UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

SYLLABUS FOR FIREARMS SAFETY TRAINING

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PREFACE

The Geologic Division of the U.S. Geological Survey provides annual firearms safety training for employees who carry firearms while on official field duty in back country areas, mainly Alaska. Impetus for the training was a tragic accident in 1977 in which a USGS geologist was attacked and seriously mauled by an Alaskan black bear and nearly lost her life. In addition to personal defense, firearms may be used for signaling, or for taking small game in emergency situations.

USGS regulations require that anyone carrying a government-owned firearm on official duty must complete an approved basic firearms safety course and a refresher course at least once every three years, in addition to annual practice (USGS Safety and Occupational Health Handbook 445-1-H, Chapter 19, August 1989).

The Central Region of the USGS in Denver, Colorado, teaches an annual, three-day firearms safety training course that meets training regulations. The course content, briefly outlined in this syllabus, was developed over seven years in Central Region training classes. It is modified annually as new information comes to light from actual experiences of field personnel and as new equipment and techniques are developed and tested.

The firearms safety training program in Denver is supervised by the Assistant Chief Geologist for the Central Region, Denver. Instruction is provided by a Firearms Safety Committee, which is comprised of 10 to 12 staff volunteers, several of whom have professional training in firearms proficiency and instructional techniques.

Part of the course covers bear ecology and behavior, providing a basis for understanding passive techniques for avoiding hostile encounters with bears. The course is conducted from the compound perspective that fewer bears will be killed unnecessarily and employee safety from bear attacks will be maintained if employees are proficient in defensive shooting skills, have a proper mental attitude, and have knowledge of bear behavior. Lectures on bears are augmented by several commercially-available VHS video programs on bear ecology and behavior.

The firearms doctrine and instructional methods taught in the course have, in part, been adapted to the needs of the USGS from programs of the American Pistol Institute, Paulden, Arizona; International Training Consultants, Huntertown, Indiana; and Ramparts Systems Incorporated, Denver, Colorado.

More information about this syllabus and training program can be obtained by writing the Firearms Safety Manager, Office of the Assistant Chief Geologist, U.S. Geological Survey, Denver Federal Center, Box 25046 MS 911, Denver, CO 80225.

I. INTRODUCTION

A. Purpose of firearms training: To promote the safety and security of USGS and other personnel working in back country areas. This includes:

1. Safety from firearms accidents.

2. Personal defense against hostile animals, mainly bears.

3. Emergency signaling.

4. Emergency survival in wilderness areas.

5. Meet USGS regulations for employees who carry government-owned firearms on official duty. See Geological Survey Safety and Occupational Health Handbook 445-1-H, Chapter 19, August 1989.

B. Training objectives

1. Develop individual skills in handling and operating firearms safely.

2. Develop a proper mental attitude for threat avoidance and personal defense.

3. Introduce modern techniques of reactive defensive shooting (RDS), which include gun handling, marksmanship, and mental conditioning.

4. Discuss bear behavior, habitat, and the proper human etiquette for living and working safely in bear country.

5. Understand passive defensive techniques for avoiding the use of lethal force against wild animals, except as a last resort.

6. Summarize laws and regulations that govern the possession, transportation, and use of firearms under various conditions.

C. Introduction to general firearm safety

1. Firearms safety is an individual responsibility--it can be neither delegated to a subordinate nor assumed by a superior. The most reliable form of firearms safety is the mental attitude of the firearm user. Compulsive attention to firearm safety is encouraged among users and others working around firearms.

D. Regulations

1. The U.S. Geological Survey requires that all personnel issued a government-owned firearm for use on official duty successfully complete an initial 20 hours of approved firearms safety training followed by a refresher course at least once every three years. [See further, USGS Safety and Occupational Health Handbook 445-1-H, Chapter 19 (August 1989)].

2. Issuance of a government-owned firearm is based on 1) certification of successful completion of training and 2) a "certificate of need" signed by the supervisor prior to the employee being issued a firearm.

3. Civilian regulations

a. When traveling by commercial vehicle, applicable Department of Transportation (DOT) regulations must be followed.

b. For airline travel, DOT regulations require that you declare the firearm to airline authorities. Prior to traveling, ask the airline agent for any special requirements. If firearms are allowed by the airline company, DOT requires that the firearm be unloaded and packed in a hard case that is locked with a key. Some airlines may prohibit traveling with firearms. If the transportation of firearms is allowed by the airline, the airline company will issue the traveler with a red or orange tag which must be signed, certifying that the gun is unloaded. Attach the signed tag to the handle of the case with the string provided and place the tag inside the case so that it does not serve as a marker visible to potential thieves.

c. Ammunition must be in an original factory wrapper and packed in a hard case.

d. State and local laws. The individual is responsible for knowing and conforming to local and State laws governing firearms. If in doubt, ask a local law enforcement officer.

e. Concealed carry versus non-concealed carry. Local laws may vary on the definition of "concealed carry," a criminal offense that may be treated as a misdemeanor or felony in different jurisdictions.

f. Regarding firearms carry and use, U.S. Geological Survey and other government civilian employees have no special status in the eyes of the law.

4. What to do if you shoot a bear:

The killing of a bear must be reported to State wildlife authorities. In Alaska (and some other States), an attempt must be made to salvage the meat, hide, skull, and claws which are to be surrendered immediately to the Alaska Department of Fish and Game. A written report describing the incident must be filed within 15 days after the kill. For other special requirements in Alaska, see *Guidelines for Safe Geologic Field Work in Alaska* (Nelson and others, 1985).

II. FIREARMS SAFETY

A. Introduction

1. Guns are tools; they deserve proper respect, as do any tools that can cause harm if used improperly. Some people have an irrational fear of firearms--a condition called hoplophobia--and may choose not to carry one in the field. Supervisors should take this into account in assigning employees to work in areas with bear hazards.

2. The probability is low of being attacked by a bear in Alaska or other back country area. The probability of being injured by improper handling of firearms is much greater.

3. Safety is common sense; take nothing for granted. Be compulsive in your observation of safety rules and procedures.

4. Handling and working around firearms is serious business. No goofing around with guns; do not drink alcohol when handing guns, or when you may be handling guns in the immediate future; always observe the four general safety rules (below) and insist that others in your field party do too. Most accidents happen in the home or camp when loading and unloading firearms, and when untrained people (including children) have access to firearms.

5. FIREARMS SAFETY CANNOT BE LEARNED BY EXPERIENCE; WE MUST GET IT RIGHT THE FIRST TIME!

B. Four general rules of firearms safety, first introduced by the American Pistol Institute, Paulden, Arizona, should be made part of our reflex behavior (automatic reactions without deliberate thought):

Rule 1. ALL GUNS ARE ALWAYS CONSIDERED LOADED

a. Assume that all firearms are loaded unless you have personally verified otherwise. If the gun leaves your control, verify again. Never rely on someone else's word that a gun is unloaded. Many firearms accidents result from violation of this rule. The incompetent identify themselves by saying, "But I didn't know it was loaded!"

