

OPERATIONS REPORT LESSONS LEARNED REPORT 1-68

SUMMARY OF LESSONS LEARNED



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TAB 80-21



DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
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AGAM-P (M) (31 Jan 68) FOR OT RD-1-68

1 February 1968

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Kenneth G. Wickham

KENNETH G. WICKHAM
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SECTION I

MANEUVER TACTICS AND TECHNIQUES

1. ITEM: Pursuit, battlefield sweep and evacuation of the wounded. (670698)

DISCUSSION: The 4th Infantry Division reports that there is a built-in conflict as to what action should be taken immediately upon the enemy attempting to withdraw in the dense jungle near the Cambodian Border. The ideal situation would be to have a landing zone in the immediate proximity of the contact area through which reinforcements could be inserted to initiate an aggressive exploitation or pursuit. Simultaneously, the US unit in contact should evacuate its wounded and dead and initiate an immediate sweep of the battlefield. However, in dense jungle landing zones are not readily available in the vast majority of cases. As soon as the situation permits, and in the absence of a landing zone, the US unit must cut a landing zone out of the jungle foliage to evacuate the wounded. The normal time required to cut such a landing zone is about 15 hours, but may often extend to 24 hours and, on occasion, may exceed 36 hours. During this period, the enemy is making a maximum effort to evacuate his wounded, documents, weapons and other items of equipment from the battle area. In many cases, he is able to physically remove his dead before a sweep of the battlefield can be accomplished.

OBSERVATION: Each situation must be analyzed carefully to determine the sequence of the actions to be taken. If at all possible, reinforcements should be inserted to pursue the enemy and to otherwise exploit the situation. Moreover, immediate action must be taken either by the US unit in contact or by the reinforcing unit, as the case may be, to conduct an immediate sweep of the battlefield. Obviously, the seriously wounded must be evacuated from the battlefield by the fastest method in order to prevent further loss of lives. To accomplish all of these things in the proper order or simultaneously requires careful judgment and coordination by the commanders involved.

2. ITEM: Combat in rock complexes. (67X071)

DISCUSSION: The 3d Brigade, 25th Infantry Division, during Operation Thayer II, conducted sustained combat operations in mountainous terrain containing numerous rock complexes. The following is based on the brigade's experiences:

- a. Operations within rock complexes. Combating the enemy within a cave is extremely difficult. Since the enemy inhabits the cave, he knows where the passages lead and has the advantage of interior lines of communication in his reinforcing capability.

Additionally, he has a defense plan based on a detailed reconnaissance, knowing well in advance what avenues of approach must be used by his opponents. The attacker has no way to make a reconnaissance except by fire. Although the advantage is on defense, there are several advantages that accrue to the attacker. The attacker has the initiative and freedom to choose where and when to strike. Secondly, the attacker has a significant psychological advantage in that the defender harbors a great fear of being entombed alive. The final result depends mostly on the quality of the individuals fighting the engagement.

b. Organization of rock complex fighting teams. A typical rock complex fighting team consists of three to four men led by an experienced non-commissioned officer. The point man leads the way and provides security to the front. The second man in line, normally the leader, provides observation and security to the flanks. The rear man secures the rear and becomes the guide in case a rapid withdrawal is necessary. The point man should carry a large flashlight to investigate cracks and crevices. This light must be cautiously used as it will often draw enemy fire. Training and practice in the attack of a rock complex are absolute necessities for successful accomplishment of the mission.

c. Use of hand grenades within rock formations. All types of hand grenades can be effectively used at rock formations entrances, but once the team is underground the fragmentation type hand grenades are not practicable. If thrown, the effect on friend and foe alike is chaotic.

d. Use of demolition within the underground rock complex. The most effective method of underground rock complex destruction is through the utilization of demolitions. Great quantities of explosives, nearly 75 tons, were required to destroy the underground rock complexes which were found in the brigade's area of operations. Transportation of the explosives was a most difficult logistical problem. Maximum use was made of small satchel charges by tossing them into the cave entrance then exploding the charge with a claymore firing device.

e. Use of individual weapons within an underground rock complex. Due to the size of the M60 machine gun and noise it created, it was impossible to use the weapon in the caves. The identical problem exists with the M14 rifle. The XM16E1 proved to be somewhat better than either of the other two weapons due to its light weight and compact size; however, as with all weapons with high muzzle velocity, ricochets were so frequent and so dangerous that our soldiers were reluctant to use them. The best weapon by far proved to be the caliber .45 automatic pistol. As the ranges at which most kills were made were in the neighborhood of a few feet, there was little need for accuracy. The tremendous stopping power of the caliber .45 pistol at close ranges more than once literally blew the enemy down as well as killing him.

OBSERVATION:

a. The psychological effect on the enemy can be exploited by using a small portable loud-speaker encouraging the enemy to come out or be buried alive. A rock complex can be attacked through many openings by using small elements (less than fire team size) operating independently but with a common mission. Little use can be made of demolitions, or fragmentation grenades once a team is within the cave as the explosives have an equal effect on both friend and enemy. The demolitions, and fragmentation grenades affect the eardrums. Therefore, the battle within the cave rock complex returns to the most primitive of fights; man against man, using pistols at ranges of two and three feet. Here control and leadership is difficult and the will of the individual becomes the dominant factor.

b. The technique of rock complex fighting requires detailed planning and violent execution similar to the technique developed by the US Army for destruction of a fortified area. The main difference in the attack of a cave complex and the attack of a fortified area lies in the intelligence field for in a cave complex a reconnaissance is impossible.

c. Hand grenades can be employed by troops outside the caves but once inside only non-fragmentation grenades can be used, such as white phosphorous and CS, and these must be used with extreme caution. The best technique is to employ them around corners or down in crevices.

d. When underground rock complex destruction is required a great quantity of explosives will be necessary to break the vast amount of rocks that support the cave and the entrance. The transportation problem was solved by using a CH-47 helicopter with a 100 foot sling which transported the explosives directly to the rock complex entrance where the demolition was to take place. The explosives were emplaced and exploded. The technique used was to throw the small satchel charge device into the rock complex while a soldier stood by with a claymore firing device. No sooner did the charge fall to the ground than it was exploded with the firing device preventing the enemy from tampering with it.

e. Since the caliber .45 pistol has an extremely low muzzle velocity and a very heavy slug, there is little chance of a ricochet hitting the firer. The big disadvantage is the report from the pistol which at times will stun the firer, momentarily preventing a good second shot. For future operations of this nature silencers would be useful.

3. ITEM: Stay behind patrols in areas where units have remained overnight. (670624)

DISCUSSION: Reconnaissance of areas previously occupied by US units revealed that all holes had been dug up. Also, ralliers reported that Viet Cong reconnaissance elements maintained surveillance of US troop movement by trailing about five to ten minutes on a parallel route. During Operation Diamondhead, stay behind patrols were left in the vicinity of vacated assembly areas.

OBSERVATION: On two occasions, Viet Cong were taken under fire within 15 minutes of the departure of the main body. Both instances resulted in enemy casualties and the capture of weapons.

4. ITEM: Effectiveness of cordon and search operations.
(670698)

DISCUSSION: Village cordon and search operations are an effective method of temporarily destroying or neutralizing the local Viet Cong infrastructure. As soon as the tactical units leave the area however, the Viet Cong will begin to rebuild their organization, unless GVN Revolutionary Development teams or similar type government organizations move in to permanently secure the area and prevent the Viet Cong from re-entrenching themselves.

OBSERVATION: Revolutionary development efforts must follow immediately behind tactical cordon and search operations if the full value of the tactical efforts are to be realized.

5. ITEM: Utilization of gunships supporting a unit in contact.
(670698)

DISCUSSION: Frequently gunships are called to an area of contact. Upon arrival on station they are then required to orbit and ultimately are never used because of the presence of other fire support means. The resolution of this problem lies in the commander's integration of the gunship support with the artillery and tactical air support available.

OBSERVATION: One solution would be to give the gunships a separate mission and area of operation within the zone of contact, such as covering the enemy's escape routes. Gunships, employed at treetop level, are particularly useful in identifying the direction and extent of enemy movement and in conducting a visual reconnaissance by fire for friendly units moving to contact.

6. ITEM: Location and destruction of North Vietnamese Army reserve forces. (670698)

DISCUSSION: During a recent North Vietnamese Army attack on a company patrol base visual reconnaissance aircraft discerned

considerable movement 1500-2000 meters behind the attacking North Vietnamese force. Artillery and air strikes were placed in the suspected area. A sweep of the area after contact had been broken revealed large numbers of enemy casualties.

OBSERVATION: The possibility exists that reserve units of a North Vietnamese attacking force will be 1500-2000 meters behind the attacking elements. This general area should be considered and reconnoitered as a target for artillery and air strikes to inflict greater casualties on the enemy and prevent his reinforcing attacking units.

7. ITEM: Mobile strongpoint security for convoy routes. (670698)

DISCUSSION: The 4th Infantry Division reported that the age and high mileage on the combat vehicles in the armored cavalry squadron, and especially the armor battalion, made it necessary to reduce escorting of convoys to a minimum, and instead, employ mobile strongpoints for the security of convoy routes. This practice has provided continuous surveillance of bridges, critical terrain features and likely ambush areas but with much less mileage being accumulated on the tanks and armored personnel carriers. All convoys have continuous coverage and the number of convoys or their size is not limited by the availability of combat vehicles for escort.

OBSERVATION: The mobile strongpoint method of convoy route security has eased the problem of excessive mileage and the resulting maintenance problems. Even if each convoy was provided escort, bridges and other critical sites along its route would still require a constant security force. The strongpoint system has proven successful in that no convoy has been ambushed since the system was adopted in December 1966.

8. ITEM: Small unit movement. (660509)

DISCUSSION: A squad or platoon should never use the same general route moving to or from an area. A unit in the habit of returning along the same route used prior gives the enemy a chance to maneuver and prepare an ambush.

OBSERVATION: When possible, use a different route to return. Do not establish a pattern of action that will allow the Viet Cong to anticipate friendly actions.

9. ITEM: Use of armed helicopters to interdict Viet Cong escape routes. (670221)

DISCUSSION: Armed helicopters have been used successfully to observe the enemy attempting to flee operational areas during search

and destroy operations. Recently it appears that the Viet Cong are trained to remain in hiding while the armed helicopters are on station and when the helicopters withdraw to rearm or refuel, to quickly withdraw from the area.

