

FM 31-75

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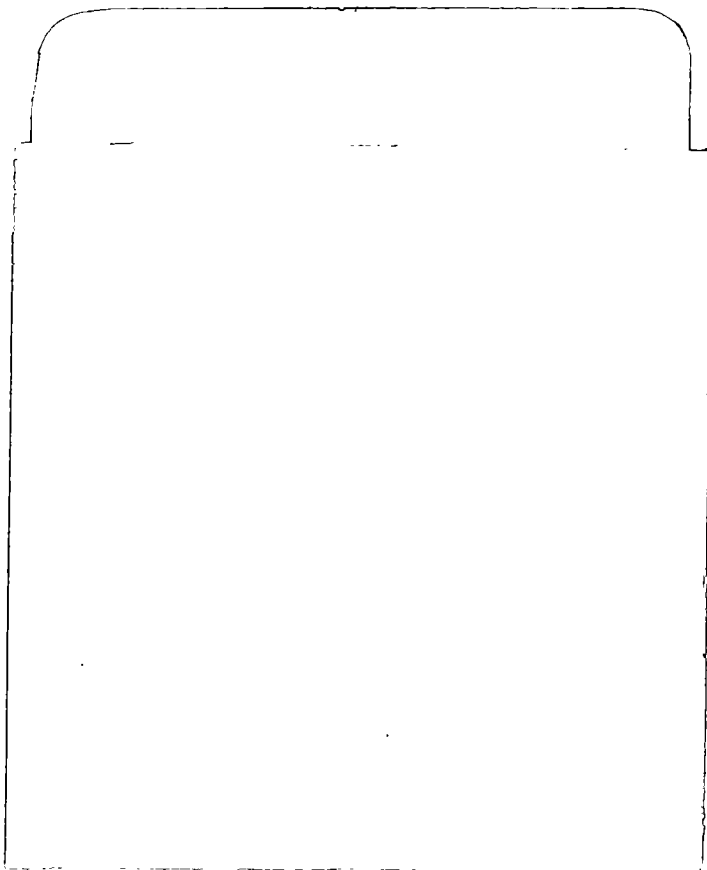
FM 31-75

FIELD MANUAL

RIVERINE WARFARE

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**HEADQUARTERS, DEPARTMENT OF THE ARMY
JANUARY 1971**



PREFACE

This manual sets forth basic guidance for commanders and staff officers for planning and executing riverine warfare.

While this manual reflects riverine warfare as conducted in the Republic of Vietnam where it was field evaluated, the principles, procedures, and techniques expressed, should be applicable to worldwide riverine environments where a riverine force may be employed.

Riverine warfare differs from conventional ground warfare chiefly in environment. The fundamentals and tactics applicable in conventional ground operations apply in riverine operations. Special organization, techniques, and operating procedures are required when ground forces, supported by Navy ships and crafts, operate directly from inland waterways.

By their nature, riverine operations are joint operations undertaken primarily by Army and Navy forces. Joint riverine operations require the coordinated and integrated efforts of participating forces to achieve a common objective. Chapter 3 covers command arrangements to insure a coordinated effort of the forces committed. The joint forces command arrangement is highlighted by decentralized execution.

Riverine operations should employ all available forces by all possible modes of transportation to seek and destroy enemy forces or installations; one portion of the riverine force may enter the area by watercraft; another may employ air assault tactics to enter the area; and still another force may move overland, either mounted or dismounted; all combine to encircle the enemy force in the area of operations (AO). All available fires are used in support of the operation: close airstrikes, air artillery, waterborne and land-based artillery, and gunfire from the supporting naval flotilla.

Because most riverine operations involve two Services and may involve Allied forces, parallel planning and coordinated planning are required at all echelons. Initial coordination among participating elements begins on receipt of warning orders. Coordination and liaison between units insure the establishment of common goals to accomplish the mission. Alternate plans are habitually developed to take advantage of opportunities that the force creates in the AO or to counter unusual, unsuspected enemy actions or reactions, changes in water or airlift capabilities, and the availability of fire support.

Withdrawal and return movement from an AO is a critical phase. A withdrawal in a riverine environment where all or part of a deployed force discontinues operations and moves to another location by watercraft requires detailed planning. Enemy forces may have precise information on the location of friendly units, their composition and relative combat power, and the location of watercraft that are confined to existing waterways. Plans for the withdrawal should insure air and fire support throughout the withdrawal operation.

Limited ground mobility in the riverine environment restricts certain aspects of combat support. Units may be widely dispersed, and environ-

mental restrictions often prevent mutual support. Although support requirements are no greater than normal, immediate response is essential. The scarcity of dry land, which many units need to accomplish their mission, requires the commander to establish priorities for land use. Several factors make provision of continuous, flexible fire support difficult. These factors include inadequate survey control, either a lack of maps or inadequate maps, scarcity of dry land for artillery positions, scarcity of meteorological data, and curtailment of massing fires when fire direction is decentralized. Although normal fire support procedures apply, some modifications and innovations, particularly in the use of fire support from rivercraft, are necessary in riverine areas.

The principles, techniques, procedures, and organizational concepts of combat service support in support of other operations apply with modifications to riverine operations. The basic dissimilarity in riverine operations is the extensive use of ships and watercraft to provide combat service support. The extensive use of waterways to move supplies and personnel partially overcomes the lack of primary highways and interconnected road nets in the riverine AO. Other factors requiring special consideration are the lack of suitable landsites for large, semifixed combat service support installations; the requirements for support of watercraft and associated equipment; and maintenance problems aggravated by the weather and terrain.

As in all tactical operations, civil-military operations is a command responsibility. The location of human habitation and activity along the river and canal banks may increase the magnitude and importance of civil-military operation considerations.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 18 January 1971

RIVERINE WARFARE

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CHAPTER 1

INTRODUCTION

1-1. Purpose

a. This manual presents concepts and techniques for training and employing forces in a riverine environment. It outlines doctrine, tactics, techniques, and procedures for training an infantry division or separate task force for employment where inland waterways are the primary lines of communications (LOC).

b. The significant operational concept of riverine warfare concerns the sustained employment of forces in a riverine environment, one element of which is the force operating on the waterways. Military forces equipped and trained to operate on rivers and canals, together with airmobile and groundmobile overland forces, can add a new dimension to mobility and firepower, can successfully dominate the overall environment, and can control its routes of communication and populated areas.

c. The contents of this manual are applicable to—

- (1) Nuclear and nonnuclear warfare.
- (2) Employment of and defense against chemical and nuclear weapons and defense against biological weapons.
- (3) Stability operations.

1-2. Scope

a. This manual covers doctrinal concepts, operating techniques, and procedures for infantry divisions; it specifically applies to units based afloat or supported by naval units. It adapts existing doctrine, terminology, and techniques to riverine operations.

b. This manual provides guidance in the integration of ground forces, naval units, and supporting air forces conducting joint operations. The nature of riverine operations requires utmost coordination and cooperation between the forces involved. Their operations are interdependent, and the combined forces operate as a single tactical entity responsive to the needs and requirements of the ground force.

1-3. Recommended Changes

Users of this manual are encouraged to submit recommendations to improve its clarity or accuracy. Comments will be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons will provide for each comment to insure understanding and complete evaluation. Comments should be prepared using DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commanding General, U.S. Army Combat Developments Command Institute of Combined Arms and Support, Fort Leavenworth, Kansas 66027. Originators of proposed changes that would constitute a modification of approved Army doctrine may send an information copy, through command channels, to the Commanding General, U.S. Army Combat Developments Command, Fort Belvoir, Virginia 22060, to facilitate review and followup.

1-4. Distinguishing Characteristics

a. In areas with limited land transportation and abundant surface water, inland waterways provide natural routes for transportation and link centers of population. In some countries, inland waterways are major arteries for economic circulation. River transportation of people, raw materials, and goods of all kinds may necessitate military operations to keep waterways open and, in some instances, to transport people and goods to maintain the regional or national economy. These operations may or may not involve extensive, recurring combat actions.

b. Water routes have strategic and tactical importance to an insurgent or enemy force. Such a situation dictates a doctrine and strategy of interdiction and control of waterways and surrounding territory and population centers. Operations involving this doctrine are known as riverine warfare.

c. In many ways, inland waterways resemble roads or railways and can be considered simply as LOC. The enemy may use these LOC for access or egress for infiltration and exfiltration

of individuals and units. The mission of the infiltrators may be a raid or ambush; it also may be subversion, espionage, reinforcement of engaged units, or eventual regroupment for a future operation. Tactical principles that govern the control and use of inland waterways for military operations are essentially the same as those that apply to land LOC. Equipment for waterborne operations may look different, but it serves the same purposes as equipment for ground operations. Ships and watercraft are substitutes for wheeled and tracked vehicles in meeting armor, armament, and transport requirements. FM 55-15 provides information on vessels and amphibians that may be used in riverine warfare. Navy forces operating on inland waterways must be familiar with the principles of ground combat because these principles determine the characteristics of the watercraft required and their employment.

d. Military forces equipped and trained to operate on rivers and canals, together with airmobile and groundmobile overland forces, provide an added dimension to mobility and firepower. Riverine warfare differs from conventional ground warfare chiefly in environment. The fundamentals and tactics applicable in conventional ground operations apply in riverine warfare. Special organization, techniques, and operating procedures are required when ground forces, supported by Navy ships and craft, operate directly from inland waterways. These special considerations are outlined in subsequent chapters.

e. Riverine warfare is not just another aspect of amphibious operations. Riverine warfare is distinct in that it requires continuous use of specialized watercraft, equipment, and techniques and is concerned with sustained land combat operation.

CHAPTER 2

OPERATIONAL ENVIRONMENT

Section I. GENERAL

2-1. Introduction

A thorough understanding of a riverine environment is necessary to plan and conduct riverine operations. The people settle along waterways, often the only lines of communications (LOC). Civilian traffic and settlements conceal the enemy's movements and help to conceal mining and ambush operations. The physical characteristics of the environment dictate the sociological and economic development of the area. The control of waterways is necessary to establish and maintain control in riverine areas.

2-2. Riverine Environments

A riverine environment is characterized by water LOC, possibly several major rivers and tributaries or an extensive network of minor waterways, canals, and irrigation ditches. Military units use air and water transportation extensively because of the lack of a suitable road net. Suitable land for bases, airfields, and

artillery firing positions may not always be available because of the topography, location of civilian population, restrictions on withdrawing land from agricultural use, or a combination of these factors.

a. Constructing bases and airfields using fill from dredging operations is a solution. Normal dredging may create new land but at locations unsuitable for bases and airfields. Also, dredging equipment may not be available solely to reclaim land for a base.

b. Another solution to the shortage of land areas for bases is to use naval ships and barges as a mobile afloat base. Such a base can move to an area of operations (AO) as needed. The afloat base provides a suitable launching point for waterborne operations and, because it does not occupy land, it reduces the impact on the civilian population. A nearby airfield, providing a base for an airborne forward air controller (FAC), may be a consideration in selecting the site for the afloat base.

Section II. ENEMY FORCES

2-3. General

Enemy activities described in this section, although peculiar to riverine operations of the Mekong Delta of South Vietnam, should be considered as typical enemy activity applicable in other riverine areas of the world. FM 31-16 provides information on typical enemy organizations and missions encountered in stability operational areas.

2-4. Control of Riverine Areas

The control of the riverine areas fluctuates with the effectiveness of the riverine force, the size and capabilities of enemy forces, and the attitudes of local civilians. FM 31-16 contains a general description of enemy-controlled, contested areas and friendly controlled areas that are applicable to stability operations.

2-5. Activities

Enemy activities in a riverine environment, though similar to those in other operational areas, will be affected by the peculiarities of the geographical conditions.

a. *Offensive Operations.*

(1) The enemy capitalizing on his knowledge of the riverine area may mass battalions or larger units for short, violent attacks on isolated friendly outposts and troop units. He may limit his operations to raids, sniping, mining operations, subversion, espionage, psychological operations, terrorism, or sabotage.

(2) LOC may be subjected to continuous or intermittent harassment to deny friendly forces the use of the LOC or to delay, harass, and prevent movement along the routes. Bridges and roads may be destroyed or they

may be blocked sufficiently to stop or restrict military traffic and to allow civilian traffic to move with difficulty. The use of mines and demolitions, to include command detonated mines, is extensive. Obstacles frequently block waterways to military traffic and allow civilian traffic to move with difficulty.

b. Defensive Operations. In defense, enemy units take full advantage of heavy vegetation and tree lines. These wooded areas vary in width from a few to several hundred meters.

(1) Enemy forces may be expected to prepare primary and alternate defensive positions to defend against airmobile attacks along waterways. Primary positions usually are inside the tree line on suspected landing zones (LZ), oriented toward the open field. These positions provide excellent observation, fields of fire, and maximum grazing fire into the LZ. Delaying positions are constructed to allow the force to conduct an orderly delay to a waterway, to break contact, and to withdraw.

(2) Normally, trails and footpaths are constructed parallel to the banks of waterways. They may contain obstacles and boobytraps to canalize an attacking force. The obstacles may be natural or artificial.

(3) An enemy unit occupying a village places all-round security well forward of the defensive positions. When attacked, the security elements alert the main force and take the attacking force under fire. Normally, this fire is long-range sniper fire designed to slow the advance rather than to inflict casualties. If possible, the main enemy force withdraws to succeeding positions as the attack advances and fights only when it detects a weakness in the attacking force.

(4) If, in attempting to withdraw, the enemy force is trapped and must stand and fight, it usually allows the attacking unit to

come within 100 meters before it initiates a large volume of fire to stop the attack. By conducting the firefight at close range, the enemy attempts to prevent the attacking force from employing artillery fires and airstrikes.

c. Ambushes. Movements on the waterways and on the limited road net are particularly vulnerable to ambush. The climate in most riverine areas permits ambushing forces to remain in position for a considerable time without undue physical discomfort. The heavy vegetation along many of the waterways and roads provides concealment, and the terrain generally provides some cover. Ambushes (chap 5) are similar, whether the ambush site is on a road, a trail, or a waterway.

d. Use of Waterways.

(1) Enemy units normally plan operations to use water transport extensively. The geographic area or the extent of friendly control in the area may require the enemy to operate during darkness or reduced visibility. When cover or concealment is nonexistent along streams or canals, enemy units may move at night even in their own base areas. Where tidal conditions exist, enemy movements along canals often can continue during high or low tide because their craft generally are lighter than friendly craft.

(2) In areas under friendly surveillance during waterborne movements, the enemy uses a variety of security measures, to include advance boats, security elements on shore, and signal systems. When enemy units move during daylight, they stay close to shore to prevent detection from the air. Normally, they move during daylight only when they control the surrounding area or along waterways that provide concealment. Usually they avoid concentrating more than three or four boats at one location. The enemy may construct inlets in concealed locations to hide boats if their movements are detected.

CHAPTER 3

ORGANIZATION AND COMMAND

Section I. GENERAL

3-1. Introduction

a. By their nature, riverine operations are joint operations undertaken primarily by Army and Navy forces. Joint riverine operations require the coordinated and integrated efforts of participating forces to achieve a common objective. Department of Defense (DOD) and Joint Chiefs of Staff (JCS) directives prescribe joint forces command arrangements to insure coordination and integration. Joint forces command organizations provide for central direction to coordinate the efforts of the forces committed, decentralized execution to accommodate the detailed action of a large number of commands or individuals, and common doctrine among the forces involved.

b. Environmental conditions and tactical situations differ from one riverine area to another. Enemy forces may vary from lightly armed local militia units to regular military units. The environment varies with the tides and seasons, which further complicate extended operations over an area with many differences in terrain. Friendly ground forces may be transported by wheeled, mechanized, airmobile, airborne, or waterborne vehicles.

3-2. Composition of the Joint Riverine Task Force

a. The composition of the force will be deter-

mined by the assigned mission, the distinctive characteristics of the riverine area of operations, and enemy capabilities.

b. *Land Force.* The land force provides a balanced force of maneuver and support elements, with adequate command and control facilities. A reinforced infantry battalion is the smallest land force that can be effectively employed in most riverine operations. The land force is composed of Army and/or Marine Corps forces and includes aviation elements when assigned or attached.

c. *Navy Forces.* The Navy force provides an afloat base of operations, combat support and combat service support, and surface mobility. A mobile riverine base element and one riverine operations squadron (including lift for a reinforced infantry battalion), and Navy aviation units or support, as appropriate, normally are the minimum forces. In addition to these forces, Navy forces normally will be required for support and logistic functions.

d. *Tactical Air Forces.* The tactical air forces provide interdiction, close air support, reconnaissance, airlift, counterair, and related air support functions, as required.

Section II. COMMAND AND CONTROL

3-3. General

The command relationships outlined herein concern U.S. Army and Navy elements with possible U.S. Air Force support participating in joint or combined riverine operations. The unified or subordinate unified command commander who assigns forces for riverine operations specifies the command structure above the Army division/Navy flotilla level. When riverine operations are an integral part of internal defense and internal development operations, the unified or subordinate unified command com-

mander also prescribes appropriate relationships with host government agencies in the area of operations (AO). The variety of environmental influences and tactical situations that may be encountered in a riverine area prevents establishment of one command arrangement that is suitable for all situations and areas.

3-4. Typical Command Arrangements

a. *Chain of Command.* The interrelationship of the tasks of the joint riverine task force components in planning and executing riverine

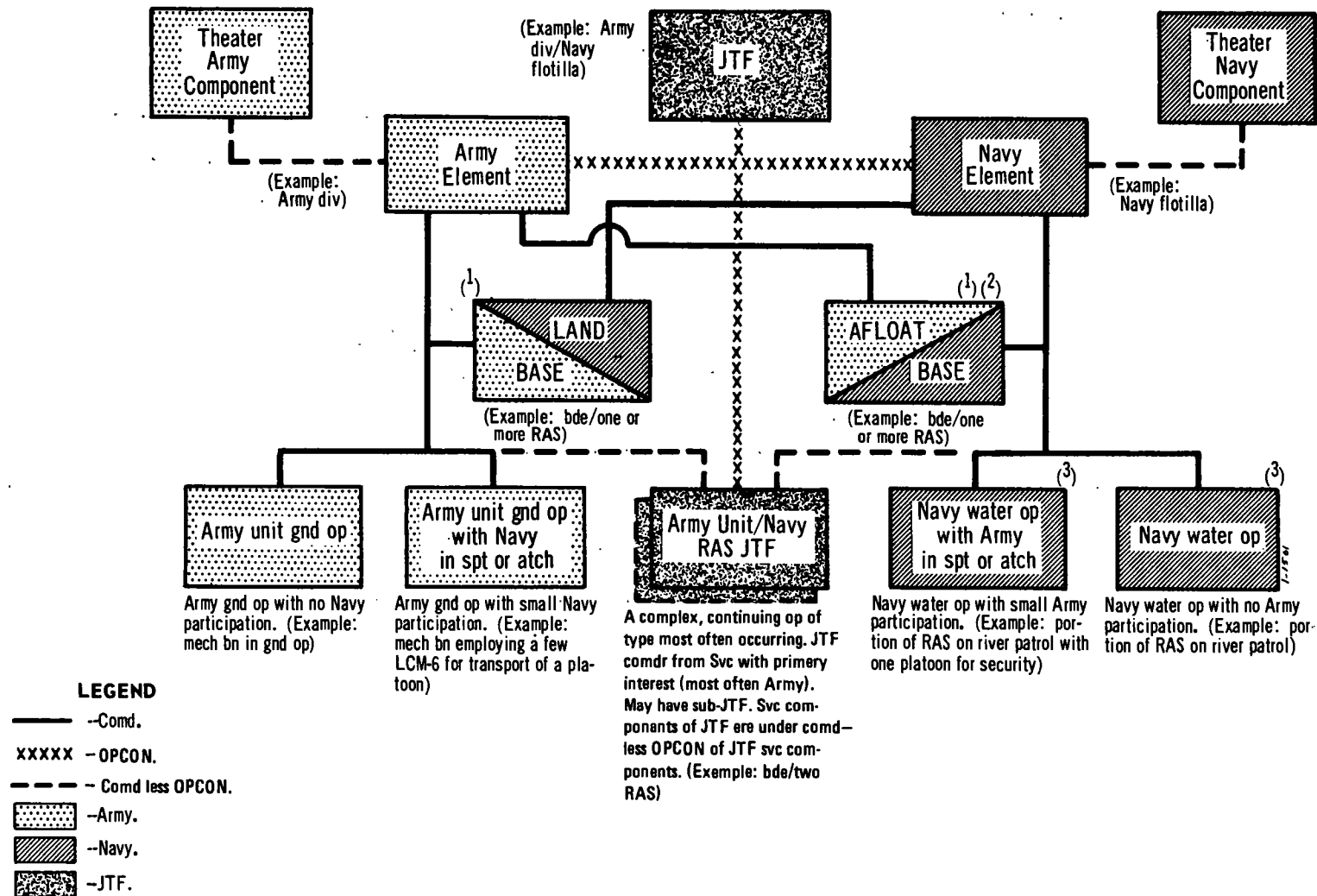


Figure 3-1. JTF organization.

operations requires the establishment of equivalent levels of command among components of the joint riverine task force (fig 3-1). The following fundamental considerations govern the application of such a chain of command:

(1) The joint riverine force commander is responsible for the operation and has operational control, less command of all riverine forces, until termination of the operation.

(2) If only a segment of his force is required to accomplish a specific mission, the joint riverine task force commander may form subordinate task organizations. Subordinate task organization commanders will exercise operational control only during the execution period of such operations.

(3) The joint riverine task force commander exercises operational control of each component through the component commander.

(4) The joint riverine task force commander must clearly identify any special command arrangements within the joint riverine task force which may be required for each operation.

(5) Command and control authority and responsibility must be specified to govern the relationship between commanders of component forces at all levels of the joint riverine task force organization, to include command relationships down to platoon/squad/boat commander level.

b. Designation of Commanders. The designation of the Service to provide the joint riverine task force commander will depend on the overall mission of the riverine operation to be conducted.

(1) If the mission is to deny the use of a waterway system to the enemy or to establish and maintain control of lines of communications (LOC) within the riverine area, with the preponderance of forces and support provided by the Naval component, the joint riverine task force commander normally will be a Navy officer.

(2) If the mission is to establish and maintain control of LOC and land areas within the riverine area and to locate and destroy enemy forces, supplies, and equipment, with the preponderance of combat forces and combat support provided by the land force, the joint riverine task force commander normally will be from the Service providing the land force commander.

(3) If the mission is to establish and maintain control of LOC and the land areas within the riverine area and to locate and destroy enemy forces, equipment, and supplies, with the land force providing the preponderance of forces, but with primary support, other than

logistic, provided by the afloat Naval component, the joint riverine task force commander may be either a Navy officer or an officer from the Service providing the land force commander.

c. Attachment. See JCS Pub 2, chapter III, section 2, subsection 6.

(1) Under this command arrangement, the commander to which units are attached shall have that degree of authority over, and responsibility for, the attached unit as is indicated in the order directing attachment and the authority to require compliance with general regulations applicable to his entire command. This authority is equally applicable to attached forces regardless of Service.

(2) While providing for unity of command, it imposes the burden of administrative and logistic support of the attached forces on the operational commander. This arrangement would be poorly suited in the case of attachments of major forces of one Service to those of another Service because of the required cross-Servicing arrangements.

d. Others. Other command relationships such as operational control (OPCON), direct support, and general support are as in other operations. Usually, direct support or OPCON are the most desirable command relationships for riverine forces when they are supporting ground forces.

3-5. Security Responsibilities

The following security responsibilities apply under any command arrangement:

a. One or more riverine bases will be established afloat and/or on land. When appropriate ships and craft are available to form a mobile riverine base, water characteristics permit its use, and it can accommodate the needs of forces assigned in the riverine area, a mobile base normally should be employed. Riverine bases, whether afloat or on land, will be joint bases; and the riverine force commander will designate the commanders thereof.

(1) As base commander of a land or an afloat base, the commander is responsible for local base defense (JCS Pub 2, para 40209).

(2) The relationship between land force and Navy elements stationed on a land or an afloat base is one of coordination or mutual support. The Army and Navy elements assign their appropriate share of forces for local base defense as the base commander directs. The primary mission of the Navy force in base defense is to provide gunfire support and protection against any threat from the water. FM 31-81(Test) provides details of base defense.

b. During tactical operations, the land force commander is responsible for providing security elements (ground or air) along the route of movement, to include the movement to contact and withdrawal to base areas. The Navy element commander exercises tactical control of the movement and maneuver of watercraft under the operational control of the joint task force commander or subordinate task force commander. Special command arrangements must be specified before movement to insure prompt reaction to tactical emergencies, e.g., ambush from the bank which requires land forces to be landed to eliminate the enemy force. Paragraphs 4-14 through 4-17 describe waterborne operations in detail.

c. The senior Navy commander embarked is in tactical control while the afloat base is en route from one anchorage to another. Higher headquarters normally directs or approves the

relocation of the afloat base. Recommendations to the afloat base commander and the senior Navy commander of the riverine force form the criteria for decisions to relocate the afloat base. The afloat base commander orders emergency relocations and informs both higher and subordinate headquarters of the move.

d. The Navy commander of the riverine force is responsible for the movement of Navy ships and watercraft between riverine bases and support facilities outside the riverine area. The land force commander in the riverine area is responsible for the security of movement of these ships within the area.

3-6. Liaison

Specific liaison requirements and responsibilities are outlined in applicable sections of this manual.

Section III. ARMY FORCES

3-7. Infantry Division

a. Infantry divisions can conduct operations in a riverine environment without major reorganization. Modifications and structuring, however, are required. The extent of these changes is contingent on the primary means used for mobility and the base location of the maneuver and supporting elements of the division, except the infantry division tank battalion (TOE 17-35H) must be replaced by a light armor battalion (TOE 17-15T). For those land elements that do not use watercraft as a primary means of tactical transportation, only minor modifications are required. The extent of the organizational changes to the division support base hinges on the ratio of land-based and afloat-based maneuver elements that it is required to support.

b. The division, brigades, and battalions require augmentation with civil affairs and psychological operations (PSYOP) units in densely populated areas.

c. Army river assault craft should be made available for tactical operations such as patrolling and resupply missions.

3-8. Nondivisional Forces

a. U.S. Army units supporting the division or operating in the area may include—

(1) Field artillery. (Medium- and heavy-caliber field artillery units, aerial field artillery, target acquisition battery or battalions, artillery meteorology sections.)

(2) Armored cavalry regiment or separate armored or air cavalry squadrons.

(3) Aviation battalions or separate companies.

(4) Engineer units:

(a) Engineer combat battalion (army or corps).

(b) Engineer construction battalion.

(c) Engineer port construction company.

(d) Engineer light equipment company.

(e) Engineer amphibious units.

(f) Engineer mobile assault bridge company.

(g) Engineer cellular teams (TOE 5-500-series).

(5) Army intelligence and security units.

(6) Combat service support units as required.

(7) Special forces detachments.

(8) Transportation boat companies.

(9) Provisional air cushion vehicle (ACV) units.

(10) Air defense artillery. (Surface-to-air missile units and gun units having both a surface-to-air and a ground fire support capability.)

(11) Signal units:

(a) Area signal battalion.

(b) Signal support company.

(c) Signal support operations company, separate brigade.

b. In a host-guest environment, U.S. military and civilian advisers to host country govern-

mental, military, and paramilitary agencies and forces may be in the riverine area. These advisers

provide a channel for liaison and coordination with host country agencies.

Section IV. NAVY FORCES

3-9. General

Navy forces in a riverine environment are organized to provide an afloat base facility and combat support and combat service support to land force elements. In addition, Navy elements may patrol and clear inland waterways, conduct amphibious operations and raids, and provide coastal patrol and naval gunfire support.

3-10. River Assault Flotilla

A river assault flotilla (fig 3-2) consists of a flotilla staff and two or more squadrons.

a. Flotilla Staff. The river assault flotilla staff (fig 3-3) plans and supervises training and operations; develops doctrine, organizations, tactics, operational procedures, techniques, and equipment for employment in restricted waters, riverine operations, and associated special operations; supervises combat readiness of assigned forces; and advises commanders on all matters concerning other assigned tasks.

b. River Support Squadron. A river support squadron (fig 3-4) contains barracks, repair, salvage, and supply ships to support land force and Navy elements operating from an afloat base. It provides—

- (1) Billets for land force and Navy personnel.
- (2) Command and control facilities for flotilla, brigade, and battalion commanders and staffs to include sufficient office space to permit

accomplishment of all routine and operational tasks.

(3) Maintenance facilities for land force and Navy units.

(4) Logistic support for land force and Navy units.

(5) Support to base defense forces.

(6) Medical facilities for land force and Navy units.

c. River Assault Squadron.

(1) A river assault squadron (RAS) (fig 3-5) contains sufficient armored troop carriers (ATC) (fig 3-6), command and communications boats (CCB) (fig 3-7), monitors (fig 3-8), assault support patrol boats (ASPB), and ATC's equipped as refuelers to transport and support an infantry battalion conducting offensive operations in a riverine environment. The RAS provides—

(a) A command and control facility for embarked forces.

(b) Gunfire.

(c) Combat resupply.

(d) Facilities for a floating medical aid station.

(e) Ambush defense.

(f) Watermine defense.

(g) Antiswimmer defense.

(h) Harbor security.

(i) Air defense.

(2) Each RAS, known as a task unit (TU), consists of two river divisions (RIVDIV) that are tactical organizations. To support combat operations, the RAS commander organizes the squadron into one or more task elements (TE) to fill the supported land force commander's requirements. The underwater demolition team (UDT), the explosive ordnance disposal (EOD) team, and the river survey team (RST) normally are embarked on the RAS watercraft performing mobile riverine force (MRF) missions. The teams are considered in general support of the MRF.

3-11. Other Navy Forces

Other Navy forces operating in the area normally are not a part of the river assault flotilla; however, they may provide support to elements of the riverine force within their capabilities. Types of forces that may be present include—

a. A waterway patrol unit that is charged with interdicting enemy LOC along and across major waterways. This unit normally has fast,

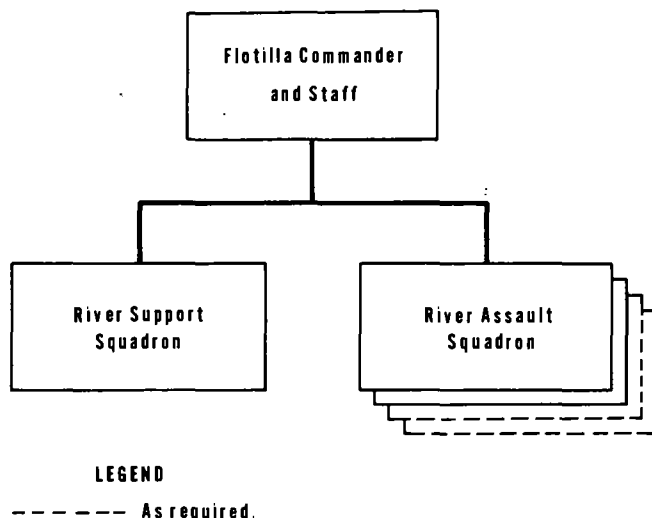


Figure 3-2. Typical river assault flotilla organization.

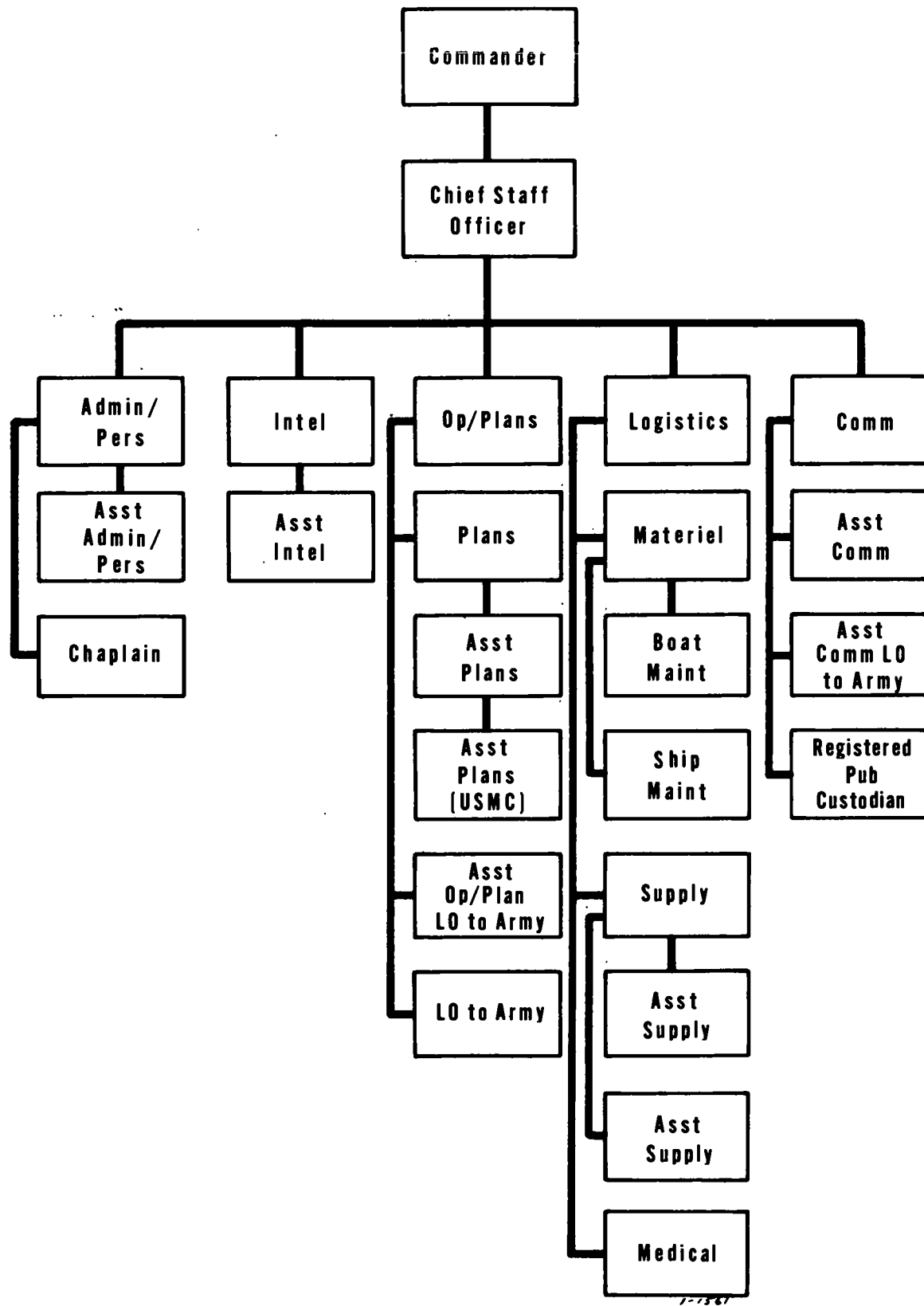


Figure 3-3. Typical organization of river assault flotilla staff.

Designation	Number	Ship/craft type	Function
APB	2	Barracks ship (self-propelled)	Billeting/command
APL	2	Barracks lighter (nonself-propelled)	Billeting
ARL	2	Landing craft repair ship	Maintenance
FDL	2	Floating dry dock (100-ton)	Maintenance
LST	2	Landing ship, tank	Supply
AN	1	Net tender	Afloat base security
YTB	2	Yard tugboat	Salvage; move APL and YFNB
LLC	2	Light lift craft	Salvage
YFNB	1	Covered lighter (large) (nonself-propelled)	Miscellaneous

Figure 3-4. Typical composition of a river support squadron.

lightly armored and heavily armed watercraft designed for use on inland waterways. On request, these boats participate in afloat base defense; act as blocking and flanking forces during tactical operations; provide high-speed transport for small land force units; insert, support, and extract long-range patrols; and perform various other tasks within their assigned patrol areas and their operational limitations.

b. An inland waterway mine clearance unit (mine hunters, minesweepers, and ordnance disposal personnel) that can operate various types of mine removal gear to clear major deep water channels.

c. Coastal patrol units that have a gunfire support capability with weapons ranging from 81-mm mortars to 5-inch naval guns. Coastal

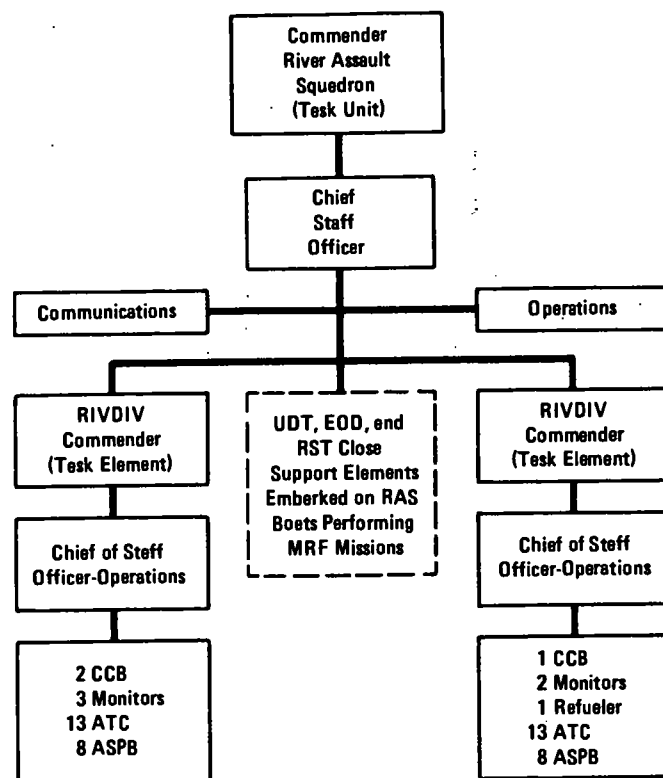


Figure 3-5. River assault squadron organization.

patrol units have a variety of ships and craft from destroyers (300 plus feet) down to patrol craft (50 feet or less). The smaller craft can support from the lower reaches of rivers.

d. Amphibious task forces that may conduct operations in coordination with riverine operations or conduct diversionary landings as part of the riverine area campaign plan.

e. Close air support and naval gunfire support that supplement fire support means available to the riverine forces. See paragraph 6-13 for naval fire support.

Section V. AIR FORCE FORCES

3-12. General

Although Air Force forces normally are not a part of the riverine force, within their capabilities they provide close air support, responsive to the needs of the riverine force.

3-13. Airlift and Close Air Support

Airlift and close air support procedures established within the theater of operations apply to riverine operations.

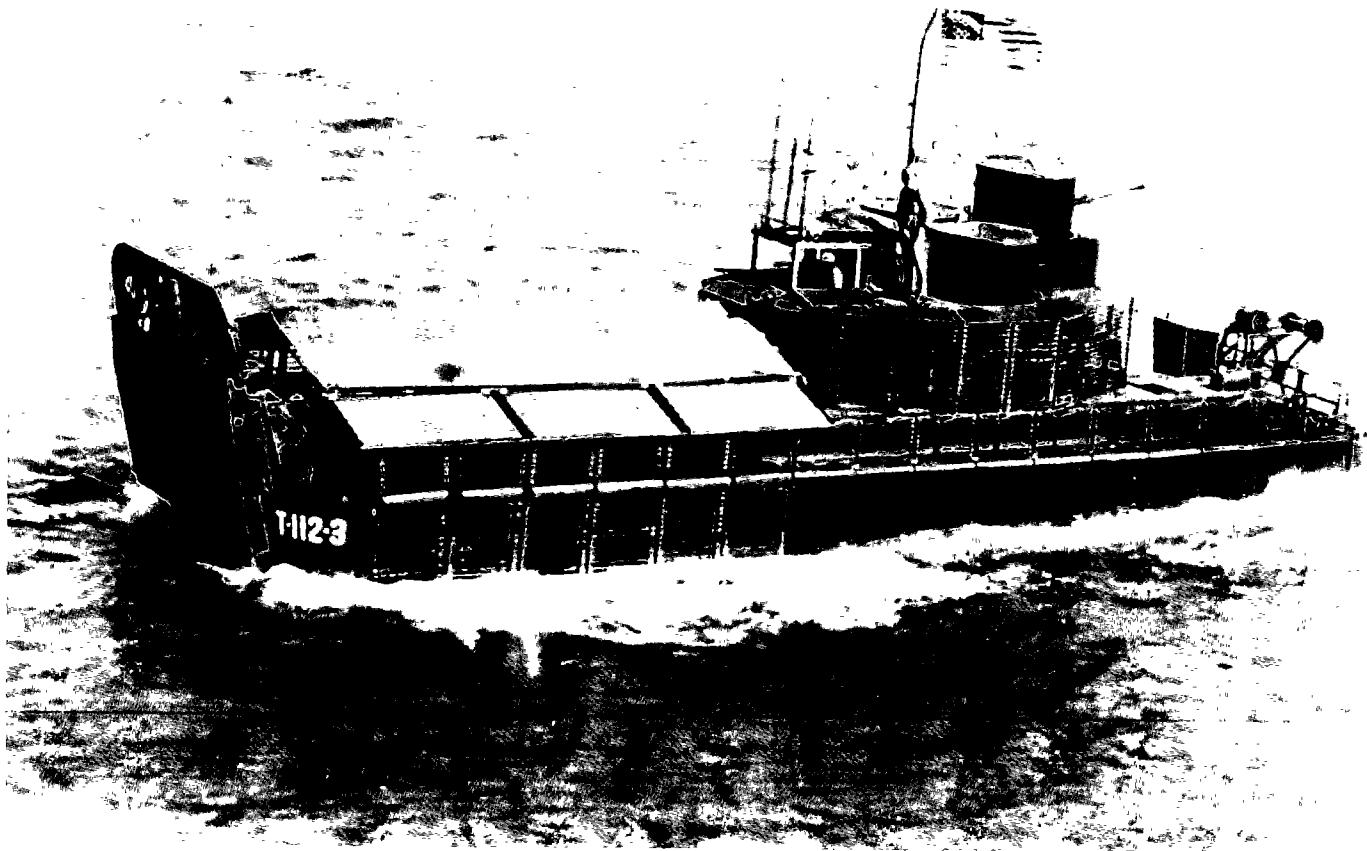


Figure 3-6. Armored troop carrier (ATC).



Figure 3-7. Command and control boat (CCB).

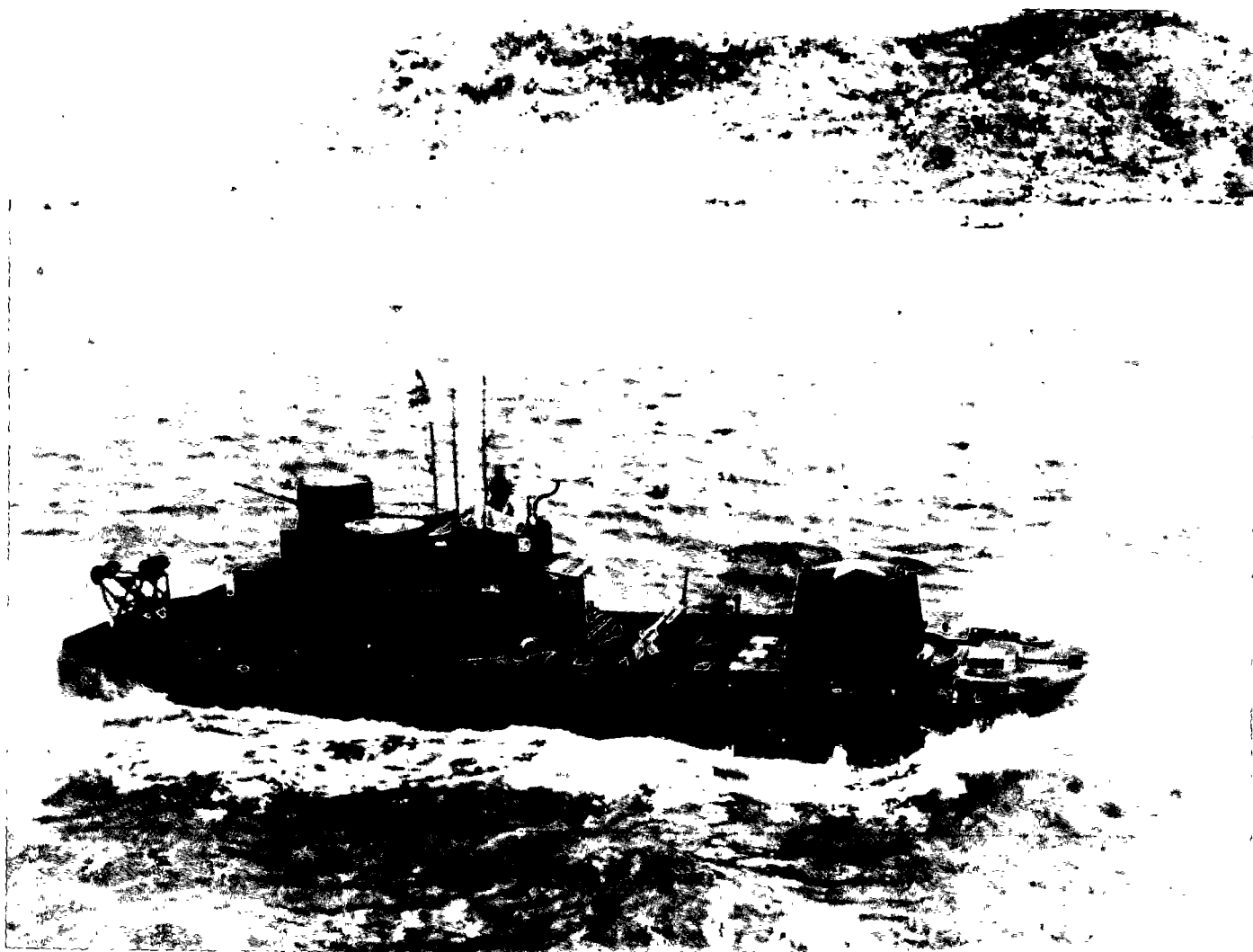


Figure 3-8. Monitor.