Rule 2. NEVER ALLOW A FIREARM TO POINT AT ANYTHING YOU ARE NOT WILLING TO SHOOT

a. This rule is easily violated, especially with handguns. Always be alert to the location of the muzzle of your gun and the muzzles of firearms held by others. Never allow anyone to point a firearm at you--it could cost you your life.

b. About 60% of fatal firearm accidents happen in the home; most by failure to follow Rules 1 and 2.

Rule 3. KEEP YOUR FINGER OFF THE TRIGGER UNTIL YOUR SIGHTS ARE ON THE TARGET

a. When under emotional stress, while moving, while holstering a handgun, or if you fall, the firearm may unintentionally fire if your finger is inside the trigger guard. Keep your trigger finger outside the trigger guard until your sights are aligned and you intend to shoot.

b. Mechanical safeties are made to help keep ignorant people safe but they should not be relied upon. Mechanical safeties may fail, just as any mechanical device may fail as a result of wear, improper use, breakage, etc.

Rule 4. BE SURE OF YOUR TARGET AND WHAT MAY BE IN FRONT OF AND BEHIND THE TARGET

a. Target identification: Never fire unless you can identify your target unequivocally and you are sure of what is in front of and behind the target. For example, don't shoot blindly at movement in the brush, or at sounds; avoid shooting at night if possible. If you must shoot at night, work with a colleague who has a flashlight and can light up the target and line of fire. Know where your field partners are at all times! Remember, many rifle cartridges can kill up to 5 miles away!

C. Firearms safety in the field

1. Familiarize yourself with your firearm before going into field. This includes checking function, test firing, sighting in, cleaning, etc.

2. Do not touch anyone else's firearm without his/her knowledge or permission.

3. Guns and either alcohol or drugs, like drinking and driving, don't mix. Alcohol or drugs can change a person's behavior and make a normally prudent person negligent.

4. A dirty gun can be an unsafe gun. Periodic cleaning is advised, even if the gun has not been fired. To keep the bore free of debris in the field, use plastic tape over the muzzle. If debris enters the muzzle, safely unload firearm before clearing with a cleaning rod. Use WD-40, or a similar petroleum product, to displace moisture, being careful not to get it on the ammunition.

5. Use factory-manufactured ammunition only for USGS field use for reasons of safety and liability. Safe, high quality ammunition can be loaded by hand, but unless you are an expert in the process it is prudent to rely only on factory ammunition for personal defense. Never use someone else's privately reloaded ammunition.

6. Carry and use the correct ammunition for your gun. Do not mix ammunition calibers, brands, bullet weights, etc. It is possible to chamber the wrong caliber cartridges in some guns, which may result in a burst action or barrel and injury to the shooter or bystanders, not to mention injury from a hostile animal you needed to stop.

7. Keep ammunition free of dirt, moisture, and contact with organic chemicals. Moisture or organic chemicals may cause a hangfire or misfire.

8. Know hunting seasons in the area you work and wear international orange or "Day-Glow" clothing if you must work during the hunting season.

9. Disposal of contaminated or faulty ammunition in the field: Soaking in oil or organic solvent will render ammunition inert. Do not burn or throw live ammunition in trash receptacles. Carry out and return to USGS armory for disposal if possible.

10. Miscellaneous safety problems (to be defined and discussed in lecture)

a. Misfire, hangfire, squib load.

b. Ruptured case; possible headspace problems.

c. Barrel obstructions.

D. Carrying firearms in the field

1. Carry firearms in the "FIELD READY condition":

a. Magazine fully charged.

b. Bolt closed on an empty chamber.

c. Hammer uncocked (hammer down).

d. Safety on (if appropriate to your particular gun).

2. Sling carry positions (discuss safety considerations)

a. Muzzle up on strong side.

b. Muzzle down on weak side.

c. Scramble, sling looped around neck with muzzle above head.

E. Field and camp safety policies

1. While in camp:

a. Field supervisors will set special rules, but remember that YOU, the individual, are ultimately responsible for your personal safety. If you do not understand something, ask! If you see unsafe behavior, politely point out the problem and ask the person to correct it. Most unsafe behavior results from ignorance and is not done on purpose.

b. Do not pitch tents in a circle. Should a hostile bear enter camp, it will be difficult to establish a safe line of fire.

2. Helicopters

a. All firearms should be unloaded before entering and while riding in helicopters.

3. Watercraft

a. All firearms should be unloaded before entering boats. Load or unload, while pointing in a safe direction, only on land if possible.

4. Motor Vehicles

a. All firearms should be unloaded while you are in motor vehicles. Know State and local laws regulating transportation of firearms in vehicles. If in doubt, ask a local law enforcement officer.

III. KINDS, CONSTRUCTION, AND FUNCTION OF FIREARMS

A. Some definitions

1. Firearm: A tool that expels one or more projectiles through a barrel by the expansion of burning gases.

2. Legitimate uses of firearms in the U.S. are:

a. Personal protection.

b. Offense (military and law enforcement).

c. Hunting.

d. Recreation (collecting and target shooting).

3. Geologic Division training is concerned with firearms safety and defensive use of firearms against hostile animals.

B. Kinds of firearms

1. Rifles (rifled bore) and shotguns (smooth bore): lever action, bolt action, autoloader, single shot, break-open breech.

2. Handguns: revolver, pistol (autoloader), single shot.

C. Basic construction and function

1. Stock, receiver/action, barrel, muzzle, magazine (loading & unloading).

2. Trigger, sear, firing pin, hammer.

3. Extractor, ejector.

4. Chamber, rifling (lands & grooves), bolt, headspace (kinds).

5. Mechanical safeties (hammer block, trigger block, firing pin block, sear disconnect, etc.). Discuss the safety problems of "old style" single-action revolvers, such as Colt and older Rugers.

6. Sights: bead/post, aperture, open, optical.

D. Cartridges and shells

1. General construction: case or hull, primer, propellant, projectiles (bullets, slugs, birdshot, buckshot, flares, etc.).

2. Caliber, gauge.

3. Explain how cartridges and shells work.

IV. ELEMENTARY BALLISTICS

A. Introduction: internal, external, terminal

B. Internal ballistics

1. Determined by the ignition characteristics of particular cartridge and firearm combinations. Stress importance of matching proper cartridge and firearm. Stress importance of proper headspace, which should be checked periodically by a gunsmith.

C. External ballistics

1. Trajectory

a. Arc made by flight of bullet from barrel to point of impact. Explain with appropriate diagrams.

b. Rifle and handgun bullets: Bullet spin is imparted by lands and grooves in rifle and handgun barrels to stabilize flight of bullet; important for long-range accuracy. In some instances, short-range shots may be ineffective (high velocity bullets may fragment on impact) because some distance is required before bullet stabilizes.

c. Shotgun rifled slugs: Shotguns have smooth barrels which provide less stabilizing effects on slugs. This makes shotguns short-range (100 meters or less) weapons. Slugs are stabilized by mass-forward construction of projectile. Example is a badminton shuttlecock. Purpose of "rifling" on some slugs is to allow the slug to constrict easily while passing through a choked barrel, thereby avoiding high gas pressure and a possible damaged choke.

d. Sighting-In: For accurate shooting it is necessary to know the relationship between point of impact and sight alignment at various distances. Sights are adjusted by moving the rear sight in the direction you want the strike of the bullet to move on the target. Front sights are adjusted by moving them in the opposite direction from the direction you want the strike of the bullet to move on the target. Rifles and shotguns used for personal defense against bears should be sighted-in at no more than 100 meters.

e. Verify point-of-aim. Different brands of ammunition and weights of projectiles may shoot to different point-of-aim in the same firearm. Field personnel should verify the point of aim of their individual weapon and ammunition after arriving in the field.

