THE SPECIAL FORCES HANDBOOK

This handbook contains useful information for the special forces man and is designed to assist you in the performance of your duties.

The material contained herein reflects doctrine as currently taught at the Special Warfare School and is derived from materials intended for School use, prepared for resident instruction at the Special Warfare School.

Suggestions and recommendations for changes or corrections should be submitted directly to the Commandant, U.S. Army Special Warfare School, Fort Bragg, North Carolina. ATTENTION: Director of Instruction.

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CHAPTER 1. GENERAL

I. MISSION OF SPECIAL FORCES:

a. To plan and conduct unconventional warfare operations in areas not under friendly control.

b. To organise, equip, train, and direct indigenous forces in the conduct of guerrilla warfare.

c. To train, advise, and assist indigenous forces in the conduct of counterinsurgency and counterguerrilla operations in support of U.S. cold war objectives.

d. To perform other special forces missions as may be directed or as may be inherent in or essential to the primary mission of guerrilla warfare.

II. UNCONVENTIONAL WARFARE IS COMPOSED OF THE INTERRELATED FIELDS OF:

a. Guerrilla warfare.
III. MISSIONS OF GUERRILLA FORCES:

a. Primary:

1. Intercept enemy lines of communication.
2. Interdict enemy installations and centers of war production, and conduct other offensive operations in support of conventional military operations.

b. Supporting Tasks:

1. Intelligence.
2. Psychological warfare.
3. Evasion and escape.
4. Subversion against hostile states.

IV. COMPOSITION OF OPERATIONAL DETACHMENTS:

a. Operational Detachment A:

<table>
<thead>
<tr>
<th>POSITION</th>
<th>RANK/GRADE</th>
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<td>Captain</td>
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<td>Lt.</td>
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<td>E-7</td>
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<td>E-7</td>
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<tr>
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<td>SMAJ</td>
<td>E-9</td>
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<tr>
<td>S2</td>
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<td>S3</td>
<td>Captain</td>
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<td>S4</td>
<td>Captain</td>
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<td>E-7</td>
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<td>MEDICAL SP</td>
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<td>RAD OPR (4)</td>
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b. Operational Detachment C:

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</tr>
<tr>
<td>S3</td>
<td>Captain</td>
</tr>
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<td>S4</td>
<td>Captain</td>
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<td>ASST SUPPLY SGT</td>
<td>E-7</td>
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<td>E-7</td>
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<tr>
<td>RAD OPR (4)</td>
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<td>RAD REPAIRMAN</td>
<td>E-4</td>
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CHAPTER 2

TACTICS

ESTIMATE OF THE SITUATION

1. MISSION: Mission assigned and analysis thereof to include sequence of tasks(s) to be performed and the purpose.

2. SITUATION AND COURSES OF ACTION:

a. Considerations affecting possible courses of action.
   1. Characteristics of the area of operation: weather, terrain, other.
   2. Relative combat power: enemy situation and friendly situation.

b. Enemy capabilities.


3. ANALYSIS:

a. Select enemy capabilities.

b. List advantages and disadvantages.

   1. Course of action vs enemy capabilities.
   2. Course of action vs enemy capabilities.

4. COMPARISON:
5. RECOMMENDATION/DECISION:

Formal statement of the course of action recommended/adopted.

II-1

OPERATION ORDER

Task Organization: Includes the task subdivisions or tactical components comprising the command and reflects the unit of organization for combat.

1. SITUATION:

a. Enemy Forces: situation, capabilities, indications.

b. Friendly Forces: missions and locations of higher adjacent, supporting and reinforcing units.

c. Attachments and Detachments: units attached to or detached from the unit issuing the order, for the operation concerned. Effective time of attachment or detachment is indicated when other than the time of the order.

2. MISSION:

Based on the order of the next higher headquarters and the commander's analysis of his mission, this paragraph contains a clear, concise statement of task(s) to be accomplished by the unit issuing the order and its purpose.

3. EXECUTION:

a. Concept of Operations.

b. Tactical mission of unit.

c. Coordinating Instruction: Tactical instructions and details of coordination applicable to two or more elements of the command.

4. ADMINISTRATION AND LOGISTICS:

Matters concerning supply, transportation, service, labor, medical evacuation and hospitalization, personnel, civil affairs and miscellaneous.

5. COMMAND AND SIGNAL:

a. Signal.

b. Command:

(1) Chain of command.

(2) Location of patrol leader and assistant patrol leader information.

ANNEXES:

a. Operation overlay.

b. Fire support plan.

DISTRIBUTION:

II-2

II. PATROL LEADER'S ORDER

1. SITUATION:

a. Enemy forces: Weather, terrain, identification, location, activity, strength.

b. Friendly Forces: Mission of next higher unit, location and planned actions of units on right and left, fire support available for patrol, mission and routes of other patrols.

c. Attachments and Detachments.

2. MISSION: What the patrol is going to accomplish?

3. EXECUTION: (Subparagraph for each subordinate unit.)

a. Concept of operation.

b. Specific duties of elements, teams, and individuals.

c. Coordinating instructions:

(1) Time of departure and return.

(2) Formation and order of movement.

(3) Route and alternate route of return.

(4) Identification techniques used when departing and reentering the friendly area (s).

(5) Rallying points and action at rallying points.

(6) Location and actions at mission support sites.

(7) Actions on enemy contact.

(8) Actions at danger areas.

(9) Actions at objective.

(10) Rehearsals and inspections.

(11) Debriefing.

4. ADMINISTRATION AND LOGISTICS:

a. Rations.

b. Arms and ammunition.

c. Uniform and equipment (State which member will carry and use)

d. Method of handling wounded and prisoners.

5. COMMAND AND SIGNAL:

a. Signal.

b. Command:

(1) Chain of command.

(2) Location of patrol leader and assistant patrol leader information.

III. PATROL WARNING ORDER

The patrol warning order should consist of the following items of information:

a. A brief statement of the enemy and friendly situation.

b. Mission of the patrol.

c. General instructions.

(1) General and special organization.

(2) Uniform and equipment common to all, to include identification and camouflage measures.

(3) Weapons, ammunition, and equipment each member will carry.

(4) Who will accompany patrol leader on reconnaissance and who will supervise patrol members' preparation during patrol leader's absence.

(5) Instructions for obtaining rations, water, weapons, ammunition and equipment.

(6) The chain of command.

(7) A time schedule for the patrol's guidance. At a minimum, include meal times and the time, place, and uniform for receiving the patrol leader's order.
IV. TROOP LEADING PROCEDURE

1. Begin planning:
   a. Study terrain from map, sketch on aerial photo for:
      (1) Critical terrain features.
      (2) Observation and fields of fire.
      (3) Cover and concealment.
      (4) Obstacles.
      (5) Routes of approach.
   b. Make quick estimate of situation (thorough as time permits).
   c. Make preliminary plan.

2. Arrange for:
   a. Movement of unit (where, when, how).
   b. Reconnaissance (select route, schedule, persons to take along, use of subordinates).
   c. Issue of order (notify subordinate leaders of time and place).
   d. Coordination (adjacent and supporting units).

3. Make reconnaissance (examine the ground—see 1a above, if necessary changes preliminary plan).

4. Complete plan (receive recommendations, complete estimates, change preliminary plan as necessary, prepare order).

5. Issue order (include orientation on terrain if possible).


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**THE GUEVARA BASE**

**ALTERNATE AREAS**

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**Figure 1**

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**TYPICAL ASKETE POSITION**

**Figure 1**

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**Figure 2**

An example of the organization for movement of a raid force.
CHAPTER 3
DEMOlITIONS

I. INTRODUCTION: The following information pertaining to field engineering and demolitions is intended to supplement, but not to replace, that contained in FM 5-25, "Explosives and Demolitions," and FM 5-34 "Engineer Field Data." These field manuals, GTA 3-14, The Demolition Card and GTA 3-11, The Mine Card, are convenient references that should be obtained and used in conjunction with this section of the handbook.

III-2

<table>
<thead>
<tr>
<th>USA</th>
<th>TNT</th>
<th>CYCLONITE *C3-4</th>
<th>Tetryl*TET-</th>
<th>PETN</th>
<th>*Pentolite</th>
<th>*Picric Acid</th>
<th>*Ammonite</th>
<th>Amatol</th>
</tr>
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<tr>
<td>BRITISH</td>
<td>TNT</td>
<td>*Trolit</td>
<td>Plastic Ex-</td>
<td>Plastic</td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
</tr>
<tr>
<td>FRENCH</td>
<td>TOLITE</td>
<td></td>
<td></td>
<td></td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
</tr>
<tr>
<td>GERMAN</td>
<td>FULL FOLYER</td>
<td>SPRING MUNDA</td>
<td>*CYCLONITE</td>
<td>*Hexogen</td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
</tr>
<tr>
<td>ITALIAN</td>
<td>TITOLI</td>
<td>*TOL-</td>
<td></td>
<td></td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
</tr>
<tr>
<td>JAPANESE</td>
<td>CAT-</td>
<td>SUTRAK</td>
<td>KOSHITUSUKI-</td>
<td>*CYCLONITE</td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
</tr>
<tr>
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<td>TOL*TRYTL</td>
<td>REKOGN</td>
<td>*KAMMITE</td>
<td>TETP</td>
<td>PETN</td>
<td>*Pentolite</td>
<td>*Cord Tex</td>
<td>*Picric Acid</td>
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</table>

*Compounded with other explosives  **Not known whether this is demolition explosive or a detonating cord.

III-2
TABLE II. BASIC DEMOLITION FORMULAS

<table>
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<tr>
<th>MATERIAL</th>
<th>R IN FEET</th>
<th>R IN METERS</th>
<th>K FACTOR</th>
<th>F-TNT</th>
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<tbody>
<tr>
<td>Normal Explosives</td>
<td>25</td>
<td>5</td>
<td>1.5</td>
<td>21.0</td>
</tr>
<tr>
<td>Tall Charges</td>
<td>50</td>
<td>10</td>
<td>1.5</td>
<td>21.0</td>
</tr>
<tr>
<td>Detonating Cord</td>
<td>15</td>
<td>15</td>
<td>1.5</td>
<td>21.0</td>
</tr>
<tr>
<td>Mortar</td>
<td>10</td>
<td>2.5</td>
<td>1.5</td>
<td>21.0</td>
</tr>
<tr>
<td>Black Powder</td>
<td>10</td>
<td>2.5</td>
<td>1.5</td>
<td>21.0</td>
</tr>
</tbody>
</table>

**Steel, Structural:**

\[ K = \frac{1}{\lambda} \]

**Steel, Wood, Bars, Cables**

\[ K = \frac{d}{2} \]

**Wood, External**

\[ K = \frac{d}{8} \]

**Wood, Internal**

\[ K = \frac{d}{16} \]

**Pressure**

\[ P = 2\pi F \]

**Breaching**

\[ P = \frac{N}{C} \]

**Detonation Charge**

Three quarter pounds of plastic explosive, either C3, C4 or their equivalent, to cut the standard rail (60 lbs. per yard). One-third of the standard issue plastic demolition block is a convenient unit of measure. A series of three quarter pound charges is arranged on the web of the rail as diagrammed in Figure 1. The series of charges should not bridge the flange. One charge is placed directly over each tie on the selected 20 feet of rail. This will result in removing all rail, at least partially breaking the ties directly under the rail, and creating some minor cracking of the ballast. Standard center line spacing is 22 1/2 inches; however, variations run from 18 inches on up to 3 feet. Lack of specific information on the tie spacing, the distance between prepared charges is based on 18 inch measurement which results in placing 15 of the three quarter pound charges for each derailment series on a continuous detonating cord main line. The detonating cord main line to which the individual charges are attached is 23 feet in length to provide approximately a foot tall at railhead for quick attachment of a firing system. A triple roll knot for each three quarter pound charge is fixed on the main line as diagrammed in Figure 2. These knots are arranged roughly on 18 inch center to coincide with the anticipated tie spacing. They are arranged to insure a snug continuous contact with the main line but loose enough to slide; thus making it possible to make on target adjustments for variations in tie spacing. The individual three quarter pound charges are finally molded around the triple roll knot. They must be sufficiently wrapped to withstand the necessary rough handling in bringing them on target and to also insure that the charge and knot will slide as an integral unit.

**Rail Cuts**

While single rail cuts have a baringing or nuisance value, we will usually be concerned with cuts designed to derail a train. In order to insure the derailment of a modern locomotive it is necessary to remove a length of rail equal to the length of the fixed wheel base of the locomotive. The weight of the locomotive is counterbalanced in such a way that the removal of rail less than the length of the fixed wheelbase may not result in derailment.

\[ a \]

Twenty-foot pop technique. World War II experience and related tests have established that a charge sufficient to remove 20 feet of rail will result in positive derailment of a locomotive under most operational situations. The most effective cut is on the outside rail of a curve. Where two or more tracks parallel, derailment should be made in such a manner that a train, when wrecked rounding a curve on the inside track, will obstruct all tracks. When derailment is attempted on a straight stretch of a multiple track line, attack should always be made on an inside rail. Note that in all cases only one of the two rails of a track is attacked.
c. Firing Systems.

(1) A standard electric firing system is best for continuous and immediate control over initiating the charge. A standard non-electric system may also be used and timed to insure that the charge explodes just in front of the train; however, both these systems require the presence of an agent at the scene of operations.

(2) All the military booby-trap firing devices can be used to initiate the charge through the movement of the oncoming train. Home made firing devices employing the mechanical principles of the military issue booby-traps can be employed. An electrical blasting cap system may be activated with a flashlight battery used as a simple, field-improvised switch that is closed by the movement of the train. If a large quantity of explosive is to be used, the firing system is set up to initiate the charge immediately in front of the oncoming locomotive, not under the locomotive. Eighty-pound or less rail (5 inches or less in height) takes 1/2 pound to cut. Over 80 pound rail (over 5 inches in height) takes 1 pound to cut.

**Manual Track Distortion**

(With a jumper wire, provide a path for the electrical current passing through most rails. The wire that normally lies between rails will be broken by this manual displacement.)