CHAPTER 4

OFFENSIVE OPERATIONS

Section I. GENERAL

4-1. Introduction

a. The concept of riverine warfare operations is to employ maximum forces by all possible modes of transportation to achieve and maintain control of a riverine area. This is accomplished by exploiting the advantages of the waterways for movement and capitalizing on mobility to find, fix, and destroy enemy forces.

b. The principles and tactics described in field manuals of the 7- and 17- series, FM 31-16, and FM 61-100 apply to land forces operating in a riverine environment.

c. Offensive operations are conducted under diversified terrain conditions against enemy forces possessing various capabilities. Riverine operations depend on the friendly forces' ability to control and coordinate their movements and firepower quickly. Highly mobile maneuver elements and continuous, flexible fire support are indispensable for successful riverine operations.

d. Figure 4-1 contains a description of a successful assault operation against an enemy force or installation. This operation is developed by establishing one or more blocking positions in the area of operations (AO); one portion of the riverine force enters the area by watercraft; another force, by air assault; and still another force by moving overland, either mounted or dismounted. All forces combine to encircle the enemy force in the AO. Once in contact, all forces press the enemy and deploy to fix him and destroy him in place. All available fire support means support the land forces. In addition, the naval flotilla may employ watercraft to establish blocks on existing waterways in support of the operation.

e. Airborne forces can be employed, in conjunction with forces moving overland or on water in a riverine environment. The terrain may restrict the size of the airborne force employed; however, the procedures outlined in FM 7-20, FM 57-1, and FM 61-100 apply. Based on map reconnaissance, drop zones normally

are readily available in a riverine area. However, careful selection is necessary because water depth, dikes, canals, and canal banks are hazards to parachute landings. Poor cross-country mobility may restrict heavy-drop and followup supply support. The airdrop of small boats facilitates movement and resupply.

f. Operations in support of the joint riverine task force may be required. Although these supporting operations normally will be at the request of the riverine force commander, they will be directed by higher authority. They may be conducted in or outside the joint riverine task force area of operations. The commander of forces conducting supporting operations will coordinate with the riverine force commander.

4-2. Factors Influencing Operations

a. *General.* The basic considerations of offense, which include analysis of the mission, the enemy, terrain, forces available, and weather (see FM 61-100), apply to riverine operations.

b. *Specific.* Specific factors affecting riverine operations that bear on the considerations above include—

(1) *Mobility.* Movement on foot for extensive periods is not desirable for maneuvering troops. Overland movement of wheeled and tracked vehicles may be seriously reduced or restricted to existing land routes. Waterborne or airborne (helicopter and/or fixed-wing) movement is the preferred method for rapid movement of land forces.

(2) *Observation, location, and identification.* Land navigation and security are critical to all units operating in riverine areas. All maneuver elements should carry color smoke grenades and signal panels for unit identification purpose by air observers. Positive identification procedures, standing operating procedures (SOP), etc. are necessary for air and ground identification. Aircraft and air observers can support maneuver elements by extending the reconnaissance capabilities of maneuver elements; detecting

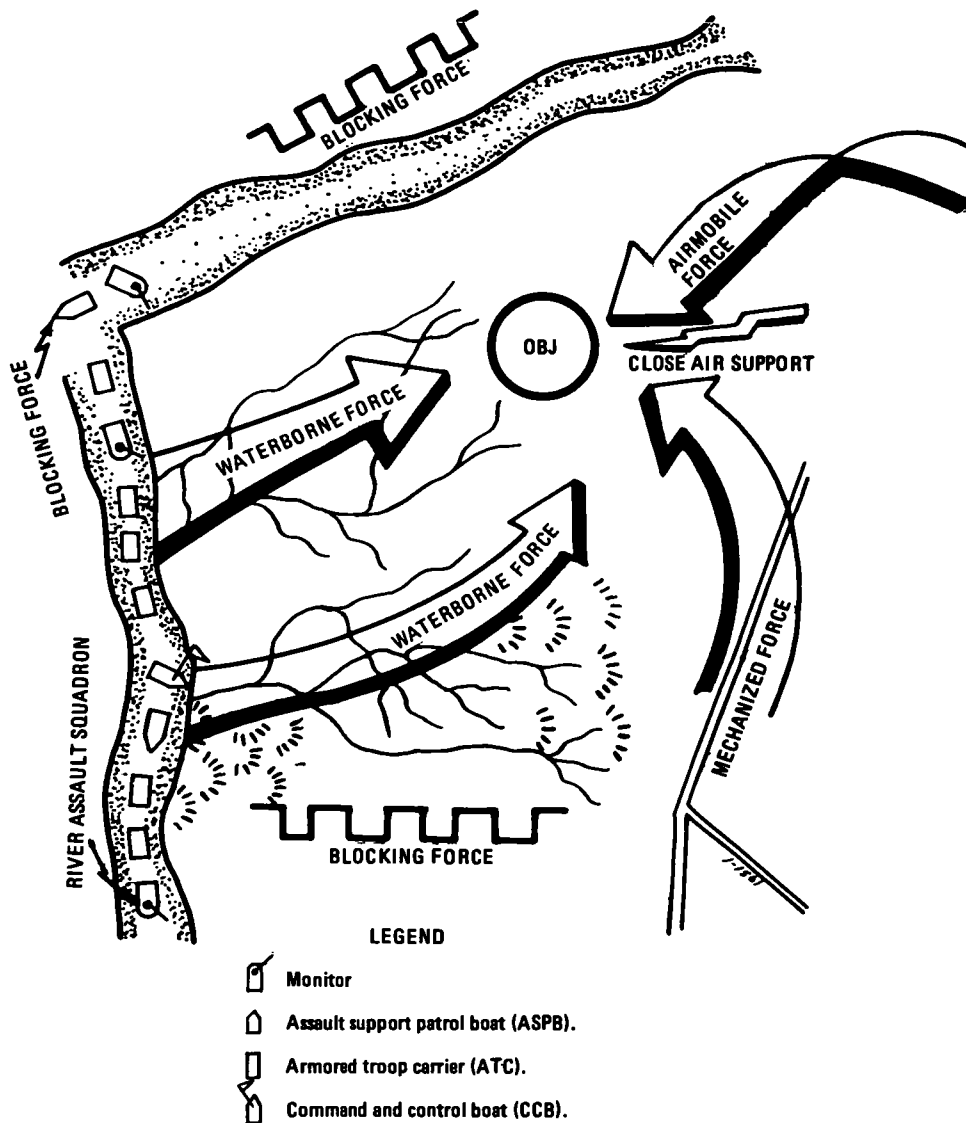


Figure 4-1. Concept of riverine operations.

and reconnoitering possible ambush sites, determining the extent of obstacles, and locating bypasses for maneuver elements; and providing responsive fire support.

(3) *Night operations.* Night actions are feasible in a riverine area. Operations that may be impracticable during daylight may prove highly successful during darkness or limited visibility. Although night offensive operations are less frequent than daylight operations, they are conducted as intelligence dictates or as a follow-on to an operation started during daylight.

(a) Night combat is a part of all operations in riverine environments. All units can conduct night operations using illumination,

infrared weapon sights, and other night vision devices. Maximum use of night raids, patrols, and ambushes keeps enemy forces off balance, prevents surprise, and obtains intelligence.

(b) Armored troop carriers (ATC) can move on waterways at night without creating excessive noise. Complete secrecy of movement is not possible, but this does not prevent employment of a force, moved by ATC, in night operations.

(4) *Tidal data.* In some riverine areas, tidal data are a major consideration in the planning and conduct of riverine operations.

(a) *Planning.* Many small streams in the AO may be navigable only at high tide. This factor must be considered in planning troop

landings and waterborne blocking and support stations.

(b) *En route to the AO.* Tides and currents are frequently the primary determinants of speed of advance. Transiting waterways against the ebb current can significantly reduce speed of movement. Conversely, using the current to proper advantage can reduce transit times. Therefore, these factors are important in planning.

(c) *In the AO.*

1. Combat operations have indicated that landings in a riverine environment are best conducted at high tide. If the operation is conducted at any other time, troops may be required to negotiate through mud, which is frequently waist-deep.

2. There is a 2- to 4-meter tidal change in some areas, which allows transit of numerous small streams at high tide. However, the unit commanders must use extreme caution to avoid being trapped by a rapidly receding tide.

3. Numerous bridges may exist over the waterways in a riverine area. In many cases, clearance of these bridges severely limits the accessibility of these waterways to riverine assault craft. Frequently, however, passage can be effected cautiously at low tide.

4. Commanders must take care in the beaching of boats. With a rapidly receding tide, a boat may become fast aground with no possibility of refloating until the next high tide.

5. At low tide or during periods of low water, the river banks may be above the level of many of the guns installed on the river assault craft which will limit the availability of fire support to maneuver units and local security for the fire units.

(5) *Small waterways and vegetation.* The presence of numerous small waterways and the presence of vegetation along and adjacent to these waterways enhance movement by stealth. Small-unit offensive operations usually gain the most operational advantage from these conditions. Also, defensive positions are particularly vulnerable to surprise engagement at short ranges. After an attack, small forces can take advantage of the surprise and confusion to withdraw by stealth.

(6) *Radius of operations.* River assault craft of the mobile riverine base operate most effectively within a radius of 40 kilometers from the mobile riverine base. Operations conducted beyond this radius are accompanied by the following problems:

(a) Length of movement time in excess

of 4 hours causes excessive troop and crew fatigue and introduces boat resupply problems.

(b) Radio communications frequency modulated (FM) reliability is questionable beyond this range.

4-3. Types of Riverine Operations

a. *General.* When U.S. Army units are part of a riverine task force, they are task-organized and equipped to support the overall riverine force mission to control the riverine area by conducting—

(1) *Assault operations.* These operations employ land, naval, and air forces to achieve one or more of the following objectives:

(a) Establish control of water lines of communications.

(b) Establish control of land areas and/or population and resources.

(c) Locate and destroy hostile forces, installations, and supplies.

(d) Establish and secure an area for a combat support base, as required.

(2) *Surveillance, interdiction, and security operations.* These operations employ land, naval, and air forces to achieve one or more of the following objectives:

(a) Protect friendly line of communications.

(b) Deny hostile forces the use of waterways.

(c) Collect intelligence information.

(d) Perform security missions.

(e) Enforce population and resources control.

b. *Other Types of Offensive Operations.* To conduct the specific riverine operations described above, U.S. Army units must be able to engage in all types of offensive operations as described in FM 7-20 and FM 61-100 to include movement to contact, reconnaissance in force, the coordinated attack, exploitation, pursuit, and night attack. For specific guidance on tactical operations applicable to stability operations, see FM 31-16.

c. *Waterway Patrols.* This operation (primarily a Navy function) may require Army security forces on a periodic or a permanent basis to achieve and/or maintain control of designated water routes.

d. *Reaction Force.* Army and Navy elements support other U.S. forces or Allied military forces by providing readily available, highly mobile reserves or reaction forces. Mechanized and airmobile units are particularly well suited for this mission. Although their movement is

slower, waterborne reaction forces may have greater accessibility to a specific area than mechanized or airmobile forces. Reconnaissance and surveillance are necessary to prevent enemy forces from ambushing the reaction force.

4-4. Control Measures

a. *General.* Control measures used in conventional operations are appropriate for use in riverine operations. Because of the habitual employment of searching, blocking, and screening forces, comprising Army, Navy, or Allied elements, the positive control of both maneuver and fire support is a necessity. The use of boundaries, phase lines, checkpoints, contact points, coordination points, linkup points, and no-fire lines are part of the joint riverine task force's standing operating procedures (SOP). Control measures that are not a part of, or are in apparent contradiction to, the SOP are confirmed and explained in operation orders.

b. *Selection of Boundaries.*

(1) Factors influencing the location of boundaries include width of the waterway in relation to the size of the unit, the nature of the operation, observation and fields of fire, the nature of the enemy, and the capabilities of the forces involved.

(2) Considerations for boundary location are—

(a) *In the middle of the waterway.* This consideration has the advantage of enabling both units to use part of the waterways without coordination and fire into the waterway. Splitting responsibility for the terrain feature and LOC is a disadvantage and the units cannot use the entire waterway or fire to the opposite bank without prior coordination.

(b) *On one bank of the waterway.* This consideration has the advantage of having only one force responsible for the terrain feature. The disadvantages are the requirement for coordination before firing on the opposite bank and restriction on use of the waterway by the unit outside the boundary without coordination. Also the unit responsible for the far bank may not be able to control the waterway without troops on the far bank.

(c) *Parallel to one bank, approximately 100 meters inland from the waterway.* This consideration has the advantage of enabling one unit to control both banks and the waterway, which makes one unit responsible for the terrain feature. The disadvantages are splitting of one unit by the waterway and restrictions

on other units' use of the waterway without coordination.

(d) *At night.* One unit should have clear responsibility for the waterway.

4-5. Liaison

a. The commander controlling the operation establishes liaison, as appropriate, with the following agencies:

- (1) Higher headquarters.
- (2) Other U.S. Army elements participating in the operation.
- (3) Supporting Navy and Air Force forces.
- (4) In stability operations, U.S. advisers to host country military units and civilian organizations.
- (5) Third country military units, if involved.
- (6) Other governmental and private organizations as directed.

b. Assignment of qualified host country liaison officers to the division/brigade/battalion is essential and is arranged among U.S. commanders, U.S. advisers, and appropriate host country commanders for each operation. The liaison officers' knowledge of the riverine AO and the population can assist in identifying friend and foe and can insure close coordination with host country forces. The participation of host country forces in operations at battalion or company is desirable. Their help in searching private dwellings and collecting information can assist in accomplishing the mission.

4-6. Phasing

a. *Planning Phase.* The impact of tactical operations on the local authorities and people can be a major factor in planning operations, particularly in densely populated riverine areas. Desired military results are achieved with the least possible damage or destruction of property or death to civilians.

(1) Because most riverine operations involve at least two Services, parallel planning and coordinated planning are required at all echelons. This planning expedites the development of supporting plans and the preparation of units for the operation. Initial coordination between participating elements begins on receipt of warning orders. Coordination and liaison between units insure the establishment of common goals to accomplish the mission.

(2) Flexible plans that provide for alternate courses of action are habitually developed to take advantage of opportunities that the force creates in the AO or to counter unusual, unsuspected enemy actions or reactions.

(3) Cover and deception plans are necessary to offset the almost certain disclosure of unit movements away from and back to riverine bases. In preparing the deception plan, the commander considers the known capabilities of enemy forces to detect and transmit movement information.

b. Staging and Loading. The staging and loading of the forces for movement to an AO are characteristic of waterborne, airmobile, and airborne operations. Elements, either dismounted or mechanized, may require staging if they are being transported by water or air from one location to another. Security precautions are necessary during the staging and loading phase to prevent enemy forces' being alerted to either the AO location or routes to it. Security precautions and cover and deception plans are implemented concurrently.

c. Movement Phase.

(1) *Methods of movement.* Navy watercraft, Army assault boats, helicopters, armored personnel carriers (APC), trucks, fixed-wing aircraft, amphibian tractors, and foot marches may move committed forces to the AO. Movement may start from either a base area or an AO that is currently occupied.

(a) *Navy watercraft.* The river assault squadron (RAS) is organized and equipped to move a reinforced infantry battalion either into an AO or into a forward staging area for movement into the AO. The RAS also provides boats for command and control, fire support, air defense, patrol/blocking, and minesweeping.

(b) *Army assault boats.* These boats perform a variety of military tasks; however, they are not satisfactory in an assault role because of their vulnerability to ground fire and limited troop carrying capacity. Their use may be limited to administrative roles where the lines of communications (LOC) are relatively secure.

(c) *Helicopters.* Helicopters offer a rapid, flexible means of movement into and within the AO. Many staging areas and landing zones may be available throughout a riverine area. Because they have speed and freedom of maneuver and because they are not as vulnerable to ambush as watercraft, helicopters are the most desirable means of moving over inundated areas.

(d) *APC.* Experience indicates that APC can traverse most of the riverine area with considerable freedom when moving over carefully selected routes. They can move and still retain unit integrity. Movement may begin

from a land base or an existing AO or may follow preliminary positioning by naval craft.

(e) *Truck.* Truck movement is practicable along the major roads in a riverine area. Ferrying operations may be required, however, for trucks or troops. When ferries are unavailable or are unreliable, additional trucks are required on the far side of the waterway to continue the movement. Route reconnaissance, including possible minefields and ambush sites, bridges, and ferries, is necessary. Sufficient assault boats are carried on the trucks to provide another crossing means when ferries are inoperable or ferry sites are congested with civilian traffic.

(f) *Fixed-wing aircraft.* Airborne forces can be employed year round. Fixed-wing aircraft may transport forces between base areas and forward staging areas.

(g) *Airboats.* These boats are fast, maneuverable, and can traverse shallow waterways containing dense grasses.

(h) *Foot marches.* Foot marches are necessary when other transportation is unavailable or infeasible. Normally, foot movement is restricted to short marches and follows initial deployment by other means.

(2) *Prepositioning.* On occasion, because of insufficient lift capability, part of the fire support elements or the combat service support elements may deploy to the AO in advance of the maneuver elements. Planning and movement requirements for prepositioned elements are similar to maneuver elements and primary forces. Once in position, prepositioned elements can provide security for movement of other elements, assist reaction forces, block enemy LOC, execute contingency plans, or participate in deception operations.

(3) *Security during movement.*

(a) The security of moving elements is a primary consideration when planning movement. All routes are subject to interdiction; and any means of transport is subject to ambush. Threats to unit movements include mines, roadblocks, ambush, sniper harassment, indirect fire, and involvement in a meeting engagement. Reconnaissance and security elements precede movements. Prior to movement, the element is thoroughly briefed on plans for security, with emphasis on SOP measures for counterambush. An air escort accompanies unit movements to provide reconnaissance, fire support, and communication relay.

(b) Moving forces at night or along indirect routes into an AO is a way of covering an operation or of deceiving the enemy. Once

enemy forces know the location of the AO, they may disperse to avoid close combat.

(4) *Coordination and control.* Detailed coordination is necessary when multiple means transport elements to the AO. Communications with all moving elements and specified reporting procedures are necessary to enable the control headquarters to monitor the progress of the move and to have adequate information on which to base decisions affecting the movement.

d. Attack Phase. An aggressive offense attains and maintains the initiative.

(1) Offensive actions normally consist of cross-country operations against suspected enemy locations or installations. These operations include use of blocking forces and supporting units.

(2) Standard formations apply for movement within the riverine area.

(3) The following actions are usually necessary once contact is established:

(a) Determine the strength and disposition of the enemy forces while maintaining contact.

(b) Gain fire superiority to permit freedom of maneuver.

(c) Deploy forces to prevent enemy escape or withdrawal. Waterways frequently are used to deploy naval and ground forces to accomplish this mission. The RAS can provide blocking forces by using organic watercraft to block navigable waterways in the area. Blocking positions should be established in the ground to trap the enemy in the AO; however, prepositioning elements of the riverine force in a blocking role alerts the enemy to an impending operation.

(d) Use fire and maneuver to the maximum to destroy or capture enemy forces. Plans provide for maximum employment of fire support to destroy the enemy on contact. If maneuver elements immediately close with the enemy and attempt to destroy him in close combat, safety considerations for friendly troops may prevent maximum employment of available firepower.

(e) Pursue enemy forces attempting to infiltrate through the blocking forces. Security

of the movement is essential to protect pursuit forces from ambush.

(4) A reaction force and fire support elements may occupy dispersed assembly areas. Each element collocates with its means of transportation to provide for rapid commitment. Means of transportation vary with the location of assembly areas and planned commitment.

e. Withdrawal and Return Movement.

(1) A withdrawal in a riverine environment where all or part of a deployed force discontinues operations and moves to another location by watercraft requires detailed planning. Enemy forces usually have precise information on the location of friendly units and their composition and relative combat power. Plans for the withdrawal insure air and fire support throughout the withdrawal. Procedures outlined in FM 7-20 apply to withdrawal before embarking; they apply generally to subsequent phases of the withdrawal.

(2) Forces withdrawing from an AO use the most appropriate available means of transport.

(3) Close supervision is required to prevent laxity in units preparing for withdrawal and during return movements. Ambush is very likely to occur during the return movement; therefore, where possible, units select different routes for withdrawal.

(4) Considerations peculiar to waterborne withdrawal follow:

(a) Planning procedures include consideration of tide and current information. Hydrographic factors controlling employment of RAS watercraft may require reverse planning procedures because of tide and current conditions.

(b) The characteristics and limitations of watercraft affect the achievement of security and secrecy during the waterborne withdrawal. Increased emphasis on deception and active security is required. When feasible, RAS craft continually patrol the water withdrawal route to deter ambush and mining attempts.

(c) Ambush parties, deployed similarly to detachments left in contact, may use a waterborne withdrawal as a lure to destroy enemy forces. The withdrawing force becomes a reaction force familiar with the AO.

Section II. DIVISION/BRIGADE OPERATIONS

4-7. Characteristics of Operations

Operations in a riverine environment usually differ from those in conventional operations and environments as follows:

a. Extreme climatic conditions have a detrimental effect on equipment. Frequent vehicular cross-country movement with the suspension systems submerged in water, particularly salt water, shortens the life of all parts with rubber

components. Prescribed load lists (PLL) should provide increased quantities of all track and suspension system components. All equipment will require thorough organizational maintenance after each operation. Weapons also require frequent oiling to protect them from moisture. Communication equipment should be dried in the sun at every opportunity.

b. A division operating in a riverine environment normally is assigned a tactical area of responsibility (TAOR). In stability operations; the host country forces may retain responsibility for insuring governmental control of the area. Division units can expect to conduct operations in specified AO for prescribed periods. The size of the AO and the duration of operations therein are determined by the factors of mission, enemy, terrain and weather, and troops available (METT). Operations within them may last from a few days to several weeks. In operations of longer duration, rotation of maneuver units is essential to the maintenance of combat effectiveness.

c. Division and brigade commanders have the opportunity to employ considerable combat power using watermobile and airmobile means of transportation and overland movement. The exploitation of all available means of transportation is a key factor in planning and conducting riverine operations. Exploiting the firepower and logistic assets of Navy elements significantly improves Army firepower and maneuver capabilities. These naval assets are aids to success in actions against enemy forces and their installations in a riverine area.

4-8. Conduct of Operations

a. Division operations may consist of the entire division committed to a single operation or a series of brigades or battalions independently conducting operations. The division commander maintains a reserve, or reaction force, varying in size from a single battalion to a brigade.

b. In riverine operations, the basic forms of offensive maneuver, frontal attack, penetration, and envelopment evolve into an encirclement or a series of encirclements. Elements subordinate to the headquarters controlling the operation may use variations of the basic forms of maneuver to accomplish their mission (fig 4-1).

c. Airmobile operations in a riverine area generally follow the established doctrine in FM 7-20 and FM 57-35. Airmobile operations are

used to commit maneuver elements, blocking forces, reserves, and reaction forces.

(1) Although riverine areas may be widely inundated, airmobile operations are feasible year round. Care must be taken to prevent off-loading troops into concealed canals. Airmobile operations in forested areas or swamp areas with heavy vegetation may be limited to employment of troops trained in rappelling or to the use of landing zones adjacent to the forested area.

(2) Weather, temperature, and humidity in the riverine environment affect the lift capability of helicopters. For example, during a late afternoon extraction, high temperature, humidity, or high grass or vegetation may necessitate a reduction of loads by one or two men because the lift capability is reduced.

(3) Although not required, moving the elements to be lifted to a preselected loading zone near the AO by boats, vehicles, or fixed-wing transport aircraft may be advantageous. This method of insertion into the AO reduces the distance that helicopters must move troops and deploys more troops into the objective area faster, without refueling.

4-9. Employment of Reaction Forces

a. The enemy normally chooses to fight only when he possibly can inflict heavy casualties; therefore, rapid response by reaction forces is essential. Reaction operations require flexibility, careful planning, coordination, and reliable communications between all elements. Reaction forces meet established reaction times through planning, rehearsals, and positioning.

b. The commander must insure that a valid requirement for commitment of the reaction force exists before he requests or commits it. A division reaction element may have a mission to be prepared for commitment within the TAOR or support of brigade operations in an AO. A brigade reaction element normally is prepared only for commitment within the AO. Airmobile reaction forces can deploy directly against located enemy positions. Elements on airborne alert are expensive in terms of resource expenditure; therefore, their use is infrequent. An operation may require a small reaction force, normally company size, to be aloft during the critical stages of the operation. This force normally provides the most responsive reaction force. Waterborne reaction forces embarked in ATC's can frequently be available for rapid and effective commitment in a riverine environment. Reaction forces, in the desired

condition of readiness, should be in an assembly area, either at land bases or at afloat bases, with a suitable landing area nearby. To facilitate immediate employment of the reaction force, the commander completes all possible preparations in advance.

4-10. Armored Cavalry Operations

a. General. The armored cavalry squadron performs reconnaissance and surveillance missions and provides security for the unit to which assigned or attached. This squadron rarely conducts independent offensive operations in a riverine area. The squadron and its troops may be employed in support of waterborne elements or elements moving overland. When the employment of an armored cavalry troop with a brigade is necessary, the armored cavalry squadron normally is given a mission to support the brigade with a troop, rather than to attach a troop to the brigade. The air cavalry troop remains under squadron control to extend the capabilities of the ground troops.

b. Missions. The armored cavalry squadron or troop (waterborne or in a ground role) can perform reconnaissance and security missions for a larger force. Additional missions within the squadron's or troop's capability include convoy security, airfield security, and land or afloat base security, and long-range reconnaissance patrols.

c. Air Cavalry Troop.

(1) The air cavalry troop complements the capabilities of the armored cavalry squadron during reconnaissance, surveillance, and security missions in a riverine area. This troop may conduct independent reconnaissance and surveillance, reaction force, raid, air patrol, or counterambush missions.

(2) Aeroscout platoons from air cavalry troops may be employed to observe possible enemy escape routes. The aerorifle and aero-weapons platoons may be used to block these escape routes when ground combat elements are not available for use in blocking positions.

4-11. Light Armor Battalion

a. General. The light armor battalion is equipped with the armored reconnaissance/airborne assault vehicle (AR/AAV). The light armor battalion may be employed independently; however, normally cross-attachment between the light armor battalion and mechanized infantry battalions is accomplished to form AR/AAV infantry teams and task forces. The light armor battalion may be employed

with a waterborne force or an overland force. The force may be transported in Navy craft for waterborne operations, or the combat elements may be waterborne using vehicular swim capabilities with the logistic elements being transported in Navy craft. Whether the AR/AAV swim or are transported by Navy craft depends on the distance.

b. Missions. The light armor battalion can conduct raids and perform missions as a reaction force, an encircling force, an assault force, and a counterambush force.

4-12. Air Cavalry Squadron

The air cavalry squadron can conduct riverine operations as part of a joint force and can provide support to the riverine task force identically as for more conventional missions. Air cavalry units supporting riverine operations can provide continuous day and night surveillance and interdiction of the waterways and flank security to the waterborne force. FM 17-37 contains employment doctrine and missions of the air cavalry squadron.

4-13. Air Defense Artillery

a. General. Air defense of the division/brigade is provided by the air defense weapons organic to the division (Chaparral, Vulcan, and Redeye), field army air defense artillery (ADA) units assigned a tactical mission of supporting the force, Air Force interceptors, and organic nonair defense weapons in an air defense role. ADA weapons having a surface-to-surface capability may be used in a ground fire support role when the threat of hostile air attack is not imminent. The division Chaparral/Vulcan ADA battalion works in close coordination with other members of the combined arms team in riverine operations.

b. Missions.

(1) *Vulcan.* A towed or self-propelled Vulcan can be used as an air defense weapon and as a ground fire support weapon. Normally, Vulcan is not assigned both types of missions simultaneously. This, however, does not preclude Vulcan from providing defensive ground fire support even though assigned an air defense mission. When no serious air threat exists, Vulcan can be given a ground fire support mission. When assigned such a mission, Vulcan fires should be integrated into the force fire support plan. Additional missions within Vulcan's capability include convoy security, landing zone and airfield security, and land or afloat base security. The swim capability

of self-propelled Vulcan and its speed and maneuverability provide cross-country trafficability similar to an armored personnel carrier. Employment of Vulcan in riverine operations follows the procedures outlined in FM 44-3.

(2) *M55*. The riverine force may be assigned the multiple machinegun mount M55 (quadfifties). This weapon has both an air defense and ground fire support capability. FM 44-2 discusses the employment of this weapon. The M55 is a comparatively lightweight weapon and may be used on most ships. It also may be airlifted into position by helicopter. In the latter case, care should be taken to insure security of the weapon until it is ready for action.

(3) *Chaparral and Redeye*. Chaparral and Redeye have an air defense capability only. Redeye is manportable, and Redeye teams are organic to each combat maneuver and cannon

field artillery battalion. Usually, a team supports each company/troop and is used to provide local air defense of the unit that it supports. Chaparral, in conjunction with Vulcan, is used to provide a defense of the riverine AO. When used in an air defense role in an unsecured area, riflemen supplement the ADA weapon crews to provide local security.

(4) *Self-propelled and towed Hawk*. Hawk may be used to defend the AO from hostile air attack. In this case, the AO would be designated a vital area defense; and, when tactically possible, the defense would be designed as described in FM 44-1. Hawk may be airlifted into position; but the result may be loss of its ground mobility. In unsecured areas, the appropriate commander must provide the Hawk fire units with additional forces for ground security.

Section III. BATTALION OPERATIONS

4-14. General

a. Introduction. This section provides guidance to infantry battalions and subordinate units in planning and conducting waterborne operations. The operations outlined below describe one of many ways that watercraft can increase battlefield mobility in a riverine environment.

b. Concept of Waterborne Operations.

(1) Units conducting riverine operations use water transport extensively to move troops and equipment throughout the area. Waterborne operations normally start from areas where ground forces and naval watercraft marshal and load and where forces can effect coordination. This may be at a land base adjacent to a navigable waterway, at an afloat base on a navigable waterway, or in an existing AO. Once troops are aboard, the watercraft proceed to designated landing areas within an assigned AO for offensive operations.

(2) Unit plans include control measures, such as phase lines and checkpoints, for the entire operation. The commander controls the unit's movement either from a command and control boat (CCB) located within the movement formation or from an airborne command post. Maneuver unit commanders embarked in command and control craft dismount from these craft to influence the action of their units.

(3) Security measures employed during the water movement include watercraft formations, constant water patrolling, ground patrolling when possible along the route, air observa-

tion, and column cover with armed aircraft. Close air support aircraft on air or ground alert, ADA, field artillery, and naval gunfire ships or boats provide fire support. The monitors and assault support patrol boats (ASPB) are the primary source of RAS fires. Maneuver elements and naval watercraft prepare to carry out counterambush attack plans at any time during the movement.

(4) The assault landing formation is consistent with the planned scheme of maneuver. Initial objectives are designated to provide security for the landing area and to facilitate assembly and reorganization of units. Each ATC normally transports one full-strength rifle platoon, which maintains unit integrity and simplifies assembly and reorganizations. When the landing is not opposed, the units move rapidly through the initial objectives. Units prepare to accept combat at any stage of the landing. RAS boats provide supporting fires for the maneuvering elements to the flank's front and rear until the fires are masked by the terrain or advancing troops. The assault landing plan includes preparatory and on-call supporting fires.

(5) After completion of the assault landing, the commander initiates appropriate actions such as movement to contact, reconnaissance in force, coordinated attack, exploitation, pursuit, or consolidation and defense. He uses encirclement and surprise to fix the enemy force and to prevent its withdrawal, and he employs firepower to destroy it.

(6) Naval watercraft and Army assault boats are used to accomplish a variety of missions. CCB provide communication facilities for command echelons to control the riverine force when it is away from the land or afloat base. Monitors provide direct and limited indirect fire support to the riverine force in base areas, during movement, and land operations. Primary missions of ASPB include security in base areas and fire support and armed escort during movement and operations. Army assault boats perform resupply missions when routes are relatively secure. Naval watercraft and Army assault boats support the operation by maximum use of existing waterways.

(7) The combat base for the waterborne battalion may include both water and land areas. This base normally includes those support elements of the maneuver battalion and the naval RAS not used with forward tactical units and Army and Navy command and control elements. The battalion combat base moves as required to control and support the operational elements. The size of the AO or the lack of waterways deep enough for RAS craft may prevent the battalion combat base from moving as close to forward elements as necessary for command and control. In this case, the unit commander establishes a tactical command post and follows the operation on foot or by Army assault boat or helicopter.

(8) Dismounted troops carry only essential equipment because of their restricted mobility in the mud and water. The ground forces may use supporting weapons positioned in the combat base. As required, aircraft or watercraft resupply the ground forces and displace supporting weapons. Assault boats transport these items when the route is relatively secure.

(9) Individual morale and alertness decrease markedly after about 48 hours of continuous operations in inundated areas. Rotating units not only helps to overcome this problem but also helps to alleviate the effects on personnel of immersion foot and fungus infection of the feet. Units withdraw by watercraft or other means, according to plan. The withdrawal of troops from the AO is a tactical movement back to the watercraft loading areas. Units are loaded on the RAS boats during extraction in a sequence prescribed by the battalion commander. The battalion commander considers all aspects of the tactical situation, hydrographic data, and future missions. Supporting artillery remains in position at the fire support base to provide fire support for the forces being

extracted. Security of the loading area, including air defense, is necessary throughout the withdrawal operation. A tactical water movement back to base areas or to another AO follows the loading.

(10) Plans allow sufficient time between operations for troop rest, medical attention, equipment maintenance, training to correct deficiencies, and planning for future operations.

(11) Units can maintain a degree of secrecy and deceive enemy forces by loading under concealment of darkness and making a feint at a false AO. The false AO is bypassed as artillery preparatory fires are initiated on it. The RAS then moves to the true AO and commences operations.

c. Task Organization. Waterborne operations require the integration of appropriate Army and Navy forces at each echelon. The task organization integrates battalion with RAS, company with boat division, and platoon with boat. Commanders at each echelon base their actions and orders on the command relationship prescribed in orders from higher headquarters (para 3-3-3-6). The battalion requires the following information to determine the required naval support:

(1) The ability of naval watercraft to move to, within, and around the AO.

(2) The maneuver elements needed in the AO and the availability and desirability of other means of transport to deliver them.

(3) Ranges of available naval support weapons.

d. Preparation for Waterborne Operations.

(1) Waterborne operations require detailed planning at all levels and close coordination with a supporting naval RAS.

(2) Units conducting waterborne operations must be ready to begin the operation as soon as possible after receiving orders. Assault boat operators require training in operation, maintenance, and navigation. Paragraph B-5 discusses techniques of navigation. The use of RAS craft for movement to the AO reduces the training requirement for assault boat operations. As a minimum, training consists of briefings in the marshaling or staging area to acquaint Army personnel with embarkation/loading procedures, required action during the water movement; and debarkation/landing procedures.

(3) The following measures are necessary to maintain unit readiness:

(a) Maintain a detailed unit alert and marshaling plan and prepare to execute the plan without delay.

(b) Prepare supplies and equipment for immediate loading aboard watercraft in accordance with established load plans.

(c) Issue necessary supplies and special equipment to personnel.

(d) Maintain current SOP loading plans for types of watercraft used.

(e) Maintain part of the authorized supplies and heavy equipment and part of the unit basic load of ammunition aboard watercraft when possible.

(f) Conduct frequent inspections, checks, and rehearsals.

(g) Conduct continuous water survival training for all personnel.

e. Orders.

(1) *Warning order.* The commander issues a warning order early in the planning phase to enable subordinate unit commanders to begin planning and preparing for the operation concurrently. The warning order for a waterborne operation is a brief oral or written message and generally contains the information necessary to start preparations.

(2) *Operation order.* An operation order follows the warning order. At battalion level, this order may be oral or written.

f. Marshaling Security.

(1) The time for planning and moving a waterborne force to its AO may vary from several hours to several days. When security measures are lax, the enemy force in the AO may have sufficient time to take evasive action and to prepare defensive positions or ambushes along the planned route.

(2) The necessity for secrecy in planning and conducting a waterborne operation calls for strict security measures early in the planning stage to prevent the enemy's gaining knowledge of the operation. Only those personnel who have a need to know are informed of a scheduled waterborne operation until all personnel are in the marshaling area and are restricted to it. Preparation, training, and rehearsals during marshaling appear routine. Periodic practice seal-in alerts accustom the local populace to conditions that exist during marshaling for actual operations.

(3) When operating from an afloat base, the entire force lives aboard watercraft, therefore, eliminating the marshaling requirement.

4-15. Planning Waterborne Operations

a. General. Plans for waterborne operations are sufficiently detailed to give all participants complete information but simple and sufficient-

ly flexible to be modified as the tactical situation changes.

b. Planning Sequence.

(1) Plans for a waterborne operation usually are developed in the following sequence:

(a) *Scheme of maneuver* based on the mission, troops available, and intelligence concerning the enemy force and terrain, and includes withdrawal of the unit.

(b) *Assault plan* based on the scheme of maneuver.

(c) *Water movement plan* based on the assault plan and the scheme of maneuver.

(d) *Loading plan* based on the water movement plan, the assault plan, and the scheme of maneuver.

(e) *Marshaling plan*, when required, based on the loading plan, the water movement plan, the assault plan, and the scheme of maneuver.

(f) *Deception plan*, when required, based on the mission.

(2) Although these various plans usually are discussed separately, at brigade and battalion they are prepared as paragraphs of the operation order. Planning follows the sequence indicated above, but the plans are interrelated and are developed concurrently. Combat support and combat service support planning begins with the scheme of maneuver and continues throughout the planning sequence.

c. Scheme of Maneuver.

(1) The scheme of maneuver is the placement and movement of maneuver units necessary to accomplish the mission. It may include displacement and linkup with other forces. Withdrawal is planned together with the scheme of maneuver and may be either a part of the operation order or a separate order.

(2) The scheme of maneuver prescribes a task organization; assigns missions, objectives as appropriate, boundaries, and other control measures; and provides for a reserve. It considers those special factors or features such as inundated land, use of supporting watercraft, use of fire support, and close air support.

(3) The scheme of maneuver of a waterborne force is planned to defeat the enemy force while sustaining minimum casualties of friendly forces. Maneuver elements use waterborne capabilities of the RAS to the maximum in moving to the AO, attempting to encircle the enemy before landing, deploying blocking forces, emplacing artillery units, providing supplies in the AO, and performing other combat service support missions. The primary objective

normally will be the enemy force, not the terrain.

(4) The scheme of maneuver is designed to encircle a suspected enemy force in the AO. Terrain objectives are selected which block escape and permit fixing of the enemy force so that it can be destroyed.

(5) Plans insure that units maintain pressure on the enemy, once contact is made. Forces are deployed rapidly to fix the enemy force in a position where maximum fire support can assist units to close with and destroy or capture the enemy force.

(6) Units use waterways to the maximum possible within the AO to capitalize on supporting watercraft capabilities.

(a) Naval RAS watercraft operating in close support of the maneuver elements can—

1. Transport and support ground troops in the assault.

2. Act as, or in support of, a blocking force.

3. Conduct reconnaissance, security, and combat patrols.

4. Transport and land a raiding force.

5. Displace crew-served weapons.

6. Transport reserves.

7. Perform resupply and evacuation tasks.

8. Serve as a command or utility vehicle.

9. Serve as a mobile aid station.

10. Provide direct and indirect fire support.

11. Withdraw or redeploy troops.

12. Act as a firing platform for 105-mm howitzer, 81-mm mortars, or lightweight air defense weapons.

13. Evacuate prisoners of war (PW), defectors, and detainees.

14. Perform damage control and salvage.

(b) The waterborne force may employ Army assault boats—

1. To position blocking forces.

2. To displace crew-served weapons.

3. To provide a means of moving either between naval craft or between naval craft and shore when waterway conditions prevent the landing of troops directly from the naval watercraft.

4. To conduct medical evacuation.

d. *Waterborne Withdrawal.*

(1) During preparation for the waterborne operation, planners determine the availability of waterways in the AO, tide and current infor-

mation for the scheduled period of operations, and suitable loading sites. This information is kept current during the operation and provides the basis for planning the waterborne withdrawal.

(2) Active employment of watercraft during offensive maneuver simplifies deception in the initial stages of a waterborne withdrawal.

(3) When possible, waterborne withdrawal is timed to allow watercraft to approach loading areas with the current, on the rising tide; to load during slack high water; and to depart with the current, on the falling tide.

(4) Because of the security problems that accompany large waterborne movements and the use of predictable routes, loading during the last hours of daylight and moving under the concealment of darkness should be considered. Moving reconnaissance elements along possible withdrawal routes several hours ahead of the movement group is a useful deceptive measure. Likely ambush positions along the planned withdrawal routes are boobytrapped with signal pyrotechnics and casualty-producing devices to warn of enemy attempts to man positions or employ mines on the route.

(5) Loading, normally the most critical phase of the withdrawal, requires detailed planning in the selection of troop assembly areas, loading areas, loading control measures, and watercraft rendezvous areas.

(6) Size of the force to be loaded, personnel training, and time available determine the detail necessary in the withdrawal plan. Routine loading instructions should be included in unit SOP. Withdrawal plans also include—

(a) Schedule for movement of units to loading areas.

(b) Schedule and priorities for loading.

(c) Designation of loading areas and loading sites.

(d) Designation of and instructions for loading control personnel.

(7) The ground force commander, after coordinating with the Navy commanders directly concerned, selects the loading areas for the withdrawal. These areas are as close to unit positions as the waterways, terrain, and enemy situation permit. Multiple loading areas are desirable to achieve maximum speed in loading and departure and to provide passive protection against enemy actions. Factors for consideration in selecting the location and number of loading areas include—

(a) Loading area requirements for the types of watercraft to be used.