D. Accuracy versus precision

1. Intrinsic accuracy ("precision"): The quality of a firearm and ammunition, measured under controlled conditions, to shoot repeated shots with a low angle of dispersion. All modern firearms in good condition have adequate intrinsic accuracy for personal defensive purposes.

2. Practical accuracy: An attribute of the individual shooter/firearm combination. Measured by how well an individual can shoot a given firearm and ammunition "on demand" under field conditions.

3. One purpose of range training is to give each participant an understanding of his/her practical ability to place one or more shots in the vital areas of a simulated hostile bear target at unknown distances up to 50 meters under stressful conditions.

E. Terminal ballistics

1. Terminal ballistics: The effect of a bullet on the target; least predictable for live animals. The ability of a firearm to stop an attack by a hostile bear is related to degree of bullet penetration, destruction of vital organs, size, health, and mental state of the animal.

2. Bullet hits to the central nervous system (CNS) are most effective in stopping a violent attack. Heavy calibers with strongly constructed bullets (.338 WM, .375 H&H, .458 WM) give best results. Among shotguns, Brenneke-type 12 gauge slugs generally give best results. High velocity/low mass projectiles (e.g., .233, 6 mm, .270) may break apart upon hitting the animal, especially at short ranges, resulting in minimal or insufficient penetration. Or, they may penetrate deeply but without massive damage to vital organs. Hollow point bullets have insufficient penetration and should not be used for personal defense against large animals.

3. Effectiveness of firearms types

a. Rifles: Large caliber magnum rifles with heavy, strongly constructed bullets give maximum stopping effects.

b. Shotguns: 12-gauge shotguns are effective on large animals at distances up to about 40 meters; however, energy decreases substantially beyond that distance. Shotgun slugs are soft lead and may deform without breaking if they hit large bones. If a shotgun is used, Brenneke-type slugs have the best terminal ballistics record. Foster-type slugs (Remington, Federal, and Winchester) are less effective than Brenneke-type slugs and should only be used for practice. Different brands and types of slugs may shoot to different points of impact.

Buckshot is only effective against large, thin-skinned animals at ranges up to about 5 meters, too close for safe use in personal defense against bears.

c. Handguns: The most powerful .44 Magnum load has relatively low stopping potential compared to heavy rifle bullets or 12 gauge shotgun slugs. If used, heavy, non-deforming bullets are recommended to maximize penetration to vital organs or to break-down major bones.

V. GUN HANDLING

A. Demonstrate proper stance, gun mount, and grip.

B. Sight alignment: eye focus on front sight; both eyes open if possible; discuss importance of knowing your dominant eye.

C. Trigger control: press, surprise break.

D. Shooting positions

1. Long guns: Prone, sitting, kneeling, and standing offhand. Standing offhand is most important to reactive defense shooting at ranges up to about 50 meters. If it is necessary to lower the line of sight to the target, the kneeling position may be used.

2. Handguns: Use the modified Weaver stance to maximize recoil control.

E. Loading and unloading

1. Loading: be sure barrel is free of obstructions such as dirt, grease, snow, or cartridge/shell of smaller caliber that might have slid forward of chamber into barrel.

2. Field carry for long guns: a) magazine fully charged; b) bolt closed on empty chamber; c) hammer uncocked; d) safety on (if appropriate to firearm). Additionally, plastic tape may be placed over muzzle to keep out dirt; extra ammunition should be readily available on belt or in cartridge/shell carrier on stock.

3. Learn to operate the action and reload long guns while keeping the gun mounted to the shoulder.

4. Reload what you shoot! Take advantage of lulls in the action to add cartridges/shells to the magazine; carry speedloaders for revolvers.

5. "Making the Gun Safe": Point gun in safe direction, remove cartridges/shells from chamber and magazine; actually look into chamber and magazine and visually determine that they are empty, or even better, stick your finger into the chamber and determine that it is empty. Be compulsive about safety! And insist on the same behavior by all others in your party. All people in a field party should know how to make a gun safe even if they do not carry one themselves.

F. Use of sling

1. Slings are used mainly for carrying the defensive firearm. Shooting from a sling-braced position is only important when shooting at distances greater than 50 meters.

2. Review carry positions: a) muzzle-up, strong side carry; b) muzzle-down, weak side carry; c) scramble carry, sling looped around neck with muzzle above head.

3. Sling should have quick-detachable swivels (with lock nuts) so that it can be easily removed when moving through heavy brush.

G. Developing proficiency

1. Proficiency with firearms results from:

a. Learning proper shooting techniques.

b. Individual practice until proper techniques become reflex behavior.

c. Regular practice to maintain acquired skills.

d. The Geologic Division Firearms Safety Course teaches proper modern shooting techniques through a formal training program, but proficiency can only be developed by the individual through practice and reinforcement of good shooting habits.

2. During practice, each shot should be analyzed for success or failure. Remember, repetition of error does not produce proficiency. Practice tends to be counter-productive when the shooter is tired.

3. Most serious practical shooters fire a minimum of several thousand rounds per year in practice. While this much shooting is not necessary in most instances to remain competent with a firearm, certainly 25 long-gun rounds and 50 handgun rounds every two months, on average, should be considered a minimum of practice.

VI. MENTAL CONDITIONING FOR PERSONAL DEFENSE

[General reference, Cooper (1989)]

A. Main objective: protection against bear attacks

1. The principles of mental conditioning for personal defense against a life-threatening attack are the same whether the attacker is a bear or a violent human; only the scale changes. A lot can be learned about mental conditioning from analysis of law enforcement experiences with hostile humans as well as U.S. Geological Survey experiences with bears in back country areas.

B. Prepare ahead of time for a violent encounter: Preparation is analogous to learning first aid skills before the need arises to use them.

1. Personal defense is partially a mental problem: "You are no more armed because you are carrying a gun than you are a musician because you own a guitar."

2. Recognize that your environment may be hostile.

3. Make personal, moral, and ethical decisions about the use of lethal force ahead of time. The well-being of colleagues may be jeopardized if you hesitate to shoot during a hostile bear attack.

4. Learn how to make clear, objective decisions whether to fire while under stress.

5. Develop a will to fight and a willingness to employ lethal force, if necessary, to protect yourself or your colleagues from a life-threatening attack.