(3) Only plastic explosive should be used, either C8 or C4. Information has been developed for breaching reinforced concrete targets from 1 through 8 feet in thickness. For maximum effect, the charge should be placed a distance equal to the thickness of the target above the base (or above the ground level). Charges placed at the base of a slab will still work but in study they produced craters 25 percent smaller than those placed above the ground.
A charge should be constructed to be as close to square as possible to yield optimal results. Charges should be placed either from one corner or from the opposite corner. Close contact with the target is required for the best results. Do not remove from the charge thickness indicated below. Use the M-17 kit as issued when possible to facilitate securing the charge in place. It is necessary to cut the block, cut them with care so that the density of the explosive is not affected.

### Table 3. Charge Sizes

<table>
<thead>
<tr>
<th>Concrete Thickness</th>
<th>Charge Size</th>
<th>Charge Thickness</th>
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<tr>
<td>(in feet)</td>
<td>(in cm)</td>
<td>(in cm Blocks)</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>1 Block (C)</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>1 Block</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>1 Block</td>
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<td>4</td>
<td>12</td>
<td>1 Block</td>
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<tr>
<td>(Equal M-17 Kit)</td>
<td>5</td>
<td>2 Blocks (C)</td>
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<td>6</td>
<td>8</td>
<td>2 Blocks</td>
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<td>7</td>
<td>12</td>
<td>2 Blocks</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>2 Blocks</td>
</tr>
</tbody>
</table>

**NOTE:**

Using this standard blasting technique with an undamaged charge above the ground would require 116 lbs of TNT to break a 4 ft wall. Using the above technique, it would require 50 lbs of C. For a 1 ft target the standard method uses 32 lbs of Tnt. This method uses 260 lbs of C.

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**Figure 4** Square Charge

**III-10**

**Cratering Technique.** A delay cratering technique has been developed that produces excellent results, and should be considered if time and materials are available. The charges themselves should be either the standard 40-pound cratering charge, or 20 to 40 pounds of C depending on the depth and diameter of the bore hole. Depth of the hole should be 4 to 5 feet.

---

**Figure 5** Cratering Technique

**III-11**

The line of two charges above should be primed to be detonated simultaneously. The line of charges should all be detonated from one to two seconds after the first charge detonates. Delay can be achieved in a variety of ways, but two separate electrical firing systems are probably the easiest. An expedient method of quickly sticking the bore holes themselves is to set up five 15 pound shaped charges (M2A3) over the desired locations. They should be provided with an improvised 30 inch standoff and all be detonated together. The effect of the delay in the cratering operation is to begin in move a large amount of earth around the first two charges, and then before it can fall back into the hole, the second line of charges displaces it entirely. The resulting teardrop shaped crater is very steep sided on the bottom end (the side having the three delay charges).

---

IV. Improved Devices

a. Bangalore torpedoes, if available, can be extremely effective if employed in an antipersonnel role. Best results are obtained if the Bangalore is planted upright in the ground so that the fragmentation effect will radiate out in 360 degrees.

b. The fragmentation hand grenade is a versatile weapon that lends itself to a wide variety of booby trapping actions. One of the simplest booby traps is in the grenade-in-a-can. The shipping container or can is affixed to a tree or other permanent object. The grenade, with pull ring removed, is placed in the can so that the arming lever is held down by the can. A string or wire is then placed so that the victim will pull the grenade from the can, releasing the lever and detonating the grenade.

c. Improvising electrical booby trap firing devices. Each of the following simple booby traps can be used in conjunction with a wide variety of casually produced charges, from the 3.5 inch rocket, fired by expedient electrical means, to the Bangalore torpedo primed to be detonated in an antipersonnel role.

d. Open loop. The open loop arrangement shown is the ONLY break in an otherwise complete electrical circuit. A wide variety of actions on the part of the victim could result in pulling the two bare ends of the wire together.

---

**Figure 6, 7, 8**

**III-12**

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**Figure 10** Open Loop

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**Figure 11** Clothscape

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**III-13**

a. Expedient firing of 3.5 inch rocket. The following techniques are one method for firing the rocket electrically. Either the cardboard shipping container or a V-shaped wooden trough may be used as an expedient launcher, with the trough being preferred if available.

1. The rocket is prepared for electrical firing by bonding the two wires in the nozzle and fin assembly that are coated with clear plastic. (The other green, red, and blue wires are disregarded). After bonding the ends of the clear plastic wires, to provide a good contact for splicing into the firing wire, the connection is made and preferably taped. Experience has indicated that the electrical splices in the preferable splices to be used without any adverse affect on rocket accuracy.

2. The bare-wired safety band is removed and the rocket is placed on the trough so that the bare-wired safety will face a side of the trough during firing. The shorting clip is removed, the rocket is aimed, an electrical power source is provided and the rocket is fired.

3. Obviously results comparable to those obtained by using the launcher should not be expected. As with all expedient demolition work, trial and error experimentation is stressed. As experienced demolitionist, can reliably hit a 55 gallon drum, a relatively small target, up to a range of 40 to 50 yards. In an antitank role, satisfactory results could be expected up to 150 yards. The rocket firing can be controlled by the operator, or can be affected by a wide variety of electrical booby trapping techniques. This expedient use of the rocket of course lends itself equally well to employment in an antipersonnel role.
(4) Power sources can be a 12-volt battery or any of the following dry cell batteries: BA-187/U, BA-270/U, BA-279/U or combinations of the BA-39/U.

(5) Safety precautions should include all of those associated with electrical fuze as outlined in FM 5-35, Explosives and Demolitions. Although it would be an extremely rare occurrence, we should operate on the assumption that the rocket may blow up on the launching site and take appropriate precautions to prevent injury from such accidents.

III-14

f. Expedition firing of 3.5 rocket non-electrically.

1. Remove all wires from fuze assembly.

2. Remove the plastic cone from fuze assembly.

3. Place matchheads or other burning material in contact with the ends of the track of propellant.

4. Tape matches around end of fuse.

5. Place base flush against perforated disc, and among matchheads already in the fuze.

6. Remove the base-rolling safety pin in depressed position against side of impressed firing platform.

V. ADVANCED TECHNIQUES. Charges constructed employing advanced techniques generally produce more positive results while using less explosive than required by conventional or standard formulas. Disadvantages of advanced technique charges are that they usually require more time to construct and once constructed they are usually more fragile than conventional charges. Following are rules of thumb for various charges and the targets they are designed to destroy.

a. Saddle Charge. This charge can be used to cut mild steel cylindrical targets up to 6 inches in diameter. Dimensions are as follows: The short base of the charge is equal to one-half the circumference. (Note that previously published dimensions called for three times the base, rather than twice the base.) Thickness of the charge is 1/3 block of C3 or C4 for targets up to 6 inches in diameter: use one-half block thickness for targets from 6 to 8 inches in diameter. Above 8 inches in diameter, or for alloyed steel shafts, use the diamond charge. Prime the charge from the apex of the triangle, and the target is cut at a point directly under the short base by cross-fracture. Neither the saddle nor diamond will produce reliable results against non-solid targets, such as gun barrels. These charges benefit from prepacking or wrapping, providing that no more than one thickness of the wrapping material is between the charge and the target to be cut. Heavy wrapping paper or aluminum foil are excellent, and parachute cloth may be used if nothing else is available. (See figure 14.)

b. Diamond Charge. This charge can be used to cut hard or alloyed steel cylindrical targets of any size that would conceivably be encountered. It has reliably been used, for instance, against a destroyer propeller shaft of 17 inch diameter. Dimensions are as follows: The long axis of the diamond charge should equal the circumference of the target, and the points should just touch on the far side. The short axis is equal to one-half the circumference. Thickness of the charge is 1/3 thickness of a block of C3 or C4. To prime the charge, both points of the short axis must be primed for simultaneous detonation. This can be accomplished electrically or by use of equal lengths of detonating cord, with a cap crimped on the end that is inserted into the charge. As detonation is initiated in each point of the diamond and moves toward the center, the detonating waves meet at the exact center of the charge, are deflected downward, and cut the shaft cleanly at that point. The diamond charge is more time consuming to construct, and requires both more care and more materials to prime. Transferring the charge dimensions to a template or cardboard or even cloth permits relatively easy charge construction (working directly on the target is extremely difficult). The completed wrapped charge is then transferred to the target and taped or tied in place, insuring that maximum close contact is achieved. The template technique should be used for both the saddle and diamond charges.
III-18

d. Ribbon Charge. To cut flat or non-cylindrical steel targets the ribbon charge produces excellent results at a considerable saving. Do not attempt to make all charges equal to the thickness of the target to be cut. (Note: never construct charges less than 1/16 inch thick.)

Width of the ribbon is equal to twice the thickness of the target. Length of the charge is equal to the length of the desired cut. Prims from an end; for relatively thick charges, build up the end to be primed. Build-up occurs if the charge is spread out to a larger size. (Stamping is unnecessary with the ribbon charge. A frame can be constructed out of stiff cardboard or plywood to give rigidity to the charge and to facilitate handling, carrying, and replacing it. The ribbon charge is effective only against targets of 2 inches thick, which effectively accounts for the majority of flat steel targets likely to be encountered.

III-19

d. Paste Explosive. Excellent results have been obtained in cutting railroad rail and other steel targets by using improvised paste explosive. An example of paste explosive follows: standard steel cutting formula, F400, yields an answer of 560 grams of explosive required to cut a rail 50 lb/yard. Eighty grams of paste explosive were actually used, and this charge removed more than a foot of the track.

e. Shaped Charges. If available, manufactured shaped charges will always give results far superior to those produced by any improvised shaped charges. The angle of the cavity of an improvised shaped charge should be between 30 and 60 degrees. Stand-off should be from 1 to 2 times the diameter of the cone.

Weight of the explosive, measured from the base of the cone, should be twice the height of the cone. Height of the explosive, measured from the base of the cone, should be twice the height of the cone. Stand-off is important.

Trial and error experimentation in determining optimum stand-off is important. A point worth mentioning is that a properly shaped bottle for shaped charges should be held in the bottle upright when burring the string soaked with gasoline. As the flame goes out submerge the bottle, neck first, in water; if properly done, the bottle will break cleanly as the string is burned. Rammidiagonal cavities will produce more surface damage on the target but less penetration. A true cone with an angle of approximately 65 degrees will produce more penetration, which ultimately is the desired result.

f. Platter Charge. The platter charge has been developed to breach volatile fuel containers and ignite their contents, from distances up to 50 yards depending on the size of the target. The platter can also be used to destroy small electrical transformers or other similar "soft" targets, again from a distance.

Platters do not have to be round or conical, although round, conical, platter is undoubtedly best. (The conical side of the platter faces the target, and the explosive goes on the reverse, or conical, side.) First, square or rectangular platters are permissible with steel being the best material. Platter side preferably should be between 6 and 12 pounds, and weight of explosive should be approximately equal platter weight. The explosive should be uniformly packed behind the platter and should be primed from most rear center. (Build up the charge and the rear end, if necessary, to form detonation.) A container is completely unnecessary for the platter charge as long as some way is found to hold the plastic firmly to the plate, tape is acceptable. The range is something in the neighborhood of 35 to 60 yards. With practice, a good demolitist can hit a 55 gallon drum, a relatively small target, at 35 yards 90 percent of the time. The largest glass or ceramic platters do not give results approaching those of steel.

III-20

g. Improvised Claymore or Improvised Grapeshot Charge. One of the most effective antipersonnel charges that can be improvised in the field requires the use of C4 and only a few other widely available materials. A container such as a number 10 can is excellent, although virtually any sized can that container could obviously be used. The ratio of projectiles ideally should be small pieces of steel although other objects can be used. Iron, brass, and stones can be used but, for the more frangible items, reduce the weight of explosive and add a few inches of buffer material, either earth or leaves, between the explosive and the projectiles.

To prepare the charge, place the projectiles in the container. Next place a layer of thick cloth, felt, cardboard, wood, or some similar material over the projectiles. Whenever in doubt about the amount of explosive to use, use lighter rather than a heavier charge. Again trial and error experimentation is extremely important in arriving at the best charge loading. The effectiveness of the finished product in this case makes all such efforts extremely worthwhile. Pack the C4 uniformly behind the separator disc, prims from exact rear center, and aim the charge toward the center of the desired target area. We obtain excellent results in dispersion, penetration, and range, by using expanded .45 caliber slugs. The main problem to guard against is the tendency to overcharge. A relatively small amount of C4 is all that is necessary to propel the projectiles: anything more will pulverize them.

III-21

Figure 17 Shaped Charge

1-STANDOFF: 1 to 2 times diameter of cone
2-CONE ANGLE: 30° to 60°
3-EXPLOSIVE DEPTH: 2 times height of cone
4-DETONATED REAR DEAD CENTER

1. Opposed Charge. (Also called the "counterforce" or "ear muff" charge.) Within its limitations, which are quite restrictive, the opposed charge offers dramatic savings in explosives for destroying reinforced concrete targets. The rule of thumb for construction is as follows: for each foot of target thickness, use 1 pound of C4 or TATB for fractions of a foot, go to the next higher pound. Divide the total amount of C4 exactly in half, placing one half of the charge on each side of the target, diametrically opposite each other. This brings up one limitation, the requirement to have two sides of the target accessible. Prime the two charges to detonate nearly simultaneously, and the target will be destroyed as the shock waves meet in the center of the target and, in "Steel, comes to virtually explode from within." It will be noted that the charge size has been reduced by one-half the ear muff used for previous publications. This charge is easy to produce and is well suited for relatively flat, large targets that are approximately
J. Improvised Cratering Charge. Ammonium nitrate fertilizer is a material that is readily available in many parts of the world. With AN and one other simple ingredient we have the ability to “tailor make” cratering charges to practically any size or configuration. A rule of thumb for the construction of an improvised cratering charge is as follows: to each 36 pounds of ammonium nitrate fertilizer, which should be prilled or pelleted variety, add approximately 400 to 500 pounds of metal or gun powder. The resulting mixture should be well mixed and then pressed into a mold or container. The charge will then be detonated by a blasting cap or electric blasting fuse. The size of the charge can be adjusted by changing the amount of metal or gun powder used. The resulting cratering effect will be proportional to the size of the charge.

III-33

1 quart of diesel fuel, motor oil, or gasoline. The motor oil may be drained from a crankcase, which will not impair the effectiveness of the charge. The charge should be soaked for 1 hour, prime with 1 pound of HMX or its equivalent, and tamp well in an appropriate borehole, and detonate. The results obtained with this charge compare very favorably with the manufactured variety. The prilled ammonium nitrate fertilizer should be of a kind having at least 33 1/3 percent nitrogen content and care should be taken to ensure that the fertilizer used is not damp. When this charge is produced in a borehole diameter that is capable of accommodating the bulk of the manufactured 40-pound cratering charge, 8 1/2 by 17 inches, excellent results can be obtained by purring and tamping the improvised AN cratering charge into the available space.

