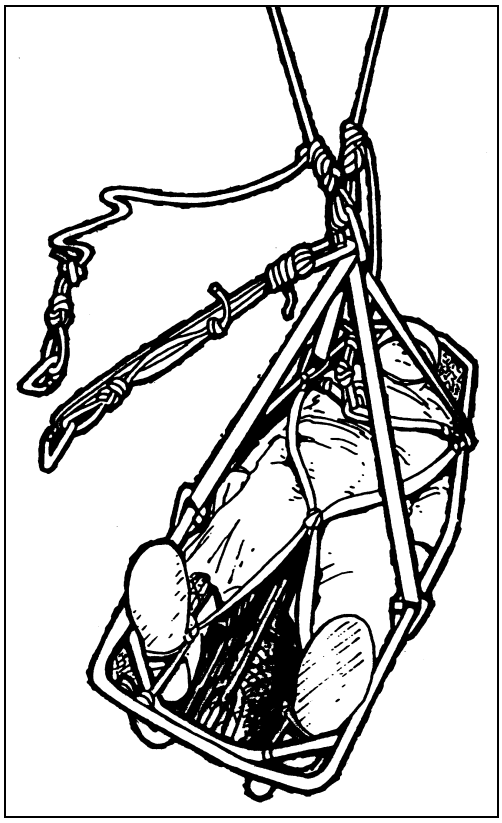


Figure 14: Rigging the Stokes litter for horizontal evacuation

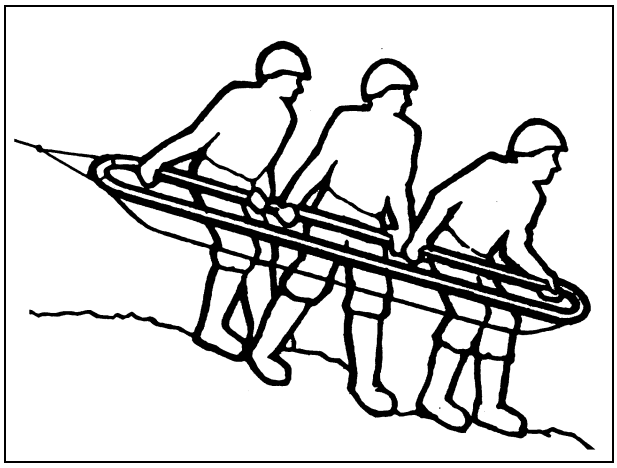


Figure 15: Carrying the Stokes litter

Additional techniques for loading and carrying survivors on the military standard litter are included as Attachment E to this reference text, as excerpted from AFH 36-2218, Self Aid and Buddy Care.

Chapter review questions

1. True or False: All CAP members can rappel on ES missions as necessary, with a minimum of guidance.
   a. True
   b. False

2. True or False: A bowline is typically used to tie-down aircraft.
   a. True
   b. False

3. True or False: A figure of eight bend re-threaded is often used for rescues by having a person tie it around their waist.
   a. True
   b. False

4. True or False: If a rope has been exposed to extreme cold or heat for extended periods, it should be retired.
   a. True
   b. False

Supporting Tasks

Basic: O-0501 and O-0502.

Advanced: O-0503, P-0202, P-0203, and P-0204.

CHAPTER 9
LAND SURVIVAL

Chapter objectives

1. Demonstrate the practical skills necessary to build a shelter capable of withstanding the elements with minimal equipment.
2. Demonstrate a practical knowledge of water collection and filtration methods.
3. Understand how to build a trap and catch animals for survival as necessary with minimal equipment.
4. Demonstrate ho to build a fire with minimal equipment.

There are three tangible things that every person needs for survival: water, shelter, and food. Not enough can be said for having the right attitude and the will to survive, but because of its' intangibility and differences that cannot be measured, it can not be determined to what level it is required for minimal survival. A positive attitude goes a long way though. Additionally, fire, although comforting and psychologically soothing, is not absolutely necessary, but will be discussed in this chapter because of the added benefits to the individual that at brings to the survival scenario.

This chapter and the class session assigned for this topic will briefly demonstrate, diagram, and describe how to implement techniques used in wilderness survival scenarios. To get the most benefit out of this type of training, you should participate to your fullest. If you don't know how to survive in a controlled environment, how can you be expected to survive when it counts!

Water procurement and filtering

The first necessity for survival is water. There are several ways to get potable water. There are the obvious places like rivers, streams, and other natural running water sources that will need to be purified. Everyone has seen a picture of the woodland creature bathing in the water, and needless to say doing other things, so we must purify it so that we don't get exposed to the many diseases and sickness abundantly available in the wilderness. Then you have the less than obvious sources, such as from the ground and plants by using a solar still or foliage and transpiration bags.

You can do one of three things to purify water:

> 1. Boil it. Boiling water kills most if not all pathogens in the water. Bringing water to a full boil will kill any organisms, but it will not remove harmful chemicals or poisons.
>
> 2. Filter it. You can make a water filter like the homemade ones diagrammed in the following figures, or you can purchase a commercial filter that will "remove" bacteria. These handmade filters are not the most reliable method, but they tend to be effective. Commercial filters certified by the National Sanitary Foundation are very effective at removing harmful material of all sorts from water.
>
> 3. Chemically purify it. You can use chemical purifiers like water purification tablets or crystals of an iodine base, which you should be carrying. This tends to be effective also, but you must follow the directions.

The diagrams on the following pages are self-explanatory, but remember to follow this simple rule. Don't trust local water, especially standing water, but not even running water. You don't know what invisible toxins or bacteria are lurking in it, so water should be purified prior to drinking.

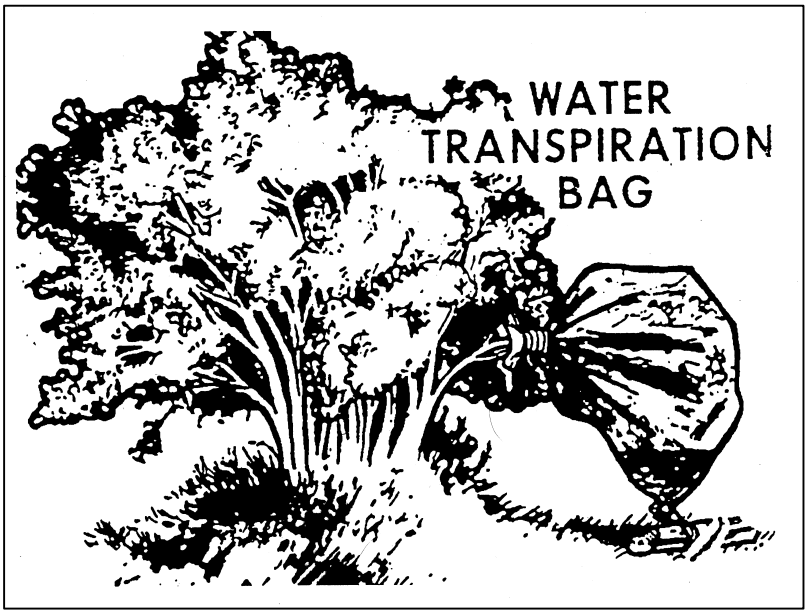


Figure 1: Water transpiration bag

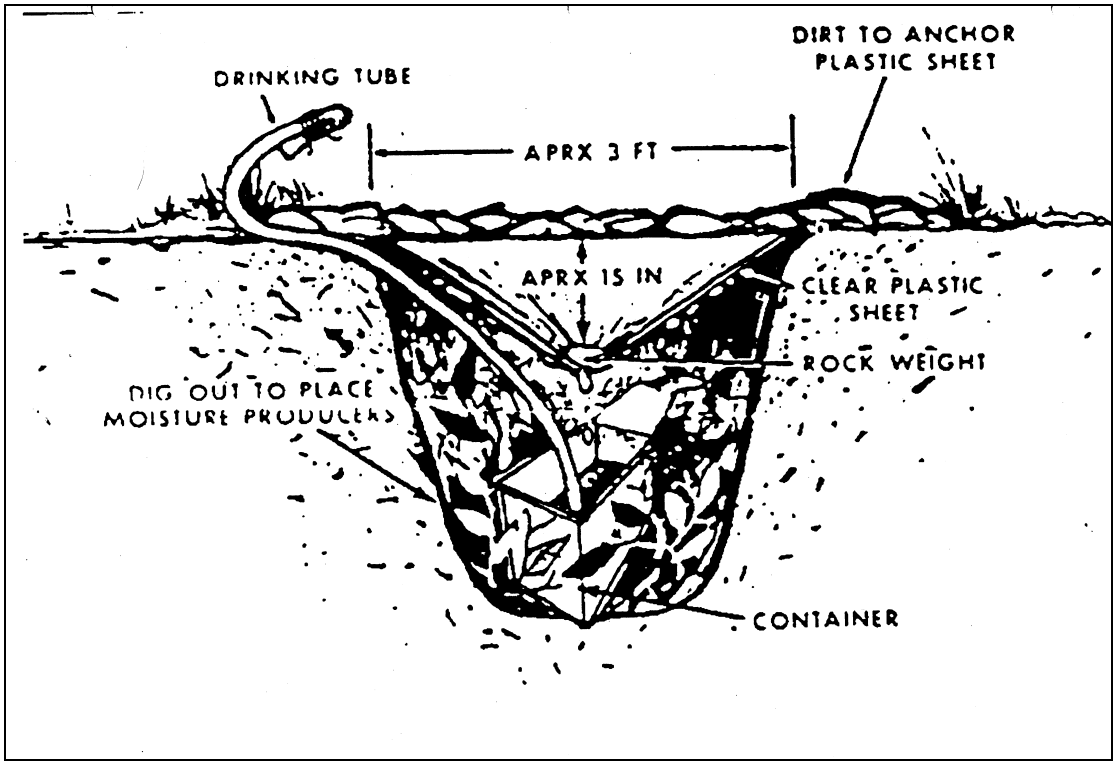


Figure 2: Solar still

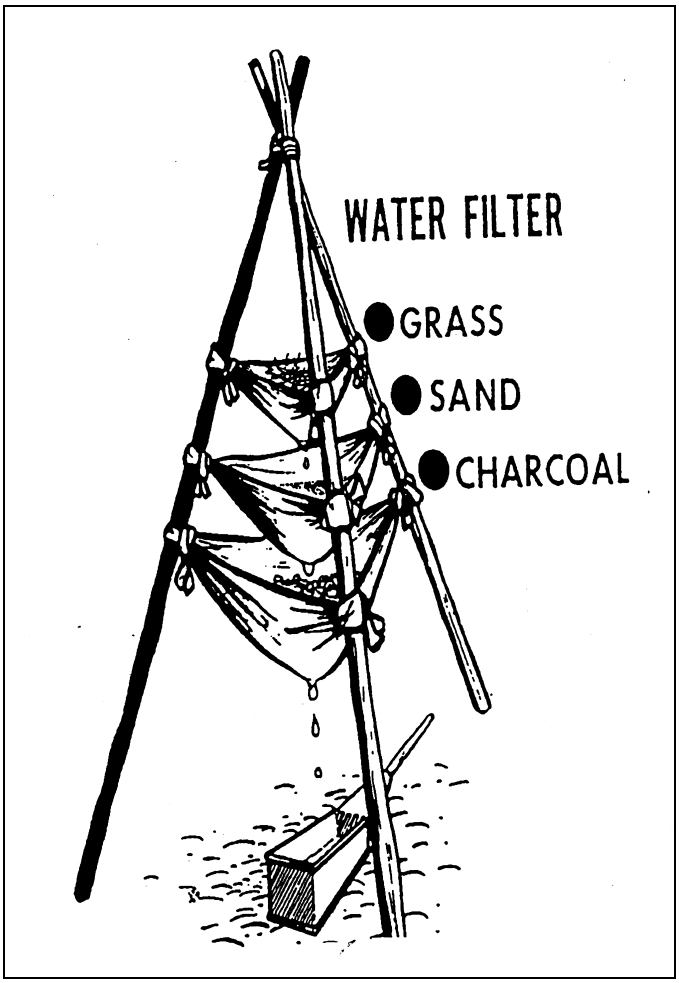


Figure 3: Filtration tri-pod

Shelter Building

Shelters can be constructed from just about anything, but you should remember that a shelter should be designed to last you as long as you may need it to protect you from nature's elements. You do not want to have to rebuild your shelter over and over again. Also, make your shelter to protect you from the elements of the season, but do not go overboard. The kind of shelter you build depends on your location and what kind of weather you could encounter. On the following pages you will find some easy to understand diagrams of shelters to guide your endeavors.

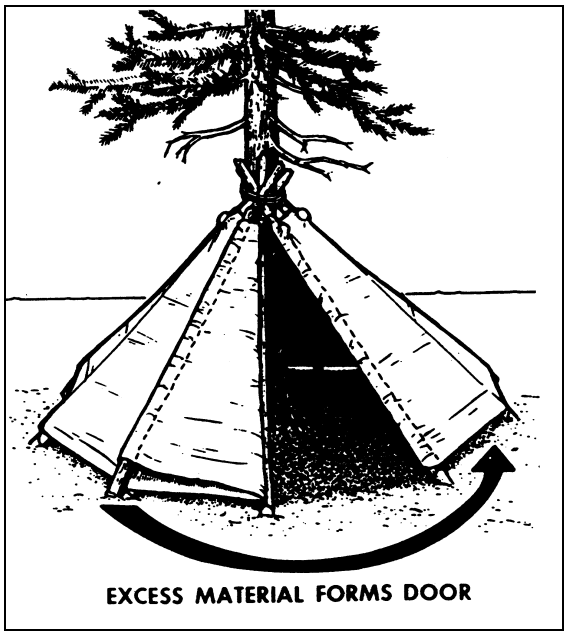


Figure 4: Fan shelter

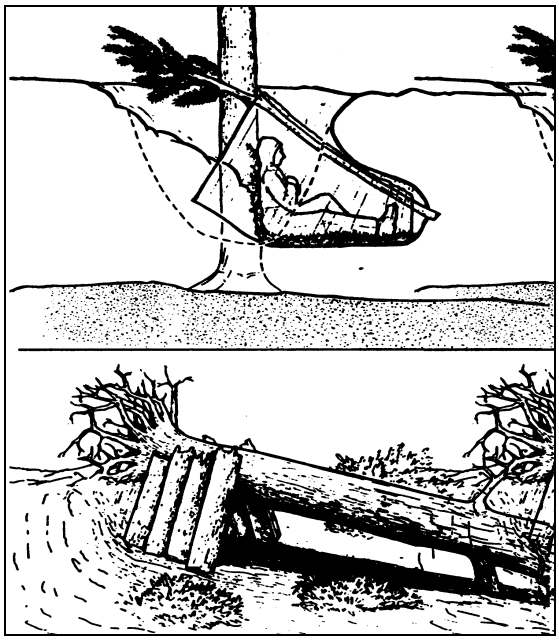


Figure 5: Field expedient shelters

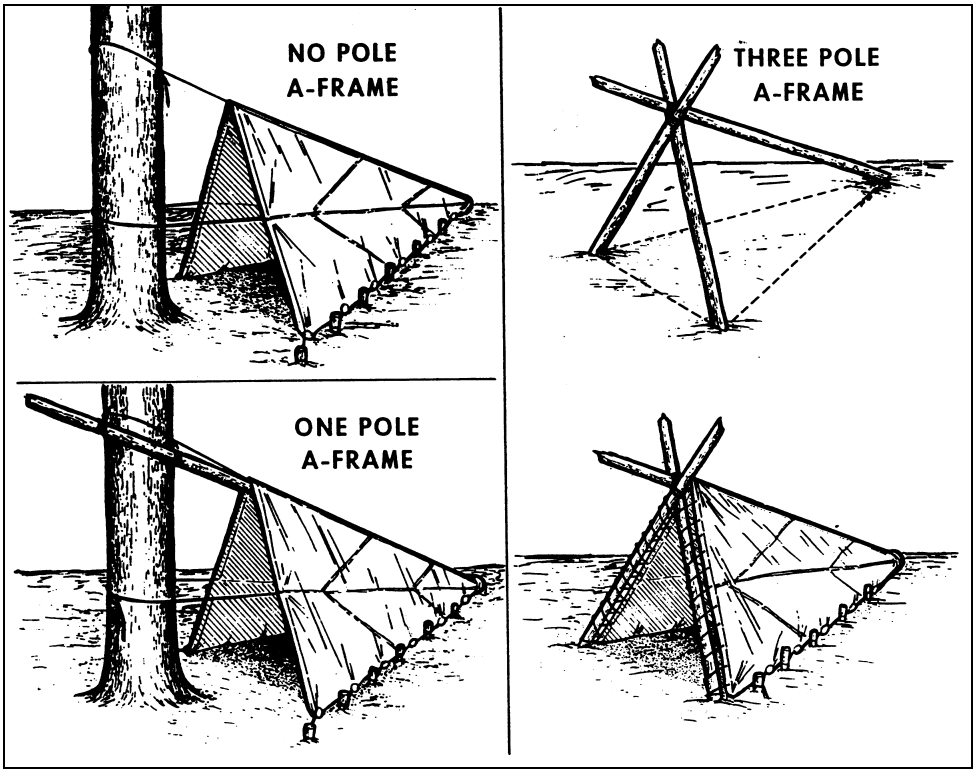


Figure 6: A-frame shelters

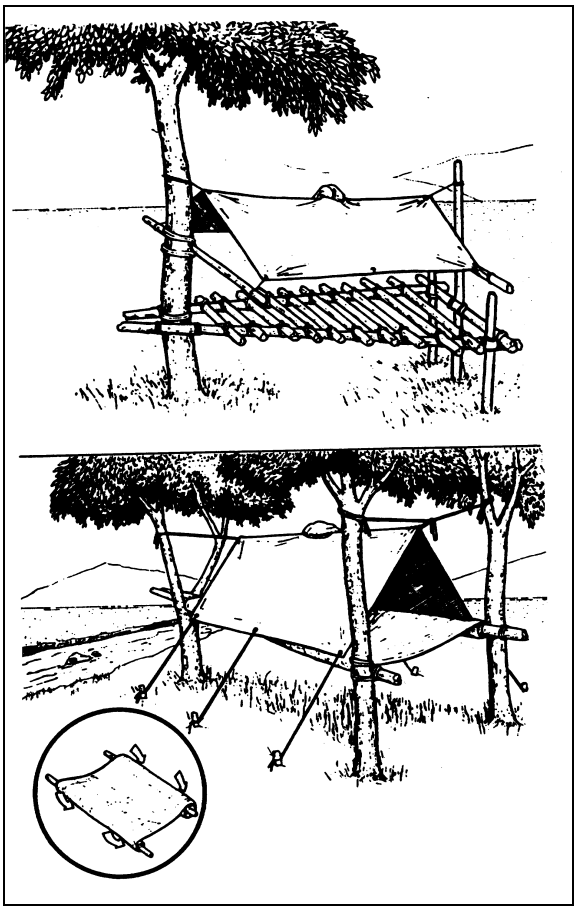


Figure 7: Raised platform shelter

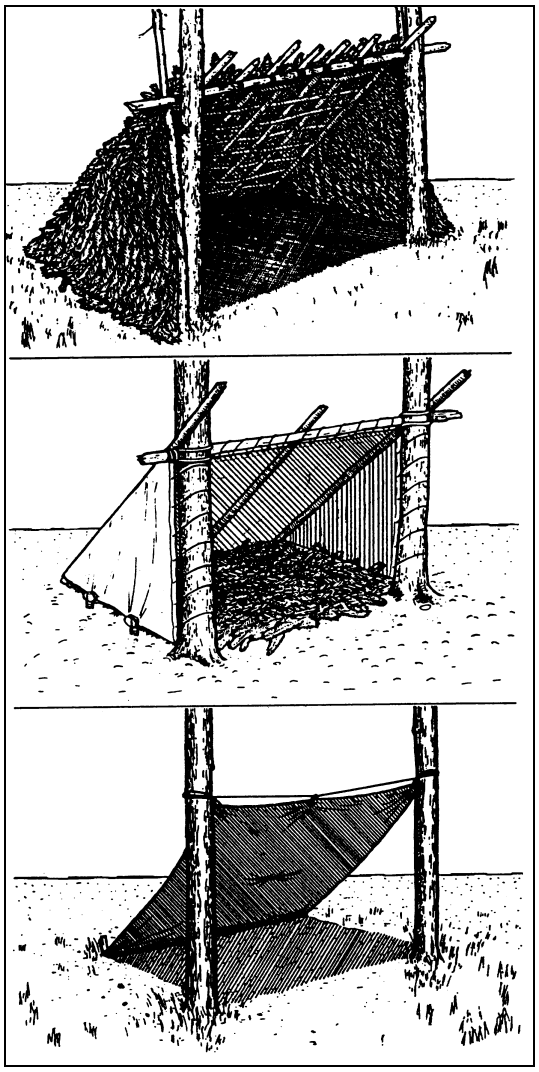


Figure 8: Lean-to shelters

Food Procurement

The third necessity for survival is food. On the wilderness there is always plenty to eat; the problem is knowing how to get it, and how to avoid poisoning yourself. Animals can be captured or caught for their meat through the use of snares, traps, squirrel poles, or even by using a twist or noose stick, should you so desire. Fish can be caught by using hooks made from wire, wood, safety pins, or by fashioning a net from what you have available to you. Practicing hunting and fishing skills would be good experience for you, but remember that you should not kill something to eat unless you truly intend to eat it. In a survival situation you should conserve all of your available resources and avoid waste. Wrap or smoke your captured food to preserve it. Don't set traps unless you need to, and when you are through, disassemble your traps. Give others the same chance in an emergency that you have in training.

Plants are all around you, and many of them are edible. It is very tricky to determine what can and can not be eaten, so we would not recommend eating plants along the trail. Don't eat whole plants, and don't try small pieces of things to see if it is poisonous. It does not take much.

Fire Building

Although fire is not a necessity to survive, it does make life in the wilderness more comfortable. On the following pages you will see diagrams of how to make and use fire. Remember though, that you may end up in situations where you can't or should not start fires such as during high danger seasons in national forests or when providing security for a crash site until the authorities arrive (damaging evidence at the site does not reflect favorably upon your team, as well as the dangers of igniting aviation fuel which is normally present in large amounts at an accident site. Also, do not forget to thoroughly put out any fires you start. No CAP member wants to be responsible for starting a forest fire of any sort.

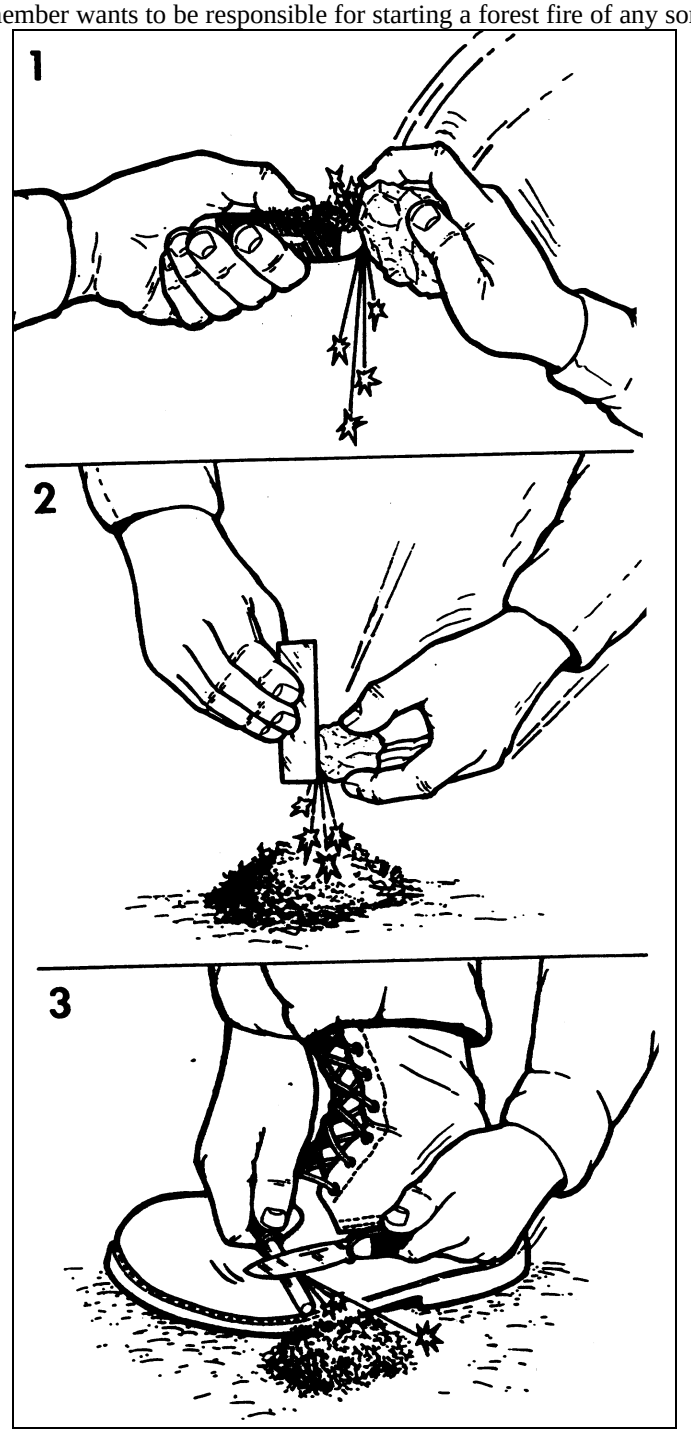


Figure 9: Fire starting with flint and steel

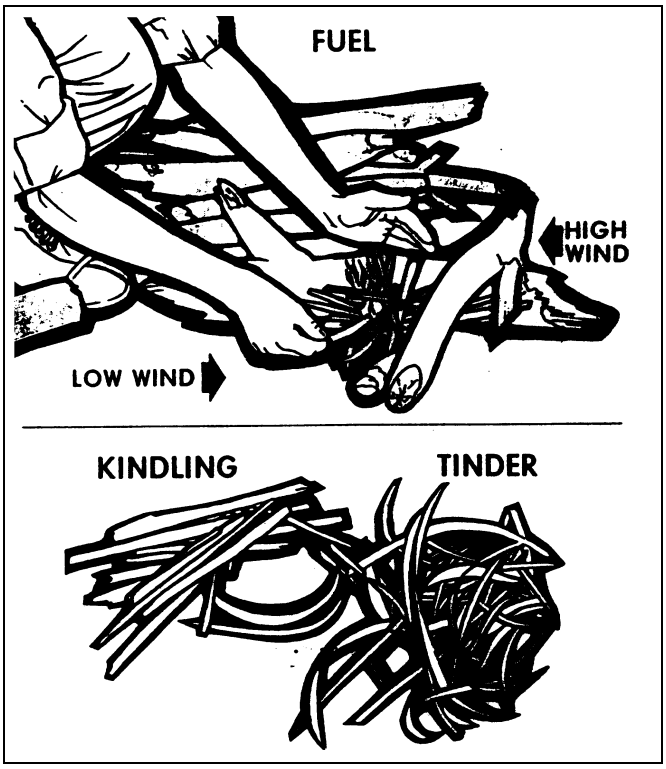


Figure 10: Stages of fire

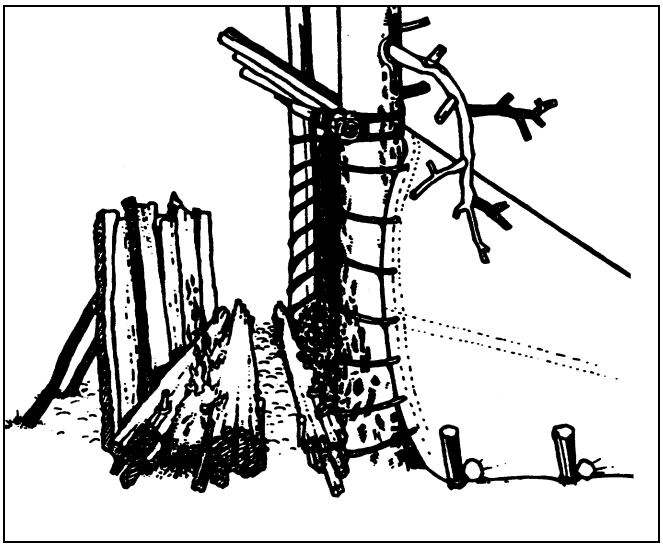


Figure 11: Fire reflector

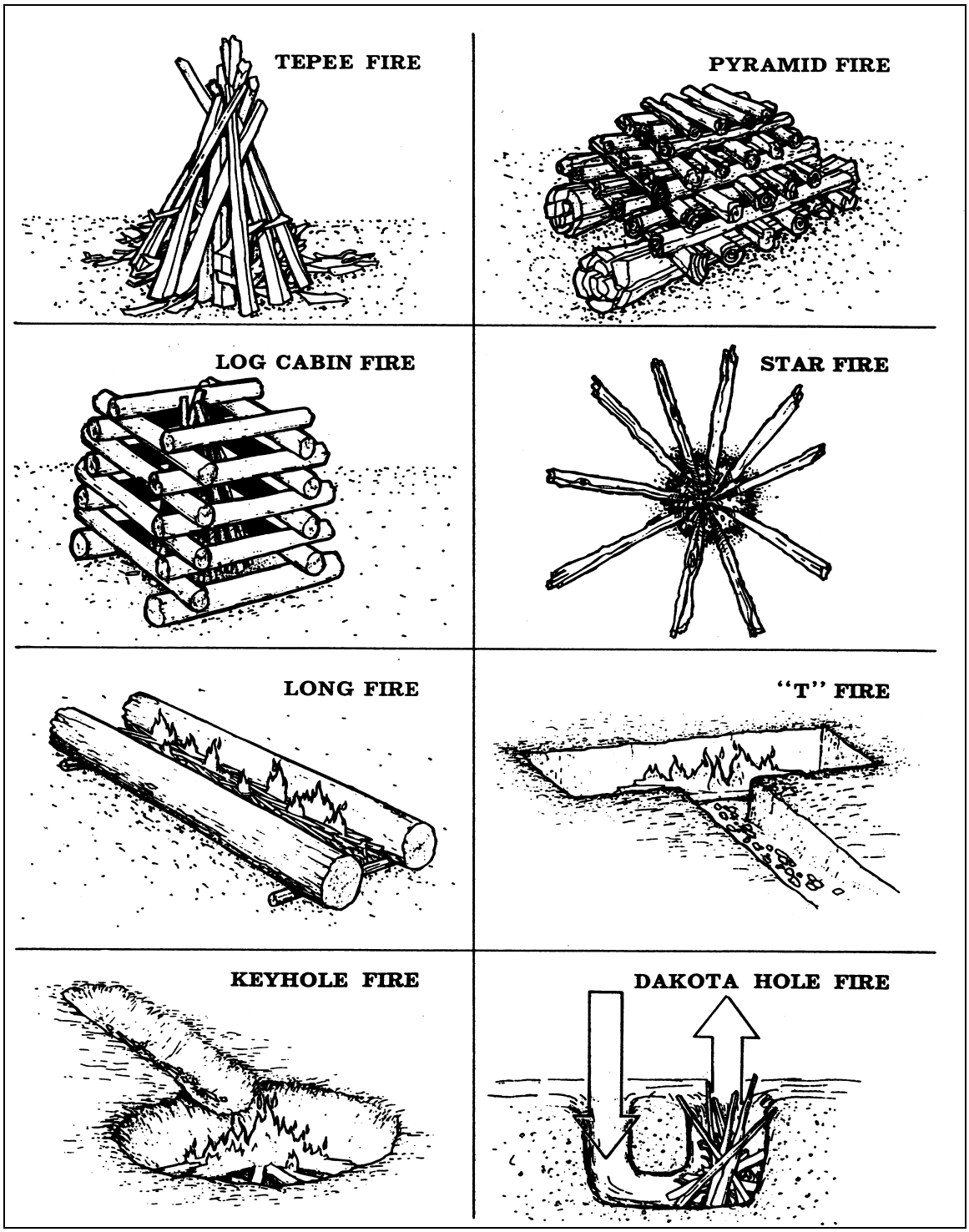


Figure 12: Fire lays

Putting out the fire

To extinguish an outdoor fire such as a campfire or small brushfire:

1. Keep upwind of the fire

2. Have all personnel, vehicles and equipment ready to clear out quickly.

3. Use water if available. Do not use the drinking water supply if it cannot be easily replenished. Splash, spray or sprinkle water onto the fire, do not pour it on all at once. As the water is put on the fire, break up big pieces of material if possible, spread out any burning or smoldering material, turning it over to ensure that all areas are wetted. Continue to add water while disturbing the material until all signs of flame and glowing embers are extinguished. Dig up or overturn the soil under the burned area to try to mix the ashes into the soil.

4. Using care, place your hand close to the burned area to ensure that it is cool. If not, add more water and continue disturbing the material until it is cool.

5. After the fire is out and cool, ensure the burned material is adequately mixed in with the soil.

6. Be prepared for flare-ups.

7. If water is not available, or in combination with water if it is, throw soil, sand, etc. onto the fire while breaking up, spreading around and disturbing the burning material, mixing it in with the soil.

8. Blankets, coats, shelter halves or similar objects of heavy fabric, not plastic or synthetic, can be used to extinguish flames by beating directly on the flames to smother them. This must be done directly on the flames, otherwise this action will fan the flames, causing the fire to grow in intensity. This technique can also be used in combination with water, and the objects should be wetted if it is.

9. Campfires, signal fires and warming fires must always be completely extinguished and cool to the touch before leaving them.

10. Efforts to extinguish a brushfire should only be attempted if the fire is very small, there is little or no wind and an escape route is planned. If in doubt, retreat and notify authorities.

Chapter review questions

1. True or False: Fire is a necessity for survival.
    a. True
    b. False

2. True or False: Even running water from a stream or river should be purified prior to drinking.
    a. True
    b. False

3. The three necessities of life are:
    a. Food, Water and Fire.
    b. Food, Water, and Shelter.
    c. None of the above.

Supporting Tasks

Basic: O-0601, O-0602, O-0603, O-0604, and O-0605.
Advanced: P-0202, P-0203, and P-0204.

CHAPTER 10
AIR - GROUND SIGNALLING

Chapter objectives
1. Recognize a signaling aircraft and the signal given.
2. From a chart, identify proper signal for a given circumstance to signal an aircraft.
3. Recognize a deployed ground signal.

Sometimes an aircraft will not be able to communicate via radio with ground teams, and vice versa. In this circumstance, techniques have been developed to have the team lead into the target, as well as to communicate general ideas back and forth between the aircrew and the ground team.

Ground Team being Mobilized by an aircrew
To get the team to follow them, the aircrew will fly one or more low passes over the vehicle, from the 6 to 12 o'clock, while gunning the engine. A diagram of this maneuver is provided in Figure 1. At this time the ground team should readily identify the aircraft as the one that is supposed to be leading them. This can be a problem, so the mission base must identify to the ground team which aircraft to follow with a description of the aircraft. If this does not happen, the ground team may end up following the wrong aircraft, obviously causing many potential problems.

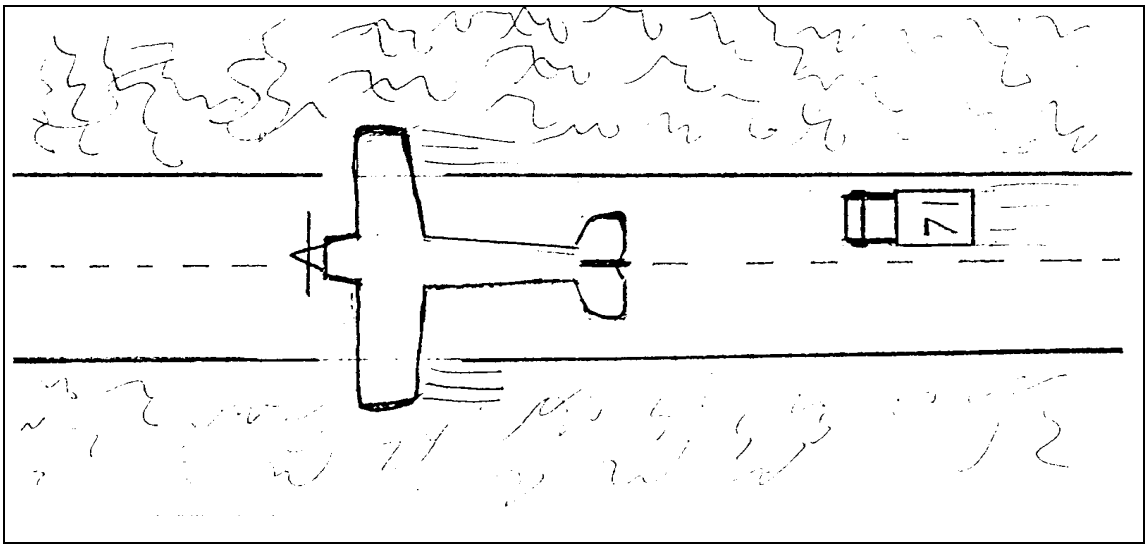


Figure 1: Aircrew leading a ground team

Ground Team being halted by an aircrew
Teams will obviously have to stopped if they have been mobilized. This may be done for several reasons; the ground team is heading in the wrong direction, the ground team has reached the jump off point, or the aircraft working the air to ground coordination may need to go back and refuel. To have the ground team stop, the aircraft will fly directly towards the ground team vehicle, and over it from the 12 to 6 o'clock positions. This maneuver is depicted in figure 2. Once this is indicated by the aircrew, the ground team should stop at the next safest place to do so. The ground team should not move until the aircrew indicates to do so, or mission base notifies you of anything to the contrary like a change in aircrew or teams being ordered to return to base for mission closure.