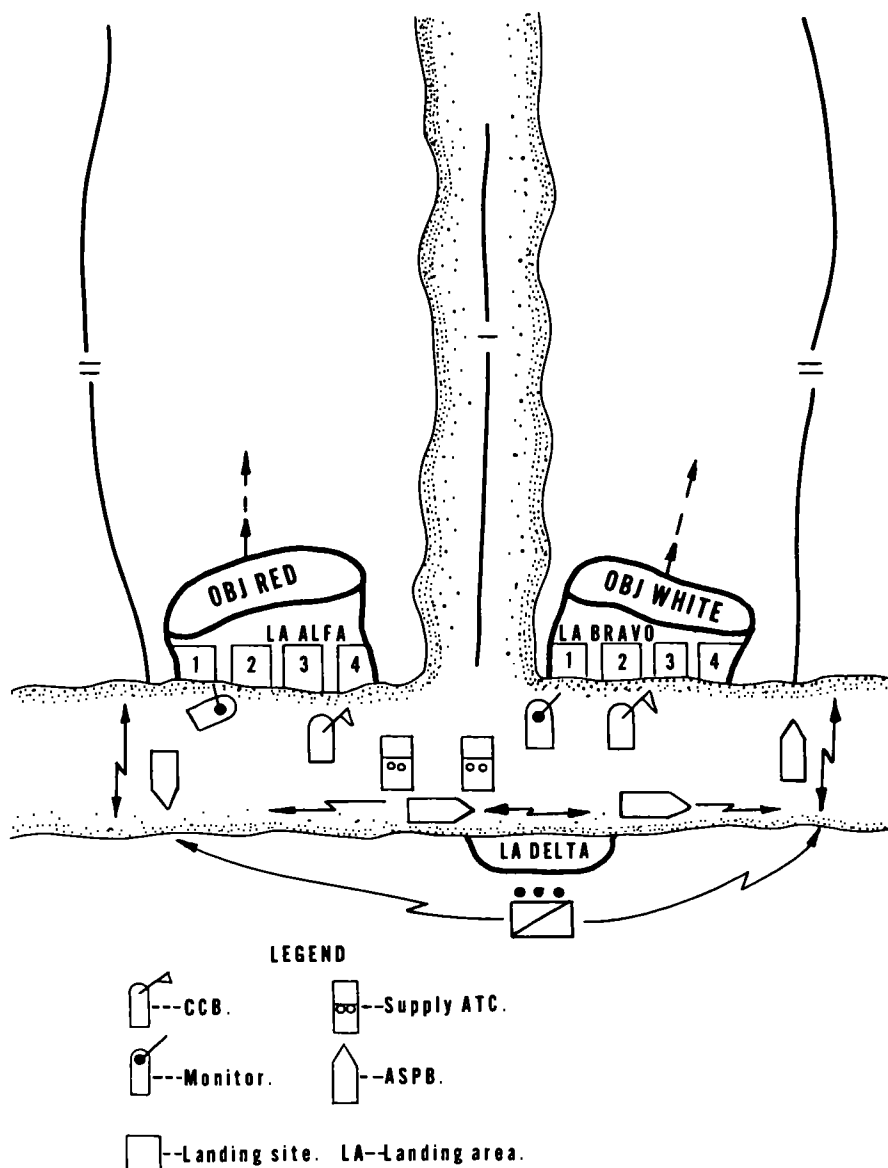


Figure 4-2. Assault plan diagram.

(b) Number of watercraft and time needed for loading.

(c) Availability of facilities for improving loading areas.

(d) Availability of watercraft control facilities.

(e) Availability of dispersed loading sites and standby maneuver area for ATC.

(f) Protection from enemy observation and fires.

e. Assault Plan.

(1) The scheme of maneuver is the basis for the assault plan. The assault plan designates the sequence and the time and place of landing of maneuver, combat support, and

combat service support units in the landing areas; securing initial objectives; and reorganization of the unit.

(2) The ground force commander selects landing areas to avoid enemy defensive positions. The RAS commander provides recommendations for tentative landing areas and alternates, when practicable. Planners must assume that the assault landing will be opposed. Figure 4-2 shows an assault plan diagram. The following influence the selection and the location of landing areas:

(a) Mission and size of the waterborne force.

(b) Scheme of maneuver.

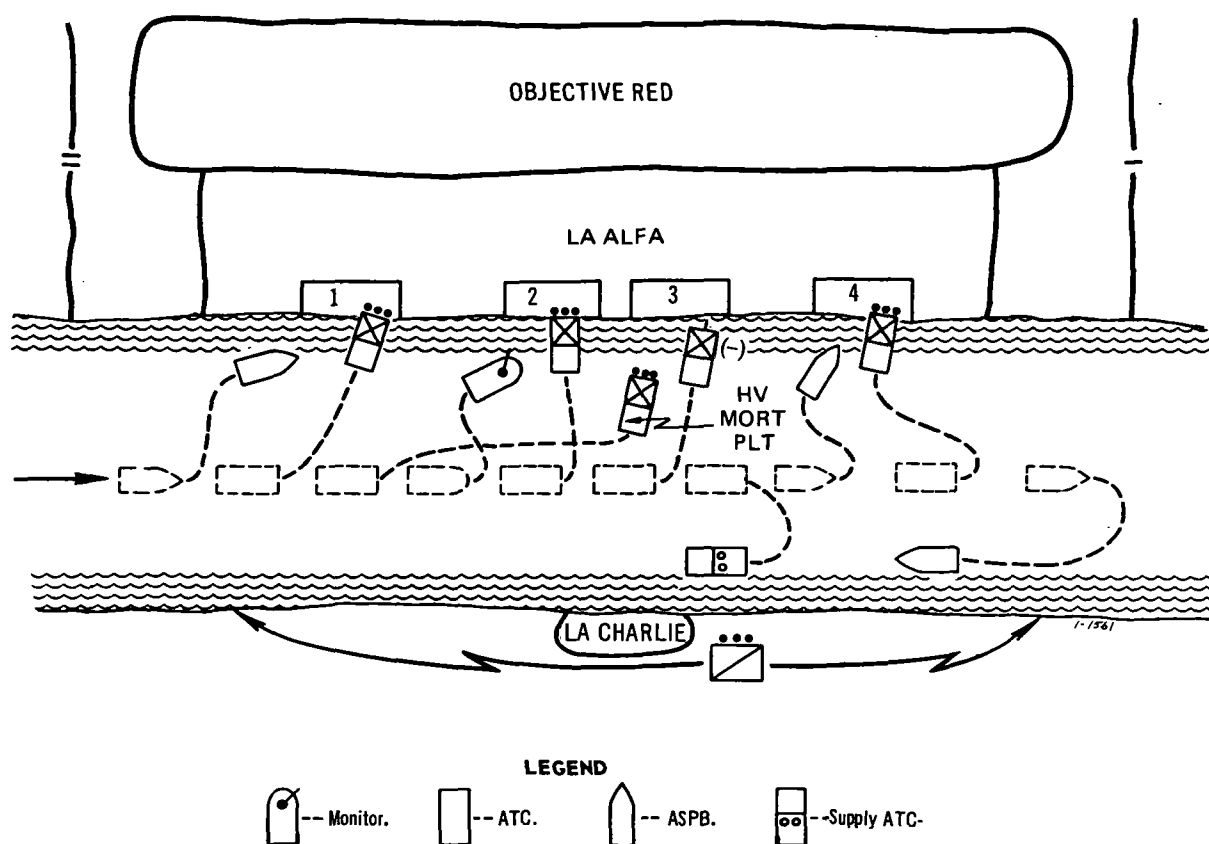


Figure 4-3. Typical landing formation.

(c) Enemy situation and capabilities.

(d) Available landing areas and individual watercraft landing sites within these areas.

(e) Requirement to land the reconnaissance platoon or similar size unit on the opposite bank of the waterway to provide rear security.

(f) Capabilities and limitations of watercraft.

(g) Characteristics of the waterways and adjacent land areas.

(3) When landing sites within the landing area are insufficient or inadequate, several elements may use the same site, landing in turn. When using a single landing site, maneuver units are landed first. Combat support elements and combat service support elements normally remain on the afloat base or the fire support base (FSB); however, should they be required to beach, the combat support and combat service support elements would follow the maneuver elements ashore in that order.

(4) The commander may recommend a time for landing if more than one battalion is participating in the operation, or he may select the

time for landing when the battalion or its elements are conducting an independent operation. In recommending or selecting the time for landing, the commander considers enemy dispositions and capabilities; the influence of predicted weather, tides, and visibility, both day and night; the number and type of watercraft being used; the availability of fire support; and the plan for supporting fires.

(a) Units may land at first light to take advantage of darkness during the water movement and to begin the subsequent operation in daylight. They may land and reorganize immediately before darkness and then begin the subsequent operation during darkness. Waterborne landings during daylight present fewer command and control problems and can be better supported by the RAS and close air support.

(b) Units may land at night or under conditions of reduced visibility to gain surprise and to reduce the effectiveness of enemy fires. Landings under these conditions have the following limitations:

1. Accurate delivery of units to their landing area is more complicated.

2. Air, RAS, and artillery fire support may be less effective.

3. Reorganization and securing of initial objectives in the landing area may be more difficult and time consuming.

4. Danger from navigational hazards increases.

(5) The landing phase is critical; therefore, maneuver and combat support elements debark as rapidly as possible and secure the initial objectives. Although the securing of initial objectives provides only a momentary pause for assembly and reorganization before subsequent operations begin, all units attain and maintain a combat posture. Each element is prepared to contribute its combat power in a coordinated effort to secure the landing area. Figure 4-3 depicts a typical landing formation. Initial objectives provide—

(a) Cover and concealment from enemy observation and fire.

(b) Sufficient size for dispersion.

(c) Proximity to landing areas.

(d) Desired dispersion of subordinate elements to conduct the subsequent operation.

(e) Ease of identification.

(6) Although assembly and reorganization are less complicated than in airmobile or airborne operations, some assembly aids may be used. These assembly aids include panels, colored smoke or other pyrotechnics, colored lights, radio homing devices, audible signals, and distinctive markings on clothing and equipment.

f. Water Movement Plan.

(1) The water movement plan, prepared by the supporting Navy commander when RAS watercraft are used, is based on the landing plan, which, in turn, is based on the scheme of maneuver. This plan includes the composition of the waterborne force, the organization of movement serials, the formation to be used, movement routes, command and control measures, security measures, mine countermeasures, plans for fire support, and immediate reaction to ambush.

(2) A water movement is planned as the approach march phase of a movement to contact and normally uses Navy watercraft as the means of transportation. During planning, the commander considers that an RAS can provide sufficient watercraft to move a reinforced infantry battalion. Other naval ships and craft, not normally a part of the RAS, may be available for a specific operation.

(3) The water movement order is issued to subordinate units in the operation order format. A water movement table, route overlay or strip map, and watercraft loading tables are included in the water movement order. Appendix C contains examples of the tables; figure 4-4 is an example of a route overlay. The field artillery forward observer plans targets along the route of march for expedient and accurate fire when needed (fig 4-4). The water movement order may be an annex to the operation order with detailed instructions in appendixes to the water movement annex.

(4) The water movement table lists assignments of units to serials or movement units within the water movement columns. Units are located in successive serials or movement to comply with landing priorities. Ideally, all elements of a given serial or movement unit land in the same landing area, using several landing sites. However, operational requirements may necessitate a release point (RP) en route to the landing area, where control passes to elements of the serial or movement unit. The elements then proceed to the designated landing area or landing site and land as specified in the landing plan; or they go to the planned area of employment to conduct fire support, blocking, or other missions to support the operation. Tactical integrity for Army and Navy units is maintained as far as practicable.

(5) Security of the units involved in the movement is a primary consideration during planning. Threats to waterborne units include water mines, water obstacles, ambush, harassment by snipers and indirect fire, attack by hostile aircraft, and direct involvement in a meeting engagement. Armed helicopters escort water movements and provide reconnaissance, fire support, and communication relays. Close air support is available, as required. When possible, waterborne movements are preceded by minesweepers and reconnaissance and security elements using all available means of transport. Troops are briefed thoroughly on security plans, with emphasis on counterambush and SOP security measures.

(6) Organic and attached reconnaissance elements use naval watercraft and Army assault boats for water route reconnaissance. The size of the movement unit, the length of the formation, the speed of advance, the terrain, and the suspected disposition of enemy forces along the routes determine the area on each side of the waterway that is reconnoitered. Commanders consider attaching engineer ele-

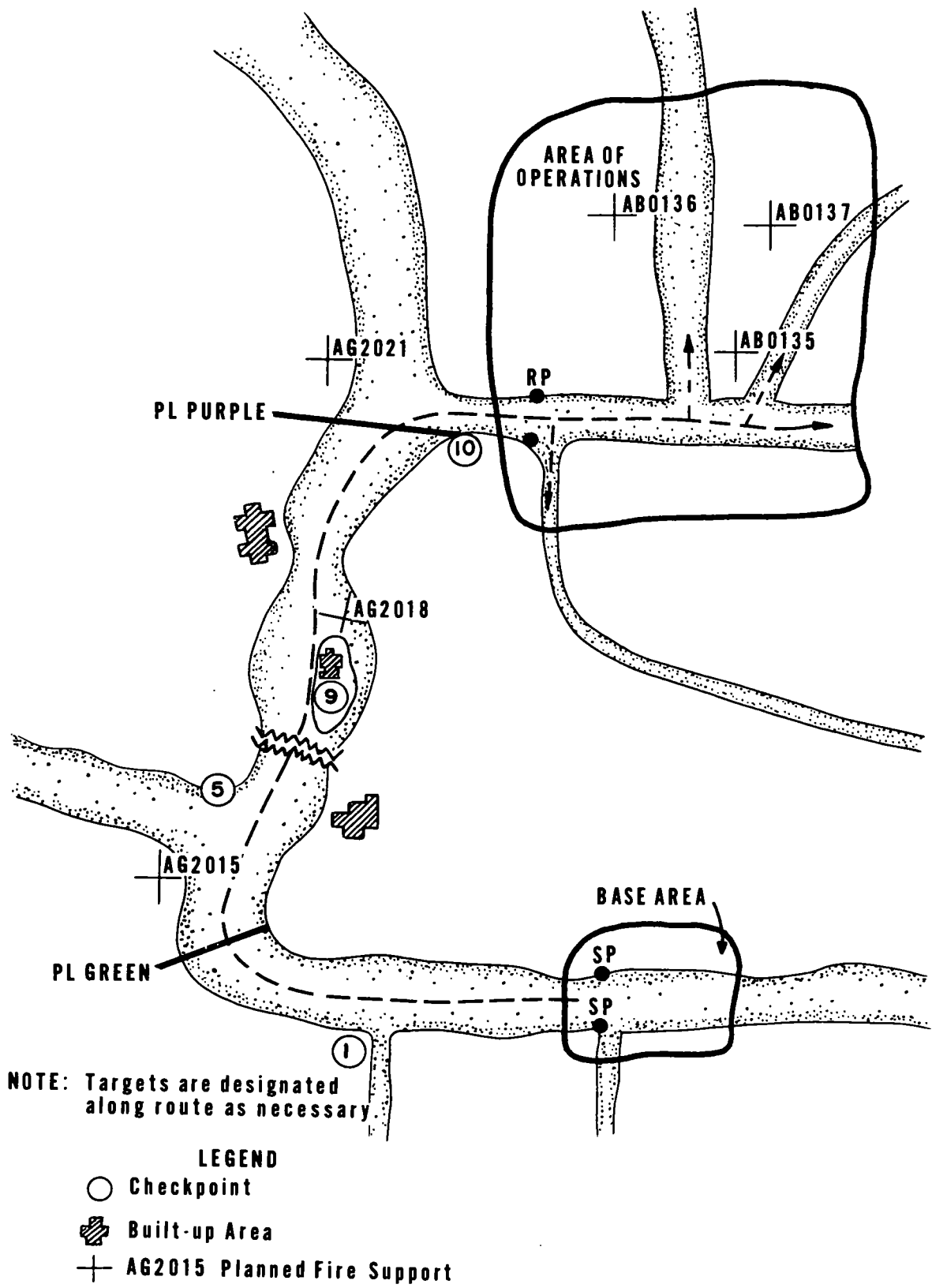


Figure 4-4. Water movement diagram.

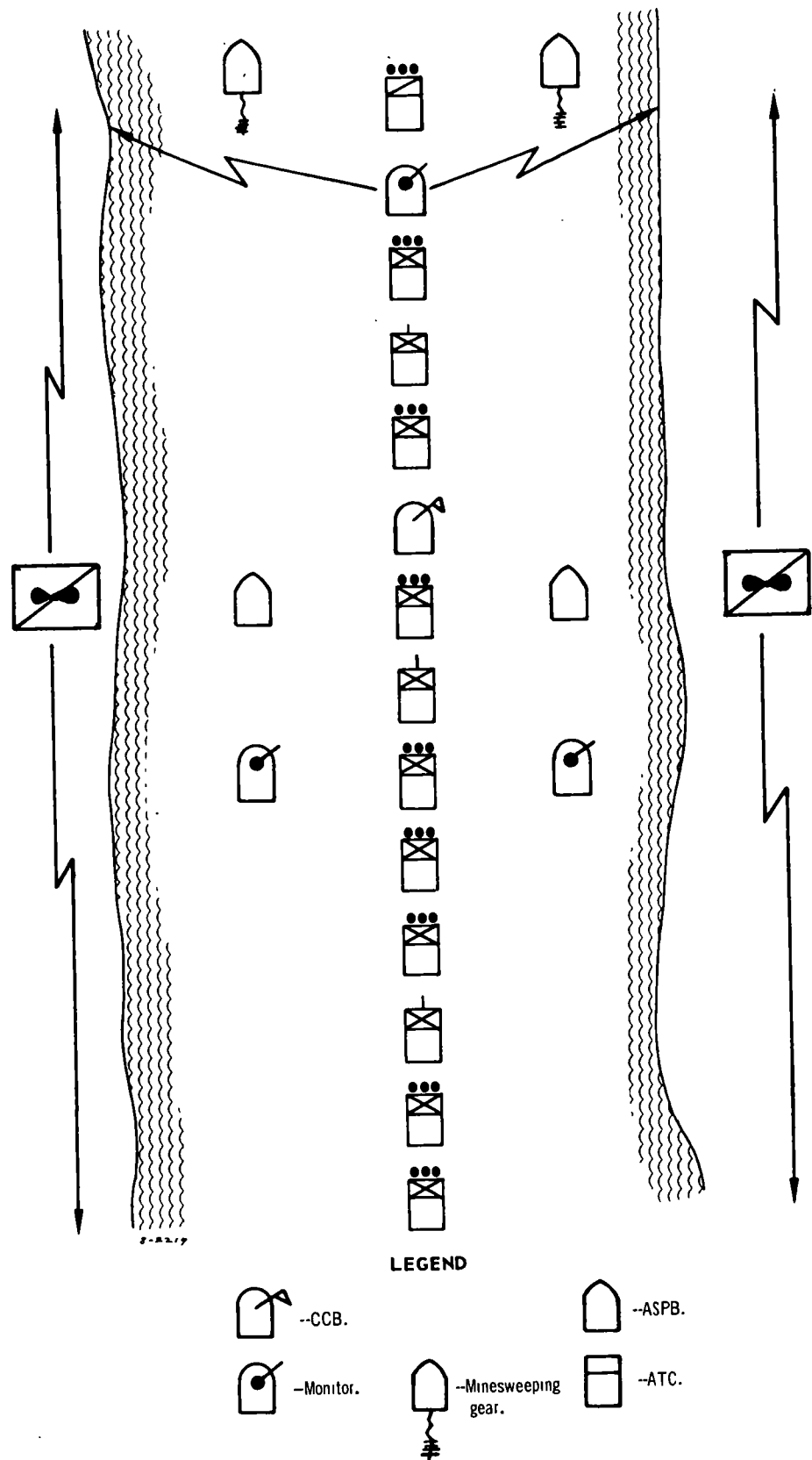


Figure 4-5. Typical battalion waterborne movement formation.

ments to the reconnaissance units to assist in the destruction of obstacles and fortified positions. Army assault boats are used only when the threat is insignificant.

(7) Planners consider formations that contribute to movement control and mutual support while retaining unit integrity as much as possible. Figure 4-5 shows a typical water movement formation: Units conducting water movements normally have four primary components: an advance guard, a flank guard, a rear guard, and a main body. Formations are similar to those used in ground movements to contact. The functions of the security elements and the distances within the formation are outlined in FM 7-10 and FM 7-20. These formations facilitate Navy control of watercraft movements while maintaining unit integrity.

(a) *Advance guard.* This component, operating ahead of the main body, uses naval watercraft and/or Army assault boats to prevent unnecessary delay in the movement of the main body and to protect it from surprise frontal attack. It covers the deployment of the main body, if necessary. The advance guard is far enough (approximately 400 meters) in front of the main body to allow the succeeding element to deploy without serious interference from the enemy, but not so far as to prevent the succeeding element from rapidly assisting the advance guard, when required. The battalion reconnaissance platoon may be used as the advance guard.

(b) *Flank guard.* In the approach march, flank guards operate in the area from a point opposite the rear of the advance guard to a point opposite the front of the rear guard to protect the main body. Naval watercraft serve as a close-in flank guard. Elements from the main body may be required to provide a flank guard operating on land adjacent to the water movement route. Naval watercraft and Army assault boats can transport the flank guard operating ashore from one blocking position to the next to maintain the flank guard's position alongside the main body.

(c) *Rear guard.* The rear guard follows and protects the main body from enemy attack from the rear. The rear guard normally consists of naval patrol-type boats and may or may not have ground troops embarked. The rear guard is organized similarly to the advance guard except that it is oriented to the rear and may include a trail party. The rear guard also controls any friendly water traffic that overtakes the movement column.

(d) *Main body.* The bulk of the battalion and supporting forces comprise the main body, which is organized for combat before the water movement begins. Units are positioned for rapid deployment if the enemy attacks during the movement. Watercraft in the formation must assist rapid employment of assault troops in any direction without excessive risk of collision.

(8) Both Army and Navy forces develop plans for coordinated, immediate reactions to enemy ambush encountered during water movement. Plans include designation of counterambush maneuver elements, command and control measures, fire support, all-round security, identification and recognition of committed elements, and recovery and reorganization of the committed force. Provisions are included for watercraft security and reserves when major elements of the ground force have been committed to counterambush missions. The waterborne force's mission determines the reaction to an enemy ambush. Actions may range from commitment of the entire waterborne force to attack and destroy enemy forces encountered to taking evasive action and suppressing the ambush by fire and continuing the movement.

g. *Loading Plan.*

(1) The water movement plan is the basis for the loading plan. At battalion and lower levels, they are integrated into one plan. The loading plan for a waterborne operation normally is less complex and detailed than for airborne, airmobile, or amphibious operations. Some battalion loading plans may be complex enough to require written instructions for delivering troops and equipment to the loading area; designating loading sites, loading times, and priorities; and specifying personnel, supplies, and equipment to be loaded aboard each watercraft. Unit SOP simplify loading plans and reduce loading time and written orders to a minimum.

(2) Details of the loading plan are coordinated with the supporting naval RAS through liaison personnel and/or joint staff planning. The watercraft loading table (app C) specifies personnel, equipment, and supplies to be loaded in each watercraft. This table normally is published as an appendix to the water movement plan.

(3) A loading area diagram may be issued as part of the water movement plan to insure a coordinated effort and to avoid confusion in loading during large operations. Figure 4-6, an example of a typical loading area diagram,

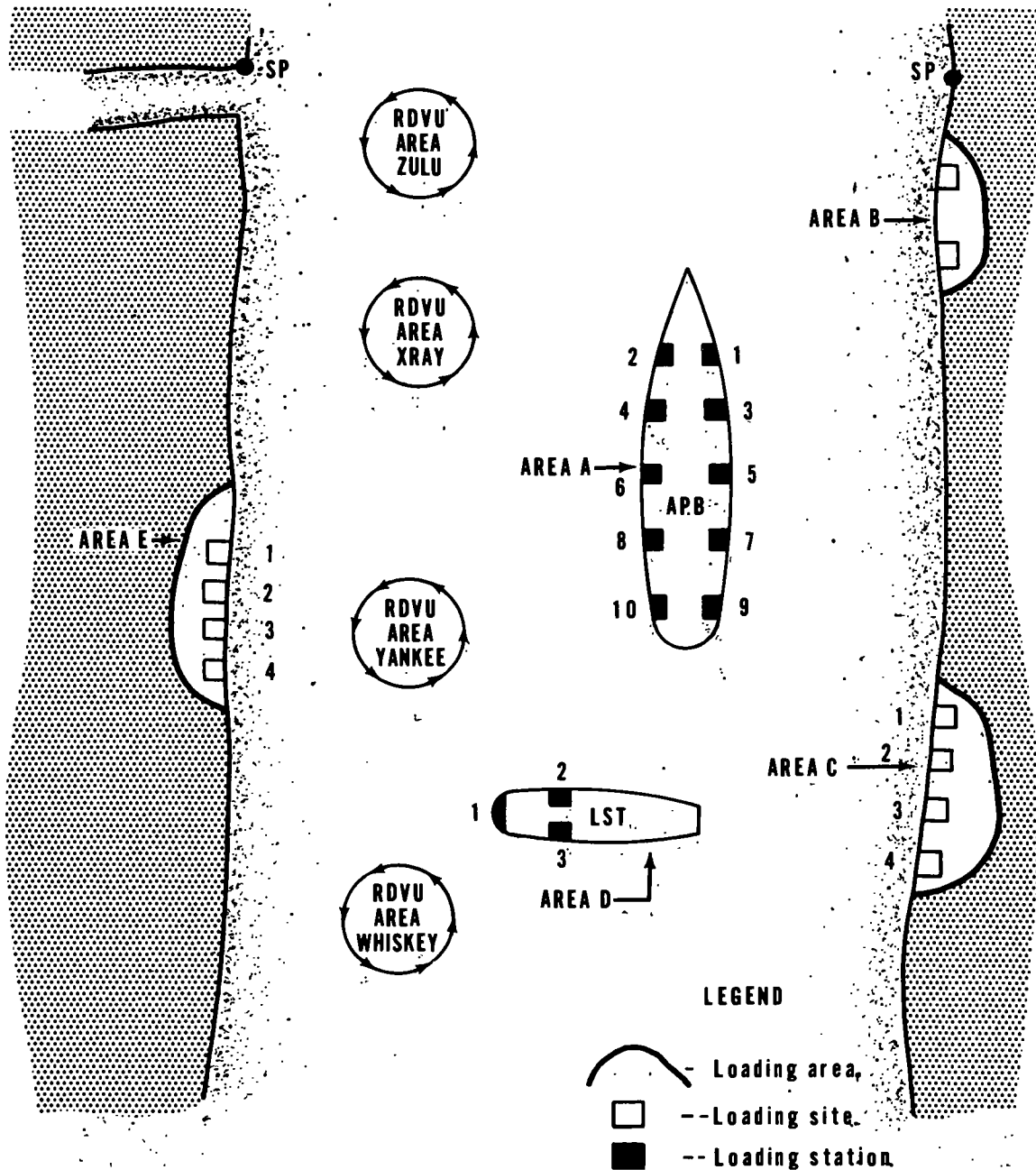


Figure 4-6. Typical loading area.

shows a combination of loading from a land base and an afloat base.

(4) In preparing loading plans, the following items are considered:

(a) *Mission.* The loading plan supports the mission, which determines the troops, equipment, and supplies to be moved.

(b) *Watercraft.* Personnel preparing loading plans are familiar with the types and characteristics of the watercraft available. Cargo-

carrying characteristics listed below are considered:

1. Allowable cargo load.
2. Size and shape of the cargo compartment and its limiting features.
3. Strength of deck (flooring).
4. Location and strength of cargo tie-down fittings.
5. Location, number, and type of troop seats or troop space available.

6. Capacity to carry assault boats externally.

7. Capability to tow assault boats and other watercraft.

8. Organic loading aids available (ramps, winches, and hoists).

(c) *Unit integrity.* Unit integrity is maintained if possible.

(d) *Distribution.* Key personnel and medical personnel are distributed throughout the main body so that the loss of one boat does not destroy the unit's command structure. Key items of equipment, such as crew-served weapons and communication equipment, are also distributed throughout the movement formation. The boat that transports the battalion surgeon is the battalion aid station for the movement. When possible, this craft serves as the battalion aid station in the AO. Normally, it is attached to the movement unit containing the forces to secure the combat base on reaching the AO.

(e) *Self-sufficiency.* Personnel and ammunition are loaded in the same watercraft with their crew-served weapons, and component parts are loaded with major items of equipment. Personnel accompany the cargo on the watercraft to its destination, where they unload it.

(f) *Weights.* Standard weights for individuals plus their combat equipment and their share of hand-carried table of organization and equipment (TOE) equipment are used in computing watercraft loads:

1. Watercraft crewman—200 pounds.
2. Combat-equipped soldier—240 pounds.
3. Litter patient—190 pounds.

(5) The senior Army member aboard each watercraft prepares a manifest, which is an informal listing of the Army personnel and equipment loaded thereon. Copies of the completed manifest for each craft are delivered to the Army unit commander who uses them to help determine promptly any losses.

(6) Spare watercraft are available in the loading area, if possible, in case one or more watercraft abort.

h. Embarkation/Debarkation Plans. Embarking and debarking from an afloat base or a land base is a hazardous operation that requires careful planning. Navy and land force commanders must jointly prepare and supervise the execution of each operation. Recommendation for inclusion in embarking/debarking SOP follow:

- (1) For each unit, designate a staging posi-

tion with an identifying number painted on the ammi (name of French designer) barge or the ship's compartment.

(2) All craft not participating in the embarking or debarking operation cast off from along side the ammi barge and clear the area.

(3) Position a party at each staging position to assist the troops in passing equipment from the boat to the barge/pier. Troops must not be encumbered with heavy packs and equipment as they load onto the boats from the ammi barge or as they step from the boat to the ammi barge.

(4) Position a container for hand grenades on the ammi barge with noncommissioned officers (NCO) to insure that grenades are secured and not taken aboard the ship or into the land-based camp.

(5) Provide a high pressure hose on the ammi barge so that the troops can wash the mud from their equipment and clothing before they board the ship.

(6) Position a life guard team (a swimmer equipped with a harness and safety line plus two or more line handlers) on the ammi barge.

(7) Because embarking and debarking during the hours of darkness are especially hazardous, have large flashlights or other portable light sources immediately available to assist in retrieving a man overboard.

4-16. Conduct of Waterborne Operations

a. Preparation.

(1) Units are trained and prepared to conduct waterborne operations on short notice. SOP are kept current by applying lessons learned in previous waterborne operations. Training and adequate unit SOP allow marshaling activities to focus on the pending tactical operation.

(2) Units complete preparation for the tactical operation, move to their loading area, and load on assigned watercraft in accordance with the water movement table and information in the watercraft loading table. Bulk supplies and ammunition are transported to the loading site and loaded and lashed in designated watercraft.

(3) Since several units may use the same loading site, loading must be completed and watercraft moved to their assigned rendezvous area according to the time schedule in the water movement table.

b. Water Movement.

(1) *General.* All water movements outside base areas are tactical moves. They are similar to the the approach march of a movement to

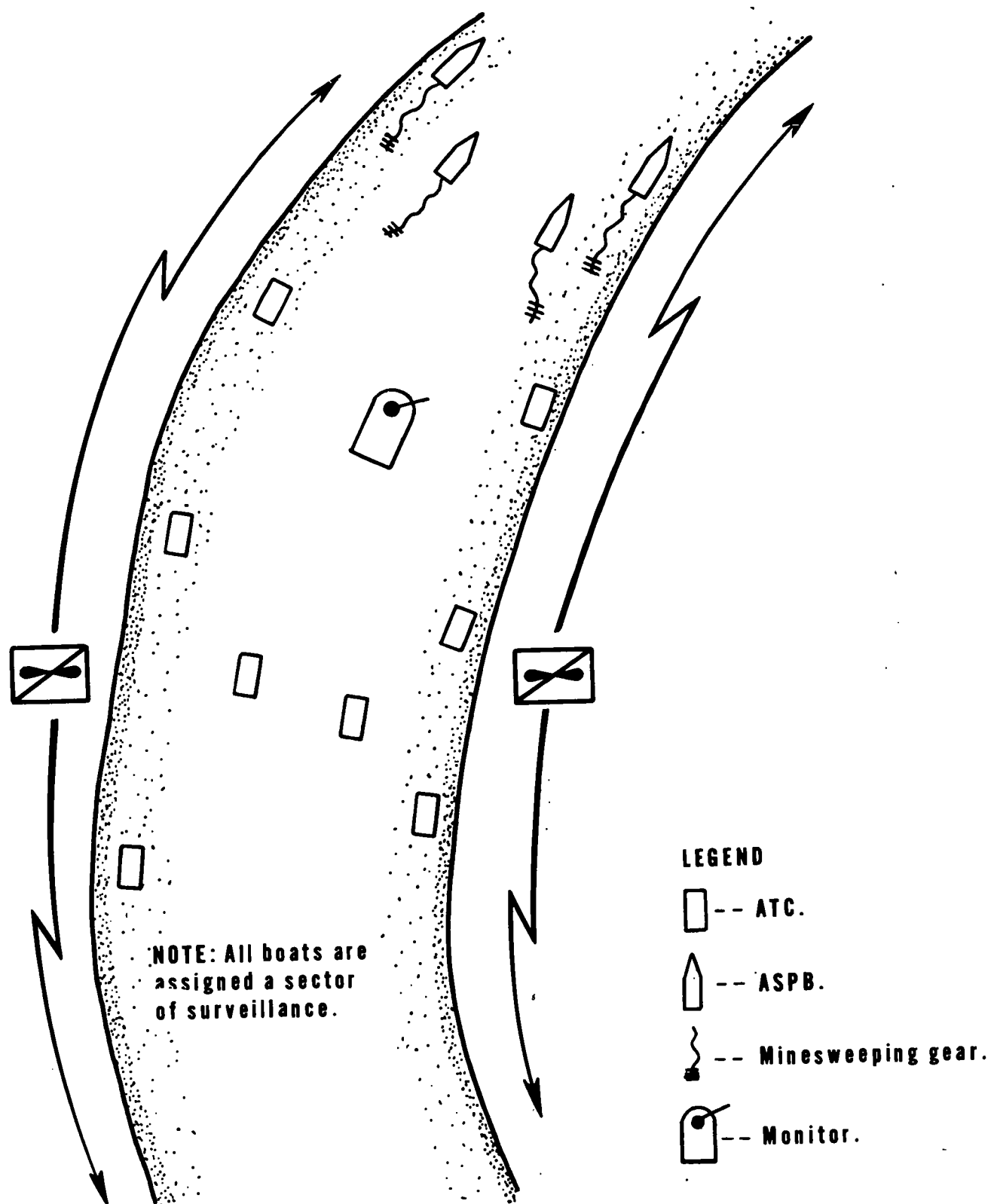


Figure 4-7. Typical advance guard formation.

contact in ground operations where speed of movement and security of the formation are

essential. The intent of the operation is to move directly to the objective; however, the unit is

prepared for combat at any point along the movement route. The terrain and the enemy situation normally require an advance guard, flank guards, and a rear guard to protect the main body during movement. Enemy forces have an infiltration and ambush capability and have developed techniques to exploit watermobility. They have a movement and a limited combat capability when waterborne. During movement, the primary threat normally is an ambush on the flanks rather than to the front, and the enemy may strike at any point in the column. Units are organized for a rapid assault landing to either flank, followed by subsequent landings to close with and destroy the ambush force.

(2) *Organization.* The organization for the approach march (described in Fm 7-20) applies generally to waterborne movements. There are organizational differences because watercraft are used as a means of transportation. Counter-ambush plans may be to suppress the ambush by fire and continue movement or assault and destroy the ambush force. The action taken to counter the ambush depends on the mission, the size of the ambush, the ability of security forces to suppress the ambush force and protect the main body, and the characteristics of the waterway. The formation adopted normally consists of an advance guard, a flank guard, a rear guard with a trail party, and a main body.

(a) *Advance guard.* The advance guard of a waterborne movement normally includes a mine countermeasure element, a reconnaissance element, and a fire support element. Figure 4-7 is an example of advance guard formation. The tactics employed and the formation used by a waterborne reconnaissance element are described in appendix B.

1. The mine countermeasures element consists of naval watercraft with minesweeping equipment. This element adopts a formation based on the type of equipment used. This group moves in advance of the advance guard to clear the waterway of mines. Engineer personnel may be attached to the element to assist naval personnel in clearing mines.

2. The reconnaissance element consists of troops operating in ATC to locate enemy elements near the waterway banks. The area reconnoitered depends on the speed of the main body, the terrain, and enemy activity. Reconnaissance elements may be augmented with engineer personnel to destroy enemy fortifications encountered. Reconnaissance elements maintain constant vigilance for wires that may

lead to command-detonated watermines. When the reconnaissance element uses assault boats, it follows the boat procedures described in appendix B.

3. The support element is composed of naval watercraft, which move with the reconnaissance elements and provide support as required. The reconnaissance element commander may ride in one of the support boats to use the boat's communication facilities for control and to direct the fire support provided to reconnaissance elements engaging enemy forces.

(b) *Flank guard.* RAS craft provide a close-in flank guard and are normally assigned to a zone during movement. The zone may be on a flank, between serials of movement units, within serials or movements units, or a combination of these positions. The formation of the main body and other factors such as hydrographic conditions are used to determine locations for flank guards. When the column is attacked, aggressive action by the close-in flank guard provides the commander time and space for maneuver of the main body. Air cavalry or airmobile units are used to extend reconnaissance and surveillance beyond the shores of the waterway.

(c) *Rear guard.* RAS craft normally provide a rear guard during movement. While a rear guard may not be necessary during movement, when forward movement halts, the waterborne force is vulnerable from the rear and requires the deployment of a rear guard for security. Surveillance of the waterway traversed is important to prevent the enemy from placing watermines behind the waterborne force. The enemy attempts to detonate these mines when the waterborne force returns from the operation.

(d) *Main body.* The main body comprises the bulk of the waterborne force and consists of maneuver elements and the naval command and control elements. It is organized for combat before movement. The serials or movement units within the main body are organized for employment singly or in a coordinated action. The entire waterborne force is oriented toward counterattack to the flanks, rather than to the front. Each movement unit provides a reserve and far-bank security during counterattack actions.

(e) *Trail party.*

1. Although a trail party normally is not designated in a battalion-size water movement, trail party functions to include towing,

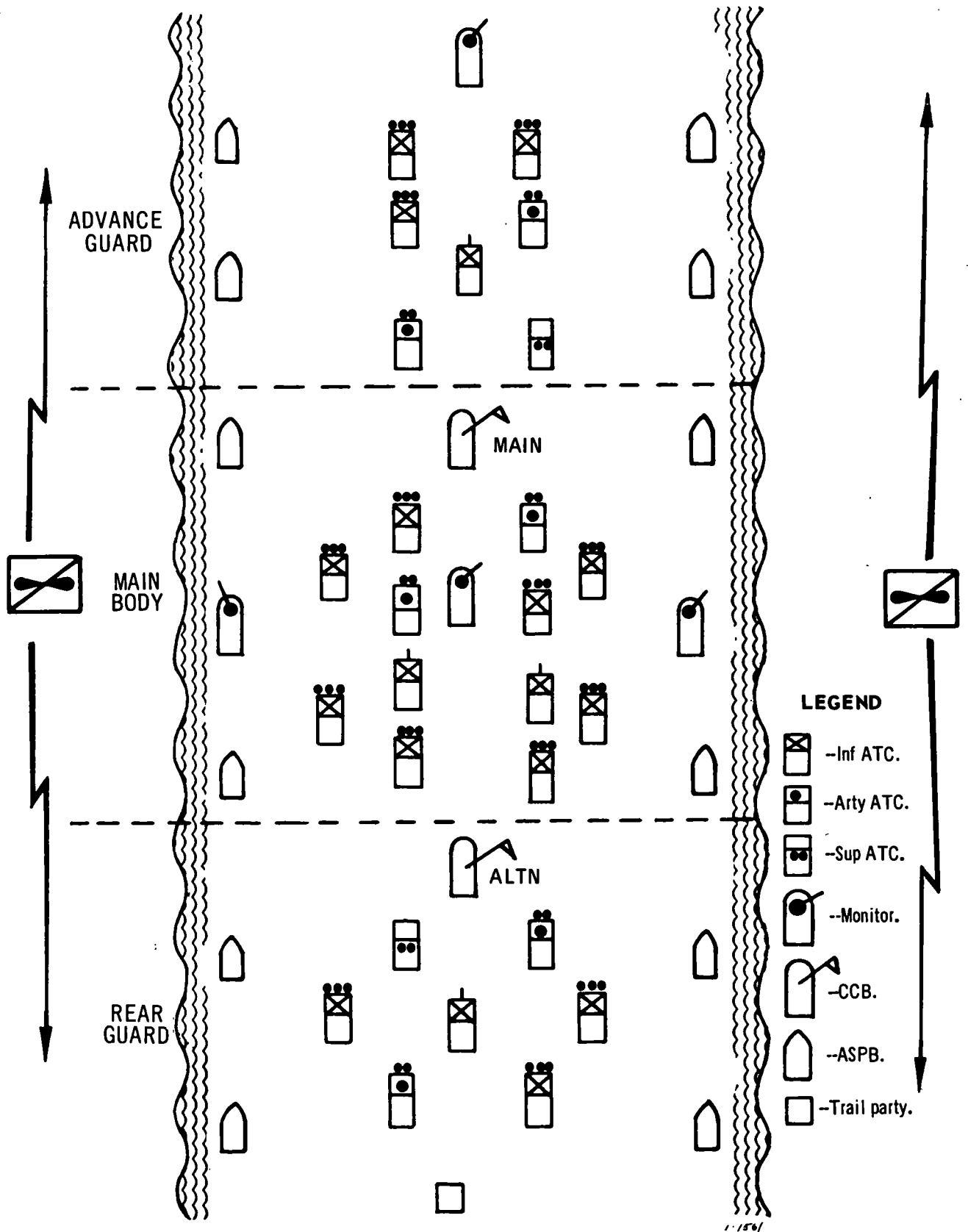


Figure 4-8. Typical movement formation when the enemy threat is significant.

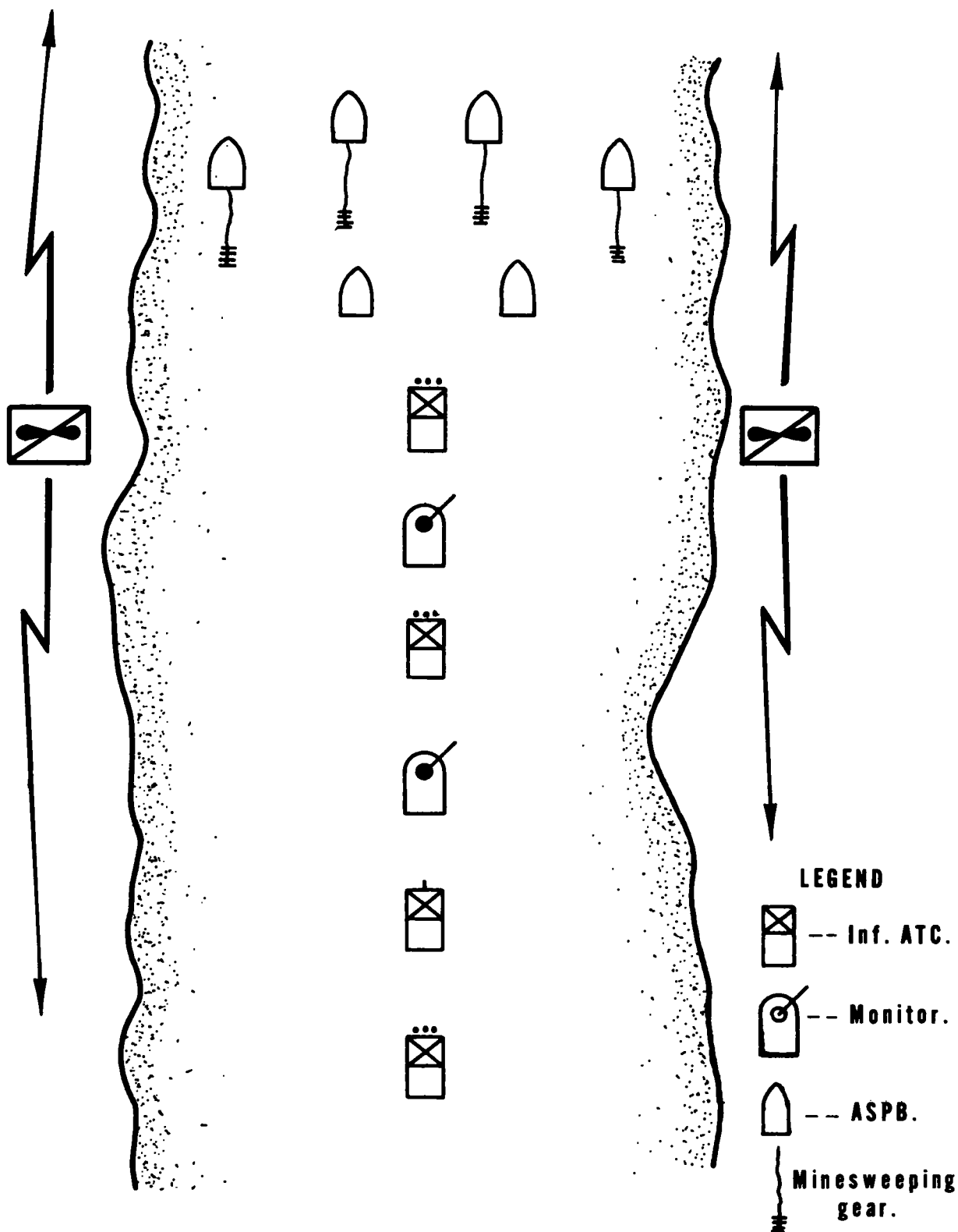


Figure 4-9. Typical column formation.

damage control/salvage, medical aid, and providing available spare transport craft, are required. Spare transport craft are attached to the rear movement unit and are prepared

to tow disabled craft and to perform minor damage control and salvage.