C. Mental factors in personal defense [adapted from Cooper (1989)]:

1. Alertness (gives warning time)

a. Don't allow yourself to be surprised.

b. Know what is behind you, in front, and to the sides. Pay attention to what is happening in your immediate environment, such as movement in the brush, sounds, alarm among small animals and birds, etc.

c. Anticipate violent action. If you see a bear, do not assume that it is friendly or that it will run away.

d. Learn from the experiences of others.

e. Continually observe your surroundings for signs of potential trouble (bear tracks, feces, putrid meat, broken berry bushes, etc.).

f. Living in a state of caution is no more troublesome than fastening a seat-belt, wearing a life jacket on a canoe trip, or maintaining a fire-extinguisher in your home or car.

2. Decisiveness (proper course of action)

a. Is the situation potentially life-threatening? Be prepared to answer this question quickly. Then carry through with a pre-planned course of action without hesitation.

b. To prepare yourself, think: "What would I do if...?"

3. Aggressiveness

a. Do not shoot bears unnecessarily, but if an attack seems imminent (criteria are discussed below), react forcefully with purpose TO STOP THE VIOLENT ACTION.

4. Coolness (you are no good to anyone if you become hysterical in the face of a threat)

a. Keep control of your emotions; don't panic. Knowing your capabilities with the firearm you carry will give you self confidence, but...

b. When under attack, your firearm is "only as good as your ability to keep cool and shoot carefully."

c. If you find yourself under attack, think: "It is happening to me. I thought this might happen. I'm prepared for this and I know what to do."

5. Ruthlessness

a. Exercise passive defensive tactics, but if they fail, your hesitation to react with resolve may result in serious harm or death to you or your colleagues.

6. Speed

a. When your life is at stake, react immediately.

b. When confronted by a hostile bear, you have no time to evaluate your moral or ethical position, that must be done ahead of time.

D. Stages of Mental Alertness (adapted from Cooper, 1980)

1. Four stages of mental alertness are indicated by a color code: white, yellow, orange, and red. The color code reflects your mental and physical preparedness to use lethal force against a life-threatening animal if such action is shown to be necessary by behavior of the hostile animal. The color code is not the degree of threat (the threat may be very high indeed without your knowing it), but rather the degree of your readiness to take action.

a. **CONDITION WHITE:** You are unaware of any potential danger in your surrounding environment. You are mentally and tactically unprepared to defend yourself against a potentially life-threatening attack. You have no firearm, nor plan for passive defense. Thus, a sudden encounter with an attacking bear, for example, will probably result in personal injury or death.

Response time is the time it takes to identify, analyze and react to a problem with an appropriate action. Psychologists suggest that people in Condition White usually take 4 seconds or more merely to recognize that a problem exists; some people NEVER recognize the problem until it is too late. In firsthand accounts, these people, if

still able to talk, are identified by their remark, "How could this have happened to me?" Or, "Who would have thought this could happen in our neighborhood?" We should never be in Condition White, unless we are asleep.

b. **CONDITION YELLOW:** You are in a relaxed state of mental alertness to potential danger. You are aware that your environment is not a universally friendly place. Either you are carrying a firearm or someone else in your field party is carrying one. The firearm is in field ready condition and readily accessible. In your mind you have worked out a general course of action should, for example, a hostile animal appear in your vicinity. By living in Condition Yellow, we shorten our response time because problem recognition can be nearly instantaneous.

c. **CONDITION ORANGE:** You are alert to a specific potentially dangerous animal. In Condition Orange, we analyze the problem and the safety of colleagues is taken into account--we are mentally ready to take action. For example a bear comes into view within, say, 100 meters of your location. You are aware of the possibility that you may have to shoot the animal, but the necessity to do so is not evident and your decision to shoot has not yet been made. Your attention is kept on the potential target while you determine whether your potential line of fire is safe: Are all people in my field party accounted for? Is anyone in front of or behind the target? You are armed and your firearm is accessible (slung on your shoulder or in your hands in field ready condition) for use in about 3 seconds or less, depending on the proximity of the animal.

d. **CONDITION RED:** You identify a specific threat. For example, a bear exhibits hostile behavior toward you or someone in your party. In Condition Red you have already made the decision to employ lethal force, if necessary. You have a firearm suitable to the task and your ability; you are trained in its proper use; personal moral and ethical decisions about the use of lethal force were made before you checked out the firearm. Your firearm is in the ready position, a cartridge or shell is cycled into the chamber, the safety is ON. Your finger is OFF the trigger. You have determined that your line of fire is safe, both in front of and behind the target. You are prepared to stop life-threatening behavior in about 1.5 seconds or less if mentally triggered to do so by some escalating hostile action by the animal. Mental triggers involve personal decisions; they may be your proximity to the bear, say, within 20-30 meters and the bear is moving toward you in a hostile manner. The bear may be charging toward you within 50 meters, or the bear may clack its teeth--behavior that usually precedes a charge. Remember, a bear can sprint at over 20 meters per second; you cannot outrun a bear intent on catching you!

2. Understanding the color code and making it part of our behavior accelerates response time for a rational, effective reaction (in contrast to an hysterical reaction).

3. Developing proficiency with a firearm and preparing oneself mentally before a potentially life-threatening crisis develops will give us the ability and self-confidence to quickly decide when to shoot and when not to shoot. Refining this critical ability will not only help keep us safe in back country areas, but it will also help us to avoid shooting bears unnecessarily.

4. "Firearms safety" also means being prepared for a hostile encounter--that is, having a loaded gun, knowledge and skill necessary to use it effectively, and a proper defensive attitude. Your firearm is of little value in a sudden hostile encounter with a bear if it is unloaded and carried inside your back pack.

E. Case histories

[Discuss several examples of life-threatening attacks to illustrate the role of mental conditioning in the survival or non-survival of attack victims.]

F. Summary of conclusions (mental conditioning)

1. Proper mental preparedness is our best defense against violent attack.

a. More important than firearms proficiency because a proper mental attitude will allow us to avoid most hostile encounters.

b. Prepare mentally before the crisis develops.

2. Think through potentially dangerous situations (e.g., hiking and camping in bear country).

a. Make mental notes on what you will do ("what if..."), and when, in given situations.

b. Resolve personal ethical questions about the use of lethal force before a life-threatening situation develops.

3. By developing the proper mental attitude we will gain the necessary understanding to avoid most violent encounters with dangerous animals. By developing firearms proficiency we will gain the skills and self-confidence to deal effectively with those encounters that cannot be avoided.

VII. REACTIVE DEFENSIVE SHOOTING (RDS)

A. RDS differs from other types of shooting.

B. The objective of RDS is to find a dynamic balance between ACCURACY (A), SPEED (S) and POWER (P). This is an individual problem; we are all different in strength, health, experience, etc. Each individual must find the balance that works best for him or her.