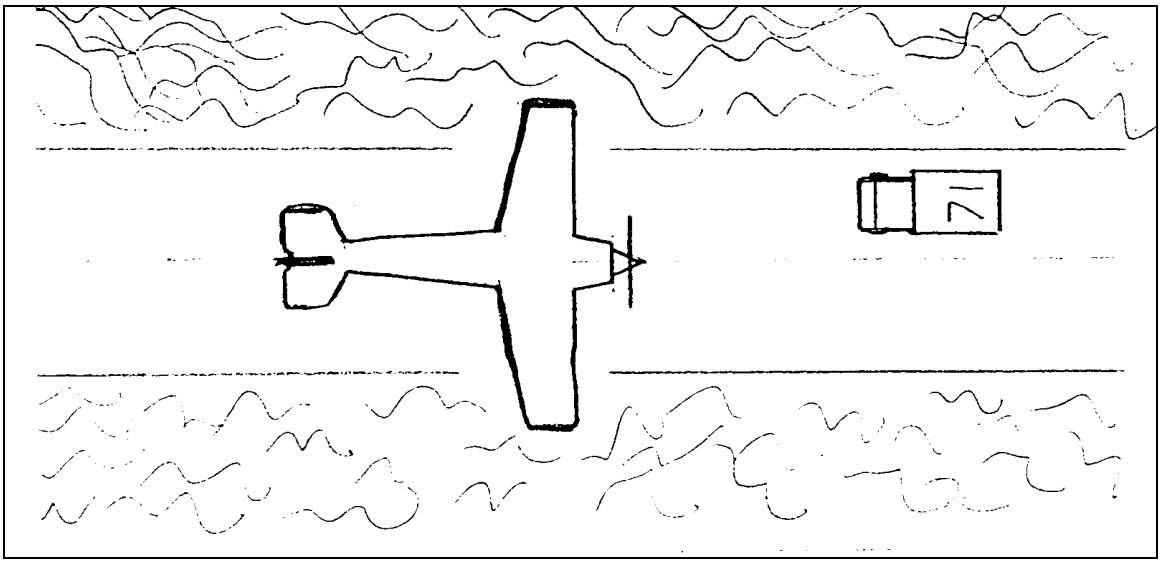


Figure 2: Aircrew stopping a ground team

Aircrew indicating a turn

Ground teams will often be lead through complex intersections. In accomplishing this task, the aircrew will fly in its normal position over the road until the turn is to be executed, and then the aircrew will perform the bank necessary to stay on the road desired. The aircrew should wait until the ground team is relatively close to the turning point before indicating the turn. If the aircrew turns too soon or too late then the ground team may turn at the wrong point causing unnecessary delays. The aircrew should fly at a higher altitude after executing the turn to make sure that the ground team turned at the proper place. A diagram of this procedure is provided in figure 3.

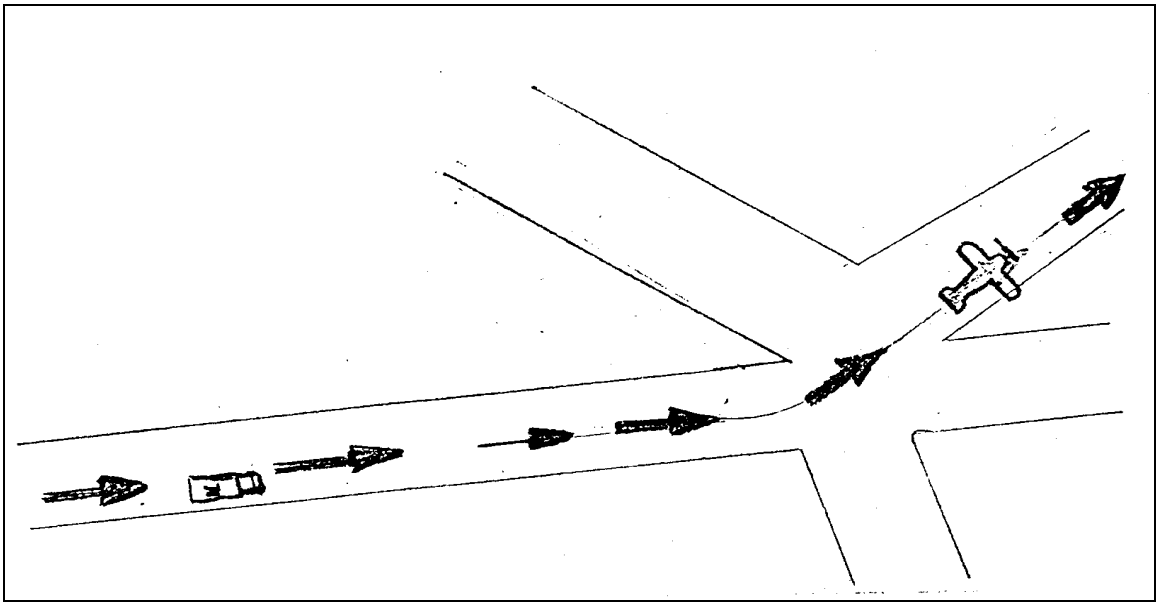


Figure 3: Aircrew indicating a turn

Aircrew leading a team to the target

The last major thing that an aircrew can indicate to the ground team is the jump-off point. This is indicated by the aircrew first stopping the ground team vehicle by using the previously described technique. After the team is stopped, the aircrew must indicate the direction the ground team should move out in. The aircrew will do this by

flying in the direction of the target, circle the target a few times, and then return to the ground team. Upon returning to the ground team the aircrew will make a 180-degree turn and again lead the ground team in the direction of the target. The aircrew should continue doing this until the team has found the target. Figure 4 depicts a ground team being lead to a target crash site.

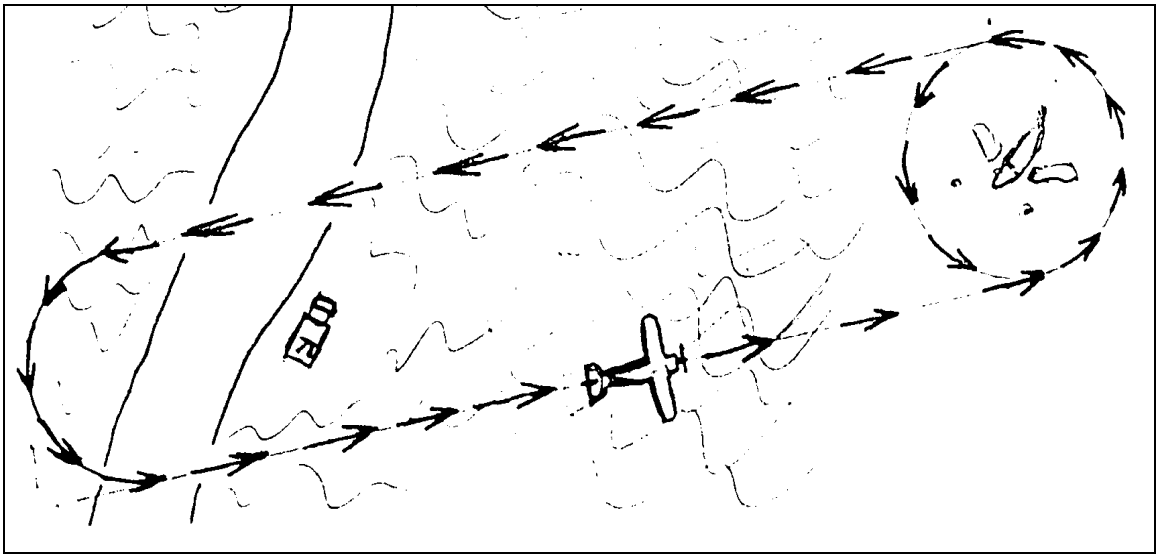


Figure 4: Aircrew leading a team to the crash site

Ground to Air Emergency Codes

Personnel on the ground can communicate many things to the aircrew without ever truly talking to them. This is accomplished by using ground to air emergency codes. The following diagram, figure 5, shows the current signals recognized in the most recent FARs and the National SAR Manual. These can be made by pilots who have crashed or ground teams to indicate their current status. Signal paulins, tarps, tracks in the snow or dirt, other distinguishable means can be used to draw these markings on the ground. Be careful to make sure that your signals are large enough to be seen, and if multiple signals are used, do not make them confusing. Remember that the aircrew may not be looking at this from the same perspective as you, and this could cause many unnecessary delays.

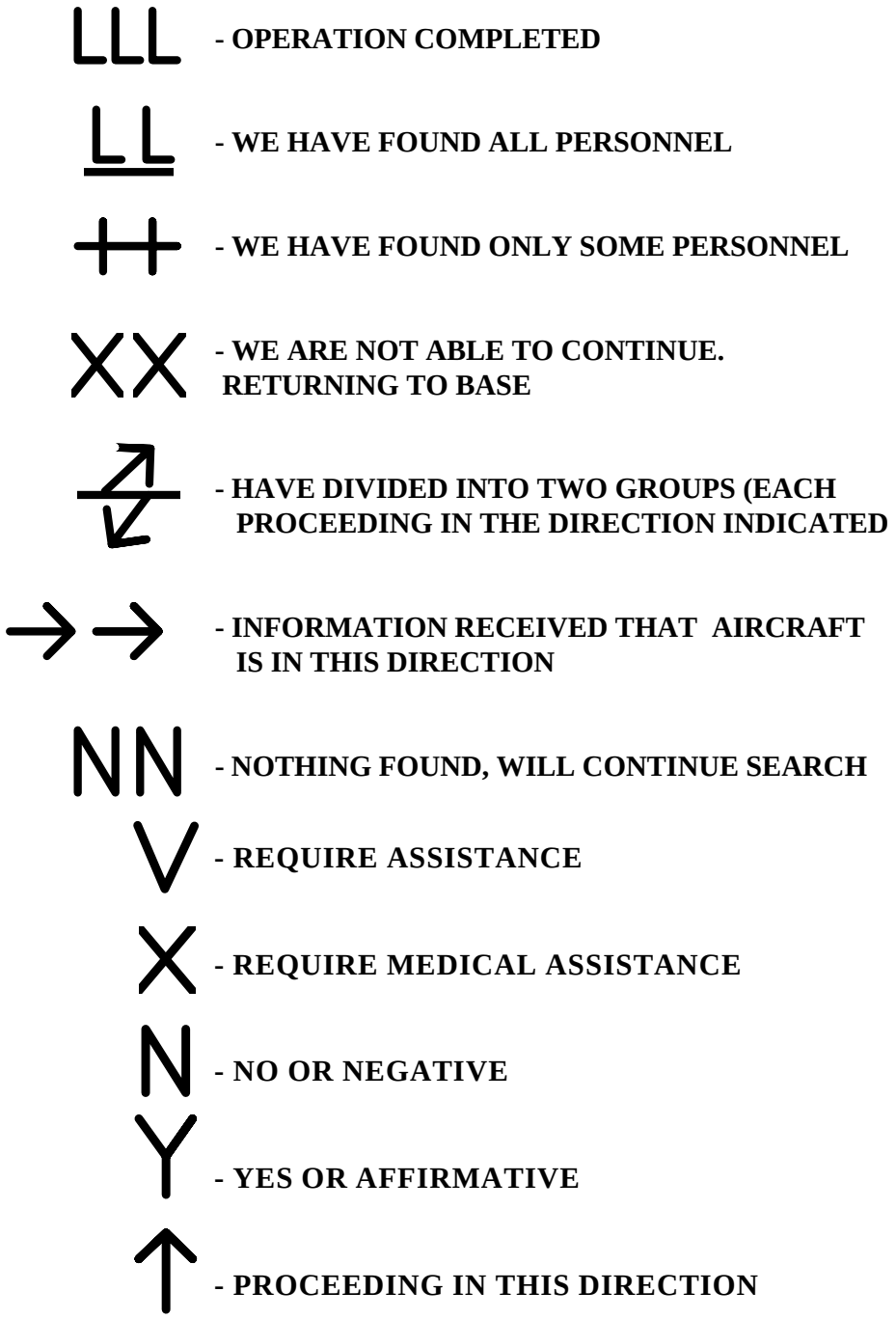


Figure 5: Ground-Air Emergency Signals

Aerial Acknowledgements

Aircrews reading signals on the ground will respond to them by noting whether or not the message was received and understood or not. A diagram of how an aircrew acknowledges this is shown in figure 6. Make sure that you pay attention to the aircraft's response. Aircrews may also use a message drop to give you further instructions.

This is not done often, but in extreme emergencies, this has been utilized. Ground team members need to be aware of this possibility, and take caution during this type of communication.

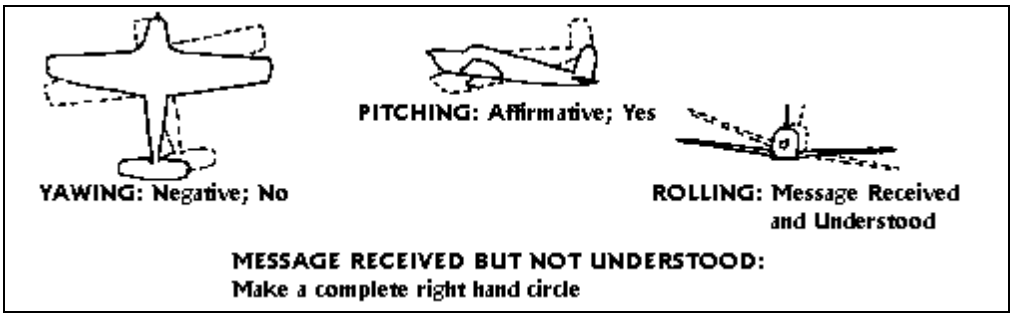


Figure 6: Aerial acknowledgements

Using a Signal Mirror

At times, you may have radio difficulties and need to attract the attention of an aircraft. Even if you have radio communication with the airplane, the pilot might be having difficulty in spotting you. In daylight, using a signal mirror is an excellent way to attract a pilot's attention, or let him know where you are. Mirror signals can be seen for over 70 miles under normal conditions. Over desert terrain or on the water they can be seen from over 100 miles. A signal mirror can be a high-tech glass mirror (military MK-3 signal mirror) or just a highly polished piece of metal. Mirror signals work well even on hazy or overcast days.

To use the MK-3 signal mirror: To properly use the MK-3 signal mirror, follow the instructions below, and refer to figure 7 below.

1.Outstretch one hand in the direction of the airplane, leaving the palm facing you.

2. With the mirror, reflect sunlight into the palm your outstretched hand.

3. Move your outstretched hand out of the way. Slowly bring the mirror up to eye-level and look through the sighting hole. You will see a bright spot of light. This is the aim indicator.

4. Hold the mirror near your eye and slowly turn and manipulate it so that the bright spot is on the target aircraft. If having a tough time lining up on the airplane, the individual might try sighting the mirror between two fingers on the outstretched hand.

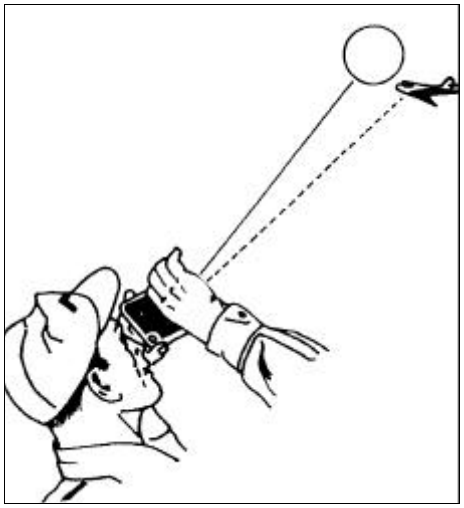


Figure 7: Sighting the MK-3 signal Mirror on an approaching aircraft.

Actions of the Ground Team

When a ground teams is put into the position of having to do air to ground coordination there are a few simple guidelines that all members of the team should keep in mind.

1. The vehicle front is labeled as 12 o'clock and so on around like a typical clock so that there is uniformity. The driver will be confused and busy enough to not have to worry about going in the wrong direction.

2. The navigator needs to be continuously aware and notice possible turns or hazards ahead of time and notify the driver so that hazards can be avoided.

3. The vehicle should be as quiet as possible, and preferably have the windows open so that the team will notice things out of the ordinary such as smoke or cries for help. Use all of your senses. The smell of burning fuel or scavengers could be your final clue.

4. NEVER leave the vehicle to go off-road without your gear, and try not to leave the vehicle unattended if at all possible. Running back and forth to get supplies is not a wise idea. Take what you think you will need and improvise when you must.

5. Stay as calm as possible and follow all motor vehicle laws in the process such as speed and wearing of seat belts by all passengers. CAP is almost never going to arrive in what first responder's typically call the golden hour. A few minutes extra to guarantee that you get there safely is better than scrubbing the entire mission because of a motor vehicle accident.

Ground teams and aircrews should regularly participate in an air to ground coordination exercises both on and off the road to remain proficient and train new team members. Just because you have done this in the past does not mean that you could not use a refresher.

Chapter review questions

1. The ground emergency code of an "X" indicates what?
   a. Require assistance.
   b. Require Medical assistance.
   c. We are not able to continue.
   d. None of the above.

2. The ground emergency code of "XX" indicates what?
   a. Require assistance.
   b. Require Medical assistance.
   c. We are not able to continue.
   d. None of the above.

3. The ground emergency code of "++" indicates what?
   a. We have found all personnel.
   b. Operation completed
   c. We are not able to continue.
   d. None of the above.

4. An aircraft is responding to your message by yawing the aircraft. The indicates that the answer is:
   a. No or Negative.
   b. Yes or affirmative.
   c. Message received, but not understood.
   d. None of the above.

5. True or False: It is not necessary to bring your 24 hour pack with you when you leave the vehicle.

a. True

b. False

Supporting Tasks

Basic: O-0701, O-0702, and O-0703.

Advanced: P-0202, P-0203, and P-0204.

CHAPTER 11
HELICOPTER OPERATIONS

Chapter objectives
1. List and explain the reasons to transport survivors via helicopter.
2. Understand the aggravating factors of a patient that may cause the recommendation for use of a helicopter.
3. Understand the requirements in establishing a helicopter landing site in day or night.
5. Explain and understand how to approach a helicopter as well as the rules of participation within the landing site.
6. Pending availability, participate in the selection, establishment, and actions within a helicopter landing site.

Reasons to transport survivors via helicopter
There are several possible reasons to transport survivors by helicopter. Consider the following questions in deciding to request a helicopter.

1. Would the amount of time needed to transport a patient by ground transportation to an appropriate facility pose a threat to the patient's survival and recovery?

2. Would weather, road conditions, or other factors affecting the use of ground transportation seriously delay the patient's access to advanced life support care?

3. Does the available rescue have the clinical skills or equipment needed to care for the patient during transport?

Medically speaking, there are several aggravating factors to the health and welfare of survivors that most medical personnel would recommend helicopter transport. Table 1 lists several potential aggravating factors affecting helicopter transport. If a patient falls into any of these categories, helicopter transport may want to be considered.

Head injuries or comatose
A systolic blood pressure <90
A respiratory rate <10 or >35
A pulse rate <60 or >120
Paralysis of extremities or spinal cord injuries
Associated fatalities
A sprung or crushed pelvis
Severe oral or facial injuries
A need for Advanced Life Support
An inability to maintain a patient airway
A prolonged extrication

Table 1: Aggravating factors to consider in requesting helicopter transport

Information needed to request helicopter transport
When you request helicopter transport you should the information needed by the transporting agency ready prior to making the request. By having the information available, it will make the process go much faster, and makes it much easier for everyone involved. At minimum, the person requesting the helicopter should have the following information available.

Team name, organization, and team information: Who is actually on site to work with the helicopter crew? Does the team have experience working with helicopter crews, or is the crew inexperienced? What kind of equipment do they have available to help in preparing the landing site? This all needs to be considered so that the crew knows who they are dealing with.

Exact location of the accident, Latitude and Longitude: Our team may have found a suitable site, but the aircrew may have a better alternative available to them by knowing exactly where the accident has occurred. The crew may decide to land close by and send a paramedic to the scene to better assess the situation while a more suitable landing site is prepared. Trust the crew aboard the helicopter. They are trained professionals that do this on a regular basis, and they have the same goal as you: to rescue survivors and preserve life.

Accident location in relation to towns or major roads: By letting the aircrew know what is nearby, they may be able to arrange for better trained personnel to arrive before they do. Most small towns have someone trained to work with local helicopter crews, or at a minimum have suitable landing sites for helicopter evacuation already designated within the community. This can save you a lot of time, and again helps survivors.

Nature of Accident: The helicopter is going to want to prepare for the victims on site so that they can get in and out quickly. Additionally, many crews have specialized trauma team personnel available to them to go out to the site and begin early primary care. By knowing the type of accident and injuries the crew can be better prepared to help all involved.

Number and relative ages of patients: The dispatcher will want to know how many people are to be transported and their ages so that the crew can again be better prepared. Additionally, other resources may need to be dispatched to adequately serve the needs of survivors. Most helicopter can only hold two, possibly three survivors plus the crew, so decisions on priority of transport or alternatives may need to be worked out.

Whether patients are or were trapped: Survivors that have undergone a long extrication or were not found for several days after the initial trauma will need to be handled differently than the typical car accident victim. Crew will need to be prepared to handle not only the physical injuries, but also much of the psychological trauma associated with this type of scenario.

Frequency and call signs to communicate with ground crews from the helicopter: Good communications are essential to the smooth running of a rescue. Ground teams and Helicopter crews will need to be in radio contact if at all possible to plan out last minute details. This also facilitated instructions to be passed to ground crews that are relatively new to this option. Most CAP ground teams do not get the opportunity to work with helicopter rescue crews until it is time to use them, and thus the helicopter crew may need to provide some last minute instructions to the ground team to make sure that everything works well.

Landing Site Requirements

The typical helicopter landing site should measure at least 60 feet square, but a larger site is always preferable. This could be larger depending upon the helicopter used. Team members wanting to use meters because they already know there pace count in meters should estimate that one foot is equal to one-third of a meter. The site will end up slightly larger, but the helicopter crew will appreciate it. Establishing a takeoff and approach area to the actual landing site is a wise idea. It is recommended that the approach area be at least twice the length of the actual landing area (120 feet or 40 meters) and at least the same width, on the side of the landing site where the ground level wind is coming from. This allows the crew more ground distance for the approach and landing, and allows the helicopter also take off into the wind gaining altitude more easily. Take into account that obstructions surrounding the site cause the site necessity to be larger. Refer to figure 2 for examples. Also, remember that even though a helicopter may be able to land or takeoff along a vertical plane in most situations, most helicopter pilots will want to have an approach and takeoff area. This insures that there is some room for emergencies and as the load increases with additional passengers or the situation changes.

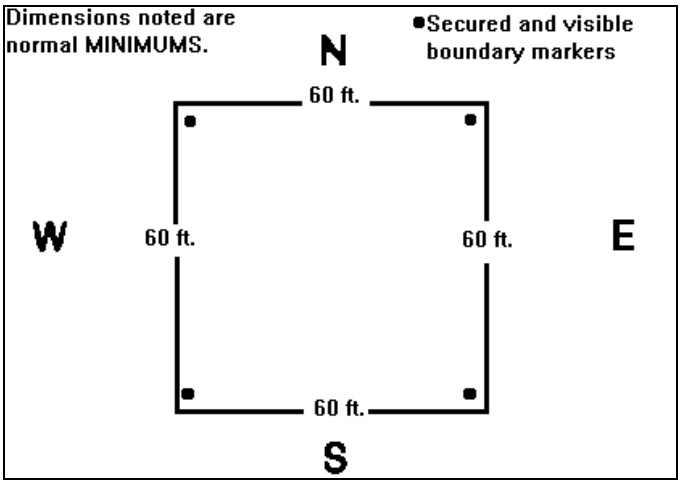


Figure 1: Landing site minimum dimensions

General Considerations: Consider the type of ground that you want to have the pilot land the helicopter on. Helicopters are used to get into some tight spots, but should be treated as a delicate and expensive peace of equipment. Use proper hand signals to tell the pilot where to land if requested (see attachment B to this manual). Don't try to have the helicopter land on an extremely sloped or rocky field. The helicopter could be damaged and it makes it more dangerous for all personnel involved. Notify the helicopter pilot of any obstructions such as tall grass, rocks, or loose dirt. The pilots point of view of things may appear much different than yours. The pilot may not to be able to see these obstructions until the helicopter is right on top of them, possibly causing another

accident on top of the survivor's tragedy. Consider possible alternative sites if the accident site or first site is possibly unfeasible. It is better not to risk the lives of the rescuer than assume that the helicopter crew will land there.

Boundary markings: Mark the corners with secure items so that these markers don't move in the rotor wash. Personnel in orange vests at the corners of the site is fine, but make sure that they are not essential to the last minute details of the operation. It is great to have personnel volunteer to mark borders, but make sure that they know where they are supposed to be, and that they stay there until told to move. At night, the landing area should be illuminated, but take caution not to blind the pilot on landing and takeoff. Have vehicles aim lights on low beams into the site. The helicopter pilot will most likely contact the ground crew to also turn these off so that the pilot and crew isn't blinded on the approach. All helicopters have some sort of landing light that should adequately cover the area. Clear the site of all debris that might get sucked up in the rotor wash, and only put signal markers in the center of the landing area on request of the helicopter pilot

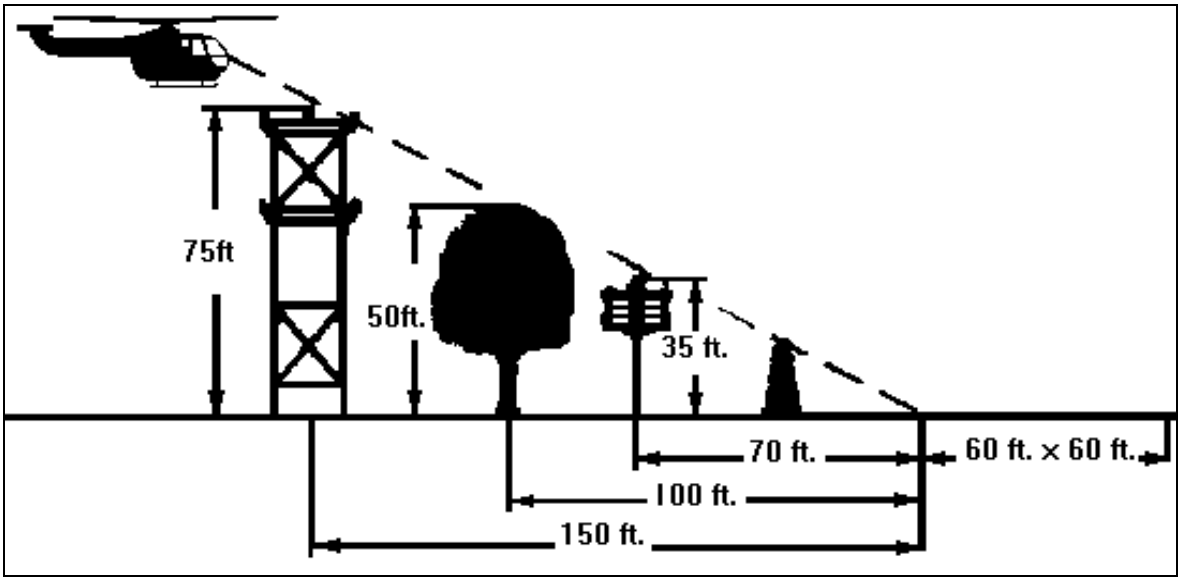


Figure 2: Site obstructions

Approaching the helicopter

A helicopter landing site is not the place to horse around. It only takes a second for an accident to occur, and there is no reason to add another person onto the transport manifest at the last minute. The following sections discuss the general rules for approaching the helicopter.

Stay out of the landing site unless accompanied by a member of the aircrew: The aircrew has been specially trained to use that large piece of equipment, and they know all of the dangers associated with doing so. Wait for one of them to guide you into the helicopter before you cause more problems.

Always approach the helicopter from the front of the aircraft: A helicopter is just like any other form of transportation; the pilot has blind spots to his or her sight. A diagram of the typical danger areas and safe areas on a helicopter is provided in figure 3. Never walk around the tail rotor area; the pilot definitely will not see you there, and the tail rotor can be very hazardous to your health. Additionally, make sure that all members approaching the helicopter or within the site have removed all loose clothing or headgear so that it does not get blown off by the rotor wash. Any clothing that is not caught in the case of being blown should not be chased, but left alone. The helicopter crew should be warned so that the item can be retrieved by trained personnel of the flight crew. Rotor blades and engine parts move very fast, and it does not take much to damage them or you.

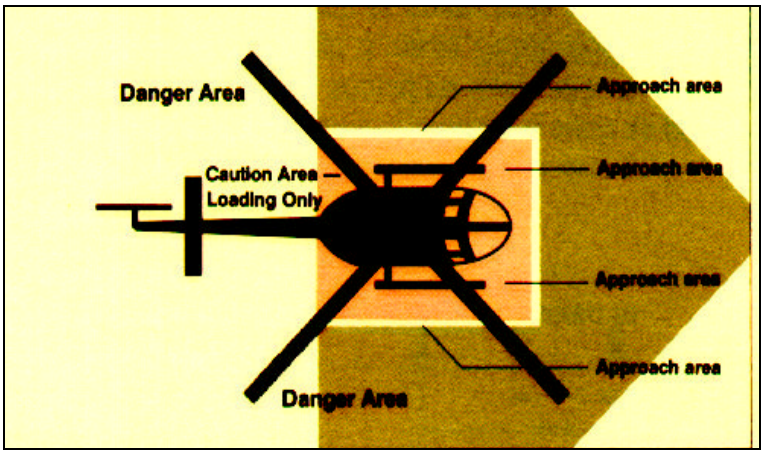


Figure 3: Helicopter danger areas

When approaching on a slope, approach from downhill: Since the rotor will be closer on the uphill side normally, it is logical to approach the helicopter on the side with more head room. Either way, personnel should always approach the helicopter in a crouched position with IVs or long objects carried low or parallel to the ground. As the rotor blades move they actually dip closer to the ground, and it would not take much to cause another accident.

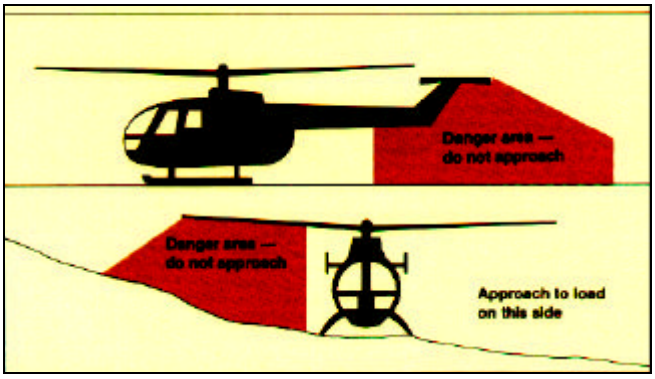


Figure 4: Approaching on a slope

No unauthorized personnel go into the landing area: Unauthorized personnel should stay out of the landing area because there is no need to put more people at risk than necessary. Helicopters kick up rock and pebbles and other loose objects within the site, and inevitably someone who should not have been there will get struck by some of this flying debris. Makes sure that only trained personnel are working the site, and minimize those used in this area so that risks are also reduced.

Do not smoke in the landing area: CAP members should know better than smoke around aircraft, but as a reminder remember that aviation fuel does not react well with flames.

No are allowed vehicles within the landing site: Personnel always have an overwhelming desire to have their vehicle as close to the action as possible. Whether it is laziness or just a simple feeling that having it that much closer will help. Consider this. If we warn personnel not to walk on the slopes towards helicopters, then that means that the blades are close to their body at that point. Most CAP units drive vans, blazers, or pick-up trucks to ES missions. These vehicles tend to be as tall if not taller than personnel, so it is logical to not have them within the site. Additionally, nobody wants to see any vehicles damaged by pebbles thrown through the air by the rotor wash. Keep the vehicles out of the helicopter site.

Transferring the patient from the team litter to the helicopter litter will be done outside of the landing area: Helicopters often have specialized equipment to transport survivors, and will not take your equipment with them. To avoid exposing the survivor or rescue crews to additional hazards, the transfer of patients will be done outside

of the landing site. Don't assume that you will rush the patient right out to the helicopter. The aircrew may want to better stabilize the patient prior to transport, and that is their call to make.

Only the flight crew will open and close the doors or compartments on the helicopter: Helicopters are very expensive and are also very easy to damage. Let the trained personnel do their job, and guarantee that the helicopter does not get grounded because a door latch is now broken.

Chapter review questions

1. What is the minimum size that a helicopter landing site should measure?
    a. 20 meters
    b. 30 meters
    c. 40 feet
    d. None of the above

2. What is the recommended minimum approach area length of a helicopter landing site?
    a. 40 meters
    b. 20 meters
    c. 60 feet
    d. None of the above

3. True or False: Helicopters have no trouble taking off and landing directly vertical.
    a. True
    b. False

4. True or False: Helicopter should be requested immediately, without consideration for the patient's status on all incidents.
    a. True
    b. False

Supporting Tasks

Basic: None.

Advanced: O-1002, P-0202, P-0203, and P-0204.

CHAPTER 12
LEGAL ASPECTS TO SAR

Chapter objectives
1. Understand that laws are open to interpretation in different areas, but CAP will not support units or members who blatantly break the law.
2. Understand and explain the references to force in relation to CAPRs.
3. Briefly explain how the NTSB fits into the big scheme of Aircraft Crash Laws.

Legal issues are not always clear cut or black & white; law tends to be open to interpretation within reason. Laws change or differ from state to state, or even jurisdiction to jurisdiction such as counties or towns. Laws can normally be associated with levels and penalties/rewards depending on the locality and affected components. Does the law come from the Local, State or Federal level? Is it a criminal or civil matter?

Civil Law
Civil law is the branch of law pertaining to suits outside of criminal practice.

Trespass: Trespassing is considered to be a wrongful interference with or disturbance of the possession or property, and is applied to personality as well as realty. Personality or personal property are movable things as distinguished from things attached to the realty. However, things attached to the realty may be considered personality if by their nature they are able to be severed without injury to the realty. Personality includes tangible items such as Televisions or Radios, and intangible property representing value such as stocks or bonds. Realty is an interest in land, another word for real property or real estate. This should be considered to be land and other property permanently affixed to it. Possession is considered to be the dominion and control over property.

CAP does not often have problems in this area, but it should be touched upon. In prosecuting a mission, CAP members often walk a fine line in legality. When you enter onto private property because you are looking for a downed aircraft, you are breaking the law, but you most likely will not be brought up on any charges. This does not mean that you should charge into the situation though. Think, and be positive before you add any additional risks to the mission. Additionally, this is not normally the ground team's call to make, unless they are positive. The mission coordinator with approval from the AFRCC will give you permission to enter this property, and you will normally do this with assistance from a local law enforcement official. Additionally, a transmitter going off on an aircraft or boat does not give you the authority to break into it to shut it off, or to damage the outside of the vehicle or structure to get to it. Follow the guidance that comes down from your mission headquarters staff and the AFRCC, but minimize the possibilities of future investigations into your actions. As a CAP member you need to always remember to act professionally and within the legal boundaries already established so that you do not tarnish CAP's image or your own.

Negligence: Negligence is the failure to exercise that degree of care which a person of ordinary prudence (reasonable man) would exercise under the same circumstances. The term refers to conduct which falls below the standard established by law for the protection of others against unreasonable risk of harm. Negligence does not comprehend conduct with reckless disregard of the interests of others.

In discussing negligence, one needs to understand duty of care. In reference to negligence duty of care says that if an individual owes this duty to others that he must conduct himself so as to avoid negligent injury to them.

While discussing negligence, due care should also be brought up. Due care is care that is reasonably commensurate with a known danger and the seriousness of the consequences which are liable to follow its omission. This may be ordinary care or a high degree of care, according to the circumstances of the particular situation.

To close off discussions of negligence, good samaritan or good faith laws need to be mentioned. This refers to a total absence of any intention to seek an unfair advantage or to defraud another party; an honest and sincere intention to fulfill one's obligations. Thus if you perform at your expected standard of training with honest intentions, in most states you are covered. The problem is when you enter into the care without proper training for your rating or for the situation. You may then be out of luck.