Figure 18

III-32

K. Improvised Ammonium Nitrate Satchel Charge. While the cratering charge referred to earlier is undoubtedly good, it is really only suitable for cratering use. A more manageable charge can be produced from AN, using wax as the second ingredient, rather than oil. The procedure for making this charge is merely to melt ordinary paraffin and stir in AN pellets, ensuring that the wax is thoroughly mixed with the AN while still hot. Before the mixture hardens add a one-half pound block of TNT, or its equivalent, as a primer. A number 10 can makes a good container for this charge although practically anything may be used. A mixture of suitable strap and handle can be used to dispose of the mixture away from the exterior of the charge. This mixture is more manageable than the AN and TNT mixture and much less susceptible to moisture. In fact, this charge can be stored for extended periods without regard to humidity and without loss of effectiveness.

1. Dust Initiator. The employment of a small initiator charge to make use of explosive energy provided by a target site is an economical means of destroying certain types of targets. An improvised dust initiator charge can be constructed as follows: To make the standard 1 pound charge use half explosive and half incendiary mix. The explosive may be either powdered TNT obtained by crushing the TNT in a canvas bag or C4. C4 does not properly mix with the incendiary and will not produce the desired result. The incendiary mix may be any part of aluminum powder to three parts of ferric oxide; magnesium powder may be used in lieu of aluminum powder. If used with powdered TNT, the two should be thoroughly mixed. If used with C3, the incendiary mix should be thoroughly mixed throughout the half-pound of explosive. The dust initiator requires a “surround” which is merely the addition of a suitable, finely divided (dust) material or a volatile fuel such as gasoline. The DI works best in an enclosed space; and such targets as boxes, warehouses, and other relatively windowless structures are best suited to an attack by this means. A rule of thumb for its employment is that three to five pounds of cover or surround should be provided for each 1,000 cubic feet of target. The 1 pound DI charge will effectivly disperse and detonate up to 40 pounds of cover charge. The effect of the surround as it is first scattered and then detonated by the long-lasting flame of the DI is to increase the internal explosive pressure from 500 to 900 percent over the effect of the DI being detonated without a surround. If used with gasoline the optimum results are obtained by only using 3 gallons of the fuel. The addition of more gasoline not only does not produce better results, the fuel usually will not even be detonated. A large number of dust materials can be used as a surround, including coal dust, sand, salt, powdered salts, sugars, salt, and potash. A good expedient DI charge can be produced by packaging the contents of two thermite grenades around a stick of military dynamite. (Note that this is just the DI charge to which a surround must be added).

III-34

VI. IMPROVISED INCENDIARIES, EXPLOSIVES AND DELAY DEVICES.

Caution: As a general rule improvised explosives and incendiaries are much more dangerous to handle than conventional explosives. Such mixtures as the nitrate-sugar mix mentioned below can be ignited or detonated by a single spark, excessive heat, or merely by the friction generated by stirring or mixing the ingredients together. The danger in handling these items cannot be over emphasized.

a. Chlorate-Sugar Mix. This mixture can be either an incendiary or an explosive. Sugar is the common granulated household variety. Either potassium chlorate or sodium chlorate may be used; potassium is preferred. Proportions can be equal parts by volume, 5 parts of chlorate, or 2 parts of sugar preferred. Mix in or on a non-sparking surface. Unconfined, the mix is an incendiary. Confined in a tightly capped length of pipe it will explode when a spark is introduced. Such a pipe bomb will produce casualties, but will not be suitable for breaching or cutting tasks. Concentrated sulphuric acid will ignite this fast burning incendiary mixture. Placing the acid in gelatin capsules, balloon, or other suitable container will provide a delay, length of which depends on how long it takes the acid to eat through the container.

b. Potassium Permanganate and Sugar. Another fast burning, if fire mix is obtained by mixing potassium permanganate, 8 parts, and 1 part sugar. It is somewhat hotter than the chlorate sugar mix, and can be ignited by the addition of a few drops of glycerine.

c. Sawdust and Wax. An effective and long burning incendiary can be produced by adding molten wax or tar to sawdust. The advantage of this incendiary is that its components are truly universally available.

d. Matchheads. A quantity of matchheads crumbled from common safety matches will make either a fast burning incendiary or, if confined, an explosive. A length of pipe filled with matchheads and capped and fused makes an effective antipersonnel bomb. Again extreme caution must be exercised in handling of matchheads in bulk—a single spark will detonate or ignite them.

e. Improvised Napalm. To either gasoline or kerosene add finely cut soap chips. Pure SOAP must be used, not detergents. Working in the open, use a double boiler with the bottom portion filled approx 3/4 full of water. Heat until fuel comes to a boil and then simmer. Stir constantly until the desired consistency is reached. Remember that it will thicken further on cooling. Trial and error experimentation will determine proper amounts for best results.

f. Improvised Thermite Grenade. The main burning agent, the thermite, is composed of 2 parts of iron oxide to 2 parts of aluminum powder. A ceramic flower pot makes a good container for the thermite. A potassium chlorate and sugar first fire mix of 3 parts charcoal and 2 parts sugar is placed in a paper tube running down through the thermite. When the charcoal is ignited, it in turn ignites the thermite, which can be used to attack mild steel. This thermite mix burns at approx. 4,000 degrees.

7. Molded Brick Incendiaries. Proportions are 3 parts aluminum powder, 4 parts water and 5 parts plaster of paris. Mix the aluminum and plaster...
oughly together, then add the water and stir vigorously. Pour the resulting mix into a mold, let harden, and dry for 2 to 3 weeks. While they are difficult to ignite, a dry mix of 3 parts of oxidizer and 2 parts of aluminum powder should be used. These bricks burn with intense heat and are suitable for melting mild steel.

b. C4 As An Incendiary. Most plastic explosives, including C3 and C4 can be used as an incendiary. They are easy to ignite and burn with a hot flame of long duration.

c. Sulfuric Acid can be used to ignite chlorates and sugar. An expedient method of obtaining sulfuric acid is as follows: Drain the liquid from one or more wet cell batteries. Place it in a glass, pottery or ceramic container, and heat it. As the liquid comes to a boil it will begin to emit a dense white smoke. Remove the remaining liquid from the heat, allow to cool, and place it in a tightly stoppered glass bottle. Test the acid before each operational use.

d. Fire Bottle. Fill a glass bottle about one-fifth to one-fourth full with sulfuric acid. Fill the remainder with gasoline, kerosene, or a combination of both. Add water to potassium chlorate and sugar mix, and soak rags in the mixture. Wrap the rags around the bottle, tie them up, and allow to dry. When thrown, the bottle will break, the acid will ignite the chlorate sugar saturated rags, which in turn will ignite the fuel.

a. Thermite.

Use any size can with sticks tied or taped to sides and cut small hole in bottom. Cover bottom with paper. Place round stick wrapped in paper in middle of can. Fill bottom of can 1/4 inch with magnesium. Over this place mixture of 3 parts ferric oxide and 2 parts aluminum powder. Remove stock and fill half dome with mixture 3 parts potassium chlorate and 1 part sugar. On top of this place paper bag containing chlorate-sugar mixture. Place fuse in top of tank with dirt or clay.

g. Molotov Cocktail.

Figure 20

Fill bottle with gasoline, jelly gas or 2 to 1 ratio mixture of gas and oil. Use wick of rag or cotton dipped in wax. Light before throwing.

c. Satchel Charge.

Figure 21

Fill # 10 can with mixture of ammonium nitrate and melted wax, stirring vigorously to insure a complete mix. Prime with small amount of C4 or TNT before mixture hardens. Add a rope handle for convenient improvised satchel charge.

Figure 22


<table>
<thead>
<tr>
<th></th>
<th>Percent by Wt</th>
<th>Parts by Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium Nitrate</td>
<td>74</td>
<td>25</td>
</tr>
<tr>
<td>Powdered Charcoal</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>Sulpher</td>
<td>10</td>
<td>2</td>
</tr>
</tbody>
</table>

3. Procedure.

a. Dissolve potassium nitrate in water using a ratio of three parts weight of water to one part nitrate.

b. In a second container, dry mix the powdered charcoal and sul-
DRIED SEED TIMER

A time delay device for electrical firing circuits can be made using the principle of expansion of dried seeds.

MATERIAL REQUIRED:
Dried peas, beans or other dehydrated seeds
Wide mouth glass jar with nonmetal cap
Two screws or bolts
This metal plate
Hand drill
Screwdriver

PROCEDURE:
1. Determine the rate of rise of the dried seeds selected. This is necessary to determine delay time of the timer.

2. Place a sample of the dried seeds in the jar and cover with water.

3. Measure the time it takes for the seeds to rise a given height. Most dried seeds increase 50% in 1 to 2 hours.

4. Cut a disc from this metal plate. Disc should fit loosely inside the jar.

NOTE: If metal is painted, rusted or otherwise coated, it must be scraped or sanded to obtain a clean metal surface.

5. Drill two holes in the cap of the jar about 1 inch apart. Diameter of holes should be such that screws or bolts will thread tightly into them. If the jar has a metal cap or no cap, a piece of wood or plastic (NOT METAL) can be used as a cover.

6. Turn the two screws or bolts through the holes in the cap. Bolts should extend about one in. (2 1/4 cm) into the jar.

7. Pour dried seeds into the container. The level will depend upon the previously measured rise time and the desired delay.

8. Place the metal disc on top of the seeds.

HOW TO USE:
1. Add just enough water to completely cover the seeds and place the cap on the jar.

2. Attach connecting wires from the firing circuit to the two screws on the cap.

Expansion of the seeds will raise the metal disc until it contacts the screws and closes the circuit.
IX. Delays.

Cigarette (in match book or box)
Candle (surrounded by inflammable material)
Spark (from short circuit electrical wires)
Sulphuric Acid (sugar chlorate mixture)
Nitrate Acid (sugar chlorate mixture)
Glycerine (sugar permanganate mixture)
Water Delay (see diagram)
Watch Delay (see diagram)

X. Demolition Data

Figure 26 - Leaflfrog series circuit
Parallel circuits
Series-parallel circuits

Figure 27 - Placement of charges for heavy road crater.

Figure 28 - Charges placed in fill behind reinforced concrete abutment 5 feet or less in thickness. (The 5-5-5-40 method)

Figure 29 - Placement of charges behind concrete abutment more than 5 feet thick.
(a) Flat or rolling terrain is desirable, however, in mountainous or hilly country, sites selected at higher elevations such as level plateaus can be used.

(b) Small valleys or pockets completely surrounded by hills are difficult to locate and should not normally be used.

(c) In order to afford the aircraft unit flexibility in selecting the IP, it is desirable that the aircraft be able to approach the target site from any direction.

(d) There should be an open approach quadrant of at least 90° to allow the aircraft a choice when determining their approach track from the IP.

(e) DZ's having a single clear line of approach are acceptable for medium aircraft, provided: a level turning radius of 3 miles (4.8 kilometers) on each side of the site. 3.1 kilometers for light aircraft (Figure 1).

(f) Length of dispersion pattern in meters equals 1/2 aircraft speed (in knots) times exit time (in seconds).

(g) Deviations from the aforementioned minimum distances cause the aircraft to fly at higher than desirable altitudes when executing the drop.

(h) Weather in drop areas. The prevailing weather conditions in the area must be considered. Ground fogs, mists, haze, smoke, and lowflying cloud conditions may interfere with visual signals and DZ markings. Excessive winds also hinder operations.

(i) Obstacles. Due to the low altitudes at which operational drops are conducted, consideration must be given to navigational obstacles in excess of 300 feet (90 meters) above the level of the DZ and within a radius of 3 miles (4.8 kilometers). If such obstacles exist and are not shown on the issued maps, they must be reported.

(j) Enemy air defenses. Drop sites should be located so as to preclude the aircraft flying over or near enemy air installations when making the final approach to the DZ.

Ground Considerations:

1. Shape and size:

- The most desirable shape for a DZ is square or round. This permits a wider choice of aircraft approach directions than is normally the case with rectangular-shaped sites.

- The required length of a DZ depends primarily on the number of units to be dropped and the length of their dispersion pattern.

1. Dispersion occurs when two or more personnel or containers are released consecutively from an aircraft in flight. The long axis of the landing pattern is usually parallel to the direction of flight (Figure 2).

2. Dispersion is computed using the rule-of-thumb formula: 1/2 speed of aircraft (knots) x exit time (seconds) x dispersion (meters). Exit time is the elapsed time between the exits of the first and last items.

- The length of the dispersion pattern represents the absolute

Figure 3. Computation of Dispersion
minimum length required for DZ's. Personnel are to be dropped, a safety factor of at least 100 meters is added to each end of the DZ site.

- The width of rectangular-shaped DZ's should allow for minor errors in computation of wind drift.

- The use of DZ's measuring less than 900 x 900 meters should be avoided.

3. Surface.

- The surface of the DZ should be reasonably level and free from obstructions such as rocks, trees, fences, etc. Tundra and pastures are types of terrain which are ideal for both personnel and cargo reception.

- Personal DZ's located at comparatively high elevations (6,000 feet, 1,840 meters) or higher should, where possible, utilize soft snow or grasslands, due to the increased rate of parachute descent.

- Swamps and low marshy ground, normally less desirable in the summer, and muddy fields when dry often make good drop zones.

- Personnel and cargo can be received on water DZ's.

1. Minimum depths for reception of personnel is 4 feet and arrangements must be made for rapid pickup.

2. The surface of the water must be clear of floating debris or man-made craft, and there should be no protruding boulders, ledges, or pilings.

3. The water must also be clear of underwater obstructions to a depth of 4 feet.

4. Water reception points should not be near shallows or where currents are swift.

5. Minimum safe water temperature is 60°F. (16°C).

- Supply drop zones may, in general, utilize any of the following types of surfaces:

1. Surfaces containing gravel or small stones no larger than a man's fist.

2. Agricultural ground, although in the interest of security, it is unadvisable to use cultivated fields.

3. Sites containing brush or even tall trees; however, marking of the DZ and the recovery of containers is more difficult.

4. Marsh, swamp, or water sites, provided the depth of water or growth of vegetation will not result in loss of containers.