2. Designated craft within the movement units tow disabled craft clear of the for-

mation, and elements of the last movement unit or the trail party take these vehicles in tow. Other assistance such as firefighting may also be required; and embarked troops may have to assist boat crews in immediate action. If an RAS can repair breakdowns or combat damage, disabled craft will be repaired while being towed. When possible, relatively secure areas along the water movement route are used to berth more seriously disabled craft, pending retrieval or repair by river support squadron units.

(3) *Formations.* Enemy information, width of the channel, availability of transport craft, availability of fire support craft, and control measures required influence the selection of a formation for the waterborne movement. The main body is divided into serials or movement units that can be effectively controlled. Formations are developed on the basis of planned reaction to enemy attack with emphasis on maintaining unit or element tactical integrity.

(a) *Formation used when a significant enemy threat exists.* This formation (fig 4-8) is used when contact is probable and when enemy control of terrain adjacent to the waterway makes it preferable. Lateral dispersion and maneuver are limited in narrow channels. This formation permits rapid employment of ground forces toward the flanks when required and permits massing of fire when an ambush is suppressed and movement continues. Naval fire support craft of the flank and rear guard position themselves to support the assault landing of maneuver elements instead of interposing themselves between the enemy force and the ATC.

(b) *Column formation.* This formation is used when friendly forces control the terrain adjacent to the waterway, when the enemy situation is not clear, and when control of watercraft during the movement is a major consideration. It provides maximum control and prevents a major portion of the unit from becoming involved in a single ambush. It also provides maximum use of naval firepower and allows sufficient time and space for the main body to maneuver. Figure 4-9 shows a typical column formation.

(4) *Control.* Control procedures for the water movement are similar to those for other movements.

(a) *Rendezvous area.* Control of the movement begins in the rendezvous area where the serials or movement units form for the water movement.

(b) *Start point.* Movement units proceed from their rendezvous area in formation to cross the start point (SP) at the scheduled time. The security units (advance, flank, and rear guards) are assigned SP times and rendezvous areas, as necessary, to form them properly in relation to the main body.

(c) *Checkpoints.* Checkpoints are used as in other movements.

(d) *Release point.* The RP is that point on the water movement route where movement units are released to subordinate commanders to proceed to designated assault landing areas. Each movement unit normally is in its assault landing formation before the lead craft passes the RP.

(e) *Traffic control.* Civilian boats are inspected and cleared from the waterway, if possible, and beached; gathered at control points; or routed clear of the formation. The advance, flank, and rear guards of the waterborne force normally perform traffic control functions. In congested areas, additional traffic control elements are necessary.

(f) *Fire control.* The flat terrain and winding waterways often found in a riverine environment require planning and coordinating fire control measures to prevent firing into friendly elements. The waterborne force uses a jointly prepared fire control plan that provides for both full use of RAS firepower and protection for friendly elements. The plan is simple and normally includes—

1. Zones of responsibility for weapons or craft.
2. Assignments of target priority to naval gun stations.
3. Neutralization fire plan.
4. Assault landing support plan.
5. Employment of troop weapons from well deck procedures.
6. Communication procedures.

(g) *Others.* Naval SOP provide additional control measures for watercraft that consist of, but are not limited to—

1. Standard formations.
2. Maneuvering instructions.
3. Standard speeds and turns.
4. Standard distance and interval between boats.
5. Signal procedures—visual and electronic.

(5) *Immediate action.* Immediate action procedures are used to overcome conditions or situations that adversely influence individual watercraft, movement units, or the entire

waterborne force. Typical immediate-action procedures are—

(a) Employing counterambush suppressive fires.

(b) Initiating counterambush assault landings.

(c) Establishing local security for a damaged boat that must be beached.

(d) Employing troop weapons.

(e) Embarked troops manning boat-mounted weapons when boat crews are engaged in damage control or when assigned gunners become casualties.

(f) Firefighting.

(g) Passing tow lines, using boat crew and embarked troops.

(h) Abandoning ship.

(6) *Combat support.* Available combat support elements support all water movements. The following means of combat support are required to support all operations in an AO:

(a) *Artillery.* Planned artillery fires along the movement route and harassing and interdiction (H&I) fires into suspect areas assist in protecting the waterborne force during movement. These fires are used against suspected ambush sites and mined location. Naval gunfire, when available, is used the same way. In stability operations, preplanned targets and H&I fires are coordinated with host country officials.

(b) *Air reconnaissance.* Air reconnaissance improves the allround security of the waterborne movement. It often detects mines, mine control personnel, ambush sites, mortar emplacements, assembled troops, etc. that ground reconnaissance elements may not find. Air reconnaissance of specific areas may prevent employing ground elements in these areas. The habitual employment of air reconnaissance elements to the front and flanks of the main body and over the route immediately ahead provides added protection to the waterborne force. The air cavalry troop (a control element) is ideally organized and equipped to accomplish air reconnaissance and to provide fire support for water movements.

(c) *Close air support.* Close air support provides rapid and accurate delivery of ordnance on an enemy force that may be in defilade from the waterborne force because of high banks, dense tree lines, or fortifications.

(d) *Signal intelligence.* The U.S. Army Security Agency provides signal intelligence, advice, and assistance on signal security matters, and it can conduct electronic warfare activities. Signal intelligence activities extend

the depth of intelligence operations and contribute to long-range target acquisition. They furnish information and intelligence on enemy forces and locations by the detection and study of enemy electromagnetic emissions (see FM 32-10). The signal security activities contribute to the counterintelligence effort and to the protection of communications and electronic systems operated by the waterborne force (see FM 32-5).

c. *Assault Landing.*

(1) Landing areas normally are selected to avoid known defended positions. Assault landing formations are selected and supporting fires are planned, either as preparatory fires or on-call fires. Assault landing formations provide for rapid, orderly movement of units ashore and an immediate advance to secure initial objectives close to the landing sites. RAS craft are stationed to provide fires to the flanks and rear. The success of the landing depends, to a degree, on positive control that coordinates and directs the movement of boats and ground units.

(2) The landing and the reorganization in preparation for the attack phase are critical periods for the maneuver elements. These operations require speed and precision in execution. Ideal landings and extractions with the boats 50 meters apart usually are impossible because of inadequate beaching space, tidal conditions, or dense undergrowth and brush. Crowding of boats is hazardous, but the hazard can be minimized by using the monitors as flank security protection. Preparatory fires on the beach by air, artillery, and RAS boats reduce the hazards considerably. A helicopter fire team increases security, particularly during extraction. Beaching should be accomplished at high tide, when possible, to provide a hard landing area for troops. Extreme caution must be exercised to prevent the boats from being trapped on the beach by a rapidly receding tide. In any case, the ground force commander to be landed makes the final decision as to the exact place and time that the force will land. His decision is based on Navy personnel's recommendations and the enemy situation.

(3) Water movement serials or movement units are organized to facilitate the immediate securing of initial objectives, reorganization, and implementation of the scheme of maneuver. Units land as close as possible to their initial objectives. Normally, securing initial objectives and reorganizing take a short time. Security

elements move directly to assigned positions to secure the landing areas.

(4) The battalion reorganizes according to plan, using designated initial objectives as assembly areas.

(a) Mortar, artillery, and other fire support units occupy their initial firing positions and support the reorganization and prepare to support the scheme of maneuver.

(b) Subordinate unit commanders report status of personnel and equipment after securing their initial objective. Reorganization is complete when all or the majority of subordinate units have secured their initial objectives (assembly areas) and battalion control has been established.

(5) On completion of the landing and the reorganization, the battalion normally establishes a combat base near the landing area. The combat base includes RAS elements and both land and navigable water areas. The combat base remains mobile during fast-moving tactical operations to control and support engaged maneuver elements.

(6) Security is required for watercraft after troops debark. The preferred method of providing security for the boats is to rendezvous them in relatively safe areas (holding areas) rather than to divert combat troops as security elements for them. Monitors and ASPB may assist ATC crews in establishing adequate security. Monitors, ASPB, and ATC can provide preparatory fires on beaches or serve as blocking elements on waterways.

(7) A primary duty of riverine assault craft in combat operations is to block and patrol exfiltration routes that the enemy might employ to escape from the AO. An aggressive patrol is a deterrent to insurgent attempts to use the waterways for escape. Operations have shown the necessity for using image intensification devices and infrared devices while on night patrol and blocking stations. While on blocking stations, boats should be in sight of each other at all times for mutual support, especially at night. On narrow waterways, boats become vulnerable to rocket and recoilless rifle fire. Therefore, the decision to use them to block under these circumstances should be considered with respect to support from the available ground elements. If possible, night blocks should be established on the larger waterways where boats can maneuver to defend themselves. Navy commanders should be notified of intended areas of night illumination so that they

may take measures to avoid these areas to prevent being detected.

d. *Movement to Contact (Scheme of Maneuver)*. The movement to contact is initiated when the commander is satisfied that the assault landing, reorganization, and securing of initial objectives have progressed to the desired degree. Movement to contact follows procedures described in field manuals of the 7- and 17-series as modified by this text and FM 31-16. Naval watercraft and Army assault boats support these operations by using available waterways to the maximum. Air cavalry units are ideally suited to act as a screening force in movement to contact. FM 17-37 contains details on this type of operation.

(1) Units designated as a waterborne reaction force maintain a maximum readiness posture. Personnel of these units are restricted to designated areas and issued individual supplies and equipment. Unit supplies, equipment, and ammunition are loaded or prepared for immediate loading aboard assigned watercraft. Loading tables and manifests are prepared and kept current to insure a prompt, coordinated departure on receipt of orders.

(2) Conducting a movement to contact on foot reduces the attacking force's maneuver capability to that of the enemy. Encirclement, surprise, and firepower, as described earlier, are used to fix the enemy and prevent his withdrawal.

(3) Attacking units move along waterways when possible. Trails and footpaths normally parallel waterways, making foot movement faster and less exhausting than it is farther inland. The enemy normally organizes defensive positions along the long axis of waterways and plans observation and grazing fire to cover the open fields. Attacking along the waterway, maneuver elements take advantage of concealment provided by vegetation and can attack the enemy's flank, restricting his observation and fire. Movement along waterways is not always possible; therefore, cross-country foot movement may be required. When waterways cross the route of movement, they present significant obstacles to foot movement. Crossing canals and ditches with soft mud bottoms consumes time and strength. Units continue to advance unless the width or depth of the waterway stops them. Insofar as the tactical situation and reconnaissance allow, crossings requiring swimming or ferrying should be avoided. Unit positions or maneuver can be planned with this in mind and usually more rapid, cohesive execu-

tion of the operation will occur. Since tidal phases often determine water depth in riverine areas, this factor must be considered in planning for each operation of concern.

(4) In all instances in which troops move cross country, security is a critical factor. Personnel are required to maintain dispersion. However, in many areas, security elements close up to within 2 to 5 meters of one another to detect the enemy's hiding places. Security elements move well forward of the main body and to the flanks and rear. When approaching a tree line, the security elements move into the tree line and clear it before the main body approaches. When security elements receive fire, a vigorous assault coordinated with indirect fire and airstrikes is normally used to neutralize or destroy enemy positions.

(5) During movement, troops remain alert to detect mines, obstacles, and boobytraps. Demolitions and other devices may be hidden below the water line in streams and canals. Trip wires for mines and boobytraps may be strung across a trail, canal bank, or footbridge. When security permits, personnel remain 10 to 15 meters apart to limit casualties if a mine or boobytrap is detonated. All existing footbridges are thoroughly examined before anyone crosses them. They may collapse under the weight of a combat loaded soldier, and the water beneath them may hide boobytraps. After clearing a footbridge for use, personnel cross one at a time.

(6) Methods of crossing inland waterways.

(a) Each squad carries a minimum of one 50-foot length of 1/4-inch rope and one air mattress as aids in crossing unfordable waterways. The use of strong swimmers as lifeguards along the rope will reduce the danger of drowning. They assist individuals who panic, who are non-swimmers, or who lose their grip on the rope. When possible, crossings should be timed to avoid high and receding tides. Security elements are positioned to protect personnel at the crossing site before troops begin the crossing. When the security element is in position, one soldier taking one end of the rope with him swims across the waterway. He ties to a stationary object, providing an anchor line across the waterway to help others cross. Weapons and other equipment may be towed across the water on the air mattress. A security element is established on the far bank as soon as sufficient personnel are available. Reconnaissance by fire may be used before, during, and after water crossings since units are extremely

vulnerable to attack or harassment during water crossings. Unit leader's decision to use reconnaissance by fire normally will depend on an estimate of the enemy situation and particularly whether the friendly unit's position is known to the enemy. Multiple crossing sites are used to reduce crossing time for a unit larger than a squad.

(b) The grapnel with line (propelled) is a 4.5-pound folding grapnel assembly, propelled from a 40-mm grenade launcher, pulling a 400-foot-long, 0.312-inch line. It is used to aid troops in crossing fast-moving streams, ravines, canyons, cliffs, and similar obstacles. When the grapnel is firmly engaged, the line will support the weight of a 300-pound man and enable him to cross or ascend 150-foot obstacles.

(c) Airmobile operations offer the quickest way to accomplish a crossing over inland waterways. Helicopters can lift troops over the waterways if landing sites are available.

(d) Equipment used for water crossing in previous riverine operations includes—

1. The canal bridge for troops which is a flat, buoyant sheet of fabric over plastic foam, which offers troops a rapid means of transit across narrow bodies of water. It allows troops to avoid established footpaths and bridges and to cross streams and canals at multiple points. The bridge is provided by 4-by 15-foot sections and weighs approximately 2 pounds per running foot. As personnel walk across the bridge's surface, the surface is deformed and sinks slightly. Fabric side flanges keep the water off the center section of the bridge. When there is no load on it, the buoyant bridge lies flat on the surface of the water.

2. The flotation gear for the individual soldier which is lightweight, reusable flotation gear that will support a combat-loaded soldier during water crossings. It consists of three bladders inclosed in a one-piece cover. When the bladders are inflated, the cover forms a U that fits around the soldier's body. The gear can be used with or without a full pack.

3. The four-man lightweight fabric boat which is a low-silhouette boat that can be used for crossing rivers or canals and for scouting and clandestine operations on inland waterways. The boat weighs less than 6 pounds and will carry four men with combat equipment.

(7) Mechanized infantry units, using organic APC, can traverse a riverine area with considerable freedom of actions. Seasonal aspects decidedly influence operations, particularly those concerning off-road trafficability and

cross-country movement in a riverine area. As in conventional operations, routes are carefully selected. The significant problem affecting mechanized movement is not the water obstacles, but the techniques for crossing and exiting canals. Development of a trafficability map indicating those waterways where difficulty is anticipated or expected becomes paramount. The APC provides a means of rapid movement while retaining unit integrity. Movement may commence from a land base or an existing AO, or it may follow initial transport into an AO by naval watercraft. Field manuals of the 7- and 17- series and FM 31-16 provide information on mechanized combat operations.

(a) Mechanized operations:

1. Areas accessible by road or cross-country movement during dry seasons are sometimes inaccessible during wet seasons. Army or naval craft such as the LCM (6), LCM (8), LCU, or LST can transport APC on waterways. Reconnaissance to locate potential landing sites is the key to the successful water movement and debarking of APC in the AO. The amphibious characteristic of the APC permits it to be off loaded in locations where the shallow bottom prevents the watercraft from reaching shore. Planners study tidetables and other hydrographic information to prevent debarking APC on mud flats or near banks too steep for APC to climb.

2. Mechanized units may reach an AO by watercraft and withdraw overland, mounted in APC's. Withdrawal or extraction is often a critical phase of an offensive operation. During this phase, troops are often ambushed because they are fatigued and less alert. As in any movement, air observation is essential to assist in detecting an ambush force.

(b) Mechanized units in a riverine environment normally are not employed independently, but operate in coordination with waterborne and/or heliborne units. Mechanized units also can perform the following specialized missions:

1. *Counterambush.* Immediate, positive, and aggressive action is required. Chapter 5 provides information on counterambush procedures.

2. *Blocking.* Mechanized elements conduct blocking actions while the assault elements maneuver using other means of transportation. A mechanized unit can move rapidly and, therefore, can block or cut off the enemy's escape route.

3. *LOC security.* The unit performs an

LOC security mission similar to a route security mission. The LOC may be a waterway or a land route.

4. *Security for resupply missions.* The unit operates in coordination with other units to provide security for watercraft resupply missions after troops have debarked in the AO.

5. *Interdiction of enemy supply routes.* Patrols, raids, or other offensive operations, separately or in conjunction with other units, are used to interdict routes that the enemy uses for resupply. The supply routes may be on land or water or both.

(c) Mechanized units crossing canals and small streams:

1. Canals and small streams varying in width from 3 to 5 meters present the primary obstacles to APC trafficability. Canals with mud banks present a difficult barrier to APC movement. The initial reconnaissance and selection of crossing sites frequently determine the method to use in crossing. A major consideration at the exit point is the trafficability of the bank because sufficient traction is necessary for the vehicle to pull itself from the obstacle. Frequently, the only adequate exit point is upstream or downstream from the entrance point. Consideration of the influence of tides is required in the initial planning stage. A heavy accumulation of mud in crossing bottoms may make an otherwise easy crossing extremely difficult.

2. The marginal terrain assault bridge mounted on and launched from an APC is particularly useful for crossing canals and steep-sided irrigation and drainage ditches. The bridge can support 15-ton loads over spans up to 10 meters. The bridge launcher operates hydraulically, and the hinged aluminum bridge can be emplaced in less than 2 minutes from its mounting on the APC. The bridge can be retrieved in 10 minutes by reversing the launching procedure.

3. Trafficability and cross-country movement for APC may be better during wet periods of the year. Flooded areas with from 0.5 to 1.5 meters of water are completely trafficable for the APC. Uncultivated ground usually poses problems in off-road mobility. Swamps, marshes, daily tidal variations, and speed of the current have a detrimental effect on cross-country mobility.

4. FM 20-22 provides expedient recovery techniques applicable to riverine areas.

e. *Waterborne Withdrawal.*

(1) A waterborne withdrawal is similar to a waterborne movement to contact. The threat of attack is much greater because the enemy usually has information on location, composition, and relative combat power of the waterborne force. During the withdrawal, reconnaissance by fire, use of planned fire support on suspect areas, and alertness of all personnel are used to counter enemy threats. The loading and rendezvous phases of the waterborne withdrawal are critical.

(2) On arrival in the loading assembly area, units complete preparations for loading and form into boat-load groups. These groups move to the loading site when summoned by loading control personnel. Unit integrity is not sacrificed for speed of loading or for maximum use of the watercraft capacity unless absolutely necessary.

(3) The arrival of units at loading areas in coordinated with the arrival of watercraft. Watercraft delaying in the loading area invite destruction by enemy fires.

(4) When loaded, individual watercraft proceed to designated rendezvous areas in a secure stretch of the waterway. Unit rendezvous areas are dispersed within the waterborne force assembly area. When all water movement units are in the rendezvous area and the detachments left in contact are loaded, the units proceed toward the SP and take up assigned positions within the formation.

(5) Loading areas for the detachments left in contact are as close as practicable to their battle positions. Helicopters are preferable for this phase of the withdrawal because they can land, load, and take off faster.

(6) Maximum use is made of RAS fire in support of withdrawing units, particularly if the situation requires executing simultaneous withdrawal of all elements without employing detachments left in contact.

4-17. Employment of Organic Combat Support Elements

a. Reconnaissance Platoon.

(1) This platoon can perform waterborne reconnaissance and provide limited security for the waterborne battalion. Normally it is employed as a unit under battalion control because of the complementary nature of the platoon elements. Under certain conditions, however, the platoon, or elements of it, may be attached to another unit or task force organized for a specific operation. The platoon also

may operate as an independent element to perform special missions.

(2) The platoon can conduct water route reconnaissance, using assault watercraft as its primary transportation. Platoon elements may debark long enough to conduct spot reconnaissance of land areas along the waterway banks. Platoon elements may be leapfrogged along the route by watercraft to maintain a speed of movement equal to that of the main body.

(3) In performing a water route reconnaissance mission, the platoon may require support from other units, such as engineers, Army aviation, artillery, and RAS. Elements of the battalion ground surveillance section also may be attached to the platoon.

(4) During water route reconnaissance missions, boats of the RAS (monitor or ASPB) may be attached to, or support, the platoon to provide a command and control facility for the platoon leader, communication relay, and fire support.

b. Heavy Mortar Platoon.

(1) FM 7-20 contains information on planning and coordination procedures.

(2) Watercraft, barges, armored self-propelled mortar carriers, or helicopters provide transportation for heavy mortars in riverine operations. Even though the heavy mortar platoon mounted on barges is readily transportable throughout a riverine area, the probable requirement to provide security for a base area may dictate splitting the heavy mortar platoon. This fragmenting enables the platoon to provide fire support for both maneuver elements and base areas.

(3) The platoon provides fire support to maneuver elements during the assault landing and the securing of initial objectives. When waterways permit, watercraft will displace the platoon and resupply ammunition. Ammunition is kept on the barge and on supporting watercraft.

(4) Chapter 6 contains additional details on employment of the platoon.

c. Antitank Platoon.

(1) The antitank platoon normally is employed in the defense of the base areas.

(2) The composition of enemy units and the riverine environment normally will prevent the platoon's engaging tanks. The platoon's secondary mission of engaging other point targets becomes its primary mission in riverine operations. When in the AO, the platoon engages enemy bunkers, watercraft or vehicles, crew-served weapons, and similar targets. The use

of antipersonnel ammunition is particularly effective against human-wave attacks.

d. Ground Surveillance Section.

(1) FM 7-20 contains a description of the use of the ground surveillance section.

(2) During the water movement phase, radar sets may be attached to the reconnais-

sance platoon embarked in assault boats. Once the battalion combat base is established, the section normally provides general support to the base. When the situation permits, radar sets may be attached to rifle companies for night defense. Watercraft or helicopters are used to transport radar sets within the AO.



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CHAPTER 5

OTHER TACTICAL OPERATIONS

Note. This chapter provides guidance for conducting operations unique to a riverine environment or modifications to normal procedures required because of the environment. Units conducting operations in a riverine area may participate in one or more of the operations described and are expected to maintain proficiency in all. These operations may be separate or combined with the operations discussed in chapter 4.

Section I. PATROLLING

5-1. General

The terrain and the activities of the enemy require modification of normal patrol techniques. In a riverine environment, enemy forces use the waterways to move troops and supplies in support of their operations. The waterways are the focal point for all enemy and noncombatant activities and are the lifestream of the area. In stability operations where the area is densely populated, the enemy can mix freely with the local civilians, with slight chance of identification.

5-2. Types of Patrols

Patrols may be either long or short range and generally are classified as security, combat, or reconnaissance.

a. Security Patrols. When frontlines are nonexistent and base areas are under constant threat, the requirement for patrols to provide security for the base increases. The patrol area may contain friendly units and heavy population concentrations. Enemy agents, mixing freely with local residents, easily gain information on the location of outposts and routine patrol routes. Outposts and patrol areas are changed at random to hamper the enemy intelligence-gathering agencies. Waterways near the base require particular attention because they permit the enemy to position heavy weapons and assault elements for an attack on the base.

b. Combat Patrols. FM 21-50 and FM 21-75 contain detailed information on planning and conducting combat patrols.

(1) Saturation patrols or patrolling consists of a large number of lightly armed, small patrols in a relatively limited area. The name is derived from the fact that the area is saturated with patrols. To prevent one patrol from attacking or ambushing another requires care-

ful selection of routes, scheduling, and close coordination between patrols. A combination of water, ground, and airmobile means of transportation may be used in patrolling.

(2) Airmobile hunter-killer teams are combat patrols transported by helicopter that are escorted by armed helicopters. They can cover large areas and may be used as a reaction force.

(3) Ambush patrols establish ambushes at selected positions to destroy enemy elements.

(4) Reconnaissance patrolling is a mission well suited for the air cavalry troop's aeroscout section and aerorifle platoon.

c. Reconnaissance Patrols. Reconnaissance patrols collect information of the enemy, terrain, and weather in a prospective area of operations (AO). They avoid contact when possible and fight only in self-defense or when necessary to accomplish the mission. A five- to eight-man patrol normally is required for reconnaissance missions. Typical missions or specialized reconnaissance patrols follow:

(1) Engineer patrols collect information of river obstacles; fortifications; roads; minefields; and bridges, to include underbridge clearance at high and low tide, water depths at high and low tide, and clearance height and width between bridge piers.

(2) Naval patrols collect information of major waterways, to include hydrographic conditions, location of water obstacles, planned ambush sites, mines, etc.

(3) Artillery patrols collect terrain information required for the selection of artillery positions to include accessibility, availability, defensibility, and ground condition.

5-3. Means of Transportation

All available means of transportation are used in a riverine environment. Movement of patrols

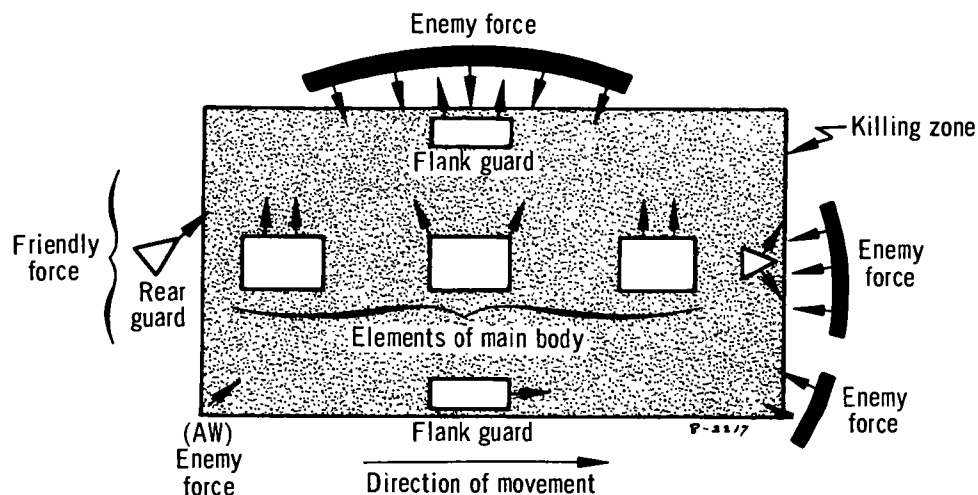


Figure 5-1. Reaction when entire unit is caught in killing zone.

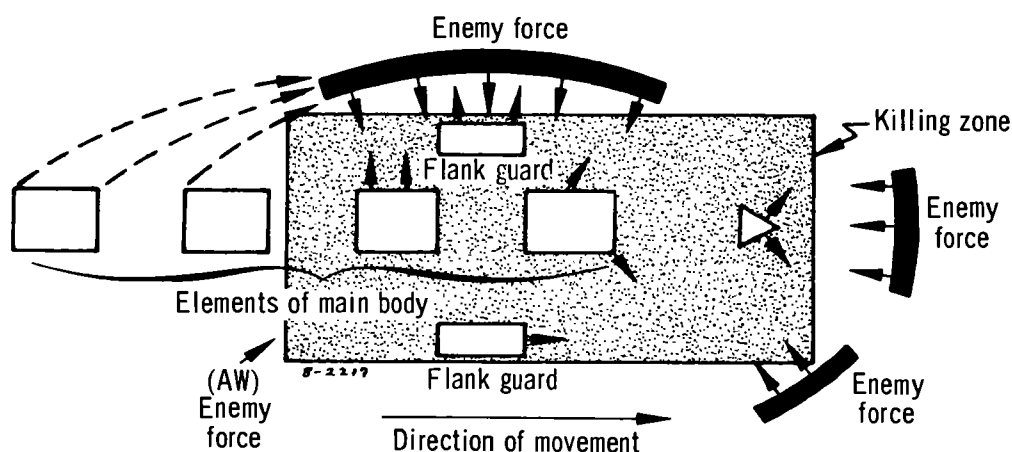


Figure 5-2. Reaction when a portion of a friendly unit is caught in killing zone.

consists of three phases: insertion into, operations within, and extraction from the operational area. The means of transportation used during each phase depends on the variables of speed, terrain, degree of covertness necessary, and equipment. The following paragraphs describe considerations for selecting the means of transportation.

a. Fixed-wing aircraft are fast and relatively unrestricted in the amount of equipment that they can deliver. Personnel and equipment are delivered by air-landing or parachute. A night parachute drop offers a better possibility of maintaining secrecy than a day drop; however, it may result in unacceptable dispersion of the patrol and equipment. Equipment normally is

restricted to items that the patrol can carry unless time is available to rendezvous with other means of transportation.

b. Helicopters can insert a patrol into the operational area as a unit, with its equipment and boats for transportation in the area, if required. Helicopters can be easily seen and heard from a great distance, but their use eliminates the necessity of a rendezvous once the patrol lands. Helicopters provide a rapid and reliable means of transportation into the operational area and extraction therefrom.

c. River assault squadron (RAS)craft are used to insert patrols and their equipment, including assault boats or armored personnel carriers (APC), into the AO. RAS craft provide fire sup-

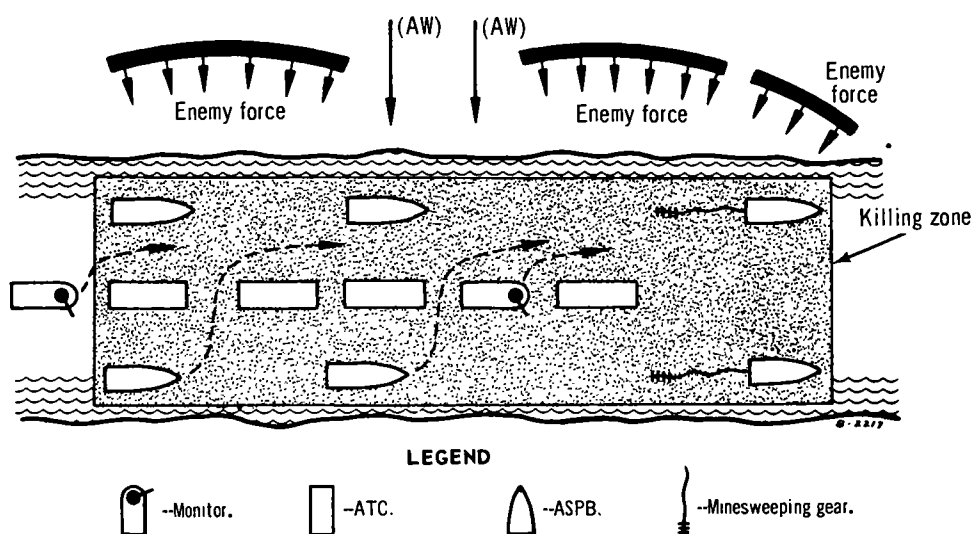


Figure 5-3. Reaction when an ambush force is suppressed and movement continues.

port and resupply and they may extract the patrols.

d. Assault boats are used for insertion into, movement within, and extraction from an AO. When using assault boats, a patrol can move faster and carry more equipment, weapons, and ammunition than when dismounted. Movement by assault boat does not normally provide as much secrecy as movement dismounted; however, moving at night, drifting with the current, paddling or poling, and being able to accelerate quickly to speeds in excess of 25 knots provide some security. Appendix B contains techniques for using assault boats.

e. Indigenous watercraft assist in deception and can either substitute for assault boats or supplement them. These craft arouse less suspicion than assault boats. Personnel must be well trained in the use of indigenous watercraft. They must know their peculiarities, capabilities, and limitations for better tactical utilization and safety.

f. Airboats may be used for insertion into, movement within, and extraction from the AO. The noise of these craft is a major consideration because secrecy of movement is virtually impossible; however, their speed is such that enemy reaction to the movement may be impossible. These vehicles can also be effective as part of a cover or deception to divert attention from patrols in the area.

g. Dismounted patrols in a riverine environ-

ment are limited in speed of movement, ability to remain in the AO, and ability to transport required supplies and equipment. The terrain and the physical strain on dismounted elements operating in inundated areas are limitations on patrol operations. Operational range and duration are limited. When consistent with the mission, patrols are provided transportation.

5-4. Long-Range Patrols

a. All available transportation is used in long-range patrols, which frequently perform a series of missions within the AO.

b. Detailed planning for insertion into the operational area and extraction therefrom is required when a unit conducts long-range patrols. Physical limitations of patrol members are a major consideration in planning these patrols. Patrol planning includes coordination with friendly waterway patrols operating in or adjacent to the operational area. These waterway patrols may provide resupply, fire support, and extraction or ferrying to the long-range patrol.

5-5. Night Patrols

Night saturation patrols deploy to locate enemy forces, interdict lines of communications (LOC), and prevent raids or harassing attacks. Darkness or reduced visibility allows patrols to move with less chance of being detected, but increases problems of control. Maximum use of light intensification, surveillance, and listening devices increases the effectiveness of night

patrols. Aircraft, using similar devices, assist night patrols in land navigation.

5-6. Motorized Patrols

Motorized patrols are conducted in riverine areas containing a suitable road network. Normally, wheeled vehicles are more suitable than tracked vehicles because of the reduced noise levels, but they may be road bound. The techniques of motorized patrols described in FM

21-75 apply, with particular emphasis on security during the march and during halts.

5-7. Employment of Scout and Tracker Dogs

Scout and tracker dogs are effective, particularly during searches and night operations. A dog in good physical condition can work effectively in riverine areas for about 6 hours. Scout and tracker dogs are also useful with patrols and ambushes.

Section II. RAIDS

5-8. General

a. A raid is an operation, usually small scale, involving a swift penetration of enemy territory to secure information, confuse the enemy, or to destroy his installations. It ends with a planned withdrawal on completion of the assigned mission. The principles involved and techniques used in raids in a riverine environment are basically the same as those listed in FM 6-20-2, FM 17-1, FM 21-75, FM 31-12, and FM 61-100.

b. In a riverine environment, vegetation limits visibility and affords excellent concealment. In this type of terrain, raids may produce results unobtainable by other operations. Squads, platoons, or companies conduct raids. Air cavalry units are well suited to conduct raids (See FM 27-37 for details).

5-9. Planning Considerations

a. Movement and control are hampered by terrain, vegetation, weather, and limited visibility. Elements conducting raids are armed with light infantry weapons and carry the minimum equipment. Weapons include shotguns and 40-mm grenade launchers and the automatic weapons. These weapons are particularly suitable since raids are normally conducted during reduced visibility and fires are delivered at short ranges. White phosphorus (WP) grenades cause casualties among the enemy and provide smoke to cover the withdrawal. Personnel selected to participate in a raid must have endurance and stamina.

b. Use of all available intelligence and detailed coordination of all supporting fires are necessary in planning a raid. Personnel are selected in advance for training in the conduct of raids to prevent delay when the opportunity for a raid occurs. Training stresses land navigation and use of the compass. Friendly, reliable, and trustworthy indigenous guides assist the raiding party in cross-country movement.

c. Rehearsals are essential to precision and speed in carrying out a raid, and they follow a plan similar to that for the forthcoming operation.

d. Cover plans are prepared and maximum security measures are enforced to prevent an ambush of the raiding party. Ruses and other deception actions are considered to deceive the enemy about the planned raid.

e. The withdrawal is planned in detail. Plans include alternate routes and means of transportation and ambushes along the route of withdrawal to assist in the extraction of the raiding party. Air, artillery, and naval gunfire support are planned for the withdrawal phase.

f. Marshy areas, covered with tall reeds and scrub growth, hinder movement of assault boats. Commanders should consider the use of indigenous watercraft because they traverse these areas with less difficulty than assault boats.

5-10. Raid by Fire

Although not outlined in FM 6-20-2 as a normal artillery operation, artillery units, using massed, surprise fire, can conduct successful raids by fire within the definition in paragraph 5-8. Coordination with the area coordination center (ACC) in a stability operation may reveal lucrative targets for artillery raids by fire. This raid by fire may be accomplished from the normal supporting positions. When not required to support operations or provide fire support for base defense, artillery units move to a suitable location and conduct a raid by fire. A sudden, large volume of fire is directed at previously selected targets. The artillery unit completes the firing and returns to the base area, and another unit or agency conducts and reports target damage assessment.

5-11. Mechanized Units

Mechanized units are well suited for raids in open marsh areas. Their speed of movement

and their cross-country mobility reduce the enemy's capability to counter or prevent the raid. Mechanized units, using naval craft, are transported from the base to a landing site near the objective, debark, and move rapidly onto the objective. The APC amphibious characteristics allow it to be off-loaded in places where a shallow bottom prohibits the landing ship from reaching the shore. As with other raids, mechanized units require aviation support for reconnaissance and surveillance, fire support, medical evacuation, and resupply.

5-12. Water Movement

a. Watercraft may provide the best means of transportation to the objective and withdrawal therefrom. Waterborne elements debark

at a distance from the objective and approach the objective on foot. If the objective is near a waterway, the assault element uses power boats to move directly into the assault area. This tactic is used only when surprise can be achieved and the waterway is large enough to permit the boats to take evasive action. Supporting fires and smoke or riot control agents may be used to cover the withdrawal.

b. When the objective is close to a waterway and the enemy has concentrated his defense for protection of the installation against waterborne attack, a diversionary attack or the use of riot control agents may permit trained personnel to enter the target area for destruction of selected facilities.

Section III. OPERATIONS IN SWAMPS AND FORESTS

5-13. General

Operations in swamps and forests are conducted in a manner similar to the jungle operations outlined in FM 31-30. Dismounted elements normally conduct these operations. The complex of mangroves, ferns, and palms normally found in these areas offers excellent concealment for the enemy and he frequently uses them for base areas and safe havens. The enemy usually locates his installation in areas close to streams to utilize the waterways for transportation of supplies and equipment. Elements conduct extensive operations in these areas to defeat the enemy or to deny him use of the waterways.

5-14. Military Characteristics

The dense vegetation and inundated areas in this environment hinder movement. Key terrain in a swamp or forest includes trails, streams, rivers, coastal areas, small villages, and built-up areas. Air observation is limited, and ground observation may be limited to as little as 1½ meters. Concealed movement is possible throughout the area. Dismounted elements can operate in inundated areas for limited periods; however, the mission can be accomplished by rotating units and using all available firepower.

5-15. Command and Control

Operations in these areas are conducted primarily by small units as separate engagements. Control of supporting fires and maneuver elements is difficult because of the dispersed actions. Dense foliage reduced the distance that organic electronic, audio, and visual means of

communication can transmit messages. Trustworthy indigenous personnel familiar with the terrain or troops from the host country who have operated in these areas assist units during the operation.

5-16. Movement

a. Foot movement normally is restricted to narrow trails; boat movement within swamps is usually restricted to streams within the swamp; and helicopter landing sites are few. Pathfinder teams are used to insure that available helicopter landing sites are not booby-trapped. During operations, teams use aerial ladders to assist in inserting or extracting elements. A waterborne approach from the sea into coastal swamp area may be difficult because of shoals, shifting channels, and tidal effects.

b. Units converge on suspected enemy base areas. Units, with minimum equipment, using watercraft to negotiate streams and waterways, are trained to move as fast as or faster than the enemy.

5-17. Fire support

Fire support is planned in detail to support engaged forces, to destroy the enemy and his equipment, and to interdict his movement. Napalm is an effective weapon; however, planners consider all available weapons during planning and weapon selection for fire support. Scarcity of information concerning the strength and disposition of the enemy requires planned fires for a greater number of contingencies. The positioning of conventional artillery is often difficult

in swamps; therefore, barge-mounted or helicopter-emplaced artillery is employed when possible (chap 6). Since observation normally is restricted to a few meters, forward observers are trained in sound sensings. Coordination between air and ground observers is necessary to verify location of friendly troops and to obtain positive sensing of rounds fired. Frequently, Air Force and Army aircraft and Navy elements provide the preponderance of fire support.

5-18. Tides

In swamp areas affected by tides, the tidal influence on currents, depths of water, and bank and bottom conditions of canals and tidal streams is an important consideration for

waterborne elements. Tidal effects and physical characteristics of the area are considered during planning.

5-19. Denial of Drinking Water

In many riverine areas near the sea, drinking water is scarce. Streams may be of a tidal nature; the normally low elevations preclude deep wells; and water in natural reservoirs normally is not suitable for drinking. All personnel living in this type of area entrap water during wet seasons and store it in manmade ponds or metal or pottery containers. Units operating in swamps or marsh forest areas destroy stored water supplies. Patrols along waterways assist in preventing the enemy from importing water.

Section IV. AMBUSHES/COUNTERAMBUSHES

5-20. General

Both sides employ ambushes in a riverine environment. Waterways and roads are LOC, therefore, making many ambush sites available to both friendly and enemy forces and increasing the requirement for counterambush tactics. FM 21-75 provides additional details on ambushes and counterambushes.

5-21. Ambush Operations

a. Concept.

(1) Units involved in base security use ambushes as a security measure. Cover and concealment are essential to ambush patrols entering enemy territory by boat or helicopter or on foot to interdict canals or other suspected enemy routes of movement.

(2) Surprise is the key to success in ambush operations. Surprise allows the ambush force to seize and retain control of the situation. Units achieve surprise by careful planning, preparation, and execution.

(3) Units maintain close control during movement to, occupation of, and withdrawal from the ambush site.

(4) All available weapons, including mines, demolitions, artillery, and mortars, and close air support are coordinated to achieve maximum effectiveness of the ambush.

b. Planning.

(1) Ruthlessness and violence are characteristics of successful ambushes. Use of all available intelligence and detailed coordination of all supporting fires are necessary during the planning phase. The maximum number of automatic weapons is used by the ambush to

engage the enemy in the killing zone and to cover the ambush force's withdrawal. Rapid and coordinated movement is critical to the ambush force's exfiltrating after executing an ambush.

(2) Commanders have an excellent choice of ambush sites along rivers, canals, roads, or converging dikes in a riverine environment. Before making a selection, however, they make a careful study, using maps, aerial photographs, and, when possible, a personal reconnaissance of the area to determine the availability of natural obstacles. Minefields create artificial obstacles to supplement natural obstacles. The claymore antipersonnel mine is effective in the killing zone in preventing the enemy's escape. A successful ambush destroys the enemy at the ambush site.

(3) Commanders carefully select routes to and from the ambush site to insure secrecy when occupying the positions and speed and security when withdrawing from them. They select alternate routes or withdrawal and designate rally points and assembly areas.

(4) Communication and control procedures are necessary during movement to, occupation of, and withdrawal from an ambush site. Strict control and discipline are necessary to keep the ambush unit alert and silent. Communications security procedures are strictly enforced to prevent the compromise of the ambush operation. Movement and communications are kept to a minimum once the ambush unit is in position. Communications are necessary to issue orders to open fire and withdraw and to maintain contact with local security elements and

higher headquarters. An alternate plan provides for opening fire when the enemy's lead elements reach a designated location.