Criminal Law

In general is concerned with acts done with malicious intent, from an evil nature, or with a wrongful disposition to harm or injure other persons or property. Violations of criminal law are considered to be acts against the community. Cases are thus noted as State vs. Defendant rather than Plaintiff vs. Defendant in civil cases.

Force: Most criminal cases involve the use of force. Force in this case is defined as a physical act or the threat of physical acts intentionally used to do an act or to commit a crime. CAPR 55-1 expressly states the level of force to be used in the execution of assistance to Law Enforcement officer. None. The most that a CAP team can truly do is warn the individual of consequences of his or her actions and notify authorities. In times of Martial Law CAP is still considered non-combatant and will not use force in assignments undertaken. For this very reason, CAP will not accept assignments of a law enforcement nature.

Self Defense or Preservation: In discussing force and the use of it, we should discuss what you can do to protect yourself. Every person has this right, within reason. Deadly force may only be used in defense of deadly force. The person using self-defense must be free from fault; provoking action either vocally or through actions undertaken can cause a failure in the eyes of the law of the use of force. The person must exhaust options for escape either physically or through negotiation following the fight or flee rule. If you have a way out, you must use it. Don't stand in front of the person wanting to enter the crash-site and provoke an argument or a fist fight. Simply warn them of the consequences of their actions, and let the local sheriff or police officer handle the situation.

Aircraft Crash Laws: The National Transportation Safety Board (NTSB) is responsible for the investigation and determination of probable cause in aircraft accidents, as well as keeping a public record of the same. The investigation itself may be delegated to the FAA, but the determination of probable cause is made by the NTSB. Legal authority and guidelines for the NTSB can be found in Title 49 of the US Code. Additional guidelines for such incidents may also be found under Department of Transportation and FAA regulations.

Chapter review questions

1. True or False: To shut off an ELT, CAP members may do anything they feel is necessary, and will never be prosecuted.
    a. True
    b. False

2. True or False: Determination of probable cause of aircraft accidents is always made by the NTSB.
    a. True
    b. False

3. True or False: In times of Martial Law, CAP members can be used for law enforcement assignments.
    a. True
    b. False

4. What federal agency determines probable cause in aircraft accidents?
    a. FAA
    b. NTSB

c. FBI
d. CAB

Supporting Tasks

Virtually every task could have legal ramifications for team member and team leaders. As long as you make an honest effort to work within the law and CAPF regulations, you will normally be covered.

CHAPTER 13
EMERGENCY SERVICES FORMS

Chapter objectives
1. Provide a quick reference and overview to CAP forms used during the prosecution of Emergency Services missions in CAP.

The forms that we use in CAP emergency services are all relatively self-explanatory, or have directions on them. You should familiarize yourself with these forms and their use so that you can become an integral part of the CAP mission, as well as to be insured, reimbursed, or qualified to perform the tasks you are training to do. The following chart outlines what the CAP forms used in ES are according to number and description.

Form Number	Form description
CAPF 100	ES QUALIFICATION REQUEST
CAPF 101	ES QUALIFICATION CARD
CAPF 101T	ES TRAINING QUALIFICATION CARD
CAPF 102	COMBINED SAR AND CD ALERT AND GENERAL BRIEFING FORM
CAPF 103	MISSION SIGN-IN REGISTER
CAPF 104	MISSION FLIGHT PLAN BRIEFING AND DEBRIEFING FORM
CAPF 106	GROUND INTERROGATION FORM
CAPF 107	FLIGHT OPERATIONS LOG
CAPF 108	MISSION REIMBURSEMENT REQUEST FORM
CAPF 109	VEHICLE CLEARANCE FORM
CAPF 110	AIR TO GROUND OR POINT TO POINT LOG FORM
CAPF 121	AIRCRAFT/VEHICLE REGISTER
CAPF 122	SEARCH AND RESCUE (SAR) REPORT

Throughout the course of your CAP career you will be instructed in how to these forms are utilized. Follow along and you should not have any problems completing them when necessary.

Chapter review questions
1. True or False: Certain forms must be completed during or after the mission to be properly reimbursed or receive insurance coverage from.
   a. True
   b. False

2. What CAP form is used by ground team members to apply for reimbursement of fuel expenses on USAF funded missions?
   a. CAPF 101
   b. CAPF 106
   c. CAPF 107
   d. CAPF 108

3. On what CAP form do members sign in themselves at mission base?
   a. CAPF 101
   b. CAPF 102
   c. CAPF 103
   d. CAPF 121

4. On what CAPF form do members sign in their vehicles at mission base?
   a. CAPF 101
   b. CAPF 103

c. CAPF 104
d. CAPF 121

Supporting Tasks
Basic: P-0101.
Advanced: P-0201, P-0202, P-0203 and P-0204.

CHAPTER 14
INTERVIEWING TECHNIQUES

Chapter objectives:
1. Understand and explain what an interviewing team does.
2. List and explain the types of people to interview.
3. List and explain the steps included in assuming the proper attitude of an interviewer.
4. Briefly explain the reasons for the requirements for speed of information transmission.
5. List and explain the guidelines for conducting an interview.
6. List and explain the techniques to get a person to start and continue talking.
7. List and explain the guidelines for evaluating information received.
8. Demonstrate a proper understanding of how to conduct an interview through mock interviews amongst participants, staff, and volunteers.

Good interviewing team members to have had a lot of practice, and know themselves, as well as their situation, very well. This chapter will introduce you to interviewing, but you will have to practice to become truly good at performing an interview.

Definition of an Interviewing Team
What is an interviewing team? The interviewing team is a small, lightly equipped, mobile unit used to conduct interviews to find new information and to investigate leads during a search. Information collection should be considered one of the most important functions of a search, in that one piece of information could bring a search to a rapid close. Effective interviewing team members look and conduct themselves in a professional manner. Remember that this is not an interrogation. We are non-combatant volunteers that people do not have to talk to if they do not want to.

Persons to interview
There are many different types of people that should be interviewed. Don't eliminate people from your list because you don't think that they will know anything or aren't the type of person that you would talk to. That person could hold the key to bringing the mission to a close successfully. It is suggested to talk to the following personnel when you are looking for information:

1. People in remote areas and relatively quiet suburbs who tend to notice unusual sights or sounds

2. Forest service personnel and game wardens

3. All night gas station attendants

4. Farmers and other people who work outdoors

5. People at malls or local gathering points such as schools, stores, or restaurants who may have discussed the events, or saw the missing individual(s) prior to their disappearance.

Attitude to assume as an interviewer
Professionalism in questioning citizens will do much to reveal information. Following an established pattern not only helps you keep track of what has been done, but normally makes you appear more friendly, aware and in control, without scaring them. The following steps should be taken in conducting an interview.

1. Properly identify yourself as a member of Civil Air Patrol. Wear a proper and clean uniform and show an ID card. Photo IDs are best so that the person can verify you are who you say you are. It is recommended that interviewers wear the AF blue uniform so that you appear professional and crisp to the public. Try to make yourself available to the person and do the

interview as soon as possible, but don't be forceful. By forcing an immediate interview, you may frustrate or scare a person with prior engagements to rush and forget an important detail.

2. Do not relate details of the mission to interviewees. Do not "put words in their mouth". Only give enough detail to help the interviewee recall the situation. Walking the person through stages in the mission and what has been happening only adds fuel to the fire for people just trying to get attention rather than actually help searchers progress.

3. Listen to what the interviewee has to say. Let the witness tell the story in his or her own words and in its entirety. Afterwards you can question the interviewee about details or to establish the validity of information. Use the CAPF 106 or a standardized Missing Person Questionnaire only after the interview is complete. Most people interviewed will not follow a form exactly to relate information. Tape recording the interview with the interviewee's permission can help the interviewer, but should not be a requirement. A sample CAPF 106 is provided in attachment 4 with the rest of the CAP emergency services forms.

4. Be skeptical of statistical information given by untrained observers. Try to find out why or how this person is so accurate. Is the person a retired pilot, or did something on the television clue the person in to the time of an event? Find out, but do it tactfully.

5. Courtesy and patience when dealing with a witness is essential. Never rush a witness because he may leave out important information

6. If the witness is a child, question very carefully and have the child tell the story several times and in several ways. Try to talk to children alone so that you can try to determine if the parents are coaching the child or if the child truly knows something. Talk to the child's parents about the child's reliability under such circumstances, but make sure that you don't offend the parents in the process.

7. Create a comfortable atmosphere (what climate would you need to reveal things about yourself?)

8. Start with non-threatening questions. It helps in two ways: it reduces tensions and it shows that you care about the interviewee's feelings.

9. Understand his or her need to express emotional feelings. Plane crashes an missing person searches tend to be very emotional issues for the entire community, and by being understanding you create a better impression on all involved, possibly leaving a door open for more information to be passed from this interviewee or another.

10. Know yourself and how you come across; you get back what you project.

11. Know what you are after and have a general plan of attack, but don't be afraid to modify that plan.

12. Prepare the interviewee for personal questions. It shows compassion, and normally facilitates answers rather than closed doors.

13. Listen! Listen! Listen! This can't be emphasized enough. You will learn nothing if you do all the talking.

14. Use all of the following techniques to get the person to start, and continue talking:

a. Use structured questions (questions that require only a simple one or two word response) to clarify a point

b. Use unstructured questions (questions such as why...? How about ...? What do you think may have happened? Etc.) to get the interviewee thinking and talking about the subject of interest.

c. Once you have the person talking, encourage the interviewee to continue. Listen! Give no implicit message to stop. Show acceptance - nod, yes..., Please continue, etc.. Silence forces the interviewee to continue and ordinarily those being interviewed will add additional information that will probably be the most important information received.

d. To probe an area of interest (particularly a touchy or sensitive area) restate words that the person just used, but don't interrupt the interviewee and summarize back what you perceived the interviewee was saying.

15. Leave the mission operating base telephone number and the interviewer's name with the witness and ask them to call if they recall any other helpful information.

Speed of information transmission

Data collected must be transmitted to the Mission Coordinator or designated receiver as soon as possible. Use the telephone primarily and two-way radio next for security purposes. This is a great opportunity to use Packet or related systems to transmit data quickly and without fear of security breaches that could affect the integrity of the mission. CAPF 106 and other standardized forms facilitate transmission of data by using the block numbers or sequenced sections instead of saying the whole phrase. Do not try to analyze leads in the field. You don't have the "big picture."

Evaluating information being received

You may be asked to give your opinion on the interview by either mission base personnel or possibly the interviewee. Don't jump to conclusions, but listen to what is being said and form hypotheses as you go. Guide the interviewee into giving you more information to either support or refute each hypothesis that you make. Remember, you are trying to put together a picture of what may have happened, and the information from this individual is only one piece of the big puzzle.

Chapter review questions:

1. True or False: Information received from an interview that the team leader judges as useless should be immediately discarded.
   a. True
   b. False

2. What is the form used in CAP to facilitate interview information transmission?
   a. CAPF 103
   b. CAPF 102
   c. CAPF 122
   d. None of the above

3. How large should an interviewing team be?
   a. two members
   b. six members
   c. 12 members
   d. None of the above

4. True or False: Interview information should always be relayed via radio back to the mission base.

a. True

b. False

Supporting Tasks

Basic: None.

Advanced: O-1101.

CHAPTER 15
SCENE MANAGEMENT

Chapter objectives
1. Understand and explain the mission of a CAP ground team at a crash site or other scene, including actions that should be taken.
2. List the responsibilities of the NTSB at a crash-site and in accident investigations.
3. Understand and explain the guidelines for First Responders.
4. List and explain the DOs and DON'Ts for First Responders.
5. List and Explain the functions of all team members and sub-teams on scene.

Mission of Civil Air Patrol ground teams
The mission of a CAP ground team is to find, identify, and render lifesaving first aid while safeguarding and assisting authorities. Safeguarding is the procedures or actions taken to preserve evidence at an accident/crime scene within the boundaries of our current regulations and laws at all levels.

CAP ground teams should only take those actions necessary to save lives, protect the public including crash, fire, and rescue teams, and protect the wreckage from further damage.

National Transportation Safety Board Responsibilities
In the United States the National Transportation Safety Board (NTSB) investigates fatal aircraft accidents or delegates that authority to a responsible party (normally someone from an FAA field office). In performing this job, the NTSB has several responsibilities outlined by law for them.

Determine the probable cause of the accident: The NTSB is the government agency tasked with determining the cause of aircraft accidents, and there is a reason or this. If multiple agencies were responsible, the job would probably never get done, and improvements to aviation safety could not be implemented as quickly as necessary. Additionally, it should be noted that even though another agency's representative may actually be on site collecting data, the probable cause is always determined by the NTSB.

Publicly report all civil aircraft accidents in the United States of America: The NTSB also has the responsibility of making their findings available to the public. This is done so that future accidents can be avoided, and the public can make better informed decisions about the aviation industry. The reader needs to understand that NTSB reports are never officially closed. New evidence is often brought forward after an initial report is made that will change the official findings of the report. This is the same reason that accident reports often have multiple causes of the accident, not just one. Aircraft accidents can often be traced through a series of events where many things went wrong causing the aircraft to crash. In most cases you can not trace the accident to one event only, and the accident may not have occurred if the chain of events could have been broken.

Perform and/or delegate actual accident investigation responsibilities: The NTSB is responsible for the investigations of accidents within the United States. The NTSB will normally investigate incidents unless several major investigations are under way at the same time, in which case, they can delegate this authority to an investigator of the FAA. Although an investigation may be accomplished by an FAA investigator, the findings based on the investigation are only determined and released by the NTSB.

National Transportation Safety Board Accident Guidelines for First Responders
NTSB investigators are often asked what the personnel first on the scene should do to help them. The following are the recommendations made by the NTSB Go Team.

Rescuing survivors is paramount to scene preservation: Worry about the safety of yourself and others before you worry about contaminating the scene of the accident. This does not mean that you should go out of the way to damage the scene, but you should do what is necessary to maintain the health and

welfare of survivors. Additionally, being situationally aware and knowing exactly what you have done helps the NTSB. NTSB investigators will ask you what you moved or touched so that they can put the puzzle pieces together, and being able to retrace your steps is imperative to them doing that correctly.

Guard the wreckage from further damage: Nobody should be allowed inside the wreckage area except those personnel necessary to survivor removal, fire fighting, and the possible removal of mail and cargo when it could possibly be further damaged. Items removed from the wreckage need to be kept locally for proper examination by the NTSB or designated accident investigators. Taking a trophy or souvenir from an aircraft accident site is illegal! Remember that CAP members are not allowed to restrain or use force to maintain the security of a crash-site, but the police officer, sheriff can. Accident sites should be treated just like a crime scene, don't contaminate it unnecessarily.

The NTSB recommends that drawings and photographs be taken of the entire crash area as well as documenting movements in the crash area if you or your team is the first on scene. The accident investigator will need to know what you have done to determine probable cause properly. Additionally, photographs of the scene can be used as evidence and prove that you did your job properly. Remember though, that survivors take precedence over picture taking. Further discussion as to who should take pictures and how they should be taken will occur later in the chapter.

Team members will want to discuss problems incurred for future reference, to correct mistakes and problems, but this should be done only after they have been properly debriefed by the responsible authorities. This avoids accusations of the team trying to "get their stories straight", and allows team members to collect themselves after seeing the gory details of a crash-site.

Advise the county coroner or medical examiner of the situation: Fatalities should be held for autopsy and toxicological examination PRIOR to embalming or other post-mortem actions. CAP members will not remove the deceased without the proper federal, state or local authority. It is not recommended that younger cadets or those that may be otherwise naive or new to the situation be involved in victim removal at all.

Identify the position of fatalities, especially if they must be moved to get to survivors: Try to photograph the original position of deceased occupants prior to removal from wreckage, but remember not to interfere with the victim removal to get to survivors to get pictures. Tag or otherwise identify the location of each body, making note of the location in the wreckage, or on the ground. Victims should not be touched if not moved, but locations should still be noted on crash site diagrams.

News media coverage: Accredited news media may be permitted to enter and photograph the wreckage area as long as the wreckage and scene is not disturbed, and extrication is not interfered with. Again, remember that CAP personnel cannot physically restrict entry according to regulation, and Law Enforcement personnel need to be made aware of this. If Law Enforcement personnel are not immediately available, remind the media of federal statutes outlining fines and terms of imprisonment for interference with accident or crime scenes and actions being taken to save lives. Remember that good or bad media relations can make or break the situation. If the media understands the situation and is willing to work with you, then you will be better off in the long run. Additionally, CAP should not release any information about the accident. Don't make statements of assumption about the accident. It will end up in the newspapers, and will cause any respect that you have earned by doing a good job at the scene to be thrown out the window. Refer questions from the media to the Information Officer (IO) or Public Affairs Officer (PAO) at mission base. The IO or PAO should arrange for scheduled press conferences to release any available information determined releasable by the Mission Coordinator or Incident Commander in charge of all operations. CAP is not often in charge of the entire incident by this time, and though a CAP MC is in charge of his or her personnel, the overall responsibility may be held by another agency, such as the NTSB or the FAA.

Notify the local authorities, NTSB, and the FAA if they have not been already: Teams often forget to call the truly responsible agency until long after the incident has started. Mission base personnel should make this a top priority so that teams are fully supported early on in the rescue and investigation. Local, State and Federal agencies are more often than not better prepared to deal with accidents, and should be brought in as soon as possible to make everyone's jobs easier.

DOs and DON'Ts from the NTSB

As a quick reference, the following chart of things to do and not to do is provided.

DO	**DON'T**
1. Make sketches and drawings 2. Take pictures 3. Record major disturbances to the scene that you cause. 4. Tag disturbed and/or altered items with the following: a. Name of person tagging item b. Organization of person tagging c. Telephone number of contact (Mission Base or Mission Coordinator) d. Date of action taken e. Time action was taken f. Brief description of action taken. Try to be sure that the investigator knows what you did, but don't write an essay for each tagged item.	1. Disturb switches if at all possible 2. Disturb aircraft controls if at all possible 3. Remove fatalities unless authorized or to save a life. (This may be different if working under another agency, or if in a different jurisdiction. In some cases the local Medical Examiner or Coroner has initial jurisdiction, but in most the FAA or NTSB will make the determination to remove fatalities.) 4. Disturb or otherwise contaminate the scene, unless necessary to preserve life, and even then should be minimized. 5. Take souvenirs. The investigator will not be able to come to a reasonable conclusion without all parts of the wreckage, and it is AGAINST THE LAW.

Civil Air Patrol Standard Ground Team Actions

CAP ground teams should react the same way whether they are responding to an aircraft crash site, or assisting in securing the scene of a victim found during a missing person search, or in simply coming across an accident on the side of the road on the way to mission base. The first team to arrive at the scene should break up into three sub teams, if the personnel are available, to manage the scene: a Leader Team, a Medical Team, and a Support Team. Each team's makeup and general job descriptions are outlined in the following sections.

Leader Team (Military version of a Hasty team): This team is made up of three personnel, the Ground Team Leader, the team's Mission Radio Operator/Communicator, and a Runner/Log Person. Each person has their own job, but each must interact with the other for this to work well.

The Ground Team Leader (GTL) has several functions at a the site. The GTL supervises all actions, from the initial survey for potential hazards and survivors to the turnover of control of the scene to the appropriate authority. In doing so the GTL must insure that safety margins are kept high, all actions taken are within guidelines established in CAP regulations and standards, and is responsible for the following of NTSB rules and recommendations or local laws at the scene by CAP team members. To do this, the Ground Team Leader is the first person into the scene, if anybody enters at all. There is no reason to have the entire team enter a crash scene if the Ground Team Leader has determined the scene unsafe for entry, or that there are no survivors. In general, crash sites (aircraft or vehicular) should be treated like a very large hazardous materials incident or bio-hazard area. Restrict entry to the site and do as much of your survey from as far away as possible. HAZ-MAT team leaders normally follow the "thumb rule". If you can't cover up the scene with your thumb when looking at it, then you are too close. Consider all of the possible safety issues at a crash site: fuel, broken tree limbs, the aircraft itself, weather conditions; there are too many, just play it safe. To aid you in laying out a crash scene, a diagram of the ideal layout for a crash site or HAZ MAT area is provided on the next page of this chapter.

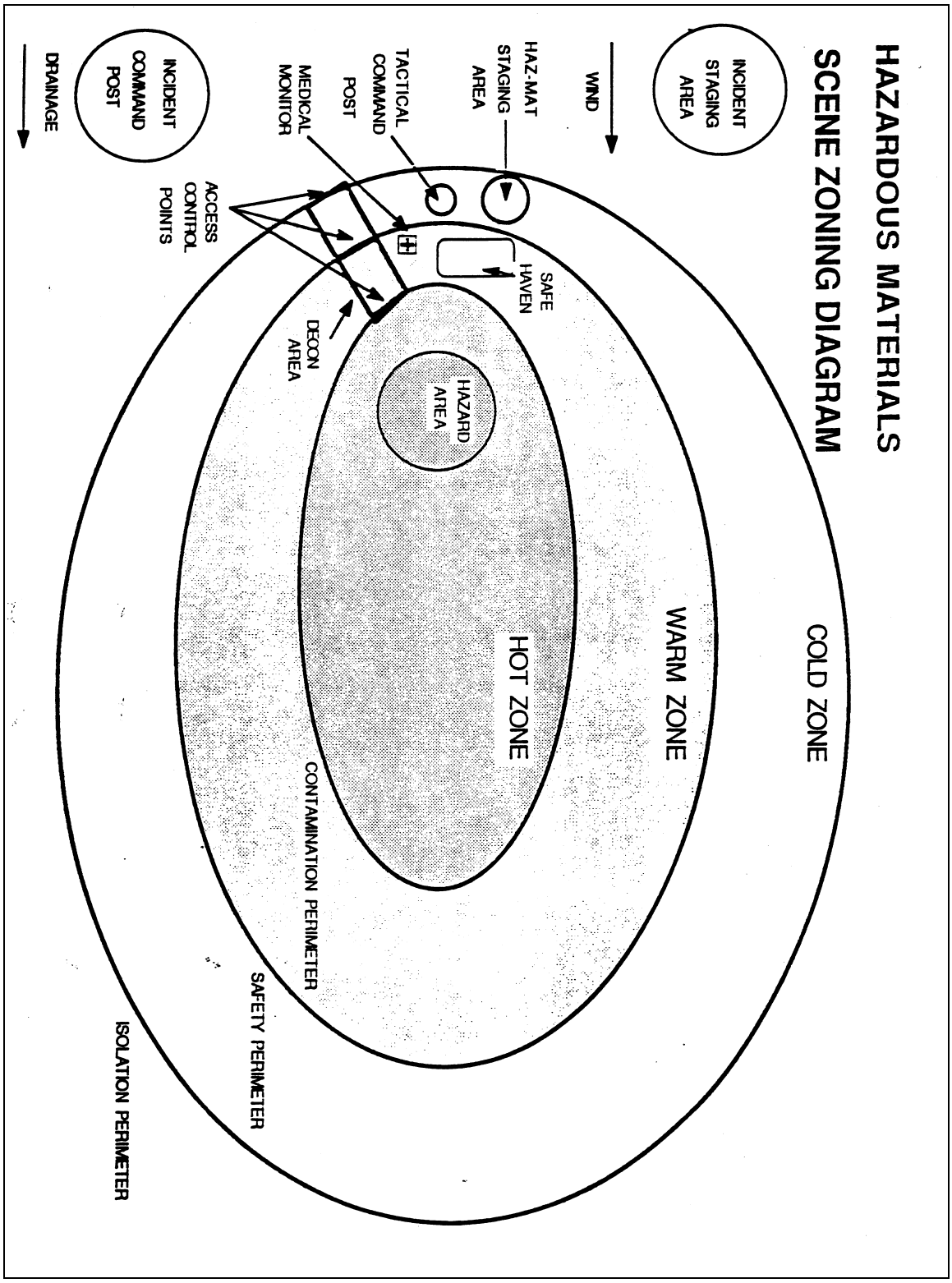


Figure 1: HAZMAT Ideal Site Layout

The Mission Radio Operator (MRO) also has a specific job. The MRO maintains communications with mission base via relay or direct transmission for the Ground Team Leader as well as remaining in contact with the support team and incoming personnel from other teams as necessary.

The Runner/Log Person is the last Leader Team member listed, but has an extremely important job. The Runner makes drawings or sketches and/or takes pictures of the scene to note initial positions, and changes made to preserve lives of survivors. All events occurring at the scene or in reaction to crash-site operations should be documented including time, location, and description of occurrences at a minimum. In doing so, the runner should establish some sort of pattern including frames of reference so that those not at the scene can understand the situation at future debriefings and after action critiques. It is recommended to work from the "Four Corners" of the aircraft or other vehicle inward. The "Four Corners" of an aircraft are the nose, tail, and each wing. At most aircraft crash sites, the rest of the pieces of the aircraft including any survivors should be found within the area between these points. Most motor vehicles remain intact even if involved in a violent accident. Using the "Four Corners" method not only establishes a frame of reference, but also creates an initial boundary to the scene. This initial boundary will be determined during the Ground Team Leader's site survey, and will end up being considered the Hazardous Center Area, noted in the GTL's ideal site diagram.

The Runner should also record the position of all switches, knobs and instruments upon arrival at the scene, and changes made to them during extrication. DON'T INTERFERE WITH THE EXTRICATION OF SURVIVORS TO RECORD SWITCH POSITIONS! Documentation is great, but families do not appreciate rescuers trying to cover themselves legally prior to saving lives.

The last main job of the runner is to coordinate incoming personnel, insuring that order is maintained. Everyone want to be involved, but most crash sites have very limited access, and having more people in that area makes it even worse.

Medical Team: This sub team is made up of the Head Medic and 2 or 3 additional medical personnel. Just like the Leader Team, each has a specific job and is an integral part to the overall success or failure of the team.

The Head Medic is responsible for all members coming in contact with the victims or survivors to include the wear of proper medical protective gear, and proper treatment as necessary. Additionally, the Head Medic is responsible for requests for evacuation and extrication of victims, survivors, rescue personnel and equipment. The ultimate decision is up to the Ground Team Leader, but most will follow the recommendation of the Head Medic. This is meant to be a support structure to the Ground Team Leader's initial site survey for the removal of survivors or rescue personnel from the area for survival/safety concerns. Ground Team Leaders can not possibly see everything and must rely on their team members to provide them accurate information as soon as it is available. The Head Medic is also responsible for the accounting for of all passenger's that were supposed to be aboard, and whether they are with the wreckage or not. For the most part this is done by the Ground Team Leader counting victims during the initial site survey, but once survivors are found the Head Medic should identify them as best as possible during assessments of the survivors injuries and overall health and welfare.

Two or three Support Medical Personnel are also part of the Medical Team. Each performs lifesaving first aid under the direction of the Head Medic. Each is also responsible to report any hazards or problems with the wreckage that may endanger rescue personnel or survivors further. It should be noted that all personnel need to be situationally aware, but these few members of the team will most likely be the ones hurt if not especially careful. A dead hero is still dead.

Support Team: Made up of the assistant team leader, a communicator, and a first aider or other team personnel, this sub team performs tasks assigned by the Ground Team Leader as necessary. These personnel may do a hasty search of the local area for any missing passengers who could have wandered off, or may be used to set up a perimeter around the site and control incoming personnel, or even may aid in the extrication of survivors.

All of the positions referenced in the above sections are extremely important, and nobody should feel degraded if not in a leadership position or directly in contact with survivors or the site. Most accident sites create a picture that personnel never forget, and consider yourself lucky if you do not have to see this kind of atrocity.

Chapter review questions

1. Upon entering into a site, how many parts will the team divide into if it has a standard sized team of 12 members, and conditions are ideal?
    a. One
    b. Two
    c. Three
    d. Four
    e. None of the Above

2. A rescue crew can't move wreckage parts for any reason.
    a. True
    b. False

3. At the initial scene, before NTSB investigators or local authorities assume control, any person assigned to site security may act with the authority of law enforcement officials.
    a. True
    b. False

4. If a CAP ground team is the first team on scene, who is responsible for determining assignments of personnel on site.
    a. The Ground Team Leader
    b. The Medic
    c. Member act autonomously
    d. None of the Above

Supporting Tasks

Basic: O-0801.

Advanced: O-0421, O-0422, O-0802, O-0803, O-0804, P-0202, P-0203, and P-0204.

CHAPTER 16
BLOODBORNE PATHOGENS

Chapter objectives:
1. Define and give examples of Bloodborne Pathogens.
2. List and recognize the symptoms of Hepatitis B.
3. List and recognize the symptoms of HIV and AIDS.
4. List and explain the four ways to prevent exposure to Bloodborne Pathogens.
5. Understand and explain the guidelines for dealing with sharps, including but not limited to sharps container guidelines and cleaning up potentially infected broken glass.
6. Recognize the known facts about Hepatitis B.
7. Recognize the known facts about HIV and AIDS.
8. Demonstrate and explain the proper donning and removal of a Bio-Hazard Anti-exposure suit.

What are Bloodborne Pathogens?
Bloodborne pathogens are disease causing microorganisms that may be present in human blood. They may be transmitted with any exposure to blood or other potentially infectious material. There are several pathogens of significance are Hepatitis C, Hepatitis D, as well as Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) which we will discuss in more depth because of the commonality of these pathogens.

What is Hepatitis B?: HBV is one of the five known viruses that causes illness directly affecting the liver. It is the major cause of viral hepatitis, which is preventable through immunization. There are several recognizable symptoms of people infected with HBV, listed in table 1, but in some cases those infected with HBV show no symptoms, and therefore are not diagnosed.

Blood will test positive for the HBV surface antigen within 2 to 6 weeks after symptoms develop. Approximately 85% of patients recover in 6 to 8 weeks. The major source of HBV is chronic carriers; chronic carriers will have the antigen present at all times, and can unwittingly transmit the disease to susceptible persons through needle, any other penetrating injury or intimate contact. Chronic active hepatitis may be the consequence of a problem with the immune system that prevents the complete destruction of virus infected liver cells.

Weakness	Abdominal pain
Fatigue	Fever
Headache	Nausea
Anorexia	Jaundice

Table 1: HBV symptoms

Some general facts about HBV are provided in table 2. In reviewing them, realize that HBV though not as publicized as HIV, is also very dangerous, and should be regarded as an active threat.

a. 200 out of 8700 health care workers contracting Hepatitis B yearly will die.
b. Hepatitis B cases increased by 37% between 1979 and 1989.
c. Estimates between 1980 and 1991 say that 200,000 to 300,000 new cases of infection occurred annually.
d. Estimates within the U.S. say that 1 to 1.25 million persons have chronic hepatitis B and are potentially infectious to others.
e. HBV is more persistent than HIV in that it is able to survive for at least a week in dried blood on environmental surfaces or contaminated instruments.

Table 2: HBV facts

What is HIV?: Human Immunodeficiency Virus is a virus that infects immune system T4 blood cells in humans and renders them less effective in preventing disease and is the virus identified as being responsible for Acquired Immunodeficiency Syndrome (AIDS). The symptoms for HIV are very similar to those of HBV, and are listed in the table 3. Please note that just like HBV, those infected may feel fine and not be aware of exposure to HIV for as

much as 8 to 10 years. Blood tests may not show positive for as long as a year, and therefore multiple tests may be required to determine if the person has been infected.

HIV and AIDS does not just occur in drug users and those who are sexually active. Those who take care of the sick and injured, and thus run greater risks of being exposed also get infected. Some general facts about HIV are provided in table 4.

Night sweats	Fever
Weight loss	Gland pain or swelling
Muscle or joint pain	Fatigue

Table 3: HIV symptoms

a. Estimates in the U.S say that 1 out of 250 people are infected with HIV.
b. There are at least 65 case reports of health care workers whose HIV infection is associated with occupational exposure.
c. The World Health Organization estimates that 10 to 12 million people around the world are infected with HIV.
d. Approximately 200,000 AIDS patients have been reported to the Centers for Disease Control, and more than 100 of those are health care workers with no other identified reason for infection.

Table 4: HIV facts

Four Methods of Exposure Prevention

There are four main categories of ways to prevent exposure to bloodborne pathogens: Engineering Controls, Work Practice Controls, Personal Protective Equipment, and Universal Precautions. Each will be briefly discussed in the following sections.

Engineering Controls: Structural or mechanical devices the organization provides to prevent or reduce the risks of exposure to health care workers/employees. Some examples of these controls are hand-washing facilities, eye stations, sharps containers and biohazard labels.

Work Practice Controls: The training and behaviors necessary to use engineering controls effectively. Examples of work practice controls are training sessions on how to properly use sharps containers or eye wash stations, or washing your hands after removal of personal protective equipment. The following are some simple guidelines to follow as part of your training plan and as a work practice control.

1. Hand washing is considered to be the most effective method of preventing transmission of bloodborne pathogens. Wash your hands often! Health care workers are taught to wash there hands and change gloves between patients, not just potential exposures to bloodborne pathogens. This keeps the workers and the patients safe.

2. Alternatives such as hand cleaners and towelettes are acceptable alternatives to hand-washing for those without ready access to wash facilities, but the individual should still wash their hands with soap and warm water after contact with blood or other possible infectious material as soon as possible. Take care to not rub your face with unwashed hands.

3. All procedures involving blood or other potentially infectious material will be performed in such a way as to minimize or eliminate splashing, spraying, splattering, and generation of droplets of these substances

4. Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses is prohibited in work areas where there is a reasonable likelihood of exposure. Think before you act. It is a natural reaction to scratch any itches you have, especially in the facial area, and that is the worst thing that you can do if you have been exposed to a bloodborne pathogen. It should be noted that hand creams are allowed, but it that the petroleum based hand creams can have an adverse affect on glove integrity.

5. Contaminated needles or other contaminated sharps must not be bent, or removed unless it can be demonstrated that no alternative is feasible or that such action is required by a specific medical procedure. Such procedures must be specified in the unit's Exposure Control Plan. The above should not be necessary in the course of regular duty for a CAP ground team, but must be considered as some of those involved with our teams are qualified to use such procedures and can't be hindered from doing so to save a life.

6. Many units do not have the funds to purchase several sharps containers manufactured for hospitals or other funded resources. Sharps containers must meet four criteria to be considered acceptable, and this does not list a manufacturer:

a. Able to be closed
b. Puncture resistant
c. Leak proof on sides and bottom
d. Labeled or color-coded

7. Additionally, units or individuals utilizing sharps containers need to follow applicable laws and regulations for disposal to prevent harm to themselves and others. Many health care workers get jabbed by needles every day because someone was not careful. Those workers will live in fear for a long time, simply because they do not know if they have been exposed.

8. When cleaning up possibly contaminated broken glass, follow the following guidelines:

a. Wear gloves and/or other personal protective equipment
b. DON'T clean up broken glass with your hands! Instead use a dust pan and brush, cardboard, or tongs.
c. Vacuum cleaners are prohibited for the cleaning up of broken glass
d. Broken glass must be placed in an appropriate sharps container.

Personal Protective Equipment: Equipment provided by your employer at no cost to you, which is to your advantage to use, and must be reported to supervisors when not in working order. Some examples of personal protective equipment are face shields or goggles, rubber gloves, gowns or aprons, or tyvek suits. Volunteers are often required to purchase their own equipment, but the agency they are responsible to pays for replacements should it be used in the course of an actual mission.

There are some additional rules/guidelines that need to be followed when using personal protective equipment.

1. Whenever you need to wear a face mask, you must also wear eye protection.

2. When wearing personal glasses, you must use side shields and plan to decontaminate your glasses.

3. Personal Protective Equipment is acceptable if it prevents blood or other possible infectious material from contaminating work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes.

4. Your employer is responsible for providing personal protective equipment in appropriate sizes within easy reach for all employees at no cost to you. This includes alternatives as a result of allergies.

5. Your employer is responsible for cleaning, laundering, disposal, and replacement of personal protective equipment at no cost to you. If you use it on a CAP actual or training mission you can apply for reimbursement for these items on a CAPF 108. Contaminated materials should be clearly labeled and put into separate leak proof containers to be sent to a facility following OSHA standard. Units should try to establish an agreement with a local hospital or rescue squad to properly dispose of these materials.

Remember: DON'T HANDLE CONTAMINATED CLOTHING MORE THAN ABSOLUTELY NECESSARY!

6. In the event that clothing next to the skin becomes contaminated do the following:

    a. Remove it in such a way to avoid contact with the outer surface.
    b. Rolling the garment as it is pulled toward removal will decrease chance of contact with the contaminated area.
    c. After rolling it up, carefully pull it off to avoid contact.
    d. If it cannot be removed without contamination, it is recommended that the item be cut off, again trying to minimize contact.

NOTE: When removing contaminated clothing it is often easier and safer to use the buddy system so that neither partner unnecessarily comes in contact with blood, blood products, or remnants of the same.