OBSERVATION: A technique successfully used is to have the armed helicopters accompany the combat assault helicopters and then orbit on station as the unit organizes and begins its search. Then at a time determined by the airmobile force commander, the gunships withdraw from the operational area and orbit in an area three to five kilometers away, and then after a five minute interval, return to the operational area at low level. This has resulted in the sighting of Viet Cong attempting to flee the area believing that the armed helicopters had been withdrawn from the area. (See Item 18, Section II)

10. ITEM: Special considerations for night heliborne operations. (670708)

DISCUSSION: The 11th Combat Aviation Battalion reports that night combat assaults introduce two special considerations that are not present during daylight assaults. The first consideration is marking of landing zones. If the battlefield illumination is properly placed and timed, all pilots involved in the assault will know the approximate location of the landing zone. Green or yellow smoke will show up well as a mark for the desired touchdown point. If the assault is conducted without illumination, the landing zone can be marked by firing a flare pistol after the troop carriers have been vectored onto the final approach. The second special consideration for night combat assaults is notification of the troops to disembark. Troops must be cautioned to stay on the troop carriers until the aircraft commanders of each helicopter give them a signal to disembark. This is done to preclude having troops exit the helicopter prematurely while either still high above the ground or while hovering to clear obstacles such as dikes, ditches, streams or bomb craters.

OBSERVATION: Night combat assaults can be conducted on a routine basis if all the special planning considerations are evaluated. There can be no substitute for deliberate planning and professionalism.

11. ITEM: Illumination of night heliborne operations. (670708)

DISCUSSION: The 11th Combat Aviation Battalion has participated in several night combat assaults during which several variations of battlefield illumination were used. The best means of battlefield illumination has been found to be flares, either air dropped or fired by artillery or mortars. There are two major considerations in the use of illumination. The first consideration is timing. The illumination must be properly timed during the assault to prevent compromise of the landing zone and still provide effective illumination during

the landing phase. The best time to illuminate a landing zone is 2 minutes before touchdown of the assault helicopters. The second consideration is accuracy. It is absolutely essential that the flares be placed accurately. The best location for flares is on the downwind side of the landing zone on the side farthest from the fire support base in the case of mortars or artillery, or on the downwind end on one side in the case of air dropped flares. This places the illumination to the rear and to the side of the troop carriers who then are not blinded by the illumination and can use their shadows to judge height. Placing artillery and mortar flares on the side of the landing zone farthest from the fire support base provides the greatest safety factor because the projectiles pass high over the landing zone and the empty projectiles do not fall on the landing zone after ejecting the flare cannister. Dropping flares downwind of the landing zone places the illumination in the optimum location and prevents the parachute flares from becoming hazards to flight.

OBSERVATION: Battlefield illumination during night combat assaults must be carefully planned. Poorly timed or placed illumination can negate all the planning of the operation and jeopardize mission accomplishment.

12. ITEM: Night heliborne operation without illumination. (674216)

DISCUSSION: Company A, 25th Aviation Battalion conducted a night operation, inserting troops into three landing zones without the aid of artificial illumination. Due to the nature of the mission, the ground force commander requested that no flares be dropped. The mission was accomplished in three lifts, each lift going into one false landing zone before or after dropping the troops in the actual landing zone.

OBSERVATION: On a dim night, terrain detail can be seen at altitudes above 1000 feet; however, as the flight descends toward the landing zone, terrain features will become invisible. Since the flight leader is unable to determine the distance to the landing zone, a command and control aircraft orbiting the landing zone is effective in talking the flight leader into the landing zone by furnishing altitudes and headings. The flight leader and other flight aircraft should turn on their respective search lights as they descend below 200 feet. Landing lights should be set at the proper angle while on the ground prior to departure.

13. ITEM: Operations in semi-inundated areas. (670467)

DISCUSSION: To operate in semi-inundated areas, troops require special training. They must be trained in water survival, small boat operations and field expedient methods of crossing rivers and canals. Extensive practice work is required to develop the necessary skills.

Proper positioning of security elements prior to conducting stream crossings must be stressed. Not only must troops be taught to cross water areas in safety and with dispatch, but they must also be taught how to take care of their equipment in such an environment. When planning operations in semi-inundated areas, a tidal chart must be developed. This chart must indicate times of high and low tide and record changes in water levels.



MEMBERS OF COMPANY B, 3D BATTALION, 22D INFANTRY
CROSSING AN INUNDATED AREA WHILE PARTICIPATING IN
A SEARCH AND DESTROY OPERATION. (Note the effort
to keep weapons dry and the interval between men.)

OBSERVATION: Unless the men are adequately trained, they will spend all of their time fighting their environment and will have no time or energy left to fight the enemy.

14. ITEM: Landing zone clearing operation. (T674249)

DISCUSSION: Landing zone clearance for a combat assault became a matter of great concern to battalion commanders of the 1st Brigade, 101st Airborne Division during the early assaults of Operation Wheeler. Mined landing zones were frequently encountered. The landing zones were often covered by fire, both sniper and automatic weapons. The resulting casualties received when personnel leaped from the helicopters and hit anti-personnel mines had considerable effect upon the morale of men going into a combat assault and upon the time involved in moving off the landing zone. Therefore, a procedure had to be developed to insure that at least the assault troops were provided with mine-free terrain on which to land and a cleared path off the landing zone.

a. In the brigade's area of operation, most landing zone sites were obvious to the enemy; thus he had ample time to prepare the probable landing zone sites with anti-helicopter punji stakes and anti-personnel mines. In most cases, the anti-personnel mines were of the M-16 "Bouncing Betty" type. Since surprise is a primary advantage during combat operations, the landing zones were prepared from the air just prior to the assault. Due to the time limitations on the landing zone and the fact that the landing zones are often subject to enemy fire, engineers cannot clear a landing zone from the ground either prior to, or during, the infantry assault. This necessitated development of a fast and efficient means of clearing a landing zone or landing space for troops and pathways off the landing zone during the assault. An approach to the solution is described below.

b. The first problem solved was that of providing the helicopters with a safe place to discharge troops. To this end, the landing zone was prepared to receive three ships simultaneously. The "Daisy Cutter," a standard 500-pound bomb with a three foot length of pipe attached to the detonator, was developed for this purpose. The bomb explodes off the ground and clears an area approximately 20 feet in radius of punji stakes. Anti-personnel mines within nine feet of the point of detonation are exploded by sympathetic detonation. A three ship landing zone is prepared by a minimum hit on the landing zone of six 500-pound bombs and six "Daisy Cutters." This gives at least 12 locations where a ship can discharge troops safely. The next problem was to get troops off the landing zone without detonating anti-personnel mines. The solution to this problem was the M1E1 Projected Charge. This charge, weighing 92 pounds, consists of 170 feet of detonation cable which is more powerful than normal detonating cord. The cable is fired over the landing zone by means of a small rocket motor. When the cable explodes, it clears a path one foot wide and exposes any mine one foot on either side of the path. It can be prepared and detonated by two engineers in less than four minutes. To employ this method, each of the first three helicopters in the assault should carry two engineers, a Projected Charge and four infantrymen. The ships discharge the troops over a crater made by a 500-pound bomb. The engineers set up the projected charge on the lip of the

crater nearest the landing zone edge, and infantrymen provide security from the crater. The charge is set and blown, producing a clearly visible path. If the landing zone is abnormally large, a series of charges should be used between craters until there is a path off the landing zone.

OBSERVATION: A landing area can be prepared with lanes for movement off the landing zone without exposing troops to mine and punji stake obstacles.

15. ITEM: Coordination with ARVN. (670801)

DISCUSSION: Close coordination with ARVN forces working in the same area must be accomplished down to and including company level to insure that US and ARVN have exchanged call signs, radio frequencies, points of origin, overlays and operations orders.

OBSERVATION: The employment of liaison personnel with ARVN units working with, or in conjunction with, US units is a must for proper coordination.

16. ITEM: Hot meals transported by helicopter. (670801)

DISCUSSION: The 9th Infantry Division reported that the use of a helicopter to transport hot meals twice daily improved the effectiveness of ground units.

OBSERVATION: The individual pack was reduced; and due either to morale and/or increased energy from two hot meals daily, units performed more effectively.

17. ITEM: Waterborne and airborne command and control craft. (670801)

DISCUSSION: Both brigade and battalion commanders in the 9th Infantry Division have found the helicopter an invaluable tool for command and control. The Delta environment, flat, open and free of vegetation canopy, presents a challenge to ground navigation and a great advantage to the airborne commander and observer. Delineation of objectives, routes and obstacles and, to a smaller degree, enemy fortifications is a very difficult task to the commander on the ground yet usually an easy task for the airborne commander. Troop and assault craft maneuver is greatly facilitated as a result of the generally unobscured view of the airborne command group. With the limited visibility of darkness and marginal flying weather experienced during the southwest monsoon season, the command and communications boats are essential to continuing command and control by brigade and battalion commanders in their forward positions of the area of operations.

OBSERVATION: The combined use of command and control helicopters and command and communications boats by brigade and battalion commanders permits close supervision and control of the combat power deployed by a mobile riverine force.

18. ITEM: Coordination requirements of a mobile riverine force. (670801)

DISCUSSION: The 9th Infantry Division reported that the nature of primarily strike operations conducted by a mobile riverine force necessitates rapid and continuing coordination. For example, at one anchorage a mobile riverine force employed security forces in three separate provinces. As evidenced by this example, a mobile riverine force is a transient force continually crossing political and military boundaries. This requires extensive liaison and coordination which has been routinely handled by the brigade command and staff, with the exception of purely US Navy advisory matters.

OBSERVATION: The two liaison officers authorized a brigade cannot accomplish all of the required coordination and liaison; consequently, the S-5 and command group must assume a portion of this responsibility.

19. ITEM: Airmobile feint as an economy of force. (670801)

DISCUSSION: The 9th Infantry Division reported that areas of operations assigned for strike operations often exceed a unit's capability to attack and simultaneously block probable enemy escape routes.

OBSERVATION: Airmobile feints to include full airstrikes, artillery and gunship landing zone preparations can often be employed along probable enemy escape routes to deter enemy use of those routes. When the enemy's use of a route is restricted, he may remain in a fixed position or attempt to escape along routes blocked by maneuver forces.

20. ITEM: Daylight ambushes. (670221)

DISCUSSION: During operations in areas controlled by the Viet Cong, it has been observed that they habitually move in small groups along well used trails during the daylight hours.

OBSERVATION: Units should plan and conduct daylight ambushes along well used trails. This is particularly effective upon initial entry into Viet Cong controlled areas.

21. ITEM: Registering mortars around ambushes. (670467)

DISCUSSION: If ambush patrols habitually register mortars close to their locations, the Viet Cong can surmise the location of the ambushes.

OBSERVATION: Registration should be conducted in several areas to preclude giving information to the enemy.

22. ITEM: Use of sharpened bamboo stakes or metal rods from 105mm ammunition boxes as probes, (674216)

DISCUSSION: In recent search and destroy operations, numerous enemy weapons and tool caches were found just inches under the surface of the ground by probing. Because of the excellent use of camouflage, many caches similarly hidden have probably been overlooked. Sharpened bamboo stakes or metal rods from 105mm ammunition boxes were found to make excellent expendable probes.

OBSERVATION: The use of probes will significantly assist in finding caches located near the surface.