(5) Rehearsals for the ambush force are conducted on terrain similar to that for the actual mission. All personnel are briefed on the exact sequence of events until they thoroughly understand their duties. They also are briefed on the location of rally points, assembly areas, and withdrawal routes. All personnel rehearse until every individual knows his job completely on the move, at the rally points, at the objective, during the ambush, and throughout the withdrawal.

(6) Personnel and weapon positions provide cover and concealment. The fire plan integrates the fires of all weapons, automatic weapons, flame field expedients, grenade launchers, and claymore mines. The ambush plan includes the signal to open and cease fire, the assignment of sectors of fire, and the location of all elements. Planned fires isolate the ambush area and prevent the escape or reinforcement of the enemy. Commanders insure that the large volume of surprise fire in the killing zone comes from at least two directions and converges on the target.

c. Execution.

(1) The enemy's arrival in the killing zone is the most crucial moment in an ambush. When he reaches a designated location in the zone, the order is given to open fire. All weapons deliver a large volume of fire into the killing zone to inflict maximum casualties before the enemy can take cover. Fire continues until the enemy is annihilated or until a friendly assault element is committed.

(2) The ambush commander often has to use assault elements to move through the ambush site, destroying equipment, searching the dead, and performing other necessary duties. The assault begins with the lifting or shifting of supporting fires.

(3) During ambushes along waterways, the concussion from exploding offensive grenades thrown into the water produces casualties among swimmers. The assault elements then use boats to capture prisoners.

d. Use of Assault Boats.

(1) When transporting an ambush force, assault boats move stealthily by using paddles or poles instead of motors, or by drifting into position with the current or tide. When they move this way, the motor is fastened to the boat in the up position, ready for immediate use.

(2) Whether an ambush site is selected to cover a road, trail, or waterway, the ambush force debarks and occupies concealed positions. The boats are concealed, and designated crewmen remain in or near their craft prepared to assist in the ambush or in the withdrawal.

(3) If the ambush site is on a tidal waterway, changes in the water level and the direction of flow are considered in the plan. A considerable change in water level may prevent withdrawal by boat.

5-22. Counterambush Tactics

a. General.

(1) The riverine environment offers the enemy many opportunities for ambushes. The population provides a cover for enemy ambush forces' movement into and occupation of ambush sites. Accordingly, the riverine area rarely is considered secure, and counterambush measures are planned in conjunction with all operations and movements.

(2) When moving through open or broken terrain, security elements are employed to the front, rear, and flanks of the moving column, out to the maximum effective range of small-arms fire. In wooded areas, security elements are a minimum of 200 meters forward and must cover a front broad enough to prevent a line ambush, in which the long axis of the enemy parallels the direction of movement. The forward security elements are far enough to the front to allow the main body to deploy without serious interference from the enemy. When movement is along a canal or river, units may take advantage of adjacent canals to move security elements.

(3) Routes of movement are reconnoitered in detail from the air by map and, if possible, by small reconnaissance patrols. Air observation is valuable, but is not a substitute for ground reconnaissance. An ambush force, once in place and camouflaged, is not likely to be detected from the air.

(4) Local activities along roads or waterways are carefully observed to detect unusual patterns of behavior. No children in the area or no vehicular or boat traffic may indicate the presence of an enemy ambush force. If the mission permits, frequent questioning of local civilians about recent enemy activities in the vicinity may be advantageous.

(5) Security is maintained from the beginning to the end of any movement; and dispersion, combat formations, and observation are emphasized. Troops have a tendency to relax and become careless when returning to a base

area from an operation. This tendency increases as the units near the base area.

(6) Paragraphs 6-41 through 6-44 contain details on employment of Army aviation in counterambush operations.

b. Planning Counterambush Actions.

(1) All movements and operations are susceptible to ambush. In any movement, representatives from supporting artillery, tactical air, Army aviation, and Navy units participate in the planning. During initial planning, the commander decides whether air relay and observation are required for positive communications and control and whether an airborne command post is necessary. The airborne command post affords the commander the best means of control and communications and enables him to react rapidly to all contingencies.

(2) Plans for column cover and reaction elements provide support for all operations. Reaction elements must constantly be prepared for immediate dismounted employment. The reaction element may attack the ambush force or may maneuver to block the enemy's withdrawal. Column cover provides observation and fire support to both the moving unit and the reaction force.

(3) During planning, the commander designates the sequence of command succession, considers intelligence indications, has a detailed fire support plan prepared, and plans for the placement of forward observers and tactical air controllers. If movement is by water or if naval gunfire or RAS fire support is available, these fires are integrated into the counterambush plan.

(4) Plans are made to brief and rehearse all personnel concerning their individual responsibilities and duties if ambushed. All personnel, including embarked troops and the supporting boat crews, are familiar with the plan for immediate action, control procedures, and artillery and tactical air support available.

c. Counterambush Actions on Land.

(1) When a unit is caught in an ambush, troops return fire in their assigned sectors. The unit is organized to cover the entire area with a large volume of fire, and troops gain and maintain fire superiority. The unit increases speed and continues movement unless the road is blocked. If movement stops, troops return fire immediately with organic weapons and follow up with an assault on the primary ambush, using their individual weapons and supporting fires. Units entirely in the kill zone (fig 5-1) assault and overrun the ambush positions.

When only part of the unit is caught in the killing zone (fig 5-2), the elements not in contact act as a maneuver force and attack the flanks and rear of the ambush. Personnel continue to fire even after the enemy ceases fire to prevent the enemy's recovery of weapons and bodies. After overcoming the ambush, the area is searched to insure that the ambush site is clear.

(2) Troops moving through suspect areas carry offensive grenades, which they immediately throw toward the enemy when ambushed. Enemy ambush forces often hide at very close range and assault only after the friendly force has been attacked by long-range fire. Offensive grenades may inflict heavy casualties on the concealed force and often prevent it from assaulting.

(3) The immediate reaction plan provides for an assault to overrun the enemy positions. Enemy ambush forces often fire from only one flank to make the friendly force take cover in a mined area or killing zone. An assault toward the enemy normally lessens friendly casualties and produces more enemy casualties.

d. Counterambush Tactics During Water Movement.

(1) General.

(a) Even though suspected ambush sites along waterways have been attacked by artillery or close air support fires, ambushes may be encountered. The enemy generally selects ambush sites on waterways at points where maneuvering is difficult and the channel either brings the craft well over to one bank or restricts them in a narrow channel. Ambush forces usually hide in dense vegetation; but, in some areas, they conceal themselves along dikes or in tall grass. High banks provide advantageous firing positions above the rivercraft and limit the range of friendly direct fire. Avenues of withdrawal are normally available to the enemy. Mudflats, steep banks, or slippery shores hinder friendly troops assaulting from the river.

(b) Normally, the friendly unit counters the ambush with suppressive fire and forward movement; it commits an element to suppress the ambush while the main body moves through the killing zone. The alternative course of action is to commit the entire unit in a coordinated attack to assault and annihilate the ambush force. The mission, the forces available, and the relative size of the ambush force determine the tactic to employ.

(c) If a commander plans to counter the

ambush with suppressive fire and forward movement, his plan includes the designation of ships and watercraft to take the ambush force under fire. The plan also includes instructions on the use of artillery and close air support. If the unit's mission specifies destruction of any ambush forces encountered en route, plans are necessary to land elements for this purpose and to commit blocking forces or reserves.

(2) *Planning.*

(a) Reconnaissance of the selected waterway is conducted at both high and low tide to determine navigability under these conditions. The commander considers the use of parallel rivers, streams, and canals by security elements. When time permits, reconnaissance patrols, well forward of the main body, debark and investigate likely ambush sites. When scout and tracker dogs are available, they are used along the banks or in small boats near shore to detect ambush sites. Since the return route of boats is easily predictable, plans provide for the use of alternate routes. When this is not possible, units avoid setting a predictable time pattern of return from operations.

(b) The plan allocates transportation for the evacuation of casualties and damaged equipment. Army troops may augment Navy crews to replace losses.

(3) *Execution.*

(a) When ambushed, the waterborne force normally maintains forward movement and executes a coordinated plan for suppressive fire, aimed fire to neutralize major weapons, planned artillery or RAS supporting fires, and close airstrikes. When the ambush is activated and only a portion of the unit is in the killing zone, fire support craft (monitors and assault support patrol boats (ASPB)) immediately maneuver to take positions between the

armored troop carriers (ATC) and the ambush force. The fire support boats attempt to suppress fire until the ATC are past the killing zone; then they disengage and re-form for movement (fig 5-3)

1. Troops embarked in ATC remain, but are ready to establish local security if an ATC should be beached. These troops are ready to assist in the recovery of damaged watercraft and to man Navy guns if the ATC crew is engaged in emergency damage control or had sustained casualties.

2. The planned maneuvers of ASPB and monitors and possibly violent course changes by the ATC require positive fire control.

3. One alternate tactic for reacting to an ambush is for all boats in the killing zone to close and move toward the bank from which the heaviest fire comes. This maneuver limits the enemy on the opposite bank to a long-range fire with the danger of firing into their own positions. Fires massed on the shoreline just ahead of the evading watercraft can suppress the enemy fires on the near bank while the boats pass each ambush position.

(b) When an assault element lands, fires are coordinated to support the assault element and to deliver suppressive fire on the ambush forces. The assault element lands outside the ambush position and attacks the flanks of the ambush force. When the entire force is caught in the ambush area, boat speed is increased and the force moves through the ambush area as quickly as possible. Waterborne forces seldom will beach where the enemy has prepared well-fortified positions. Maximum suppressive fires are employed against both banks as the boats move through the area. Monitors and ATC equipped with flamethrowers are excellent counterambush weapons. FM 20-33 contains details on combat flame operations.

Section V. CLEARANCE OF WATER OBSTACLES

5-23. General

a. Navy elements clear navigable waterways of obstacles. Divisional engineer elements may assist in clearance. A planned water obstacle removal program is conducted throughout the riverine area.

b. Close coordination with local officials is mandatory before the removal of any water obstacle. Dikes may be constructed as flood control measures.

5-24. Water Obstacles

Three basic types of water obstacles are—

a. The log, which is the most common. Crossed logs (frequently as small as 3 to 5 centimeters in diameter) may be used in waterways from 25 to 50 meters wide. In areas where the current flows in only one direction, debris, to include small trees, bushes, and foliage, accumulates on the upstream side.

b. The mud dike, which may be found in

canals having a tidal current. This dike restricts the movement of military watercraft and may reduce the flow of tidal currents upstream from the dike.

c. The reinforced mud dike, 2 to 3 meters wide, laterally reinforced with logs on each side is the hardest to remove.

5-25. Waterway Clearance

a. Log obstacles usually are removed by fastening heavy lines to the main structural members and by using watercraft as tractors to pull them out.

b. Mud dikes usually are removed by using either explosive charges or a clamshell or dragline. The most common error in using explosives to remove mud dikes is failure to place the

charges sufficiently deep in the dike. This error, wasteful of time and explosives, increases the difficulty of ultimate clearance.

c. The mud dike reinforced with logs cannot be removed with explosives alone. Logs as large as telephone poles or reinforced concrete pillars may be used in constructing this type of obstacle. The logs on both sides of the dike are removed first by pulling them out with watercraft. Major pieces of debris are then removed from the dike, and explosives are used to complete the removal of the obstacle.

d. The stream usually requires widening or deepening after removal of water obstacles. Dredges may not be available; however, divisional engineers can mount a crane on organic rafts and use either a clamshell or dragline to complete the removal of the obstacle.

Section VI. COUNTERMINE OPERATIONS

5-26. General

a. Extensive use of mines and boobytraps may represent either a major tactical advantage or threat in limited wars, cold wars, and especially stability operations. Friendly tactical employment of mines and boobytraps may be advantageous in complementing stability operations by limiting free enemy movement through otherwise unattended areas or denying particular geographic areas for use by enemy forces. Careful planning and coordination must be exercised by the tactical commander to reduce the possibility of friendly military and civilian casualties resulting from encounters with friendly employed mines and/or boobytraps.

b. The tactical threat arises from the extensive use of mines and boobytraps by enemy forces coupled with the friendly forces' unfamiliarity with locating, identifying, neutralizing, and/or removing enemy mines and boobytraps. Commanders at all echelons are responsible for disseminating current information on enemy mines and boobytraps. The effectiveness of nonstandard, hand-emplaced mines is a threat that should be countered by the application of all known doctrine and equipment (to include surveillance, target acquisition, and night observation (STANO) devices).

5-27. Implementation of Countermining Activities

a. Riverine forces, regardless of branch designation, must be able to apply mine emplacement techniques (to include boobytraps) and must be qualified to counter the employment of mines and boobytraps by enemy or insurgent forces. Engineers can provide technical advice and assistance in mine/countermining measures. However, the tactical commander must provide all units of his command with current information and detailed training in countermining activities. This information and training should be designed to fit the local countermining requirements.

b. When units locate new or previously encountered enemy mines or boobytraps, they must make an initial identification or provide a description in order to devise appropriate countermeasures. Specifically qualified mine/countermining personnel or explosive ordnance disposal (EOD) teams may be called on to make this determination if the troops in the immediate area are unqualified. Rapid accurate dissemination of this countermeasure information through the tactical commander to the troops will result in effective increases in countermining capabilities.

CHAPTER 6

COMBAT SUPPORT

Note. Limited ground mobility in the riverine environment restricts certain aspects of combat support. Units may be widely dispersed, and environmental restrictions often prevent mutual support. Although support requirements are no greater than normal, immediate response is essential. The scarcity of dry land and the dependence on water and air transportation require the commander to establish priorities for their use.

Section I. FIRE SUPPORT

6-1. General

Continuous, flexible fire support is indispensable in riverine areas. However, these factors make provision of this support difficult: inadequate survey control, either a lack of maps or inadequate maps, scarcity of dry land for

artillery positions, and curtailment of massing fires when fire direction is decentralized. Although normal fire support procedures apply, some modifications and innovations, particularly in the use of fire support from rivercraft, are necessary in riverine areas. Discussion of these modifications follows.

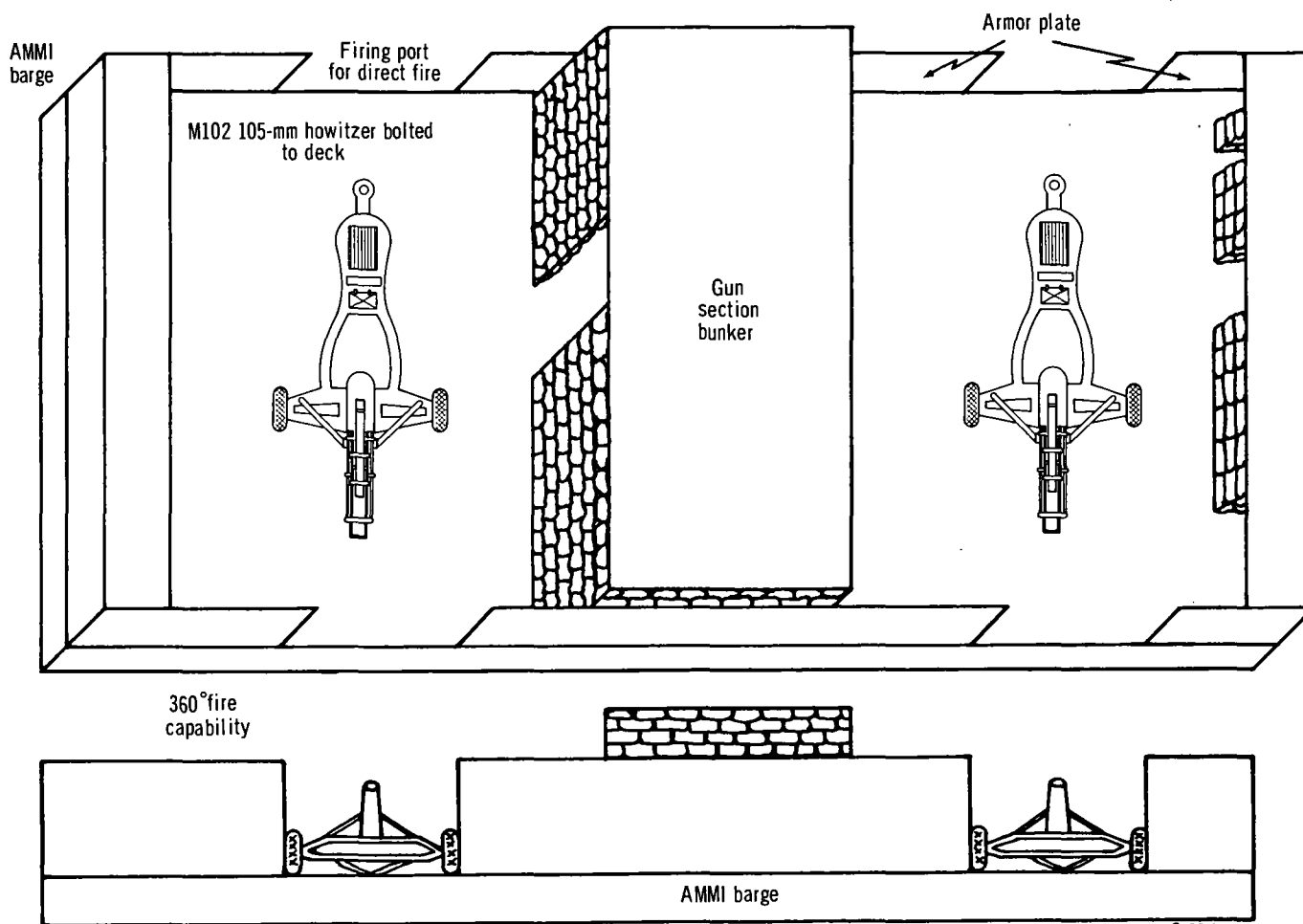


Figure 6-1. 105-mm howitzer artillery barge.

6-2. Rules for Engagement

A requirement to defeat enemy forces in densely populated areas with minimum loss of non-

combatant's lives and property necessitates a thorough understanding of the rules for engagement. All personnel have to be aware of the implications associated with the use of

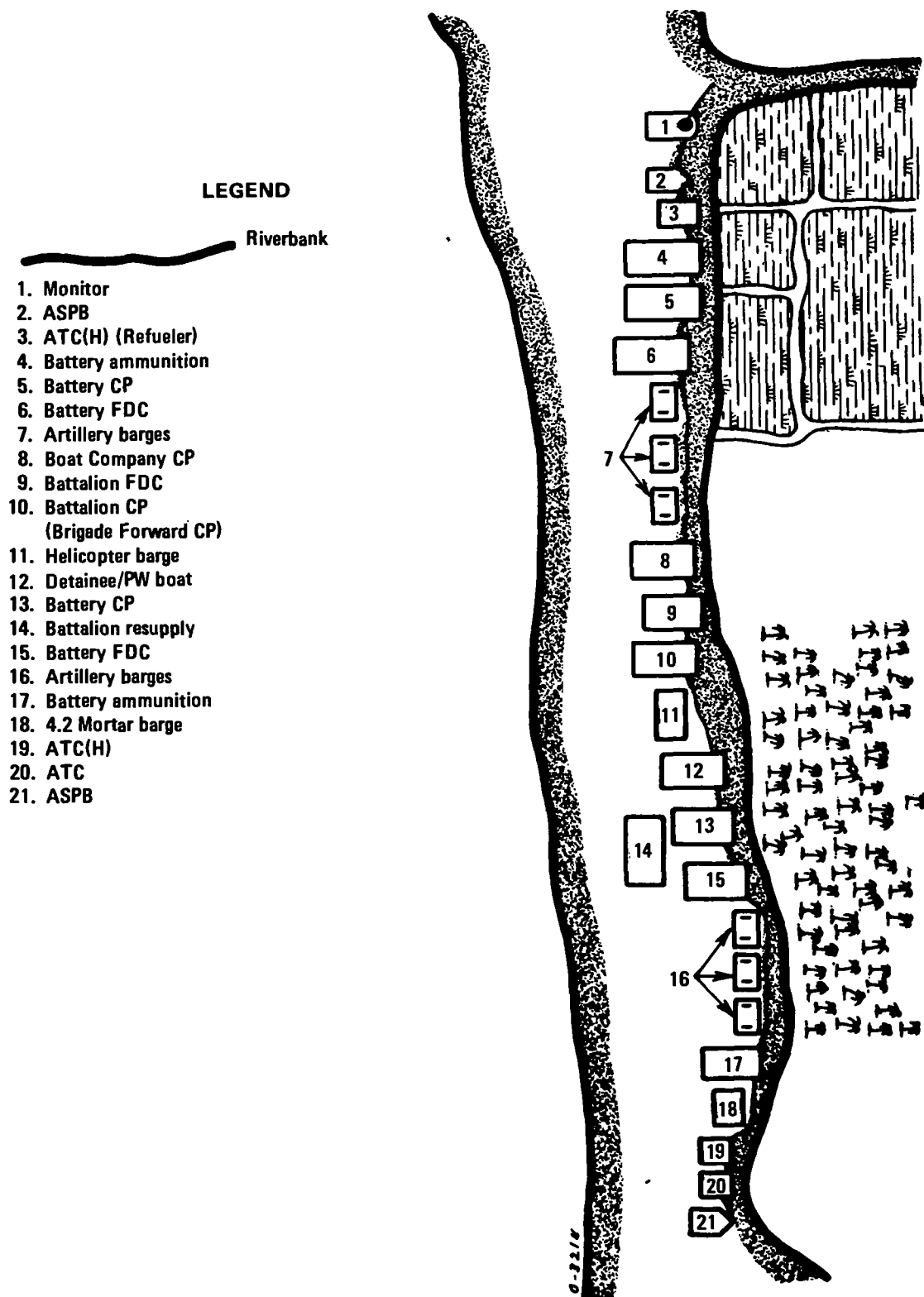


Figure 6-2. Barge-mounted artillery position.

long-range direct and indirect fires in a densely populated area. All fire support elements prepare to provide fires on short notice. Rules for engagement normally permit the use of indirect fire in populated areas only when the enemy's position has been positively located and identified and clearance to fire has been obtained. Accidental killing or injuring of friendly civilians is not conducive to the mission of gaining support from the local populace. Because of the danger of long-range ricochets from flat trajectory weapons, employment of .50-caliber machineguns or larger caliber weapons in a riverine environment may be restricted.

a. To provide for ease and speed of response to the fire requests in stability operations, the area coordination center (ACC), when possible, designates free-fire areas for the entire area of operations (AO) or a large portion of the area. Through the ACC, the riverine force attempts to identify enemy-controlled areas throughout the tactical area of responsibility (TAOR) or AO for ease in securing fire clearance for landing zone (LZ) preparation and objective preparation in an AO. Liaison teams from the riverine force assist in obtaining fire clearances from regional coordination centers. Because of the wide scope and transient nature of its operations, the riverine force commander may be compelled to divert officers from their normal duties to augment authorized liaison teams. Delaying the request for clearances will prevent premature disclosure of scheduled operations. Cover and deception plans may provide for submitting clearance requests for impact areas outside the AO, and some fire missions in these areas may actually be fired.

b. The fire support coordination officer coordinates with local government officials and their U.S. advisers before firing harassing and interdiction (H&I) fires or firing artillery for training, calibration, or registration. When possible, requests for impact areas, free-fire areas, rocket disposal areas, and target lists for H&I fires are submitted in advance to the U.S. adviser for his counterpart's approval. Desired leadtime enables these officials to make necessary arrangements with civilians in the impact area. The need to prevent disclosure of a prospective AO may delay coordination until the operation commences.

c. All personnel concerned with requesting or providing fire support must be intimately familiar with the rules for engagement established for the riverine area.

6-3. Fire Support Coordination

Current doctrine pertaining to techniques and procedures for planning and coordinating fire support, as found in FM 6-20-1 and FM 6-20-2, is valid for riverine warfare. Detailed coordination and planning are necessary before and during operations. An example of the detailed coordination and planning necessary in riverine operations is the preparation of landing areas assaulted by a waterborne force or LZ assaulted by an airmobile force. Close airstrikes begin preparation shortly before the landings commence, followed immediately by the artillery preparation and the organic firepower of the watercraft and the attack helicopters as the maneuver elements land. Population density may require other than normal procedures. Fire support coordination in this environment may increase the use of fire coordination lines (FCL).

a. At company level, the commander coordinates his own fire support and integrates available fires with his scheme of maneuver or plan of defense. In addition to his organic weapons, he may have support from artillery, the battalion heavy mortar platoon, weapon helicopter, high-performance aircraft, naval gunfire, and the direct and indirect fires of the river assault squadron (RAS). Forward observers (FO) from the direct support artillery battalion and battalion heavy mortar platoon, the forward air controller, and infrequently a naval gunfire spotter and an RAS liaison officer assist the company commander in coordinating fire support.

b. At battalion level, the fire support coordination center (FSCC), either at the command post (CP), or on a command and control boat (CCB), coordinates all fire support available to the battalion commander. Key personnel who normally operate in the FSCC are the fire support coordinator (FSCCOORD) (liaison officer from the artillery battalion in direct support of the brigade); the battalion heavy mortar platoon leader and, when appropriate, the S3 air; a tactical air control party (TACP) with an air liaison officer (ALO) and a forward air controller (FAC); a shore fire control party (SFCP) with a naval gunfire liaison officer (NGLO) and a naval gunfire spotter (NGFSPTR), when available and when naval gunfire is provided; a liaison officer from RAS; and liaison officers from host country and third country. When an airborne CP is employed, only FSCC personnel essential to the particular phase of the operation in progress accompany the commander. When only the FSCCOORD

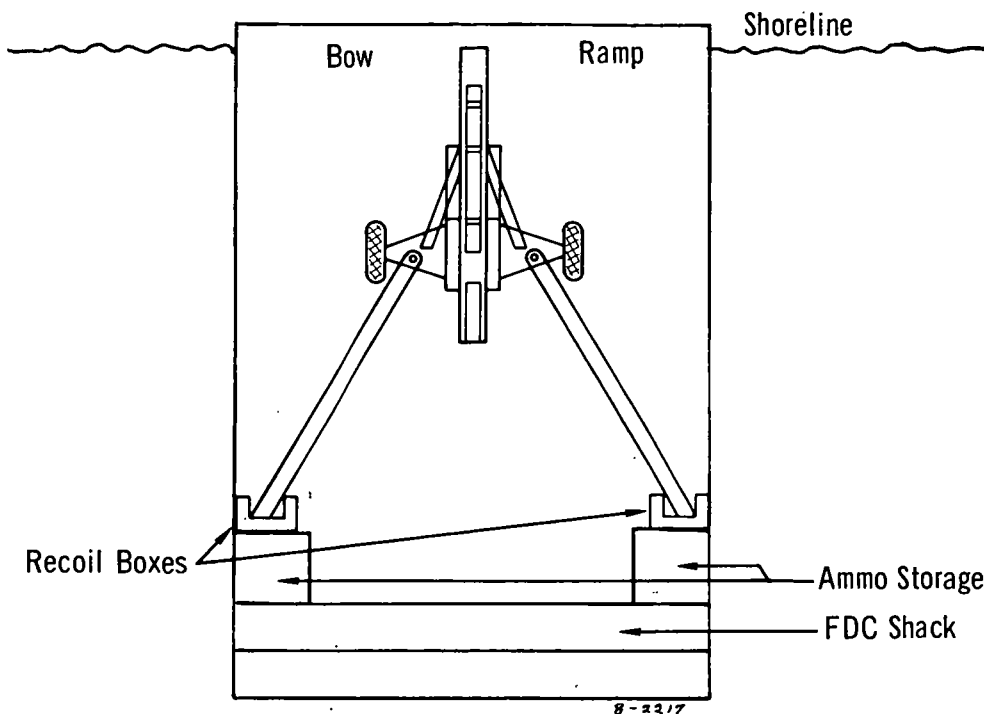


Figure 6-3. Firing of 105-mm howitzer from an ATC or LCM.

accompanies the commander, he uses radio to coordinate with other elements of the FSCC.

c. At brigade level, the FSCC at the CP either aboard the brigade APB, at the land base, or aboard a CCB coordinates all fire support available to the brigade commander. The direct support artillery battalion commander is the FSCCOORD. Key personnel who normally operate in the FSCC are the FSCCOORD or his assistant (the liaison officer from the direct support artillery battalion); the brigade assistant S3, S3 air, when appropriate; the brigade chemical officer; ALO from the TACP; NGLO from the SFCP; and RAS, host country, and third country liaison officers.

6-4. Field Artillery

a. *Consideration and Applicability.* The following guidance, based on the employment of infantry division artillery in a riverine environment, is applicable to division artillery of other types of divisions and nondivisional artillery units operating in this environment.

b. *General.* Artillery units, employing normal procedures, provide fire support to all echelons of the riverine force. Independent fire direction by batteries is a normal procedure in riverine operations. Exploiting all means of mobility is a key factor in planning and conducting riverine artillery operations. Artillery tactics do not change; however, the techniques of artillery

employment change to fit the existing situation and terrain. The doctrine, techniques, and procedures outlined in FM 6-20-1, FM 6-20-2, FM 6-40, and FM 6-140 and modified by this text apply to artillery operations in a riverine area. Some changes in techniques of employing artillery follow:

(1) Artillery fire support must be available during movement of the maneuver elements. This may require emplacing artillery in firing positions before the maneuver elements move. The artillery movement requires security elements from the supported unit and support from other artillery units and tactical air or Army aviation units.

(2) Artillery organization for combat is commensurate with the needs of the operation and the availability of artillery units. In riverine warfare an artillery battalion may support a maneuver battalion independently. Scarcity of adequate position areas may prevent using the quantity and caliber of artillery indicated by enemy strength and area characteristics.

(3) Field artillery units must be prepared to occupy small insecure position areas.

(4) Artillery batteries prepare to use all available means of transport during any one operation.

(5) The primary mission of artillery is to support the operations; however, batteries may provide area support as a secondary mission.

This secondary mission requires the immediate readiness of batteries to support any friendly forces within range.

(6) Lack of positions in defilade, lack of cover and concealment, and positioning in an unsafe area necessitate preparation for direct fire techniques and use of antipersonnel ammunition for local security. The supported unit augments the artillery unit's local security elements.

(7) Artillery's lack of survey and meteorological data may prevent its delivering accurate fires without adjustment (registration). The division artillery meteorological section may employ two- or three- man teams equipped with visual siting instruments in support of each direct support battalion. These teams can provide wind direction and speed data up to the cloud cover and also surface temperature and humidity readings.

c. Positioning Artillery Units.

(1) When performing a base defense mission, the battery position facilitates—

(a) Defense of the base area and all watercraft. Positions selected for defense of base areas insure direct fire coverage on avenues of approach including canals and rivers. They also facilitate loading on watercraft for movement. Maneuver battalion radar sets assist in providing surveillance along the perimeter of the afloat- or land-base defense system.

(b) All-round defense of the battery position area.

(c) Resupply of ammunition.

(2) The scarcity of good dryland positions with dispersion laterally and in depth in riverine areas necessitates maximum use of canal banks, riverbanks, and roads when artillery is not firing from watercraft. Normally, artillery cannot collocate with the combat base; however, positioning to facilitate the provision of fire support to all units has first priority. When possible, batteries are positioned within range of one another to facilitate massing of fires and the firing of planned mutual defensive fires. Positions are selected to support the riverine force during movement to, within, and return from the AO.

d. Reconnaissance, Selection, and Occupation of Position.

(1) Watercraft provide normal artillery movement in the riverine environment. (Current manuals adequately cover procedures for land and air movement.) Artillery movement may precede the supported maneuver force movement and, if possible, over a different

route. Modifications of normal reconnaissance, selection, and occupation of position (RSOP) procedures and techniques for use in riverine environments follow:

(a) Helicopters, when available, transport the reconnaissance party along the movement route, to the selected positions, and return along the withdrawal route. The reconnaissance party accompanying the battery/battalion commander will be smaller than normal when using helicopter transport.

(b) When the enemy situation permits, assault support patrol boats (ASPB) may be used to perform reconnaissance missions. Reconnaissance party personnel performing reconnaissance of a waterborne position normally will not go ashore. However, a check on the formation of riverbanks and the depth of the water at the shore is necessary.

(c) Since water movement is normal in a riverine area, the reconnaissance party, when moving by boat, includes the Army boat commander or platoon leader. During reconnaissance of the position, locations will be selected for each firing battery, the battalion headquarters, Navy escort boats, and Army boat company administrative boats.

(2) Each artillery unit prepares detailed standing operating procedures (SOP) for conducting RSOP using all means of transport. The riverine force commander allocates boats (armored troop carriers (ATC), ASPB, monitors, refuelers, and combat support boats) to artillery units for escort during movement and security of position area. Navy LCM boats are utilized normally to support the artillery in position and during moves.

(3) During all movements, battery commanders/executive officers (XO) and boat commanders independently and continuously maintain an awareness of boat position and verify it with each other to insure accuracy of its location in preparation for an emergency occupation of a firing position. Fire direction center (FDC) personnel plot suspected targets and known locations from which to transfer firing data to assist the unit in providing fire support during the movement.

(4) Air and artillery support, air observers, and radio retransmission are SOP for all artillery movements. Naval elements, armed helicopters, other artillery, tactical air, and host country forces may provide support and route security on request.

(5) Buoy markers, attached to watercraft, assist underwater recovery of equipment when

watercraft sink.

e. Defense of the Battery Position Area.

(1) Plans for defense of the firing position include close-in defensive fires, coordinated with a mutually supporting battery or battalion, when possible. Positioning of artillery pieces provides for covering avenues of approach into the firing position with direct fire, using antipersonnel ammunition. Defensive plans include the use of claymore mines, flame field expedients, trip flares, hand-held flares, radar, and seismic intrusion devices.

(2) Battalion/battery personnel can perform duties as security guards when the environment prevents their employment at their primary tasks.

(3) Searchlight sections and air defense artillery in a ground support role may augment organic weapons in the defense of the position.

(4) Available military and civilian police or security guards control and direct traffic near the battery area. In a host-guest environment, coordination with host country officials and their U.S. liaison officers or advisers will be necessary.

(5) Adequate countersurveillance measures commensurate with the enemy surveillance and detection means must be provided. Camouflage and communications security techniques are the minimum requirements to reduce vulnerability.

f. Observation, Fire Direction, Survey, and Ammunition.

(1) Increased emphasis on air observation is necessary in the riverine environment, particularly during all waterborne movements. A lack of commanding terrain necessitates air observation in the AO. The coordination of air observers with FO on the ground insures the best artillery coverage, coordination, and surveillance of the area. The artillery headquarters battery observer and uncommitted liaison officers and firing battery observers may be used as air observers.

Division artillery aircraft may be used to accomplish this mission, or the observer may ride with the airborne FAC. When trained in adjustment of indirect fire procedures, the FAC may perform this mission to augment the field artillery air observer. Air Force or Marine Corps FAC and Army observer aircraft over the area are coordinated to provide continuous air observation of the area to detect enemy targets. Air observers become familiar with the AO before the operation to improve their effectiveness for both air and ground operations.

Observers can become oriented with the AO by flying with visual reconnaissance (VR) pilots during regularly scheduled flights, thus preventing an increase in air activity over the AO. VR pilots identify friendly villages and likely target areas to these air observers.

(2) The RAS has no organic observers to adjust the gunfire support that it provides during operations; therefore, artillery FO adjust RAS fires and artillery fires. FO require training in adjusting RAS fire. SOP will be established for procedures, frequencies, and circuits for obtaining and adjusting RAS fire.

(3) Fire direction and fire planning follow conventional methods. Battalion controls fire direction when possible; however, widely dispersed operations and special task assignments may dictate fire control and direction by battery. SOP must be established to provide procedures for special corrections as requested by FO where required by the restricted nature of the terrain in the position or target area where friendly and enemy elements are in close contact, which may be the case in an encirclement operation.

(4) Specialized uses of fuzes and projectiles are as follows:

(a) *Smoke.* In addition to providing a screen to conceal friendly movements, smoke rounds can be used when white phosphorus (WP) is not available for marking rounds.

(b) *WP.* The use of WP as a destructive means is limited in a riverine area. However, the use of airburst WP for marking rounds in adjusting artillery fire near populated areas reduces physical property damage and injuries to both friendly forces and the civilian population. WP is also very effective as a navigational marking round when fired to burst high in the air.

(c) *VT fuze.* The variable time (VT) fuze normally is more effective than fuze quick against personnel in this environment. Fuze VT may prove particularly effective for H&I missions, along trails and small waterways, for fires to block the enemy in tree lines until the maneuver elements can be inserted, and on the rare occasions when the enemy is caught in the open.

(d) *Concrete-piercing and delay fuzes.* When the enemy fight from strongly fortified positions, the use of concrete-piercing fuzes or delay fuzes is required. Special procedures for destruction missions may be used to facilitate the complete destruction of the fortifications.

(5) A secondary mission to provide fire sup-

port to friendly forces requires the mutual exchange of call signs and radio frequencies with U.S. advisers or liaison officers in the area. An area support mission may require an aircraft and an observer on ground alert to adjust fire.

(6) The division artillery's distance measuring equipment (DME) can provide survey data to firing points if survey control is available. Liaison with U.S. advisers or liaison officers to local country governmental officials may reveal survey control points (SCP) as carefully surveyed public buildings. Survey parties, augmented with security forces and using boats or helicopters, can establish SCP. Lack of survey control probably will necessitate the use of observed firing charts or map firing charts. Small teams of battalion survey personnel at battery can establish common direction by simultaneous astronomical observation to assist in massing fires.

(7) Methods of employing the countermortar radar include—

(a) Mounting aboard the brigade personnel barracks ship (APB).

(b) Transporting forward to a selected ground position in the AO.

(c) Emplacing on a tower at the land base.

6-5. Barge-Mounted Artillery

Barge-mounted artillery is one of the best methods of providing artillery fire support during riverine operations. LCM, tugs, or other suitable craft are employed to tow barges transporting two 105-mm howitzers, ammunition, and gun crews into position to support operations (fig 6-1). Construction of these barges permits the howitzers to fire from the barge with negligible shifting as a result of recoil, even when fired at low elevations. LCM are used to displace the barges to firing positions. Additional LCM provide waterborne facilities for the artillery battalion CP, FDC, and aid station; battery CP and FDC; ammunition resupply; and damage control. Other watercraft at the position normally consist of 155-mm howitzers mounted in LCM, the brigade CCB, a helicopter (HELO) barge, and a refueler (fig 6-2).

a. Firing positions for barge-mounted artillery are readily available, and occupation of the positions presents few problems. Desirable qualities for position areas are—

(1) Steep banks below the surface of the water to decrease listing as the tide fluctuates.

(2) Wide expanse of water to the front and open areas to the rear to reduce the danger

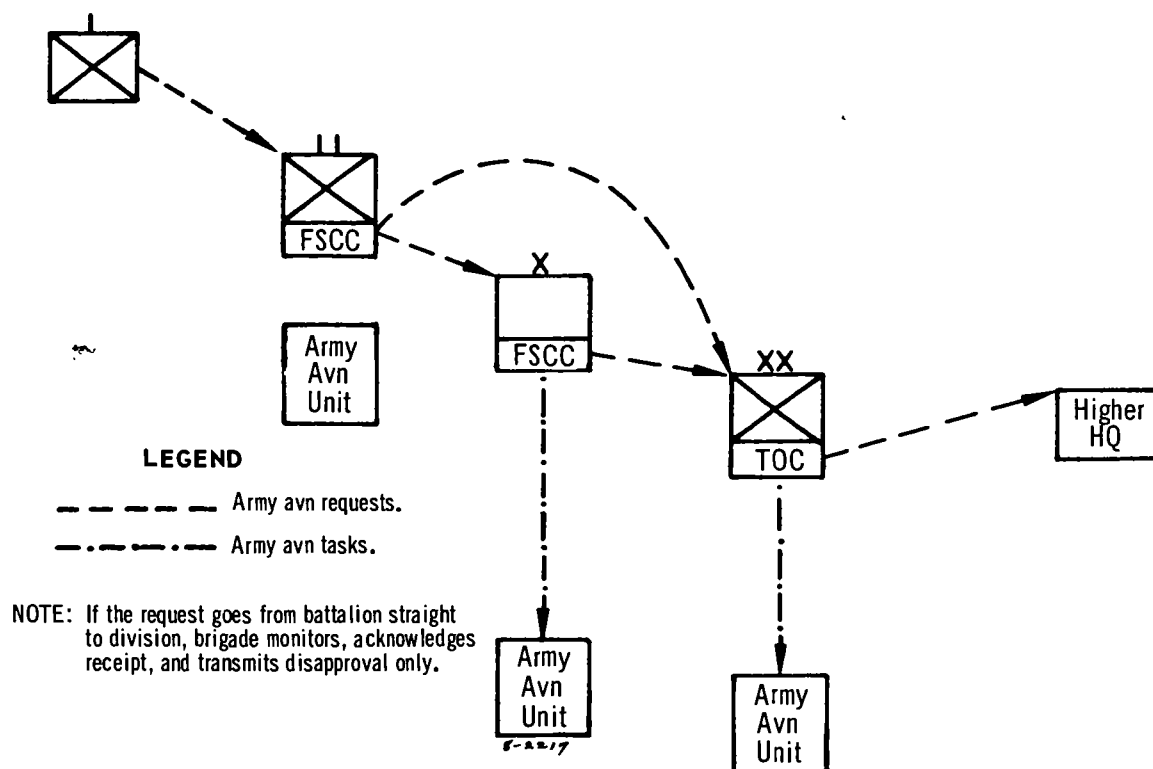


Figure 6-4. Direct aerial fire support request channels.

of hand grenade and small-arms attack and to provide clear fields of fire for artillery anti-personnel ammunition fired in defense of the position.

(3) Limited avenues of approach over land. Islands and small peninsulas are desirable, but frequently have undesirable sloping banks.

(4) Avoidance of areas of strong current, when possible, to reduce anchorage problems.

b. Reconnaissance, selection, and occupation of position by bargemounted artillery include the following:

(1) Three to four ASPB minesweeping craft, two to four ATC, and usually one monitor precede the barge-mounted battery/battalion while one combat support boat (retriever) and two ATC(H) refuelers (ATC with helipad) follow.

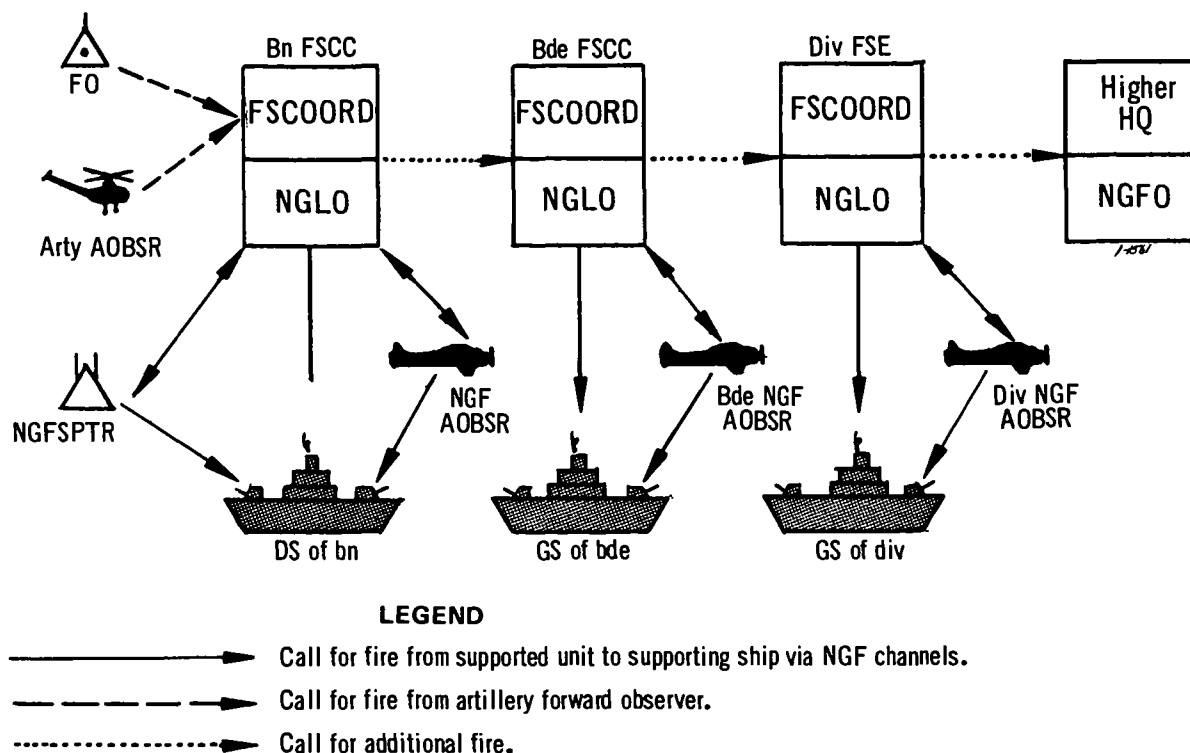
(2) During movement, the artillery barges are so secured to the LCM that the howitzers are in position to fire on each shore in a direct fire role. The preparation and placement of ammunition at each howitzer assist in quick reaction to ambushes. The barges are also tied to the LCM so as to facilitate movement into position and to immediately deliver direct fire into the position area if it is occupied by the enemy.