Universal Precautions: The concept that all blood and certain body fluids are to be treated as if contaminated with HIV, HBV, or other bloodborne pathogens. A similar, accepted and highly recommended alternative is Body Substance Isolation; the treating of all fluids and substances as infectious. For most CAP members performing ground SAR, contamination will never become an issue, but for those few that do, it is safer to be prepared than to risk yourself. Remember that you, the rescuer, must come before the victim. A dead rescuer rescues no more. OSHA maintains that the following materials require the use of universal precautions:

1. Blood
2. Semen
3. Vaginal secretions
4. Cerebrospinal fluid
5. Synovial fluid
6. Pleural fluid
7. Any body fluid with visible blood
8. Any unidentifiable body fluid
9. Saliva from dental procedures

Additionally, OSHA has stated that the following materials do not require universal precautions unless there is visible blood:

1. Feces
2. Nasal secretions
3. Sputum
4. Sweat
5. Tears
6. Urine
7. Vomitus

Personal protective equipment like gloves and a mask must be used whenever you might be exposed to blood or other potentially infectious materials. If you don’t know, then it is always safer to protect yourself.

The Anti-exposure Suit

CAP provides tyvek anti-exposure suits with accessories to all wings for use by their ground teams. In any situation where a ground team is forced into a major bloodborne pathogens incident, like the typical plane crash, then only trained medical personnel should enter the scene wearing the suit properly. The suit is not necessary for simple band-aid injuries. Team Leaders need to use common sense and their core training. Directions on how to don and remove the Anti-Exposure suit are provided below.

Donning the Anti-exposure suit: This can normally be accomplished alone, but is much easier to do using the buddy system.

1. Empty pockets of sharp objects that could puncture the suit or may be required (Keys, Pens, Pocket Knives, etc.).

2. Check the suit for tears or damage before donning.

3. Put on booties if part of the kit and are necessary. These should be worn if the user is wearing boots or shoes made of a porous material, and most in this situation will be wearing boots that he or she is not willing to get rid of. Booties should be worn over coveralls as demonstrated, and preferably taped.

4. Put on the Tyvek ™ overalls and zip-up.

5. Put on the Hair Cover.

6. Put on the Face Mask.

7. Put on the Goggles or Face Shield.

8. Put on a pair of Rubber Gloves. Gloves should also be taped to the suit to prevent rolling and potential contamination.

9. Put on work gloves if working as site removal and extrication, or in general not dealing with the patient as a medic where feeling in the hands is desired and necessary to do a proper patient assessment.

Removing the Anti-exposure suit: This is a normally a two person operation, and is almost impossible to do alone.

1. The second person dons a pair of rubber gloves.

2. Open a bio-hazard bag to deposit suit and potentially contaminated items into. Roll the top few inches down so that they may be clean on the outside and touched without gloves. This bag will be the only one used in this procedure.

3. Wearer takes off work gloves and deposits in the bio-hazard bag using the pull and peel method.

4. Wearer takes off rubber gloves by rolling inside out with partner's help so that he/she does not get contaminated. Deposit the gloves into the bio-hazard bag.

5. Helper assists in removal of the hair cover by removing on outside only. The helper may now be contaminated so direct contact is forbidden. Deposit the hair cover into the bag.

6. Helper removes the wearer's goggles/ face shield. Deposit it into the bag. If the wearer is wearing prescription lenses then separate them out for cleaning in a separate bag.

7. Helper removes face mask by untying. Avoid contact with the wearer's scalp or neck. Deposit the mask into the bag.

8. Helper unzips the suit and the wearer steps out. The helper should assist in rolling the suit inside out, but also needs to avoid contact with the wearer. Deposit the suit into the bag. If booties or gloves have been taped then the tape will need to be removed first.

9. Helper removes booties of wearer again using rolling method outward. Deposit into bag.

10. Helper rolls gloves off and deposits into bag.

11. Either person closes the bag by rolling top few inches up and tying off. Make sure that the bag is clearly and properly labeled for disposal

12. Both the wearer and the helper should wash potentially affected areas immediately. Make sure not to touch other areas of body until you have done so. Rubbing your eyes could be the worst mistake you have ever made if you are not clean.

Chapter review questions:

1. True or False: It may take up to a year for HBV to show up as positive in a blood test. This is why more than one test is required.
   a. True
   b. False

2. True or False: HBV always shows symptoms, and therefore can be easily diagnosed.
   a. True
   b. False

3. The concept that all blood and certain body fluids are to be treated as if contaminated with HIV, HBV, or other bloodborne pathogens is ____.
   a. Engineering controls
   b. Work practice controls
   c. Personal protective equipment
   d. Universal precautions

4. True or False: Body substance isolation is an acceptable alternative to universal precautions.
   a. True
   b. False

5. What is the most effective method of preventing transmission of bloodborne pathogens?
   a. Eye wash stations
   b. Hand washing
   c. Immunization against HBV
   d. Gloves and mask

Supporting Tasks

Basic: O-0902.

Advanced: O-0903, P-0202, P-0203, and P-0204.

CHAPTER 17
ACTIVATING THE SAR SYSTEM

Chapter objectives
1. Know the agency you should contact to activate the SAR system.
2. Know basic information that you should gather to make a SAR incident report.
3. Know basic procedures to use in taking an initial report of a possible SAR incident.
4. Be familiar with the types of search and rescue resources that are available.
5. Be familiar with the role of the Air Force Rescue Coordination Center.

SAR Responsibility in the United States
The *National SAR Manual* defines the SAR system as an orderly way of handling SAR incidents supported by the necessary organization, facilities, communications, emergency care capability, and documentation. To activate the SAR system someone with knowledge of an emergency must contact an organization with SAR responsibility. These organizations vary based on the law of each state. However, in general the following guidelines apply:

1. On the navigable waters of the United States, including major rivers, the Great Lakes, and coastal areas the US Coast Guard is responsible.

2. For a land or boating incident other than the above the chief law enforcement agency of the jurisdiction, normally the sheriff is typically responsible. In a National Park or National Forest, the National Park Service or US Forest Service is respectively responsible.

3. For a missing aircraft or distress beacon search within one state's boundaries, the State Office of Emergency Management or it's designee is normally responsible. In many state's the sheriff's aviation division or Civil Air Patrol is designated as the responsible agency.

4. For a missing aircraft or distress beacon search to be conducted in multiple states, the Air Force Rescue Coordination Center is responsible. Because AFRCC does not have actual searching assets assigned to it, it uses local resources to accomplish these missions. Civil Air Patrol is the primary resource used on 80-85 percent of these federal missions annually.

Information Gathering
When activating the SAR system, provide all available information as accurately as possible. If information is not known, do not guess or give opinions. Questions used by reporters help gather information and organize it in a form rescue managers can use. Who, what when, where, why and how all need to be answered. Let's play twenty questions:

1. How many people are missing?

2. What are their names, ages, and sex?

3. Is there a physical description available of what they had with them and what they were wearing?

4. What were their physical conditions, mental state, or medical condition?

5. Is a description of their car or airplane, including type, color and registration available? Do any of the missing people have any, survival training or equipment; any signaling equipment?

6. What activity were these missing people involved in?

7. What was their proposed route of travel?

8. What weather conditions existed at the time?

9. Why were these people doing what got them lost?

10. Was it business or pleasure?

11. Were there alternate activities they could have engaged in?

12. Any possibility of criminal activity, illicit relationships, or suicide?

13. Where were the persons last seen?

14. Conditions at the time?

15. Did the last witness watch them until they were out of sight?

16. In what direction did they go?

17. When did they depart?

18. When were they supposed to arrive or return?

19. When were they last heard from?

20. How did you find out the answers to the above questions? Are the sources credible?

This is not a complete list of questions. Some information has to be gathered from friends, coworkers, or persons the victim did business with rather than from the family. However, the family of the victim knew that person best and is usually very cooperative in supplying information. Often searchers don't want to disturb the family because they feel uncomfortable dealing with upset or grief stricken relatives. This is a mistake. Not only are they a good source of information, but you also convince them you are serious about trying to find their loved one. Try to get as much information as possible early in the search to improve your chances of finding the victim alive - ask!

Asking questions is not enough - you must record the answers. It helps to keep pencil and paper handy everywhere you go. Once you finish asking questions, the complete answers are a critical tool for the search manager. Make sure it is saved and passed on to the management team. It is advisable to keep a copy for your own records as well.

What to do when you get the initial call

Often the person reporting an overdue person will not know how to get help. They will call the agency in their community most accessible to them, and this is not always the agency responsible. As the first point of contact, your actions are vital to a successful rescue.

Treat the situation as a serious matter: Let the person know their report is important. This establishes your good faith. If the victim is found dead or seriously injured, your support of the person who made the first report may help alleviate some of their guilt or concern.

Get the person's name, address and phone number(s): You must be able to get back to the person who made the report if you or others need more information.

Get every bit of information you can: Always end up with the question "is there anything else you can think of, no matter how small, that might help us?"

Make certain they can get back to you: You want the person who made the report to be able to get back to. You

with any added information or if the victim shows up under their own power. Give them your Team's phone number.

Contact the person/agency with SAR responsibility: Turn the problem over as quickly as possible to the agency responsible for coordinating searches in your area. Don't try to run your own private search You may not have all the facts and you may confuse rather than help the situation.

Available resources

What sort of support is available to help solve a search problem? The search and rescue system can mobilize a wide variety of different types of search and rescue units. Search resources can be classified as:

Primary: organizations whose primary job is SAR. These include:

Air Force Rescue Units (Pararescue - the Air Force's SAR specialists)
Coast Guard and it's Auxiliary
Mountain Rescue Association units (for vertical rescue)
Civil Air Patrol
Explorer Search and Rescue Teams
Canine Search Teams
Mantrackers
Other community SAR teams
National Park Service (have some highly trained search managers)

Secondary: Organizations with the capability to support searches. These include:

Red Cross
Salvation Army
Amateur Radio Emergency Service
REACT
Sheriff's jeep and mounted posses, aero squadrons, fire departments, rescue squads, military units, state police, wildlife officers, and parks and recreation departments

This list is by no means complete. You should make an effort to find the primary and secondary SAR units in your area, and learn how they are activated what capabilities they have.

Conclusion

Once the SAR system is activated it is important that awareness of the search passes to higher levels. Normally, in even a local SAR incident, the state's duty SAR coordinator should be alerted. In many states this is handled by the state emergency management department's emergency operations center in the state capitol. Extended searches may involve the Air Force Rescue Coordination Center at Langley Air Force Base in Virginia. The Air Force is the federal agency responsible for coordinating federal response to searches in the continental United States. They can often mobilize search resources you don't know about from great distances, provide transportation, and help with a wealth of information and other support. However, you have to call for help, starting with local and state authorities first.

Chapter review questions

1. True or False: The Air Force Rescue Coordination Center is responsible for all searches along navigable waterways within the boundaries of the Continental United States.

a. True
b. False

2. What federal agency is responsible for coordinating all inland search within the continental United States?

a. FEMA
b. AFNSEP
c. AFRCC
d. None of the above.

3. True or False: It is not important to document the information received on the initial call requesting SAR assets because it will be available at the mission base anyway.

a. True
b. False

4. True or False: CAP is always the first resource called for a missing person search.

a. True
b. False

Supporting Tasks
Basic: P-0102.
Advanced: P-0202, P-0203, and P-0204.

CHAPTER 18
STARTING THE SEARCH

Chapter objectives
1. Know the definition of Last Known Point and Point Last Seen.
2. Know how to protect the Last Known Point.
3. Be able to identify typical clues.
4. Be familiar with the typical order of use of various search and rescue techniques.

Where do you start?
Now, how do you know where to look? After all, if you know where the victim is, it is not a search but a rescue! In every search there is a logical starting point:

Last Known Point (LKP): LKP is the last spot at which we can definitely establish the victim's presence by:

1. Radio report from an aircraft to an air traffic control facility.
2. Telephone call from the missing person to his family.
3. Trail log at the start of a wilderness trail.
4. The victim's parked car.
5. An article of the missing person's clothing discarded along the trail.
6. A gasoline credit card receipt.
7. Interviews conducted with airport personnel.

Point Last Seen (PLS): PLS is the last spot anyone actually saw the missing person. PLS is established by witnesses.

These points may be the same or different, and they may change during the search. At the start PLS and LKP may be the same and tare established by the individual reporting the missing person overdue. As the search continues a new LKP may be established by finding the person's car at a trailhead. Good news media coverage may bring in witness reports that move the PLS. Constant efforts to develop more information refine the PLS and LKP to reduce the search area.

Protecting the LKP and PLS
Once you have the LKP and PLS, it is important to protect each. These are the starting points for intensive field efforts and may be rich with clues for a successful search. This means:

Approach with caution and on foot: The ground may have footprints that can be identified and used to track the person. Even a parked car on a roadside should be approached carefully to avoid trampling evidence. One searcher is enough.

Keep the number on scene down: More people means more footprints for trackers to deal with and more scents to confuse search dogs.

Don't handle things: Discarded clothing and food wrappers can be visually identified. Leave them where they lie for trackers and dog teams. It is very useful to have a supply of inexpensive surveyor's flags (a plastic flag<on a short metal stake) that can be used to mark such clues.

Keep purposeless activity to a minimum: It is hard to restrain the enthusiasm of searchers wanting to immediately charge into the brush. Until the scene has been checked, you have no idea in which direction the person went. Charging off can destroy valuable clues, create mislea4ing signs for tracking teams, and waste everyone's time

Are your searchers clue conscious?
From the start of a search, searchers should concentrate on looking for clues, not on looking for the missing person. Any victim will generate a large number of clues that can help the searcher find the single victim. What

are some of the typical clues left behind?

Missing person: People traveling through an area often leave the following behind, which could help you find them:

1. Trip plan of any sort
2. Car
3. Discarded clothing
4. Food wrappers
5. Discarded equipment
6. Log entry in a trail log
7. Footprints
8. Disturbed vegetation
9. Credit card receipts
10. Signs of fire or a camp site

Missing aircraft: Aircraft and their crews also leave clues that can be followed to the crash site.

1. Flight plan
2. Log book entries noting common trips taken
3. Credit card receipts
4. Fixed base operator gas pump log
5. Contact with air traffic control facilities
6. Weather briefing received from flight service station
7. Airport Courtesy Car or Rental Car Records
8. Disturbed vegetation, unexplained fires
9. Distress Beacon signal
10. NTAP or other Air Traffic Control data

These lists are by no means complete. The important thing is that you as a searcher are constantly looking for the things out of the ordinary that could be a clue to survivor's location.

Priority of searches

The search manager will typically use a number of different search techniques to find a missing person. A typical series of actions in a search for a lost person might be:

1. Identify the *LKP* and begin confinement and containment of the area.

a. Gather information quickly and efficiently to focus your search

b. Stop a moving survivor from getting past you to stop the area of possibility of getting any larger.

2. While limiting the search area through containment, simultaneously begin searching with resources that typically provide quick and accurate results.

a. Tracking teams to determine the direction in which the person is travelling (cutting down the search area further)

b. Hasty search resources to check high priority areas (common areas where missing persons are located, ramp searches, etc.). Remember that most missing people are found by hasty searches.

c. Canine search teams to limit search areas, and assuming scent articles are available, track from LKP and/or PLS if possible

3. Once a direction of travel is established use other hasty searchers to cut ahead of the trackers to locate clues and speed up the search. Be careful not to place resources in the area that will hinder searches by other resources.

4. If hasty search does not turn up the missing person, use more intensive methods to cover the area with increasing thoroughness.

a. Line or Grid Search

b. Aircraft Search

Chapter review questions

1. True or False: PLS is defined as the last spot at which we can definitely establish the victim's presence.
   a. True
   b. False

2. True or False: LKP is defined as the last spot anyone actually saw the missing person.
   a. True
   b. False

3. True or False: PLS and LKP can be the same place.
   a. True
   b. False

4. True or False: Hasty searches should never be done early in the search because they have a very low probability of finding the survivor.
   a. True
   b. False

Supporting Tasks

Basic: None.

Advanced: O-0415, O-0416, O-0419, O-0420, P-0202, P-0203, and P-0204.

CHAPTER 19
MANAGING THE SEARCH PROCESS

Chapter objectives
1. List the steps to beginning a search while waiting for the trained search managers.

What do you do when the search is handed to you to run?
In this book we have covered the initial actions that have to be taken to start a search. We have not tried to teach you how to be a search manager. However, you may be one of the first trained searchers on scene, which means you may have to get the process going. The following set of guidelines will help you take the right steps while waiting for trained search managers to show up.

1. Start a log: Everything you do in managing a search should be written down. Include the time of the action, what was done, why it was done (so that others can follow your thought process), who you talked to[1] and what their phone number is. Turn this log over to your replacement - make certain they understand what it is and why you have kept it. There still are search managers who don't keep a log. ICS Form 214 can be used to keep chronological logs.

2. Gain cooperation: A number of different agencies may be on scene already. If you live in an area where there is no organized search and rescue response system some interesting things will be happening. Some will be waiting for someone to tell them what to do. Others will feel they have to do something because they are supposed to do something, regardless of what something is. Find all the people who think they are in charge and offer your services. Introduce yourself and shake hands to establish the social niceties. Tell them what you can do. Tell them your people are trained and know how to get a search going. Volunteer to help them organize the effort.

3. Find out what' s been done already: Enter all of this in your log. If you don't it will be forgotten in the press of getting on with the search. Vital information may be lost easily at this stage.

4. Get control of the physical facilities: The early stages of a search are often chaotic. People and equipment tend to be set up with no real eye toward future functions. Very frequently, vehicle parking degenerates into a mess of vehicles of all sorts. If you are lucky one lane remains open through the mess. Time spent on making sure the search base is set up in an orderly way early on will pay dividends throughout the search.

> Stage vehicles and searchers: Designate a staging officer to make certain vehicles are parked in an orderly pattern, preferably so they can pull through to exit the parking area (rather than backing out). Have search teams with their vehicles (if they will need to drive to their areas) or in a holding area (if they will proceed on foot). Organize vehicle traffic flow, and get someone directing traffic and parking.
>
> Set up a command post: In the early stage of the search this may be two or three vehicles clustered together, one with communications and the others with tailgate command post kits. These kits are chests designed to fit in the back of a vehicle and open out to allow access to forms and references and to provide a writing area. Mark the command post with signs and a green command post flag.
>
> Get an ICS staff appointed: Find the most qualified people and set them to *work*. If at all possible, try to get every agency represented in some ICS staff function. This uses the people, establishes liaison quickly, and makes sure each jurisdiction is represented. If the person who thinks he is in charge is not familiar with the ICS do some quiet, subtle education as you go along. Emphasize that the key staff members must stay at the Command Post.
>
> Get maps: This may mean finding out where a copier is located and sending someone to make many copies. You always run out of maps.
>
> Set up briefing and debriefing areas: you need to have areas where search teams can be briefed on their assignments and where returning teams can be debriefed on the results of the search. These areas should

be separate from the personnel staging areas.

Get someone working on billeting, messing, and latrines: Contact your secondary search agencies and see if they can help you find a place for people to sleep and wash up, arrange for food, and arrange for latrine facilities. Find out where people can fill their canteens. Find out where vehicles can fuel up most quickly. With -large numbers of searchers these support arrangements become a full time function. If you don't think about them early, they quickly become their own disaster. And, if you find the person quickly before they are needed, absolutely make sure you get back to your support agencies and let them know. Nothing builds hate and discontent quicker than to have a volunteer mass feeding group spend their money for food, make a lot of sandwiches, and then drive two hours to find that the searchers all went home three hours before.

5. Start posting information: Post the following where everyone can see the information. All charts should be updated when necessary during each operational period.

Staff organization chart: So everyone knows who has what job.

Basic search information: A description of the incident details and of the search objective. A completed CAPF 102 normally takes care of this, but needs to be updated for each operational period.

Hazards to searchers: Searching can be dangerous, and avoiding mishaps or accidents by planning and information sharing is critical

Post the following for the use of the incident staff:

Search areas covered: A map with the areas that; have been covered once lightly. Cross-hatched in one direction and subsequent searches in other directions. Color coding search areas can also be helpful.

Known information: A map with everything that is known about the search objective's trip posted on it ($route_1$ times, LKP, PLS).

Leads and clues: A map with all leads and clues found posted on it. Each should be rated for quality and assigned a color. High probability could be red, moderate probability green, low probability blue for example. Post the leads using colored adhesive dots with the lead or clue number written on the dot. The color concentrations will start to highlight the problem for you.

Resources status: A chart of what resources are available, what are assigned to search tasks where, and when the assigned units are due back.

6. Get a grip on search strategy: In the initial stages of a search some actions should be virtually automatic. An initial strategy should be:

a. Gather information to determine who you are looking for, where they were going; the LKP and PLS.

b. Based on LKP confine the search area.

c. Start interviewing aggressively to try to develop more information.

d. Have trackers and dogs work from the LKP.

e. Develop probability areas to guide your other search efforts. Based on what you know and what the terrain is like, try to determine areas in which the person may be located. At the first stages of a search these should be concentrated around the LKP and along the expected route if it is known. Rank these areas in the order of likelihood that the missing person may be in them; again based on the best

information you have.

f. Assign search teams to do hasty searches in these areas in the order from most likely to least likely.

g. Start preparations for more in depth searches.

7. TURN-OVER: Hopefully by this time a trained search staff has arrived. And even if more qualified staff has not arrived yet, you will need rest if you are to coordinate efforts over a long period. Whoever replaces you in down periods or for the long haul needs to know what is going on. Complete a turnover briefing for them. It should cover at a minimum:

a. What the search objective is and what you know about it.

b. The geography of the search area.

c. The search base facilities (where vehicles are staged, traffic flow, where people are set up to sleep, where meals are available, where the bathrooms are, etc..

d. Resources available.

e. What search activity is ongoing now.

f. What search activity has been completed and what the results were.

g. What communications are available.

h. Any hazards.

i. Any ongoing, unresolved problems.

Chapter review questions

1. True or False: It is not necessary to keep a mission log. All searching done before trained managers arrive will be redone anyway.
   a. True
   b. False

2. True or False: It is not necessary to gain the cooperation of other search agencies. CAP always works alone on searches.
   a. True
   b. False

3. True or False: Once you start serving as search manager, you are in charge until the mission is suspended or the victim or survivor is located, no matter how tired you get.
   a. True
   b. False

4. True or False: The mission log should include a history of what was done before you arrived as well as maps denoting areas all areas searched.
   a. True
   b. False

Supporting Tasks

Basic: None.

Advanced: O-0415, O-0416, O-0419, O-0420, P-0202, P-0203, and P-0204.

CHAPTER 20
STARTING A SEARCH TEAM

Chapter objectives
1. List logical steps involved in starting SAR Team.

Where to start
If your unit is regularly called on to help in search incidents, and if you have interested members, you should consider organizing a search team. This is not a simple effort, and one you should undertake only if you are willing to be serious about the commitment required. Advertising that you have a search team obligates you to respond day or night, in good weather or bad, and regardless of the sporting event on the television. And it also obligates you to do a lot of training beyond that normally required of your emergency response organization and beyond what is included in this book.

Determine the local interest: The first step is to find out who in your organization is interested in search and rescue. Assess your members carefully. Some might want to get involved, but may not be physically able to do strenuous work in the field. Don't reject these members. They can help interview or do a wide variety of functions at the search base.

Train regularly and as a team: Have all interested members complete a basic search and rescue training course. Course completion proves you are serious and can be important for liability defense. Start planning how to get more advanced training and start working on meeting certification requirements.

Develop an alert roster: The third step is to develop an alerting roster of names and phone numbers of your search team members. Give a copy to each member. Update it regularly, and use it to do practice call outs each month.

Accumulate some basic equipment: Any required or recommended equipment like topographic maps or first aid kits that the entire team will need should be centrally located for the group to access it. Individual equipment for new members should also be collected, but don't be afraid to issue it out to those who truly need it. Obviously you can't just give all of your equipment away, but when it is needed, don't be afraid to use it.

Wear your uniform: This may sound silly, but a uniform appearance goes a long way to communicating to others that you are a serious team, and it is required as part of CAP regulations. Uniforms shouldn't be worn only because they are required though. A uniform also gets you recognition in large incidents; people see that you are there, and if everyone is in the same uniform, you look like an organized team, not a bunch of hanger's on. You would be amazed at how many doors are opened simply by presenting a clean organized appearance.

Assign jobs: Assign jobs within the team based on the key team functions. Try to have each member become expert in at least two duties. In addition, try to have at least two members who are trained to set up and operate an initial command post until specialized searchers arrive and can take over.

Run some training exercises: Have a member hide in a reasonably sized area (such as a wooded park) and practice locating him or her. If you run a training exercise on public property, notify the responsible agency. It is amazing how quickly your exercise can become a full-fledged search because of reports from onlookers. Design a simple scenario, give instructions to practice witnesses, and have team members interview them. See if you can borrow an emergency locator transmitter trainer to practice locating emergency beacons. Train with other groups to expand your opportunities.

Get to know the search and rescue community: Many states have statewide SAR organizations (try contacting your state police or local sheriff for a point of contact). Find out who is out there, ask for their help, and train together whenever you can. If there is a state search and rescue council, join and even more important, attend meetings. Get to know people by face and name. It makes things work much more smoothly when you have to work together on a search. Wings often have MOUs with these agencies, allowing members to be not only a federal resource, but a state or local resource when necessary.

Advertise: Let the agencies in your community that are involved in searches know who you are, that you are available, and that you want to help. Distribute your alerting roster to every agency that might call you and send them the updates. Don't oversell your abilities, but a1so don't hide under a rock. And don't be discouraged if calls don't come fast and furious. There aren't that many incidents, and acceptance takes time. Also, don't forget to coordinate all of this with your wing operations staff. They need to know your capabilities, and are responsible for relaying it to many partner agencies.

Chapter review questions

1. True or False: Starting a SAR team does not put any additional responsibilities on members of the unit.
    a. True
    b. False

2. True or False: It is not necessary to wear a uniform when serving as a member of a CAP SAR team.
    a. True
    b. False

3. CAP does not need to work with local SAR councils since the only SAR we do is assigned by the AFRCC.
    a. True
    b. False

4. Advertising your units' planned capabilities to the community is the first thing a new SAR team should do.
    a. True
    b. False

Supporting Tasks

No specific tasks are referenced by this chapter, but before forming a search team within your unit it is advisable to review all tasks thoroughly so that you know what you are getting into, and what is needed to do the job.

CHAPTER 21
COMPUTERS IN SAR

Chapter objectives
1. Introduce computers as a tool for the SAR environment.

Technology Available Today
Technology in the working world has increased greatly in recent years, and the SAR industry is beginning to evolve with it. Databases storing everything imaginable about people, places and objects are readily available to those who are willing to pay for the service. Knowing who is on your team and all of the background information about those team members can save mission coordination staff a lot of valuable time.

Mapping: Take that one step further. Mapping programs linked to those databases make up what is better known as Geographic Information Systems (GIS). These GIS can then be used to track placement of resources or even track the movement of resources. A small transmitter relaying real time location information to the GIS from a Global Positioning System (GPS) can let anyone watching know where an aircrew or ground team is presently located with relatively good accuracy (down to within a few meters in many cases). Think about all of those operations normal check-ins that could be minimized by simply sending a data burst of a team's location and status.

Statistical Tools: There are also other tools available to assist not only the ground teams, but mission base staff. You have worked through several problems determining the POA, POD, POS, ROW and several other mathematical functions with a calculator and formulas given to you. Now try entering the baseline numbers into the computer and let it do the work for you, and get the same answer. Never mind the fact that the computer processes the data faster, allowing you to make better predictions and reduce the planning time involved in dispatching multiple teams out to the field.

The Future
Now let's take that one more step farther along. You are now sending a regular data burst of your location to mission base without having to press a button. You have some free time and happen to be the team performing damage assessment or that locates the crash site. Take a picture like you should, but now you can transmit that picture back to mission base for immediate analysis by using a special camera. What if the picture cuts off an object? This is no longer a problem since the team is still on site to just take another at the direction of the mission base staff. Consider the time saved, never mind the fact that a record is now available to justify everything done on the mission, and it is as accurate as time allows. A few CAP Wings are field testing such equipment. This may not be that far off.

Problems to be aware
There are also problems with increased technology. If you keep that in mind, and also remember a few other things you will be fine. The following are a few to think about:

Availability: Computer and technology systems are not always available, so you may have to go back to using a map and compass or a calculator. Use the tools if you have them available and know how to use them, but don't forget how to do the job without them. Remember, quality is normally better than quantity in SAR operations.

Data Overload: The second is that you may end up overloading personnel with unnecessary data. It is great to be able to use all of these gee-whiz toys, but if you still can't make a decision or get the job done, then the information is useless.

Garbage In equals Garbage Out (GIGO): The information you get out of the computer is only as good as the information that you put into it. The lawyer is not going to care that "the computer told you to". You

need to be able to make decisions on your own. Data can be manipulated to show just about anything, so you need to be able to properly interpret that data.

WYSIWYG isn't always true: What You See Is What You Get (WYSIWYG) is a popular phrase for people using computers to present information. The problem is that people make computers, and thus mistakes are made. Check your presentations before they go out to the world. You'll catch problems more often than not before they are released to the world. And if it is critical to your operations, we would suggest that you check the results a second time, or even have another qualified person take a look before you change the entire direction of your operations.

Y2K: Many older computer systems or certain software packages used on them will not work after the year when we move into the next millenium. If it is critical to your operations, choose software packages that will work. Most packages designed from 1997 on have been year 2000 compliant, or have fixes in development, so there isn't much to worry about if you buy something now. But it is better to check than to be caught later, unable to meet your operational commitments.

Chapter review questions

1. True or False: Though computers are an integrated part of most of our lives, they will never be used in SAR.
    a. True
    b. False

2. True or False: Software is currently available to compute POS, POD, as well as many other mathematical models used in SAR planning.

    a. True
    b. False

3. True or False: Tracking teams at any given point during the search, and even uploading digital pictures on site will be possible in the future.
    a. True
    b. False

4. True or False: More is always better in terms of computer data presentations.
    a. True
    b. False

Supporting Tasks

Though no specific tasks are referenced, students should consider computers to assist in accomplishing tasks in a variety of areas like planning tasks or navigation tasks.

CHAPTER 22
CRITICAL INCIDENT STRESS

Chapter objectives
1. Generally define critical incident and common reactions of personnel involved in response to these incidents.
2. Demonstrate an understanding of the Critical Incident Stress Debriefing and its' rules and objectives.

Critical Incident Reactions
After being involved in an intense, unusual, or abnormal event (critical incident), you may experience reactions that are out of the ordinary for you. This is not an uncommon experience. The event may create a stress response which can result in changes in your usual physical or emotional reactions. These reactions are normal. Often these reactions appear immediately after the event, but they may appear hours, weeks or months later. Some of the more common reactions reported by individuals after a critical incident may include (but are not limited to):

PHYSICAL*	EMOTIONAL	COGNITIVE	BEHAVIORAL
Nausea	**Anxiety**	**Memory Problem**	**Withdrawal**
Intestinal upset	**Grief**	**Poor Attention**	**Restlessness**
Fatigue	**Guilt**	**Nightmares**	**Antisocial acts**
Rapid Heart	**Denial**	**Intrusive Images**	**Increased ETOH**
Chest Pain	**Fear**	**Hyper-alertness**	**Avoidance**
Difficulty Breathing	**Depression**	**Loss of orientation**	**Change in speech**
Shock symptoms	**Panic**	**Poor problem solve**	**Change in appetite**
Muscle cramps	**Apprehension**	**Poor decisions**	**Startle reflex**
Headaches	**Disturbed thinking**	**Sleep Disturbance**	**Blaming others**
Chills	**Irritability**	**Flashbacks**	**Pacing**

Some people exposed to the same event may not suffer any effects at all; this, too, is a normal reaction. While these reactions can be alarming and unsettling, it is important to remember that you are not losing your mind or "falling apart."

We want you to understand that these are normal reactions that normal people experience after an abnormal event. The intensity and frequency of these reactions usually decrease after one to three weeks.

If you are experiencing painful thoughts, memories or feelings during this period, we would like you to get in touch with trained professionals. Many active duty Air Force Units and a few CAP wings have personnel on call that you may call (A Peer Support Network (PSN)) and speak with in the event you notice some of these symptoms.

If you believe that you need additional assistance, contact the PSN, *we understand.*
*Any of these symptoms may indicate the need for medical evaluation

Critical Incident Stress Debriefing Meeting
This type of meeting has been developed to assist people manage and to prepare for possible stressful reactions following critical incidents or traumatic experiences.

As mentioned previously, people often differ widely in their responses to critical or traumatic events. You do not have to be experiencing any particular difficulty to benefit from this type of meeting. It has been shown that debriefings often help prevent effects of stress such as painful feelings or memories. Some people may feel more like talking than others. There are a few basic rules and objectives associated with stress debriefings:

1. There are no specific expectations for you. We welcome you to be yourself.

2. The meeting is confidential. No notes are kept. Only people affected by the incident and Peer Support Members will be present. The PSN consist of Civil Air Patrol Members who are trained Peer Support

Counselors and have valuable information to offer to you. Confidentiality is binding not only for the Team Members who are here to assist you, but for all participants as well. To breach that confidentiality is to violate the trust of all who are present. Please do not discuss the reactions of the participants of the meeting.

3. The main part of the debriefing consists of a discussion of the critical incident that has taken place and the impact of the incident on you. The purpose of the meeting is to give you an opportunity for support, understanding and learning. The team's objective is to help you validate what you went through and to ventilate some of the intense reactions you may still be experiencing.

4. You will also review or learn about normal stress reactions people experience after a traumatic event to help prepare you for possible future reactions you may experience. You may experience some, several, or none of the reactions described for varying periods of time.

5. At the end of the Debriefing Meeting, you may have additional questions or comments. If there are any questions or information beyond what the debriefing team can offer, you will be referred to other resources which will be helpful for you. In addition, you may wish to participate in additional Stress Debriefing Programs which may be available.

6. If you have additional questions after the debriefing, please notify the Team Leader and s/he will arrange any referral deemed necessary, or requested.

Chapter review questions

1. True or False: All information provided in a stress debriefing can be released to the general public without regard for confidentiality.
   a. True
   b. False

2. True or False: No notes will be taken during a critical incident stress debriefing.
   a. True
   b. False

3. True or False: All personnel react the same way to incidents they are involved in.
   a. True
   b. False

4. True or False: Signs of stress associated with participating in a critical incident can often manifest themselves days or even weeks or months after the incident.
   a. True
   b. False

Supporting Tasks

Basic: O-0102.

Advanced: O-0005, O-0007, O-0421, O-0422, O-0802, O-0803, O-0804, O-0903, O-1101, P-0202, P-0203, and P-0204.

CHAPTER 23
CONTINUING EDUCATION

Chapter objectives
1. Understand the reasons for additional training required to participate as a professional in the emergency services industry.

Why is Continuing Education Necessary?
Developing the skills necessary to be a ground team member, leader or any other member of the mission team can be a extremely difficult. Though you may be qualified in a certain specialty already, there is always additional training that is necessary to remain current. Technology has allowed us to provide many more resources to our ES team, but at the same time this requires team members to constantly be aware of innovations in the field, and go through additional upgrade training so that they may take advantage of all that these tools can offer. Never mind the fact that most team members want to become leaders, most team leaders want to become branch directors, and so on, and this all requires additional continuing education.

What Opportunities are available?
A variety of opportunities are available to CAP members, both internally and externally, to continue their emergency services education. A few are listed below:

National Ground Search And Rescue School: Personnel with a variety of experience in ground SAR, often graduates of local SAR schools, go to the National Ground Search And Rescue School to further their training. The course takes a group of potential team leaders and members, and provides them the training they need to be better teams in the field.

Hawk Mountain Ranger School: Put on by the Pennsylvania Wing, Hawk Mountain Ranger School is another national training program available for personnel to attend to develop emergency services skills. Like NGSAR, Hawk Mountain Ranger School also provides training for team members and leaders in SAR skills in a variety of training programs.

SAR Management Course: Provided by the AFRCC specifically for CAP members, this course teaches potential Mission Coordinators the basic principles they need to run standard CAP missions. Helpful hints are provided in a lecture format, as well as interaction between students and instructors culminating in a 4 hour table-top exercise.

FEMA (Federal Emergency Management Agency) Home Study Courses: Courses ranging from managing disasters to radiological monitoring refresher courses are offered to anyone interested. The courses give the average individual insight into what emergency manager really do.

State and County Training: Most state emergency management agencies (EMA) or county EMAs provide training like CERT (Community Emergency Response Training) and shelter management. Typically these courses are offered annually or semi-annually, so if you are interested in doing this training right away, you might want to check it out real soon.

Medical and Technical Rescue Training: Personnel should consider taking first responder or emergency medical technician classes to upgrade their medical training. Also, many requirements from OSHA need to be updated annually, like bloodborne pathogens training. Check with your local chapters of the American Red Cross or National Safety Council, or even your state or county's department of health. They should be able to let you know when future courses will be that meet your needs. Also, you may want to consider joint training between CAP mission teams and other local technical rescue groups to better learn what they do. Other organizations like the National Association for Search And Rescue also provide technical training.

Distance Learning: There are many colleges and universities that provide undergraduate and graduate level educational courses as well as courses for the general public that you might be interested. For example, Embry-Riddle Aeronautical University provides aviation training in accident investigation and safety management via

correspondence through its department of Independent Studies. Much of this training is via videos and online interaction with fellow students and instructors via internet forums.