23. ITEM: Security for landing zones. (674216)

DISCUSSION: Enemy forces have been known to close within 15 meters of a landing zone and effect damaging fire on aircraft and personnel.



LISTENING POSTS MUST BE ESTABLISHED
TO PROVIDE EARLY WARNING

OBSERVATION: Listening posts must be established around the landing zone at a sufficient distance to provide early warning against the advance of enemy forces. H&I artillery fires may also be used to assure that the enemy does not infiltrate the area.

24. ITEM: Probing the sides of abandoned enemy foxholes. (674216)

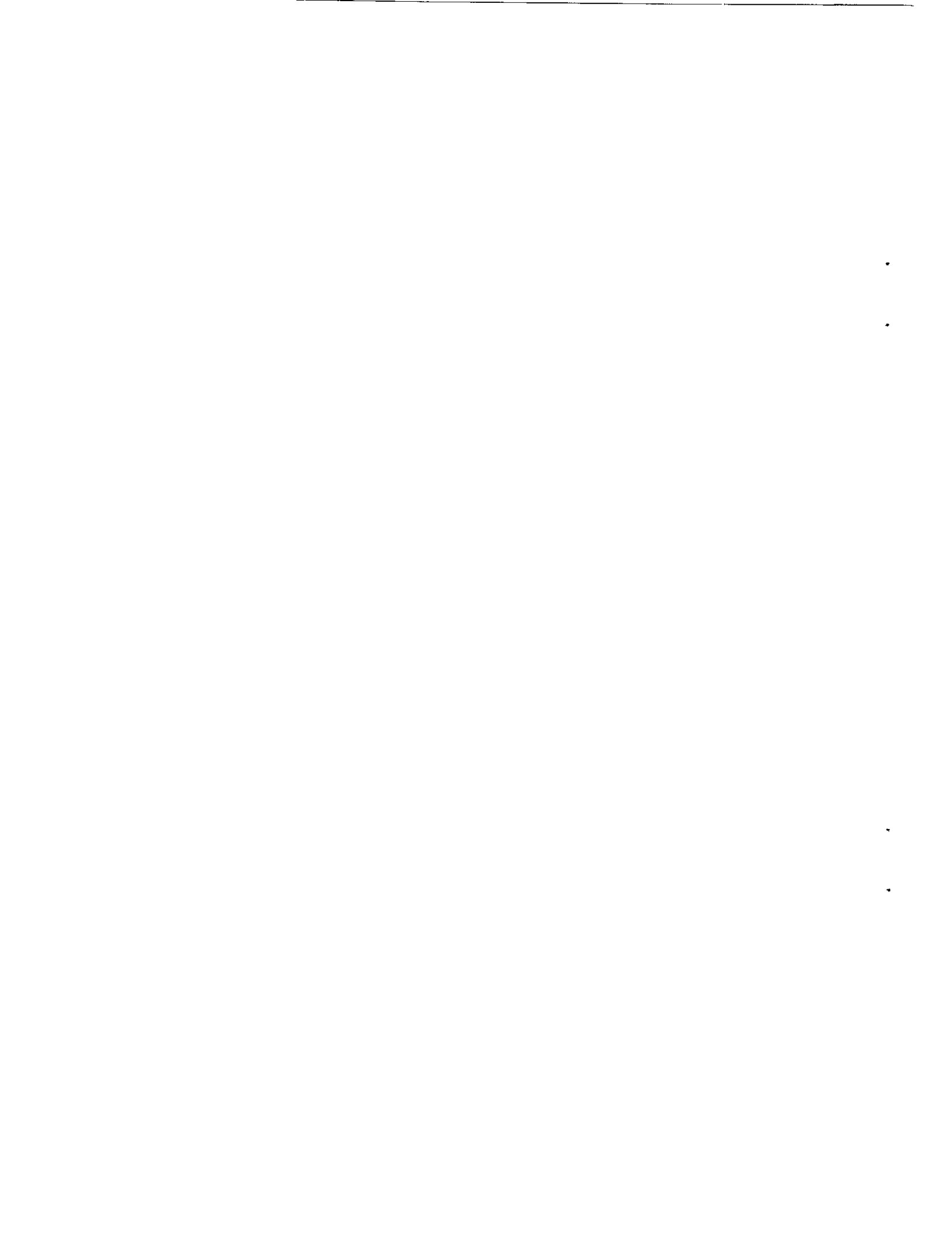
DISCUSSION: An element of Company D, 3d Battalion, 22d Infantry, while conducting a search and destroy operation north of the Michelin Plantation, noticed that erosion around the edge of a foxhole revealed a small portion of wood planking. Further investigation yielded a cache containing 15,000 - 20,000 rounds of mixed .50 caliber and 7.62 ammunition and 55 rolls of communication wire. The soil excavated to construct the cache was piled a short distance from the foxhole in a manner as to give the impression of an ant hill.

OBSERVATION: Probing the sides of Viet Cong foxholes is a necessity. Partitions made of wood covered with reeds and mud have been used to conceal caches of weapons, ammunitions, documents and even entrances to tunnel complexes.

25. ITEM: Control of Vietnamese boat traffic on inland waterways. (670772)

DISCUSSION: The Viet Cong frequently utilize inland waterways for resupply and troop transportation. Due to the large number of boats operating in local waterways, it is relatively simple for the Viet Cong to mingle with innocent traffic and conduct logistical and personnel moves.

OBSERVATION: The 196th Light Infantry Brigade reported establishing a system of numbering all boats according to village of origin. Local forces, furnished by the Vietnamese District Chief in conjunction with US Forces, publicized the boat registration program. The local forces then assigned numbers to be printed on the bow of registered boats. All registered boats that pass through the waterway to the South China Sea are checked and given an identification marker. This marker is color coded so that the length of stay in the South China Sea may be determined visually. Coordination is also made to insure that US Navy elements in the area know the registration and color coded marking system in use.



SECTION II

ARTILLERY TACTICS AND TECHNIQUES

1. ITEM: Effective use of supporting fires. (670698)

DISCUSSION: The 4th Infantry Division reported that US forces have been the most successful when they utilized artillery and tactical air fire support simultaneously. Air support should normally be used to supplement the fires of supporting artillery. The calling of a "Check Fire" to bring in tactical air is dangerous and should be limited to the immediate area/axis of the airstrike.

OBSERVATION: Units in contact should not sacrifice artillery fire for the sake of an airstrike. Both means of support should be employed to complement one another. If an airstrike is to be placed on a particular target, artillery fires may be shifted from the immediate area of the strike for its duration, but not lifted entirely. In the same manner, if artillery is being fired in support of a particular contact, tactical air should be used to block likely routes of withdrawal or to strike areas where the enemy may be assembling his reinforcements.

2. ITEM: Current village overlays. (670698)

DISCUSSION: The fire support coordinator at each level of command should maintain accurate data on the locations of villages so that artillery fire will not inadvertently fall in an occupied village. It is essential that this data be obtained and kept current since available maps are of 1965 vintage and do not show new locations or villages. Village data should be collected and forwarded to a central collection agency for consolidation. An overlay showing village locations should be prepared and distributed to artillery units to preclude firing into or near friendly villages. In the 4th Infantry Division, all such data is collected and maintained by the G-2 and is available to all commanders and staff officers. The fire support coordinator publishes overlays showing the locations of all known inhabited villages.

OBSERVATION: To preclude unnecessary casualties, all artillery units must be kept abreast of the current locations of villages in their area of operation.

3. ITEM: Coordination with supported units in contact. (67X071)

DISCUSSION: To facilitate processing calls for fire from the supported infantry companies, the artillery battery in direct support should operate a radio on the supported infantry battalion command net.

This procedure gives the battery fire direction center prior warning, a general direction in which to lay the battery, the approximate coordinates of the target and facilitates quick reaction to fire support requirements. A battery alerted by this means may also enter the company net to receive fire missions from the platoon leaders if an artillery forward observer is not immediately available.

OBSERVATION: Utilization of additional radios on the supported infantry nets has permitted artillery batteries to provide quick reaction to calls for fire from infantry units.

4. ITEM: Aerial observation. (67X071)

DISCUSSION: It is desirable that an aerial observer establish the location of all friendly troops in the vicinity of a desired target area.

OBSERVATION: The friendly units can assist an air observer by marking their positions with a readily identifiable means such as colored panels or smoke. When several friendly troop units are located near a target area, a different means of identification should be used by each unit.

5. ITEM: Methods to preclude casualties from own fires. (670826)

DISCUSSION: An observer error in judgment can result in casualties to friendly forces. Measures that can be taken to preclude errors include:

a. Warnings against making large deviation and range corrections in conjunction with changing from shell smoke or WP to HE in adjustment.

b. All friendly locations and no-fire zones should be plotted by the fire direction center on the firing chart or map.

c. Forward observers announce "DANGER CLOSE" and the direction and distance of friendly elements from the target when firing within 600 meters of friendly positions.

OBSERVATION: All units must continuously review and analyze standard operating procedures to preclude casualties from own fires.

6. ITEM: Control and adjustment of supporting fires. (670698)

DISCUSSION: The 4th Infantry Division reported that a company commander on the ground does not have the knowledge of the overall

situation or the advantage of the battalion commander overhead to control the blocking fires and close air support. The most effective control of blocking fires on the enemy's avenues of approach or withdrawal and suspected areas of enemy reserves can be accomplished from the battalion commander's position in the air overhead. However, the control and adjustment of close in, direct supporting fires--200 - 400 meters out from the perimeter--must be left to the company commander and his artillery forward observer.

OBSERVATION: Reinforcing and blocking fires can best be controlled by a battalion commander from his command and control ship.

7. ITEM: Use of "At My Command" during fire missions. (670804)

DISCUSSION: The term "At My Command" is used by an observer during fire missions when necessary to control the time of impact due to observation or safety requirements. Many observers use "At My Command" as a common practice which can delay firing. Delays in firing after powder has been inserted will significantly increase the powder temperature causing inconsistent powder performance which can be critical during registrations.

OBSERVATION: The observer should control the fire only when observation or safety in the impact area is an over-riding factor.

8. ITEM: Firing accident involving charge 1 powder increment. (670804)

DISCUSSION: A charge 1 powder increment ignited upon closure of the breech. After a sustained fire mission using charge 7, the battery received a new mission requiring charge 1. After the tube was swabbed, a charge 1 increment was placed in the breech; and when the breech was closed, the powder ignited. The apparent cause of the accident was due to the powder increment sliding back in the breech and being pinched by the breech block, causing ignition.

OBSERVATION: Caution must be exercised by units to insure that light powder increments remain in place prior to closure of the breech.

9. ITEM: Countermortar and defensive fire programs. (670698)

DISCUSSION: Programs for countermortar fires, defensive fires, blocking fires and fires to cover avenues of withdrawal must be developed for base camps, fire support bases and other friendly locations. The programs should designate the type or the plan, the number of rounds to be fired on each target during the phase and the type fuze most desirable for the target location. Concentrations should be assigned to all

artillery units thus obtaining maximum area coverage. These concentrations should be cleared daily prior to dusk and the units to fire should be notified of the concentrations which are not clear to be fired.