(3) Artillery pieces remain on barges because the barges have aboard all that is required for the artillery unit to provide fire support. The firing batteries move to a new position when they can no longer provide fire support from the original position. Movement by echelon will provide the displacing battery a quick artillery fire channel to the remaining batteries in case the new position area is occupied by the enemy.

(4) The time available determines whether reconnaissance is deliberate or hasty. In the hasty reconnaissance, the reconnaissance party, riding aboard an ASPB at the head of the column, will at some point along the route move forward of the main body and perform necessary reconnaissance. In the deliberate reconnaissance, the reconnaissance party will conduct the reconnaissance before the firing elements displace.

c. Requirements for the security of barge-mounted artillery battalion/battery follow:

(1) The Army riverine force commander normally assigns one infantry company as security for an artillery battalion. The company travels with the Navy escort during displacement. During occupation of position, the compa-



NOTE: NGLO/NGFO will monitor and coordinate all calls for fire from air and ground NGFSPTR.

Figure 6-5. Naval gunfire request channels.

ny sweeps the shoreline, sets up defense positions on the flanks, and places listening posts in front of the positions.

(2) The RAS commander provides Navy ASPB, ATC, and ATC(H) for the artillery escort during displacement. After displacement, these craft remain in the position area. Their security missions are to patrol the waterways; cover the far shore; and, with their direct fire weapons, to provide flanking fires in front of the infantry.

(3) Plans are made for barge-mounted howitzers to cover by direct fire the area on shore in front of the position.

(4) Concussion grenades and ¼-pound blocks of explosives are dropped in the waterway at random times and locations to deter attacks by swimmers.

6-6. The 155-mm, Self-Propelled Howitzer Mounted in the LCM

The 155-mm, self-propelled (SP) howitzer can fire from the LCM in the stream or anchored to the shore. Such employment of the howitzer provides medium artillery reinforcing and general support fire capability with the force in the AO. The 155-mm, SP howitzer maintains a 6,400-mil traverse capability when aboard the LCM and offers armor protection for the crew. The 155-mm, SP howitzer LCM combination does not require additional boat space for prime movers.

6-7. Airmobile Positioning of Artillery

Helicopters may transport artillery units to firing positions within the AO.

a. Displacement by helicopter is a method of deployment; however, temperature, air density, and altitude may limit it and necessitate disassembling howitzers into suitable loads by weight. Some vehicles for surface movement in the AO require deployment by airmobile means. Helicopter deployment would—

(1) Reduce the time that a battery is out of action.

(2) Circumvent the problem of exiting canals and rivers.

(3) Increase the element of surprise. The speed of deployment increases the element of surprise; however, this activity may alert the enemy to an impending operation.

(4) Prevent the possibility of ambush while en route.

(5) Make accessible those position areas that normally are inaccessible from waterways or roads.

b. Airmobile deployment may make the battery an integral defense element of the combat base by positioning it in the combat base area with naval and infantry elements. Such positioning facilitates defense of the howitzers.

6-8. Artillery Mounted in or Transported by ATC or LCM

a. A 105-mm howitzer can fire from a beached ATC or LCM using the techniques described in this paragraph.

(1) Boat cargo capacities, number of boats available, and weight of cargo determine the amount of ammunition carried into the artillery pieces. The ammunition load includes high-explosive (HE), illumination, WP, smoke, and antipersonnel ammunition.

(2) Timbers and sandbags placed in the well of the ATC brace the howitzer and trail spades. The piece is laid over the lowered bow ramp. Additional timbers placed behind the trail spades transfer the recoil to the bulkhead and prevent shifting of the ammunition (fig 6-3).

(3) A combination of winches, cables, and land anchors holds the ATC in position against the shore. Holding the boat in position against the shore and preventing the current from broaching the boat require the attachment of two lines to the stern and two to the bow.

(4) Fire direction at battery may take place from inside a prime mover or aboard a watercraft. The artillery units may not be allocated sufficient boats to transport vehicles to the battery area for use as an FDC. When vehicles are not available, portable radios replace vehicular radios in the FDC. Wire communications between ATC transmit fire commands. Standard fire direction procedures apply.

(5) Both high- and low-angle fires are possible; however, low-angle fires place more strain on the anchor system. Howitzers fire along the center line of the ATC and to the sides within normal traverse limits.

(6) Masking due to trees or vegetation may limit fire support available to maneuver elements. If this masking problem cannot be overcome by high-angle fire techniques, the barges should be anchored on the rear bank of the waterway.

b. Prime movers and howitzers back into the cargo compartment during loading. Loading a 2½-ton truck prime mover and a 105-mm howitzer aboard a single ATC or an LCM requires uncoupling the howitzer and spreading the trails.

Net	VHF FM voice nets															HF AM voice nets				UHF voice	RATT nets			
Station	Div* CG comd (FM)	Flot* comd & con (FM)	Bde* comd 3 (FM)	Bde* O&I (FM)	Bde* admin/ log (FM)	Arty* FD (FM)	Arty* CF (FM)	AF* ln (FM)	RF* com- mon/ helo (FM)	RB* def- ense (FM)	Bn* comd (FM)	Bn* admin/ log (FM)	RAS* per bn (FM)	Aja* unit or host country ln (FM)	Bde* air-ground (FM)	Bde comd 1 (AM-SSB)	Navy comd (AM-SSB)	AF sir req (AM-SSB)	Bn comd (AM-SSB)	AF tac air dir (UHF-voice)	Div op/ intel (HF)	Div admin/ log (HF)	Navy comd (UHF)	Bde comd 4 (GP) (HF)
Bde APB	X	X (NCS)	X (NCS)	X (NCS)	X (NCS)	X	X	X (NCS)	X (NCS)	X (NCS)				X ¹	X	X (NCS)	X (NCS)	X	X ⁴	X	X	X	X ¹ (NCS)	X (NCS)
Bde CCB		X ³	X	X	X ¹	X ¹		X ¹		X ³				X ¹		X	X ³	X		X				
Bde base			X	X	X			X						X ¹		X	X	X			X	X	X	X
Bn APB		X	X	X	X	X	X	X ¹	X	X	X (NCS)	X (NCS)	X	X ¹		X	X	X ¹	X	X ¹			X	X
Bn CCB		X ³	X	X			X			X ¹	X	X	X	X ¹		X	X ³	X	X	X ¹				
Debarked bn			P	P	P	P		P ¹			P	P	P ¹	P ¹		P				P ¹				
Arty CCB		X ³	X	X		X (NCS)	X (NCS)		X ¹	X ¹	X ¹	P ¹	X	X ¹		X	X ³							
Supply ship		X			X				X	X	X	X		X			X						X	
Hospital ship		X			X				X	X							X						X	
Repair ship		X			X				X	X							X						X	
Other boats as required						X ¹			X	X			X				X							
AF DASC or Abn FAC						X ²	X ²	X ²										X ²		X ²				
Each embarked co						P					P	P												

¹ Provided if required.² Air Force-provided.³ Navy operated in wheel house. May be removed into operations center.⁴ May be used to monitor any subordinate battalion comd net.

LEGEND

RF—Riverine force.

RB—Riverine base.

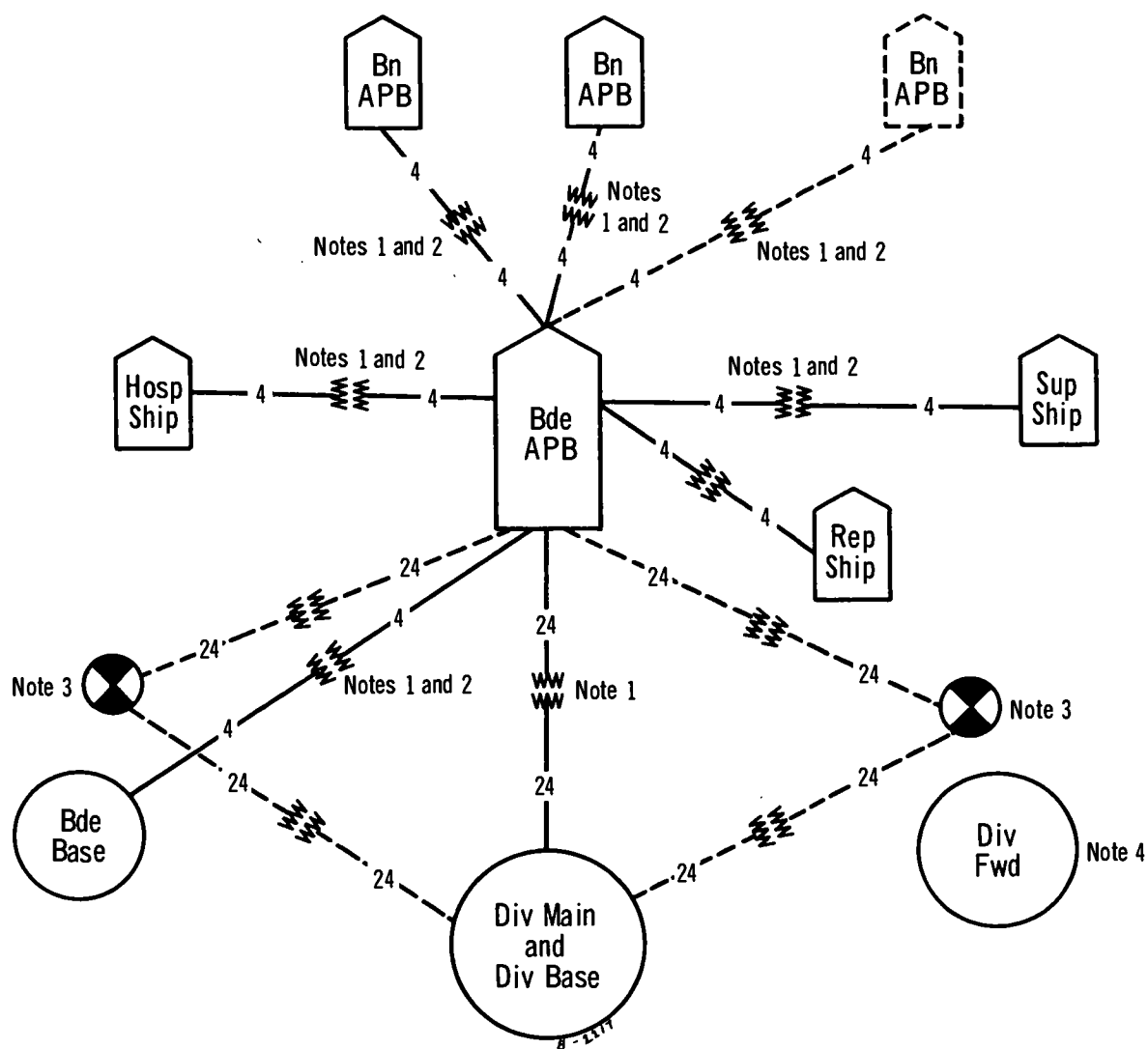
RAS—River assault squadron.

P—Portable radio set.

X—Installed radio set.

*—Speech secure.

Figure 6-6. Typical radio nets for a riverine force.



NOTES:

1. Current multichannel radio equipment to be replaced by new PCM equipment when available.
2. Radio terminal sets AN/GRC-163 are also a possibility if frequency interference does not prohibit.
3. Shore-based multichannel radio repeaters are located on advantageous high ground to insure communications from division to bde APB. Only two repeaters are shown as types.
4. Radio multichannel terminals may operate from division forward if required.

LEGEND





- —Ship or boat.
- —Land base.
- —Operational as required.
- —Multichannel radio repeater.

Figure 6-7. Typical radio multichannel networks for a riverine force.

c. Successful occupation of land positions in a riverine operation using water transport depends on the unit's ability to traverse the canal bank or riverbank. The elimination of some prime movers from the movement and substitution of additional ammunition might be a consideration if boats are not available to carry sufficient ammunition forward on initial occupation. Ammunition resupply is by water or helicopter.

(1) Reconnaissance of the route and selected position provides the following information:

(a) Effects of the tide and width of the canal at debarkation time.

(b) Riverbank or canal-bank obstacles.

(c) Selected points of egress and alternates.

(d) Terrain adjacent to and inland from point of egress.

(e) Suspected enemy areas and likely ambush sites along route and around planned position.

(2) Frequently units will occupy unprepared positions. To facilitate rapid occupation, battery personnel (less howitzer sections, but possibly augmented with personnel from battalion) form six security and pioneer teams. These

teams (one per section) clear the canal bank of natural and manmade obstacles, assist in debarking and positioning the howitzers, and assist in providing security. Batteries prepare for action by piece, organizing the position as the situation permits. The following techniques are employed in the hasty occupation and preparation of position:

(a) Prior preparation of points of egress when possible. Chain saws assist in clearing trees and undergrowth from egress points and position areas. Beach matting, class 30 assault trackway, pierced steel plank, or T-10 membrane provide a stable surface condition for use by the prime movers in debarking the artillery pieces.

(b) Use of winches, blocks and tackle, and Danforth anchors to help prime movers and howitzers exit the canal.

(c) Use of the collimator, infinity aiming reference, to eliminate the need for a stable base for aiming posts at 50 and 100 meters from the piece.

(d) Use of helicopters to shuttle artillery pieces from boat to position areas.

(3) When the M113 armored personnel carrier (APC) is used as a prime mover, additional

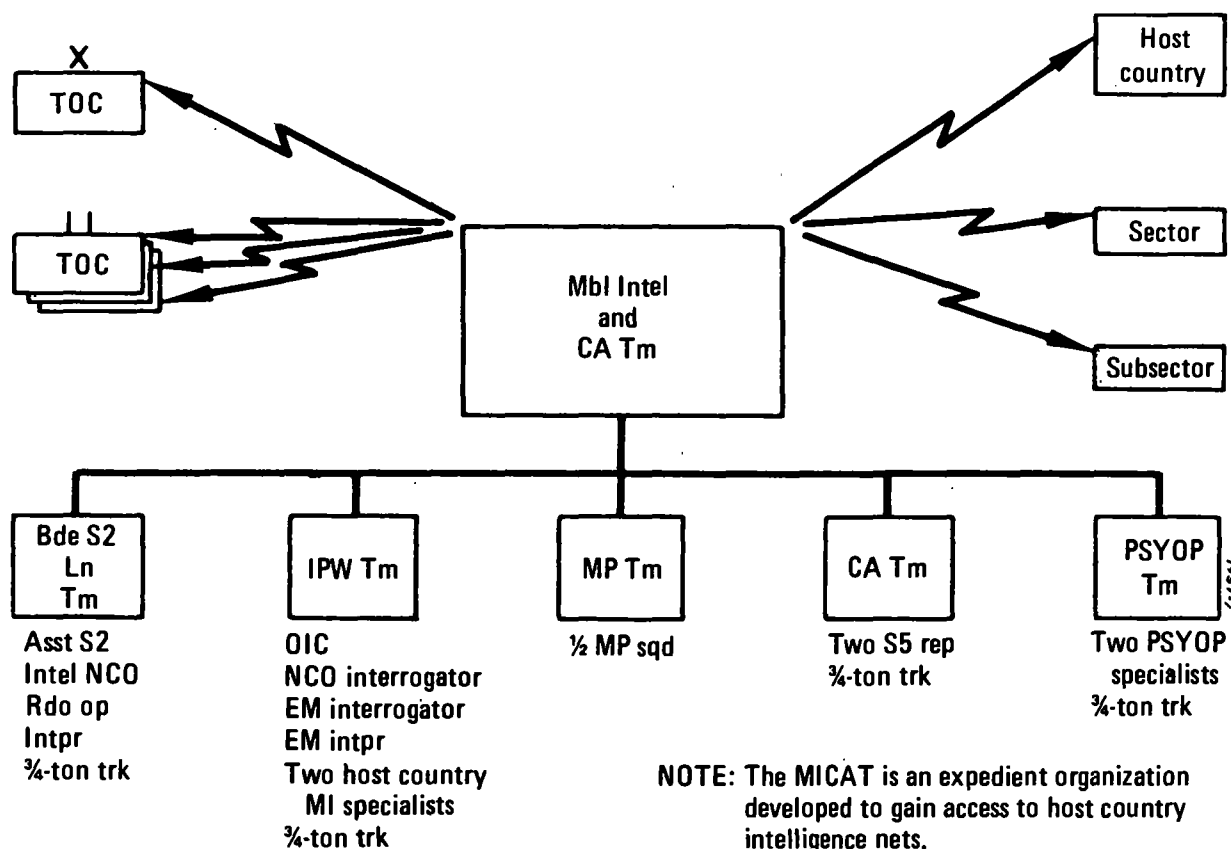


Figure 6-8. Mobile intelligence and civil affairs team.

watercraft may be necessary to transport the piece and prime mover because the M113 weighs almost twice as much as the 2 1/2-ton truck. Studies of performance of currently available vehicles operating in the riverine environment indicate that the M113 performed better than all wheeled vehicles and most amphibians. Advantages and disadvantages of using the M113 versus the 2 1/2-ton truck follow:

(a) *Advantages.* The M113—

1. Is more maneuverable.
3. Climbs canal banks better.
3. Traverses paddies and mud areas better.
4. Provides crew protection against small-arms fire and shell fragments and increases available firepower.

5. Requires less space in the watercraft cargo compartment because it is shorter.

6. Crosses dikes and levees better.

(b) *Disadvantages.* The M113—

1. Has increased weight.
2. Requires increased maintenance.

(4) Dual front wheels installed on 2 1/2-ton trucks provide the capstan part of a capstan and anchor system to assist in climbing riverbanks and canal banks.

6-9. Transporting and Firing Artillery From LARC

The lighter, amphibious, resupply, cargo (LARC) can transport a variety of artillery pieces within weight and space limitations of the vehicle. The LARC family consists of the LARC-V (5-ton capacity), LARC-XV (15-ton capacity), and the LARC-LX (60-ton capacity). The LARC does not have good mobility in some types of riverine terrain; however, it does have good handling characteristics in the water. Artillery can fire from the LARC with equal or better firing capabilities than when the same piece fires from ATC or LCM. The main advantage accruing from this combination is the amphibian characteristics of the LARC, which allow the howitzer to fire while in the stream, during exits from the waterway, and after occupation of the firing position—all while remaining aboard the LARC.

6-10. RAS Fire

The RAS provides direct fire with 20-mm and 40-mm cannons, M79 grenade launchers, 7.62-mm machineguns, .50-caliber machineguns, and 105-mm howitzers. RAS fires require close coordination because of their flat trajectory and range and to assist in the scheme of maneuver.

a. *Direct Fire.* Boats providing direct fire to a supported unit for one or more phases of an operation are normally in direct support. These weapons augment infantry heavy weapons by overhead fire, when possible, and fire to the flanks and through gaps in friendly lines. The use of the .50-caliber machinegun and other heavy direct-fire weapons is restricted in relatively flat terrain because of the danger of ricochets.

b. *Indirect Fire.* Monitors and assault support patrol boats (ASPB) provide indirect fire support for the water movement and the scheme of maneuver after the assault landing. These boats provide fire support independently or in groups. Each one can process firing data independently. When grouped, they constitute a mortar battery in a position area on the waterway. One of the boats can provide fire commands for all others in the position area. Because monitors and ASPB also perform mine-sweeping, waterway patrolling, and fire support missions during movement, their employment in an indirect fire support role depends on the commander's priorities. The RAS liaison officer and the FSCoord recommend employment of indirect RAS fire, based on the commander's guidance. The normal mission assigned to the RAS indirect fire support boats is reinforcing the direct support artillery battalion with short-range, indirect fires.

c. *Techniques of Employment.* Techniques of employment of RAS fires are varied. Some of these techniques are as follows:

(1) Quick reaction to gain fire superiority in an ambush and to neutralize the ambush site. Ambushes of RAS craft may occur at any time during movement between the AO, fire support base (FSB), and mobile riverine base (MRB).

(2) Reconnaissance by fire along the shore in front of the craft when intelligence indicates that the enemy is likely to ambush elements of the RAS.

(3) The continuation of beach preparation by direct fire after the artillery fires have been shifted further inland. The RAS fires are started when the RAS is within range of the beach site and artillery fires have been lifted. The beach preparation is continued until debarkation begins.

(4) Use of flamethrowers mounted on RAS craft to neutralize bunker complexes along waterways.

(5) Security and a floating ready reaction force at the artillery positions and around the

mobile riverine base. The RAS fires and fires from the river assault support squadron provide a rapid means of suppressing enemy fires from ashore. The fires of the RAS task unit assigned to the artillery provide excellent means of covering waterways and flanks.

6-11. Close Air Support

a. General. Close air support (CAS) for units operating in a riverine environment follows current doctrine, principles, and in-country procedures. The U.S. Air Force, U.S. Navy, host country, Allied nations, and/or U.S. Marine Corps may provide CAS.

b. Operations and Considerations. The riverine force uses air/ground procedures that are standard within the geographic area. TACP are provided at battalion, brigade, and division. The direct air support center (DASC) for the geographic area in which the riverine force conducts operations provides tactical air support. FM 61-100 contains details for requesting air support. When controlling tactical airstrikes, FAC are airborne as much as possible. Unique features and requirements of CAS in riverine operations follow:

(1) Effective CAS requires marking friendly elements to insure identification. Standard marking procedures used throughout the area are signals displayed using panels, colored smoke grenades, flares, and lights.

(2) Grid coordinates are necessary when submitting requests for tactical air support. Waterway intersections and river bends used as reference points assist in orienting the pilot. A sharp contrast between land and water exists during dry seasons, but may not exist during the wet seasons. The pilot cannot depend on this contrast to provide positive orientation under marginal visibility conditions.

(3) Because of the type of terrain found in a riverine area and the operating technique used by forces operating in a riverine environment, use of the FAC and ALO by the same unit is desirable. Also desirable is for them to interchange duties occasionally to become familiar with the supported units' SOP and areas of operation. Overall, this system will result in effective use of close air support, will create better working relationships between Air Force and Army personnel, and will make for ease of coordination.

6-12. Armed Helicopter Support

All UH-1 helicopters in an infantry division are armed with two 7.62-mm machineguns

mounted as door guns. The general support company, aviation battalion, has a tactical support section containing attack helicopters armed with combinations of machineguns, rockets, and grenade launchers. Door machineguns are primarily for self-defense; but machinegun pods, rockets, and grenade launchers provide a capability to seek and attack the enemy. Attack helicopters possess an attack capability and provide fire support to maneuver elements. Attack helicopters escort utility helicopters in airmobile operations and also escort and provide armed reconnaissance and flank security for waterborne movements. Aviation elements available to riverine units can extend the range of fire support available to the ground commander. Attack helicopters locate and destroy enemy forces during night operations in conjunction with radar- and searchlight-equipped aircraft. Attack helicopter fires complement other types of supporting fires. Positive identification of friendly elements is necessary before attack helicopters provide fire support. Attack helicopters may be under brigade control or further attached to subordinate elements of the riverine force. Attack helicopters normally are employed as a light fire team of two aircraft and a heavy fire team of three aircraft. The FSCC must be informed of any request for direct aerial fire support to insure that neither the attack helicopters nor artillery interfere with each other. Figure 6-4 shows the channels for requesting this type of fire support.

6-13. Naval Gunfire

a. General. Extensive mudflats and sandbars, which extend for several kilometers into the sea, may prevent large naval ships from providing naval gunfire support to riverine operations. Destroyers or smaller inshore fire support ships may be able to navigate the principal rivers during seasonal floods or peak tidal stages and provide gunfire support. When this support is available, procedures outlined in FM 31-11, FM 31-12, and FM 61-100 apply.

b. Organization. The command echelon that controls and employs naval gunfire includes special staff representation for liaison and naval gunfire support. Personnel are available for liaison and control of naval gunfire at every level from the maneuver battalion to the highest echelon present. Air and naval gunfire liaison company (ANGLICO) personnel may be attached to headquarters at division and above. The duties of naval gunfire personnel include planning, providing information regarding

gunfire support situations and capabilities, coordinating with other supporting arms, and supervising naval gunfire support. The naval gunfire officer serves as a member of the FSCC. At battalion, the SFCP consists of an NGLO and a naval gunfire spotting team commanded by a naval gunfire spotter. This party controls and adjusts naval fires. It may be assigned to the maneuver battalions when naval elements provide gunfire support.

c. Observation and Communications. The SFCP normally provided a maneuver battalion observe and adjust naval gunfire. Direct support ships are in direct support of a specific unit, normally a battalion; and general support ships are placed in general support of a specific unit, normally brigade or larger. Calls for fire may be transmitted directly to the direct support ship by—

- (1) The naval gunfire spotter.
- (2) A naval gunfire air observer.
- (3) The battalion NGLO.

(4) The artillery FO or field artillery air observer if the direct support ship has a radio set capable of entering the field artillery fire direction net. If the ship cannot enter the field artillery fire direction net, calls for fire may be passed from the FO or air observer to the direct support ship via the field artillery and NGLO at the maneuver battalion FSCC. If naval gunfire support in addition to that available from a direct support ship is required, a request must be submitted to NGLO at successively higher echelons until it reaches a level

at which a naval gunfire support ship is available to fulfill the request. Figure 6-5 shows naval gunfire request channels.

6-14. Riot Control Agent CS

a. Agent CS can be used in riverine warfare for direct target effects in the following tactical applications:

(1) Attack targets containing enemy troops and civilians where minimum destruction of civilian structures is desired.

(2) Rout enemy troops from bunkers, caves, buildings, foxholes, tunnels, and similar strong-points.

(3) Suppress enemy fire.

(4) Break contact with the enemy.

(5) Support friendly troops when the enemy is too close to permit friendly troops to use HE munitions.

(6) Defend barge-mounted artillery position.

b. Agent CS can be employed for residual effect in riverine warfare identically as in conventional ground warfare. This includes—

(1) Restricting the enemy's use of land base camps, safe havens, and assembly areas.

(2) Restricting the enemy's use of dug-in positions along riverbanks that could be used for ambush positions.

(3) Harassing and interdicting enemy land lines of communications (LOC), infiltration routes, and supply routes.

c. Detailed information on tactical employment of riot control agent CS can be found in FM 3-2 and TC 3-16.

Section II. ENGINEER

6-15. General

Engineer support is essential in a riverine environment with restricted LOC; frequent obstacles and barriers; and a requirement for many rafts, boats, and temporary bridges. In a riverine environment, the engineer battalion's tasks are more diverse than in a conventional environment. Normally, engineer units operate under centralized control when the situation permits. As units disperse and as support requirements increase, decentralization of engineer activities may become necessary. Classification of local bridges may determine the equipment that supports operations. Storage space for engineer equipment and construction material is limited.

6-16. Special Requirements of Riverine Operations

Commanders modify engineer operations in a riverine environment to accomplish special requirements:

a. Construction and maintenance support to keep the limited and vulnerable LOC open. This mission may require construction of temporary bridges and ferries.

b. Production of sufficient quantities of potable water and construction of adequate storage and collection facilities for it.

c. Technical advice in the construction of barriers, obstacles, berms, and fortifications in the land and afloat base areas.

d. Collection of engineer or allied intelligence. This mission includes maintenance of liaison with host country engineer units to assist in collection of engineer intelligence.

e. Preparation of landing sites on riverbanks to facilitate exit from the waterway. Organic engineer raft components transport heavy equipment and supplies across rivers, streams, and canals.

f. Preparation of helicopter landing sites on land and floating helicopter landing pads on rivercraft.

g. Demolition support to construct helicopter LZ to deny, destroy, or seal enemy caves, tunnels, and bunkers.

h. Engineers provide technical advice and assistance in mine/countermine applications. Engineer teams accompany land convoys to assist in mine clearance. Engineer teams may also assist in the clearance of naval-type mines from navigable waterways. However, naval explosive ordnance disposal personnel train these engineer teams before they are assigned this mission.

i. Detection of enemy arms and munition caches.

j. Construction of protective storage and shelter facilities that unusual drainage and moisture problems necessitate.

k. Production of map substitutes requiring updated imagery where waterways change constantly and cannot be mapped accurately. Making gridded air mosaics available to ground, air, and naval elements assists in ground orientation. The engineer photomapping company (TOE 5-308G), organic to the engineer topographic battalion, can provide map substitutes.

6-17. Intelligence and Reconnaissance Support

The criticality of terrain intelligence and route reconnaissance in a riverine area places unusually heavy demands on engineer reconnaissance elements. Air and boat reconnaissance also can produce significant intelligence information. Army engineers coordinate with the Navy on these surveys and assist the Navy in marking channels and other activities necessary to aid navigation. To assist in maintaining control of the waterways, army engineer units must—

a. Determine waterway characteristics. Reliable information of the characteristics of waterways is necessary to their proper use. This information must be gathered continuously because waterway characteristics change constantly with the tides and season. Special engi-

neer units, such as the engineer military hydrology team (TOE 5-540G), can supply timely and accurate information to include studies of hydrologic and hydraulic factors involved in riverine warfare and predictions of river stages and discharges of natural and artificial floods. This information can be overprinted on standard topographic maps by Army engineer topographic units in the field. Necessary information concerning waterways includes—

(1) Width, depth, and bottom characteristics of waterways.

(2) Velocity and nature of current and tidal effects.

(3) Height, slope, and condition of banks.

(4) Location of obstacles and potential ambush sites.

(5) Location and gradient of possible crossing sites.

(6) High- and low-water underbridge clearance and clearance between piers of bridges.

(7) Characteristics of waterways during periods of heavy rains and flooding conditions.

b. Reconnoiter land areas contiguous to waterways. Engineers surveying waterway characteristics also survey contiguous land areas for type and condition of roads, approaches to waterways, and village locations.

c. Augment the organic topographic capability. Expanded engineer intelligence operations require maximum use of battalion intelligence sections and augmentation of topographic personnel. The attachment of other intelligence personnel to engineer units and the employment of local civilians provide the capability to—

(1) Use indigenous guides and interpreters.

(2) Maintain and update maps, charts, and air mosaics.

(3) Maintain and disseminate waterway data, mark channels, and identify all waterways with legible signs. Street names are a source of identification.

d. Utilize the river survey teams.

(1) The river survey team contributions are significant to operations. The team is normally embarked on river assault craft for each combat operation and major transit.

(2) Initial transit of a river or stream in the area of operations is made by river assault craft at high tide. The river survey team can give an immediate indication of navigability at low tide. This on-the-spot information is extremely valuable to the on-scene commander in deciding where his waterborne patrols can be established and how much support his boats

can provide for the ground troops. Without this immediate information, the commander would have to rely solely on outside sources for trafficability data. In general, outside sources may be unreliable in regard to water depth, stream width, and obstructions. It is not uncommon to find river craft transiting streams described on local maps as navigable to "small craft" only.

6-18. Potable Water

a. Water Sources. Because most delta-type riverine areas are close to the sea, their rivers and streams may be tidal and much of the water is saline and unfit to drink. There are five ways to obtain an adequate supply of potable water:

(1) *Wells.* Although environmental characteristics make digging deep wells difficult, every possible site is investigated. Seepage wells are possible in some locations; and adequate, nearby storage facilities are necessary. The type of storage facility—high tower, concrete storage area, or plastic envelopes—depends on the time that the wells probably will be used. Engineer cellular team GE, well drilling (TOE 5-520G), can drill and develop wells to supply water to users at the wellhead. Well water requires testing and treatment.

(2) *Collection of rainwater.* During the rainy season the heavy rainfall in delta-type environments warrants collection and storing as much rainwater as possible. At riverine land bases, storage facilities should provide each man 5 gallons of water a day. Rainwater must be tested and must be treated.

(3) *Engineer water supply points.* The divisional engineer battalion can operate five water points to produce potable water from fresh water sources for the division. The engineer combat battalion (army or corps) has a similar capability. Engineer cellular water purification teams can produce varying amounts of potable water. A water supply point located at a seepage well produces water efficiently.

(4) *Conversion of saline water to potable water.* Saline water, although not potable, is good for washing, sanitation facilities, and

bathing. When bathing, troops must prevent nonpotable water from entering their mouths. Both the Navy and the Army can convert saline water to potable water.

(a) The distillation systems of the ships in the Navy support squadron can convert saline water to potable water. Each APB can distill 40,000 gallons of potable water a day and can store a 4- or 5-day supply. The APL can distill 24,000 gallons a day and can store 250,000 gallons. In an emergency, a ship can replenish water supplies at land-base facilities. The auxiliary and expedient distillation equipment discussed in TM 5-700 supplements the ships' distilling capabilities.

(b) Team GI, water distillation (TOE 5-520G), can produce 6,000 gallons of potable water from sea or brackish water in a 20-hour period of time. The water purification teams of the TOE 5-500-series can operate the thermo-compression-type equipment required to convert saline water to potable water. Saline water conversion units can be mounted on watercraft, with storage facilities, to provide mobile, potable water production and distribution points.

(5) *Truck or water-barge importation of water.* This method is the least desirable for obtaining potable water because of the additional equipment required.

b. Supply of U.S. and Friendly Forces.

(1) Potable water supply storage is critical. A ship may fill a land-base water storage facility initially; however, after adequate storage and entrapment facilities have been constructed, a ship replenishes these supplies only in emergencies.

(2) Water supply points normally are not established at wells that are a primary source of water for civilians. Close coordination with local officials insures an adequate supply of water to friendly forces and the denial of potable water to enemy forces.

c. Denial to Enemy Forces. Enemy forces may depend primarily on the entrapment of rain and boat importation of water for their supply. Eliminating stored water or adding chemicals whose odor or taste makes the water unpalatable are means of denial.

Section III. COMMUNICATIONS

6-19. General

This section provides information on those aspects of communications peculiar to the employment of maneuver elements on afloat bases and land bases, during waterborne move-

ment, assault landings, and subsequent operations. Established communication procedures and principles in current field manuals apply in a riverine area. This operational environment, which places additional demands on the resources of the division signal battalion and

the communications platoons organic to the brigade and maneuver battalion, requires certain techniques not normally used. Emphasis is on required communication during all phases of troop deployments—waterborne, overland, air-mobile, and airborne operations. Communication considerations applicable to riverine operations are—

a. The requirement for flexible communication support for brigades and battalions operating in a larger than normal area.

b. The requirement for increasing the brigade's communication capability and for organizing a self-contained, area-type communications system within the division area system.

c. Reliance on portable radio equipment by maneuver battalions after landing. The requirements for battalion wire communications personnel may be reduced.

d. The requirement for extensive signal planning and coordination with higher, adjacent, lower, and supporting units and with U.S. advisory and liaison teams, host country, and Allied military forces. Division and brigade staffs are the primary communication planners. This planning includes the continual evaluation of very high-frequency—frequency modulated (VHF-FM) and high-frequency—single-side band (HF-SSB) radio teams provided by the division signal battalion to support offensive operations.

e. Knowledge of naval communications organization and network structure. Familiarization with the operation of naval communications equipment used by embarked Army troops may be required. The limited flexibility of installed fixed-plant type of wire communications aboard APB and APL requires alteration of normal procedures.

f. Thorough knowledge of the location and capabilities of area signal centers established by higher echelons in the riverine area. These centers provide multichannel radio-relay communication links and retransmission stations when organic capabilities are overcommitted or require augmentation. The afloat-based riverine force completely depends on radio for communications with units or headquarters outside the base area.

g. Increased maintenance and waterproofing requirements for all communication equipment.

h. Use of both rotary- and fixed-wing aircraft for radio relay, particularly during movements.

6-20. Communications Security

a. Communications security (COMSEC) is the

protection resulting from all measures designed to—

(1) Deny unauthorized persons information of value that might be derived from the possession of communication equipment and study of friendly telecommunications.

(2) Mislead unauthorized persons in their interpretation of the results of such a study.

b. The objective of COMSEC is the effective and efficient application of security procedures to avoid compromise of sensitive information. COMSEC must be considered during the planning phase of any operation. Security measures for the protection of military information, equipment, and materiel include defense against capture, observation, photography, theft, interception, direction finding, traffic analysis, enemy intrusion or imitative deception, and personal carelessness and laxity.

c. COMSEC includes cryptosecurity, transmission security, and physical security of COMSEC materials, equipment, and information.

d. The commander is responsible for COMSEC. He states general principles to insure COMSEC in the unit SOP and announces variations from these normal security practices before each operation.

e. FM 24-1 contains procedures for providing COMSEC. FM 32-5 contains a detailed discussion of COMSEC.

6-21. Type of Riverine Force Communications

From the Army standpoint, the type of riverine force considered for communication planning is a brigade with from two to four battalions.

a. *Afloat Bases.* The afloat base consists of a brigade APB; battalion APB or APL; CCB; and associated supply, maintenance, and hospital ships. The CCB serves as a forward CP with one required for brigade, each maneuver battalion, and the direct support artillery battalion.

b. *Land Bases.* For communication planning, the minimum land bases required to support the riverine force are a division main/division base and a brigade base. The brigade base is comparable to brigade trains less the combat-essential elements that are afloat. Provision is made for incorporation of a division forward CP when and if required.

c. *Interconnecting Communications.* Radio and multichannel radio links connect land and afloat bases, ships and boats operating on the waterway, ground forces, and security forces. Figures 6-6 and 6-7 represent a brigade communication plan.

6-22. Communication Equipment

a. Normally the communication equipment that Army personnel use aboard the APB, APL, and CCB of the riverine force is permanently installed. This equipment is Navy-provided and part of the ship's design. It may be a mixture of Navy (primarily), Army, and Air Force equipment and will net with similar Army equipment ashore. This communication equipment is not the normal tables of organization and equipment (TOE) authorization of the Army units aboard ship.

b. Brigade units normally keep the TOE or modification table of organization and equipment (MTOE) aboard the APB or APL or at the land base. Typical items of equipment kept on the afloat base are portable radio sets for use by debarked forces, telephones to augment APB and APL facilities or for shore operations, and field wire required for shore use.

c. When APB, APL, and CCB lack necessary communications equipment installed for riverine use, special arrangements by joint Army and Navy agreement may be necessary. Ships and craft may be outfitted largely with brigade and battalion TOE signal equipment or equipment obtained by special authorization. This may involve the dismounting of equipment from organic vehicles, in which case the contributing organization must be augmented accordingly. Necessary electrical power for the Army communication equipment is ship supplied.

6-23. Radio Communications

a. A typical radio communication plan for a brigade is shown in figure 6-6. Emphasis is primarily on the communications required by the Army forces; however, the flotilla command and control net and the RAS net (both Navy) are included since their traffic is of direct interest to brigade and battalion commanders.

b. Because of the large number of radio sets aboard the various ships and boats, especially the brigade and battalion APB, some type of antenna-patching or an antenna-switching facility is necessary. Such a system assists in overcoming the radiation problems that occur in a crowded shipboard installation. In addition, an antenna-patching system serves as a positive measure of systems control and facilitates the exercise of radio net discipline.

6-24. Multichannel Radio Communications

A typical multichannel radio communication plan for a brigade is shown in figure 6-7.

a. *Ship-to-Shore Communications.*

(1) A typical radio multichannel network from division main/division base to the brigade APB requires 24 channels. The brigade CP ashore (or brigade rear) normally is linked by the division multichannel network to the brigade APB. Provisions are necessary to extend a minimum of four-voice channels from the brigade APB to a brigade forward CP, when established. These networks provide common- and sole-user voice and the necessary teletypewriter circuits. Division main and division base are presumably collocated.

(2) When a division forward is established and communication personnel and equipment permit, a second 24-channel network to division main/division base will be installed. Communications between division forward and the brigade APB may then be provided by "stopping three" selected channels at division main/base.

b. *Ship-to-Ship Communications.* Separate four-channel terminals aboard the brigade APB provide common- and sole-user voice and teletypewriter circuits to four-channel terminals aboard each battalion APB and each essential combat service support ship. This communication equipment is not normal TOE authorization of the division/brigade signal organization. Experience indicates that a hospital ship, supply ship, and repair ship are minimum essential support ships for a riverine force of brigade size.

6-25. Division Signal Battalion Support

a. *General.* The many variations possible in riverine operations prevent establishment of rigid guidelines for the employment of division, brigade, and battalion communications systems. However, division communications as described in FM 11-50 generally remain applicable for the organization and employment of the division signal battalion. Resources of the forward communications company are required for direct support to brigades and battalions with assistance from the remainder of the signal battalion as required.

b. *Division Main/Division Base.*

(1) Elements of division headquarters company and support command are located at division main/division base and use the communication facilities organic to the command operation and signal support operation companies. This complex requires entry into an area communications system or equivalent communications network to provide contact with the next higher headquarters. These facilities are provided by the next higher headquarters.

(2) The tactical situation, units in the division base, and the additional facilities required for riverine operations determine the supplemental communications center service required from the command operations and signal support operations companies. For example, if an ACC is established near the division base, demands for supplemental communication center service will increase.

c. Brigade Support. The division signal battalion organizes and trains mobile radio teams equipped with HF-SSB voice or VHF-FM voice radio sets. These radio teams are either motorized or equipped with portable equipment to augment the facilities of maneuver battalion headquarters and certain liaison teams—the liaison teams to host country, U.S., or Allied military forces. Elements of the forward area signal center platoon and one forward command terminal section of the forward communications company normally provide communication support to a brigade. The division signal battalion may require augmentation to provide this support.

6-26. Brigade Communications

a. Afloat Base.

(1) *General.* When a brigade operates from an afloat base, the brigade headquarters and other personnel are assigned to and billeted aboard an APB. This ship also serves as the flag ship for the naval river assault flotilla commander. Communication facilities to satisfy both the flotilla and brigade commander's requirements for all aspects of command control and support during riverine operations are necessary.

(2) *Shipboard communications.* Typical communication facilities installed aboard a brigade APB are shown in figure 6-6. This shipboard communication facility provides the necessary means to maintain all required radio nets, to operate a telephone exchange, and to establish a communications center with teletype terminations. Brigade organic and attached signal elements may require augmentation to operate this shipboard system. Communications are established with base security forces ashore and with brigade command elements operating aboard a CCB. A VHF multichannel radio to a land-based area signal center terminates on board the brigade APB. This multichannel link gives the brigade commander aboard the APB 24 voice channels for entry into the area or division communications system.

b. Land Base.

(1) *General.* Riverine land-based internal communication installations are similar to those facilities normally provided in a semipermanent conventional military camp or garrison containing a part of the division. External communications from a land base to higher and lower headquarters are operational requirements; therefore, they take precedence over the installation and operation of an internal communications system.

(2) *Land-based communications.* Brigade elements and their organic and attached or supporting signal units normally are adequate to operate and maintain land base facilities required for all forces attached to the brigade. The time available and the communication facility already in operation determine the elaborateness of the communications system established in a land base. Supplemental internal communication considerations as described for the afloat base apply equally to the land-based complex. Wire is the primary means for internal base communications. Camp security outpost positions and airstrip facilities require radio backup.

c. Brigade Command and Control Communications.

(1) *Command helicopter.* During combat operations, the brigade commander normally commands from a command and control helicopter. The Navy commander also may operate from this aircraft during RAS operations. Communication equipment installed on these helicopters varies in quantity and composition. Current production models contain from two to four VHF (FM) voice radios, and some models have an additional UHF (AM) radio for air controller use. Similar equipment, in a slightly different configuration, is also available for airborne FM automatic voice retransmission in support of riverine operations.