1. Accuracy and speed are provided by the shooter, power by the firearm and cartridge.

C. The general kinds of shooting can be graphically compared by use of ternary diagrams.

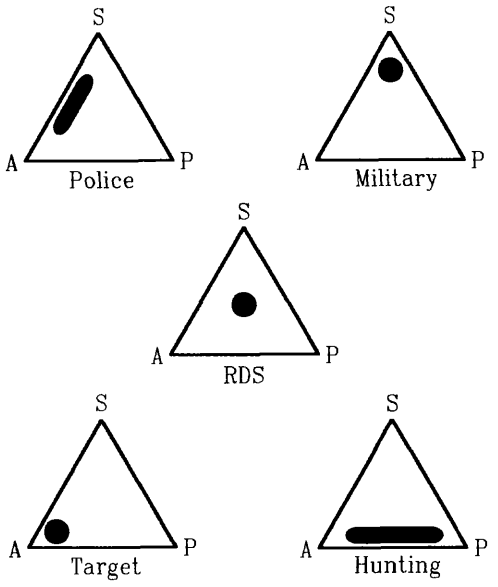

Figure 1. Comparisons of general types of shooting. Ternary diagrams show relative proportions of accuracy (A), power (P), and speed (S) that contribute to each general type of shooting. "Police" includes most law enforcement defensive shooting, "military" includes general small arms combat shooting, and "target" includes formal competition and informal recreational shooting.

D. "Killing Power" versus "Stopping Power"

1. Stopping Power: The ability of a firearm to render an attacking animal incapable of further action.

2. All firearms are potentially lethal, but all are not equal in stopping power.

3. The first priority is to stop hostile action; the second priority is to kill the animal.

E. How do we stop a charging bear?

1. The highest probability of stopping a charging bear is by accurate shot placement and deep penetration to vital organs, such as:

a. Shot to central nervous system (CNS, brain or spinal cord).

b. Heart/lung region (although this might not result in an immediate stop).

c. A shot that crushes hip bones and/or shoulder bones may slow the animal and give opportunity for a shot to the CNS.

2. After a bear is knocked down continue to shoot into vital areas; penetrate the skull if possible.

3. Then, before approaching the animal, wait, calm down, reload and approach from the back side with caution. Do not shoot your firearm empty and then approach the animal with an empty gun. Some hunters and experienced guides have been killed after making this mistake.

F. Where to shoot the bear...

1. If bear is not moving, aim at its head. More likely the bear will be moving and the head will become a difficult, if not impossible, shot for most shooters under stress. The most reliable defensive method is to shoot at the center of mass of the charging animal. The charging bear will be running on all four legs with head down, so center-of-mass becomes the head/heart region. A shot too high may hit the spine; a shot to either side may breakdown the shoulders or hips. A shot too low...? Well, try again--quickly!

2. If the bear falters or stops, keep shooting. Learn to speed-load the firearm you use, so that it need never be shot empty. This technique will be taught at the firing range with appropriate firearms.

VIII. FIREARM SELECTION ("THE BEST BEAR GUN")

A. Relative merits of firearms types. General reference: Meehan and Thilenius (1983)

1. Plethora of firearms types available; tools intended to serve different purposes.

2. The "best" firearm/ammunition combination for defense against bears is dependent upon an individual's ability to handle and shoot the firearm effectively and safely, and on an individual's ability to tolerate and control recoil to allow quick, repeat shots.

3. The most suitable firearm is the one from which multiple shots can be fired accurately and rapidly with the largest, most powerful, and most strongly constructed bullets available.

4. Only commercially loaded ammunition is recommended for reason of liability. High quality ammunition can be reloaded by qualified individuals. But reloading of cartridges for personal defense should not be attempted by novices, nor should ammunition reloaded by another person be used.

5. Remember, if it is necessary to shoot, the first priority is to STOP the bear; most firearms will kill a bear eventually, but not all will stop an attacking bear quickly enough to avoid personal injury.

B. Rifles

1. Bolt and slide-action types are considered best for personal defense against bears.

2. Bolt action rifles have strong actions, they are relatively easy to keep clean, and they are available in large magnum calibers (e.g., .458 Win. Magnum, .375 H&H Magnum, .338 Winchester Magnum). However, the heavy magnums have relatively low magazine capacities, multiple shots are relatively slow, and most bolt actions have a poor potential for rapid reloading.

3. Remington slide-action rifles, available in .30-06, have adequate magazine capacity and allow rapid multiple shots by experienced shooters. With practice, quick reloads can be made. However, the .30-06 has marginal power for defense against the large coastal brown bears and the available models are not too sturdy for sustained field use.

4. Autoloading sporting rifles are more prone to malfunction, require more attention to maintenance, and are less suitable for field carry than bolt and slide-action rifles. Ammunition must be balanced to the gun for reliable function. Military autoloading rifles (e.g., M1 Garand; H&K M91) are too heavy or underpowered for practical use by field personnel.

5. Lever-action rifles, such as the Marlin Model 444, have exposed hammers which can be hazardous to decock with wet hands or when the shooter is under stress. These problems can be overcome with training, however. Lever-actions can make rapid repeat shots and they are relatively quick to reload. But commercially available large caliber ammunition (e.g., .444 Marlin, .45-70) has weakly constructed bullets.

6. If you choose to carry a government-owned rifle from the USGS Central Region, the Firearms Safety Committee recommends the following, in order of preference [Note: The Central Region does not own any .458 Winchester Magnum rifles, which might otherwise be first choice for the person who can deal with its heavy recoil]:

> a. Bolt-action rifles in .375 H&H Magnum or .338 Winchester Magnum with strong, heavy bullets, such as Federal Premium Safari Grade ammunition with Nosler Partition bullets.
>
> b. Bolt-action or slide-action rifles in .30-06 with ammunition such as Federal Premium ammunition with Nosler Partition bullets, or Winchester or Remington 220 grain ammunition.
>
> c. Rifle ammunition is available in most major sporting goods stores. If difficult to find, large caliber ammunition with strong, heavy bullets--such as Federal Premium Safari Grade ammunition--may be available in some sporting goods stores in Anchorage, Alaska.

7. Each individual firearm and ammunition type should be tested by the user for proper function--including proper feeding of cartridges through the magazine--and sighted-in before the user begins field work.

C. Shotguns

1. Shotguns can fire a variety of ammunition; they are useful for signaling, emergency survival situations, and for personal protection against dangerous animals at short range. For example, birdshot can be used to gather small game for emergency food, flares and flash/bangs can be used for signaling, and 1- to 1-1/4-oz. rifled slugs can be used for personal protection.

2. Readily available shotgun slugs are composed of soft lead and are not as strong as jacketed rifle bullets. Slug penetration is limited by weaker construction and larger cross-sectional area.

3. Shotguns with rifle sights are reasonably accurate up to about 100 meters, but energy drops rapidly beyond 40 meters. With large animals such as bears, shotguns are most effective with 12 gauge Brenneke-type slugs at 35 meters or less.

4. Momentum (related to stopping potential) of 12 gauge slugs at distances under 25 yards is approximately equal to the .30-06, but penetration may be considerably less with the 12 gauge slug.

5. The moderate short-range stopping potential of 12 gauge slugs and the relatively greater magazine capacity to support rapid multiple shots afforded by a slide action are assets, however, and make the shotgun an attractive choice for field carry.

6. If shotguns are selected for protection in the field, only firearms of 12 gauge with slide actions and slug barrels with rifle sights are recommended. The USGS has experienced good mechanical reliability with Remington Model 870 shotguns.