OBSERVATION: During mortar or ground attacks on friendly locations, all artillery and mortars within supporting range must react quickly. Thorough prior planning and coordination will reduce response time.

10. ITEM: Countermortar radar targets. (670698)

DISCUSSION: The 4th Infantry Division reported that an after-action check of enemy mortar positions detected by the countermortar radar indicated that the positions were sometimes as far as 500 meters away from the actual locations.

OBSERVATION: When the countermortar radar detects an enemy mortar position, the artillery fires should be shifted to that location. In addition to firing several volleys on the target, firing units should cover the surrounding area within a 500-meter radius by fire. The enemy's probable avenue of approach and withdrawal should also be covered by fire after coverage of the primary target area.

11. ITEM: Towed medium artillery maneuverability. (670645)(670739)

DISCUSSION: The towed 155mm howitzer can be moved into areas inaccessible to self-propelled artillery through the use of helicopters. This gives the infantry added artillery firepower in remote areas. However, during the monsoon in the central highlands, it is very difficult to move on the ground. The five-ton prime mover cannot negotiate the wet roads and trails pulling a six and one-half ton weapon. Therefore, movement is possible only with armored personnel carriers pulling both the prime movers and the howitzers. A move over poor roads will usually take about triple the time normally required because of the necessity for the prime movers and howitzers to be pulled from the mud or back onto the road.

OBSERVATION: The ground maneuverability of the towed 155mm howitzer can be improved during the monsoon season by utilizing armored personnel carriers. Therefore during planning, consideration should be given to obtaining armored personnel carriers for the purpose of pulling prime movers and howitzers.

12. ITEM: Coordination with ARVN units on firing clearance.
(670698)

DISCUSSION: The fire support coordination element of a unit operating in an ARVN sector must be briefed carefully and specifically

on the procedures for clearing and coordinating artillery fires. Often a target cleared for fire by the sector will have friendly elements located nearby. In order to preclude friendly casualties, artillery fire should be cleared with the Vietnamese sector, subsector headquarters and with any tactical unit operating in the area.

OBSERVATION: Particular attention must be given to procedures for the coordination and clearance of targets for artillery fires to preclude firing on friendly elements.

13. ITEM: Coordinated employment of searchlights and the 40mm or .50 caliber automatic weapons systems. (670820)

DISCUSSION: The First Field Force Artillery reports that searchlights and the automatic weapons systems have proved to be a valuable team during night operations in Vietnam. By coordinating weapons fire with scheduled searchlight missions, a psychological fear is introduced into the minds of the enemy that whenever the light shines, it will be accompanied by a heavy volume of automatic weapons fire.

OBSERVATION: The simultaneous employment of searchlight illumination and automatic weapons fire has a psychological effect on the enemy.

14. ITEM: Training. (670820)

DISCUSSION: The combat proficiency of artillery units is adversely affected by the rapid turnover of personnel and the relatively independent operation of firing batteries. Also, as the artillery is committed continuously, training programs must be conducted concurrently with tactical operations.

OBSERVATION: Training programs must be systematic and continuous. Although training must receive attention at each level of command, its real effectiveness will be measured by the programs carried out at battery level and thus depends largely on the initiative and aggressiveness of unit leaders.

15. ITEM: Control of artillery fires for a landing zone preparation. (670698)

DISCUSSION: One individual, normally the maneuver battalion's artillery liaison officer, should be designated to control all artillery fires and notify the flight leader when the landing zone is clear of artillery fire. To insure that the landing zone is clear, the following measures should be taken:

a. Each 105mm and 155mm battery should fire one round of smoke in the last volley.

b. Each supporting artillery unit should notify the artillery liaison officer when the last volley is fired and announce, "SPLASH", when it should be over the landing zone.

c. Once the artillery liaison officer has received all "SPLASHES" and observed the last round, he should notify the flight leader that the landing zone is clear.

d. Should radio communication fail, a prearranged colored smoke round should be on-call to notify the flight leader that the landing zone is clear.

OBSERVATION: During all landing zone preparations, there must be close coordination and planning with aircraft flight leaders and ground commanders to preclude firing artillery through the flight path of approaching aircraft.

16. ITEM: Coordination of supporting fires for landing zone preparation. (670467) (670645)

DISCUSSION: Once the landing zone preparation has been initiated, suppressive fires should be continuous until the landing zone is secured. Since close air support is dependent on many variables, it is normally used to lead off the preparation. Artillery continues the softening process while the gunships escort the troop ships in for their landing. As the troops are committed, their firepower is added to that of the gunships. The close coordination necessary to affect this continuous fire can only be perfected through teamwork.

OBSERVATION: The team consists of the artillery liaison officer, the forward air controller, the gunship flight commander and the ground commander's representative. The artillery liaison officer in the command and control ship is kept informed of the progress of the close air support strike so that he may have fire on the way at the exact moment the strike terminates. The gunship flight commander is alerted by the artillery liaison officer that the last round, which can be designated by colored smoke, is on the way. The gunship flight commander initiates his flight pattern to enter the target area and makes final coordination with the ground commander's representative, who is riding with him. As the troop carriers land, the gunships continue to deliver fire until the deployed troops gain fire superiority. The artillery fire, when lifted from the landing zone, is normally shifted to cut off suspected avenues of withdrawal.

17. ITEM: Coordinated use of artillery and close air support. (670621)

DISCUSSION: At times, there may be delays between flights conducting a series of airstrikes against the same target. The enemy can utilize such lulls to withdraw or regroup.

OBSERVATION: Artillery can initially be adjusted onto the target then lifted or shifted while the close air support aircraft attack. As the close air support aircraft depart, the artillery should again be employed against the target until the next close air support sortie is on station. Such a procedure insures constant coverage of the target and discourages enemy movement.

18. ITEM: Luring the enemy into the open. (670621)

DISCUSSION: The experience of the 223d Aviation Battalion indicates that during an artillery strike called by an observation aircraft, the enemy takes cover in bunkers, caves and tunnels. However, shortly after the artillery fire ceases and the aircraft departs, the enemy leaves his protective shelters.

OBSERVATION: After the initial artillery fire has ceased, the artillery can prepare to fire VT on the observer's command. Simultaneously, the observation aircraft moves to a location 3 to 5 kilometers away from the target area. Then the command to fire can be given with the probability that the enemy will be caught outside of their protective shelters, thus suffering additional casualties. (See Item 9, Section I)

19. ITEM: Employment of AA (SP) artillery to augment fire support/patrol bases. (670801)

DISCUSSION: The 40mm and quad .50 caliber weapon systems have proved to be a definite assets in securing fire support/patrol bases. By positioning these weapons at fire support/patrol bases, infantry elements are freed to conduct extensive patrolling during daylight hours. Although the 40mm weapon system is not air transportable, the quad .50 caliber weapon system can be dismounted and easily airlifted to a new location.

OBSERVATION: The use of twin 40mm and quad .50 caliber machine guns in defense of fire support/patrol bases releases infantry elements to conduct operations during the daylight hours. These weapons also significantly increase the firepower and defensive capability of the bases.

20. ITEM: Predicted impact points for expended illumination rounds. (670798)

DISCUSSION: During the early morning hours, expended illumination rounds fell in a friendly village damaging homes and property.

OBSERVATION: Although proper clearance was obtained for the predicted impact points, skillful gunnery could have placed these impact points in known clear areas; in this case, the river. Gunnery officers should aid observers in obtaining proper target illumination with minimum risk to friendly elements located down range from the illumination point. This can often be accomplished by proper selection of the firing battery to accomplish the illumination. Flanking fire should be used when possible. When the situation does not allow flanking fire, a clear predicted impact point should be selected and fuze and charge should be varied to obtain desired height and range along gun-target line.

21. ITEM: Mutual fire support. (670801)

DISCUSSION: Gunships are vulnerable when making approaches to, and exits from, areas where they fire in support of troops in contact.

OBSERVATION: Coordination of mutual fire support has a definite application when planning employment of helicopter gunships in support of troops in contact. Suppressive fires from ground elements during a helicopter gunship firing pass will provide a positive degree of protection for the gunships.

22. ITEM: Boresight stand. (670741)

DISCUSSION: When a firing battery is moved by helicopter, only equipment essential to mission accomplishment can be taken. To insure boresight requirements are completed, the test target can be utilized. The support for the test target consists of two 8-foot engineer stakes with a wire around the top to hold the stakes together when driven in the ground. The target is moved up or down to the desired height; and when the boresight has been completed, it is lowered to the ground, eliminating any mask problems.

OBSERVATION: Airmobile batteries can utilize two 8-foot engineer stakes to provide a lightweight, mobile stand to hold the test target.

23. ITEM: Movement of artillery in the Delta. (670474)

DISCUSSION: The 3d Battalion, 34th Artillery, due to the lack of land lines of communications, developed a method of providing artillery support from a Navy barge. Two 105mm howitzers are mounted on a barge approximately 30 by 90 feet and are maneuvered by an LCM-8. The barge provides sufficient space for storage of ammunition and limited troop living space. A fire direction center is mounted in the LCM-8.



BATTERY B, 3d BATTALION, 34th ARTILLERY, FIRING THE 105mm HOWITZER FROM A U.S. NAVY BARGE. ANOTHER U.S. NAVY BARGE AND AN LCM-8 ARE VISIBLE IN THE BACKGROUND.

OBSERVATION: This innovation permits the artillery to utilize inland waterways that are of sufficient size as routes. However, careful consideration of tide conditions must be made to preclude grounding during a falling tide.

24. ITEM: Control and coordination of aircraft and supporting fires in a mobile riverine force area of operations. (670801)

DISCUSSION: The variety of air transportation and firepower available to the commander must be judiciously employed to achieve tactical success without endangering one element by indiscriminate employment of another. For example, the mobile riverine force must, on occasion, employ land and barge based artillery, mortars organic to Navy craft, fires of maneuver battalions, close air support, gunship support, command and control aircraft, observer aircraft, troop lifts, aerial resupply, and medical evacuation helicopters.

OBSERVATION: The senior headquarters exercising command and control of aircraft and supporting fires in an area of operation can facilitate this employment by:

- a. Use of every means possible to remain continually abreast of friendly locations.
- b. Employing supporting fires after contact is established to block enemy escape routes which cannot be covered by ground elements.
- c. Exploiting supporting fires with maneuver battalions.
- d. Avoiding the necessity of registering indirect fire weapons after contact has been made.
- e. Employing close air support beyond the impact area on either flank of the gun-target line of indirect fire support.
- f. Varying the type of ordnance on a target by alternating air and artillery, one immediately following the other.
- g. Maintaining direct fire on targets by employing armored troop carriers as monitors from otherwise open water escape routes.
- h. Employing gunships against machine guns or other crew-served weapons emplacement too near friendly positions for artillery and airstrikes to be used.
- i. Providing continuity of gunship support by designating one team leader to remain on station and brief relief teams.
- j. Insuring that a subordinate command group is prepared to oversee the battle when it is necessary to withdraw the senior command and control helicopter.
- k. Retaining approving authority for entrance and exit times and routes of dustoff helicopters so that the momentum of the attack will not be lost because of an unexpected requirement to cease fire.