(2) *Brigade CCB.* A CCB is available to establish a waterborne brigade forward or a tactical command post. This boat has the communication facilities that the brigade and flotilla commanders need to control the RAS and movement of the embarked Army unit to the objective area. The CCB may also be a communication radio retransmission station, if necessary. The brigade CCB is sufficiently equipped to permit entry, as required, into radio nets as shown in figure 6-6.

6-27. Battalion Communications

a. Afloat Base.

(1) *General.* Normally, one infantry battalion headquarters is located on an APB or an APL.

(2) *Shipboard communications.* A battalion APB is sufficiently equipped to permit entry, as required, into radio nets as shown in figure 6-6.

b. *Battalion Command and Control Communications.*

(1) *Command helicopter.* The use of helicopters and the communication facilities available is the same as for brigade command and control helicopters (para 6-26c(1)).

(2) *Battalion CCB.* The use of a CCB and the communication facilities available to the battalion and RAS commanders is the same as for brigade and flotilla commanders (para 6-26c(2)). In addition, the battalion CCB radios may relay requests for supporting fires and may transmit adjustments. The battalion CCB is sufficiently equipped to permit entry, as required, into radio nets as shown in figure 6-6.

c. *Debarked Battalion.* Once ashore, the debarked battalion headquarters operates in the radio nets shown in figure 6-6.

d. *Embarked Company.* En route to its land objective, the embarked rifle company has a requirement to operate in the radio nets shown

in figure 6-6. Once ashore, the company uses radio nets as directed by the parent organization signal operation instructions (SOI).

e. *Heliborne Infantry Battalion Communications.* Communication doctrine and techniques prescribed for conventional airmobile operations are applicable to airmobile operations in the riverine environment. However, when airmobile units operate more than 20 kilometers from base areas, they need a man-portable HF SSB, continuous wave (CW), in addition to TOE allowances.

6-28. Artillery CCB

Artillery CCB operate in VHF FM voice nets and HF AM voice nets as shown in figure 6-6. The artillery CCB or LCM(8) may require additional radio sets for essential fire control.

6-29. Other Ships and Boats

a. *Combat Service Support.* Experience indicates that a supply ship, hospital ship, and repair ship are essential combat service support for a brigade riverine force. Minimum essential communication requirements for each of these ships are identical and are shown in figures 6-6 and 6-7.

b. *Other Boats.* Army units use other boats as required (fig 6-6).

Section IV. INTELLIGENCE

6-30. General

a. FM 30-5, FM 32-10, and other field manuals in the 30- and 32- series contain the general doctrine, methods, and procedures directing collection, processing, and dissemination of intelligence. The procedures discussed in these manuals vary in their application in riverine operations. This section contains information on special aspects of intelligence that apply specifically to operations in a riverine environment.

b. In addition to the combat intelligence needed to support offensive operations and base area defense, a requirement exists to support—

(1) Civil-military operations.

(2) U.S. military and civilian advisory assistance programs, when applicable.

(3) Intelligence operations established by higher headquarters.

6-31. Sociological, Political, and Economic Considerations

a. Basic intelligence includes population size and distribution; basic racial stock and physical characteristics; ethnic and minority groups;

social structure; health organization and capabilities; religion, culture, and political tendencies; and organizations in areas adjacent to land and afloat bases and in prospective AO. This basic intelligence assists in the development of intelligence sources in the area and is essential to the success of civil-military operations.

b. Among important local economic considerations are the income-producing activities (agriculture, fishing, etc.), transportation, food supply sources, and living conditions at various social levels. Tactical operations that improve the economy usually result in better intelligence, more successful tactical operations, and less effective enemy activities. Conversely, friendly operations that unnecessarily disrupt or destroy the economy tend to confirm enemy propaganda and to gain local support for the enemy forces.

c. The enemy's use of inland waterways and his attempts to control friendly use of them demand special attention. Barricades or obstacles often may restrict friendly military move-

ment, but allow local watercraft to reach market areas. The enemy infrastructure may restrict or harass movements of food and supplies. The securing of routes for transportation of agricultural products to market becomes important to the local population who depend on the income from the sale of such products.

6-32. Intelligence Collection Considerations

a. Adaptation of Conventional Intelligence Agencies, Sources, and Techniques. Conventional intelligence collection agencies, sources, and techniques are adapted to the riverine environment and the local enemy forces. Procedures that clearly define the responsibility for intelligence collection and exploitation are necessary for all U.S. forces and agencies operating in a riverine area.

b. Sources for Information. In stability operations, host country units, agencies, and individuals may be the primary sources for information about the area. When possible, division tactical units exploit these sources through the U.S. military and civilian advisers working with them. ACC provide a mechanism for quickly obtaining collected information.

c. Tactical Air Reconnaissance and Aerial Battlefield Surveillance.

(1) Visual air observation provides responsive and detailed surveillance of a riverine area to detect enemy activity. As an observer becomes more familiar with an assigned area, he can more readily detect changes in the topography and evidence of enemy activity (obstacles on land and water, LOC, land and water traffic, fortifications, weapon emplacements, and propaganda displays). Air observation can continue during darkness, by using night vision devices.

(2) Because of the contrast in riverine topography between wet and dry seasons, aerial photography updates existing maps and produces map supplements for tactical unit commanders down to the platoon/boat level. Aerial photography, particularly during periods of low-water level, may identify the main channel of waterways and obstacles—fishtraps, sandbars, water vegetation, entrapped debris, and enemy-emplaced obstacles. Aerial photography, utilizing a photo flasher system, provides a capability for night surveillance along the LOC. Night photography, however, has the disadvantage of requiring visible artificial illumination. Comparative photographic studies often detect enemy activities and as the imagery interpreter becomes more familiar with the area, he can

readily detect the evidence of this activity and note any changes in topography.

(3) Side-looking aerial radar (SLAR) is well suited for near all-weather comparative coverage of large areas and for surveillance of linear distances such as coastlines and international boundaries.

(a) When a data transmission capability exists, the SLAR required information can be transmitted to a ground sensor terminal for processing and viewing in near real time.

(b) Limitations exist in the resolution of both moving and stationary targets with the SLAR system. Boat traffic cannot be identified as to size, shape, or type. SLAR imagery cannot detect or identify small stationary tactical targets against a land background.

(c) Fixed target imagery from a SLAR can provide readily available, accurate mapping of uncharted areas or areas previously mapped inaccurately. (Silt constantly changes the configuration of islands, channels, and beaching locations along major waterways and coastal areas.) Although radar mapping cannot be used when great detail is required, it does afford up-to-date, fairly constant-scale reproduction of a riverine area.

(4) Infrared imagery, which records thermal emissions, is particularly effective for passive nighttime surveillance of waterways. This type of surveillance may indicate the general size and shape of watercraft. Other infrared targets include heat emissions along LOC and in suspected enemy locations.

(a) The infrared system has limited capabilities for detecting heat sources through heavy cloud layers, dense jungle or tree canopies, or similar heat-absorbing environments.

(b) When employed to detect heat emissions or other activities along riverbanks and trail systems and inland areas, the infrared sensor either complements or supplements other means of surveillance. It may confirm or deny the existence of targets reported by other intelligence sources.

(c) An infrared sensor can readily detect moist areas or hidden streams due to temperature variance.

(d) When the infrared system has an inflight display capability, the information acquired may produce near real time target information in the aircraft. This information may be relayed by voice communications to an appropriate ground or airborne station. When a data transmission capability exists, the infrared acquired information can be transmit-

ted to a ground sensor terminal for processing and viewing in near real time.

(5) The commander employs simultaneous multisensor coverage of the area of interest when possible.

(6) Airborne emitter location and identification systems are excellent means of seeking out enemy transmitters in the flat terrain normally associated with riverine warfare. FM 32-10 contains further information on airborne direction finding.

d. Ground Surveillance and Reconnaissance.

(1) Ground surveillance and reconnaissance are within the capabilities of all maneuver units. They are accomplished either as part of the normal unit SOP or as a result of the commander's specific intelligence requirements. Effective ground surveillance and reconnaissance are difficult in riverine areas because the dispersed and frequently isolated operations often prevent mutual support by units on the flanks and in the rear. Reconnaissance elements may have to perform security-type missions for land and afloat bases and combat bases or serve as a reserve maneuver force.

(2) The employment of ground surveillance devices takes full advantage of their all-weather, day-and-night capability. Surveillance radars, anti-intrusion devices, night vision devices, and searchlights complement human reconnaissance and surveillance. These devices are essential to land and afloat base defense, and they support offensive operations in AO.

(3) Details on patrolling in a riverine area are contained in paragraphs 5-1 through 5-7.

e. Employment of Specialized Intelligence Agencies.

(1) The employment of the military intelligence detachments is similar to that provided in FM 30-9. Tactical requirements for imagery interpreters may increase because map supplement imagery requirements increase.

(2) The United States Army Security Agency (USASA) support company can provide signal intelligence (SIGINT) and electronic countermeasures (ECM) in support of riverine warfare. With the wide dispersion of forces normally found in a riverine area, the exploitation or denial to the enemy of his radio communications can play an important part in combat success.

(3) Special forces detachments operating in the riverine area can provide information and intelligence to the riverine force.

(4) Long-range patrols are discussed in paragraph 5-4.

(5) Combined reconnaissance/intelligence

units composed of individuals from riverine forces and enemy defectors or returnees can be attached to U.S. units or used separately for the collection of battlefield intelligence.

(6) Sea-air-land (SEAL) teams may be available through naval channels for special intelligence missions. The SEAL team may be used to obtain up-to-date intelligence concerning specific landing areas.

f. Mobile Intelligence and Civil Affairs Team. In a stability operation, a mobile intelligence and civil affairs team (MICAT), organized as shown in figure 6-8, may enter the AO before the operation begins. The MICAT collocates with governmental facilities in the AO and obtains information of benefit to the riverine force in planning the operation. MICAT is land based and moves from one area to another in advance of the riverine force to compile intelligence and to plan psychological operations (PSYOP) and civic action operations that will aid the units on arrival in the AO. To prevent disclosure of scheduled operations, the MICAT periodically visits areas where no operations are scheduled.

(1) The duties of MICAT civil affairs personnel include but are not limited to coordinating with U.S. military advisory personnel, other U.S. Government personnel, and local officials concerning—

(a) The present status of political-military in the area.

(b) The status of hamlets/villages in the AO.

(c) A listing of projects that the riverine force can undertake to complement the local governmental revolutionary program.

(d) Locations to conduct medical civic action projects/dental civic action projects (MEDCAP/DENTCAP).

(e) Surveys of areas that may be of special interest to the riverine force.

(2) The duties of MICAT PSYOP personnel are—

(a) To study and analyze intelligence in the planned AO.

(b) To extract from this intelligence information of value in planning PSYOP support for operations.

(c) To interview defectors and prisoners of war in order to collect information on enemy morale, activities, and weaknesses of value in determining PSYOP themes for the particular area.

g. Intelligence Requirements. Examples of

intelligence requirements used by riverine force intelligence agencies are listed below:

(1) Indications of any hostile actions that will be directed against riverine force, watercraft, personnel, or base facilities.

(2) Enemy riverine mining and ambush tactics and doctrine with emphasis on early warning of any such impending actions.

(3) Indications that swimmers are being trained or have been trained for use against the riverine force, craft, or facilities. Where? Unit identifications? How many? How equipped?

(4) Waterway depths, tides, currents, and underbridge clearances under varying seasonal and tidal influences.

(5) Location and description of manmade or natural waterway obstructions.

(6) Location of enemy's munition factories. Details of output.

(7) Attitudes of local populace, local military, and the enemy toward U.S. riverine assault operations in the area.

(8) Locations of the enemy's logistic facilities or arms caches near navigable waterways.

(9) Enemy LOC in the AO with emphasis on waterway LOC.

(10) Locations of enemy tax collection points on navigable waterways.

(11) Locations of enemy river and canal crossing points.

(12) Distances to which assault craft have penetrated any given waterway and at what state of the tide this penetration occurred.

6-33. Security and Counterintelligence

a. Effective counterintelligence increases both the security of riverine forces and the probability of surprising enemy forces. The presence of large numbers of civilians in the area and the difficulty of identifying enemy

personnel among them frequently complicate counter-intelligence activities in riverine areas. The attached USASA unit conducts signal security operations and participates in electronic counter-countermeasures in support of the counterintelligence mission.

b. Counterintelligence operations often rely on information from civilian informants concerning enemy activities—sabotage, subversion, and espionage.

c. Efforts to prevent premature disclosure of tactical operations are difficult. Local civilians, a number of whom may support the enemy forces, constantly observe the riverine force. Increased emphasis is placed on denial measures and deception measures as described in FM 31-16. Every individual and unit in the area not only must understand necessary security measures but also must observe them; counterintelligence specialists, alone, cannot achieve and maintain security of information.

d. Riverine bases are particularly vulnerable to enemy sabotage because of the difficulty of controlling the waterways. A combination of physical security measures, orders, and controlled access to information and installations provides the best defense for bases. Only carefully screened, essential civilians are allowed entrance to land or afloat base areas; and constant control and supervision of them are necessary to reduce sabotage. In primitive areas of the world, essential local hire civilians should be thoroughly interviewed and should be given a polygraph-supported technical interview each 6 months on a recurring basis.

e. Care must be exercised to prevent the enemy force from effectively employing cover and deception techniques against the friendly forces.

Section V. TACTICAL AIRLIFT

6-34. General

Tactical airlift is the means by which aircraft deliver personnel, supplies, and equipment on a sustained, selective, or emergency basis to dispersed sites under a wide range of climate, terrain, and combat conditions (FM 100-26 and FM 100-27). This airlift increases battlefield mobility by air-landing or airdropping combat elements and providing them sustained logistic support. The U.S. Air Force may sustain an air line of communications (ALOC) for Army forces in a riverine area. Army aviation units augment the Air Force capability for move-

ment, supply, and resupply operations; and they support combat elements as operational requirements dictate. Air Force and Army aircraft complement each other in tactical airlift. FM 57-1 and FM 57-35 provide information in airmobile and joint airborne operations.

6-35. Army Aviation Airlift

a. *Airmobile Operations.* Paragraphs 4-7 through 4-13 describe airmobile operations. The division aviation battalion and nondivisional aviation units can introduce troops into an AO rapidly. The division's airlift capability is limit-

ed, however, and operations require careful planning and detailed coordination to be effective. Operations involving the simultaneous airlifting of more than one company requires non-divisional aviation units.

b. Medical Evacuation. Helicopters provide rapid evacuation of casualties from AO. Prompt and speedy removal from land or afloat aid stations can save lives.

c. Artillery Positioning. Helicopters frequently position or reposition artillery and, in some cases, may be the artillery's only means of displacing.

d. Combat Service Support. Often, air movement of essential supplies is necessary to maintain the momentum of offensive operations. Helicopters frequently resupply artillery ammunition in the AO.

6-36. U.S. Air Force Airlift

a. Air forces may be tasked to provide tactical

airlift support to riverine forces. Air forces may operate from airfields adjacent to land or afloat bases or from outside the riverine area. Detailed planning and coordination are essential when using airlift support. Air Force troop carriers deliver airborne troops to an objective area by airdropping or air-landing. When airfields are available, Air Force troop carriers can preposition units and supplies (in coordination with appropriate Army logistic elements) in preparation for future operations. Resupply is accomplished by air-landing or airdropping. An ALOC may have to be used to support riverine operations in some instances. With necessary prior coordination, Air Force aircraft may be used for medical evacuation.

b. U.S. Navy and/or Marine Corps aviation units can provide similar airlift support to riverine forces.

Section VI. MILITARY POLICE

6-37. General

a. Military police support in riverine operations involves increased considerations in the functional areas of traffic control, prisoner of war (PW) and refugee operations, and security of critical areas and supplies. Additionally, support in populace and resources control becomes important because of the semi-independent nature of riverine operations.

b. Military police resources organic to the division may be insufficient to provide the necessary support; therefore, plans for augmentation may be necessary. The riverine force commander normally retains this augmentation under his direct control.

6-38. Traffic Control

a. Traffic control is important in riverine operations because the generally poor road network and numerous small canals hinder combat and combat support elements as they traverse the riverine area. Continuous boat traffic on navigable waterways presents additional requirements for traffic control and may also require special military police support.

b. Traffic control in a riverine area follows the basic principles applied to river-crossing and amphibious operations and the general guidance enumerated in FM 19-25 with the exceptions that—

(1) Flexibility is necessary because of the greater frequency of water obstacles and the generally poor trafficability of the area.

(2) Greater decentralization may be necessary because combat elements are widely dispersed.

(3) Greater than normal resources may have to be assigned to the control of refugee traffic.

(4) Military police elements use patrol river boats (PBR) and amphibious vehicles to provide mobility on the network of waterways in the AO.

(5) The integration of military police elements in advance, flank, and rear guards of water convoys assists them in clearing civilian boats from waterways and inspecting boats when necessary.

6-39. PW Operations

a. The processing and handling of enemy PW conform to the principles and procedures outlined in FM 19-40.

b. Planning for PW evacuation includes a detailed study of transportation used in the operation with special attention to the boat traffic plan. Use of the multiplicity of transportation available in a riverine area increases flexibility and expedites the early evacuation of PW from the AO. When boats are the primary means of evacuating detained personnel, consideration must be given to the modification of an ATC for this purpose.

c. An increased number of civilian detainees may require special consideration for segregation and increased coordination with civil-military personnel.

6-40. Security Operations

a. Military police security operations orient on populace and resource control with special consideration to environmental restrictions.

b. Security operations require advance and continuous coordination with civilian police to restrict indigenous persons from the base area and control their movement throughout the AO.

c. Afloat base security involves consideration of a special traffic plan on the waterways and the use of river curfews and control points for civilian river traffic.

d. Additional considerations are the use of boat patrols to secure LOC and the use of military police on supply vessels to provide added security.

Section VII. ARMY AVIATION

6-41. General

The mobility provided by Army aviation units adds to the flexibility of the Army commander conducting riverine operations. Helicopters air-lift personnel and materiel needed to meet many of the requirements of these operations, and attack helicopters delivery responsive fire support where and when needed. The helicopter's ability to move virtually without regard to terrain obstacles, to land on very small land areas, or to perform tasks by loading or unloading while hovering over areas in which no land is available gives supported riverine forces a distinct advantage over forces lacking aviation support. FM 1-100 provides general doctrine and guidance for the employment of Army aviation in support of military operations on land. This section provides information on specific tasks that helicopter units can perform in support of forces engaged in riverine operations.

that movement of his watercraft is under observation can cause him to reduce or discontinue use of the waterways during daylight.

b. Night. The availability of night observation means permits interdiction operations at night. A successful technique is the use of a search-light-equipped helicopter to locate and illuminate enemy craft for destruction by attack helicopters.

6-44. Helicopters Operating With Airboats and Watercraft

a. General. Helicopter teams support watercraft operations to form an effective fighting unit and to promote an important advantage over conventional units operating in the riverine environment.

b. Security. Helicopter elements provide armed escort during movement of watercraft. When the movement unit is ambushed, gunships can engage the ambushing force and provide suppressive fire to cover the advance or withdrawal of the surface elements.

c. Armed Reconnaissance. Helicopter crews can direct escorted airboats and assault boats over selected routes to avoid terrain obstacles and suspected ambush sites.

d. Finding and Fixing. Helicopters can find and fix enemy positions, develop the situation, and direct the movement of surface elements to the site.

e. Blocking Force. Helicopter elements can aid in blocking the retreat or advance of enemy elements while allowing friendly forces sufficient time to maneuver.

f. Reaction Force. Helicopter elements can move quickly to any point on the battlefield to aid in exploiting a success of the maneuver elements or to deliver direct fire support to allow the surface elements to maneuver.

6-42. Ambush

a. Enemy. Air observers can detect points of likely ambush or enemy activity indicating the preparation of an ambush and provide information for use by friendly troops in avoiding or countering the ambush.

b. Friendly. Observation of repeated enemy use of certain waterways can provide opportunities for the establishment of ambushes by friendly forces. Helicopters, using deceptive means, can transport troops to points at or near the location of the planned ambush.

6-43. Interdiction

a. Day. Attack helicopters can deny enemy watercraft free use of waterways. Observation helicopters, supported by on-call attack helicopters or quick-reaction watercraft, can accomplish the same mission. The enemy's awareness

Section VIII. CIVIL-MILITARY OPERATIONS

6-45. General

a. The initiating directive that establishes the joint riverine task force will provide instructions to the force on civil-military operations (CMO).

b. Civil-military operations combine civil affairs and psychological operations (PSYOP) into a single activity for military units and organizations. Civil-military operations is a command responsibility. The G5/S5, civil-military operations officer, provides staff supervision for this activity. FM 101-5 lists the duties and responsibilities of the G5/S5.

c. Civil-military operations obtain essential civilian cooperation and support or reduce civilian interference with the accomplishment of the military mission. Civil-military operations may require military forces to perform some or all functions that the government normally performs. See FM 31-23 for CMO operations in stability operations.

6-46. Civil-Military Operations Planning Considerations

The civil-military operations officer should consider the following in developing his plans:

a. In riverine areas, normally fishing is the chief livelihood for a number of people. Fishing operations may range from organized businesses employing small fleets, processing areas, markets, and other facilities to single units or devices to satisfy immediate family needs. Enemy forces may exploit the fishermen, much like the farmers, to supply a portion of their basic food needs. Plans for surveying food items in the AO include control of the fish harvest. On discovery of bulk supplies of fish or fish products in enemy area, U.S. units normally move these supplies to areas under friendly control. A thorough investigation of these supplies is necessary to insure that their removal does not cause hunger or hardship among civilians remaining in the area. Fishing operations in contested or neutral areas pose other significant civil affairs problems that U.S. units recognize and deal with appropriately.

b. Curfew hours must be realistic. Fishing operations normally require a fisherman to depart in early morning hours to reach the best fishing areas. Such things as tide and tide-tables also are considered. Ignoring these considerations may force a fisherman to choose between a reduced harvest or violating the curfew.

c. Distinguishing between a legitimate fishing operation and a military movement disguised as a fishing operation is difficult. In remote or fringe areas where establishment of checkpoints is difficult, waterborne forces may control the movement of fishing craft. Air surveillance provides an excellent means of checking the flow of traffic; but, with the exception of amphibious aircraft, physical examination of the watercraft is not possible. Use of air surveillance and waterborne forces jointly provides an ideal solution. The enemy may force fishermen to transport enemy forces and materiel. Unarmed fishermen are defenseless against impressment and when apprehended should be detained for interrogation. Claims of impressed service by the apprehended fishermen warrant detailed investigation. In all cases, local government officials determine guilt or innocence.

d. Units establish checkpoints where there is sufficient space to assemble people under guard and to moor boats and to park vehicles for search and investigation. Sufficient troops are near the checkpoint to apprehend vehicles, boats, and individuals attempting to avoid the checkpoint and to provide fire support. Local security elements are necessary to protect the checkpoint. Processing of individuals, vehicles, and boats at the checkpoint is as rapid and efficient as possible.

6-47. Civil Affairs

a. Civil affairs activities applicable to all types of warfare that may be conducted in a riverine environment are discussed in detail in FM 41-10. These activities include—

(1) Provision of civilian support for and prevention of civilian interference with tactical and logistic operation.

(2) Provision of or support for the functions of government for a civilian population.

(3) Community relations of the military forces.

(4) Military civic action.

(5) Military participation in populace and resources control.

(6) Military support of civil defense.

(7) PSYOP.

Directed activities usually involve specific assignments, central funding, and authorization to use military resources. Civil affairs activities in riverine operations are usually near base areas.

b. Military civic action may be a major activity of the civil affairs effort in a riverine environ-

ment. Development and stabilization of agricultural and fishing areas, which may be the economic base of the entire country, are essential. The securing of land or air routes, in addition to water routes obstructed by hostilities, for transportation of agricultural products to market becomes important to the local population because of its dependence on income from sale of such products.

6-48. Psychological Operations

a. PSYOP support offensive operations and

base security in a riverine environment for the same basic reasons as in other areas. FM 33-1 discusses the PSYOP required to support the riverine task force.

b. All types of propaganda (black, white, and gray) apply to riverine operations.

c. Tactical and consolidation PSYOP are staff responsibility of G5/S5. During stability operations in a riverine environment, no clear distinctions exist between the area and phases of tactical PSYOP and consolidation PSYOP.

CHAPTER 7

COMBAT SERVICE SUPPORT

Section I. GENERAL

7-1. Basic Considerations

a. The principles, techniques, procedures, and organizational concepts of combat service support in Army field manuals in support of divisions, brigades, and battalions conducting ground, airborne, or airmobile operations apply with modifications to riverine operations. The basic dissimilarity in riverine operations is the extensive use of ships and watercraft to provide combat service support.

b. A riverine environment severely restricts movement overland. Except for a few primary highways, interconnected road nets are often nonexistent. The extensive use of waterways to move supplies and personnel partially overcomes this disadvantage. Helicopter and fixed-wing aircraft may also be used for this purpose.

c. Other factors requiring special consideration are the need for increased control of individuals and traffic in the area of operations (AO); the lack of suitable land sites for large, semifixed combat service support installations; the requirements for support of watercraft and associated equipment; and maintenance problems aggravated by the weather and terrain.

d. The economical use and the conservation of combat service support resources are paramount.

e. Plans make provisions for supplies, services, and medical treatment for civilians in the AO.

f. Combat service support in a riverine environment is primarily support of land and afloat bases and operations launched from these bases.

g. An Army graves registration team normally is embarked on a vessel of the riverine force. This vessel, usually a landing ship tank (LST), will be equipped with refrigerated holding facilities. The remains will be transported as incon-

spicuously as possible to an Army tactical mortuary for further processing. When possible, a helicopter should be used as a means of transportation. Packaging of the deceased's personal effects and delivery to the transportation point of departure should be accomplished by the unit commander in time to accompany the remains.

h. Backup support provided by higher echelon is that normally available from the field army support command (FASCOM) and its support brigades. FM 54-2, FM 54-3, and FM 54-4 contain detailed information on this support.

7-2. Responsibilities

a. Each Service is responsible for administration and logistic support of its component forces. Joint operations in riverine areas require close coordination of combat service support to make the best use of the limited facilities and available lines of communications (LOC).

b. The Army component commander supplies and maintains common and Army-peculiar items to both Army and Navy forces. The Navy component commander supplies and maintains Navy-peculiar items and provides a portion of the transport required to move Army supplies by water. The Army and Navy commanders of the riverine force are mutually responsible for coordinating logistic support and determining the specific arrangements and procedures to accomplish the mission.

c. Forces stationed on either an afloat or a land base receive support from combat service support installations outside or on the periphery of the riverine area, initially. As suitable areas become available, combat service support installations are established within the riverine area.

Section II. SUPPLY

7-3. General

Coordinated Army and Navy supply activities insure the most efficient use of limited transportation resources, supply personnel, and available storage facilities. In addition to normal resupply, special items needed include assault boats, outboard motors, paddles and poles, life preservers, rope, waterproof matches and maps, waterproof bags, insect repellant, special foot gear, and foot powder. Clothing and equipment wear out fast, thus increasing the normal replenishment rate.

7-4. Resupply of a Land Base

a. Truck transportation provides the most responsive means for resupplying a land base if an adequate LOC is available. Naval supply vessels or Army watercraft provide another means by which equipment and supplies may be transported to a land base adjacent to a river or canal. Air movement may be used for high-priority or emergency resupply.

b. Supply policies and procedures for units stationed at a land base generally compare with those for resupplying base camps in nonriverine areas. The type and the amount of storage space available at the land base influence the stockage maintained.

7-5. Resupply of an Afloat Base

a. *Periodic Resupply.* Resupply ships and watercraft provide the primary means of transporting supplies between combat service support installations and an afloat base. Helicopters are an alternate or an emergency means of resupply.

(1) One LST should be in the afloat base—on station—at all times. In addition to normal resupply missions, the LST of the river support squadron supporting the afloat base provides for—

(a) Storage of a portion of the afloat unit's basic load.

(b) Transportation of supplies, equipment, salvage, and personnel between the afloat base anchorage and the supporting combat service support installation.

(2) Each LST can carry and store a 10-day supply of dry cargo for a brigade afloat base. Army supply personnel and portions of maneuver elements may be billeted aboard the LST on station. Supply and transportation are handled—

(a) Either by using one LST continually

on station as a floating supply point and resupplying periodically with a second LST. This is the preferred method based on combat experience.

(b) Or by using each of two LST alternately, with one supplying the afloat force when the other is replenishing supplies from the supporting installations. When this method is used, Army personnel billeted aboard the LST on station transfer to the incoming LST each time the ships rotate.

(3) In either method, a periodic replenishment cycle is necessary to keep reserve stocks from falling below a 3-day level.

b. *Classes of Supply.*

(1) *Class I.* Each self-propelled barracks ship (APB) and barracks ship (nonself-propelled) (APL) is initially stocked with a 30-day supply of rations. Resupply is by LST.

(2) *Classes II, IV, VI, and IX.*

(a) These supplies for Army units stationed on the afloat base consist primarily of fortification materials, individual clothing and equipment, personal demand items, and limited repair parts.

(b) Supplies for Navy elements on the afloat base consist primarily of repair parts and assemblies. Most of these items are carried aboard the repair ships (ARL). Resupply is by the LST or during periodic calls at a supporting shore base.

(3) *Classes III and III(A).*

(a) River assault squadron (RAS) watercraft are refueled with diesel and JP-5 from the APB and supply LST. The supply LST refuels the APB and other ships of the flotilla as required.

(b) Motor gasoline (MOGAS) for Army assault boat outboard motors, motor vehicles, and naval auxiliary engines is supplied from the landing craft, mechanized (LCM) refueler in each RAS. The 500-gallon collapsible tank provides a flexible means of storing and transporting MOGAS and diesel fuel aboard the LCM refueler. The 600-gallon metal tank may also be used. Commercial barges or military yard tankers (YOG) may refill the LCM refuelers periodically.

(c) A combination of stocks at an airfield adjacent to the afloat base and stocks prepositioned for support of specific operations provide JP-4 and aviation gasoline (AVGAS) for supporting helicopter units. Command and control helicopters may refuel on the helicopter (HELO)

barge normally deployed with the barge-mounted artillery.

(d) The LST supply ship provides resupply of packaged class III products.

(4) *Classes V and V(A).*

(a) Normally, that portion of the unit's basic load issued to individuals and weapons crews is stored on the ammunition barge. The remainder of the basic load may be stored either on the LST or on the armored troop carriers (ATC). Storing part of the basic load on ATC obviates the requirement to transfer class V items from the LST to other watercraft for resupply to an AO. Detailed load plans are necessary when ATC stock part of the basic load.

(b) Normally, ammunition for supporting Army aviation units is provided by the aviation units.

7-6. Resupply During Tactical Operations

a. ATC, helicopters, air boats, or assault boats may transport supplies to units in the AO. U.S. Air Force planes may provide backup resupply in the AO when the area and the nature of the operation warrant.

b. Unit distribution of supplies in the AO is normal procedure. Distribution of supplies in the AO is facilitated when supplies are packed in one-man loads.

c. One ATC can transport sufficient supplies for a battalion to conduct a 1-day operation. An additional 2-day supply for a battalion is transported in the ATC carrying troops. The battalion S4 controls and issues these supplies.

Howitzer ammunition accompanies the artillery piece aboard each watercraft. Watercraft or helicopters resupply artillery ammunition in the AO.

d. An LCM refueler or helicopters normally transport bulk MOGAS to resupply assault boat outboard motors and motor vehicles in the AO. Refueling points may be established in the AO using a collapsible fuel tank. The tank will float in water and can be dropped by fixed-wing aircraft or helicopters or towed into position by watercraft.

e. Potable water, in 5-gallon cans or plastic containers, is distributed with rations in the AO. Purification tablets are supplied for use with water from local sources when potable water is not provided.

f. Development of a brevity code simplifies supply request procedures. With such a system, a code word or an alphabetical designator, transmitted by radio, identifies and requests a single item or several associated items of equipment or supplies to be issued.

g. Assault boats and landing craft can transport supplies on shallow waterways, in relatively secure areas, to units within the AO.

h. Night kits include such items as mortars, starlight scopes, recoilless rifles, sundry packs, and items of personal clothing that are needed at night but are not needed during the day. Night kits normally are stored aboard the supply LST during the day and delivered to the AO each night.

Section III. MAINTENANCE

7-7. General

a. This section contains guidance for the organization and operation of maintenance units supporting Army forces conducting combat operations in a riverine environment. FM 29-30, FM 29-20, and FM 29-22 contain additional information on maintenance support.

b. Maintenance services include repair of materiel, supply of repair parts for organizational maintenance, and supply of replacement end items using operational readiness float procedures.

c. The division maintenance battalion provides direct support maintenance for all equipment authorized the division other than medical materiel, ammunition, clothing, bedding, light textiles electronic accounting machines (EAM), automatic data processing equipment (ADPE), cryptographic equipment, and air-

delivery equipment. Signal units located within the division base provide direct support maintenance for cryptographic items. Maintenance support for all other items that are not supported by the division maintenance battalion is provided by nondivisional units.

d. The size and the composition of the maintenance unit depend on the size, composition, and equipment of the supported force; the degree of support that the Navy forces (e.g., repairmen and test and tool sets) can provide; and the requirement to provide support to the Navy elements (which may be partly equipped with Army-type equipment).

e. The mission and the requirement for deviation from normal operational techniques influence the organization, equipment, and deployment of the maintenance structure providing support. Operations in a riverine envi-

ronment require more reliance on an air or water LOC for resupply of needed end items and repair parts than on a ground LOC. Dependence on air and water transportation requires special orientation of maintenance support to provide needed capabilities and delete unneeded capabilities.

7-8. Principles of Maintenance Support for Riverine Operations

The organization and the operation of the maintenance support system follow these principles:

a. Detailed planning insures that units retain only those minimum essential maintenance supplies and that equipment required to support planned operations.

b. Detailed analysis of the mission insures that maintenance units and teams contain minimum essential personnel.

c. Plans to provide transportation support for maintenance service elements consider all methods of transport. The commander allocates a part of the available airlift and watercraft to support maintenance units and teams.

d. Procedures for repair parts resupply are as simple as possible. Maximum use of direct exchange reduces the number of unserviceable items of equipment.

e. Unit distribution of maintenance supplies and repair parts is the normal procedure in a riverine area.

f. Contact teams from the maintenance battalion accomplish critical onsite maintenance in the AO. They accomplish normal maintenance tasks at the land base or the afloat base. Contact teams should have authority to perform controlled cannibalization in the AO, land base, and afloat base as an emergency method of obtaining critical repair parts.

g. Backhaul transportation (aircraft, watercraft, and available wheeled or tracked vehicles and armored personnel carriers (APC) returning from supply or combat missions) evacuate materiel and deliver supply requests from using units.

h. Maintenance battalion elements in brigade areas evacuate items requiring complex repairs to supporting elements located in the division base camp. The headquarters and light maintenance company operate the primary repair parts supply point in the division.

i. Operational readiness float procedures provide serviceable end items in exchange for unserviceable end items.

j. Navy maintenance personnel augment the

productive capacity of Army maintenance units and vice versa.

7-9. Maintenance Operations

A U.S. Army division develops a series of bases (base camp, land and afloat, combat, and patrol) to mount, control, and support operations in a riverine area. The number, size, and composition of these bases depend on the size and deployment of the committed force and the functions performed at these bases. An aircraft landing facility at each base facilitates operations.

a. *Division Base Camp.* The headquarters and light maintenance company, the heavy maintenance company, and the aircraft maintenance company of the maintenance battalion are in the division base camp to provide backup support to elements of the riverine force (Army, Navy, or both). Brigade elements may place equipment not suited to riverine operations in limited storage at the division base or the brigade land base.

b. *Land Base/Afloat Base.* These bases are semipermanent installations containing essential command, control, and combat service support elements for the organization (brigade or battalion) and any attachments necessary (e.g., boat and outboard motor maintenance personnel). The direct support maintenance personnel or elements attached for support of the brigade (less personnel and equipment detached for support of brigade equipment that remains at the division base) provide support from the land base or afloat base.

c. *Combat Base.* Battalion maintenance elements and direct support contact maintenance teams perform onsite maintenance services in combat bases. The majority of this maintenance is performed on combat essential items. Less critical items of equipment are repaired either aboard the battalion APB or APL or at the land base.

d. *Patrol Base.* Contact maintenance teams, battalion or direct support personnel, move to patrol bases to perform necessary repair of combat essential items of equipment. On completion of the repairs, these teams normally return to the combat base.

7-10. Considerations Influencing Organization of Maintenance Units

a. Scarcity of adequate maintenance facilities and the need to support widespread units require decentralization and the increased use of contact teams by the maintenance battalion.

b. The riverine environment is unusually destructive to all types of electronic and fire control equipment. Daily cleaning of equipment is mandatory. Technical assistance to the user is necessary to insure effective organizational preventive maintenance.

c. Modifications to organizational structures and equipment authorizations eliminate the need for most types of heavy repair equipment, which may remain at the division base area. Limitations of the road net in the area may require substitution of lighter vehicles for the authorized vehicles. The existence of many navigable waterways in the area indicates that augmentation of the unit with boats and outboard motors is feasible for the movement of men and materiel. Air resupply of end items and repair parts in the AO may become necessary.

d. The joint nature of riverine operations requires the close coordination of maintenance support to obtain maximum advantage from the limited facilities and maintenance equipment available.

7-11. Direct Support Maintenance

a. This level of maintenance takes place in three general locations: in the AO by contact teams; at the afloat or land base by the forward support company, maintenance battalion; and at division base by the headquarters and light maintenance company, the heavy maintenance company, and the aircraft maintenance company of the maintenance battalion. Navy maintenance personnel, assigned to the ARL as part of the Navy riverine force, accomplish Army maintenance tasks within their capability.

b. Division direct support maintenance personnel aboard ARL ships perform maintenance on weapons, vehicles, communication/electronic equipment, outboard motors, generators, assault boats, and fiber glass equipment. Repair facilities available aboard the ARL include office space; toolroom and repair parts storage area; and shops for repair of small arms and weapons, assault boat outboard motors, generators, and communication/electronic equipment. Repair and storage space aboard the ARL for Army maintenance tasks include the following:

- (1) Communication/electronic equipment, Army and Navy—350 square feet.
- (2) Repair parts storage, with storage bins—1,000 square feet.
- (3) Small-arms repair—200 square feet.
- (4) Operational readiness float storage, weathertight—300 square feet.

(5) Space for repairing fiber glass boats.

c. The difficulties of evacuating unserviceable major items for repair require contact teams to operate forward with the units to be responsive to unit needs. Watercraft or helicopters accomplish required evacuation of equipment. These means, which are more secure normally than ground means, provide fast evacuation. Evacuation overland is less secure and requires security elements to accompany the movement.

d. Maximum use of an operational readiness float provides using units an immediate replacement for unserviceable equipment.

e. The forward support company elements operating at the afloat or land base perform their duties based on the following following principles:

(1) Perform only those repairs that can be accomplished speedily, using the minimum of heavy repair equipment and heavy, bulky repair parts.

(2) Perform maintenance at the site of the equipment failure, using contact maintenance teams.

(3) Even though the headquarters and light maintenance company or the heavy maintenance company normally accomplishes complex or time consuming repairs at the division base, elements of the forward support company supporting a brigade may accomplish these repairs in the following instances:

(a) When a critical need for the equipment exists and the performance of repairs, regardless of complexity, is faster than obtaining an operational readiness float item as a replacement for the unserviceable equipment. Repair parts necessary to complete repairs in these cases may require airlifting or controlled cannibalization of similar items awaiting evacuation.

(b) When LOC are interrupted, the forward support company performs all repairs within its capability and obtains repair parts through controlled cannibalization of similar equipment.

(4) The commander allocates part of available transportation to maintenance elements for movement of contact teams, evacuation of materiel, resupply of repair parts, and movement of operational readiness float items.

(5) Perform overflow organizational maintenance for the brigade and assist Navy maintenance elements, as necessary.

(6) Provide the maximum number of components to brigade elements through direct exchange procedures.

f. The headquarters and light maintenance company, the heavy maintenance company, and the aircraft maintenance company, normally in the division base, provide direct support maintenance for units in the division base and backup direct support maintenance for the forward support companies in brigade areas. Contact maintenance teams from the companies in the division base perform their duties on site, when possible, repairing heavy equipment and aircraft in brigade areas or AO. Unserviceable materiel that exceeds the repair capabilities of the forward support companies and contact teams from the division base is evacuated to the division base for repairs or further evacuation. Elements of the division maintenance battalion operate collecting points throughout the division AO for unserviceable equipment awaiting repair and return to user. Collecting points for captured enemy materiel and abandoned U.S. materiel that is subsequently recovered are operated by the division supply and transport battalion.

7-12. Supply of Repairs Parts and Operational Readiness Float Items

a. General.

(1) Quantities of repair parts and related expendable supplies stocked by units depend on needs of the unit, availability of transportation, and responsiveness of resupply. Repair parts stockage by maneuver units includes only combat essential items. The headquarters and light maintenance company operate division supply points for repair parts and related expendable supplies other than those required to repair aircraft.

(2) Procedures for resupply of maintenance items are included in the standing operating procedure (SOP). Development of a brevity code simplifies supply request procedures. With such a system, a code word or an alphabetical designator, transmitted by radio, identifies and requests a single item or several associated items of equipment or supplies be issued.

b. Repair Parts Supply.

(1) The repair parts supply element of the forward support company operates at the brigade base.

(2) The supply element of the forward support company provides repair parts and related expendable supplies to all units of the brigade

and common items to the Navy element and to the maintenance elements of the company. Repair parts and related expendable supplies are combined with shipments of other types of supplies to use available transportation to the maximum. When possible, the forward support company delivers repair parts directly to the requesting unit.

c. *Operational Readiness Float Items.* Requisitions for lost or destroyed end items are submitted to the supply and transport battalion. Elements of division maintenance battalion maintain the division operational readiness float. Each forward support company provides a limited operational readiness float of end items to exchange for reparable end items. This float consists primarily of small arms, fire control instruments, and portable radio sets and includes a limited quantity of other critical end items as determined by experience factors.

7-13. Destruction of Supplies and Equipment

Supplies and equipment are not abandoned. If units cannot evacuate equipment, they destroy it (except for medical items); SOP of all units include means and priorities for destruction. FM 5-25, the FM 23-series, and technical manuals dealing with specific types of equipment contain information on which to base destruction plans.

7-14. Organizational Maintenance

a. Preventive maintenance is essential to prevent overtaxing organizational maintenance capabilities. The condition of seals and the operation of valves and pumps require special attention. Individual weapons must be kept clean and dry. Because of the space limitations on board the APB and APL, users of equipment perform preventive maintenance services on their equipment on board the ammunition barge moored to each barracks ship. Maintenance sheds or express containers, placed on these barges, provide a storage area for organizational maintenance equipment and supplies.

b. Unit armorers and maintenance personnel aboard the APB and the APL perform organizational maintenance on all equipment deployed from the afloat force. Maintenance facilities available for a maneuver unit on board include a teletype/radio repair workshop, a radio/electronic workshop with test equipment, and a shop for small-arms maintenance.

Section IV. MEDICAL

7-15. General

a. Medical support in a riverine area follows the basic principles and practices of military medicine; however, provision of this support is more complex. The distances between supporting bases and AO and the semi-independent nature of operations (particularly the waterborne phases) complicate medical treatment and evacuation. Medical service organization and procedures usually require modification.

b. Army medical personnel at land or afloat bases and Navy medical personnel of the river flotilla work together to support coordinated operations effectively. Joint medical facilities provide the most effective use of limited resources.

7-16. Medical Support of a Land Base

The Army commander provides medical support for all personnel stationed at a land base. Medical organization and procedures generally compare with those used to support base camps in nonriverine areas. A medical company of the division medical battalion, augmented as necessary by appropriate medical service teams, normally collocates with the brigade at the land base.