7. Recommended shotgun ammunition:

a. Rottweil Brenneke 12 gauge magnum velocity, 2-3/4 inch (or 70 mm), 1-1/8 oz. rifled slugs; or

b. Rottweil Brenneke 12 gauge standard velocity, 2-3/4 inch (or 70 mm), 1 oz. rifled slugs.

[Note: The imported Rottweil Brenneke ammunition, manufactured by Dynamit Nobel, is the only readily available Brenneke-type slug ammunition sold in the U.S.]

c. Foster-type slug ammunition, such as Federal 12 gauge, 2-3/4 inch, 1-1/4 oz. rifled slugs.

d. Buckshot and birdshot should not be used against bears; they lack significant penetration potential and they are likely to only enrage the animal.

D. Handguns

1. All handguns are a poor choice for personal defense against large animals. Handguns are more difficult to shoot accurately and rapidly than long guns. They lack the potential stopping power of either rifles or slug-firing shotguns. Handguns are best employed as a last resort, such as when you have climbed a tree to avoid a bear and the bear begins to climb the tree after you.

2. Pistols (i.e., autoloading handguns) should be avoided for use against large animals because most are less powerful than the .44 Magnum and because they are potentially more dangerous than revolvers in the hands of inexperienced or improperly trained shooters.

3. Single-Action Revolvers: Hammer must be manually cocked before each shot can be fired. Additionally, single-action-only revolvers are slow to reload and appropriate mainly for recreational shooting. Firing in the single-action mode has added safety problems because the gun must be decocked by either firing the gun or lowering the hammer while the trigger is being pulled, an operation that can be dangerous with cold or wet hands.

Some USGS geologists favor the .454 Casull single-action revolver for field duty. Its power approaches that of some high power rifles, but recoil is intense and the cylinder only holds five rounds, which must be loaded and ejected one at a time.

4. Double-Action Revolvers: Can be fired by either manually cocking the hammer and pulling the trigger, or by pulling the trigger to cock and fire in a single operation.

The heavy trigger pull (about 12 to 15 lbs.) common to new double-action revolvers can be safely smoothed and lightened by a competent gunsmith, allowing a person to shoot more effectively. Double-action shooting is more accurate than single-action shooting.

5. Despite these cautions, a number of USGS field personnel choose to carry handguns for personal protection in bear country. If you are one of these people, the Firearms Safety Committee recommends that you carry a double-action revolver (such as Smith and Wesson or Ruger Redhawk) with barrel length of at least 6 inches, in .44 Magnum caliber, with full metal jacketed ammunition.

IX. BEARS: DISTRIBUTION, HABITAT, AND BEHAVIOR

[General reference, Herrero (1985)]

A. Three species of bears

1. *Ursus arctos*, inland grizzly and coastal brown bear; *Ursus americanus*, black bear--may also be other colors; *Ursus maritimus*, polar bear.

2. Geographic ranges of bear species.

[See bear distribution maps in Herrero (1985): Black bears, page 95; grizzly bears, page 14.]

B. Bear behavior

1. Widely studied by research biologists; abundant literature available which shows

a. Individual bears have different personalities.

b. Bears will usually avoid humans if given a chance. Free-ranging animals have rules of behavior: they try to minimize violent (injury producing) behavior.

c. Bears may range over large territory.

1) Mountain grizzly male, 414 square kilometers.

2) Mountain grizzly female, 73 square kilometers.

d. Bears achieve 95% of body size in 6-8 years.

e. Size: Mountain grizzly 200-600 lbs.; some Brown bears up to 1400 lbs and 9-ft tall standing on back legs.

f. Some 16 year olds known; fewer reported older.

g. Seasonal movements

1) Spring, most travel.

2) Summer, streams for salmon.

3) Late summer, disperse for berries.

4) Fall & early winter, found along protected stream courses, or in dens.

h. Bears have a great sense of smell, good hearing, and may have better sight than we assume.

i. Bears are fast (up to about 35 m/sec.), agile, and unbelievably strong.

j. Grizzly at home in dense brush and open meadows; black bear prefers forest habitat.

k. Bears, like humans, follow paths of least resistance; often travel by well-beaten paths.

l. A bear may move around a lot, or may stay in same feeding area up to a week--depends in major part on the availability of food.

C. Bear-human contacts

1. Data mostly from National Parks. Studied extensively by Steve Herrero (1970, 1985), wildlife biologist, University of Calgary, Alberta.

2. Remember, the human is the "wild animal" in bear country; many hostile actions by bears are probably defensive.

3. Human injuries by grizzly bears: Statistics for 97 years (to 1970):

a. 5 deaths.

b. 32 accidents with hospital more than 1 day.

c. 40 accidents w/hospital less than 1 day.

d. Rate of injury increased from 1960 to present; correlates with number of visitors to parks.

1) Injury rate is one injury per 1.5 million visitors, on average.

2) Trends same for black bears.

4. Despite low injury rates: injuries can be horrendous; field personnel are at risk and need to learn personal defensive behavior.

D. Human activities associated with bear attacks

1. 98% of all injuries happen

a. Hiking, 31%; camping in developed areas, 56%; camping back country areas, 5%; PROVOKING BEAR, 6%.

2. Hiking (31%)

a. Sow with cubs, 83% (54% while human is running away).

b. Other and unknown, 17%.

3. Camping in developed areas (56%)

a. Sow with cubs, 21%.

b. Unknown, 65%.

c. Other, 14%.

4. Camping in back country areas (5%)

a. Sow with cubs, 75% (n = 3).

b. Female, no cubs, 25% (n = 1).

5. Provoking bears (6%)

a. Sow with cubs, 100%.

6. USGS-Branch of Alaskan Geology reported bear kills.

a. N = 24 in about 50 years.

b. 65% in camp (13 black, 2 grizzly).

c. 35% while hiking on field traverses (7 grizzly, 2 black).

E. Bear signs

1. Torn tree stumps or rotten wood.

2. Dug up or turned over rocks.

3. Pits or holes from digging for roots, insects, or small rodents. Look at vegetation dug up versus surrounding vegetation.

4. Bear tracks: Front feet seldom show imprints of horny heel, bears walk more on the toes of their front feet.

a. Grizzly tracks are larger than black bear tracks.

b. Claw marks--longer distance between the toes and claw imprints in grizzlies.

5. Bear droppings or scat, differ if eating red meat and fish versus vegetation. Beware of areas with lots of scat which normally means either bedding area or prolonged feeding.

6. Bear kills, signs include birds on alert, as well as odor.

7. Berry bushes with numerous broken branches.

F. Aggressive behavior

1. Bear attacks ... motivation:

a. Sow defends cubs (blacks & grizzlies have different defensive behavior).

1) Black bear sows often push cubs up trees for defense.

2) Grizzly sow will often stand ground or attack in defense of cubs; grizzlies are poor tree climbers.

b. Defend food supply (dead animal used as food source).

c. Violation of "individual space."

d. Rarely, bears may become predacious; may occur when food scarce, or when animals are old or diseased.