- Ground Security. The basic considerations for ground security are that the DZ be:

- Located to permit maximum freedom from enemy interference.

- Isolated or in a sparsely populated area.

- Accessible to the reception committee by concealed approach and withdrawal routes.
(s) Adjacent to areas suitable for the caching of supplies and disposition of aerial delivery equipment.

III. REPORTING DROP ZONES:

a. Drop Zone Data. The minimum drop zone data which is reported includes:

(1) Code name. Extracted from the SCI, also indicate if primary or alternate DZ.

(2) Location. Complete military grid coordinates of the center of the DZ.

(3) Open Quadrant. Measured from center of DZ, reported as a series of magnetic azimuths. The open quadrant indicates acceptable aircraft approaches (Figure 3).

(4) Track. Magnetic azimuth of required or recommended aircraft approaches (Figure 3).

(5) Obstacles. Those that are over 300 feet (90 meters) in elevation above the level of the DZ, within a radius of 5 miles (8 kilometers) and which are not shown on the issued maps. Obstacles are reported by description, magnetic azimuth, and distance from the center of the DZ (Figure 4).

(6) Reference point. A landmark shown on the issued maps, reported by name, magnetic azimuth and distance from the center of the DZ (Figure 4). Used with (3) above in plotting the DZ location.

IV-4

![Diagram of Drop Zone Data]

Open quadrants above would be reported as:

OPEN 130 to 220 AND 330 to 012 DEG

Figure 3  Composition of Open Quadrant

IV-7

(7) Date/time drop requested.

(8) Items requested. Extracted from the catalog supply system.

b. Additional Items. In special situations, additional items may be required; e.g., additional reference points, navigational check points in the vicinity of the DZ, special recognition and authentication means. Sub-paragraphs (7) and (8) above are included only when requesting a resupply mission in conjunction with the reporting of the DZ.

(9) Altitude. Altitude is measured from the center of the DZ. Appropriate abbreviations are used.

IV-9

![Diagram of Initial Points (IP's)]

d. Initial Points (IP's). It is desirable to reconcile the requested aircraft track with an identifiable landmark that may be used by the aircrew as an initial point (IP). The IP, located at a distance of 5 to 15 miles (8-24 kilometers) from the DZ, is the final navigational checkpoint prior to reaching the target. Upon reaching the IP, the pilot turns to a predetermined magnetic heading that takes him over the DZ within a certain number of minutes (Figure 5). The following features constitute suitable IP's:

(1) Coastlines. A coastline with breaking surf is easily distinguished at night. Mouths of rivers over 30 yards wide, sharp uplandings, and inlets are excellent guides for both day and night.

(2) Rivers and canals. Wooded banks reduce reflections, but rivers more than 30 yards wide are visible from the air. Canals are easily recognizable from their straight banks and uniform width. Small streams are not discernible at night.

(3) Lakes. Lakes at least one-half mile (1 kilometer) square give good light reflection.

(4) Forest and woodlands. Forested areas at least one-half mile square with clearly defined boundaries of unmistakable shape.

(5) Major roads and highways. Straight stretches of main roads with one or more intersections. For night recognition, dark surfaced roads are not desirable as IP's although when the roads are wet, reflection from moonlight is visible.
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IV. MARKING DROP ZONES

a. Purpose. The purpose of DZ markings is to identify the site for the aircrew and to signal the point of exit, over which the personnel and/or cargo should be dropped. The procedures for marking DZs are determined prior to infiltration and are included in the SOI.

b. Equipment.

(1) The marking of DZs at night during clandestine operations will normally be only by flashlights. Flashlights manufactured in the country are easily procured by the guerrillas, give adequate directional lighting when properly held, and are not incombustible when held by the security forces on the part of a member of the resistance force. In rare instances, other lighting devices such as flares, flares, flares, or small wood fires may be used.

(2) For daylight operations a satisfactory method is the use of issued Panel Marking Set AP-9 or V8-16. If issued panels are not available, sheets, strips of colored cloth or other substances may be issued as long as there is a sharp contrast with the background. Smoke signals, either smoke grenade or

simple smoke flares, greatly assist the aircrew in sighting the DZ markings on the approach run.

(3) The use of electronic homing devices permits the conduct of reception operations during conditions of low visibility. Such devices normally are used in conjunction with visual marking systems.

c. Computation of Release Point. The release point must be determined to ensure delivery of personnel and/or cargo within the usable limits of the DZ. Computation of the release point involves the following factors (Figure 4).

IV-11

1. Training jumps conducted at an absolute altitude of 1,250 feet (386 meters) require the use of a flank panel or light placed 100 meters to the left of the release point markers. The configuration of present cargo and troop carrying aircraft prevents the pilot from seeing the markings after approaching within approximately 1 mile of the DZ while flying at 1,250 feet (386 meters) absolute altitude. From this point on, the pilot must depend on flying the proper track in order to pass over the release point. The flank marker serves to indicate when the aircraft is over the release point and the exact moment the drop should be executed. Operational drops executed at 500 feet (152 meters) absolute altitude do not require the flank panel because the pilot does not lose sight of the markings as he approaches the DZ. (See Figure 7)

2. Operational personnel drops or supply drops within a GWCA will normally be executed at altitudes between 500-600 feet for personnel and 400-500 feet for supplies. Release point markers are different numbers of lights with different configurations for each 24-hour period. The exact configuration of lights and the exact configuration is determined by the detachment SOI. (See Figure 9)

IV-12

For personal using the 7-10 parachute, the wind drift (miles) is altitude (feet) x wind velocity (mph) x 1.1 (constant factor).

2. For all other low velocity parachute drops: Same as 1 above, however, substitute a constant factor of 2.6 for 4.1.

NOTE: Where no mechanical wind velocity indicator is available, the approximate velocity can be determined by dropping bits of paper, leaves, dry grass, or dust from the shoulder and pointing to the dry place where they land. The estimated angle in degrees formed by the arm with the body, divided by 4, equals wind velocity.

2. Forward throw. This is the horizontal distance traveled by the parachute or cargo container between the point of exit and the opening of the parachute. This factor, combined with the reaction time of personnel in the aircraft, is compensated for by moving the release point an additional 100 meters in the direction of the aircraft's approach (Figure 4).

High velocity and free-drop. Due to their rapid rate of descent, high velocity and free-drop loads are not materially affected by wind conditions. Otherwise, the factors of dispersion and forward throw are generally similar to those for personnel and low velocity loads and are compensated for in the same manner.

d. Methods of Release Point Marking. There are two methods for marking the DZ release point. The principal difference between the two is the method of providing identification. The marking systems described below are designed primarily for operational drops executed at an absolute altitude of 800 feet (244 meters). Training jumps executed at an absolute altitude of 1,250 feet (386 meters) require a modification of the marking systems.

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For personal using the 7-10 parachute, the wind drift (miles) is altitude (feet) x wind velocity (mph) x 1.1 (constant factor).

2. For all other low velocity parachute drops: Same as 1 above, however, substitute a constant factor of 2.6 for 4.1.

NOTE: Where no mechanical wind velocity indicator is available, the approximate velocity can be determined by dropping bits of paper, leaves, dry grass, or dust from the shoulder and pointing to the dry place where they land. The estimated angle in degrees formed by the arm with the body, divided by 4, equals wind velocity.

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IV-13

1. Training jumps conducted at an absolute altitude of 1,250 feet (386 meters) require the use of a flank panel or light placed 100 meters to the left of the release point markers. The configuration of present cargo and troop carrying aircraft prevents the pilot from seeing the markings after approaching within approximately 1 mile of the DZ while flying at 1,250 feet (386 meters) absolute altitude. From this point on, the pilot must depend on flying the proper track in order to pass over the release point. The flank marker serves to indicate when the aircraft is over the release point and the exact moment the drop should be executed. Operational drops executed at 500 feet (152 meters) absolute altitude do not require the flank panel because the pilot does not lose sight of the markings as he approaches the DZ. (See Figure 7)

2. Operational personnel drops or supply drops within a GWCA will normally be executed at altitudes between 500-600 feet for personnel and 400-500 feet for supplies. Release point markers are different numbers of lights with different configurations for each 24-hour period. The exact configuration of lights and the exact configuration is determined by the detachment SOI. (See Figure 9)
craft. As a guide, markings must have a clearance of at least 500 yards (460 meters) from a 100-foot (30 meter) mark (Figure 9).

2. Additionally, precautions must be taken to ensure that the markings can be seen only from the direction of the aircraft approach. Flashlights may be equipped with simple hoods or shields and aimed toward the flight path. Fires or improvised flares are screwed on three sides or placed in pits with sides sloping toward the direction of aircraft approach.

IV-16

3. When panels are used for daylight markings of DZ's, they are positioned at an angle of approximately 45° from the horizontal to present the maximum surface toward the approaching aircraft (Figure 10).

![Diagram](image)

Figure 10. Obstacles and Reference Point (Area DZ)

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V. RECEPTION COMMITTEES

a. General. A reception committee is formed to control the drop zone or landing area. The reception committee can be anyone who is capable of performing the following duties. A permanent committee for each unit provides the best results, eliminating the need to cross train every one to be capable of this mission. However, training in depth should be accomplished to ensure that losses of key personnel will not adversely affect the operation of the group as a whole.

(1) Provide security for the reception operation.

(2) Emplace DZ markings and air-ground identification equipment.

(3) Maintain surveillance of the site prior to and following the reception operation.

(4) Recover and dispose of incoming personnel and/or cargo.

(5) Provide for dispatch of personnel and/or cargo in evacuation operations.

(6) Provide for sterilization of the site (when secrecy is possible and desirable only).

c. Composition. The reception committee is normally organized into five
The composition and functions of the five parties are as follows:

1. Command party.
   a. Controls and coordinates the actions of all reception committee components.
   b. Includes the reception committee leader (RCL) and communications personnel, consisting of messengers and radio operators.
   c. Provides medical support, including litter bearers, during personnel drops.

2. Marking party.
   a. Operates the reception site marking system, using one man for each marker.

   a. Ensures that unfriendly elements do not interfere with the conduct of the operation.
   b. Consists normally of inner and outer security elements.
   1. The inner security element is positioned in the immediate vicinity of the site and is responsible for securing or holding actions.
   2. The outer security element consists of outposts established along approaches to the area. They may prepare ambushes and roadblocks to prevent enemy movement toward the site.
   c. The security party may be supplemented by auxiliaries. These are generally used to maintain surveillance of enemy activities and control the support party from hostile movements.
   d. Provides march security for moves between the reception site and the destination of the cargo or infiltrated personnel.

4. Recovery party.
   a. Recover cargo and aerial delivery equipment from the L2. Unloads aircraft or landing craft.
   b. For aerial delivery operations, the recovery party should consist of at least one man for each parachute or cargo container. For such operations, the recovery party is usually dispersed along the length of the anticipated impact area. The members spot each parachute as it descends and move to the landing point. They then recover all parachute equipment and cargo, moving to a predetermined assembly area with the infiltrated personnel or equipment.
   c. Recovery parties are normally responsible for sterilizing the reception site to ensure that all traces of the operation are removed when secrecy is possible and desired.

5. Transport party.
   a. Moves items received to distribution points or caches.
   b. May consist of part, or all, of the members comprising the command, marking, and recovery parties.

VI. LANDING ZONES (LZ)

a. General. The same general considerations apply to DZ selections applies to the selection of LZ's. However, site size, approach features and security are far more important.

b. Selection Criteria.
   1. Desirable terrain features:
      a. LZ's should be located in flat or rolling terrain.
      b. Level plateaus of sufficient size can be used. Due to decreased air density, landings at higher altitudes require increased minimum LZ dimensions.

If the L2 is located in terrain above 4,000 feet (1,220 meters) and/or areas with a very high temperature the minimum lengths should be increased as follows:

1. Add 10 percent to minimums for each 1,000 feet (305 meters).
2. Add 10 percent to minimum for the altitude for temperatures over 90°F. Add 20 percent for temperatures over 100°F. (38°C).
3. Pockets or small valleys completely surrounded by hills are usually unsuitable for landing operations by fixed-wing aircraft.
4. Although undesirable, sites with only a single approach can be used. It is mandatory when using such sites that:
   1. All takeoffs and landings are made upwind.
   2. There is sufficient clearance at either end of the L2 to permit a level 180° turn to either side within a radius of 3 miles (5 kilometers) for medium aircraft (e.g., light aircraft).
Figure 13. Landing zone (small aircraft night operations).

4. Surface.
(a) The surface of the LZ must be level and free of obstructions such as ditches, deep ruts, logos, fences, hedges, low shrubbery, rocks larger than a man's flat or grass over 1 1/2 feet in height.
(b) The sub-soil must be firm to a depth of 2 feet.
(c) A surface containing gravel and small stones, or thin layers of loose sand over a firm layer of sub-soil is acceptable. Plowed fields or fields containing crops over 1 1/2 feet in height should not be used.
(d) As with DZ's surfaces that are not desirable in summer may be ideal in winter. Ice with a thickness of 1 inch (61 centimeters) will support a medium aircraft. Unless the aircraft is equipped for snow landing, snow in excess of 4 inches (11 centimeters) must be packed or removed from the landing strip.

5. Approach and takeoff clearance. The approach and takeoff clearances are based on the glide-climb characteristics of the aircraft. For medium aircraft the glide-climb ratio is 1 to 40; that is, 1 foot of gain or loss of altitude for every 40 feet of horizontal distance traveled. The ratio for light aircraft is 1 to 20. As a further precaution, any obstructions in approach and departure lanes must conform to the following specifications (Figure 14).
(a) An obstruction higher than 5 feet (1.5 meters) is not permissible at or near either end of the LZ.
(b) A 50-foot (15 meters) obstruction may not be nearer than 2,000 feet (610 meters) for medium aircraft, or 1,000 feet (305 meters) for light aircraft.
(c) A 150-foot (55 meters) obstruction may not be nearer than 4 miles (6.4 kilometers) for medium aircraft or 2 miles (3.2 kilometers) for light aircraft.
(d) Hills of 1,500 (355 meters) feet or more above LZ altitude may not be nearer than 8 miles (12.8 kilometers) from the landing zone for medium aircraft.

Figure 14.

6. Heights of the obstacles are computed from the level of the landing strip. Where land falls away from the LZ, objects of considerable height may be ignored provided they do not cut off the line of ascent or descent. This condition exists more often in mountainous terrain where plateaus are selected for LZ's.

a. Markings.