25. ITEM: Firing on reverse slopes. (670741)

DISCUSSION: The 2d Battalion, 11th Artillery reported that in mountainous terrain, artillery fire is often required on the reverse slope. A trajectory trace is necessary to insure that the projectile clears intermediate heights. If the trajectory does not clear these heights, high angle fire or low angle fire at the next lower charge is utilized. Firing at a lower charge has proven to be more effective, more accurate and more rapid to the response of the forward observer.

OBSERVATION: In mountainous terrain, firing on reverse slopes requires a trajectory trace at the battery fire direction center to insure clearance of intermediate crests. Firing at a lower charge provides rapid, accurate and effective fire.

26. ITEM: Observer procedures. (670741)

DISCUSSION:

a. Forward observers have found that the strike of artillery rounds in mountainous terrain should be adjusted vertically, especially on mountain slopes, rather than adding or dropping in range.

b. When firing medium artillery close to friendly troops in dense jungle, forward observers have achieved good results in opening the canopy by firing a converged sheaf. This procedure is utilized in the fire for effect phase of the mission, and it eliminates less effective results obtained when a normal dispersion of pieces is utilized.

OBSERVATION: Forward observers adjusting artillery in mountainous terrain must be aware of a variety of techniques.

27. ITEM: Artillery operations in beach and sandy areas. (670772)

DISCUSSION: The 196th Light Infantry Brigade reported that operations in beach areas, loose sand and near large bodies of water pose many considerations for a firing unit, particularly during air-mobile operations. Some of these are:

a. All exposed surfaces of howitzers must be securely covered during lift and resupply due to large grains of sand being blown about.

b. Materials for constructing a platform base for the howitzer must be taken with the battery, as the displacement obtained from firing on loose sand is much too great.

c. During resupply, consideration should be given to resupply by a platoon concept; if possible, use natural obstacles, such as sand dunes, to shield one platoon from the wind effects of the resupply effort to another platoon. Firing during such resupply operations is impossible without some type of obstacle separating the platoons. Ammunition must be dropped at or very near the howitzer to prevent excessive fatigue of the men carrying ammunition in deep, loose sand.

d. Reserve or reaction forces should be assembled on high ground to facilitate their deployment.

e. Firing on loose sand causes a rippling effect of the sand which necessitates the use of some type of reinforcement for parapets. Digging in loose sand is a futile task since the sand rolls back into place.

f. The extreme temperatures encountered affect crew performance and can cause large deviations in corrections for powder temperatures. Maximum effort should be made to store all ammunition in the same manner to get the same temperature.

g. Lift capability of the CH-47 is reduced due to extreme heat and humidity. Lifts should be programmed for early morning to capitalize on the maximum lift capability of the CH-47.

OBSERVATION: Characteristics of the proposed area of operation and probable effects must always be considered during the initial planning phases.

SECTION III

AVIATION LORE

1. ITEM: Instruction for movement of 155mm howitzer by CH-47.
(670739)

DISCUSSION: These instructions were prepared by the 12th Combat Aviation Group as a guide in planning the movement of units equipped with the 155mm towed howitzer by CH-47 for distances up to 30 kilometers.

a. Preparation of loads.

(1) The vehicles, unit personnel and ammunition to be transported must be prepared for movement as 8,000-pound loads, the normal payload of the CH-47.

(2) The 155mm howitzer must have the following equipment removed:

- (a) Trail spades.
- (b) Splinter shields.
- (c) Jack float or plate.
- (d) Hand spikes and rammerstaff.
- (e) Sighting devices.

b. Preparation of helicopters.

(1) For all loads, except the howitzer, no special preparation is required.

(2) For helicopters lifting the howitzers, the following personnel and equipment must be removed prior to the lift:

- (a) Two crewmembers.
- (b) All stored equipment, such as survival gear, rations, cargo handling rollers, tie downs and tools.
- (c) Defensive armament weapons system and all ammunition. The crew should retain only their personal weapons.

c. Sequence of movement. Loads may be transported in any order, but to increase the efficiency of the unit, the advance party

and the fire direction center should precede movement of howitzers. Crews and basic ammunition loads for the weapon being moved should precede movement of each howitzer.

d. Fuel requirements. Because of the restricted fuel load for the helicopters lifting the howitzers, a portable refueling point should be established in the landing zone.

e. Armed helicopter escort. Armed helicopter escorts are required because the CH-47's used to lift the howitzers will have no defensive armament on board.

f. Sorties required for one battery. Approximately 26 sorties will be required to move one battery of 155mm howitzers complete with command and control elements plus 1,000 rounds of ammunition. The sorties are apportioned as follows:

- 1 sortie - ½-ton truck, ¾-ton trailer (FDC)
- 1 sortie - ¾-ton truck, ½-ton trailer, 1,500 lbs equipment
- 6 sorties - 155mm howitzer, stripped
- 6 sorties - howitzer crews, section equipment plus 40 rounds of ammunition
- 12 sorties - ammunition (64 rounds per load)

- 26 sorties - TOTAL

g. Limiting factors. Factors to be considered in lifting 155mm howitzers by CH-47 are:

- (1) Density, altitude and temperature must permit 33,000 gross weight capability.
- (2) Limited distance for move - 30 kilometers established by limited fuel range of CH-47 when carrying the 155mm towed howitzer.
- (3) Time for preparation of weapons and helicopters for movement is approximately 20 minutes.
- (4) Refueling required in landing zone, to be provided by CH-47 unit.
- (5) Logistical support of unit on subsequent days after emplacement requires continued availability of airlift support.

h. Consideration of weights.

(1) The maximum allowable gross weight of the CH-47 is 33,000 pounds. The normal payload of this helicopter is 8,000 pounds. Items which make up the gross weight are:

Basic aircraft weight	19,000
Cargo handling equipment, survival gear, tools and armament system	1,000
5 crew members	1,000
Fuel load	4,000
Payload	<u>8,000</u>
	33,000

(2) The weight of the 155mm howitzer complete is 12,700 pounds. There is a necessity to remove all items readily removeable to minimize the weight of the howitzer.

Basic weight of 155mm howitzer	12,700
Less: Trail spades	368
Splinter shields	100
Jack float	85
Hand spikes and rammer- staff	42
Sighting device	<u>5</u>
	<u>600</u>
	12,100

(3) By careful planning the 155mm towed howitzer can be lifted by the CH-47. The weight of the aircraft is changed by removing 2 crewmembers--3 being the minimum for operation; by eliminating all onboard equipment--survival gear, tools, cargo handling equipment and armament system; and by reducing the fuel load of the aircraft.

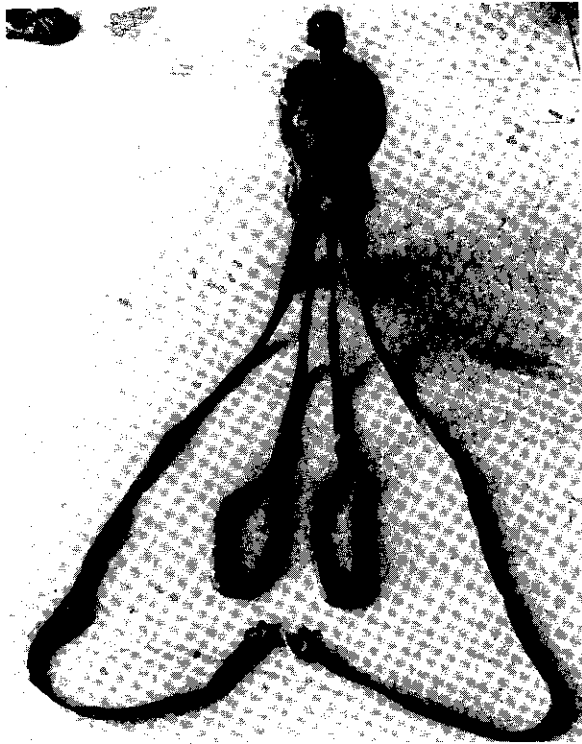
Basic weight of CH-47	19,000
3 crewmembers	600
Fuel (for 30 kilometers with 15 minutes reserve)	1,300
Howitzer	<u>12,100</u>
Gross weight	33,000

i. Consideration of rigging.

(1) Department of the Army Technical Manual 55-1025-200-10-1 presents an approved rigging procedure for external transport of the 155mm towed howitzer by CH-47. The procedures set forth in this TM require approximately 30 minutes for four men to prepare the howitzer for sling loading. The removal of the rigging is almost as time consuming. Because of the time involved, the rigging procedures set forth in TM 55-1025-200-10-1 are considered unsatisfactory for use in a tactical move of the 155mm towed howitzer.

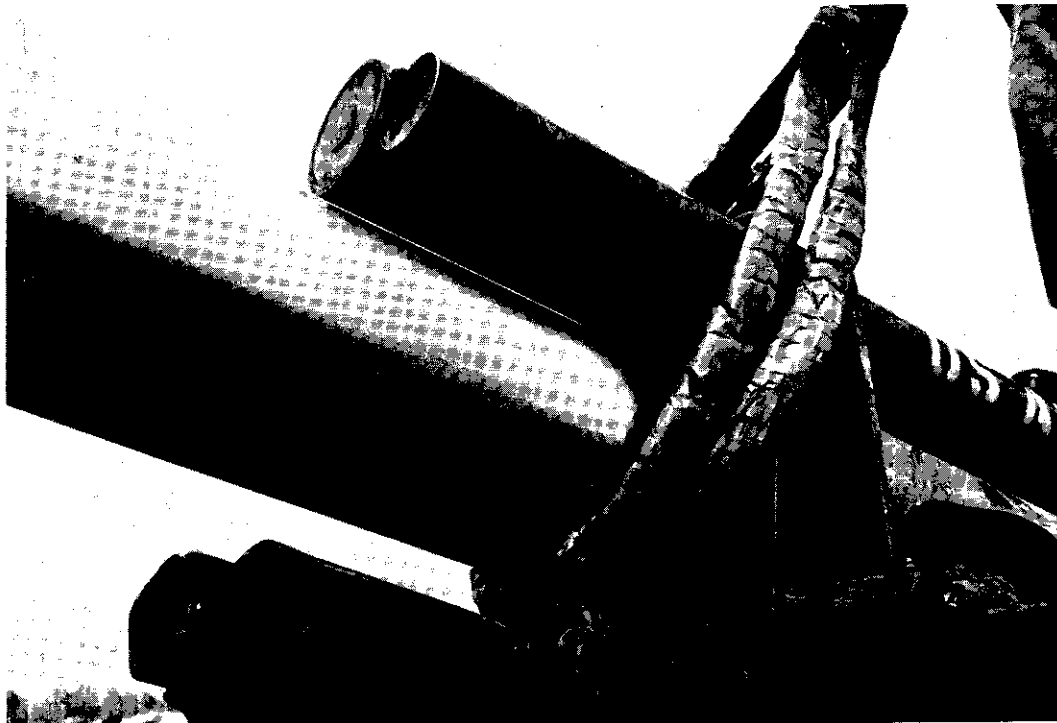
(2) A sturdy sling has been fabricated by the 147th Assault Support Helicopter Company which meets the tactical requirement of rapid rigging and de-rigging of the howitzer and exceeds the strength requirements of the load lifted. The complete sling is shown at Figure 1. Figures 2, 3 and 4 show the manner of attachment of the sling to the howitzer. Figure 5 displays the components of the 155mm howitzer sling.