2. Aggressive characteristics (Tate and Pelton, 1983):

a. Low moan or growl.

b. Blowing or huffing.

c. Running toward people; head up may indicate false charge.

d. Swatting at ground or object.

e. Charge at particular person, head and shoulders low.

f. Bite, snap, clacking of teeth.

g. Swaying of head from side to side.

h. Snort or woof.

i. Ears lowered, flat against head.

3. Precautions in bear country

a. Be aware: Remember that the best defense is your brain.

b. If possible, ask questions about current bear activity from locals, rangers, etc.

c. Make noise: bear horns, yodel, sing; bells poor. Remember that near streams or in heavy wind, noise may be muffled. Also sound may attract cubs and young adults.

d. Be aware of a good climbing tree. Black bears can climb trees; grizzlies are poor climbers.

e. Think of what you will do if injured. Be prepared to handle such emergencies.

f. Think about how to avoid encounters before you enter the field.

g. Radio communication: Use it to warn others and to let them know your location.

h. Use binoculars to scan area of field work.

i. Be especially alert along stream courses; especially if wind is blowing in your face; walk slowly; carry firearm in the ready position with sling removed.

j. Try to stay up-wind of bear if possible so it can catch your scent, which usually causes them to run.

k. If approaching by helicopter, watch for bear sign from air; but don't assume that bears will always be seen from the air.

l. Carry a firearm you are proficient in using for personal defense; or work with someone who has firearm; or ask for a different assignment.

m. Photograph bears from at least 300 meters; use a telephoto lens.

n. Stay away from bear kills and other dead animals, bears commonly stay nearby; avoid bear trails; avoid forest-meadow edges.

o. Do not take pets to the field.

p. Never approach a bear for any reason!

q. Never leave your firearm unattended for any reason.

r. Never hike alone.

4. What to do if attacked

a. Do not panic.

b. Do not run or show aggression.

c. Climb a tree or stand your ground if no tree is available; slowly back away if possible.

d. Make noise; let the bear know where you are. Some people advocate firing a shot over the bear's head; avoid shooting in front of bear because it may cause debris to strike and anger the bear. Remember that a bear is swift and if you shoot a warning shot and the bear charges, you have to recover from the recoil, aim, and fire again, sacrificing valuable time. Also, you will have wasted one round from your magazine.

5. If you do not have a firearm

a. Do not play dead before the attack.

b. Try to climb a tree, as high as possible (Remember a bear can run 35 m/sec.).

c. Talk to bear in a low voice, but avoid eye contact.

d. Keep your pack on if possible; if attacked, roll into fetal position and protect neck and other vital areas as much as possible.

e. Flares may be used to scare the bear if you are unarmed. This may or may not work.

6. Non-aggressive bear behavior

a. Standing on hind legs. Indicates inquisitiveness, curiosity, sensing immediate environment.

b. Approaching with head erect.

c. Ears erect.

d. Beware that bear may turn hostile very quickly.

H. Camp etiquette: Plan properly located and constructed camp grounds.

1. Camp in the open; bears prefer cover.

2. Pitch tents in a row, not in a circle, which localize dangerous lines of fire if a bear must be shot in camp.

3. Keep camp clean.

4. Cook at least 100 meters away from and downwind from sleeping areas; never cook in tent, even in winter.

5. Wash all dishes immediately after use.

6. Food storage:

a. Store food away from sleeping and eating areas. Build a food cache, or use special containers.

b. Hang food in trees out of reach of bears with a rope, on a platform, or ladder.

c. In places like the North Slope, use boulders, cliffs, crevices, waterproof containers, ABS plastic containers. In Denali National Park, use double plastic bags.

d. Do not bury garbage; burn it and carry out the remainder.

7. Use tent for sleeping; it provides some protection.

8. Wash every night if possible.

9. Women should be especially careful during menstruation; keep clean to cut down odors; use tampons, not pads. Some data suggest that menstruating women attract bears.

Case Study: In a study of polar bear behavior (Cushing, 1983), seal meat, other food, used tampons, unused tampons, and human blood were used as bait. Results: polar bears ate used tampons and seal meat, but not other food, nor human blood. Bear behavior was the same when food samples were left visible on ground surface and when buried. Whether results apply to grizzly and black bears is problematic, but conservative human behavior is to assume they do.

X. RANGE AND FIELD EXERCISES

A. The three-day Firearms Safety Training Course is taught at a private facility near Sedalia, Colorado, about 20 miles south of Denver. The facility contains a 50 meter conventional range and a field area approximately 300 by 400 meters used for shooting exercises that simulate actual field conditions.

B. Range Exercises

1. Focus of the training is "reactive defensive shooting" (RDS) which differs from proactive types of shooting such as hunting and recreational target shooting. In RDS, we strive to develop a dynamic balance between power, accuracy, and speed. Power is provided by the firearm and cartridge, accuracy and speed by the shooter. The balance may differ among students depending upon individual physical characteristics, motivation, and other factors.

2. Initially, students are taught marksmanship on stationary, simulated bear targets which are about two-thirds life size; no bullseye targets are used. Shooting distances range from about 5 to 50 meters; distances within which bears may become a physical threat.

3. Students are drilled in the proper gun mount, grip, sight alignment, trigger release, recoil control, loading, unloading, reloading under stress, and sling carrying positions.

4. Students have an opportunity to fire .30-06, .338 Winchester Magnum, and .375 H&H Magnum rifles; 12 gauge slide-action shotguns; and .44 Magnum S&W revolvers.

C. Field Exercises

1. The "Charging Bear" Exercise

a. On the last day of class students practice shooting on a simulated "charging bear" target which consists of a cable-mounted bear target that is driven by an engine and pulley system. When activated, the target moves toward the shooter at about 20 meters per second. The exercise simulates a "worst case" situation in which the student is suddenly confronted with a bear charging at high speed directly toward the student.

b. The student begins the exercise in the "field ready condition." That is, the firearm's magazine is fully charged, bolt is closed on an empty chamber, hammer is uncocked, safety is on, and the rifle or shotgun is slung on the shoulder in a muzzle-up position.

c. On command, the "charging bear" target moves toward the shooter. During the 4 seconds it takes the target to reach the shooter, he or she must mount the gun, cycle the action, disengage the safety, and make as many quick, accurate shoots as possible into the vital areas of the simulated bear.

d. Some shooters achieve 3 or 4 shots to the head/chest area with a slide-action gun, or 2 to 3 shots with a bolt action gun. Nearly all students are able to make at least one hit to the vital regions of the simulated bear in 4 seconds. We strive for speed, but only to the extent that safety and accuracy are maintained.