1. For night operations lights are used for marking LZ's during daylight, panels are used. When flashts are used, they should be hand-held for directional control and guidance.

2. The pattern outlining the limits of the runway consists of five or seven marker stations (Figure 11 and 12). Stations "A" and "B" mark the downwind end of the LZ and are positioned to provide for the safety factors previously mentioned. These stations represent the initial point at which the aircraft should touch the ground. Station "C" indicates the very last point at which the aircraft can touch down and complete a safe landing.
VII. REPORTING LANDING ZONES

The minimum LZ data required is:

a. Code Name. Extracted from SOL.

b. Location. Complete military grid coordinates of center of LZ.

c. Long Axis. Magnetic azimuth of long axis of runway. It also indicates probable direction of landing approach based on prevailing winds.

d. Description. Type of surface, length, and width of runway.

e. Open Quadrant. Measured from center of LZ and reported as series of magnetic azimuths. Open Quadrant indicates acceptable aircraft approaches.

f. Track. Magnetic azimuth of desired aircraft approach.

g. Obstacles. Reported by description, magnetic azimuth, and distance from center of LZ.

h. Reference Point. Reported same as obstacles.

i. Date. Time mission requested.

j. Items Requested. Items to be evacuated.

VIII. LANDING ZONES FOR ROTARY-WING AIRCRAFT

a. General.

1. Within their range limitations, helicopters provide an excellent means of evacuation. Their advantages include the ability to:
   a. Ascend and descend almost vertically.
   b. Land on relatively small plots of ground.
   c. Hover motionless, and take on or discharge personnel and cargo without landing.
   d. Fly safely and efficiently at low altitudes.
   e. Some unfavorable characteristics of helicopters are:
      a. They compromise secrecy by engine and rotor noise and by dust.
      b. The difficulty—sometimes impossibility—of operating when icing and/or high, gusty winds prevail.
      c. The reduction of lifting ability during changes of atmospheric conditions.

2. For the maximum effective use of helicopters, LZ's should be located to have landings and takeoffs into the wind.

3. During night operations, helicopters usually must land to transfer personnel and/or cargo.

4. A decrease in normal air density limits the helicopter payload and requires lengthened running distances for landing and takeoff. Air density is largely determined by altitude and temperature. Low altitudes and moderate to low temperatures result in increased air density.

b. Site. Under ideal conditions, and provided the necessary clearance for the

---

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IX. LANDING ZONES (WATER)

a. Criteria for selection of water LZ’s:

(1) Size. For medium amphibious or seaplane-type aircraft, the required length is 4,400 feet (1,340 meters) with a minimum width of 1,500 feet (450 meters). For light aircraft, the required length is 6,000 feet (1,800 meters) long and 500 feet (150 meters) wide. As with land LZ’s, and additional safe area equal to 10 percent of the airstrip length is required on each end. (Figure 18)

(2) Surface. Minimum water depth is 6 feet (2 meters). The entire landing zone must be free of obstructions such as boulders, rock ledges, shoals, waterlogged boats, or sunken pilings within 6 feet of the surface, and the surface must be cleared of all floating objects such as logs, debris, or moored craft.

(3) Wind.

(a) Wind velocity must not exceed 20 knots for sheltered water or 10 knots in semi-sheltered water.

(b) In a wind of 8 knots or less, the landing heading may vary up to 10 degrees from the wind direction. Where the surface winds exceed 8 knots the aircraft must land into the wind. No landing may be made in winds in excess of 25 knots. If a downwind landing or takeoff is absolutely required, this is made directly downwind.

(c) Surface swells must not exceed 1 foot in height and the windwave not more than 3 feet. The combination of swell and windwave must not exceed 3 feet in height when all swells and windwaves are in phase.

(4) Tide. The state of the tide should have no bearing on the suitability of the landing area.

(5) Water/air temperature. Due to the danger of icing, water and air temperatures must conform to the following minimums:

<table>
<thead>
<tr>
<th>Water temperature</th>
<th>Air temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt water</td>
<td>15°F (−9°C)</td>
</tr>
<tr>
<td>Fresh water</td>
<td>15°F (−9°C)</td>
</tr>
<tr>
<td>Brackish water</td>
<td>30°F (−3°C)</td>
</tr>
</tbody>
</table>
Figure 11. Landing Zone (water) medium aircraft pickup operations.

(6) Approach and takeoff clearances. Water landing zones require approach/takeoff clearances identical to those of land LZ's and are based on the same glide/climb ratios.

(1) Marking and identification of water landing zones.

(2) The normal method of marking water LZ's is to align three marker stations along the left edge of the landing strip. Station "A" is positioned at the downwind end of the strip and indicates the desired touchdown point. Station "B" marks the last point at which the aircraft can touch down and complete a safe landing. Station "C" is also the location of the RCL and the pickup point. Station "C" marks the upwind extreme of the landing area. At night, stations "A", "B", and "C" are marked by white lights. The RCL signal light is green.

(3) An alternate method is to use a single marker station, marked at night with a steady light in addition to the signal of recognition light. This station is located to allow a clear approach and takeoff in any direction. The pilot is responsible for selecting the landing track and may touchdown on any track 1,000 feet (305 meters) from the marker station. Following pickup, the aircraft takes back to the 2,000-foot (610 meter) circle in preparation for takeoff (Figure 19).

(4) Conduct of operations for water LZ's:

(1) Before the landing operation, the LZ is carefully cleared of all floating debris. Also, the marker stations are properly aligned and anchored to prevent drifting. In deep or rough water, improvised sea anchors may be used.

(2) The procedure for displaying the LZ markings and identification is the same as for operations on land LZ's.

(3) Personnel and/or cargo to be evacuated are positioned in the RCL boat. Following the landing run, the aircraft turns to the left and taxis back to the vicinity of the RCL boat to make the pickup. The RCL indicates its position by shining the signal light in the direction of the aircraft and continues to shine his light until the pickup is completed. Care must be taken not to blind the aircrew with this light and it should not be aimed directly into the cockpit.

Figure 12. One light water landing zone briefing.

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(5) The RCL boat remains stationary during pickup operations. The aircraft taxis to within 50 to 100 feet (15 or 30 meters) of the RCL boat, playing out a drogue from the left rear door. The drogue is approximately 100 feet (30 meters) in length and has three life jackets attached; one close to the aircraft, a second at midpoint, and the third on the extreme end of the line. The life jackets have small marker lights attached during night operations. The aircraft taxis to the left around the RCL boat, bringing the drogue close enough to be secured. The RCL fastens the line to the boat. Due to the danger of swamping the craft, the RCL does not attempt to pull on the line. Members of the aircrew pull the boat to the door of the aircraft. Should the boat pass the aircraft door and continue toward the front of the aircraft, all personnel in the boat must abandon immediately to avoid being hit by the propeller.

(6) After pickup, the aircrew is given any information that will aid in the takeoff. Following this, the RCL boat moves a safe distance from the aircraft and signals the pilot "all clear." At this time, JATO bottles may be used for positive takeoff power. The installation of JATO booms is time consuming and should not be done unless absolutely necessary.

(7) Helicopters can land in water without the use of special flotation equipment provided:

(1) The water depth does not exceed 18 inches.

(2) There is a firm bottom such as gravel or sand.

(3) Landing pads can be prepared on mountains or hillside by cutting and filling. Caution must be exercised to insure there is adequate clearance for the rotors.

d. Approach/Takeoff:

(1) There should be at least one path of approach to the LZ measuring 15 meters in width.

(2) A rotary wing aircraft is considered to have a climb ratio of 1:8 (Figure 20).

(3) Takeoff and departure from the LZ may be along the same path used for the approach; however, a separate departure path is free from obstacles as the approach path is desired (Figure 20).
CHAPTER 5
WEAPONS

1. Characteristics:
   a. Aircooled
   b. Semi-automatic
   c. Gas operated
   d. Shoulder weapon
   e. Clip loaded

2. Data:
   a. Maximum effective range (900 yds)
   b. Maximum range (3,450 yds)
   c. Magazines
   d. Shoulder weapon
   e. Magazine fed

Figure 1 U.S. Rifle Caliber .30 M-1

Figure 2 Colt AR-15, Cal .223
(Redesignated M-16 Rifle)

Table 1a. Fixed and Rotary-Wing Aircraft Capabilities

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Cruise Speed</th>
<th>Range Full Fuel NM</th>
<th>Payload 06 NM Radius</th>
<th>Payload 100 NM Radius</th>
<th>Type</th>
<th>Caliber Equipped</th>
<th>Lb</th>
<th>Gun Pt. Gape Space ft.</th>
<th>External Sling Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH-1B</td>
<td>120</td>
<td>213</td>
<td>3090</td>
<td>3600</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>120</td>
<td>5000</td>
</tr>
<tr>
<td>UH-1D</td>
<td>120</td>
<td>213</td>
<td>3090</td>
<td>3600</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>120</td>
<td>5000</td>
</tr>
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<td>CH-21</td>
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<td>3000</td>
<td>3600</td>
<td>11</td>
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<td>4000</td>
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<td>3600</td>
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<td>3000</td>
<td>3600</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>160</td>
<td>4000</td>
</tr>
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<td>O-1</td>
<td>80</td>
<td>300</td>
<td>6000</td>
<td>7000</td>
<td>12</td>
<td>16</td>
<td>12</td>
<td>120</td>
<td>6000</td>
</tr>
<tr>
<td>O-4</td>
<td>70</td>
<td>250</td>
<td>6000</td>
<td>7000</td>
<td>12</td>
<td>16</td>
<td>12</td>
<td>120</td>
<td>6000</td>
</tr>
</tbody>
</table>

NOTE: Above figures are to be used as guides only. Many factors will influence
the capabilities of any aircraft. Increases in temperature, humidity and altitude
will decrease performance. Desired range will affect load which will determine
number of troops or amount of cargo that can be carried.

IV-61
Figure 1 Carbine Cal .30, M1 & M2

1. Characteristics:
   a. Air cooled
   b. Magazine loaded
   c. Gas operated
   d. Semi and fully automatic
   e. Shoulder weapon

2. Data:
   a. Magazine capacity (15 & 30 rds)
   b. Maximum range (2,300 yds)
   c. Maximum effective range (275 yds)

Figure 2 Pistol Cal .45 M1911 and M1911A1

1. Characteristics:
   a. Recoil operated
   b. Semi-automatic
   c. Magazine Fed
   d. Air cooled
   e. Hand weapon

2. Data:
   a. Maximum range (1,500 meters)
   b. Effective range (50 meters)

Figure 3 Submachine Gun M3

1. Characteristics:
   a. Air cooled
   b. Blowback operated
   c. Automatic
   d. Shoulder weapon
   e. Magazine fed

2. Data:
   a. Maximum range (1,700 yds)
   b. Maximum effective range (100 yds)

Figure 4 Browning Automatic Rifle M1918A2

1. Characteristics:
   a. Air cooled
   b. Magazine fed
   c. Shoulder weapon
   d. Gas operated
   e. Fully automatic

2. Data:
   a. Range maximum (3,500 yds)
   b. Range maximum effective (500 yds)
Figure 3 Browning Machine Gun Cal .50 M1919A4 on M2 mount (top) and on bipod (bottom).

1. Characteristics:
   a. Belt-fed
   b. Recoil operated
   c. Air-cooled
   d. Fully automatic

2. Data:
   a. Maximum effective range (1,200 yds)
   b. Maximum range (3,500 yds)
   c. Maximum rate of fire (600-675 rpm)
   d. Maximum effective rate of fire (150 rpm)

---

Figure 8 Browning Machine Gun Cal .30, M1, M3

1. Characteristics:
   a. Air-cooled
   b. Recoil operated
   c. Fully and semi-automatic

2. Data:
   a. Maximum effective range (3,000 yds)
   b. Maximum range (7,600 yds)
   c. Maximum rate of fire (600 rpm)

---

Figure 9 87 mm Recoilless Rifle M18A1

1. Characteristics:
   a. Air-cooled
   b. Recoilless
   c. Shoulder or mounted weapon
   d. Single-loaded
   e. Fires fixed ammunition

2. Data:
   a. Maximum range (4000 yds)
   b. Maximum effective range (1900 yds)
   c. Bursting area (10 x 36 yds (HE))
   d. 11 yds radius (WP)

---

Figure 10

1. Safety:
   The danger zone from back blast is triangular in shape. It extends approximately 30 feet to the rear of the point of emplacement and at its widest point covers a space of 10 feet on either side of the axis of the emplaced rifle. Do not face the weapon within 100 feet of the rear of the breach because of the danger of flying particles thrown up by the blast. The following danger zone will be for all training.

---

Figure 11

For combat duty the following may be used:

Area 1 - probably lethal
Area 2 - severe wounding
Area 3 - moderate wounding
Area 4 - slight wounding
Figure 12. Rocket Launcher, 3.5-inch M2A1B1

1. Characteristics:
   a. Air cooled
   b. Smooth bore
   c. Open tube (2 pieces)
   d. Recoilless
   e. Shoulder weapon
   f. Electrical firing mechanism

2. Data:
   a. Maximum range (approx) (900 yds)
   b. Maximum effective range (Moving: 300 yds, Stationary: 200 yds)
   c. Armor penetration (approx) (11 in)
   d. Maximum rate of fire (12-18 rpm)
   e. Sustained rate of fire (4 rpm)
   f. Bursting area approx (10x12 yds) (heat)

Figure 14. Mortar 60 mm, M-19

1. Characteristics:
   a. Smooth bore
   b. Muzzle loaded
   c. High angle of fire weapon

2. Data:
   a. Maximum rate of fire (30 rpm)
   b. Sustained rate of fire (18 rpm)
   c. Bursting area (110 yd radius (HE & WP))

V-11

Safety Precautions:

a. All loading and unloading are done on the firing line with the launcher on the gunner's shoulder. The muzzle is pointed down range, not toward the ground.

b. Zone protection: For temperatures below 70 degrees F, the field protective mask must be used. For temperatures above 70 degrees F, the anti-flash mask must be worn.

c. The weapon being in the recoilless principle has a danger zone in the rear. It is triangular in shape and consists of three zones. Before firing a rocket, clear the area to the rear of the launcher of personnel, material, and dry vegetation as indicated in zone A & B.

d. Clear zone A, the blast area, of all personnel, ammunition, materials, and inflammables such as dry vegetation. The danger in this zone is from the blast of flame to the rear. Clear zone B of personnel and material unless protected by adequate shelter. The principle danger in zone B is from the rearward flight of projectile cases and/or igniter wires. An additional safety factor for training is contained in zone C.