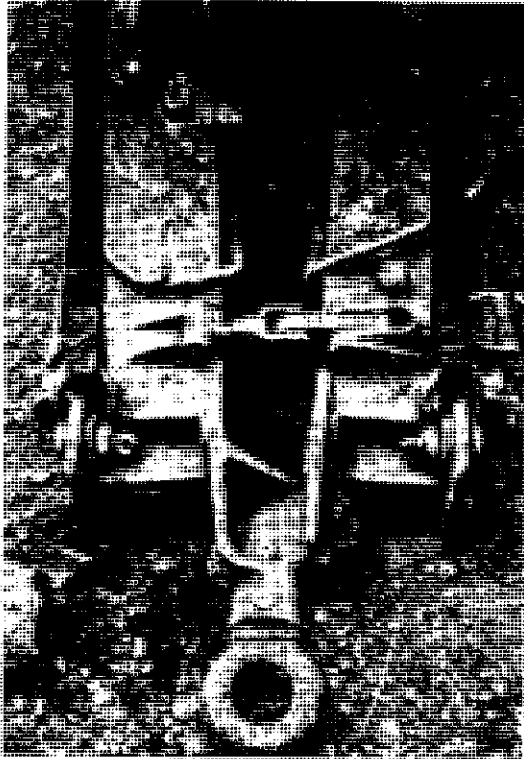
Figure 6 portrays the manner in which the sling legs are attached to the donut of the sling. Figure 7 shows the 155mm howitzer being transported by the CH-47.



LEFT: FIGURE 1. THE COMPLETE SLING CONSISTS OF A DONUT AND FOUR SLING LEGS. (Each sling leg is rated at 13,500 pounds strength. Two of the legs are 16 feet long and have a medium clevis attached; the other two legs are nine feet long and insulated and taped to prevent friction damage.)

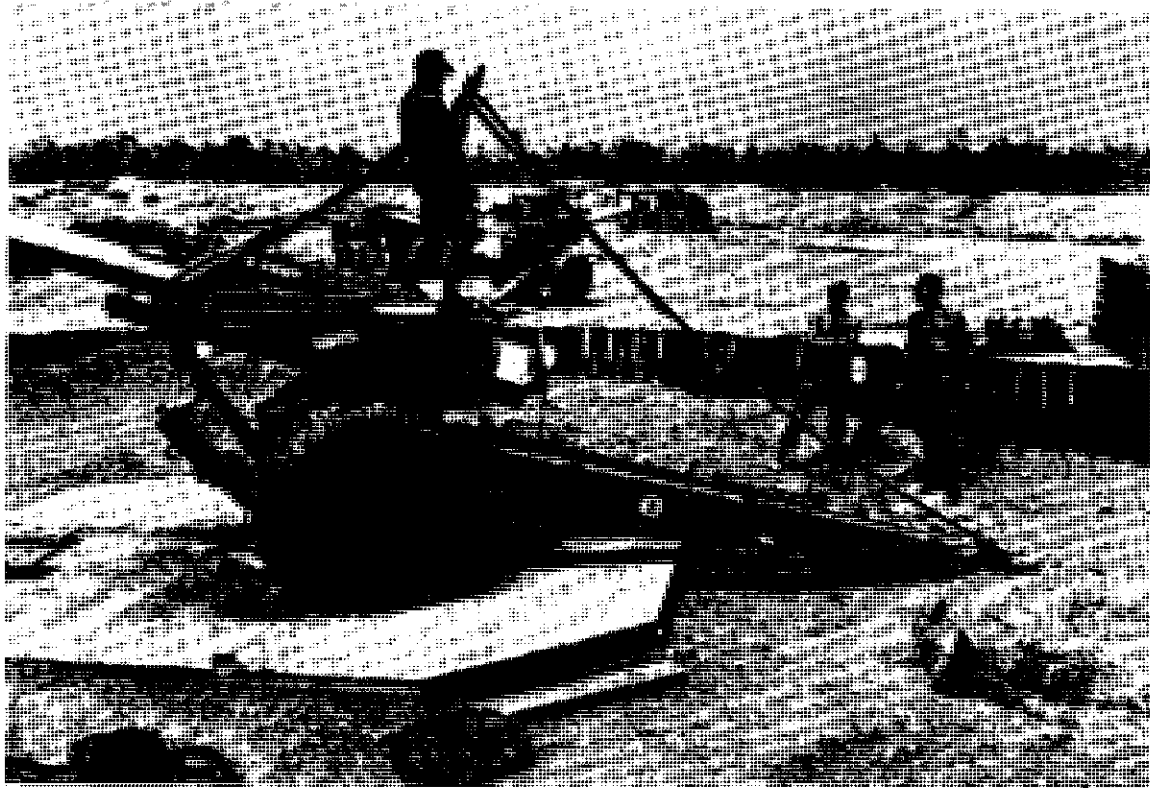
BELOW: FIGURE 2. THE NINE-FOOT SLING LEGS ATTACHED TO THE 155MM HOWITZER. (Note padding to prevent friction heat and wear on sling.)





LEFT: FIGURE 3. THE 16-FOOT SLING LEGS ATTACHED TO TRAILS OF 155MM HOWITZER. (These legs are attached after the placement of the 9-foot legs under the tube.)

BELOW: FIGURE 4. THE 155MM HOWITZER RIGGED FOR SLING PICKUP. (Note splinter shields have not been removed. They would be removed prior to actual lift.)



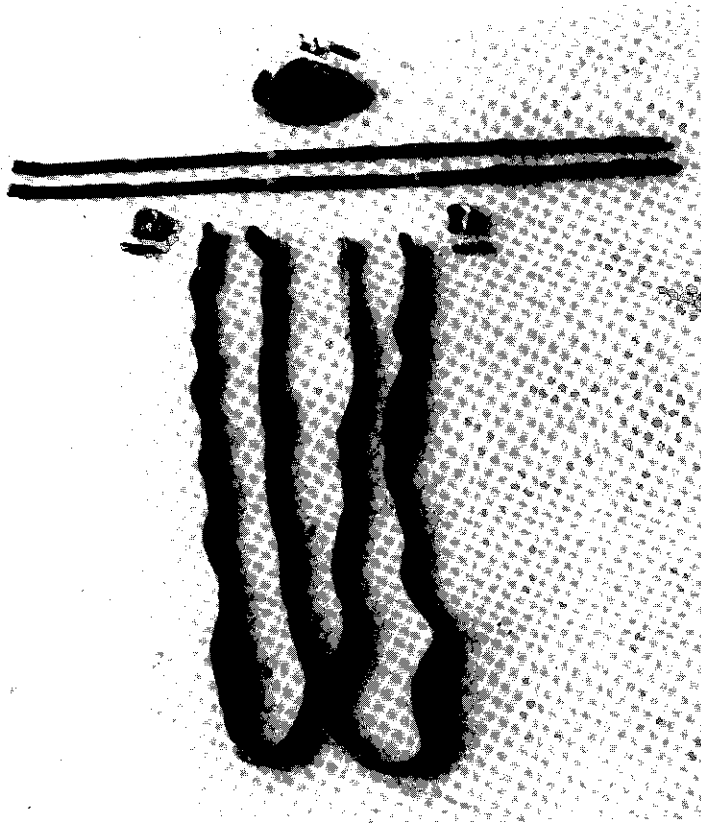


FIGURE 5. COMPONENTS OF THE 155MM HOWITZER SLING.

- A. Sling, cargo A/D, 13,500-pound capacity, 16 feet (2 loop)
FSN 1670-753-3793 (2 ea)
- B. Sling, cargo A/D, 13,500-pound capacity, 9 feet (2 loop)
FSN 1670-753-3790 (2 ea)
- C. Clevis, medium (FSN not available)
- D. Sling, cargo A/C, 13,500-pound capacity, 8 feet (2 loop)
FSN 1670-753-3789 (1 ea)
- E. Link assembly, single suspension or extraction, quick
release, FSN 1670-785-5988

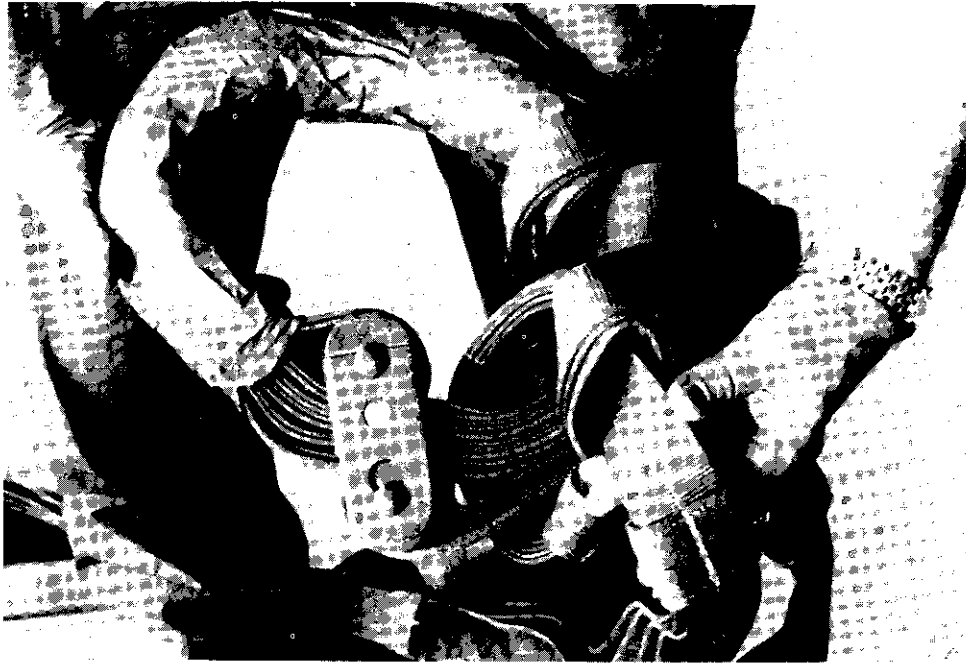


FIGURE 6. DONUT ASSEMBLY AND SLING LEG ATTACHMENT TECHNIQUE. (The donut is fabricated by looping the 8-foot sling three times and securing the ends with the link assembly. The upper portion of the donut is insulated and taped to prevent friction wear from the cargo hook. The sling legs are attached to the donut by means of a choker hitch.)