Conclusion

The choice is yours. You have taken the first step towards becoming a professional working in the emergency services industry. You could have many long, tiring days ahead of you, but you will know that you helped your community, just as you would want to be helped. To do the job you have volunteered for safely and effectively, you will need to stay current and encourage others to do the same. By fostering that environment, we can all make progress towards a higher level of training, and help others in the process. Interested? Hope to train with you in the future.

Chapter review questions

1. True or False: Continuing education is required to remain qualified in all emergency services specialties.
   a. True

Supporting Tasks

No common tasks are associated with this chapter directly, but students should consider reviewing all tasks in the future, especially ones that were especially difficult for you to grasp during initial or follow-on training.

BIBLIOGRAPHY

The following documents were reviewed prior to the publication of this manual for the Emergency Services Curriculum Project. Though many of the documents were not quoted or referenced directly, it should be noted that much time and energy has been put into the ground operations and SAR functions in CAP and the SAR industry. These books and guides could help you develop a better understanding for what is truly out there to help you do a better job as a SAR team member.

Aircraft Accident Investigation: Tips, Techniques and Pitfalls. Taylor, Sam. Transportation Safety Institute. Oklahoma City, Oklahoma. 1990.

Air Crash Investigation of General Aviation Aircraft. Glenn Ellis. Capstan Publications Inc.. Greybull, Wyoming. 1984.

An Introduction to Land Search Probabilities and Calculations. William G. Syrotuck. Arner Publications. Rome, New York. 1975.

Backpacker Magazine. "The Perfect Campsite". Twehous, Jeanne. Rodale Press, Inc. Emmaus, Pennsylvania. June 1996.

Backpacker Magazine. "Clean Up Your Act". Wiard, Brenda. Rodale Press, Inc. Emmaus, Pennsylvania. May 1996.

Barron's Legal Guides: Law Dictionary. Gifis, Steven. Barron's Educational Series, Inc. Hauppauge, New York. 1991.

Basic Search And Rescue. Greene, Walter. VASI.

Be expert with Map & Compass: The orienteering Handbook. Kjellstrom, Bjorn. Macmillan Publishing. New York New York. 1976.

Burke County Emergency Operations Plan. Foster, Steven. Morgantown, North Carolina. 1993.

Critical Incident Stress Debriefing: an operations Manual for the Prevention of Traumatic Stress Among Emergency Services and Disaster Workers, Second Edition. Mtichell, Jeffrey & Everly, George. Chevron Publishing Corporation. Ellicott City, Maryland. 1995.

Critical Incident Stress. Jones, Sherry. Michigan Wing CAP. Selfridge AFB, Michigan. 1998.

Daytona Beach Composite Squadron Emergency Services Resource Guide. Daytona Beach Composite Squadron. Daytona Beach, Florida. 1994.

ELTs: Everything You Wanted to know and MORE. Lanis, Scott. 1998.

Emergency Services Ground Operations Manual. National Capital Wing. Washington, D.C.. 1991.

Emergency Services Stress: Guidelines for Preserving the Health and Careers of Emergency Services Personnel. Mitchell, Jeff & Grady, Bray. Brady. Englewood Cliffs, New Jersey. 1990.

Evidence Documentation at the Scene of an Aircraft Accident. Feith, Greg. National Transportation Safety Board, Major Investigations Division. Washington, D.C.. 1995.

Federal Response Plan. Federal Emergency Management Agency. Washington D.C.. 1992.

Ground Search and Rescue Manual. Search and Rescue Training Associates, Inc. Richmond, Virginia. 1989.

Ground Team Training Manual. Webster, Mark. Civil Air Patrol, Adirondack Mountain Group, New York Wing. New York. 1995.

Hepatitis B: A Disease in Need of Prevention. Merck Vaccine Division, Merck & Co., Inc., 1993.

IG-317: Community Emergency Response Team. FEMA, Emergency Response Institute, National Fire Academy. Emmittsburg, Maryland. 1994

Incident Commander Field Handbook: Search And Rescue. NASAR. Fairfax, Virginia. 1987.

Incident Command System National Training Curriculum, Modules 1-17. National Wildfire Coordinating Group, National Interagency Fire Center. Boise, Idaho. 1994.

Inland SAR Course Notebook. National SAR School. USCG RTC, Yorktown, Virginia. 1997.

Introduction to Hazardous Materials Student Materials. Department of Transportation. 1990.

Land Search And Rescue. Norman Geisinger, Thomas Jensen, Glen Kreider. Pennsylvania Wing, Civil Air Patrol. Bethlehem, Pennsylvania. 1989.

L-Tronics Electronic Direction Finding Student Manual. Lou Dartanner. Santa Barabara, California. 1988.

Lyme Disease. Centers for Disease Control and Prevention. Atlanta, Georgia. 1998.

Managing the Search Function. National Association for Search And Rescue. Fairfax, Virginia. 1987.

Man-tracking. Marilyn Greene. Schenectady, New York. 1991.

Map Reading and Land Navigation. Department of the Army. Washington D.C.. 1987.

Maryland Wing Ground Team Member's Handbook. Redman, Kevin & Kilgallon, John. Baltimore, Maryland. 1998

Maryland Wing Ground Team Leader's Handbook. Redman, Kevin & Kilgallon, John. Baltimore, Maryland. 1998

Michigan Wing GSAR Manual. Captain McBride. Detroit, Michigan. 1991.

Military Mountaineering. HQ, Department of the Army. Washington D.C.. 1989.

Missing Person Search. Connecticut State Police. Hartford, Connecticut. 1990.

Missouri Wing Pathfinder School Student Lesson Plans. Scott Lawson. Whiteman AFB, MO. 1994.

National SAR Manual, Joint Pubs 3-50 & 3-50.1. Joint Chiefs of Staff. Washington, D.C.. 1991.

Northeast Region CAP SAR Management Course. Brawn, David. Springfield, Massachusetts. 1989.

Poisonous "Critters" of Florida. Florida Poison Information Center. Miami, Florida. 1998.

Protecting Yourself against Serious Bloodborne Infections on the Job: A guide for First Responders. Merck, Sharp, & Dohme, Inc. 1993.

Rescue Magazine. "Light Aircraft Crash Rescue". Smith, Barry D. JEMS Communications. San Diego, California. April 1993.

Response Magazine. "Re-examining the Search Function". National Association for Search And Rescue. Fairfax, Virginia. 1992 to 1993.

Response Magazine. "Death Investigation for the Remote Responder". National Association for Search And Rescue. Fairfax, Virginia. 1991.

R.I. G.S.A.R. Field Manual. John W. Desmarais. Pascoag, Rhode Island. 1994.

Search and Rescue Ground Operations Manual. Civil Air Patrol, Ohio Wing. Rickenbacker ANGB, Ohio. 1995.

Search and Rescue Survival Training. HQ, Department of the Air Force. Washington D.C.. 1985.

Searching Remote Areas with Airscenting Dogs. Hatch Graham. 1990.

Search is an Emergency. LaValla, Patrick, Stoffel, Robert and Jones, Anthony. Emergency Response Institute. Olympia, Washington. 1995.

Self Aid and Buddy Care, AFH 36-2218, Volumes 1 & 2. USAF. Washington, D.C. 1996.

SM 305.7: Overview of the Incident Command System. Emergency Management Institute. Emmitsburg, Maryland. 1992.

Snakes. Jackson, Scott and Mirick, Peter. University of Massachussets. Amherst, Massachusetts. 1996.

Snakes of Indiana. Indiana Department of Natural Resources, Division of Fish and Wildlife. 1998.

Standardized Emergency Services Training. Civil Air Patrol, Group 2, Florida Wing. Saint Augustine, Florida. 1995.

Standard Guide for Techniques in Land Search. American Society for Testing and Materials. Pennsylvania. 1995.

Standard Guide for Inspection of Nylon, Polyester, or Nylon/Polyester Blend, or Both Kernmantle Rope. American Society for Testing and Materials. Pennsylvania. 1996.

Standard Practice for Visual Signals Between Persons on the Ground and in Aircraft During Ground Emergencies. American Society for Testing and Materials. Pennsylvania. 1995.

Standards for SAR Technician III, II, I and Crewleader III. National Association for Search And Rescue. Fairfax, Virginia. 1998.

The Morrow Guide to Knots. Bigon, Mario & Regazzoni, Guido. William Morrow and Company. New York,New York. 1982.

The Successful Interview, excerpted from the USAF's Air Combat Command Guide to Engaging the Media. McGovern, Valerie, MSgt, USAF. 1997.

Title 49, Transportation, Chapter VIII, Part 830, NTSB. U.S. Government Printing Office. Washington D.C.. 1989.

Wilderness Survival. Shanks, Bernard. Universe Books. New York, New York. 1987.

ATTACHMENT A
GEAR FILL-IN FORM

24 Hour Pack

Pouch 1

Pouch 2

Pouch 3

Pouch 4

Pouch 5

Pouch 6

Pouch 7

Pouch 8

Pouch 9

72 Hour Pack

Pouch 1

Pouch 2

Pouch 3

Pouch 4

Pouch 5

Pouch 6

Notes

ATTACHMENT B
HELICOPTER MARSHALLING SIGNALS

PROCEED TO NEXT MARSHALLER
Right or left arm down, other arm moved across the body and extended to indicate direction of next marshaller.

THIS MARSHALLER
Arms above head in vertical position with palms facing inward.

START ENGINES
Circular motion of right hand at head level with left arm pointing to engine.

ENGAGE ROTOR(S)
Circular motion in horizontal plane with right hand above head.

CUT ENGINE(S)/ROTORS
Either arm and hand level with shoulder, hand moving across throat, palm downward.

ABANDON AIRCRAFT
Marshaller first gives signal to cut engines, followed by signal simulating unfastening seat belt and shoulder straps and throwing them up and off.

CLEARANCE FOR PERSONNEL TO BOARD/EXIT HELICOPTER.
Pilot will look at person and give a "thumbs up" for clearance to board/exit helicopter.

NEGATIVE (NOT CLEAR)
hand raised, thumb down.

AFFIRMATIVE (ALL CLEAR OR "OK")
Hand raised, thumb up.

VERTICAL MOVEMENT – MOVE UPWARD
Arms extended horizontally sideways beckoning upwards, with palms turned up. Speed of movement indicates rate of ascent.

VERTICAL MOVEMENT – MOVE DOWNWARD
Arms extended horizontally sideways beckoning downwards with palms turned down. Speed of movement indicates rate of descent.

HORIZONTAL MOVEMENT – MOVE TO RIGHT (STARBOARD)
Left arm extended horizontally sideways in direction of movement and other arm swung over the head in same direction, in a repeating movement.

HORIZONTAL MOVEMENT – MOVE TO LEFT (PORT)
Right arm extended horizontally sideways in direction of movement and other arm swung over the head in the same direction, in repeating movement.

HOVER
Arms extended horizontally sideways, palms downward.

SPOT TURN
Left or right hand moving upward and backward, from a horizontal position, to indicate direction of tail movement. Other hand pointing to center of spot turns. Marshaller must remain in full eye-view with pilot.

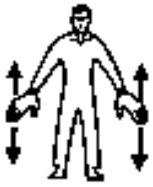
MOVE BACK
Arms by sides, palms facing forward, arms swept forward and upward repeatedly to shoulder height.

TURN TO PORT (LEFT)
Point right arm downward, left arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.

TURN TO STARBOARD (RIGHT)
Point left arm downward, right arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.

MOVE AHEAD
Arms a little aside, palms facing backwards and repeatedly moved upward-backward from shoulder height.

SLOW DOWN
Arms down with palms toward ground, then moved up and down several times.



TAKE OFF THIS WAY (at pilot's discretion)
Marshaller conceals left hand and makes circular motion of right hand over head in horizontal plane ending in a throwing motion of arm towards direction of takeoff.

WAVE OFF
Waving of arms over the head.

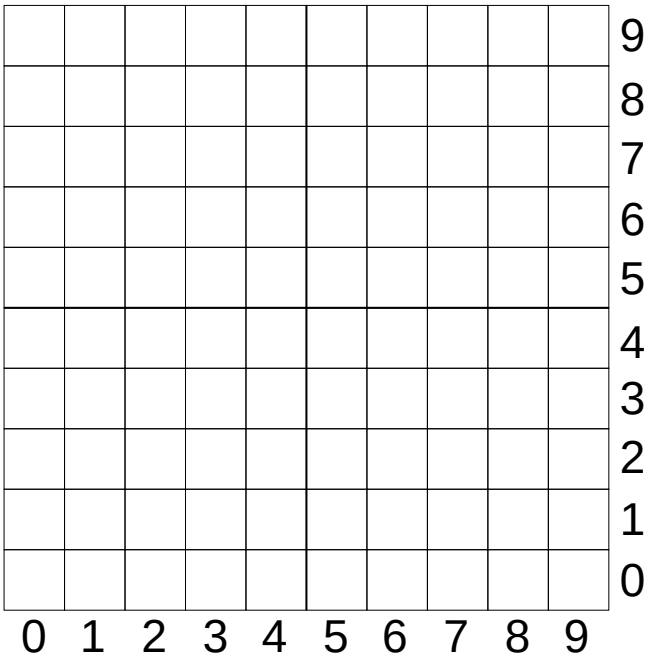
LANDING DIRECTION
Marshaller turns and faces toward point where aircraft is to land, the arms are lowered repeatedly from a vertical position to a horizontal position, stopping finally in the horizontal position.

LAND
Arms crossed and extended downwards in front of the body.

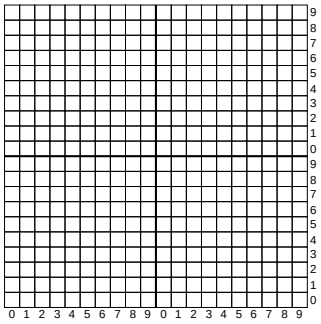
STOP
Arms crossed above the head, palms facing forward.

MARSHALLING FINISHED
Right arm raised with elbow at shoulder height with palm facing forward.

ATTACHMENT C
MAP TOOLS

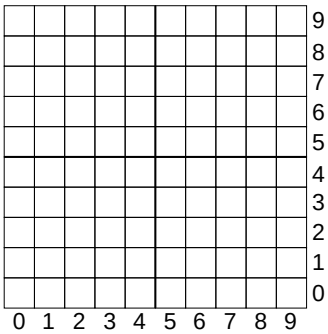


1:125,000 UTM Grid
Each mark is 1 kilometer

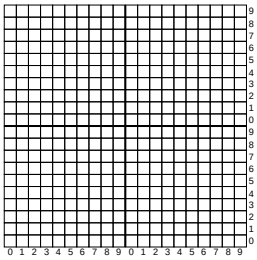


1:50,000 UTM Grid
Each mark is 100 meters

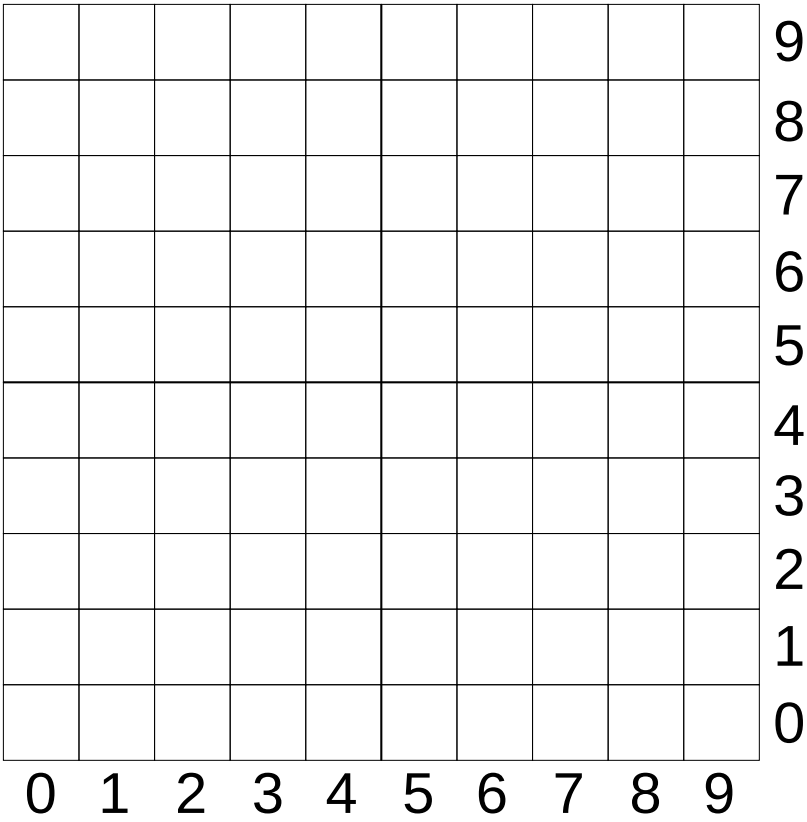
1:25,000 UTM Grid
Each mark is 100 meters



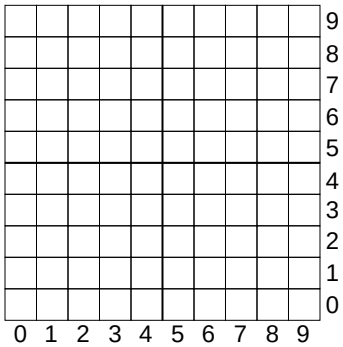
1:250,000 UTM Grid
Each mark is 1 kilometer



1:62,500 UTM Grid
Each mark is 100 meters

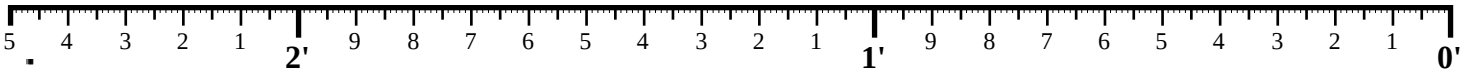


1:100,000 UTM Grid
Each mark is 1 kilometer

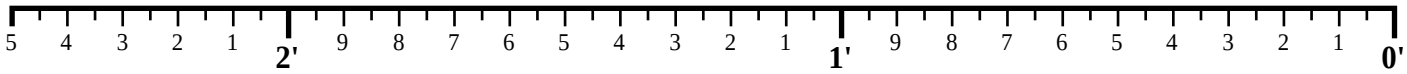


1:24,000 UTM Grid
Each mark is 100 meters

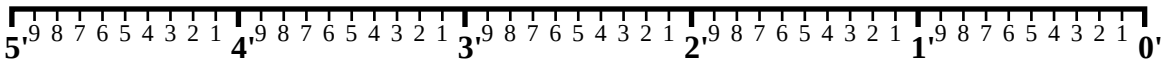
1:100,000 & 1:50,000
1:63,360
1:25,000 & 1:250,000
1:150,000
1:62,500
1:24,000



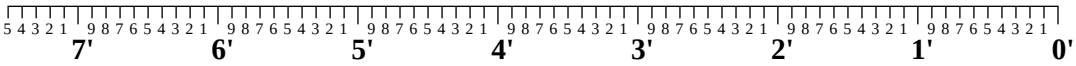
1:24,000



1:25,000

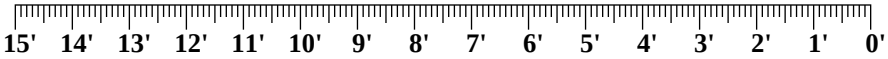


1:62,500

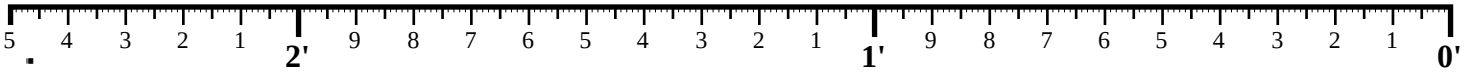


1:100,000

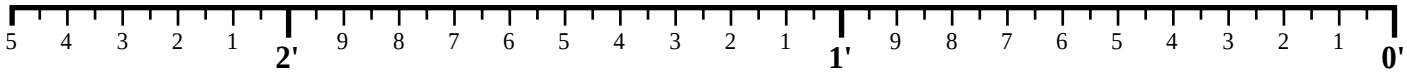
1:150,000



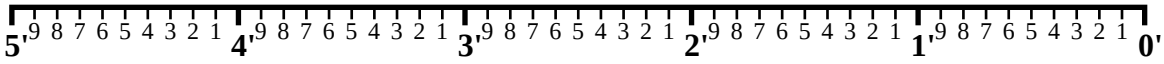
1:250,000



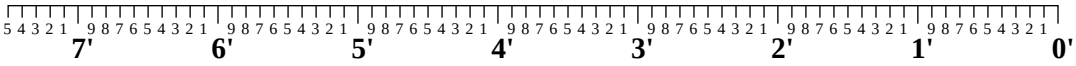
1:24,000



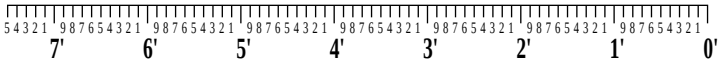
1:25,000



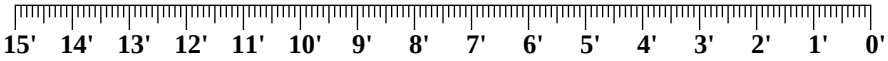
1:62,500



1:100,000



1:150,000



1:250,000

0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270
280
290
300
310
320
330
340
350

ATTACHMENT D

The standard sectional aeronautical chart and the following grid identifications system is used by CAP when coordinating missions with the AFRCC and other agencies. CAP does not preclude the use of local procedures where they are deemed necessary or more practicable. Many missions are "local" in nature, and local procedures may be highly efficient and effective in the management of SAR resources within a defined geographical boundary.

1. The Sectional Aeronautical Chart (scale: 1-500,000) is divided into 30 minute intervals. Consider both the north and south sides of a sectional chart as one unit. Identify the northern and southern most latitude limits, and the western and eastern most longitude limits from Table D-1. The rectangular area thus formed is the area to be gridded. Line off each 15 minutes of latitude and longitude within this area. Start with the first full 15 minute quadrangle in the northwest corner of the chart as number one (1) and number in sequence from west to east. Continue in this manner until reaching the southeast corner of the gridded area which serves as the last full 15 minute quadrangle. The number of quadrangles in each respective chart is scheduled in column 7, Table D-1.

2. The basic 15 minute quadrangle (grid) is further broken down into quarter sections. The northwest quarter is labeled "A"; the northeast "B"; the southwest "C"; and the southeast "D". This breakdown is used when concentrated search is required and as a means of identifying 7 1/2 minute quadrangles, they need not be annotated on the charts but should be understood to exist and used in mission assignment and reporting.

3. Where charts overlap (the same grid is located on two or more charts) the grids on all charts will be assigned the number and identifier of the primary chart (the most westerly chart will be designated as the primary chart). Consider the Kansas City and St. Louis charts as an example. The Kansas City chart will be numbered in accordance with paragraph B.1. above; that portion of the St. Louis that is overlapped by the Kansas City chart will be labeled with the number identical to the same grid on the Kansas City chart preceded by the letters "MKC" to identify the origin of the grid numbers. (See Table D-1) The normal sequential numbers on the overlap area that are displaced by the primary chart will simply be omitted for use.

   a. The Los Angeles chart has a 15 minute latitude overlap on the Las Vegas chart within the area defined by 36-00N to 35-45N, and 118-00W. (Total of 12 grids)

   b. The Los Angeles chart has one (1) degree longitude overlap on the Phoenix chart within the area defined by 35-45N to 32-00N, and 116-00W to 115-00W. (Total of 60 grids)

c. The Denver chart has a 15 minute latitude overlap on the Albuquerque chart within the area defined by 36-00N to 35-45N, and 109-00W to 104-00W. (Total of 12 grids)

d. The Kansas City chart has one (1) degree longitude overlap on the St. Louis chart within the area defined by 40-00N to 36-00N, and 91-00W. (Total of 64 grids)

e. The St. Louis chart has one (1) degree longitude overlap on the Cincinnati chart within the area defined by 40-00N to 36-00N, and 85-00W to 84-00W (Total of 64 grids)

f. The Cincinnati chart has one (1) degree longitude overlap on the Washington chart within the area defined by 40-00N to 36-00N, and 79-00W to 78-00W. (Total of 64 grids)

4. Chart identifiers are listed in Table D-1.

5. On charts with inserts over oceanic areas number consecutively through the insert just as would be accomplished were the insert not published.

C. Grids and numbering for the Sectional Aeronautical Charts listed in Table D-1 are depicted in Figures D-1 thru D-37.

Table D-1. Sectional Aeronautical Chart Grid.

Table D-1. Sectional Aeronautical Chart Grids

Chart	*Identifier*	*North Grid Limit*	*South Grid Limit*	*West Grid Limit*	*East Grid Limit*	*Total Grids*
Seattle	SEA	49-00N	44-30N	125-00W	117-00W	576
Great Falls	GTF	49-00N	44-30N	117-00W	109-00W	576
Billings	BIL	49-00N	44-30N	109-00W	101-00W	576
Twin Cities	MSP	49-00N	44-30N	101-00W	93-00W	576
Green Bay	GRB	48-15N	44-00N	93-00W	85-00W	544
Lake Huron	LHN	48-00N	44-00N	85-00W	77-00W	512
Montreal	MON	48-00N	44-00N	77-00W	69-00W	512
Halifax	HFX	48-00N	44-00N	69-00W	61-00W	512
Klamath Falls	LMT	44-30N	40-00N	125-00W	117-00W	576
Salt Lake City	SLC	44-30N	40-00N	117-00W	109-00W	576
Cheyenne	CYS	44-30N	40-00N	109-00W	101-00W	576
Omaha	OMA	44-30N	40-00N	101-00W	93-00W	576
Chicago	ORD	44-00N	40-00N	93-00W	85-00W	512
Detroit	DET	44-00N	40-00N	85-00W	77-00W	512
New York	NYC	44-00N	40-00N	77-00W	69-00W	512
San Francisco	SFO	40-00N	36-00N	125-00W	118-00W	448
Las Vegas	LAS	40-00N	35-45N	118-00W	111-00W	476
Denver	DEN	40-00N	35-45N	111-00W	104-00W	476
Wichita	ICT	40-00N	36-00N	104-00W	97-00W	448
Kansas City	MKC	40-00N	36-00N	97-00W	90-00W	448
St. Louis	STL	40-00N	36-00N	91-00W	84-00W	448
Cincinnati	LUK	40-00N	36-00N	85-00W	78-00W	448
Washington	DCA	40-00N	36-00N	79-00W	72-00W	448
Los Angeles	LAX	36-00N	32-00N	121-30W	115-00W	416
Phoenix	PHX	35-45N	31-15N	116-00W	109-00W	504
Albuquerque	ABQ	36-00N	32-00N	109-00W	102-00W	448
Dallas – Ft. Worth	GSW	36-00N	32-00N	102-00W	95-00W	448
Memphis	MEM	36-00N	32-00N	95-00W	88-00W	448
Atlanta	ATL	36-00N	32-00N	88-00W	81-00W	448
Charlotte	CLT	36-00N	32-00N	81-00W	75-00W	384
El Paso	ELP	32-00N	28-00N	109-00W	103-00W	384
San Antonio	SAT	32-00N	28-00N	103-00W	97-00W	384
Houston	HOU	32-00N	28-00N	97-00W	91-00W	384
New Orleans	MSY	32-00N	28-00N	91-00W	85-00W	384
Jacksonville	JAX	32-00N	28-00N	85-00W	79-00W	384
Brownsville	BRO	28-00N	24-00N	103-00W	97-00W	384
Miami	MIA	28-00N	24-00N	83-00W	77-00W	384