V-13

Figure 15. Mortar 81 mm, M28

1. Characteristics:
   a. Smooth bore
   b. Muzzle loaded
   c. High angle of fire weapon
   d. Drop fire

2. Data:
   a. Maximum rate of fire (24 rpm)
   b. Sustained rate of fire (3 rpm)
   c. Maximum range (4,000 yds)
   d. Bursting area (30 x 20 yds)
1. Technical Data and Characteristics:
   a. Maximum range 11,370 meters
   b. Muzzle velocity 1580 fps w/charge
   c. Type of ammunition HE, ILL, Chemical, HE, Blank, semi-
      fixed
   d. Rate of fire Rapid - 4-8 per min Prolonged - 100 rpm
      per hr

2. Technical Data and Characteristics:
   a. Maximum range 14,966 meters
   b. Muzzle velocity 1850 fps w/ch
   c. Type of ammunition HE, ILL and CHEM, separate loading
   d. Rate of fire Rapid fire - 3 rds per min Prolonged fire -
      1 rd per min

IV. IMPROVED RANGES

a. Considerations:
   1. Kind required by the training mission.
   2. Travel time from camp to training area.
   4. Permission for use of area.
   5. Safe impact area (Clear before each firing).
   6. Terrain allows proper fields of fire for training to be conducted.
   7. Vegetation in range area.
   8. Materials available.
   9. Labor and time available.

b. Shooting Gallery.
1. This is an introductory range to give the trainee practice in engaging a target with speed and accuracy.

2. Various targets such as bottles, plates, etc., of various colors and shapes are placed in clear view of the firer at various angles from the firer. He is then instructed to engage targets by commands, giving direction and target. Example, "Right red can."

3. The firer is scored by number of hits and his speed in engaging the correct target.

4. Normally 3 seconds are allowed for each target; however, the instructor may vary this if the degree of training of his students so require.

V-18

6. Transition Range.

1. Personnel are put into foxholes down range with silhouettes on poles. These foxholes must be dug deep enough to afford the operator protection. The range from firing point to target will be determined by your training program.

2. Personnel firing make up the designated position. When ready the range officer blows a whistle and all targets are exposed to the firer. The firer engages targets in his lane. After a designated time a signal is given and targets are lowered. All targets when hit will be lowered immediately.

3. Scoring may be accomplished by allowing so many points for each target hit and so many points for each unscored round.

V-22

1. This range may be used by individual firers or a small patrol. Targets are placed so they become exposed as the trainee rounds a bend or passes a thicket, etc. He will engage the target as soon as he observes it.

2. Trainee is scored on his detection, accuracy, and handling of weapon.

V-23

1. This range may be employed for either vehicle or foot L/A drill.

2. Scoring may be accomplished by allowing so many points for each target hit and so many points for each unscored round.

3. The trainee, organized in squads or larger units, are directed down the trail or road. When the instructor desires to trigger the ambush the automatic weapons in the foxholes open fire into a safe impact area and the silhouette targets are raised. The training unit then deploys, using the desired L/A drill, engaging the target with live fire.

4. The instructor must exercise various safety measures as designating zones of fire and limiting points for deploying units.
IV. 25 METER RANGE ZERO.

a. To zero the rifle for 25 meters (ballet sight), the shot group should be at the point of aim at 25 meters.

b. This sight setting enables the soldier to hit his point of aim at a range of 250 meters.

V. WIND FORMULA.

To determine the clicks for full wind:

\[
R = \frac{W \times (V \times 1000)}{U}
\]

where:
- \(W\) is the wind velocity in miles per hour (mph)
- \(V\) is the velocity of the bullet in feet per second (fps)
- \(U\) is the range in thousands of yards

VI. WIND VELOCITY CHART.

a. Degrees of Angle (flag, hand, etc.) MPH Wind

<table>
<thead>
<tr>
<th>Angle</th>
<th>MPH Wind</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>70</td>
<td>25</td>
</tr>
<tr>
<td>80</td>
<td>30</td>
</tr>
</tbody>
</table>

b. Rule of Thumb Wind Velocity Formula. Hold paper, dust, or grass at arm's length and let it drop. Point to where it lands. Divide the angle between the arm extended and the body by four to get the MPH wind velocity.

VII. TARGET CONSTRUCTION

III. 1000 METER RANGE ZERO

a. To zero the rifle for 1000 yards (ballet sight), the shot group should be 1-1/4 inches above the point of aim at 1000 yards.

b. This sight setting enables the soldier to hit his point of aim at a range of 1000 yards.

CHAPTER 6

COMMUNICATION

PHONETIC ALPHABET AND INTERNATIONAL MORSE CODE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ALFA</td>
<td>. .</td>
<td>G</td>
<td>GOLF</td>
<td>. .</td>
</tr>
<tr>
<td>B</td>
<td>BRAVO</td>
<td>. . .</td>
<td>H</td>
<td>HOTEL</td>
<td>. . .</td>
</tr>
<tr>
<td>C</td>
<td>CHARLIE</td>
<td>. . . .</td>
<td>I</td>
<td>INDIA</td>
<td>. .</td>
</tr>
<tr>
<td>D</td>
<td>DELTA</td>
<td>. . .</td>
<td>J</td>
<td>JULIET</td>
<td>. .</td>
</tr>
<tr>
<td>E</td>
<td>ECHO</td>
<td>.</td>
<td>K</td>
<td>KELLO</td>
<td>. .</td>
</tr>
<tr>
<td>F</td>
<td>FOXTROT</td>
<td>. . .</td>
<td>L</td>
<td>LEDA</td>
<td>. . .</td>
</tr>
</tbody>
</table>

Figure 26 1,000 inch target and 25 meter target
M -- M -- T -- T --
N -- T -- U -- U --
O -- V -- V -- V --
P -- W -- W -- W --
Q -- X -- X -- X --
R -- Y -- Y -- Y --
S -- Z -- Z -- Z --

**Prowords and Prosigns**

<table>
<thead>
<tr>
<th>Proword</th>
<th>Prosign</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>THIS</td>
<td>DE</td>
<td>This transmission is from the station whose designation immediately follows. TO</td>
</tr>
<tr>
<td>OVER</td>
<td>K</td>
<td>This is the end of my transmission and a response is necessary. DO NOT TRANSMIT.</td>
</tr>
<tr>
<td>OUT</td>
<td>AR</td>
<td>This is the end of my transmission and no answer is required. (Since OVER and OUT have opposite meanings, they are never used together.)</td>
</tr>
<tr>
<td>ROGER</td>
<td>R</td>
<td>I have received your last transmission satisfactorily.</td>
</tr>
<tr>
<td>SAY AGAIN</td>
<td>İMI</td>
<td>Repeat all of your last transmission.</td>
</tr>
<tr>
<td>I SPELL</td>
<td></td>
<td>I shall spell the next word phonetically.</td>
</tr>
<tr>
<td>CORRECTION</td>
<td>EEEEEE</td>
<td>An error has been made in this transmission. Transmission will continue with the last word correctly transmitted.</td>
</tr>
<tr>
<td>MESSAGE FOLLOWS</td>
<td></td>
<td>A message which requires recording is about to follow.</td>
</tr>
<tr>
<td>WILCO</td>
<td></td>
<td>I have received your message, understand it and will comply. (To be used only by the address. Since the meaning of the proword ROGER is included in that of WILCO, the two prowords are never used together.)</td>
</tr>
<tr>
<td>I SAY AGAIN</td>
<td>İMI</td>
<td>I am repeating transmission or portion indicated.</td>
</tr>
<tr>
<td>BREAK</td>
<td>BT</td>
<td>I hereby indicate the separation of the last from other portions of the message.</td>
</tr>
<tr>
<td>TIME</td>
<td></td>
<td>That which immediately follows is the time or date/time group of the message.</td>
</tr>
<tr>
<td>WAIT</td>
<td>AS</td>
<td>I must pause for a few seconds.</td>
</tr>
</tbody>
</table>

**Special Forces Handbook**

- **GROUPS**: This message contains the number of groups indicated by the numeral following.
- **READ BACK**: Repeat this entire transmission back to me exactly as received.
- **THAT IS CORRECT**: The following is my response to your instructions to read back.
- **WELCOME**: What you have transmitted is correct.
- **ERROR**: Your last transmission was incorrect. The correct version is __________.
- **RELAY**: Transmit this message to all addresses or to the address designations immediately following.
- **ALL AFTER**: The portion of the message to which I have reference is all that follows ________.
- **ALL BEFORE**: The portion of the message to which I have reference is all that precedes ________.
- **FROM**: The originator of this message is indicated by the address designation immediately following.
- **RELAY (TO)**: The addresses whose designation immediately following are to take action on this message.
- **SLOW**: Reduce speed of transmission.
- **WORDS TWICE**: Transmitting each phrase for each code group twice.
- **VERIFY**: Verify entire message (or portion indicated) with the originator and send correct version. (To be used only at the discretion of or by the addresses to which the questioned message was directed.)
- **SILENCE**: “Silsen” spoken three times means “Cease Transmission Immediately.” Silence will be maintained until instructed to resume. Transmissions imposing “Listening” silence must be authenticated.
- **SERVICE**: The message that follows is a service message.
- **DO NOT ANSWER**: Stations called are not to answer this call, receipt for this message or otherwise to transmit in connection with this transmission. (When this proword is employed, the transmission shall be ended with the proword OUT.)

**Notes**

- I must pause longer than a few seconds.
- I must pause longer than a few seconds.
QSV Send V's
QSY Change transmitting frequency
QSZ Send groups twice
QSW I am going to transmit on frequency
QTE Check you group count
ZBD Message for you
ZKB Take control of net until
ZKE Reporting into net
ZKJ Close down until
ZUE Affirmative
ZUG Negative
ZUR Unable to comply
ZUJ Stand by
ZXV Unable to decipher
ZXV Check encipherment

1 REQUIRE DOCTOR, SERIOUS INJURIES
2 REQUIRE MEDICAL SUPPLIES
3 UNABLE TO PROCEED
4 REQUIRE FOOD AND WATER
5 REQUIRE FIREARMS AND AMMUNITION
6 REQUIRE MAP AND COMPASS
7 REQUIRE SIGNAL LAMP WITH BATTERY AND RADIO
8 INDICATE DIRECTION TO PROCEED
9 AM PROCEEDING IN THIS DIRECTION
10 WILL ATTEMPT TAKEOFF
11 AIRCRAFT SERIOUSLY DAMAGED
12 PROBABLY SAFE TO LAND HERE
13 REQUIRE FUEL AND OIL
14 ALL WELL
15 NO
16 YES
17 NOT UNDERSTOOD
18 RETURN ENGINEER

Figure 1 Ground-Air Emergency Code

1. COMMUNICATOR'S CHECK LISTS.
   a. Radar:
      1. High Ground (F3).
      2. Clearing with no obstructions (F3).
      3. Antenna oriented with receiving station, clear of obstructions (AN).
4. Radio equipment properly ground.
5. Radio set properly grounded (AM).
7. Transmitting site moved, using around the clock method, but not going in a circle (AM).
8. Antenna properly loaded (AM).
9. Transmitter and Receiver on proper frequency.
10. Operator documents not at radio site.
11. Message encrypted currently (AM).
12. Radio site sterilized after departure.

b. Visual Signals:
1. Signals properly placed so as to be easily read.
2. Signals simple and brief.
3. Operator properly oriented on signals and procedures.
4. Signaling device within range of receiver's vision.
5. Signals not too obvious.
6. Alternate signals.

c. Audio Signals:
1. Easily understandable.
2. Clear and loud.
4. Signals changed frequency.
5. Signals simple and clear.
6. Alternate signals included.

d. Message Center:
1. Message center established.
2. All incoming and outgoing messages logged.
3. Code (and alternate code) made up for internal use.
4. Encrypting checked before transmission.

II. RADIO NETTING CONSIDERATIONS.

a. When planning a radio net certain technical factors must be considered in connection with the equipment available. They are:
1. Emission- Are the radios compatible? Are all radios going to operate voice or CW?
2. Frequency- Can the radios operate within the same frequency band?
3. Modulation- AM works only with AM, FM only with FM.
4. Range- Do not play a net beyond the transmission range of the weakest set.
5. Crystals- Are proper crystals on hand if needed.
6. Terrain- Are appropriate high points available for radio stations if lines of sight communications are planned.

b. Operating factors to consider are:
1. Schedule of operation.
2. Proficiency of operators.
3. Communications security.
   a. Physical security of codes cipher.
   b. Cryptographic security and operating information (SO).

---

**TABLE N. 1. AN/GRC-109 - PREPARATION FOR OPERATION**

1. Connect appropriate power supply to power source.
2. Connect transmitter and receiver to appropriate power supply or source.
3. Connect a lead 12 feet or less to the ground set of transmitter and a good ground. (If good ground is not available utilize a counterpoise). 
4. Connect a lead from "RECV ANT" to transmitter and "ANT" on receiver.
5. Connect a lead from "RECV GN" to transmitter and "GRD" on receiver.
6. Connect antenna to "ANT" post on transmitter. Select proper length of antenna to correspond with operating frequency. Antenna must be at least one quarter wave length long. Radio Set AN/GRC-109 will load properly on one foot single-storey antenna that is exactly 1/4 wave length or any multiple thereof. To provide for a better indication for the antenna load lamp, the physical length of the wire may be adjusted 7.10 percent.
7. Set tuning dial on receiver to receiving frequency.
8. Check tuning chart on front of transmitter and tune controls to the settings indicated.
9. Tune all controls on transmitter in proper sequence for maximum gain on the indicator lamps. (Remove the first lamp slightly to prevent a disturbing signal from being emitted.)
10. Connect handset to terminals on the receiver and adjust gain for desired level.
11. Tune the beat frequency oscillator control to the ON position for CW reception and adjust for desired tone.
12. Power Supplies (Must have power source): 
   b. Small Power Supply PP-343 (AC only).
   c. Voltage Regulator CH-158 (6-24V) only.
13. Power Sources:
   a. AC voltage 75-240 VAC @ 60-400 Gms (with PP-3446 or PP-3446),
   b. 6 or 12 volt cell battery (with PP-3446).
   c. Hand generator 2-15/G (with PP-3444, CH-158, or direct to transmitter),
   d. Generator AN/UGK-13 (with PP-3444 or PP-3446),
   e. Dry Battery BA-317 or BA-48 (direct to receiver).