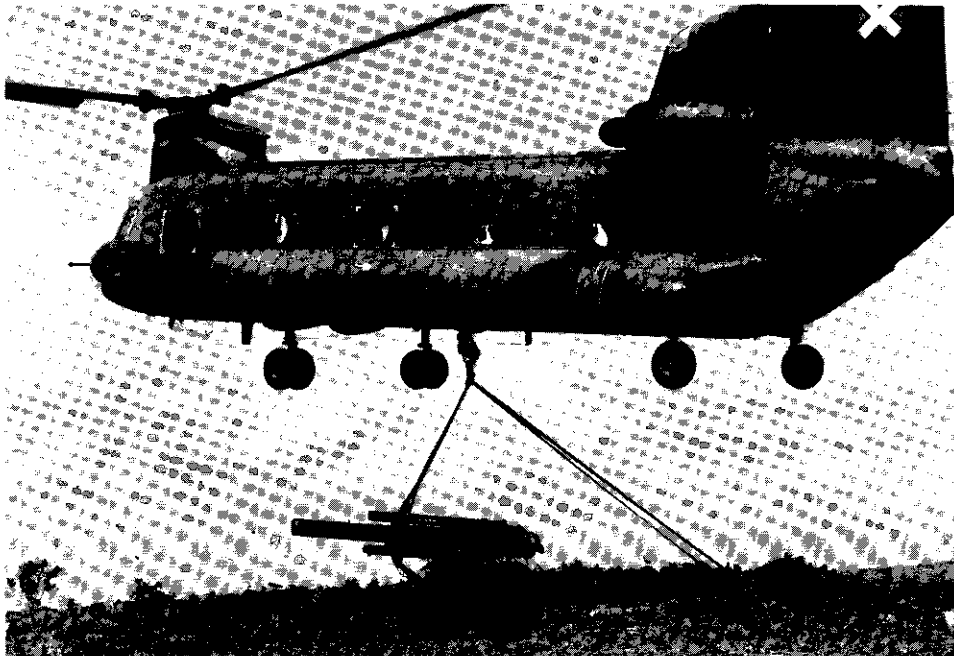


FIGURE 7. THE 155MM HOWITZER BEING TRANSPORTED BY CH-47.

OBSERVATION: Detailed planning, careful consideration of the limiting factors presented and training are required by both artillery and aviation units to assure success of this type movement.

2. ITEM: Night extraction of long range reconnaissance patrols.
(670607)

DISCUSSION: The following method for night extraction of long range reconnaissance patrols was reported by the 14th Aviation Battalion. When notified to extract, the aircraft proceeds to the patrol's location and establishes radio communication with the patrol leader. The pilot identifies his aircraft by placing his position lights on the "flash bright" setting. Once aircraft identification is completed, the pilot requests the best landing direction into the pickup zone. If, for example, the direction is South, the pilot instructs the patrol leader as follows: "I am turning to a North heading and changing my lights to steady bright. On my command, give me a left or right turn until my aircraft is facing you. You can identify me as facing you when you see a rectangle of four lights: two green and two red. Stop my turn at that time and identify your position with a flare, flashlight, etc." When the patrol pickup point is identified, the aircraft descends immediately.

OBSERVATION: This method has been successfully used during combat operations.

3. ITEM: Enemy "baiting" aircraft to land in ambush area.
(670607)

DISCUSSION: During a recent combat assault, a unit was airlifted into two landing zones. A short time later, an observer in an OH-23 saw several weapons lying in an open field in the general area of the landing zones but remote from the troops on the ground. Two aircraft were sent to pick up approximately 10 troops to recover the weapons. Landing in the field near the weapons, the two aircraft were brought under heavy fire. One aircraft was damaged and several casualties were incurred.

OBSERVATION: The weapons had obviously been placed as bait for an ambush. When a situation like this is encountered, artillery and air support should be used to cover friendly activities.

4. ITEM: Casualty evacuation by helicopter. (670801)

DISCUSSION: Due to the advent of helicopter evacuation, the casualty is often transported directly to a hospital from the battlefield. Experiences reported by the 9th Infantry Division indicate that, in many cases, it is detrimental to both the man and the mission when clearing station facilities are over-flown. The following points were emphasized:

a. Many casualties have not been seen by medical personnel prior to pick up by dustoff and should be taken to the closest facility, such as a clearing station where resuscitative treatment is given and the patient stabilized prior to further evacuation. Further, those patients treated by the tourniquet require immediate professional medical care. The risk of Dead On Arrival is much greater when clearing stations are bypassed and additional time is spent flying to a more distant medical facility.

b. The seriously injured and the slightly wounded are frequently placed on the same evacuation helicopter. At the clearing station the slightly wounded casualty can be treated, held for a short period and returned to duty without leaving the division area.

c. Evacuation can be coordinated at the clearing station, thereby preventing a situation where a helicopter takes a single patient to a hospital while other patients brought to the clearing station by troop carrier helicopters or ground vehicles are awaiting evacuation.

d. Clearing stations have the necessary equipment and professional personnel to provide resuscitative medical care and to stabilize the patient so that further evacuation will not jeopardize his health.

OBSERVATION: Whenever possible, combat operations should be supported by a clearing station in the forward support base with a medical evacuation helicopter co-located. Casualties should be brought directly to the clearing station for initial treatment and then further evacuation, if necessary.

5. ITEM: Dropping leaflets from fixed-wing aircraft. (670283)

DISCUSSION: The accurate placement of leaflets by fixed-wing aircraft is sometimes difficult because of high winds.

OBSERVATION: A single six-inch stack of leaflets bound with a thin rubber band should be dropped over the desired target area. The bound leaflets will come apart and fall in a relatively small area downwind from the target. The bulk of the leaflets can be dropped a distance upwind from the target equal to the initial downwind distance.

6. ITEM: Monsoon season planning. (670610)

DISCUSSION: Supported units scheduled large airmobile repositioning operations when the forecasted weather trend was for continued low ceilings and reduced visibility. The lifts were often scheduled to begin just after dawn and, just as often were delayed by weather until mid-morning, early afternoon, or were eventually cancelled. Some operations had to be terminated because of zero-zero conditions in the landing zone area prior to completion of the move, leaving small units isolated for a period of time.

OBSERVATION: During planning, adverse weather conditions expected during the monsoon season must be considered as possible limiting factors.

7. ITEM: Airmobile liaison. (670801)

DISCUSSION: An aviation unit conducting multiple lifts should provide a liaison officer to keep the ground commander informed of the status of the aircraft and any changes in the schedule.

OBSERVATION: An airmobile liaison officer has proved valuable in keeping the ground forces informed of the status of aircraft and changes due to the tactical situation or weather.

8. ITEM: Individual touch-down during airmobile operations. (670801)

DISCUSSION: During Operation Paddington, conducted during July 1967, a pathfinder detachment was assigned the mission of operating the stage field for a three company UH-1D tactical troop lift. The requirement was to mark the touchdown points for the lead aircraft of each company.

OBSERVATION: The practice of marking only the touchdown point for the lead aircraft of each airmobile company is not desirable if there is sufficient time to properly employ the organic pathfinder team to mark individual touchdown points.

9. ITEM: Integrated CH-47, UH-1D helicopter tactical troop lift. (670801)

DISCUSSION: Whenever CH-47's are used in conjunction with UH-1D's on airmobile operations, the landing zones must be secure. Therefore, CH-47's can only be employed on subsequent lifts once the initial assault has been conducted by UH-1D's. In order to fully integrate CH-47 and UH-1D tactical troop lifts, prior coordination is required.

OBSERVATION: For an integrated tactical troop lift, CH-47's must either be attached to the airmobile company, or as a minimum, liaison personnel from the CH-47 element must attend the briefing by the airmobile company.

10. ITEM: Logistic planning for airmobile operations. (670801)

DISCUSSION: The 9th Infantry Division reported that an adequate and organized logistics base for participating helicopters is one of the most important aspects of a successful airmobile operation.

In addition to forecasting fuel and ammunition requirements, detailed plans must be made as to the type of refueling system to be used, methods of providing ammunition to armed helicopters, physical layout and organization of refueling and rearming areas with consideration to staging and helicopter parking requirements, vehicular transportation requirements and personnel requirements. Logistic personnel must have sufficient time to complete detailed planning and preparation prior to beginning an airmobile operation.

OBSERVATION: Successful logistics support for helicopters participating in airmobile operations requires detailed planning. Logistical personnel must be notified immediately of pending airmobile operations and must work closely with the operations and pathfinder personnel through phases of planning. A thorough ground reconnaissance of refueling and rearming areas should be conducted at the earliest opportunity.

11. ITEM: Helicopter landing zone studies. (670801)

DISCUSSION: Helicopter landing zone studies should be as comprehensive as possible to provide the commander and the pilots with a complete orientation prior to an operation.

OBSERVATION: All helicopter landing zones should be plotted on an overlay with a narrative description supported by photographs.

12. ITEM: Helicopter recovery. (67X071)

DISCUSSION: An OH-23 was forced down in an insecure area due to mechanical difficulties. During recovery operations by a CH-47, one of the OH-23's rotor blades was bent, damaging the power train.

OBSERVATION: Damage to the rotor blades often causes extensive secondary damage to the power train. When the situation permits, removal of the main rotor and tail rotor blades of the OH-23 prior to recovery will reduce the chances of further damage in transit.

13. ITEM: Dust suppression on helicopter landing fields. (670031)

DISCUSSION: Dust becomes more of a problem area as the dry season progresses. The dust condition in helicopter parking and staging areas becomes a major problem and must be considered each time an operation is planned. To counter the dust, helicopters may be required to depart in individual flights with extra spacing between each aircraft. The use of penepime in these areas will greatly reduce the dust hazard.

OBSERVATION: Extra time must be allowed for helicopter operations in dusty areas when planning for a lift. Penepime greatly reduces dust and should be applied whenever possible to all helicopter

parking, staging and resupply areas. However, as reported by the 93d Engineer Battalion, penprime is wasted if not properly placed and allowed to cure before being subjected to traffic.

14. ITEM: Radio antennas. (670028)

DISCUSSION: During recent operations, vehicles have been driven under the rotating blades of helicopters, and persons with back-packed radios have inadvertently walked their long antennas into rotor blades.

OBSERVATION: All crew members must watch vehicles and personnel approaching the aircraft and take immediate action to stop them if necessary. The aircraft commander should touchdown where a ground vehicle is not likely to operate. If a collision with an antenna is inevitable, the collective pitch should be fully lowered and little or no damage will result. Ground commanders should advise their personnel of the hazards of driving near helicopters and of walking under the rotor blades with an antenna erected on back-packed radios.