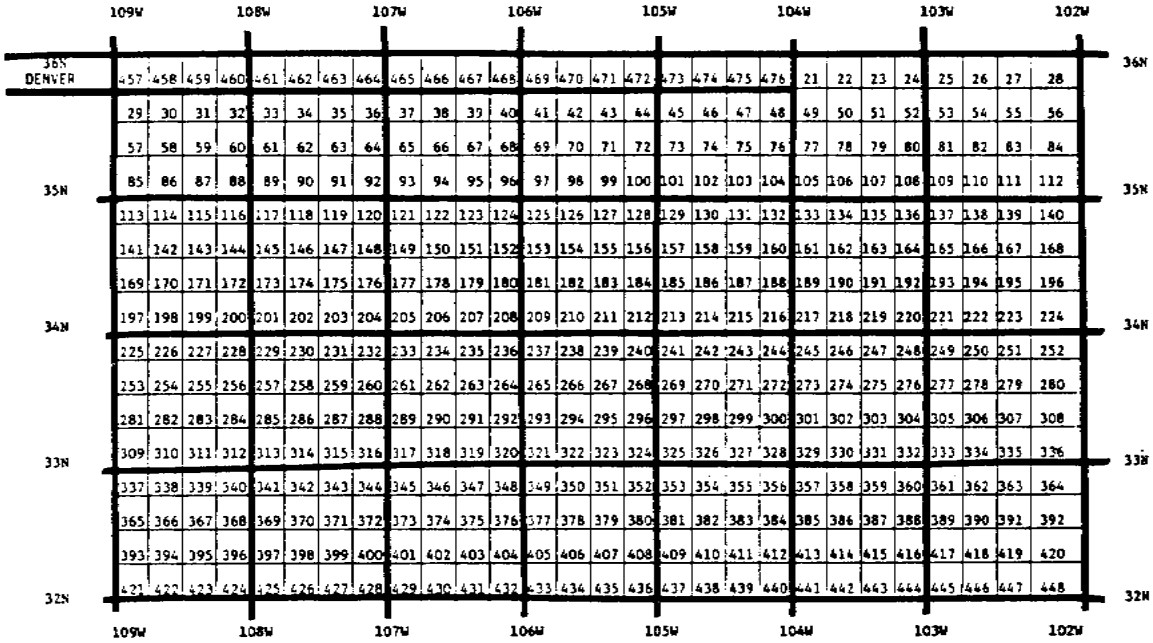


Figure D–1. Albuquerque Chart Grid

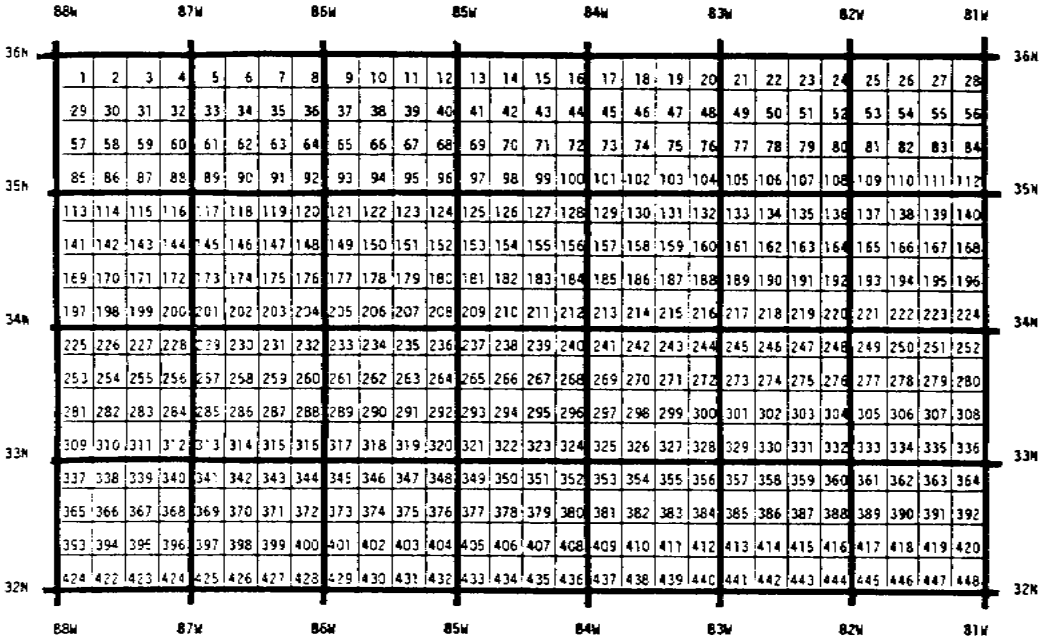


Figure D–2. Atlanta Chart Grid

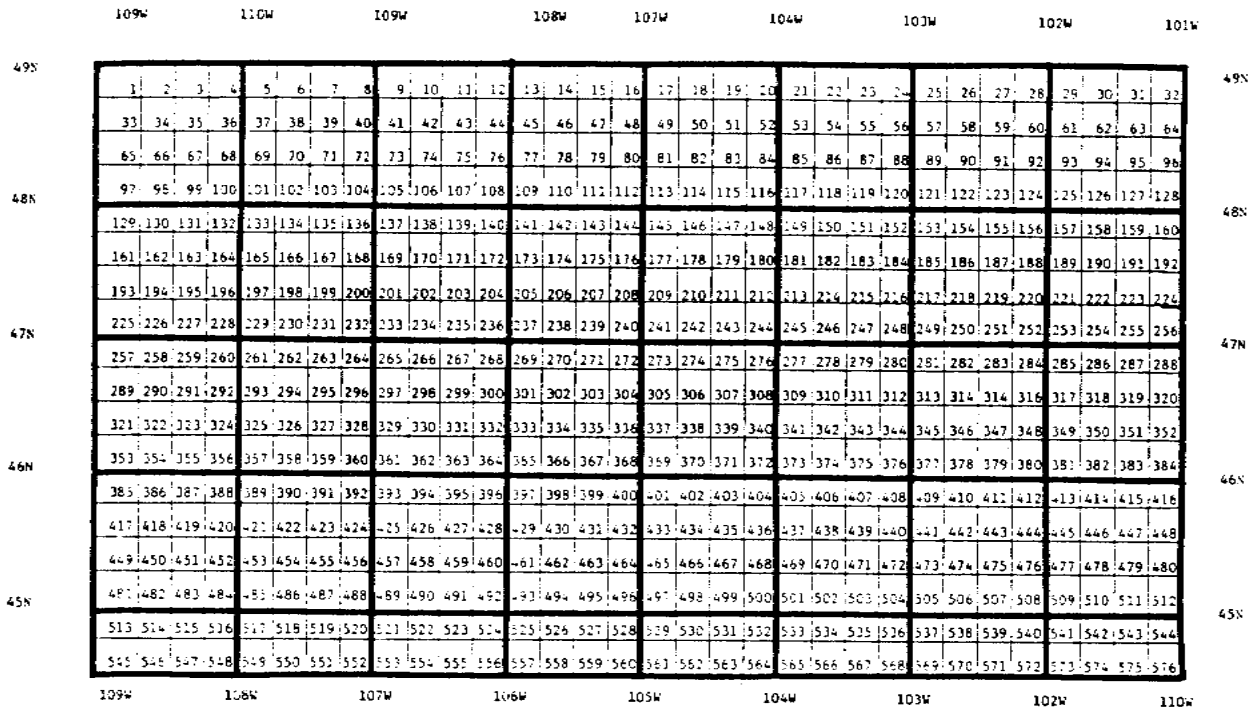


Figure D–3. Billings Chart Grid

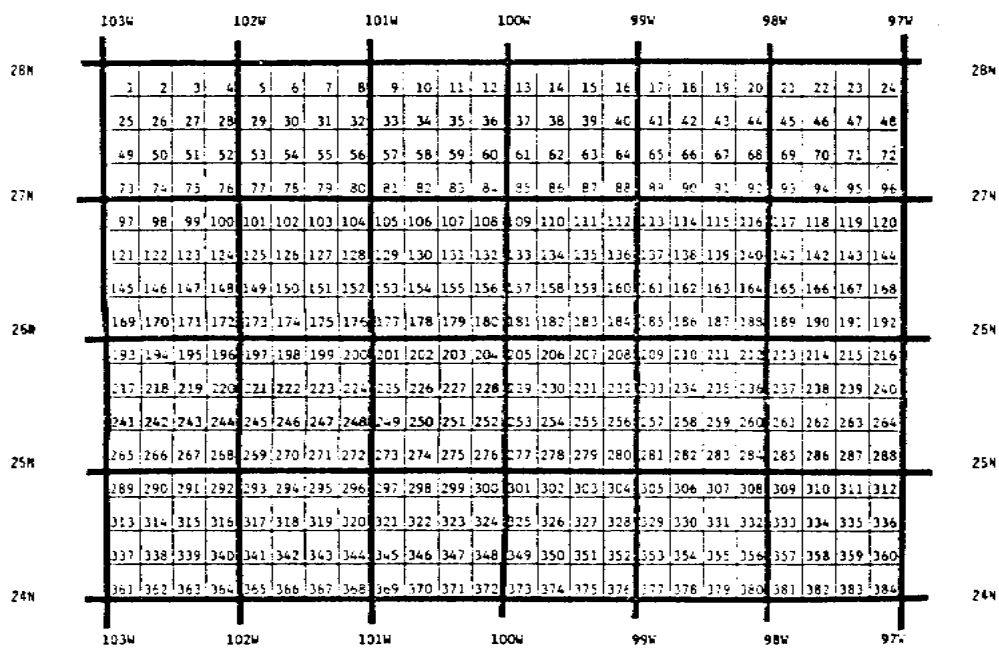


Figure D–4. Brownsville Chart Grid

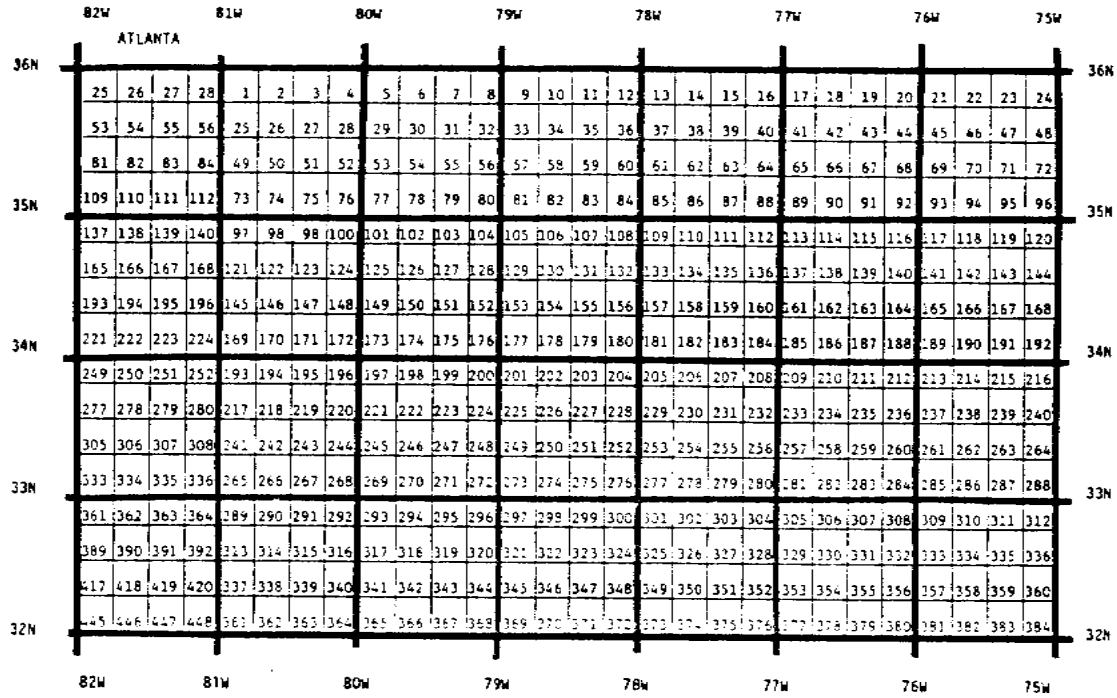


Figure D–5. Charlotte Chart Grid

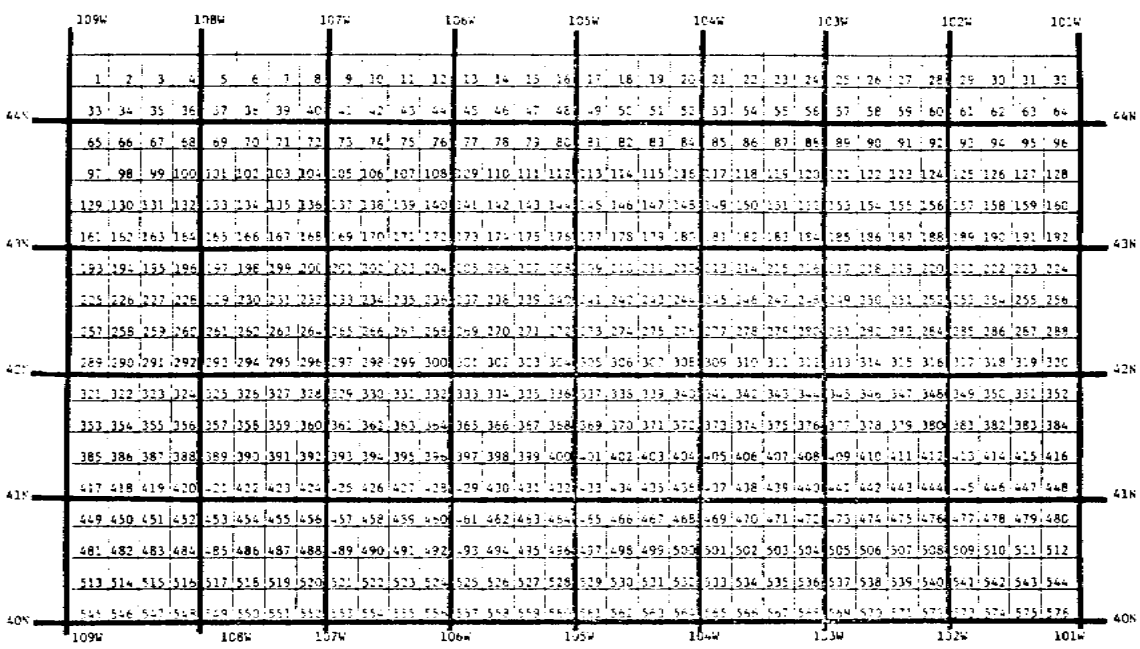


Figure D–6. Cheyenne Chart Grid

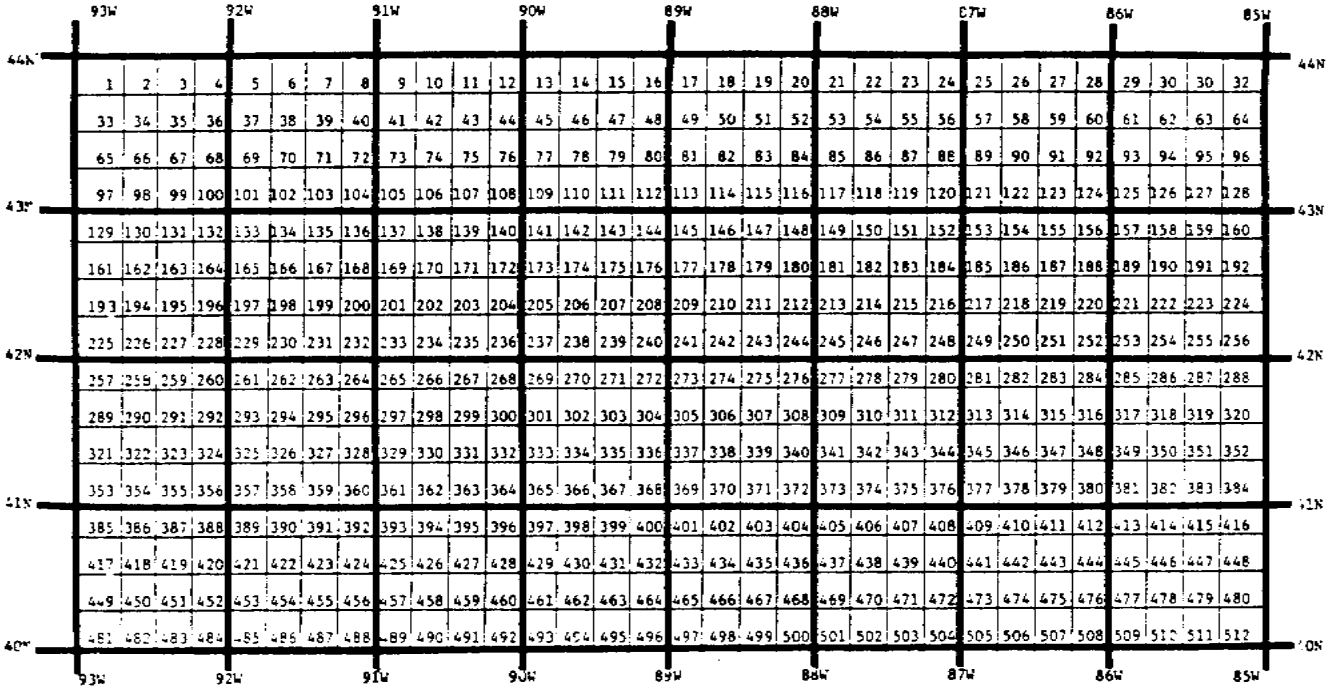


Figure D–7. Chicago Chart Grid

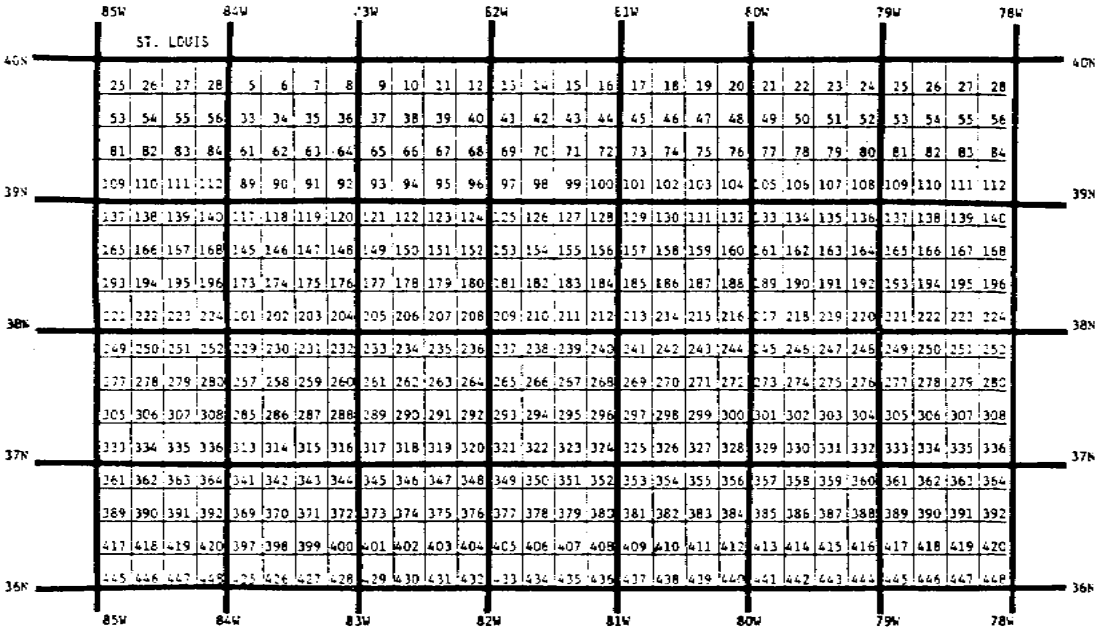


Figure D–8. Cincinnati Chart Grid

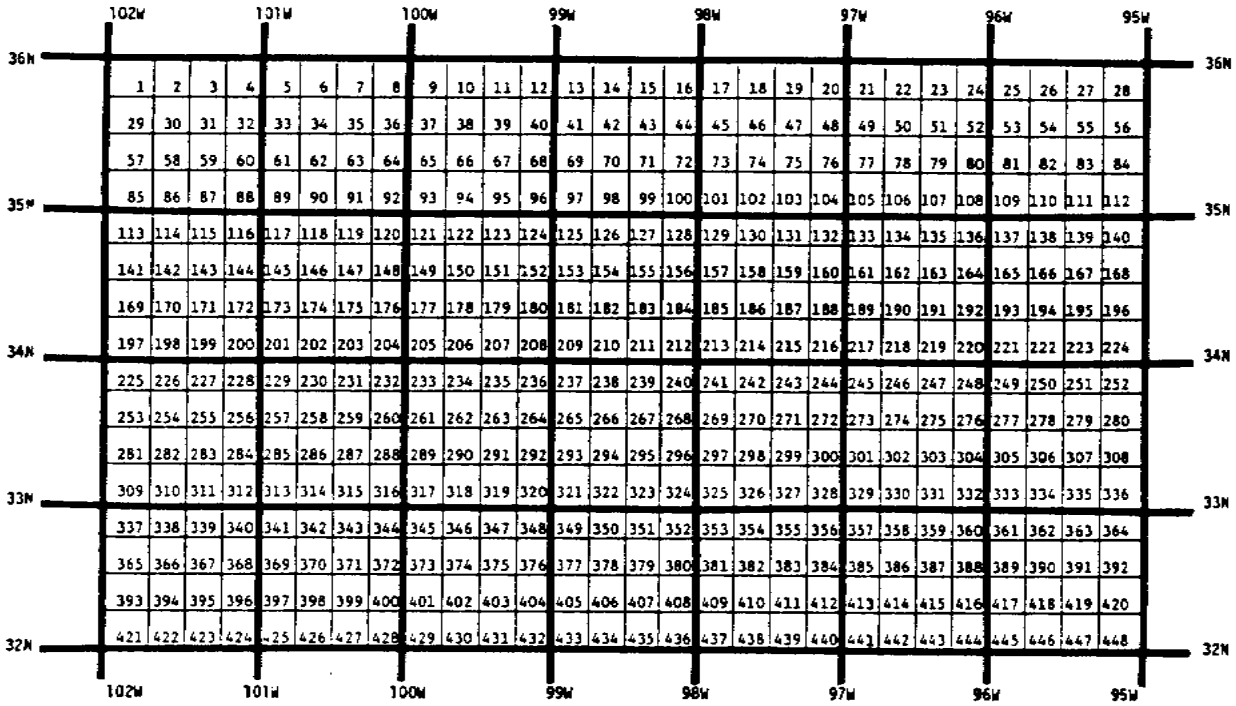


Figure D–9. Dallas – Fort Worth Chart Grid

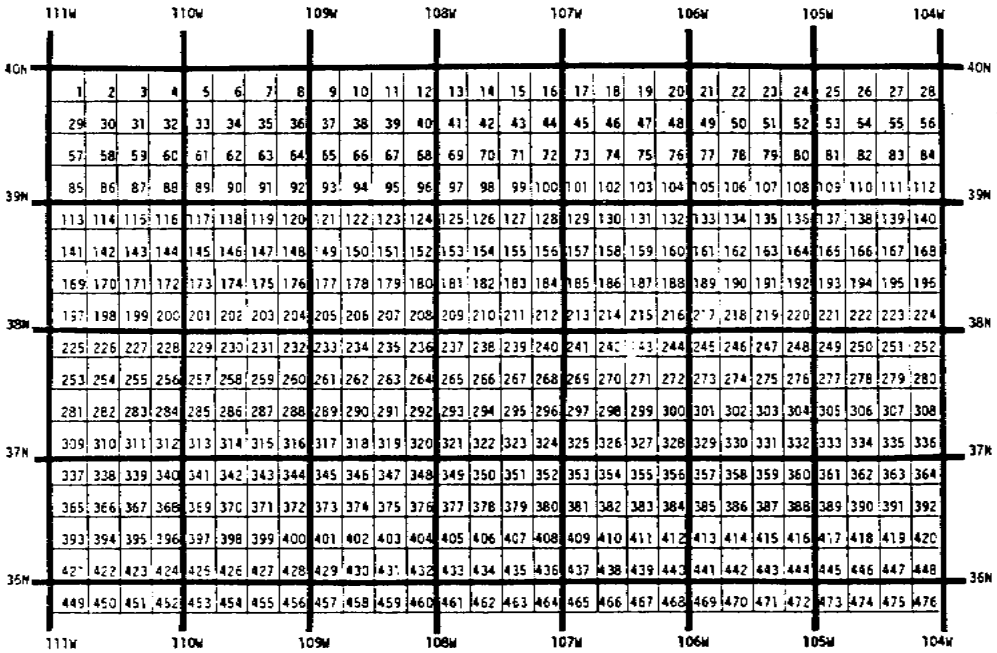


Figure D–10. Denver Chart Grid

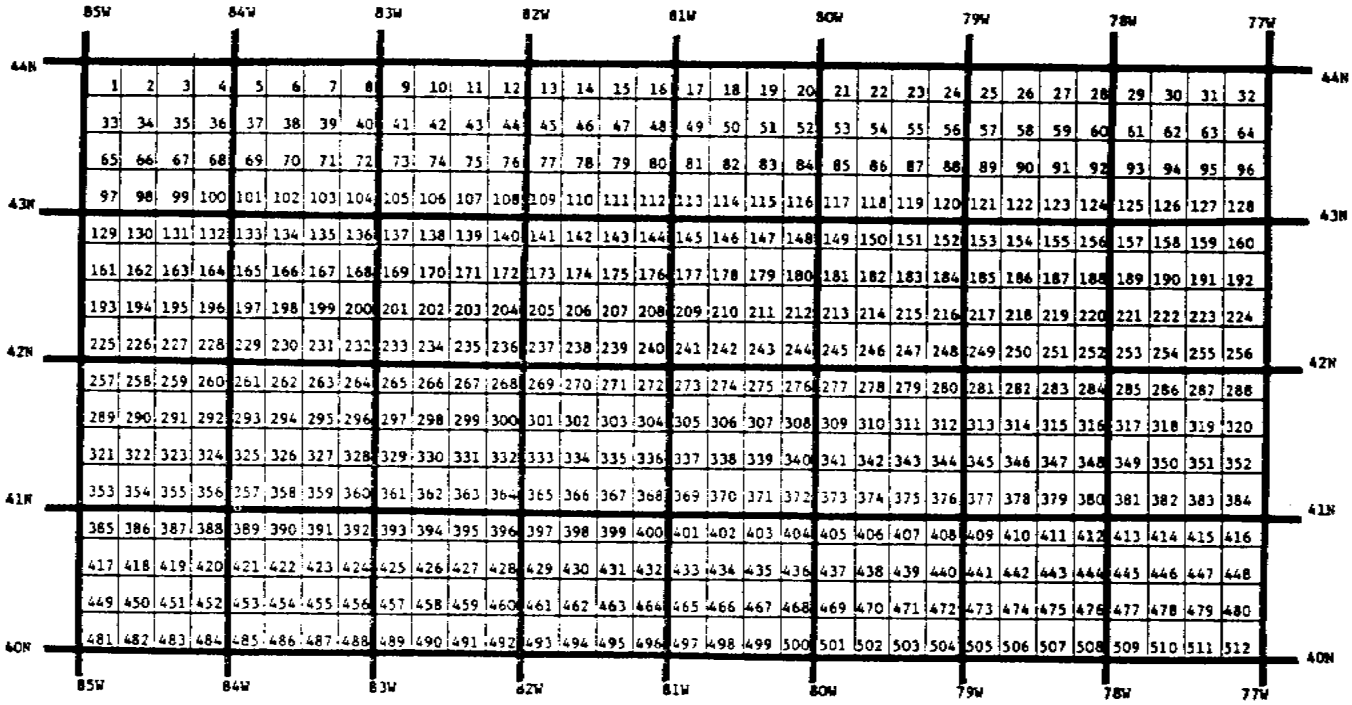


Figure D–11. Detroit Chart Grid

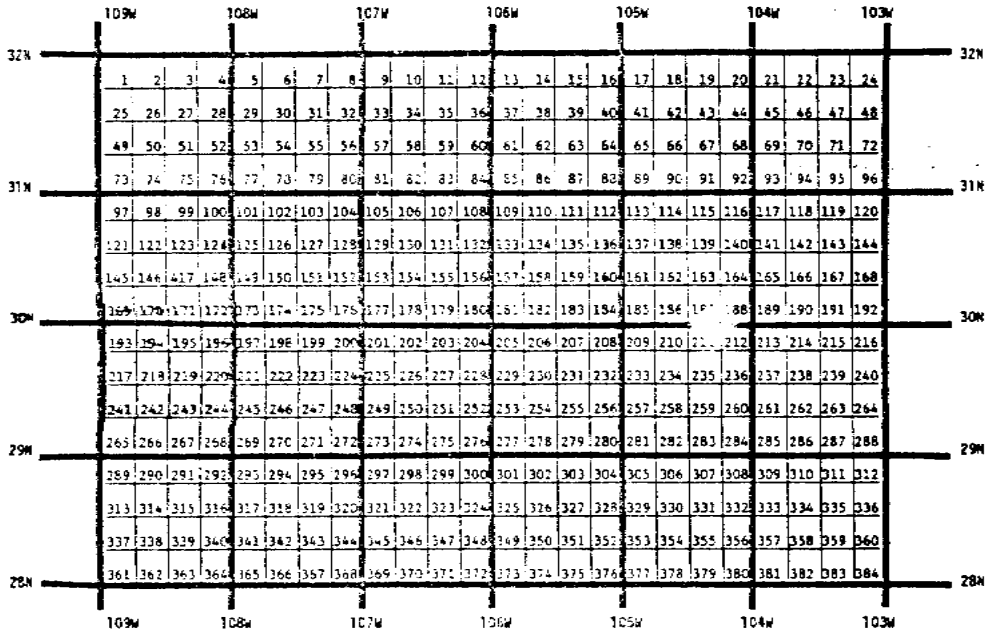


Figure D–12. El Paso Chart Grid

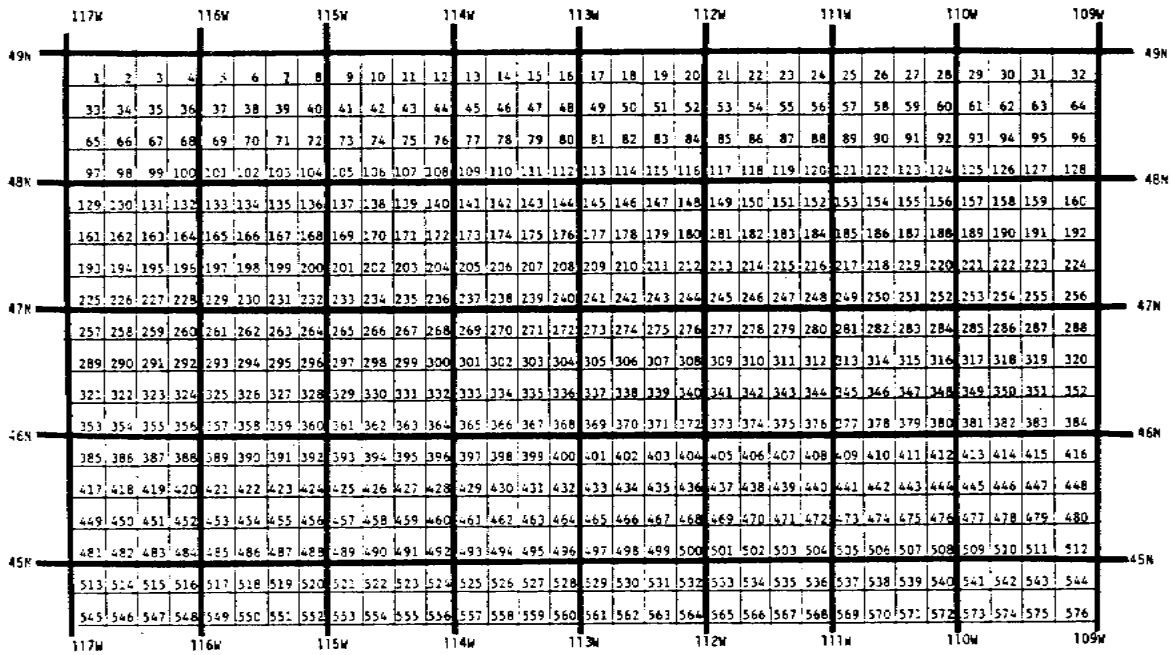


Figure D–13. Great Falls Chart Grid

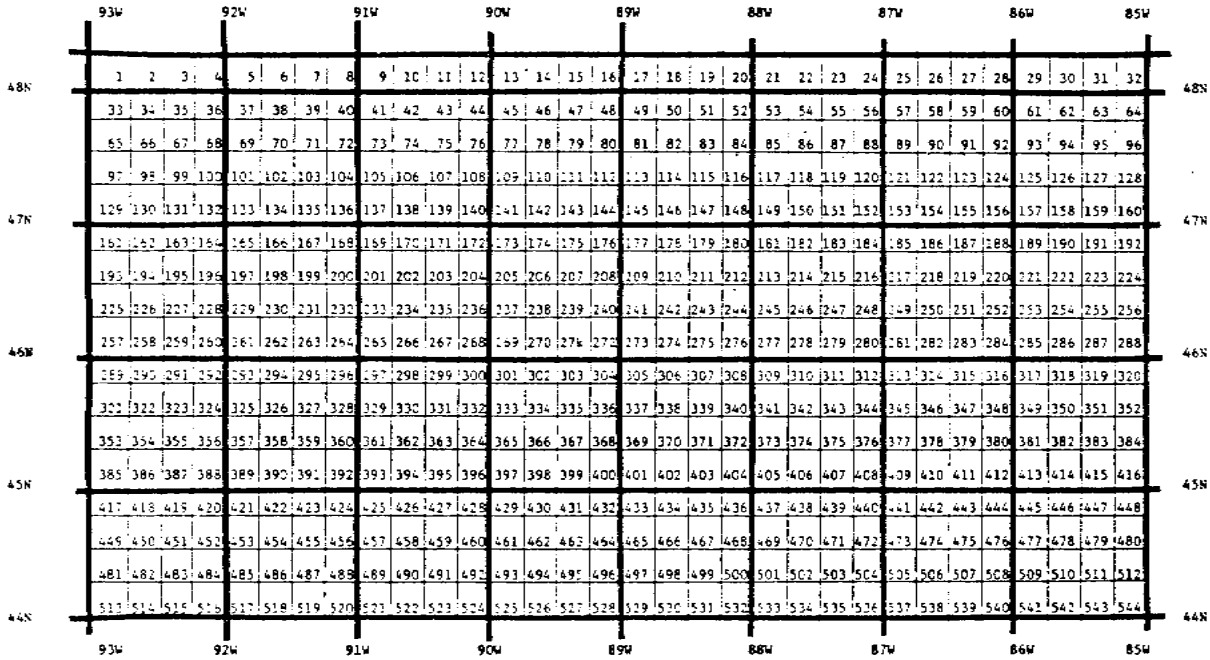


Figure D–14. Green Bay Chart Grid

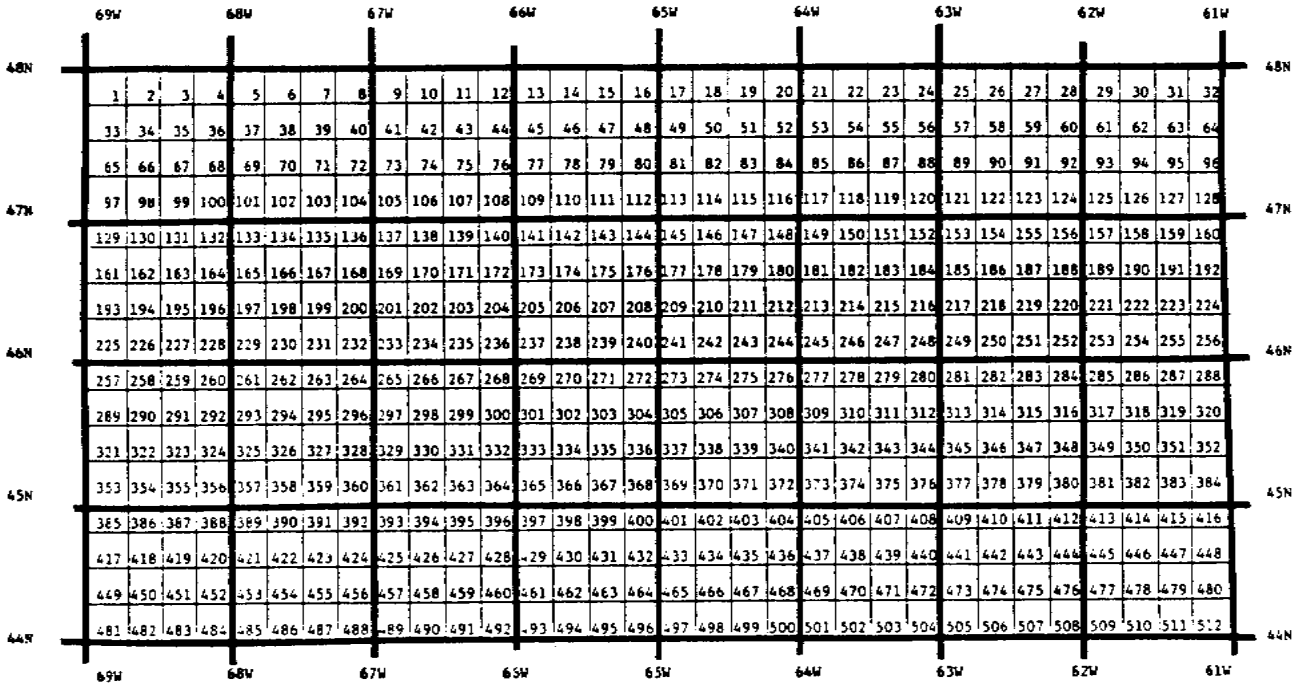


Figure D-15. Halifax Chart Grid

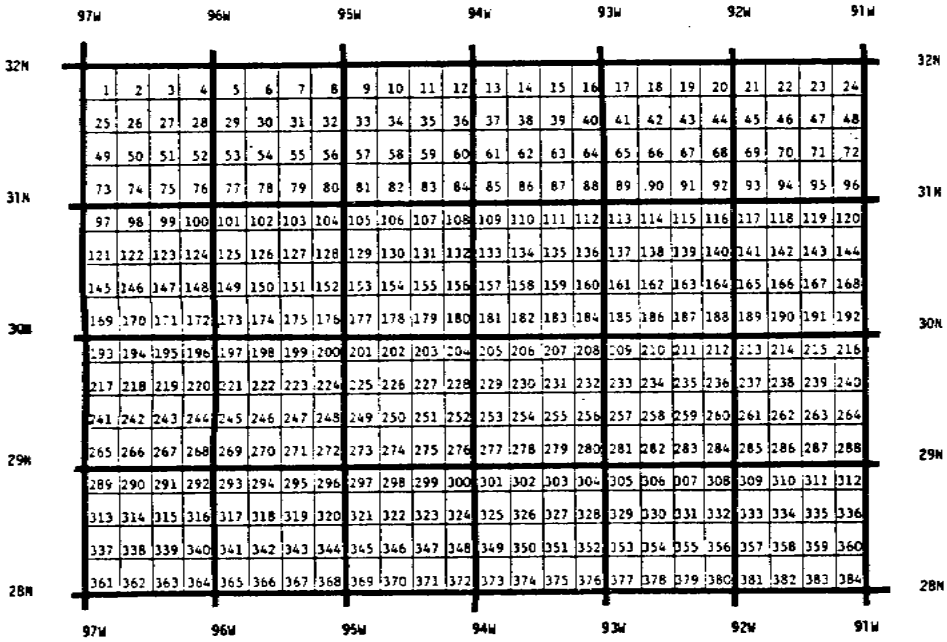


Figure D-16. Houston Chart Grid

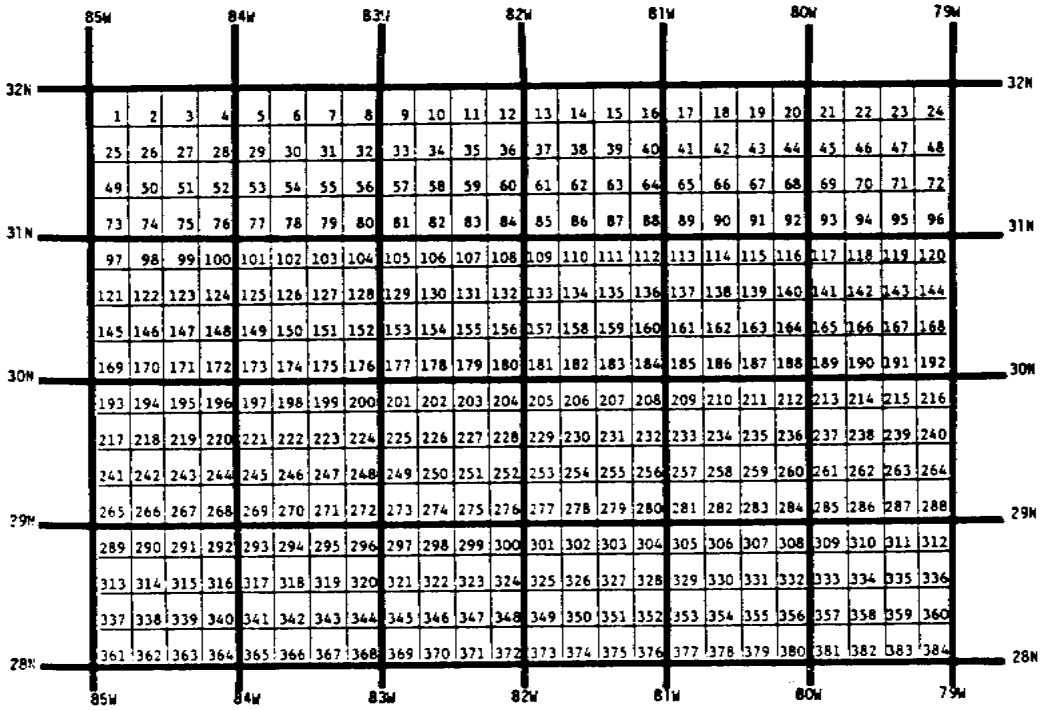


Figure D–17. Jacksonville Chart Grid

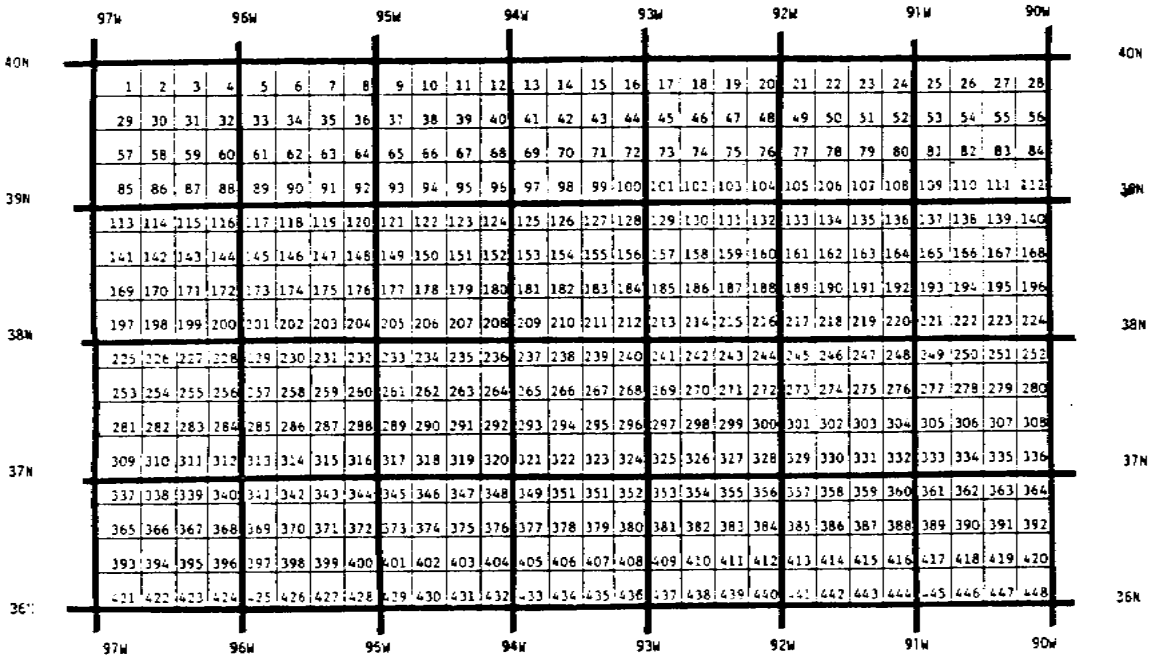


Figure D–18. Kansas City Chart Grid

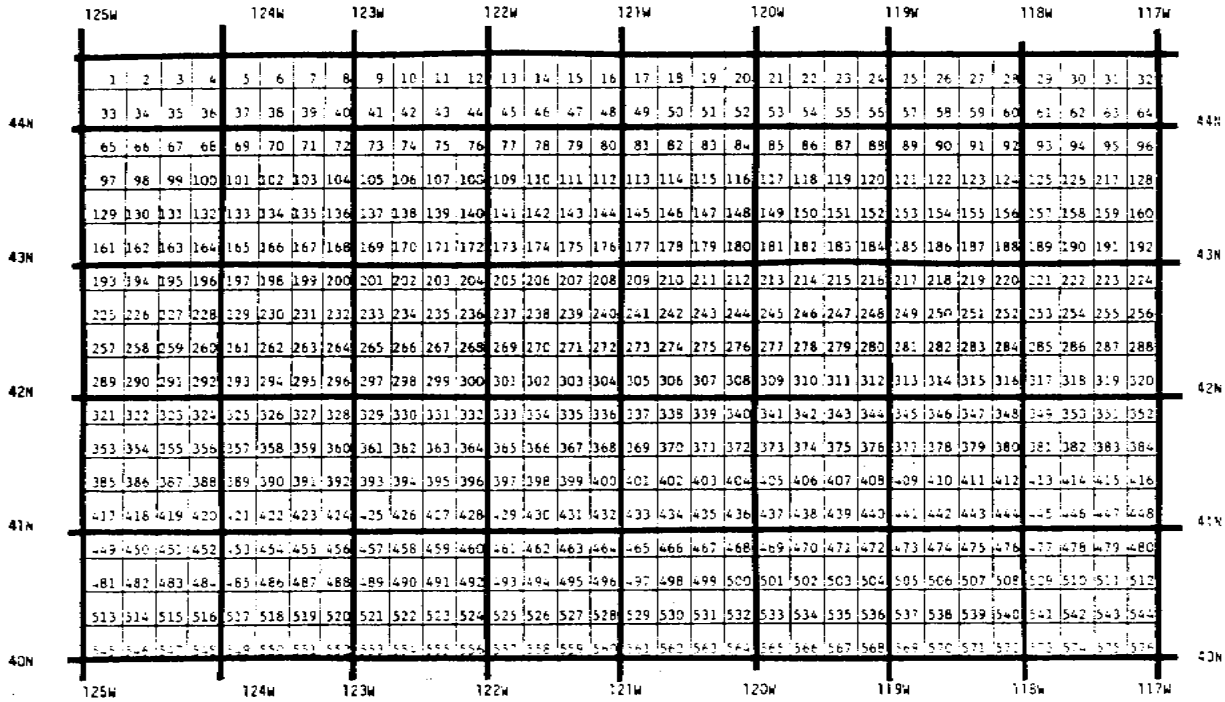


Figure D-19. Klamath Falls Chart Grid

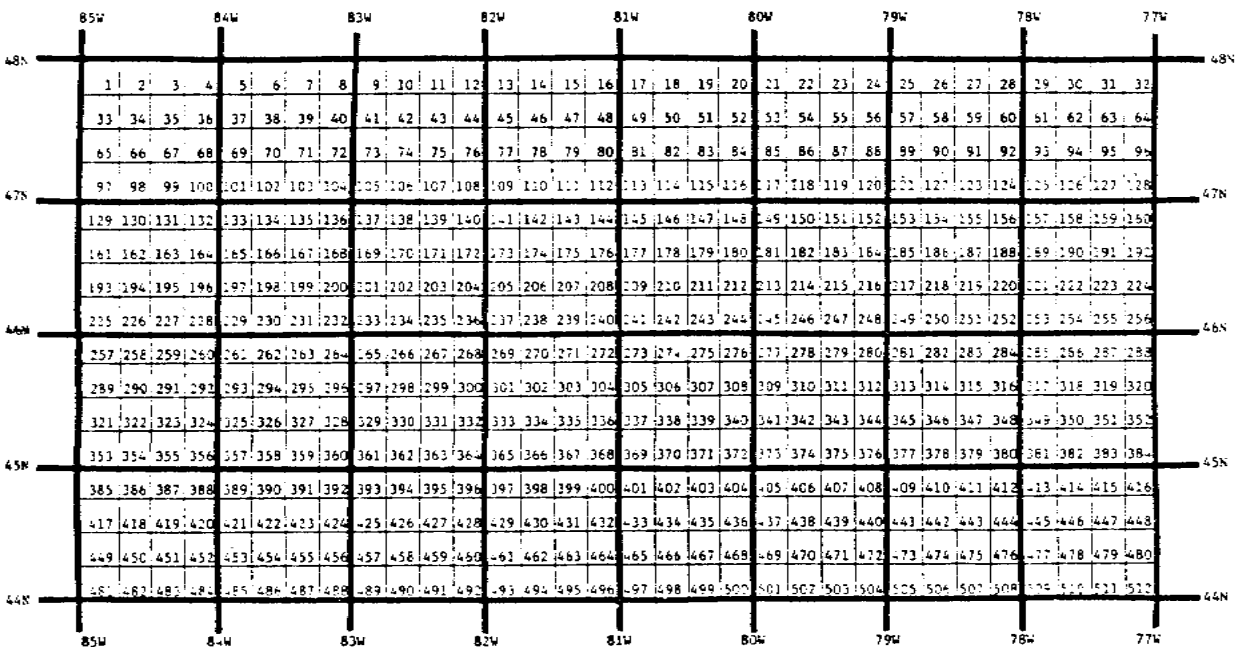


Figure D-20. Lake Huron Chart Grid

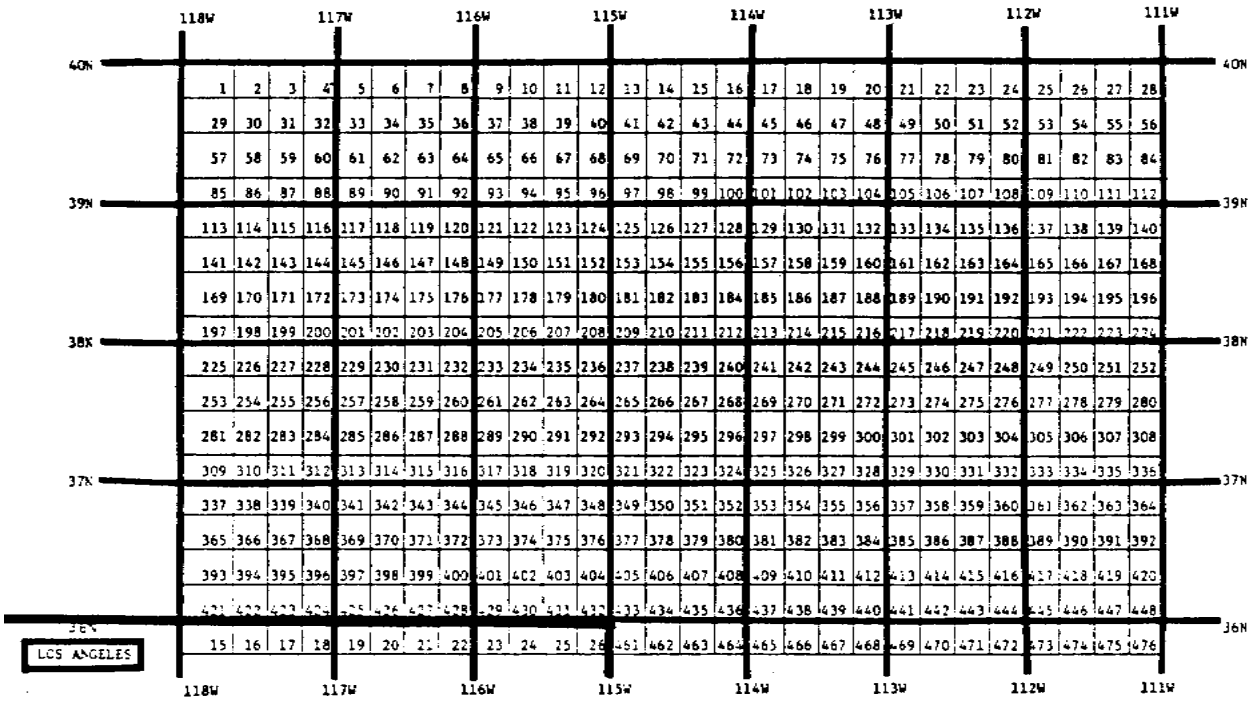


Figure D–21. Las Vegas Chart Grid

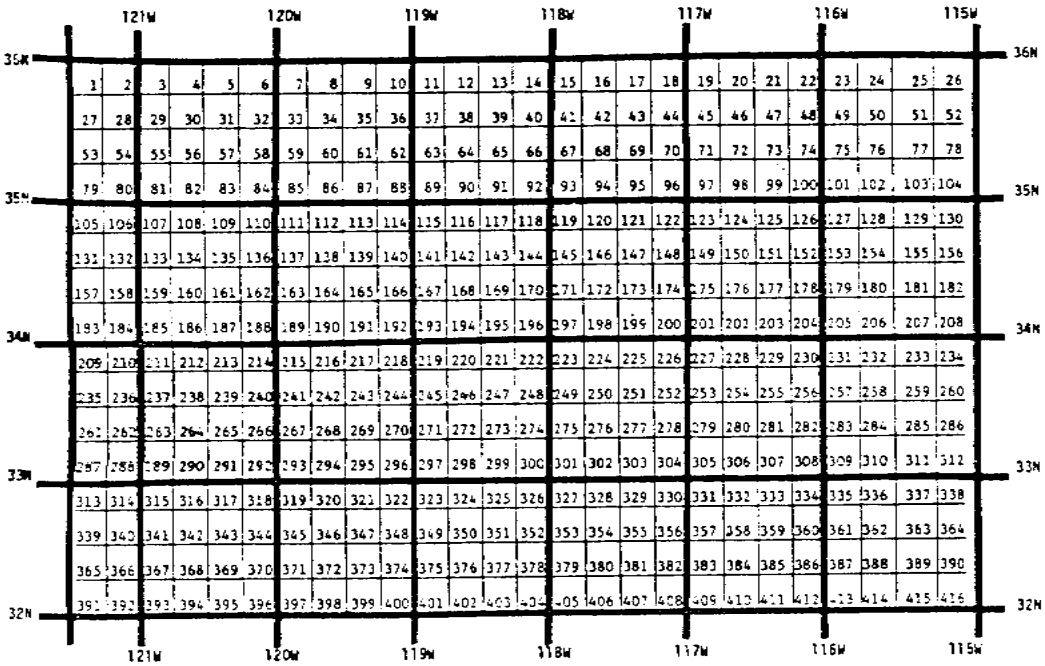


Figure D–22. Los Angeles Chart Grid

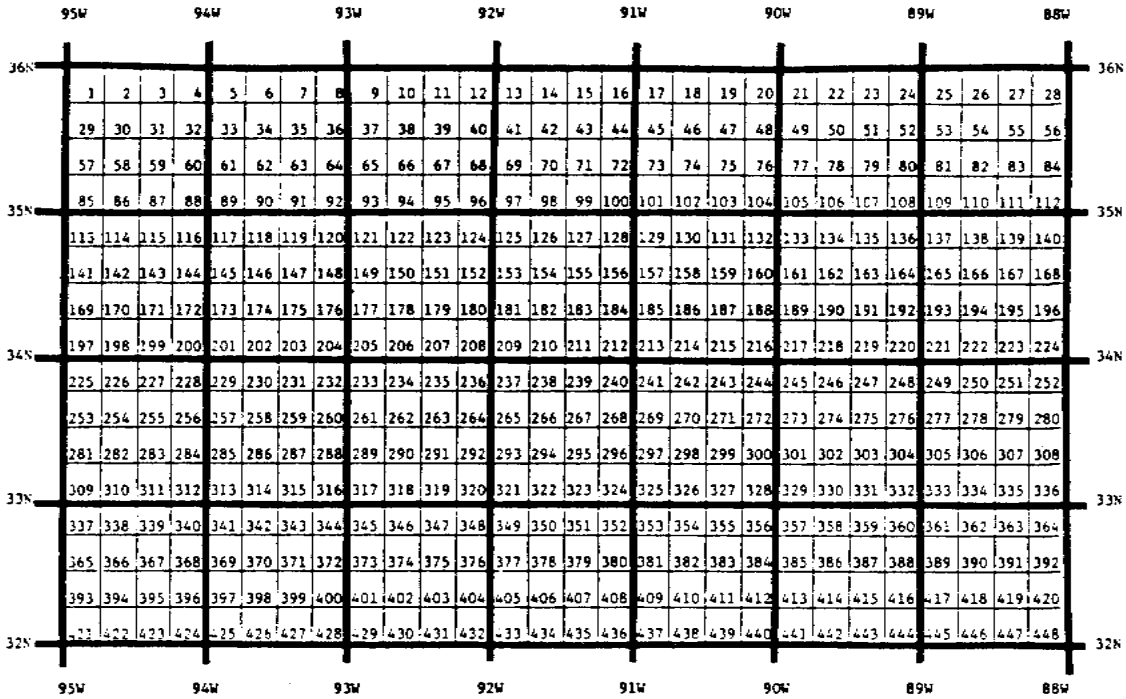


Figure D–23. Memphis Chart Grid

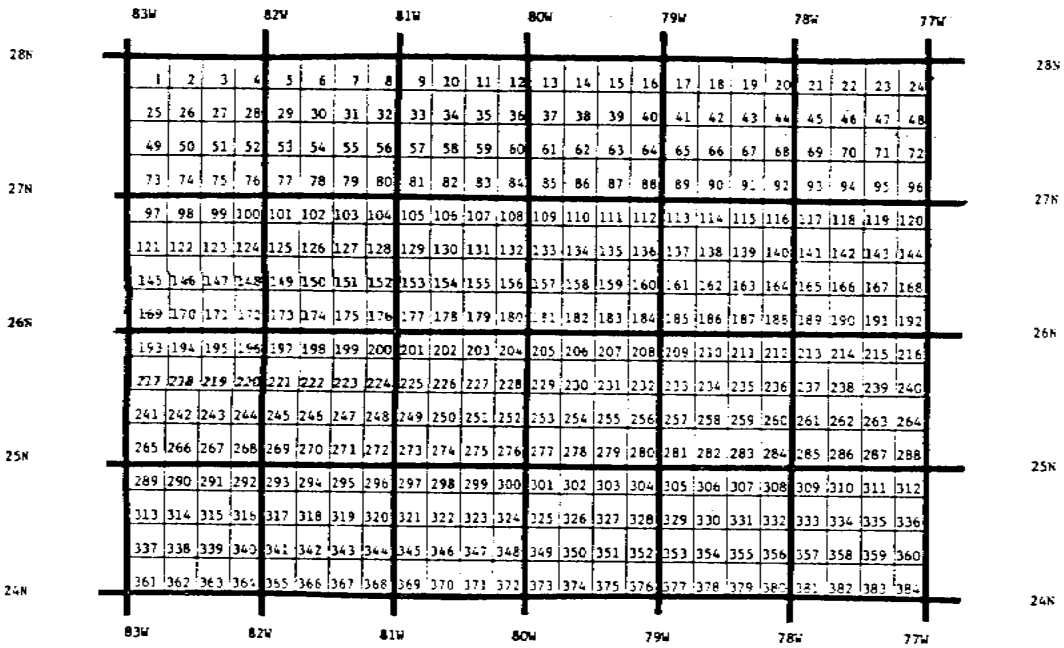


Figure D–24. Miami Chart Grid

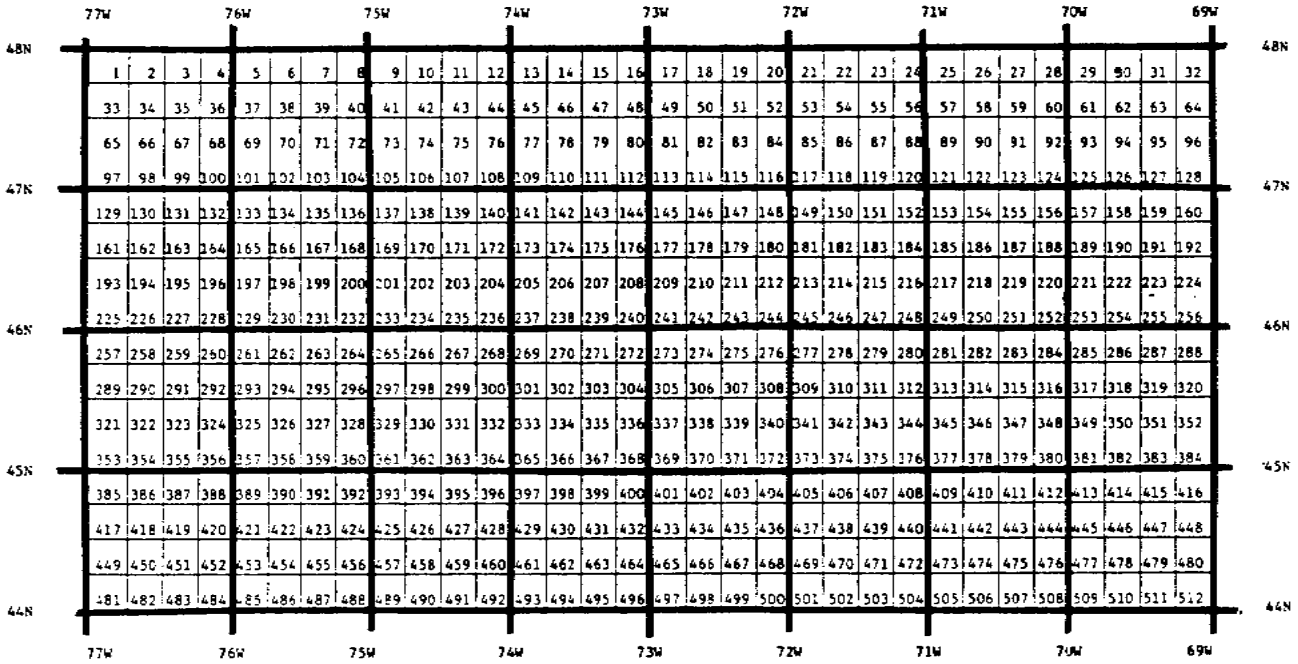


Figure D–25. Montreal Chart Grid

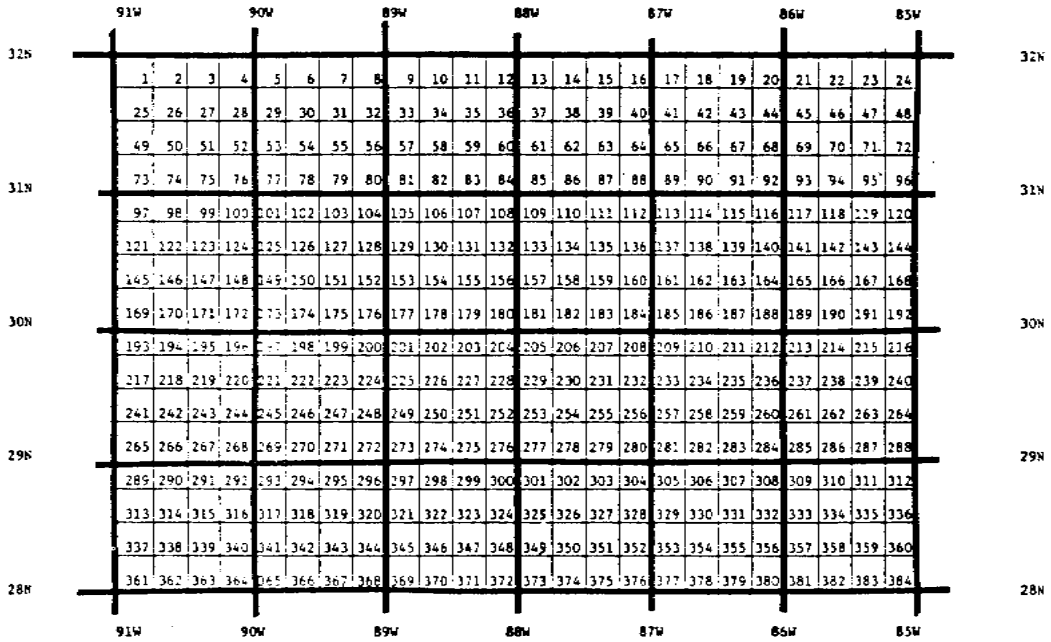


Figure D–26. New Orleans Chart Grid

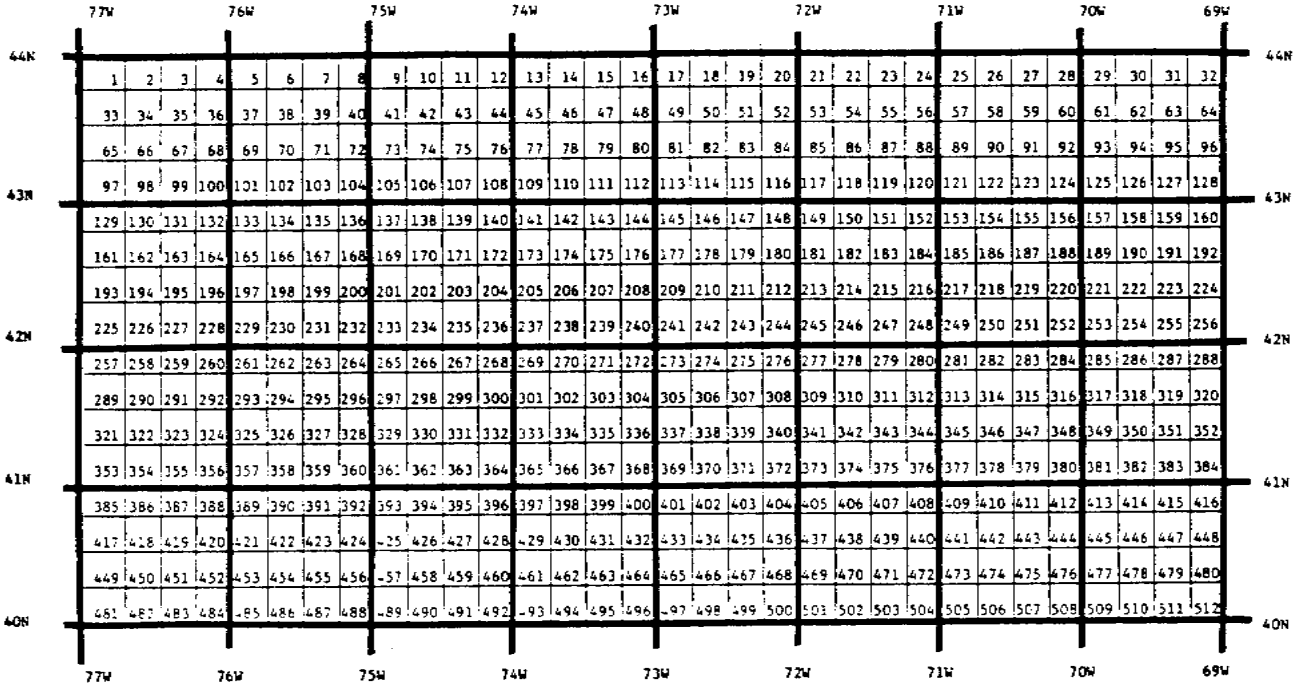


Figure D–27. New York Chart Grid

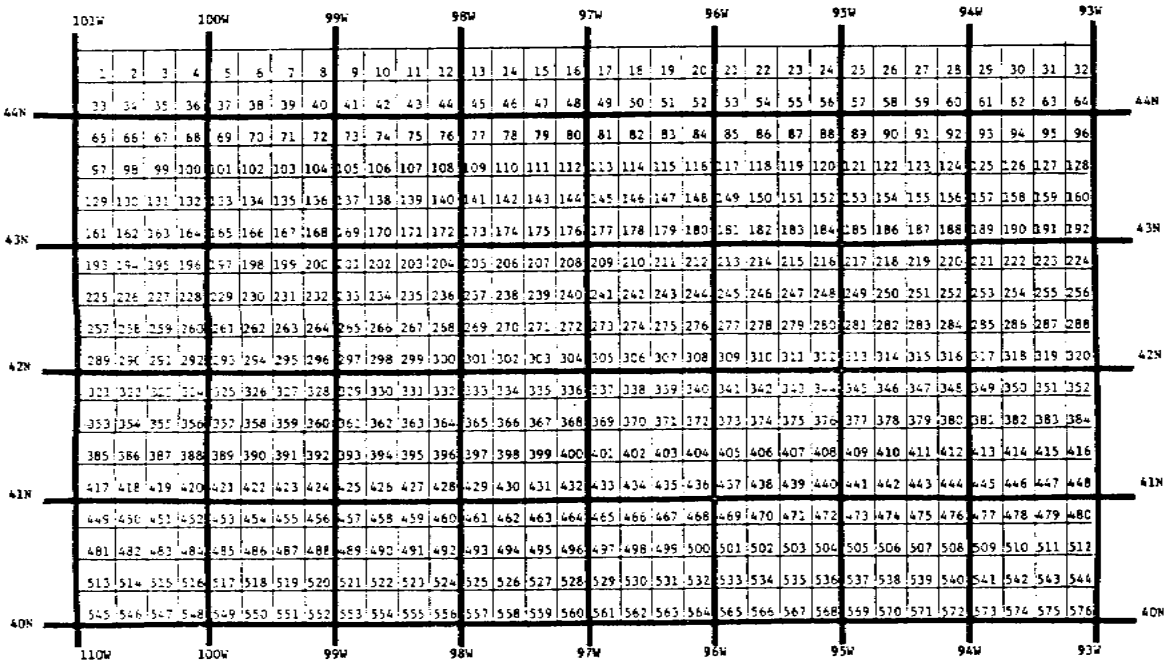


Figure D–28. Omaha Chart Grid

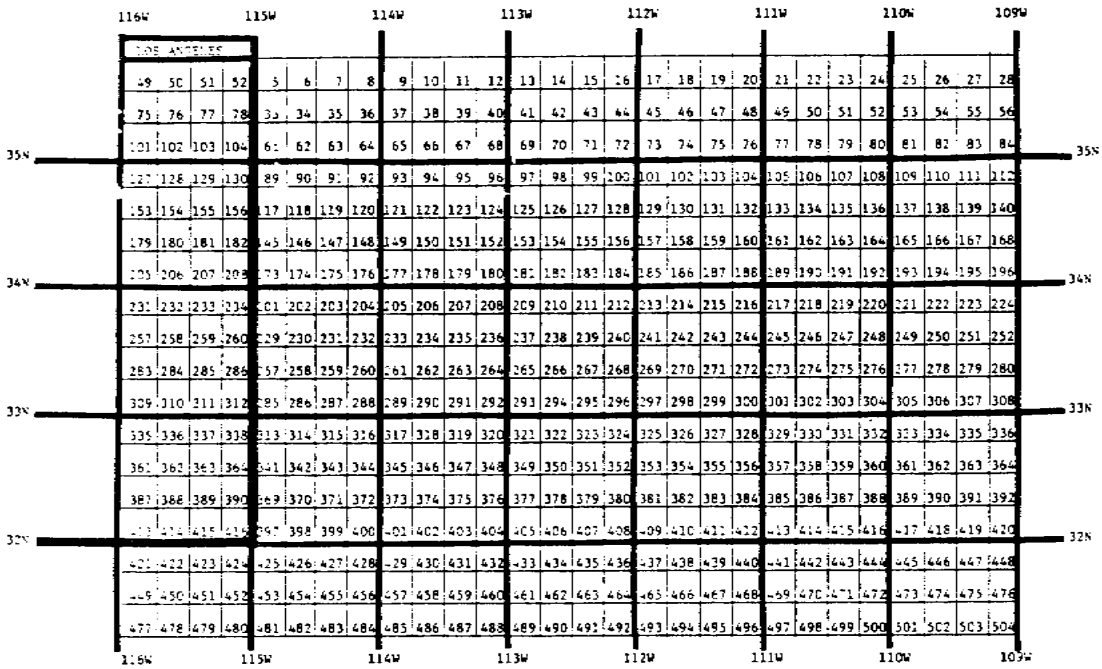


Figure D–29. Phoenix Chart Grid

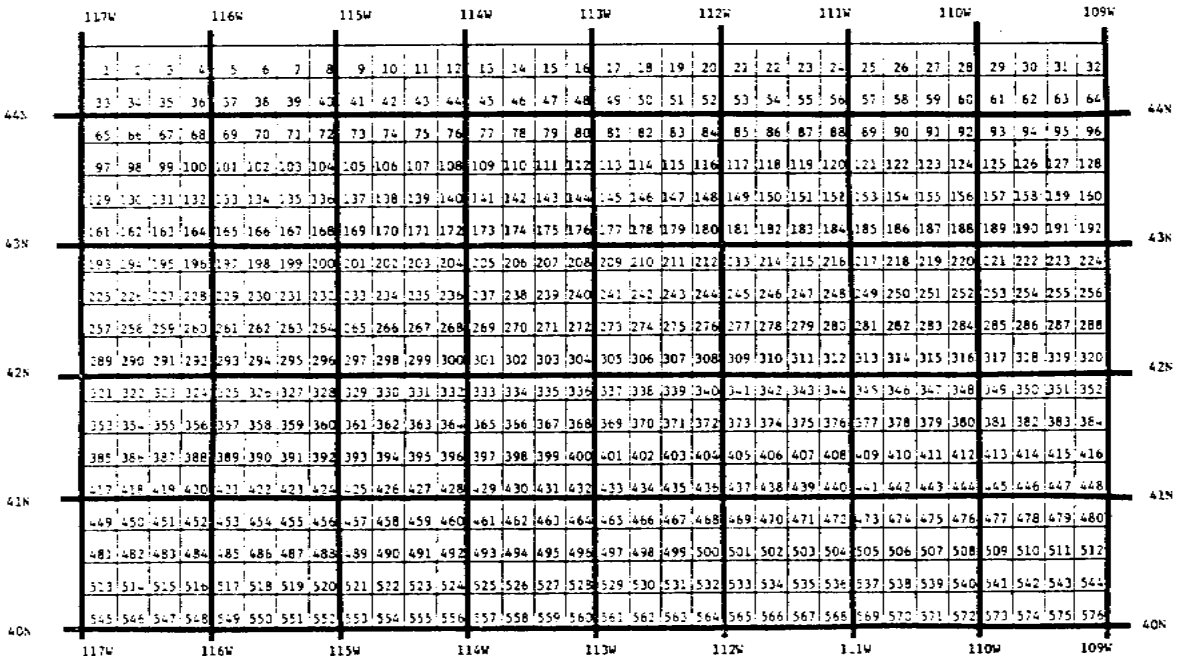


Figure D–30. Salt Lake City Chart Grid

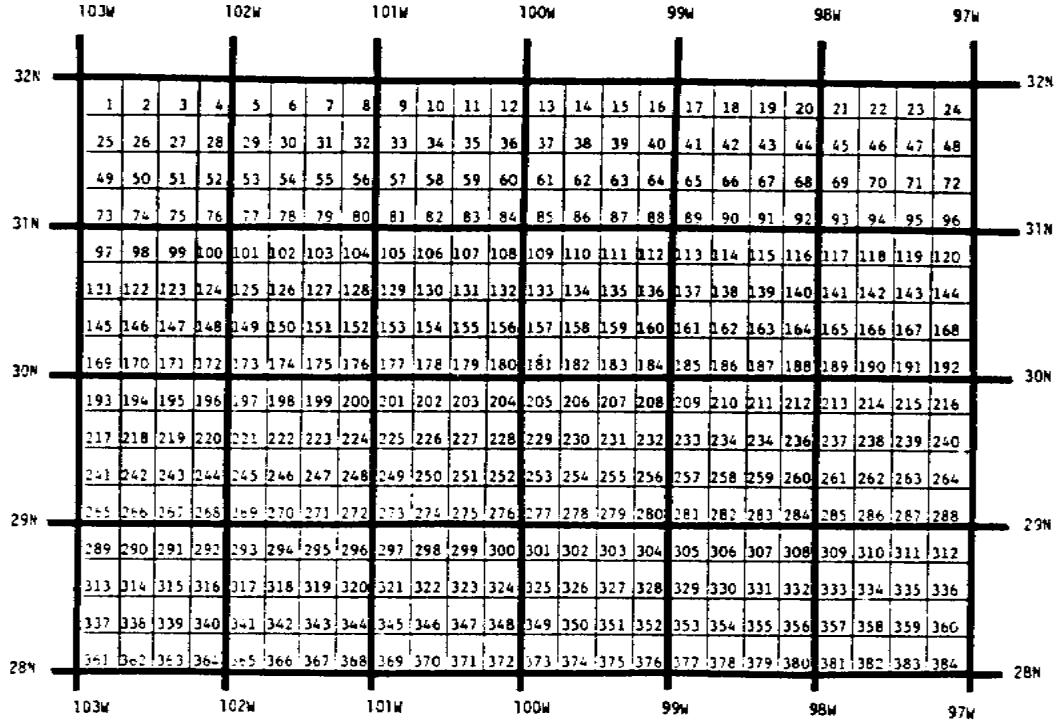


Figure D-31. San Antonio Chart Grid

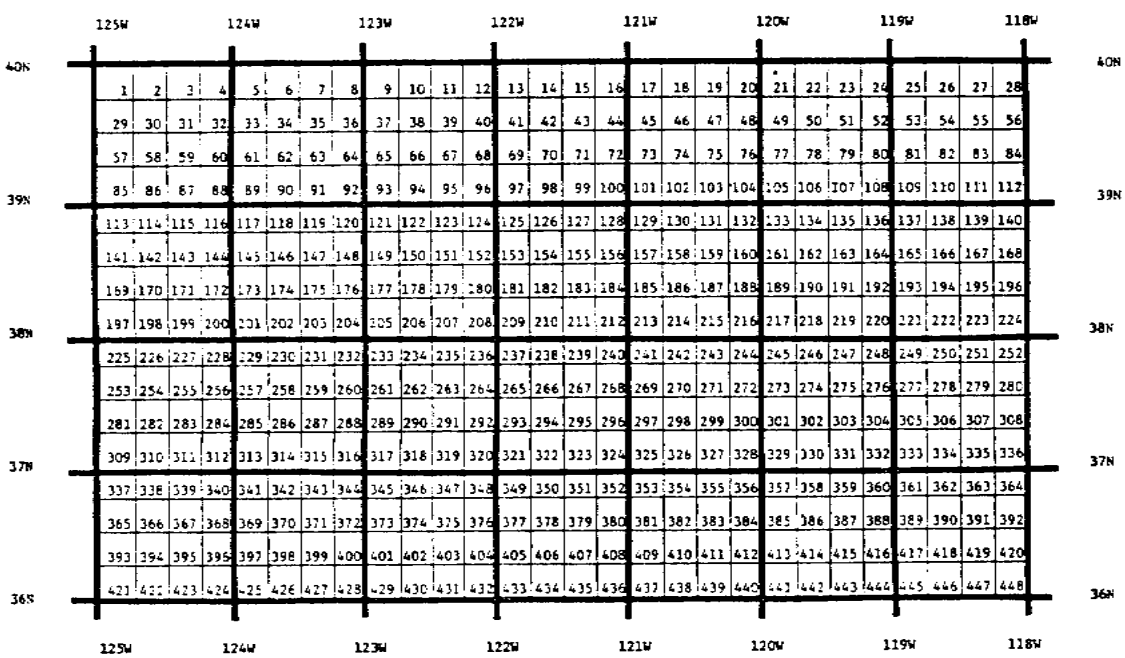


Figure D-32. San Francisco Chart Grid

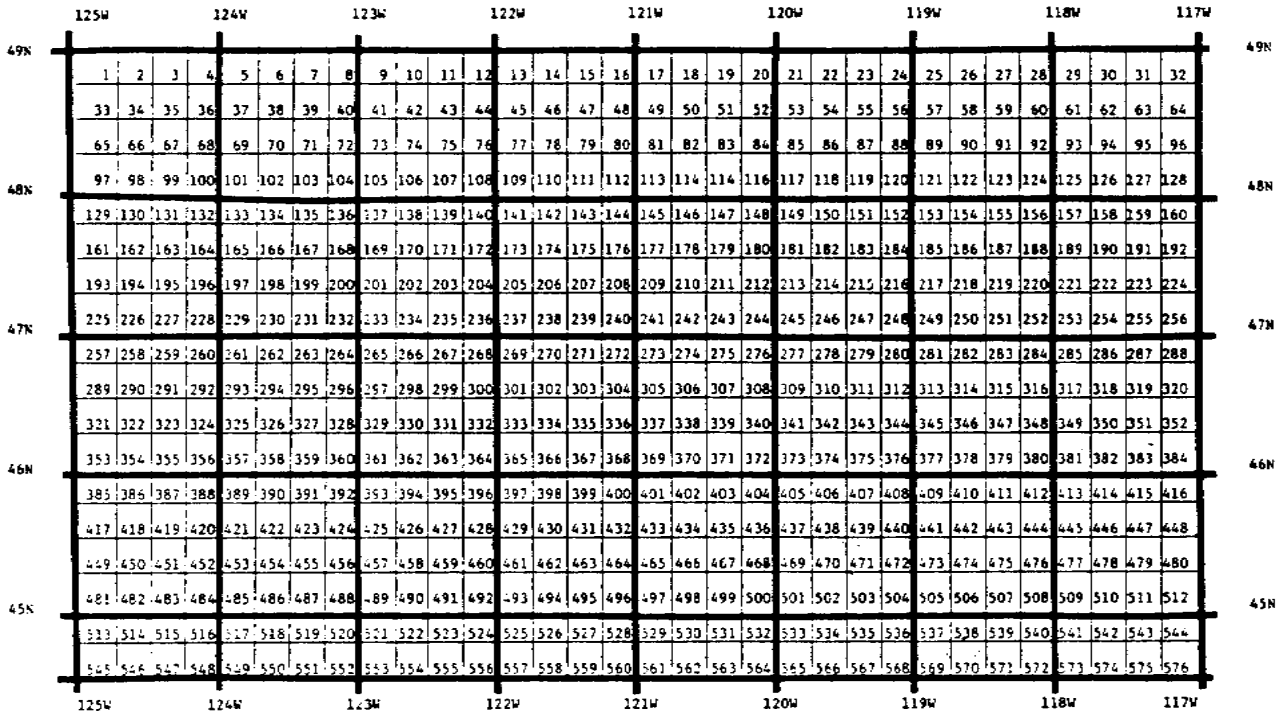


Figure D–33. Seattle Chart Grid

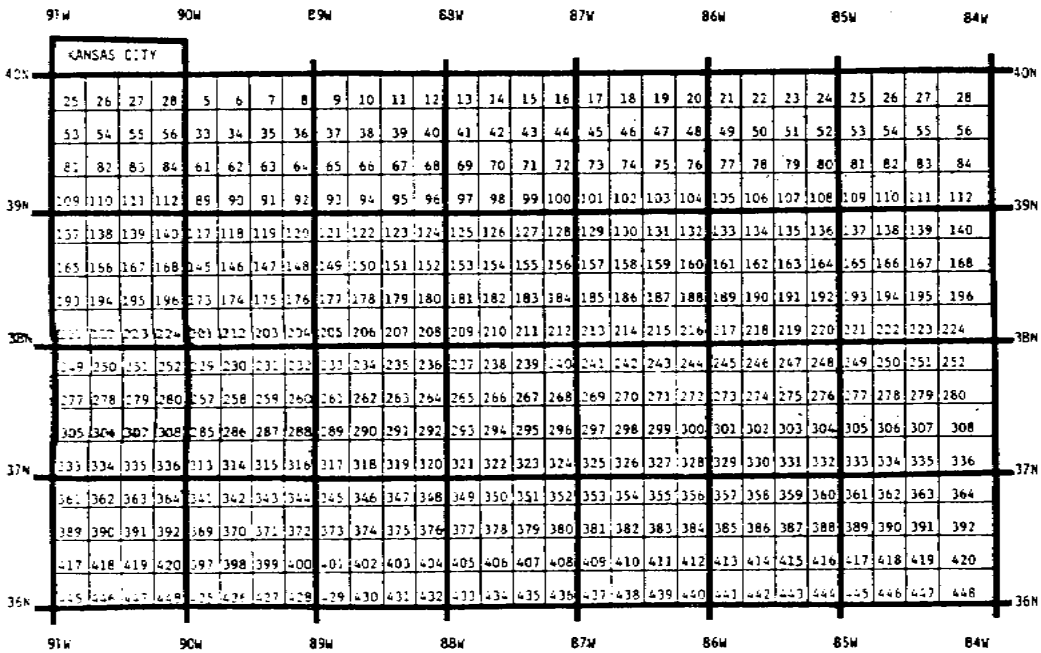


Figure D–34. St. Louis Chart Grid

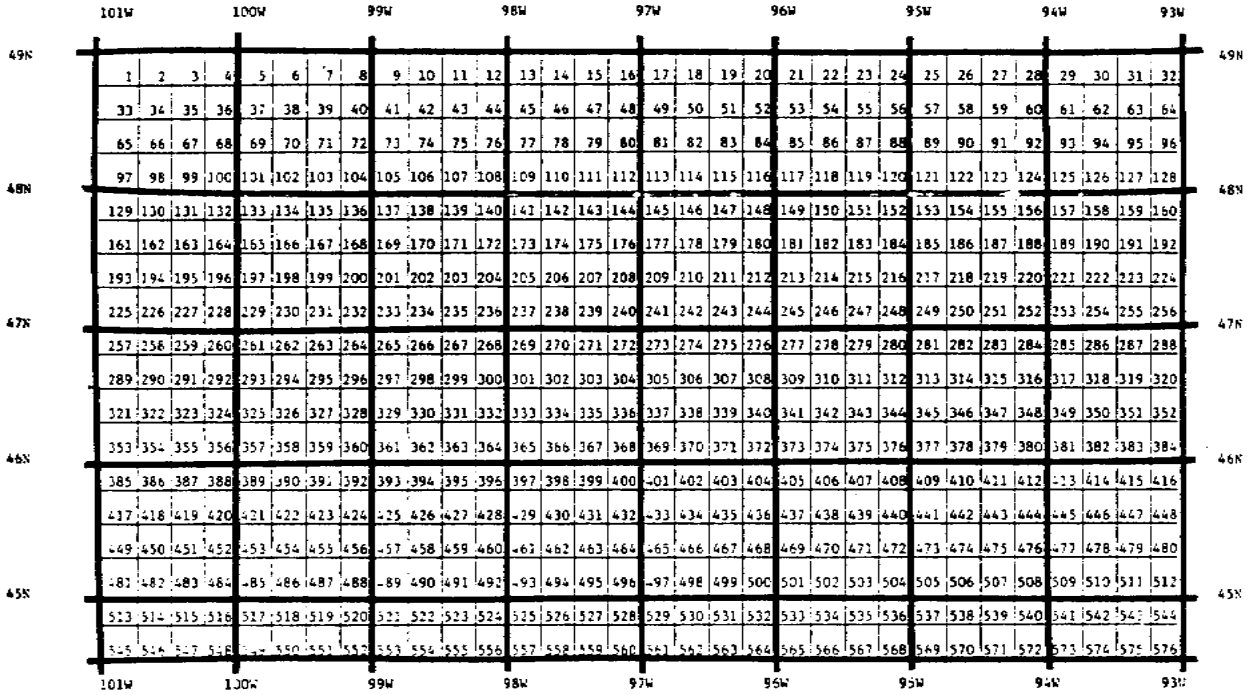


Figure D–35. Twin Cities Chart Grid

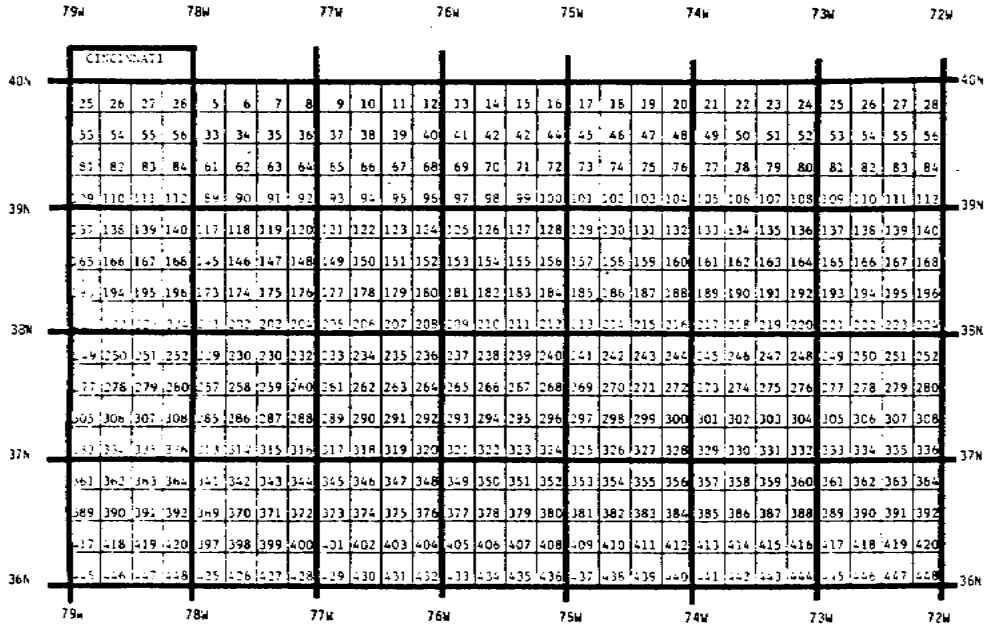


Figure D–36. Washington Chart Grid

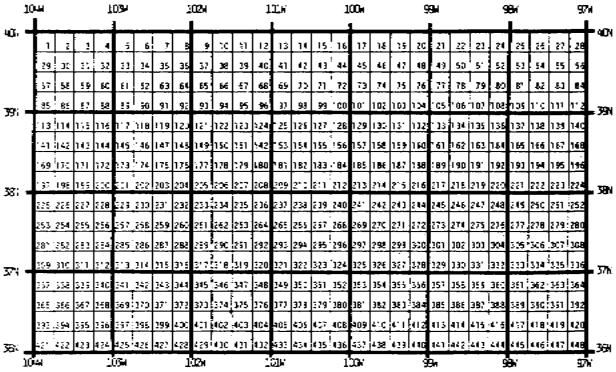
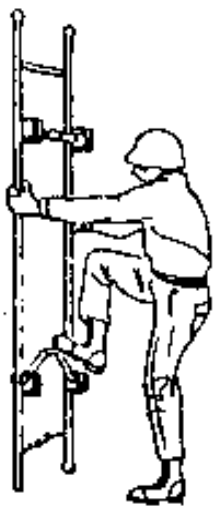


Figure D-37. Wichita Chart Grid

Attachment E
Excerpts from AFH 36-2218
Self Aid and Buddy Care

Stand litter on end and step downward with boot toe.



Invert the litter and repeat the procedure.

To close the litter, place it on its side and, using both hands, grasp the pole that is not on the ground; next, tap inward on the spreader bars with the heel of your boot until the tension is released. When both spreader bars have been released, the litter will collapse. Fanfold the canvas, secure the tie straps and the litter is ready for storage. **NEVER USE YOUR HANDS ON THE SPREADER BARS!**

TERMINOLOGY:

FRONT OF THE LITTER: The end of the litter pointed *in* the direction of travel.

REAR OF THE LITTER: The end of the litter pointed *away* from the direction of travel.

HEAD OF THE LITTER: The end of the litter where the casualty's head is located.

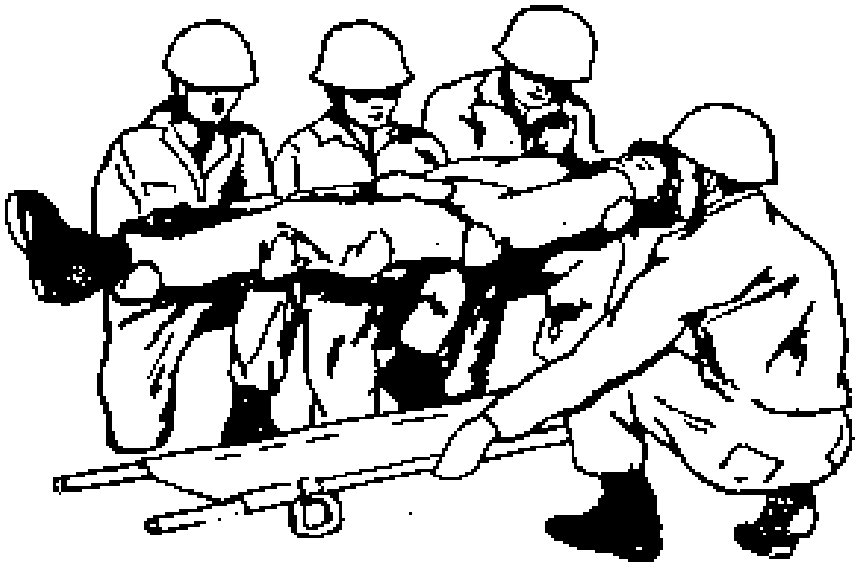