---

**TABLE N. 11. AN/GRC-148, 87, AN/GRC-34, PREPARATION FOR OPERATION**

1. OFF SEND STANDBY switch to STANDBY.
2. PHONE CW NET CAL switch to CAL.
3. PHONE CW CW switch to PHONE.
4. A.P. gain control fully clockwise to STOP.
5. R.F. gain control fully counterclockwise (OFF).
6. Band switch in appropriate band.
7. Turn receiver tuning control to crystal check point nearest desired frequency. Increase R.F. gain control slightly until signal is heard. Adjust receiver tuning control until zero beat is heard as the strongest beat note in the vicinity of the crystal check point. Keep R.F. gain control adjusted to the point where the beat note is just audible.
8. PHONE CW NET CAL switch to NET.
9. PHONE CW CW switch to CW HI.
10. XXXL 4G band switch to MO of appropriate band.
11. Refer to calibration chart, set transmitter tuning control to same frequency as now appears on the receiver dial.
12. OFF SEND STANDBY switch to STANDBY when using GN 58 and RN 317.
13. Adjust A.P. gain for the desired volume and turn R.F. gain to mid point.
14. Adjust OGC CAL control until zero beat is heard. (Do not move microphone or key while performing this step). Power must be obtained at this time from the generator.
15. Refer to calibration chart, set transmitter tuning to desired operating frequency and lock tuning control.
16. Set receiver tuning control to desired operating frequency and tune receiver for zero beat with transmitter. Lock tuning control. Must obtain power from generator.
17. Set antenna selector control to the highest numbered position for the type of antenna being used. Close key or microphone and rotate the antenna tuning control until indicator grows and adjust for maximum grow.
18. Set receiver and transmitter switches for the desired type of transmission and reception.
19. The set is now ready for operation.
TABLE NR. III INTERPOLATION

1. A dial calibration chart appears on each AN/GRC-87.
2. Its purpose is to relate dial settings to transmitting frequencies.
3. The charts on each set are different.
4. The dial calibration chart will not give you the dial setting for unlisted frequencies. You must interpolate to find it.
5. Steps in interpolation:
   a. Subtract the next lower frequency from the desired frequency.
   b. Find the difference between the dial readings just above and just below the desired frequency.
   c. Multiply the value obtained in these two steps.
   d. If in band 1 or 2, divide by 50. If in band 3, divide by 50.
   e. Add the result of step above to the dial setting for the next lower listed frequency. This is the correct dial setting for your desired frequency.

EXAMPLE: Desired frequency in 4877 has:
1. Subtract 4880 from 4877 = 7
2. Subtract 4771 from 4791 = 20
3. Multiply 7 by 20 = 140
4. Divide 140 by 10 = 7
5. Add 7 to 4781 = 1478 proper dial setting

<table>
<thead>
<tr>
<th>Freq</th>
<th>/100 kc</th>
<th>/20 kc</th>
<th>/40 kc</th>
<th>/60 kc</th>
<th>/80 kc</th>
</tr>
</thead>
<tbody>
<tr>
<td>4800</td>
<td>14.5</td>
<td>30.9</td>
<td>61.8</td>
<td>92.7</td>
<td>123.6</td>
</tr>
<tr>
<td>4810</td>
<td>14.25</td>
<td>30.55</td>
<td>61.15</td>
<td>92.05</td>
<td>123.0</td>
</tr>
<tr>
<td>4820</td>
<td>13.92</td>
<td>30.22</td>
<td>60.8</td>
<td>91.8</td>
<td>122.8</td>
</tr>
<tr>
<td>4830</td>
<td>13.61</td>
<td>29.91</td>
<td>60.4</td>
<td>91.6</td>
<td>122.6</td>
</tr>
</tbody>
</table>

VI-12

III. ANTENNA CONSIDERATIONS.

a. One of the most critical aspects of reliable radio transmission and reception is the proper design, utilization and location of transmitting and receiving antennas.

b. Antennas should be "cut" the wavelength of the frequency being used. Most of the time, however, this is not practical, so a 1/4 or 1/2 wave length antenna is used.

c. The formulas below should be used to determine desired antenna lengths.

\[ \text{1/4 wave} = \frac{294}{F} \]
\[ \text{1/2 wave} = \frac{468}{F} \]
\[ \text{1 wave} = \frac{536}{F} \]

**NOTE:** When using radio set AN/GRC-109 with 1/2 wave length end fed antenna, the antenna may be adjusted by 10 percent of the exact wavelength.
FIELD EXPEDIENT JUMBO ANTENNA

This antenna normally used with FM radio sets. It is omni-directional, best used for net control stations.

Figure 9

VI-20

VI-21

Figure 10 World Time Zone Map

VI-22
# CHAPTER 7
## FIRST AID

### TABLE NR. 1 FIRST AID TREATMENT

<table>
<thead>
<tr>
<th>AILMENT</th>
<th>SYMPTOMS</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock</td>
<td>Pale face</td>
<td>Lay patient on back.</td>
</tr>
<tr>
<td></td>
<td>Cold clammy skin</td>
<td>Lower head, elevate feet.</td>
</tr>
<tr>
<td></td>
<td>Rapid weak pulse</td>
<td>Loosen clothing, keep warm.</td>
</tr>
<tr>
<td></td>
<td>Shallow breathing</td>
<td>Feed hot liquids if conscious.</td>
</tr>
<tr>
<td>Wound</td>
<td>Expose wound.</td>
<td>Control bleeding.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apply sterile dressing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treat for shock.</td>
</tr>
<tr>
<td>Fracture</td>
<td>Pain and tenderness</td>
<td>Splint with care; splint before moving.</td>
</tr>
<tr>
<td></td>
<td>Partial or complete loss of motion</td>
<td>Support the limb on either side until splint is applied.</td>
</tr>
<tr>
<td></td>
<td>Swelling</td>
<td>Splints must be long enough to reach beyond joints above and below fracture and must be tied twice above and below break in immovable limb.</td>
</tr>
<tr>
<td></td>
<td>Dislocation</td>
<td>Pad all splints.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treat for shock.</td>
</tr>
<tr>
<td>Burn</td>
<td>First degree: Skin red No blister</td>
<td>Carefully remove or cut clothing away from burned area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don't open blisters.</td>
</tr>
<tr>
<td></td>
<td>Second degree: Skin blistered</td>
<td>Cover area with sterile dressing.</td>
</tr>
</tbody>
</table>

### TABLE NR. 1 FIRST AID TREATMENT CONTINUED

<table>
<thead>
<tr>
<th>AILMENT</th>
<th>SYMPTOMS</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn (continued)</td>
<td>Third degree: Skin destroyed and charred</td>
<td>Keep burned area apart by separate bandages.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treat for shock.</td>
</tr>
<tr>
<td>Sunburn (direct exposure to sun)</td>
<td></td>
<td>Remove from sun.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Take off all clothing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elevate head and shoulders.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apply cool compresses or bathe patient in cool water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Give patient cool salt water.</td>
</tr>
<tr>
<td>Heat Exhaustion</td>
<td></td>
<td>Move patient to shade.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reassure as for shock.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Give cool salt water.</td>
</tr>
<tr>
<td>Frostbite</td>
<td></td>
<td>Do not rub, bend or expose to excessive heat or further cold.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warm area to body temperature by holding close to warm body or exposing to warmth no higher than 95 degrees.</td>
</tr>
<tr>
<td>Snake Bite</td>
<td>Bites from poisonous snakes will cause swelling in about 45 minutes.</td>
<td>Treat all snake bites as poisonous.</td>
</tr>
</tbody>
</table>

### Figures

1. **Identifying a pit viper**
   - Positive identification for the pit viper family

2. **Sea Snake**
   - Teeth marks of poisonous snake (note fang marks)
   - Teeth marks of non-poisonous snake (note two rows)
II. FIRST AID PRINCIPLES:
   a. Stop bleeding.
   b. Protect the wound.
   c. Prevent or treat for shock.
   d. Splint fractures.

III. CONTROL OF BLEEDING:
   a. Elevate injured member if not fractured.
   b. Apply pressure bandage.
   c. Use pressure points if blood is gushing (whenever strong pulse is felt). (See figure on pressure points.)
   d. Use tourniquet only as last resort.

IV. PRESSURE POINTS:

V. TYPES OF BLEEDING:
   a. Arterial — spurt ing.
   b. Venous — flowing.
   c. Capillary — oozing.

VI. ARTIFICIAL RESPIRATION - BACK-PRESSURE ARM-LIFT:
   a. Place your hands on the back of the victim’s neck so that the palms lie just below an imaginary line running between the arm pits. With tips of your thumbs just touching, spread your fingers downward and outward.
CHAPTER 8
SURVIVAL

HOT-WET SURVIVAL
INFORMATION

1. Be Alert
2. Be Wary of Strangers
3. Guide on Trails to Friendly Villages
4. Follow or Float on Waterways to Sea Coast
5. Food Grows in Fields Near Villages
6. Conceal All Evidence of Your Being in an Area
7. A Few Feet into Dense Jungle Will Hide You
8. Insect Repellent Applied to Fiber Makes Good Tinder
9. Boil or Treat All Water Used for Drinking or Washing

Evasion.

E. First, get as far away as possible. Sometimes this may mean several miles; at other times, just a few yards. Plan your escape, do not run blindly. Use your head -- there is no substitute for common sense. As soon as possible, sit down, think out your problem, recall what you learned in training.

F. Pinpoint your location as accurately as possible, using your compass, sun, map, known landmarks, etc. If your compass is broken or lost, remember that when facing the sunrise, North is to your left. The following methods can be used for determining direction.

Using the Southern Cross: In the Southern Hemisphere you can find south by locating the Southern Cross. Compare this group of stars to a kite.
1. Shadow tip method for finding direction: Drive a stake so that at least three feet of it is above the ground. Mark the tip of the shadow it casts. Wait for a while—10 minutes is long enough—and mark the spot where the tip of the shadow is then resting. A line drawn between the two marks will always point north.

![Diagram showing the Shadow Tip Method](image)

**Figure 4. Shadow Tip Method.**

- In north temperate zone, this direction will be true north.
- In south temperate zone, this direction will be south.

\[ \text{W} \rightarrow \text{N} \rightarrow \text{E} \]

2. Study the map. Determine the slope of the land to guide on. Notice all large waterways. People usually live and travel on the waterways.

b. Determine the direction in which you wish to go, move in one direction, but not necessarily in a straight line. Pick a linear objective, not a point objective, as it is easier to locate. Avoid obstacles — don’t fight them. Take advantage of natural cover and concealment. Blundering through jungle and wooded areas leads to bruises, scratches, and quick exhaustion.

c. Check bearings often. Roads and trails can be used to guide on, but never travel on them. Stay alert. Natives remain on trails by preference. A few feet from the trail you are usually quite safe. Conceal yourself upon the approach of any other person until he passes or until you determine whether or not he is friendly.

3. The easiest traveling is on the crests of ridges. Remember, however, that crests are more exposed than hill slopes, and because of ease of travel, they are apt to be traveled more frequently than other areas.

k. Rivers or streams can make good roads but remember that the majority of native villages and encampments are on water. Rafts attract attention. Floating on or close to a log or drifting bush may be the simplest way to travel. Keep to the middle of the stream. If using a native boat, sink it during periods when not in use.

l. When close to known enemy locations, move right after sunset or just before sunrise when there is sufficient light to enable you to avoid enemy installations, mine fields, sentries, etc., but dark enough to prevent recognition by the enemy. Arrange your clothing, weapons, etc., to present a profile as similar as possible to the natives of the area.

m. Be quiet. Noise carries far and natives are alert to any strange noise. Bury your refuse. If the enemy finds sign of your presence, it may lead to your capture.

n. Do not sleep near your fire or your water supply. Get far enough away to be concealed.

o. If lost in grass that is so tall that you cannot see over it, as a last resort cut down enough to give you some freedom of movement and, using your machete or any other tool, dig a hole to crawl into and set fire to the grass. Take every precaution not to get burned by fire or subpodized by smoke.

VIII-6

p. The jungle provides many hiding places. You may have to use them. Bamboo thickets are excellent. Because of the nature of bamboo, you cannot be approached without being startled by the noise of dry bamboo.

q. When approaching camp, use extra precaution, for the camp is probably being watched.

r. At all times when hiding or remaining in one location for a period of time, be sure to plan more than one exit.

II. SURVIVAL.

a. Get to known friendly village as soon as possible. Avoid all others except as a last resort. It is difficult for a person unfamiliar with the jungle to live in it without native assistance.

b. Before entering any strange village, whether it is friendly or not, conceal your weapons. If it is an enemy village, weapons will be taken from you. If it is a friendly village, you cannot always go back and get them from where they are hidden.

c. Many of the jungle diseases are insect borne. Use insect repellent freely, if available.

d. Take time to repair your clothes. It helps to prevent insect bites and further tearing of clothes.

e. Examine your surroundings carefully. Many of your needs are there. Thorns broken from bamboo or trees can be used for needles. Strips of vines can be made into thread. If you need rope, vines will do. Your food and shelter, in fact your life, may depend on your ability to make use of things that are all around you.

f. Be careful. Do not use trees and vines to pull yourself up hills as horses, ants, scorpions, etc., will be encountered and make wounds that may become infected. Use a walking stick to push aside vines and bushes.

g. Poisonous reptiles and large mammals of the jungle will cause few problems. Given a chance, they will avoid you.

h. If a survival kit is available most articles are self-explanatory. Some have multiple uses. The waterproof adhesive tape can be used for temporary repairs to clothing and mosquito nets as well as covering body wounds. Fish line can be used for snares. Three fish hooks, their shafts tied together with their

VIII-6

hooks pointing out, can be used on the fish line to snare fish, crabs, etc. Head nets can be used as fish nets and snares. A fish hook fastened to a length of line, baited with fish or meat and left on the sea shore or in a field may be used to catch birds.