SECTION IV

ENGINEER EXPEDIENTS AND TECHNIQUES

1. ITEM: Jungle clearing with demolitions. (674216) (T674246)

DISCUSSION: The 65th Engineer Battalion was assigned a mission of clearing dense jungle and hedgerows in inaccessible areas. These clearing operations took place in widely scattered areas within the 25th Infantry Division's area of operation and involved clearing isolated canals and stream lines as well as areas of poor trafficability on the fringes of conventionally cleared areas. Most of the work was accomplished by the massive use of demolitions, primarily the bangalore torpedo.

a. Clearing along canal banks. Nine major canals were cleared for an average length of 1500 meters each. The banks were covered with trees averaging about eight inches in diameter and dense thickets of brush and bamboo. The brush was thickest close to the river. All trees over four inches in diameter were charged with C-4. In some areas of very dense vegetation, it was necessary to use bangalores to remove the undergrowth before the larger trees could be charged. Any thicket too dense to be easily removed by machette was charged with bangalores. Close to the river, the brush extended out into the canal as much as five meters. In these areas, bangalores were placed perpendicular to the canal. On the banks, they were placed parallel with its axis. Frequently, the bangalores were placed underwater among the roots of the larger and denser clumps of brush. This was found to be very effective at low tide. The normal procedure, however, was to place the bangalores about a foot off the ground and as close as possible to the heavier brush. All charges were tied with a ring main.

(1) Demolition resupply. Demolition resupply was by helicopter. Bangalores were brought by CH-47 to a central location and then carried to the site on foot or by rubber boat. Other demolitions were supplied directly to the site by UH-1D.

(2) Rate of clearance. Squads in this terrain cleared up to 500 meters per day.

(3) Demolition expenditures. Demolitions were expended at the rate of 200 to 300 pounds of C-4 per hundred meters of canal (both sides) and up to 10 bangalore kits and 1,500 feet of detonating cord per hundred meters.

b. Clearing along flooded canal banks. On canals in similar terrain, but where flooding made logistics more difficult, experiments were made in resupplying bangalores by UH-1D instead of CH-47. This took longer, but the demolition was delivered closer to the area where it was to be used. Pneumatic assault boats were used to a greater extent for both placing and transporting demolitions. In some cases, the brush was

so dense that all work had to be done from the boats and line main placed down the center of the canal. Bangalores were placed perpendicular to the stream when placed directly from the boat. In general, there were less trees and more brush in this area, therefore less C-4 and detonating cord were used. Bangalores were used at the rate of 10 to 20 per hundred meters. With the greater need for bangalores and the poor working conditions, squads often did not do better than 200 meters a day.

c. Clearing hedgerows. Different problems were encountered in an area where monsoon flooding and poor soil conditions combined to make clearing with Rome plows in the fringe areas impossible. Most of the dense brush was bamboo growing in hedgerows one to three meters wide. In many cases the hedgerows also contained large trees. Bangalores were placed down the center of the hedgerows. In the dense thickets, they were placed perpendicular to the axis of the hedgerow. In most cases, they were elevated about a foot off the ground to make more effective use of the fragmentation from the bangalores. When the bangalores were placed at right angles, care was taken to make sure that the boosters were touching. When this was impossible, the charges were individually mined. Trees larger than four inches were charged with C-4. All charges were tied to a line main.

(1) Demolition resupply. Logistics were much less of a problem in this area. Bangalores were brought in by helicopter and truck. They were hauled to the site on pole trailers towed by armored personnel carriers after the cases had been broken down and the bangalores assembled in sections of two. The armored personnel carriers drove along the hedgerows, and the bangalores were pulled off in whatever quantity necessary.

(2) Rate of clearance. A squad can clear up to 1000 meters a day if properly supported.

(3) Demolition expenditures. Bangalores were expended at the rate of 10 to 12 per hundred meters. Eighty pounds of C-4 and 800 feet of detonating cord were also used every hundred meters.

d. Clearing jungle along a river bank. During a clearing operation, difficulty was encountered near a river where ditches, trenches, swamps and rice paddies made the river banks inaccessible to dozers and Rome plows. This inaccessible strip of jungle, averaging about 15 meters wide, was destroyed by placing bangalores the width of the strip, perpendicular to the river on four-meter centers.

(1) Demolition resupply. Usually the bangalores were brought to the site on pole trailers but placing them proved difficult, particularly in the flooded area.

(2) Rate of clearance. A squad can place about 250 meters of charge per day.

(3) Demolition expenditure. Up to 24 bangalore kits and about 600 feet of detonating cord were used per hundred meters. Since there was no attempt to blow the trees, no C-4 was used.

OBSERVATION: Experience with bangalore torpedoes in these operations proves that bangalore torpedoes are effective for rapidly removing hedgerows and dense thickets in inaccessible areas. They are easy to place and prime but are difficult to transport. When bangalores must be carried on foot through rough terrain for more than a few hundred meters, the advantage over hand clearing is marginal at best. They are, however, more effective than any other type of demolition for removing dense vegetation.

2. ITEM: Field expedient bangalore torpedoes. (670645)

DISCUSSION: In fire support bases, brush and small trees can be cleared through the use of excess powder charges from the artillery. Punch a hole in a discarded powder cannister, stuff excess powder charges in it, place one-half pound of primed TNT inside, seal it and an excellent bangalore torpedo is made.

OBSERVATION: Rather than burning excess powder charges, they may serve a useful purpose in the construction of bangalore torpedoes.

3. ITEM: Tunnel destruction methods. (674216)

DISCUSSION: The 25th Infantry Division reported that the accepted method of tunnel destruction with explosives can be improved through a newly developed hydraulic process implemented by the 2d Battalion, 14th Infantry.

OBSERVATION: Complete tunnel destruction can be accomplished by pumping water into all levels of the tunnel and allowing the water to stand for an extended period of time. Once the subterranean structures have softened, artillery and airstrikes fired into the immediate area will be more effective as collapsing agents. This method can be used only when a source of water is readily available.

4. ITEM: Tunnel destruction. (T674249)

DISCUSSION: The 1st Brigade, 101st Airborne Division, while conducting operations in I Corps, discovered enemy tunnels which were extremely sophisticated and extensive in design. Denial of future use by the enemy of these fortifications has proved to be a considerable problem. Tunnels discovered indicated that the systems were constructed over a long period of time without interference from friendly forces. Some complexes were estimated to have been constructed and improved upon over a period of ten years. In one case, a 100-meter long tunnel complex lined with concrete and tile was discovered. Entrances are always well camouflaged, and the tunnels are seldom built with less than 10 feet of overburden to provide protection against artillery fire and air strikes. Considering these

factors, complete destruction is frequently not feasible under the limitations of time and demolition materials available to the unit. Tunnel destruction demolitions normally available include C-4, TNT, cratering charges, shaped charges and acetylene destruction kits. The acetylene kits do not work effectively when overburden exceeds seven feet. The amount of standard demolition needed to completely destroy the type of tunnels found in the zone would require a special supply ship to come to the tunnel site. Since a unit is vulnerable to enemy attack when stationary, few unit commanders desire to stay in one place for long periods. Therefore, the general accepted means of limiting future use of a tunnel is to seed the tunnel with chemicals and close the entrance. Although this is by no means a permanent measure, such action will deny immediate reoccupation, and if Free World Forces operate in the area, the enemy will not have the freedom of movement to reopen the tunnel.

OBSERVATION: The following method of sealing entrances has been developed. Upon discovery of a tunnel, the length is explored, and air vents and escape holes are plugged with brush and dirt to make the tunnel as airtight as possible. An average thickness of overburden is determined, and a 15-pound shaped charge is set in the ceiling of the tunnel. The charge is located the same distance from the tunnel entrance as the thickness of the overburden in feet. The shaped charge blows a hole suitable for the placement of a cratering charge or a TNT charge. If TNT is used, the amount of explosive required is calculated by $P=R3KC$. The main charge is placed in the hole created by the shaped charge, tamped and propped in place. The tunnel is then seeded with cans of crystalline CS and the whole packet is blown.

5. ITEM: Blasting trees and stumps. (670071)

DISCUSSION: US Army Engineer Command Vietnam reported that the normal timber cutting formula (21 pounds of explosive per foot of diameter, plus 50 percent) is sometimes ineffective when felling hardwood trees. Hardwood trees, such as mahogany, over 100 feet tall and eight feet in diameter are not felled using the standard charge and placement. It is also extremely difficult to drill holes in such trees in order to place an internal charge.

OBSERVATION: Reverting to the steel cutting formula ($P=3/8 A$), which basically increases the normally calculated charge to 9.8 pounds per foot of diameter, provides a suitable quantity of explosive when this charge is placed around the tree.

6. ITEM: Latrine burnout cans. (670068)

DISCUSSION: Conventional methods of halving large numbers of 55-gallon drums for use in latrines are extremely time-consuming. Usual methods are with a torch, expending valuable oxygen and acetylene, or with hand tools.

OBSERVATION: A very effective method for cutting large quantities of drums is with the use of detonating cord. A successful technique is to fill the drums with water and make four complete turns around the drum at the level desired to cut. Many barrels can be cut simultaneously using this method.

7. ITEM: Blasting caps. (670048)

DISCUSSION: The 588th Engineer Battalion reported that weather conditions in Vietnam and the age of some of the explosives issued result in frequent cases when one blasting cap will not initiate an explosion.

OBSERVATION: Because of the danger involved in misfires, experience has shown that the use of two blasting caps, side by side, will decrease the percentage of misfires.

8. ITEM: Tunnel destruction with shaped charges. (670049)

DISCUSSION: Certain configurations of demolitions are preferred over other types for tunnel destruction. Shape charges are not the best type of explosive since their explosive effect is concentrated and directional.

OBSERVATION: On Operation Cedar Falls, shaped charges were used to destroy small tunnels. To partially neutralize the "Monroe effect" the 168th Engineer Battalion packed the cone with C-4 to make the charge act as a block of explosive. It was primed with a two foot length of detonating cord with a cap crimped on each end. One cap was placed in the cap well and the other, in the C-4. One of these blocks was placed every 40 feet in the tunnel. Although effective, standard cratering charges would have been more effective.

9. ITEM: Use of conventional explosives to supplement acetylene. (670049)

DISCUSSION: The 168th Engineer Battalion reported that the acetylene method of tunnel destruction is generally effective for tunnels with seven-foot or less overburden. On deeper tunnels, the overburden does not usually collapse, but merely fractures.

OBSERVATION: During Operation Cedar Falls and as a supplement to the acetylene method, satchel charges were spaced at about 25-meter intervals along deep tunnels and detonated by a detonating cord ring main. This combined method completely collapsed tunnels with as much as 15 feet of overburden.