DIRECTION OF TRAVEL: The direction which you intend to move the survivor. It is important to understand that although a patient is transported in the feet-first position on level ground, changes in the terrain encountered mean that the litter may have to be rotated to a head-first position; or the number and position of bearers on the litter team may have to be changed.

TRANSFERRING THE SURVIVOR TO THE LITTER: The 3-man lift is the manual carry of choice for placing the survivor on the litter. To modify this carry for litter transfer, a fourth member, usually the litter team leader, is required. He/she is responsible for placing the litter beneath the patient while the patient is resting on the bearer 's knees.

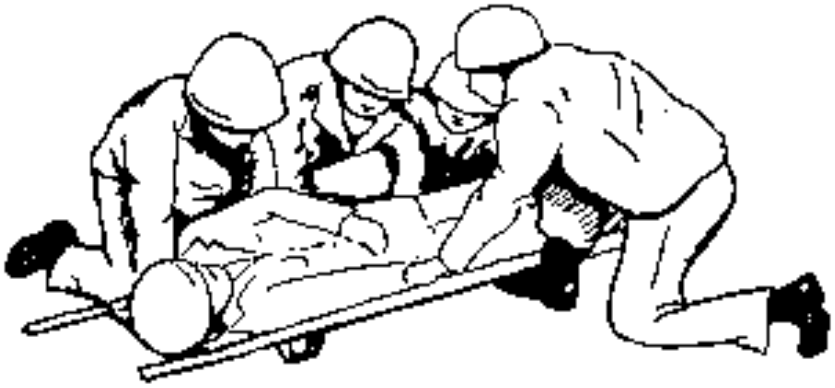
Once the patient is in place on the litter, a minimum of two litter straps should be used to secure the survivor to the litter. Litter straps are normally placed across the chest and mid thigh. The arms should be enclosed only if the patient is unconscious or restraining the arms will facilitate treatment (i.e., splints or Ivs).

Transferring the Survivor to the Litter.

Litter is placed on the ground, alongside the survivor, between three aligned bearers and the team leader.



Team leader gives lifting commands. The survivor is raised to the bearer's knees. Team leader positions the litter under the survivor.

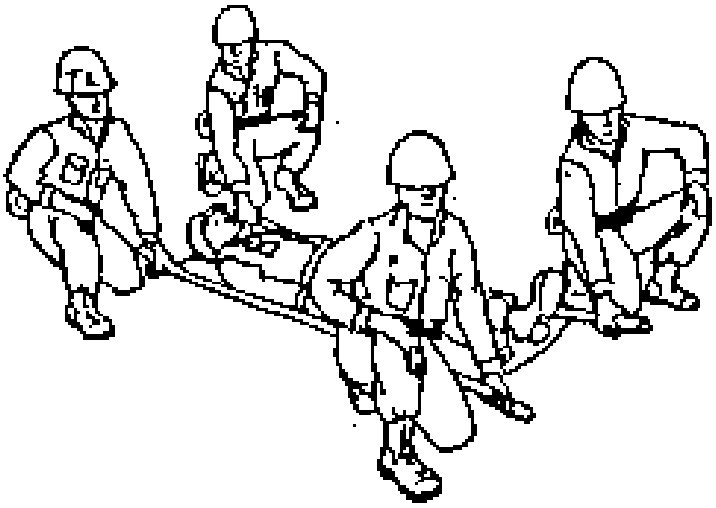


Team leader gives lowering commands and patient is lowered to litter and secured.

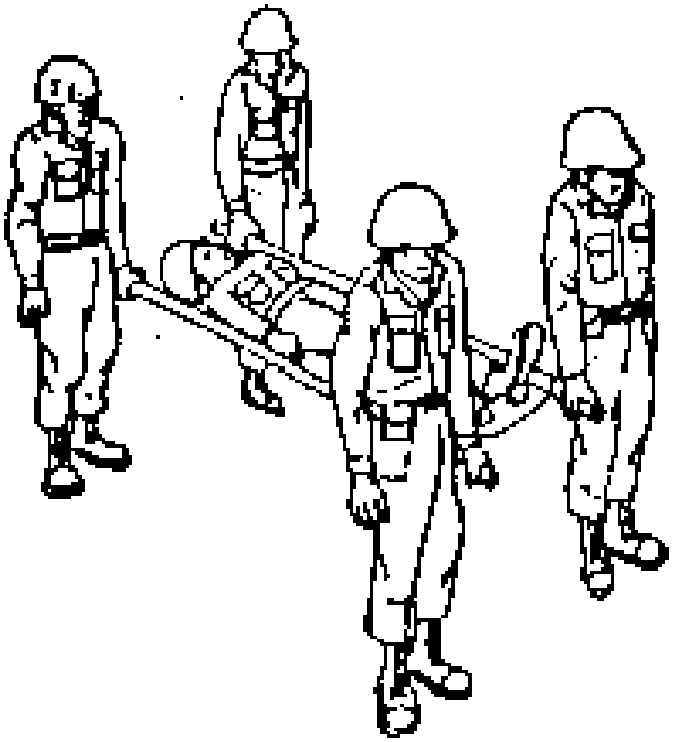
TRANSPORTING THE SURVIVOR

FOUR-MAN CARRY: Used when the terrain is smooth and level. The litter team leader, usually the senior individual or, if the team is composed of non-medical members, the individual with the most medical training, is positioned at the rear of the litter, on the survivor's right, with a full view of the casualty and equipment.

Four-Man Carry.



At the preparatory command, "Prepare to lift," each bearer kneels on the knee closest to the litter, grasps the litter handle, and places the free hand on the upright knee.



At the command of execution, "Lift," all bearers rise together, keeping the litter level.

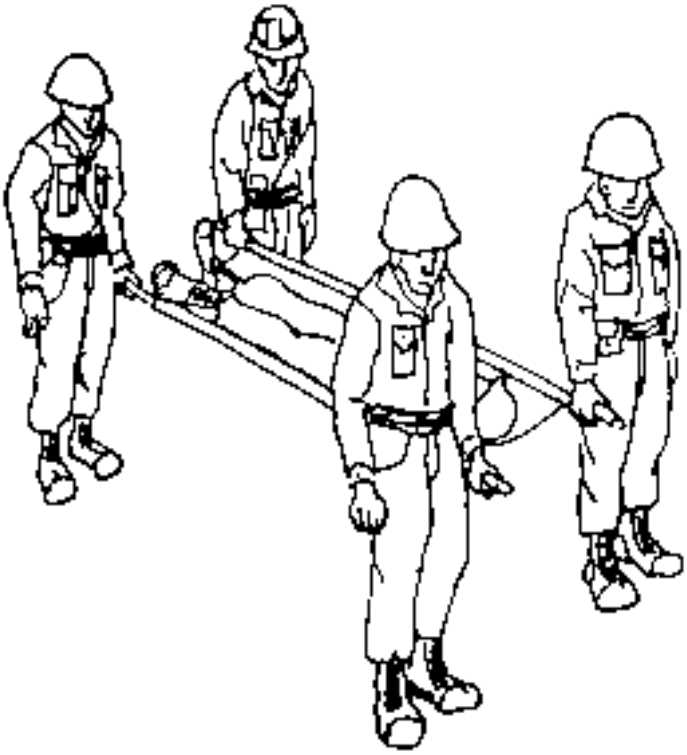
LITTER POST CARRY. Used to carry the litter when changing direction of travel (uphill or downhill) or to improve litter stability when moving through rough terrain (i.e., foot entanglements). This is a complicated carry involving several changes in position for the bearers. Good communication between all team members is a must.

Litter Post Carry.

With commands "Litter post carry, move, "change into a two-man carry." Team leader and free front bearer then grasp litter at sides, with team leader on the survivor's right.

Front and rear bearers release weight of litter and step away. Commands are, "Prepare to rotate, rotate." Side bearers rotate litter counter-clockwise 180 degrees.

Front and rear bearers resume their original position and take the weight of the litter. Team returns to four-man carry with commands, “Four-man carry, move.”

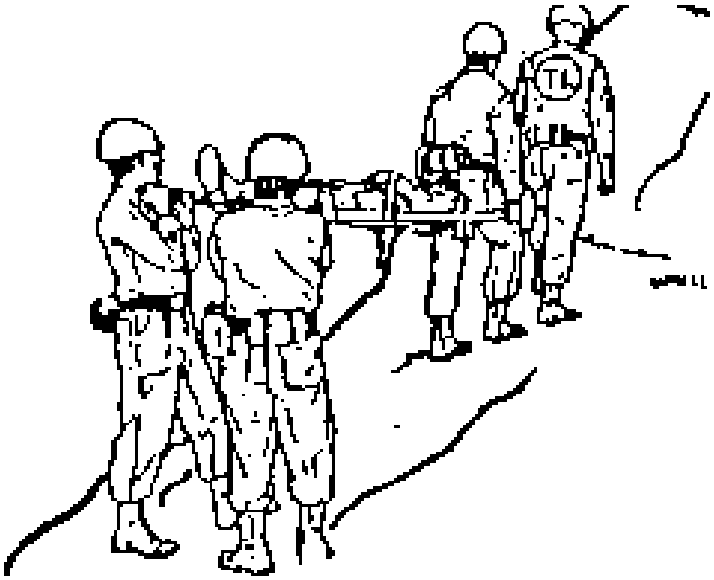


Note that the litter team leader is positioned at the survivor's right at the rear of the litter.

UPHILL CARRY. When traveling uphill, rotate the litter into a head first position. Once the litter is rotated for an uphill carry, the foot of the litter is in the rear. This keeps the survivor's head closest to the ground in case the litter is dropped.

Uphill Carry.

When front and rear team members assume original position, Team Leader commands, "Uphill carry, move."



Left side bearer moves to foot of litter and takes left post. Rear center bearer takes right post. Team Leader steps in front of front bearer.

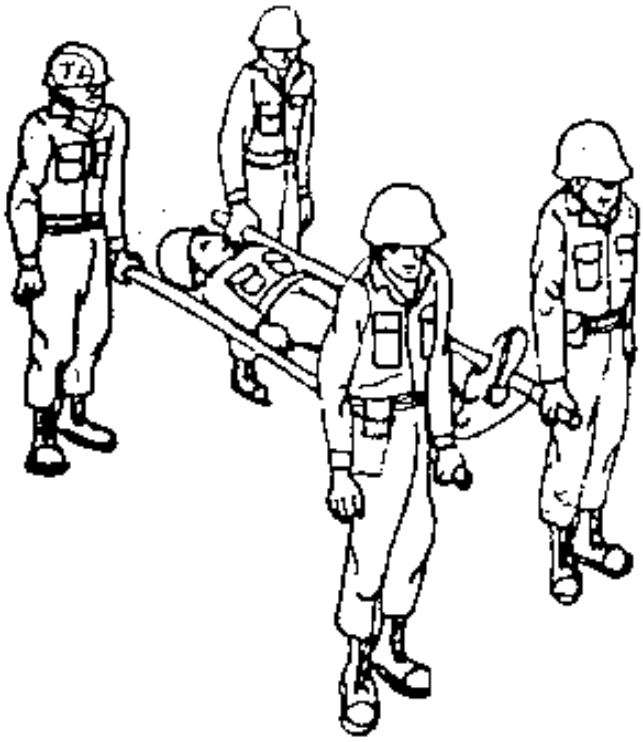
NOTE: Rear members are responsible for keeping the little level as they move uphill. Upon reaching the top of the hill, the Team Leader calls the team to a halt.

Team Leader commands, “Litter post carry, move.” The Team Leader steps to R side, R rear bearer moves to center rear and L rear bearer moves to L side position.

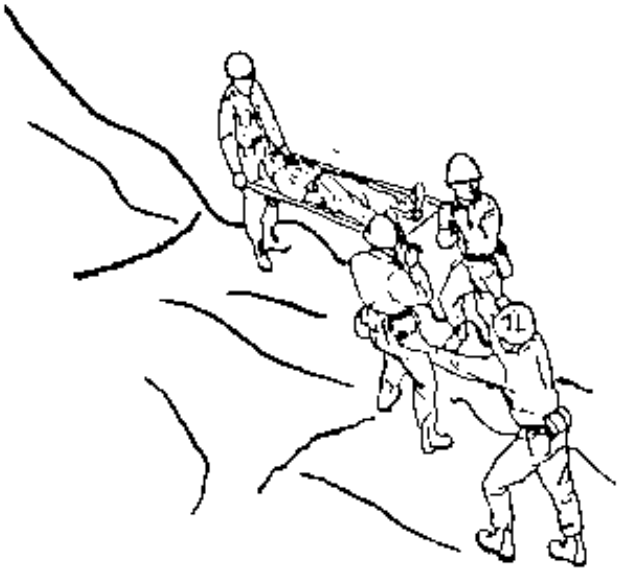