III. WHEN REQUESTING NATIVE ASSISTANCE:

a. Show yourself and let the natives approach you.

b. Deal with recognized headman.

c. Do not approach groups.

d. Do not display weapons.

e. Do not risk being discovered by children.

f. Treat natives well. There is much you can learn from them.

g. Respect local customs and manner.

h. Learn all you can about woodcraft.

i. Take their advice on local hazards.

j. Never approach a woman.

IV. SHELTER.

a. Pick a high spot when making camp. Avoid dry river beds, dead trees,
and ant nests. Avoid bat caves; droppings may cause rabies.

b. Do not sleep on the ground if you can avoid it. Use your hammock if you have one, or make one of poncho or the multi-purpose net. If this is not possible, build a platform of bamboo, small branches, etc. It will assist in avoiding insects, reptiles, etc.

VIII-7

c. Types of jungle shelters:

(1) Simple parachute shelter made by draping a parachute over a rope or vine stretched between two trees.

(2) Thatch shelter (see figure 5) made by covering an A-type framework with a good thickness of palm or other wood leaves, pieces of bark, or mats of grass. Slant the thatch stingle fashion from the bottom upward. This type of shelter is considered ideal since it can be made completely waterproof. After you finish your shelter, dig a small drainage ditch just outside the lanes and leading downhill; it will keep the floor dry.

Figure 5. A-type framework.

VIII-8

(3) Beds. Don’t sleep on the ground; make yourself a bed of bamboo or small branches covered with palm leaves (see figure 6). A parachute hammock may serve the purpose. You can make a crude cover from tree branches or leaves; even the bark from a dead tree is better than nothing.

Figure 6. Bamboo bed.

V. WATER

a. Water is more important than food. If you have no water, do not eat. Check all drinking water for leeches and other small aquatic animals.

b. Indian wells. In dry areas, water can usually be found by digging a hole two or three feet deep in the bottom of dried up streams and river beds. When water has been obtained, camouflage hole.

c. Boiled or untreated water.

(1) Many vines have water in them. The vine should be cut through. When a sick is cut in the vine about three feet above the original cut, a potable liquid will drip out. Do not apply vines to lips. Avoid any vine, plant, or tree with milky juice as many are poisonous. Water can be found at the base of the leaves of palms; or in sections of dead bamboo (see figure 7). A section of bamboo placed against a tree will collect water during rain. Moisture collects under leaves in the dry season. Rub these with a cloth or other absorbent material, squeeze it out into container.

Figure 7. Extracting water from vines.

Figure 8. Bamboo joints contain water.
(2) At the sea shore, drinkable but brackish water can be procured by digging a hole ten feet above the high tide line.

(3) If water is scarce, travel during coolest part of day or during night.

VII-11

Rest during heat of day. By doing this, the water content of the body is conserved.

TABLE NR. 1 SURVIVAL TIME CHART

<table>
<thead>
<tr>
<th>MAX. TEMP.</th>
<th>AVAILABLE WATER PER MAN IN DAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>90</td>
<td>6</td>
</tr>
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<td>7</td>
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<td>20</td>
<td>13</td>
</tr>
<tr>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

NOTE: Columns 2-7 show survival time in days.

VI FOOD.

a. There is food in the jungle if you know where to find it. Plan one good meal each day but nibble on any food that you may have or can find. Eat strange food in small quantities and wait for a reaction. Avoid all mushrooms. There is little nutritional value in them and much danger.

VIII-12

(1) In villages, eat only food that is hot, if possible. If for fear of offending your host you have to eat native food that is not hot, take a yellow pill to avoid dysentery. All vegetable or fruit procured in a village or handled by natives should be peeled.

(2) Possession of a knife is vital for successful foraging. If you do not have one, a serviceable blade can be made from split bamboo. Split dry bamboo with a stone, break out a piece, sharpen on a stone, fire harden and sharpen. The result will be a crude but effective tool or weapon.

b. Animal food. Grasshoppers, ants, eggs, harmless caterpillars, larvae and termites, are good when cooked. Remove heads, skin, and intestines of snakes, rats, mice, frogs, lizards, before cooking. Eats can be caught in caves by flailing the air through which they are flying with a multi-branched stick. Inasmuch as bats are carriers of hydrophobia, do not get bitten.

c. Traps and snares. Indiscriminate placing of traps is a waste of time. Small game such as rabbits, mice, etc., travel on paths through the vegetation. Set traps in or over these trails. A serpentine fence will guide certain birds, like pheasants and some larger animals, to your traps. Cut or collect brush for the fence and build it two feet high or more. Place traps in depth of curve.

VIII-15

d. Fish. There is no rule to determine edible fish. Avoid all strange or oddly shaped fish. Only those muscles, clams, oysters, etc., are found underwater at low tide are safe. Salt water fish and shell fish can be eaten safely raw. Do not eat the eggs or intestines of any fish. Salt water swells come in all sizes and shapes. All are good to eat. Avoid octoe snails and terres. Some have poisonous stings that can be fatal. Never eat fresh water fish without cooking or when the flesh is soft or the eye sunken for they are undoubtedly diseased.
Figure 12. Improvised hooks and lines.

1. Fish are attracted to light. If the area is safe, use torches at night to attract the fish. A head net made in a circular form by threading with bamboo or string on a crotched stick will make a dip net. Fish in ponds or at the edge of the bank can be driven into the shallows by flattening the water with hands or brush. Clean fish immediately when caught. If you are in a group, work together to drive the fish and to net them. Help each other.

2. Do not try to preserve meat or fish for any length of time. In the tropics flesh of any kind spoils rapidly unless dried or smoked.

Baited Skewer

Figure 13. Skewer hook.

VIII-17

Figure 14.

VIII-18

VII. FIRE.

a. Keep your fire small. In the rainy season or in damp jungles, dry fuel may be difficult to obtain. Carry dry tinder with you to assist in starting your fire. By cutting away the wet outer cover of a sound log, dry fuel can be obtained. Shave dry wood or dead bamboo into thin slivers and stack in tent formation over tinder. Pile heavier fuel around fire and add slowly until fire is well started. If fuel is damp, stack it close to fire to dry out.

b. If the jungle floor is flooded or may become so, build your fire on a heap of stones or wet wood. If necessary, build a shelter over the fire to protect it from the rain. If the weather gets cold and you need fire for survival, build a screen on the opposite side of the fire from you to reflect the heat toward you. A screen of leaves or branches three or four feet square tied together with fish line or vines will do the job. Tilt the screen with the top toward you. Fiber soaked in insect repellent makes good tinder.

VIII. COOKING.

a. If larger game has been killed, the stomach or skin can be made into a cooking vessel after being cleaned. Fasten three strings into holes made in the top of the wall of the open stomach or skin pouch and tie to the apex of a tripod made of sticks. Fill with water, which can be brought to a boil by putting in fire-heated stones. If sticks are not available and if the ground is not too wet or sandy, the skin or stomach pouch can be used as a liner for a hole in the ground. Then fill with water and place fire-heated stones into it.

b. Meat and fish can be stuck onto a sharpened green stick and roasted over a fire.

c. Small animals and birds can be roasted easily. Draw and skin them and wrap in leaves, clay, or mud.bury in a pit, the bottom of which is lined with heated stones. Fill pit with dirt. In the morning when the pit is opened, you will find the meat well cooked and hot. Larger game can be prepared the same way by cutting into small pieces.

Figure 15. Pit fire.
CHAPTER 9

MISCELLANEOUS

IX. HEALTH.

a. Care of your person is extremely important. If you have a survival kit, directions for the use of drugs are printed on the containers.

b. Treat every wound or sore as soon as possible. To stop bleeding in the absence of bandages, apply freshly made spider webs. This will assist in the coagulation of the blood.

c. In the absence of toilet paper, use leaves and grasses. Be careful to examine the leaves and grasses for insects. Use no leaves that have any fuzzy or hairy surfaces or are taken from a tree or plant with milky sap, or grass that has a serrated edge. Do not use material that is laying on the ground.

d. Leeches and ticks can be partially avoided by tying cuffs of your jacket at the wrist and the bottoms of your socks outside the boots and applying insect repellent to all openings. Clean your clothes and body frequently. Remove leeches and ticks carefully. If pulled off quickly, they may leave their heads in the bite. Infections will result. Wet salt, lime, or lime juice will cause them to withdraw their heads and fall off. Don’t hurry the process.

e. In case of heat stroke, heat exhaustion, or heat cramps, lower the body temperature by drenching with water or covering the body with wet clothing. Dissolve two salt pills in the equivalent of a cup of water and drink. Rest until all symptoms have passed.

f. In cases of diarrhea when no drugs are available, a tea made from boiled gorse leaves or charcoal eaten with hot water will be beneficial.

g. Boils can be brought to a head by applying hot packs.

h. Avoid sunburn. Even a short time in the jungle will reduce your resistance to the sun. Serious infection can result from over-exposure. Keep covered. Do not risk a painful, dangerous burn.

I. MOST IMPORTANT OF ALL, KEEP YOUR HEAD, TRY NOT TO GET TOO TIRED, REST FREQUENTLY, BE CAREFUL, AND DO NOT GIVE UP.
TABLE NR. II  AERIAL PHOTOS (CONTINUED)

6. Number each center line 50 and give numerical values to the other lines, increasing right and up.

7. Read coordinates as any other.

TABLE NR. III  LONG RANGE PHOTOGRAPHY
(15-mm Camera & Binoculars)

Procedure:

Camera:
- F Stop: M 18 f x 30 binoculars F 10
- M 17 f x 36 binoculars F 9
- Speed: As required by film ASA
- Range: Infinity

Binoculars:
- Set left eyepiece at zero.
- Sight through right eyepiece and adjust to focus.

Set binoculars to camera:
- Place left monocular (with reticle) flush with camera lens.
- Take picture without moving either binoculars or camera.

TABLE NR. IV  MAP-DISTANCE CONVERSION

<table>
<thead>
<tr>
<th>Distance</th>
<th>Feet</th>
<th>Yards</th>
<th>Meters</th>
<th>MILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
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<td>20,000</td>
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<td>15,000</td>
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<tr>
<td>Feet</td>
<td>7,200</td>
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<td>3,600</td>
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<tr>
<td>Yards</td>
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<tr>
<td>Meters</td>
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<td>0.115</td>
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<tr>
<td>MILES</td>
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<td>0.0014</td>
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<td>0.0011</td>
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TABLE NR. V  USEFUL KNOTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Illustration</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td><img src="image" alt="Square Knot Illustration" /></td>
<td>Join two ropes of same size, [will not slip, but will draw tight under strain.] To and black lashings.</td>
</tr>
</tbody>
</table>

TABLE NR. VI  MISCELLANEOUS INFORMATION

**PRINCIPLES OF WAR**

- M nee
- O objective
- S simplicity
- S surprise
- C command unity
- O offensive
- M maneuver
- E economy of forces
- S security

**REPORTING INFORMATION**

- S site
- L location
- U unit
- T time
- E equipment

**TERRAIN ANALYSIS**

- C critical features
- O observation
- C cover and concealment
- O obstacles
- A avenues of approach & withdrawal

**PRISONERS OF WAR**

- S search
- S capture
- S seizure
- S hand

**INTELLIGENCE EVALUATION LEGEND**

- A- Complimentary reliable
- B- Usually reliable
- C- Fairly reliable
- D- Not usually reliable
- E- Unreliable
- F- Reliability unknown

**GUERRILLA TRAINING**

I. GUERRILLA TRAINING AIDS: Survive, Obey, Fight.
II. TRAINING PLAN:

a. Steps in planning:
   1. Analysis of the mission.
   2. Systems for training:
      (a) Decentralized.
      (b) Centralized.
      (c) Combination of Systems.
   3. Estimate of training situation:
      (a) Training to be conducted.
      (b) Personnel:
         (1) Available for cadre.
         (2) To be trained.
   4. Time.
   5. Training facilities.
   6. Training aids.
      1. Equipment.
   b. Decisions.
   c. The Plan.
   d. Principles of scheduling:
      1. Facilities preparation of instruction.
      2. Facilities learning.
      3. Use training time effectively.
      4. Accommodate the troops.

III. LEGAL STATUS OF GUERRILLAS:

a. Be commanded by a person responsible for his subordinates.
b. Have a fixed distinctive insignia recognizable at a distance.
c. Carry arms openly.
d. Conduct operations in accordance with the laws and customs of war.

IV. FOR SUCCESSFUL EMPLOYMENT OF GUERRILLA WARFARE:

a. The spirit of resistance must be present in a segment of the population.
b. The guerrillas must have the support of the civilian populace.
c. The guerrilla movement must have a sponsor.

V. RECORDS OF GUERRILLAS:

a. Personal roster: name, rank, date joined, date discharged.
b. Oath of enlistment.
c. Theatre records and reports.
d. Casualty reports.
e. Payrolls.

VI. GUIDE TO ASSESSMENT OF THE AREA:

a. Initial Assessment.
   1. Location.
   2. Team morale and condition.
   4. Security (local): area, attitude of local civilians, escape plan and alternate areas, enemy situation, civilian support available.

b. Principal Assessment (a continuous estimate of the situation):
   1. Information of the enemy: includes: Dispositions, composition, identification, and strength; organization, armament, and equipment; degree of training, morale, and combat effectiveness; operations (recent and current activities of the unit, counter-guerrilla activities, capabilities, current security systems within the unit); unit moves of responsibility; daily routines of the unit; logistics support to include: installations and facilities, supply routes, method of troop movement; past and present reprisal actions.
   2. Information of security troops and police units: dependability and reliability in the existing regime and/or the occupying power; disposition, composition, identification, and strength; organization, armament, and equipment; degree of training, morale, and efficiency; influence on relations with the local people.
   4. Information of the civil government: Controls and restrictions (documentation, rationing, travel and movement restrictions, blockades and curfews); current value of money, wage scales; the extent and effect of the black market; political restrictions; religious restrictions; the control and operation of industry, utilities, agriculture, and transportation.
   5. Information of potential targets: Railroads; telecommunication: POL; electric power; military headquarters and installations; radar and electronic systems; highways; inland waterways and canals; sea ports; natural and synthetic gas lines; industrial plants.
   6. Information of the terrain: Location of areas suitable for guerrilla bases, units and other installations; potential landing zones, drop zones, reception sites; routes suitable for guerrillas and enemy; barrier to movement; the seasonal effect of the weather on terrain and visibility.
   7. Information of the weather: Precipitation, cloud cover, temperature and visibility; wind speed and direction; light data (e.g., E, EN, sunsets, moonset, moonrise).