2. The "Brush Run" Exercise

a. The "Brush Run" is to USGS training as "Hogan's Alley" is to law enforcement training: They both simulate hostile and non-hostile problems that may be encountered in actual field situations.

b. The Brush Run is conducted on the last day of training after students have completed the Charging Bear exercise. The Charging Bear exercise tests manipulation and marksmanship skills, whereas the Brush Run includes these and adds the important element of mental preparedness for defensive situations. The Brush Run is designed for the student to apply all the information learned about firearms safety, bear behavior, threat evaluation and response, and shooting skills as may be appropriate to a given situation.

c. The exercise is conducted on a hillside with about 20 meters of topographic relief. The area used is approximately 300 by 400 meters and covered with tall, dense oak brush.

d. Individual students enter on a trail accompanied by a senior instructor. A rifle or shotgun is carried in field ready condition and slung either muzzle up on the dominant shoulder, or muzzle down on the opposite shoulder. Some students wear backpacks, as they would on field duty, which helps increase their sense of realism.

e. Before entering the Brush Run, students are told only that they are simulating a hike in bear country; they should respond to problems based on the principles they have learned in the course.

f. The Brush Run contains four "problems:"

Problem 1. While hiking along a trail, the student sees two bear cubs. Proper response is to assume the mother bear is nearby; unsling and bring the firearm to the ready position, operate the action to load the chamber, safety on, finger out of the trigger guard, and slowly back away from the cubs while maintaining a 360 degree alert. This is a no-shoot situation because by themselves the cubs are not a threat. However, the threat level may change quickly if the sow bear appears on the scene ready to protect her cubs.

This scenario simulates a general situation that accounts for about 70% of human/bear encounters which lead to injury. Few students fail to make a proper response to this scenario.

Problem 2. While hiking along the trail, the student observes an attacking bear at a distance of about 20 meters. Proper response is for the student to unsling and bring the firearms to the ready position, operate the action to load the chamber, and determine whether the line of fire is safe. If the line of fire is safe, the shooter should release the safety, shoot three shots into the head/chest region of the bear, reload, and slowly move toward the bear (with finger outside the trigger guard) to verify the condition of the bear. The bear is assumed to have been downed by the first three shots, but not necessarily killed.

Most students perform well on this scenario. Some have trouble operating the action rapidly under stress; a few forget to reload before approaching the downed bear. Sometimes students will have one or more wild shots, indicating they failed to maintain proper sight alignment (i.e., they were looking at the target, not the sights). When approaching the bear target, some students take an extra shot to the head as insurance, a good practice.

Problem 3. The student is hiking along the trail and observes a standing bear in the distance. Proper response is to unsling and bring the firearm to the ready position, operate the action to load the chamber, safety on, finger outside the trigger guard, and slowly back away from the bear, being careful to maintain stable footing. This is a no-shoot situation because a standing bear is not hostile, although in real life it may become hostile very quickly. Most students do well in this scenario.

Problem 4. A life-like photographic target of a hostile bear is set about 20 to 30 meters from a blind corner along the trail. Beyond the bear target, in the line of fire, is a human target which simulates another member of the field party. At the point in the trail where the bear target first becomes visible, the human target is partially hidden from view by oak brush. Proper response is for the student to unsling, bring the firearm to the ready position while determining whether the line of fire is safe (Safety Rule 4), and operate the action to load the chamber. Upon seeing a human in the line of fire, the student should move sideways to increase the angle between the bear and human, release the safety, shoot the bear several times in the head/chest region, and reload while remaining in the ready position.

g. The Brush Run generates a great amount of emotional stress. Experience shows that people operating firearms under stress tend to unconsciously revert to learned reflex behavior: If proper shooting habits have been learned and programmed into "muscle memory," results are usually satisfactory. But if people have

developed improper shooting habits (as is sometimes true with self-taught shooters), under stress, they tend to revert to their old bad habits.

3. The Charging Bear and Brush Run exercises provide reality testing for students. All students learn the difficulty of making accurate hits on an attacking bear in a short time framework. Students learn about their own ability to manipulate the gun under stress--a point that is nearly impossible to teach on a conventional shooting range. Also, the exercises instill the importance of remaining alert as the best defense against a sudden encounter with a hostile bear.

XI. FIREARMS CLEANING AND MAINTENANCE

A. Proper cleaning and maintenance are essential if a firearm is to function properly: A gun that does not function properly when needed is merely an "expensive club".

B. Safety precautions during gun cleaning

1. Inevitably, the muzzle will cover (point at) you or someone nearby while you are cleaning the gun. Special care is required to conduct cleaning safely. Before starting:

a. Make sure the weapon is unloaded.

b. Double check your pockets and remove all ammunition.

c. Remove all ammunition from the area (room, tent, etc.) where the cleaning will be done. Put ammunition away in a trunk or bag.

d. Check your weapon again to make doubly sure that it is unloaded.

e. Do not consume alcohol or drugs while cleaning guns. This includes prescription drugs that may alter judgment or concentration.

C. Field stripping the firearm

1. Become familiar with mechanical characteristics of your firearm before leaving for the field. Acquire proper instruction manual for field stripping, if necessary.

2. Field strip (disassemble) only the larger components (barrel-receiver, slide, bolt, etc.).

3. Avoid dismantling intricate parts, such as trigger housing, under field conditions; this may result in loss of small essential parts, rendering your firearms unusable.

D. Field cleaning essentials

1. Cleaning kit should include

a. Flexible cleaning rod or multiple-piece break-down rod of proper caliber.

b. Cleaning patches or pieces of cloth.

c. Bronze brush for scouring barrel; old tooth brush for general purpose cleaning.

d. Moisture-displacing solvent/lubricant: Recommend Teflon-based lubricants such as Tri-Flo or Break Free in spray can or plastic squeeze bottle. WD-40 can also be used; it is a poor lubricant but displaces moisture well.

e. Electrician's tape, for covering muzzle.

E. Always cover muzzle with tape while in the field.

1. Helps keep debris out of barrel.

2. When gun is fired, the tape is blown off by gases exiting the barrel. Care should be taken that no foreign material, including pieces of tape, gets inside the barrel.

F. Care of a water-soaked firearm

1. Unload and hang or prop up vertically, muzzle down. If soaked with salt water, first flush with fresh water. Then flush out water with spray can of lubricant such as WD-40; remove excess with cloth; field strip and clean at first opportunity.

2. Retape muzzle (extra tape can be wrapped around barrel so as to be readily available if needed).

G. Squib load (faulty ammunition resulting from wet or oil-soaked powder, or no powder in cartridge case).

1. Often will leave bullet lodged in barrel; very dangerous if gun is fired again--may burst barrel and cause injury.

2. Tap bullet our of barrel with cleaning rod.

3. Retape muzzle.

H. General cleaning instructions:

1. Insert rod from chamber end.

2. Scrub barrel with bronze brush wet with bore-cleaning solvent; use toothbrush or cotton swabs to clean crevices.

3. Run solvent-wet patches down bore until clean.

4. Remove excess solvent with dry patches.

5. Lightly oil bore by running an oiled patch down the barrel.

6. Clean and lightly oil other parts of weapon.

7. Too much oil may cause overpressure when gun is fired; it also attracts grit and dust.

8. Wipe outside of weapon with oily cloth to displace moisture and inhibit rust.

9. For all USGS firearms users--All firearms should be cleaned and lightly oiled before they are turned in to the Geologic Division armory after completion of field work.

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