Team Leader gives command, “Prepare to rotate, rotate.” The Team Leader gives command, “Four-man carry, move.” Members then move to correct positions.

DOWNHILL CARRY. When traveling downhill, rotate the litter into a feet-first position. Once the litter is rotated for a downhill carry, the foot of the litter is the front.

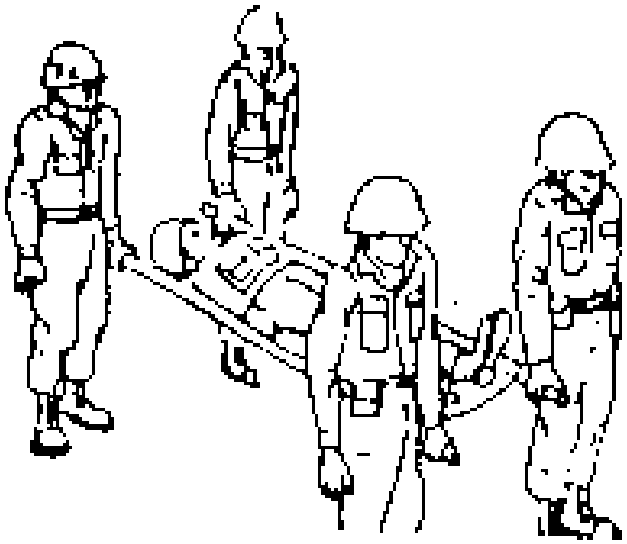
Downhill Carry.



With the litter team in the four-man carry position, the Team Leader gives the command, "Downhill carry, move." R rear bearer takes full support of the litter at the patient's head and the front bearers turn and face each other.



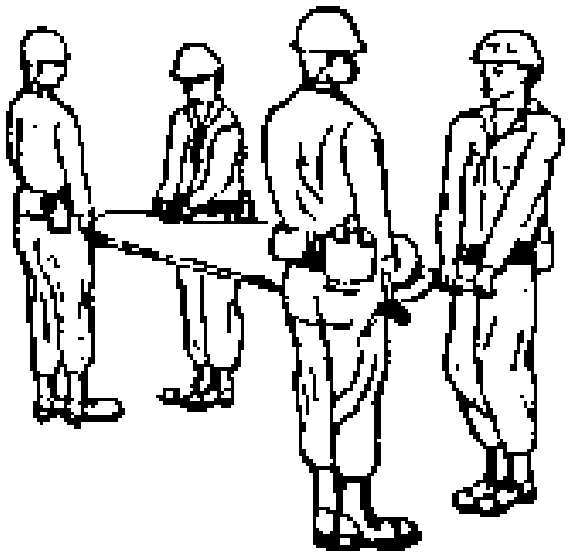
Team Leader moves to the front, facing the team. He supports the front bearers at the waist and hip area, and insures that they keep the litter level as they move downhill.



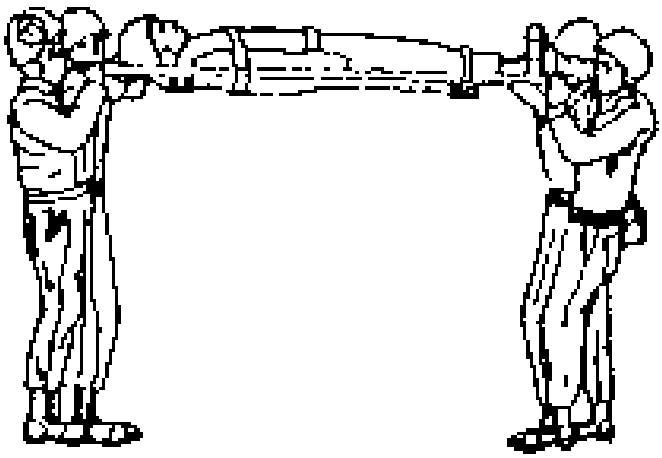
Upon reaching level ground, the Team Leader calls the team to a halt and moves back to the R rear position and the team proceeds as necessary.

OVERHEAD CARRY. Used to move over high/low walls. When attempting to cross obstacles (walls, trenches, etc.), bearer alignment must be changed to facilitate moving over and through the obstacle.

Overhead Carry.

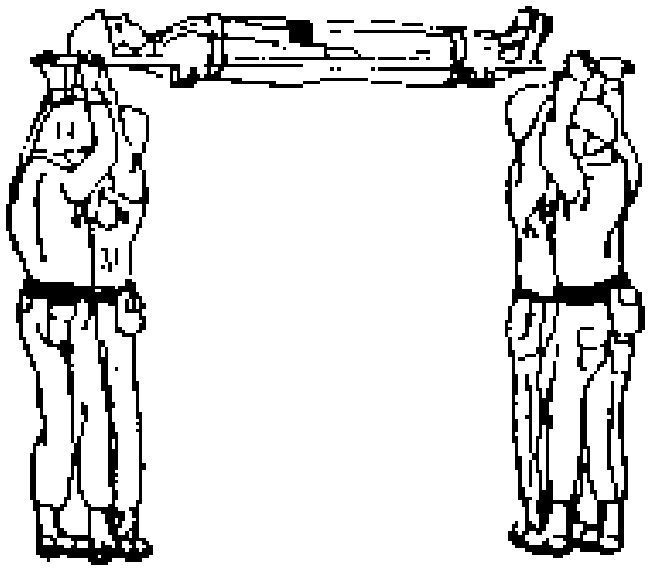


At command, "Overhead carry, move," team members turn inward, facing each other.



Team Leader gives lifting commands and litter is raised to the shoulder height of shortest team member

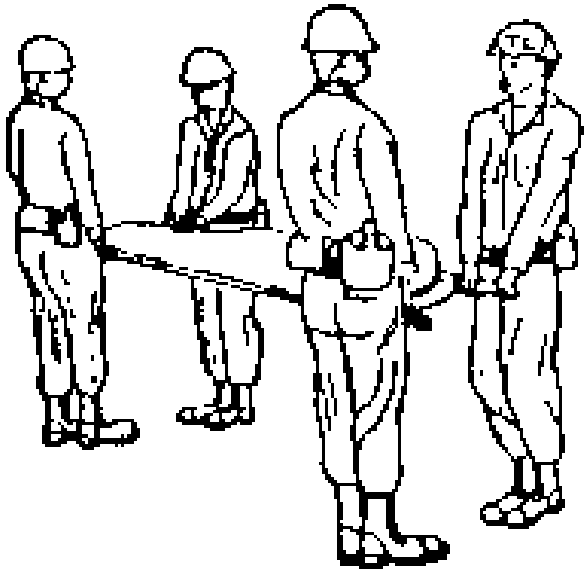
.



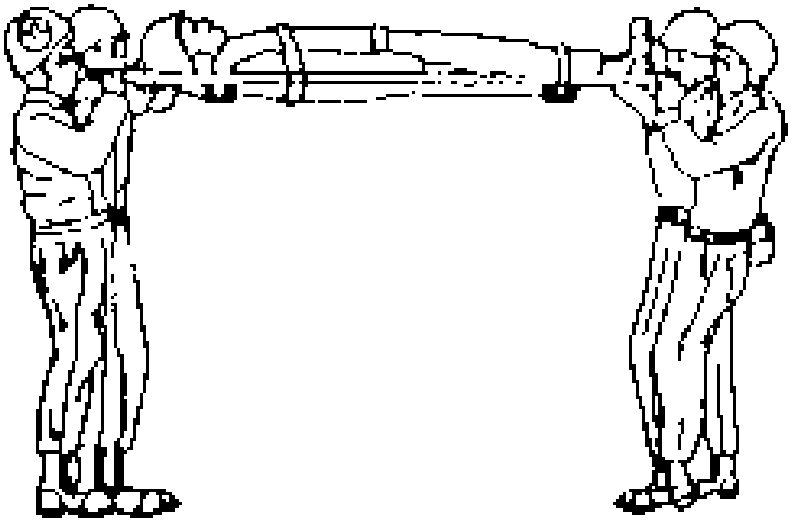
Team Leader repeats lifting commands and litter is lifted to height of obstacle.

FULL OVERHEAD CARRY. Used to move litters across streams deep enough to prevent safe carries at waist height, and through low brush which might cause additional injury to the survivor.

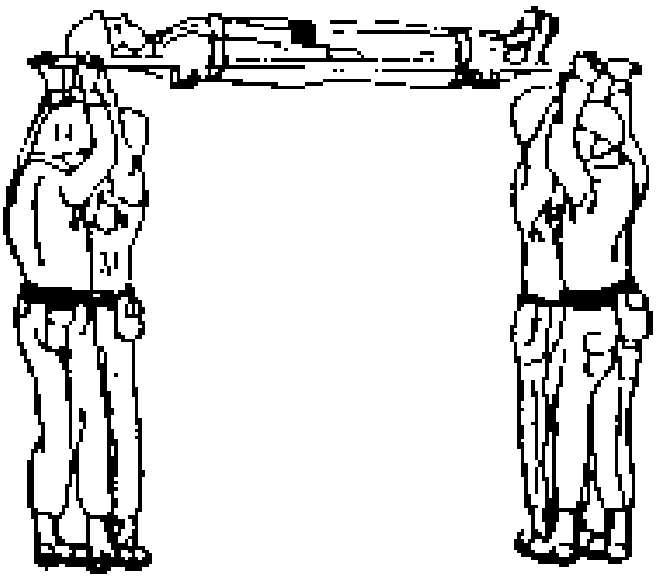
Full Overhead Carry.



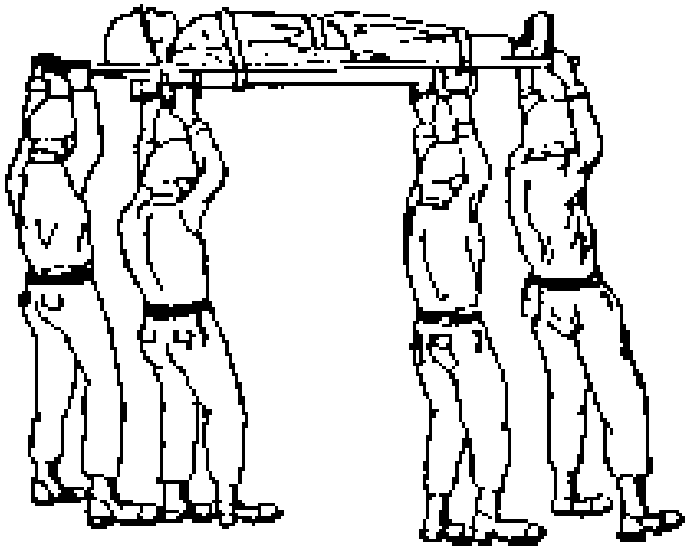
At command, "Overhead carry, move," team members turn inward, facing each other.



Team Leader gives lifting commands and litter is raised to the shoulder height of shortest team member.



Team Leader repeats lifting commands and litter is lifted overhead.

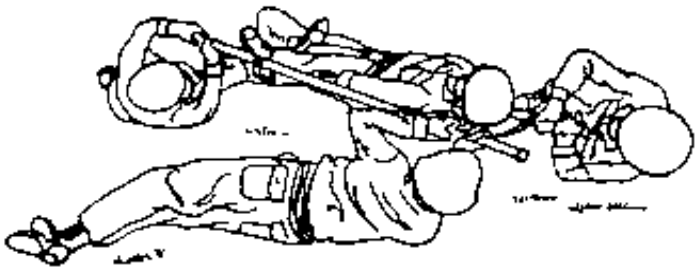


Taller team members take control of litter at each end of litter poles. Shorter team members move under litter and remain prepared to catch litter if taller bearers stumble.

LOW CARRY. Used to move under low obstacles, Take care to protect the survivor's face by covering it. Do not push or drag the litter as this can result in injuries to the bearer ’s hands or collapse of the litter.

Low Carry.

Beginning with the four-man carry, lower litter quickly and safely at command, “Low crawl.”

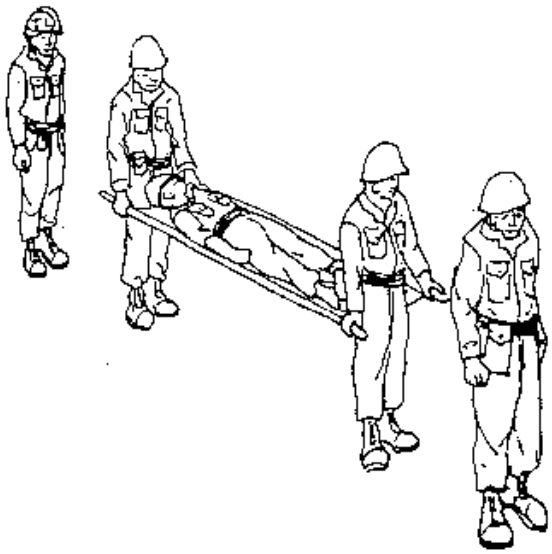


Each team member lies on shoulder facing litter with front members at a 45 degree angle and rear members aligned straight back.

Using lifting commands to move litter in a “hopping” motion.
The litter should be raised approximately 6” with every forward move.
Team members should move only while litter is on the ground.

TWO-MAN CARRY. Used to enable the litter team to pass through or over narrow passages, such as trails, bridges, gang-planks or catwalks.

Two-Man Carry.



With the litter team in the four-man carry position, the Team Leader gives the command, "Two-man carry, move." The right front and left rear bearers grasp both handles and assume responsibility for the weight of the litter.

Litter Team Leader steps to the rear and the left front bearer steps in front of the lead bearer to act as a guide.

COMMENTS AND SUGGESTIONS

Many personnel were involved in producing this training text, and though we worked very hard, we are sure that some changes can be made since this is a new project at the National level. If you have any questions or suggestions please forward them to:

HQ CAP/DOSP
105 South Hansell Street, Bldg 714
Maxwell AFB AL 36112-6332

Fax: (334)953-4242
E-mail: dos@capnhq.gov