7-17. Medical Support of an Afloat Base

a. The base commander is responsible for medical care for personnel stationed on the afloat base. Navy medical corpsmen normally provide medical support for Navy personnel in the flotilla. The battalion medical platoon aboard each battalion APB or APL provides unit-level medical care for Army personnel embarked.

b. Small medical treatment facilities aboard APB and APL necessarily limit the care that may be provided at the afloat base. Medical care normally will be restricted to that treatment within capabilities that may restore patients to duty status or to that necessary for evacuation to medical treatment facilities ashore. Selected patients may be held in the AO for observation and care for limited periods in accordance with command policy to maintain combat effectiveness. The APB and APL have a landing pad for use of medical evacuation helicopters.

c. If watercraft are mined, 30 to 40 percent of the injured may require surgical treatment. The surgical capability of the medical company of the division medical battalion, augmented

by appropriate medical cellular teams, provides the necessary level of competence. A centralized medical facility for the afloat base may be established aboard a specially configured APB or APL, or an accessory LST may be provided for a mobile surgical hospital. Use of an LST or other similar craft to house a reinforced division medical company or surgical hospital provides a readily accessible means of medical support.

d. Medical supplies for the brigade afloat base are carried aboard the APB/APL/LST of the clearing station and with the battalion medical platoons aboard the APB or ATC. Resupply of the division clearing station and battalion aid stations will be from the APB via the small boats used to evacuate lightly wounded personnel from the battalion base to the APB. Emergency replenishment of medical supplies and whole blood may be effected by medical helicopters.

7-18. Medical Support of Waterborne Operations

a. The Army commander provides medical service for all elements of a waterborne force operating away from the land or afloat base. One ATC, staffed by medical platoon personnel, serves as the battalion forward aid station. This ATC has a helipad to provide immediate evacuation by helicopter.

b. Patients must evacuate the battalion aid station on the ATC or the AO combat base as rapidly as possible. Air ambulance units at the artillery position, on the APB or APL, at the airfield closest to the AO provide aeromedical support on request. Helicopters evacuate sick or wounded personnel to a hospital equipped APB, APL, or the nearest land base hospital.

c. All Army aeromedical evacuation requests should include the following in the following sequence, but need not be limited to only those elements shown:

(1) *Location.* If grid coordinates are used, they should contain 6 digits and be preceded by the 1000,000 meter grid designator.

(2) *Radio frequency and call sign.* The radio frequency and call sign should be that of the radio at the patient's location and not a relay frequency.

Note. The location, call sign, and radio frequency should always be transmitted first. This information enables the helicopter ambulance to begin the mission and precludes unnecessary delay, should the other information

not be immediately available, both in helicopter reaction time and in cases of communication breakdown.

(3) Patient category of precedence (e.g., urgent, priority, routine).

(4) Number of patients by type, e.g., litter or ambulatory.

(5) Security of pickup site. Significant information on enemy location and/or weaponry, if available, should be noted here.

(6) Type of wound, injury, or illness.

(7) Method of marking pickup site.

(8) Special equipment (e.g., hoist) or emergency medical supplies required.

(9) Weather at pickup site.

(10) Patient nationality.

d. Army assault boats, airboats, and assault boats provide a relatively fast means of evacuating casualties from platoon and company AO to the battalion aid station. When evacuation is by boat, the evacuation sections of battalion medical platoons and the ambulance platoon of the divisional medical company man and equip the boats configured as "ambulances." The aid or clearing station is conveniently accessible from the waterway net.

(1) The assault boat may carry medical personnel with their equipment.

(2) Depending on the type of assault boats in use, one or two litter patients can lie lengthwise in the bottom of the boat. Four additional litter patients can lie crosswise with the litter handles resting on the gunwales.

7-19. Special Considerations

a. Personal health and hygiene are particularly important for troops operating in a delta-type environment. The high incidence of malaria, cholera, plague, tuberculosis, diarrhea, and louse-borne diseases among the local population requires that all personnel be thoroughly indoctrinated in disease prevention and current in personal immunization requirements.

b. Much of the surface water may be contaminated; all water from non-approved sources is tested and treated.

(1) Professional sanitary engineering and ground water geology consultation should be employed to provide technical advice on these aspects. If adequate water supplies cannot be provided in base camps, or if barracks ships cannot be located in a zone where their water purification equipment can adequately treat the water from rivers, logistic effort may be necessary in hauling potable water.

(2) The proper disposal of human waste, garbage, and rubbish also presents unique problems in riverine operations. The high water

table usually encountered precludes the use of many normal methods of disposal. Where river flow is large and of sufficient velocity and where tides are favorable, refuse may be disposed of by barging to a point where it can be carried out to sea. Burn out, pail, and mound latrines are frequently used where the water table is high. Rodents frequently become a problem when an area is filled for a land base, particularly during the flood season. A rodent control program should be established and maintained early in the course of operations.

c. Prolonged exposure in water and improper foot care often result in immersion foot or fungus infection of the feet. About 3 days is the maximum time that an individual can operate effectively in swamps and inundated areas before suffering immersion foot, even when he massages his feet and changes to dry socks frequently. Rubbing alcohol or cocoa butter, used as a field expedient, can prevent foot skin from cracking. Immersion foot in riverine areas can often cause more manpower losses than any other single factor. Daily individual foot care requires constant command emphasis at all levels.

d. In many regions, mosquitoes and biting flies are particularly numerous along waterways and in swamp and delta areas. Therefore, a sufficient quantity of insect repellent must be available for application to skin and clothing. Amounts needed may be in excess of those required for ordinary operations. Insect bites and open sores become infected quickly in the dirty, salty water found in many parts of a riverine area. Adequate provisions are made for personal hygiene and treatment of infected insect bites, cuts, and scratches.

e. Bloodsucking leeches infest fresh-water ditches, streams, and rivers in most portions of the tropics. As long as the uniform is intact and worn properly, i.e., sleeves down, jacket buttoned, and trousers tucked inside boots, aquatic leeches cannot reach the lower extremities. However, when personnel go ashore in swamp or jungle areas, they should treat their uniforms with insect repellent and apply it to their skin as a protection against land leeches. The untreated uniform does not give adequate protection against these pests.

f. Rabies may be prevalent and become a problem in countries that have been ravaged by an insurgency or conventional war. Prevention of rabies is of the utmost importance; it has no effective cure once contracted, and the

outcome is almost always fatal. To this end no indigenous animals, wild or domestic, should be brought aboard a ship or watercraft for any reason. Personnel should be instructed to avoid contact with all animals, especially pets of the local populace, while ashore. Personnel

bitten should report immediately to the nearest U.S. military medical facility for treatment and disposition. The occurrence of any type of animal bite (exclusive of insect bites) should be considered a medical emergency.

Section V. RIVER ASSAULT CRAFT HELICOPTER OPERATION SUPPORT

7-20. General

A number of the riverine assault force ATC have been equipped with small flight decks capable of accommodating observation, utility, and attack helicopters. The development of the ATC(H) (ATC with helicopter flight deck) substantially increases the force's capability to provide rapid logistic resupply medical evacuation (MEDEVAC), and personnel transfers in the area of operations. Recommended procedures to be used in helicopter operations with both the ATC(H) and the ATC are contained in subsequent paragraphs.

7-21. Preparation for Landing

a. Ideally, a helicopter should approach an ATC(H) or ATC into the wind to maintain maximum control. At the same time the ATC(H) or ATC must attempt to maintain a stationary position in the water, moving neither ahead or astern nor to port or starboard. In the case of an ATC(H), the wind should be off the beam, whenever possible, to allow for an optimum controlled approach. When the wind is blowing across the waterway, the ATC(H) or ATC heads into the current and maintains enough steerageway to hold its head and a steady position. When the wind is parallel to the waterway and there is a current running, the ATC(H) must first maintain a steady heading while placing the wind as close on the beam as possible. In some instances, it may be necessary to head into the riverbank and beach to permit the helicopter to land. In the case of an ATC conducting a MEDEVAC from the fantail of a boat with the wind blowing parallel to the waterway, it should be headed into the wind to permit the helicopter to make its approach from astern.

b. The boat captain normally acts as landing signal officer (LSO). Another boat crew member is permanently assigned as landing signal enlisted (LSE) and will direct the helicopter to a safe landing on the ATC(H) flight deck or into position over the ATC stern.

c. Additional procedures for night time medical evacuation are recommended as follows:

(1) When the helicopter is within visual range, signal with a single, flashing red light.

(2) In the case of an ATC, station men at the four corners of the fantail and show red lights on pilot request.

(3) If available, string red lights out along the port side of the boat, either hand-held or affixed to the canvas awning on the ATC.

(4) Do not at any time use white lights of any size.

(5) If time allows between the occurrence of the casualty and the arrival of the helicopter, the boat should proceed to a more secure area. Insure that any movement is reflected in the coordinates given in the patient evacuation request originally submitted when the MEDEVAC was called.

d. A wind sock should be mounted on the forward part of the flight deck to assist the helicopter pilot in determining direction and strength of the relative wind.

7-22. Procedures for Landing a Helicopter on the ATC(H)

a. LSO signals LSE to bring the helicopter in to the flight deck.

b. LSE signals landing directions to the helicopter pilot.

c. LSE motions helicopter into correct landing position. LSO maintains "thumbs down" signal.

d. When LSO feels helicopter is safe to land, he gives LSE "thumbs up" signal.

e. LSE directs helicopter to the deck.

7-23. Procedures for Launching a Helicopter From an ATC(H)

a. When pilot is ready to take off, he gives "thumbs up" to LSE, who relays the sign to the LSO.

b. If clear to take off, LSO gives "thumbs up" to LSE.

c. LSE signals helicopter to launch.

7-24. MEDEVAC From an ATC

In certain instances where no ATC(H) is available, helicopter MEDEVAC may be required

from an ATC. In such cases, the following procedures are recommended:

a. Helicopters With Hoist Capability. If the MEDEVAC helicopter is equipped with a hoisting winch, the ATC will position itself in accordance with paragraph 7-21a. The patient will be securely strapped into a Stokes wire basket stretcher equipped with flotation gear or with five kapok life jackets attached to the stretcher and placed on the fantail of the boat. On arriving overhead, the helicopter will lower an empty Stokes stretcher, which will be detached by boat crew personnel and moved clear of the working area. The stretcher carrying the patient to be evacuated will then be attached to the hooks of the winch cable. As the winch begins to lift the stretcher, it should be guided by hand until it clears the boat completely. If there are additional casualties to be evacuated at the same time, they should be loaded into the available Stokes stretchers and the process should be repeated.

b. Helicopters Without Hoist Capability. At present, some U.S. Army MEDEVAC helicopters do not have a hoist capability. When MEDEVAC must be conducted from a helicop-

ter without a hoist and an ATC(H) is not available in the area, the ATC will proceed to be nearest secure beach area where a landing zone is available. The patient will be taken ashore and placed aboard the MEDEVAC helicopter on landing. The senior officer/petty officer/non-commissioned officer at the scene may elect to evacuate casualties directly to shore-based facilities or the mobile return base (MRB) if, in his judgment, medical treatment can be obtained more expeditiously in this manner and operations permit.

7-25. Safety Precautions

The following safety precautions must be observed:

a. Insure that there is no unusual rigging, such as antennas, in the helicopter handling area that may not be visible to the pilot.

b. Insure that firefighting equipment is available in the vicinity of the flight deck or the fantail in the case of an ATC.

c. Do not take fast any lines from the helicopter to any part of the boat or its equipment.

d. Do not allow unnecessary personnel in the vicinity of the flight deck during landing or takeoff.

APPENDIX A

REFERENCES

A-1. Army Regulations (AR)

- 310-25 Dictionary of United States Army Terms.
- 310-50 Authorized Abbreviations and Brevity Codes.

A-2. Field Manuals (FM)

- 1-100 Army Aviation Utilization.
- 3-2 Tactical Employment of Riot Control Agent CS.
- 5-25 Explosives and Demolitions.
- 6-20-1 Field Artillery Tactics.
- 6-20-2 Field Artillery Techniques.
- 6-40 Field Artillery Cannon Gunnery.
- 6-140 Field Artillery Cannon Battalions and Batteries.
- 7-10 The Rifle Company, Platoons, and Squads.
- 7-20 The Infantry Battalions.
- 11-50 Signal Battalion, Armored Infantry, and Infantry (Mechanized) and Airmobile Divisions.
- 17-1 Armor Operations.
- 17-36 Divisional Armored and Air Cavalry Units.
- 17-37 Air Cavalry Squadron.
- 19-25 Military Police Traffic Control.
- 19-40 Enemy Prisoners of War and Civilian Internees.
- 20-22 Vehicle Recovery Operations.
- 20-33 Combat Flame Operations.
- (O) 21-50 Ranger Training and Ranger Operations.
- (O) 21-76 Survival, Evasion, and Escape.
- 24-1 Tactical Communications Doctrine.
- 29-20 Maintenance Management in Theaters of Operations.
- 29-22 Maintenance Battalion and Company Operations (Non-divisional)
- 29-30 Maintenance Battalion and Company Operations in Divisions and Separate Brigades.
- 30-5 Combat Intelligence.
- 30-9 Military Intelligence Battalion, Field Army.
- 31-11 Doctrine for Amphibious Operations.
- 31-12 Army Forces in Amphibious Operations (The Landing Force).
- 31-16 Counter guerrilla Operations.
- 31-23 Stability Operations, U.S. Army Doctrine.
- 31-35 Jungle Operations.
- 31-81(Test) Base Defense.
- (C) 32-5 Signal Security (SIGSEC) (U).
- (S) 32-10 United States Army Security Agency in Support of Tactical Operations (U).
- 33-1 Psychological Operations—U.S. Army Doctrine.
- 41-10 Civil Affairs Operations.

- 44-1 U.S. Army Air Defense Artillery Employment.
- 44-3 Air Defense Artillery Employment, CHAPARRAL/
VULCAN.
- 54-2 The Division Support Command and Separate Brigade
Support Battalion.
- 54-3 The Field Army Support Command.
- 54-4 The Support Brigade.
- 55-15 Transportation Reference Data.
- 57-1 U.S. Army/U.S. Air Force Doctrine for Airborne Operations.
- 57-35 Airmobile Operations.
- 61-100 The Division.
- 100-26 The Air-Ground Operations System.
- 100-27 U.S. Army/U.S. Air Force Doctrine for Tactical Airlift
Operations.
- 101-5 Staff Officers' Field Manual—Staff Organization and
Procedure.

A-3. Joint Chiefs of Staff Publications

- (O) JCS Unified Action Armed Forces (UNAAF).
Pub 2
- (O) JCS Doctrine for Joint Riverine Operations.
Pub 16

A-4. Training Circulars (TC)

- 3-16 Employment of Riot Control Agents, Flame, Smoke,
Antipersonnel Agents, and Personnel Detectors in
Counter guerrilla Operations.

A-5. Technical Manuals (TM)

- 5-700 Field Water Supply.

APPENDIX B

BOAT PROCEDURES

Section I. ASSAULT BOATS

B-1. General

In a riverine area, units equipped with assault boats perform missions similar to those assigned to dismounted units in other areas. Assault boats increase mobility and permit units to operate at greater speeds; cover greater distances; and carry more equipment, weapons, and ammunition. Personnel conducting reconnaissance and security tasks, maintaining contact between friendly units, and clearing blocked waterways can use assault boats effectively. Units, using assault boats for transportation, secure and hold key terrain features or relieve or reinforce isolated units. Assault boats may transport part of a larger force that uses other means of transportation for combat operations. Units normally use assault boats on relatively secure routes and not for assaults on known enemy positions.

B-2. Planning

a. Careful planning is necessary before using assault boats on inland waterways. Some streams and canals are navigable for only short distances. Prior training of boat operators is essential. Adequate reconnaissance is necessary before movement. Although the course of a river or stream often provides the easiest and safest route of advance, it also channels movement and may lead to an ambush. Careless or hasty selection of routes can result in delays or loss of equipment and men.

b. When the use of assault boats is contemplated, planners consider both the preparation phase and the actual water movement. Certain aspects peculiar to the use of boats require special attention.

(1) Powered watercraft require sufficient power for the boat to negotiate the waterway when traveling against known currents.

(2) Units inspect all boats and equipment before departure to insure that all equipment is in operating condition and that paddles and life preservers are aboard. Personnel insure that adequate fuel and lubricants are available in each boat.

(3) Sufficient repair parts for emergency repairs must be available in case of breakdown.

(4) Signals for use between boats require rehearsal. Personnel insure that radio equipment is operating properly and on the correct frequency.

(5) In case a boat is swamped or ambushed, all personnel must be aware of the rendezvous points along the route.

c. Certain missions require that an automatic weapon be mounted on the boat. The ground mount for this weapon must be available in the boat in case the weapon has to be used ashore. At least one compass and one watch and, if possible, a radio and binoculars are necessary for each boat.

B-3. Equipment

a. *Boat Selection.* Several factors influence the performance of a boat: hull form, hull material, weight, type of motor and propeller, location of the motor, and distribution of weight. In general, the intended use is the determining factor in choosing a specific type of boat. The width, depth, and velocity of the current are considerations in selecting a boat for military use. Rubber boats are chosen when secrecy and stealth are the prime determining factors. Paddles or poles, wrapped with cloth, produce less noise than unwrapped poles. Use of native boats may be advantageous, in some cases, because they are built to operate in the area and are less conspicuous than military craft. Locally made rafts may also be available for use.

b. Stowage.

(1) Personnel stow items of boat equipment according to approved load plans for rapid inventory and accessibility, even in darkness. Typical items in each assault boat are—

Anchor and 30 feet of line.....	1
Mooring lines, 10 feet with	
eye on each end.....	2
Bailing can.....	1
Repair parts for outboard motor	
(shearpins, propeller cone, propeller,	
spark plugs).....	1 set

Collapsible plastic water container.....	1
Gas cans.....	2
WP and smoke grenades	4
Emergency rations.....	5
First aid kit.....	1
Seizing line (30 foot)	1
Hooded flashlight with colored lens inserts	1
Camouflage net	1
Paddles	6
Poles (12 foot).....	2

(2) Equipment should be lashed to the boat so that it may be recovered if the boat is swamped or overturned.

(3) Personnel securely stow other supplies, equipment, and crew-served weapons to prevent their loss or injury to personnel if the boat capsizes. Crew-served weapons have a marker float and line attached to assist in retrieval. Each boat in the formation carries a variety of supplies and equipment so that the loss of one boat does not result in the abortion of the mission.

B-4. Care of Boats and Motors

The key to dependable service from outboard motors and assault boats is meticulous organizational maintenance and proper operation. A boat or motor used properly in normal operations more likely withstands the abuse it gets under combat conditions. Recommended precautions in the use of boats and motors are—

a. Proper Operation.

(1) Operate at moderate speeds to slow normal wear and deterioration of both boat and motor.

(2) Avoid hitting floating objects and sandbars.

(3) Do not allow the motor to run for long periods at idle or very low speed. Carbon builds up rapidly in slow-running, 2-cycle engines.

(4) Slow the engine before shifting. A fast, improper shift can cause engine breakdown in a critical situation.

(5) Allow the motor to warm up before operating at high speed. Accelerate and decelerate smoothly to avoid straining the engine.

(6) For 2-cycle engines, mix gasoline and oil thoroughly and in proper proportion. Failure to use enough oil or to mix well can cause the motor to burn out. Too much oil results in heavy carbon deposits.

(7) Handle the fuel line with care to prevent damage where it joins the connectors.

b. Preventive Maintenance.

(1) Keep the boat and motor clean and lubricated according to the technical manual (TM)

for the item. Particular emphasis is necessary on boat fittings, underwater body, and motor lower unit.

(2) When operating in brackish or salt water, take the boat out of the water after use. Clean the bottom regularly and flush the motor with clean, fresh water.

(3) Include a set of spare spark plugs with each motor. Operators remove, inspect, and clean or replace them according to the TM for the particular motor.

(4) If the boat strikes an object in the water, the hull and motor lower unit require inspection both for cracks and for damage to the propeller, propeller cap, cotter key, and shearpin. Operators must replace damaged or worn parts because uncorrected defects may unbalance the motor and cause failure at high engine speeds.

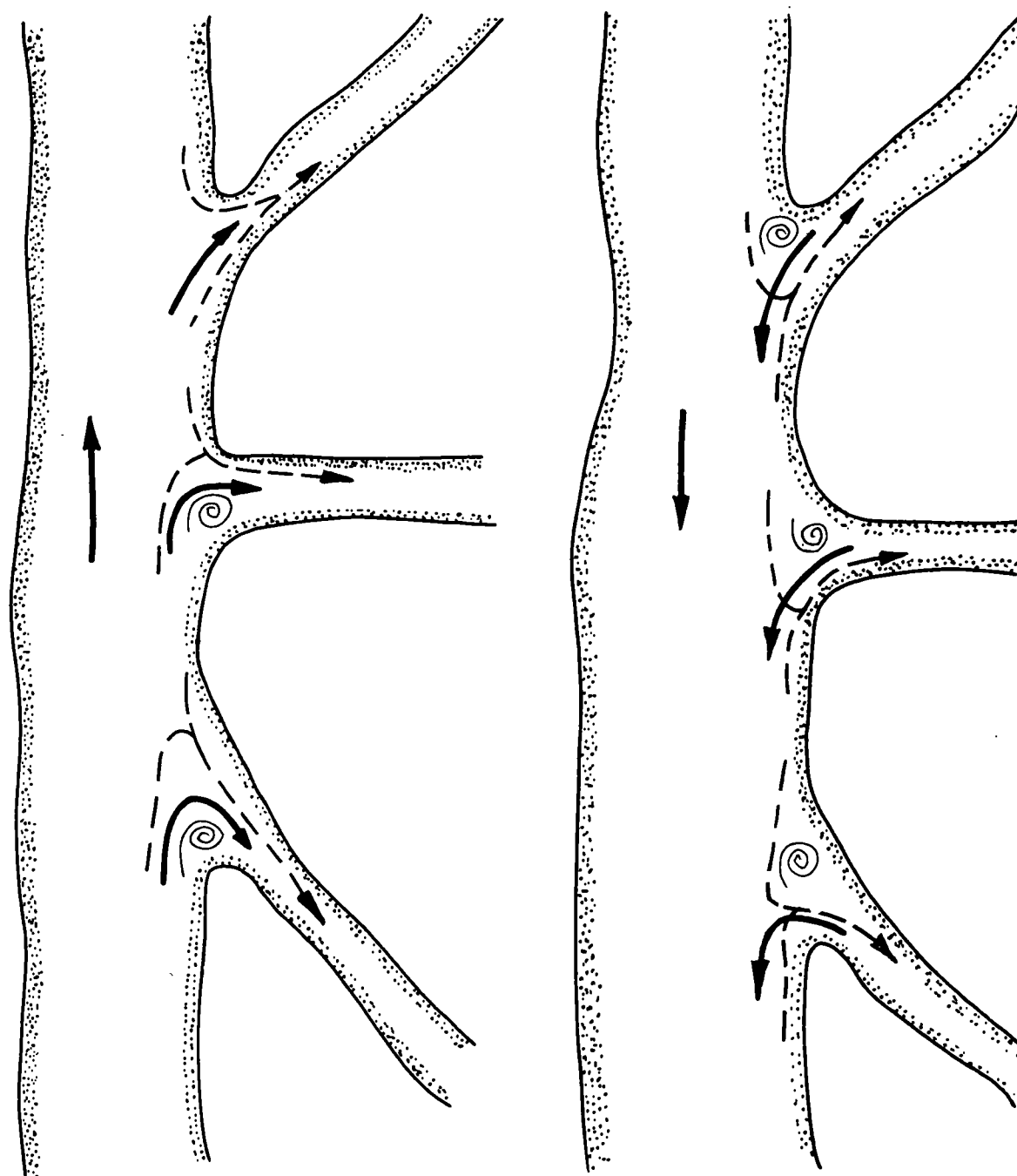
(5) Carry spare shearpins. Use only the correct-issue shearpins. When issue pins are not available, an improvised pin of equally soft or softer material than the authorized one is permissible.

B-5. Navigation

a. Boat operators and other key personnel train in the basic principles of river navigation before their unit begins operation on waterways. Boat operations may appear simple, but certain techniques require mastering. Training also includes use of native watercraft.

b. The boat operator can read a waterway more easily when going upstream than when going downstream. Waterway channels and river obstacles indicate their locations by natural signs. By learning these signs and watching for them, the boat operator can navigate the rivers and streams safely and comfortably and without damage to his boat or motor. The boat operator requires thorough training before operating the boat alone.

c. The greatest current velocities and the steepest gradients are generally found near the source of a river. Velocities may vary at any point of the river within short stretches or between points across a channel. Flow is swiftest where the channel constricts and slowest where the stream spreads out broad and shallow. In a meandering stream, centrifugal force throws the water to the outside of curves so that the deepest water is normally near the outside bends. Sandbars and shallow water are normally on the inside of curves. In spite of this general rule, underwater obstructions remain a problem. These obstructions can be



LEGEND.




-  --- Whirlpool.
 --- Current.
 --- Boat movement.

Figure B-1. Moving from one channel to another.

present even in the deepest channels, particularly in tidal waterways.

d. The surface of the water directly to the front is a key to successful navigation. Lightly rippled water, where no wind is blowing, usually

indicates shallow water. A long undulating wave indicates deep water and fast current. A smooth surface usually indicates deep water and slightly lessened velocity. A vee in the surface of the water generally indicates an

obstruction lying parallel with the direction of current. Current velocity and the size of the obstruction together determine the size of the vee. The vee is only an indication of the size of that portion of the obstruction lying very near the water surface; it does not indicate the total size of the obstruction. A rolled surface, at a particular point, usually indicates an obstruction, such as a log or tree lying perpendicular to the direction of current.

e. In tidal waterways, silt deltas or shoals are often found on both ends of midchannel islands and on both sides of the mouths of entering waterways. The tidal flow backing up into tributaries usually forms a shoal across the mouth. Breaks in the shoal are near the shore rather than in midstream.

f. The coxswain (boat operator) positions himself where he can see the river course and the water surface. Occupants of the boat remain seated so they do not obstruct the operator's view or suddenly shift the balance of the boat. The coxswain avoids ripples, boils, and other indications of disturbed water that may force his boat into obstructions that will damage the craft. He also avoids sweepers, trees that have been pulled into the river or stream by collapsing banks, or trees rooted to the bottom. A collision may cause a boat to overturn or be torn apart. A boat that overturns in sweepers exposes occupants to double danger. The tree branches can puncture pneumatic life vests or catch and hold men under water.

g. When moving from one channel to another channel that is perpendicular to the first, the boat operator navigates at right angles with the current into which he is traveling. He passes on the downstream side of the perpendicular channel, proceeds upstream a short distance, and then turns back into the flow of the new current. A power boat never goes into fast water at full throttle. The operator travels slowly until he knows what lies ahead (fig B-1).

h. Reconnaissance determines that the river or canal is of sufficient width and depth to accommodate the boat or watercraft used. If a unit is moving only a short distance or to a well-defined debarkation point, a hasty route selection may be the only preparation necessary. The length of the move increases the chance of a navigational error. For a short move, a simple plan committed to memory usually suffices. For example, "We will move west until we reach the canal intersection about 1,500 meters from here."

i. The navigator-observer method is the most

accurate means of river navigation and can be used effectively in all light conditions.

(1) Equipment needed includes—

- (a) Compass.
- (b) Photomap (first choice).
- (c) Topo map (second choice).
- (d) Shelter half or poncho (for night use).
- (e) Pencil.
- (f) Flashlight.

(2) Navigator is positioned in center of boat and does not paddle. During hours of darkness, he uses his flashlight under the poncho to check his map.

(3) Navigator places his compass in a fixed position oriented with the long axis of the boat thereby keeping a constant check on the boat's heading. He compares this heading with the azimuth of each reach which he determines from his map and he charts the boat's location on his map.

(4) The observer keeps the navigator informed of configuration of the river by announcing curves, sloughs, and stream junctions.

(5) The navigator compares this information with his map and informs the observer of curves, sloughs, reaches, and stream junctions from the map; and when these are confirmed, the navigator confirms the boat's location on his map.

(6) The observer keeps the navigator informed of turns due to crew failure to avoid confusing the navigator. The observer may also take the azimuth of reaches to confirm the navigator's heading and map azimuth.

(7) A strip map drawn on clear acetate backed with luminous tape may be used. The drawing may be to scale or a schematic. It should show all curves and the azimuth and distance of all reaches. It may also show terrain features, stream junctions, and sloughs.

j. Another aid to navigation is a strip map showing critical points drawn on a piece of luminous tape. A time-distance method is also available. The time from the point of origin to the first checkpoint is noted and compared with the entire distance to travel. This provides an estimate of the time required to complete the movement. If time of arrival at destination is critical, reverse planning by the time-distance method provides the required starting time.

B-6. Organization

a. Each assault boat transports at least four persons including the coxswain, who is an experienced operator, trained in river navigation.

He may or may not also be the boat commander. Other personnel perform duties to fulfill the requirements for navigation, observation, rowing, poling, etc. The size of the boat determines the size of the crew.

b. Normally, an element moving on water consists of at least two boats to provide some depth, flexibility, and safety if one boat comes under enemy fire, is swamped, or is swept into obstructions. The number of men, weapons, and boats necessary for the movement depends on the mission, but units of more than eight boats normally form into smaller maneuver elements. When assigning personnel to boats, the commander tries to maintain tactical unity.

B-7. Formations

The tactics of small waterborne units are similar to those of other small mounted and dismounted elements. Normal formations (column, parallel columns, vee, wedge, and echelon) are applicable to water movement. The situation and mission influence the choice of formation.

a. The column formation, or a variation, is frequently a choice because it allows all craft to use the same water and cover. Therefore, the risk of accidental grounding decreases. A disadvantage of the column formation is its provision of minimum firepower, surveillance, and security to the front.

b. The vee formation permits excellent firepower to the front and good firepower to each flank. It is useful during periods of reduced visibility when units maintain surveillance of both banks and maintain boat-to-boat visual contact.

c. The wedge or echelon formations are particularly suitable to maintain drawn on a visual surveillance of one or both banks. These formations permit excellent firepower to the front and good firepower to one or both flanks.

B-8. Control and Coordination

A simple, rapid, and reliable means of boat-to-boat communication is necessary. Arm and hand signals are satisfactory, but waterborne elements require additional immediate-action procedures and backup communication means to insure smooth functioning. The commander assigns checkpoints along the route. Reconnaissance aircraft communicate directly with a waterborne element either by using radio, when available, or by dropping messages. Use of a simple, rapid means of identification is necessary to coordinate the waterborne movement with other friendly forces in the area.

B-9. Reaction to Enemy Fire

a. The reaction of troops moving in assault boats to fires from an enemy outpost or ambush depends on the mission. When the mission requires avoiding contact, continued movement by waterway may be extremely difficult. The waterborne element may wait until darkness and then move under cover of the opposite bank. It may be necessary to dismount and continue the movement on foot.

b. When the commander has authority to fight, he has several possible courses of action.

(1) When time is critical, the element maintains forward movement and executes a coordinated plan for suppressive fire on the enemy position.

(2) An assault team may attack the ambush force or place a smokescreen between it and the boats. When possible, the ambush force and enemy positions are overrun.

c. A mission to seek out and eliminate enemy forces encountered requires a more deliberate attack on the enemy force. For example, when the leading boat comes under enemy fire, personnel in the two lead boats beach their craft and return the enemy's fire. The element leader goes ashore and, using all available cover and concealment, moves forward to reconnoiter the ambush site. He decides how best to use his force to destroy the enemy position quickly. By radio or arm and hand signal, he orders the element to beach all boats and to move forward. At least one automatic weapon remains at the boat assembly area. Boat operators protect their boats with automatic or individual weapons. After capture or destruction of the enemy, the element continues the mission.

B-10. Movement

a. For administrative moves on extremely wide rivers, boats normally move along the center of the river beyond the range of effective small-arms fire. On narrower waterways, to take advantage of natural concealment, movement is as close to the shoreline as is consistent with the water mine threat. Boats maintain an interval of 45 to 90 meters to maintain dispersal and to prevent collisions. Boats always maintain their relative positions in the formation. The two lead boats operate as a team, moving from one observation point to another. Sharp bends in a river frequently obscure the view of the river ahead. Personnel from one of the two lead boats go ashore to reconnoiter the river beyond the curve. Auto-

matic weapons from the other boat cover the personnel ashore. Footprints along the banks of the waterway may indicate the presence of enemy troops; waterfowl, suddenly alarmed and flying toward the unit, usually indicate the movement of humans along the river. Tributaries emptying into the waterway along the route are not entered unless required by the mission. Many of these tributaries may not be navigable, and entering them may result in damage to the boats or may unnecessarily delay the movement. When islands are encountered, the boats move through the near channel, avoiding open, exposed areas.

b. The element leader may order halts to send messages, rest, eat, or reconnoiter specific areas. The area selected for a halt should provide cover, concealment, and good firing positions and favor defense. The element maintains all-round security and continues to improve the position until it departs.

c. Secrecy of movement is difficult when using a motor and traveling against the current. At night, motor noise can be heard up to 8 kilometers away. Movement with the current, without using the motor, reduces noise.

d. Movement may be continuous, by successive bounds, or by alternate bounds. FM 17-36

provides an explanation of methods of movement.

B-11. Night Operations

Movement after dark assists in avoiding detection by the enemy. Special considerations for moving on waterways at night are as follows:

a. Waterways are more difficult to read, and dangerous areas are more difficult to detect.

b. All noises are audible at greater distances.

c. Coordination with friendly units is mandatory.

d. Lights and light-producing weapons such as white phosphorus (WP) grenades and flares are effective, both offensively and defensively.

e. Concealment along waterway banks is more effective.

f. Deception is more effective when units use native craft.

g. Detailed advance planning and rehearsals are necessary to insure prompt reaction by all personnel.

h. Standing operating procedure (SOP) stowage of equipment insures its location and use without lights.

i. Since enemy forces frequently employ reconnaissance by fire, friendly units withhold fire until obviously the enemy is firing at the boat.

Section II. ARMORED TROOP CARRIERS

B-12. General

a. Each unit forms boat teams when it undertakes a waterborne operation. A boat team consists of the Army troops embarked in one watercraft. An armored troop carrier (ATC) boat team may not correspond exactly to unit organization but an infantry platoon usually is the basis of the team. Positioning boats in the formation achieves unit integrity or dispersion, as required.

b. The senior Army man in each craft normally is the boat team commander. He and his designated assistant supervise the loading of Army personnel and equipment. The boat team commander also controls and directs the actions of embarked personnel during the movement.

c. This section, primarily for guidance of boat team commanders and their assistants, contains information on types of procedures employed. The unit SOP may modify the procedures herein.

B-13. Preparation for Movement

a. Major threats to embarked troops during movement are mines and direct fire weapons. In those areas in which mines are the principal

threat and the ATC are equipped with seats designed to cushion the blast, personnel must remain in the seats and use the seat belt. Accidental firing of weapons is also a hazard.

(1) The boat team stows and secures supplies and equipment to prevent their becoming missile hazards.

(2) Unless a dry ramp landing is probable, crew-served weapons remain in man-portable sections and are not assembled prior to landing. They are not loaded until necessary, and then only under careful supervision.

b. Individuals either wear or otherwise protect all individual equipment. They wear helmets and life jackets at all times. They wear packs if shock-absorbent seats are available; if not, personnel sit on their packs. Individual weapons are clear; safety is on; and magazines are removed while onboard the ATC.

B-14. Loading

a. The boat team commander organizes his team to expedite loading and securing equipment in the ATC. Procedures for loading through the bow ramp, from shore, pier, or ammi barges are relatively simple (fig B-2).

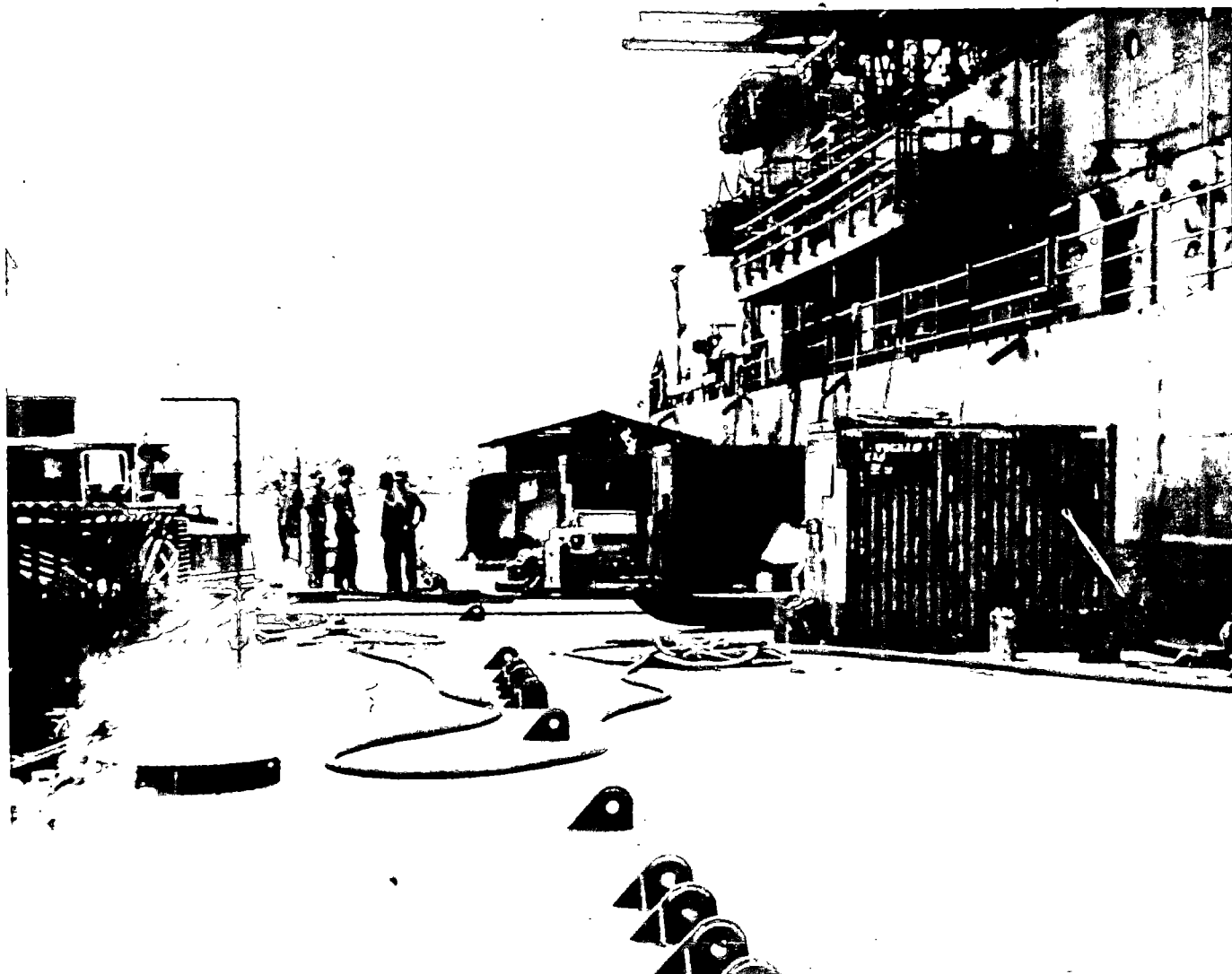


Figure B-2. Ammi barge moored alongside barracks ship.

They require common sense, safety precautions, and a reasonably even distribution of weight in the cargo space. Troops and vehicles load, prepared for speedy unloading.

b. Ammunition barges normally are moored alongside APB and APL. Loading from these barges follows the same general procedures as loading from a pier. To prevent congestion in companionways, on deck, or on the ammunition barge, members of boat teams remain in designated assembly areas until notified of their boat's arrival alongside. After notification, the team moves to the designated loading point on the ammunition barge and loads aboard its boat.

B-15. Boat Team Commander's Checklist

a. Preparation.

(1) Supervise boat team in assembly and loading areas.

(2) Appoint boat team members to be assistant boat team commanders.

(3) Assign personnel and equipment to positions in the boat in accordance with the ground tactical plan.

(4) Reconnoiter the route from assembly area to loading point.

(5) Muster boat teams in assembly area at required time.

b. Loading.

(1) Inspect each member for uniform, rations, and ammunition as well as adjustment of equipment.

(2) On order, lead boat team from assembly area to loading station.

(3) Report boat team readiness to loading station officer.

(4) Supervise loading of crew-served weapons and equipment.

(5) On order, commence and supervise loading.

(6) Inform coxswain (crew chief) of the ATC when all men and equipment are aboard.

(7) Insure that—

(a) Men are in assigned positions.

(b) Muzzles of weapons are all pointed outboard.

c. During Movement.

(1) Keep movement of troops in the cargo well to a minimum.

(2) Insure that all personnel wear helmets, life jackets, and packs.

(3) Continually inspect for potential missile hazards.

(4) Check troops for proper body positions.

(5) Coordinate with coxswain to train selected troops in immediate action procedures.

(6) Keep troops awake and alert. During lengthy movements, personnel may sleep.

(7) Provide immediate action assistance as requested.

d. Assault Landing.

(1) Check individual equipment prior to debarkation.

(2) Supervise loading and locking of individual weapons.

(3) Supervise assembly of equipment going ashore.

(4) Supervise removal of life jackets prior to landing.

(5) When ramp is fully down, lead the boat team out as fast as possible.

B-16. Immediate Action Procedures

a. Embarked troops may assist boat crews during the movement. Selected individuals receive training in performing boat crew duties. This provides trained personnel when the boat crew requires assistance.

b. Immediate action procedures that may require assistance from embarked troops are—

(1) *Responding to enemy fire.* Embarked troops may replace wounded boat crewmen and assist the boat captain as directed.

(2) *Assisting in damage control.* When the ATC crew becomes involved in extensive firefighting or damage control, they request assistance from the embarked troops in manning weapons, moving cargo, shoring, or assigning men to work with boat crew personnel. Embarked personnel keep clear of access routes and working space around the damaged area. However, initiative helps to reduce damage. For example, if a large hole is opened below

the waterline in the cargo well area, embarked troops may be able to stop the flow of water quickly by stuffing mattresses into the hole and using the pipe bunk frames for shoring. Designated personnel know the location and characteristics of firefighting equipment.

(3) *Securing a beached boat.* A boat may beach unexpectedly as a result of breakdown or combat damage. If possible, the boat is towed off immediately and/or the troops and crew are transferred. However, the embarked troops may assist in establishing local security until the boat is towed off or the troops and crew are transferred to another boat. Boat teams develop a plan for immediate execution.

(4) *Assisting in towing operations.* The boat crew, unassisted, normally accomplish towing operations. When under fire, however, the boat crew may man all boat crew stations and execute a tow with assistance of embarked troops. Expeditious towing requires rapid and proper line handling. Troops participating in waterborne operations require a familiarity with towing arrangements.

(5) *Abandoning boat.* Before troops abandon a boat, the boat normally is taken under tow or run aground. The troops may transfer to another craft, or they may have to go into the water under fire. When abandoning a boat under fire, embarked troops—

(a) Wear life jacket and helmet. Take weapons if conditions permit.

(b) Move over gunwale, keeping as low as possible on the side away from heaviest fire.

(c) Begin watching for approaching boats. *Do not swim to shore.*

(d) Float on back and close to water surface to reduce effects of underwater explosions and chances of being hit by boat propellers.

(e) Consider removing life jacket to present a smaller target.

(f) When burning oil is floating on the water, personnel must swim underwater and surface only to take a breath, and then only after splashing an area clear of oil.

(6) *Responding to call "man overboard."* All persons require training to react to the call "man overboard." When a man is seen in the water, shout "Man overboard," adding "port side" (left) or "starboard" (right), as the case may be. Designated personnel observe through the two ports in the ramp; and if, possible, a man is high enough on the bow ramp to point toward the person in the water. When any boat reports a man overboard, all boats

in the movement group are notified of the location of the boat from which he fell.

B-17. Assault Landings

a. Although an organized enemy may not oppose the landing, embarked troops always conduct an assault landing. The landing consists of two phases: preparation and movement ashore.

b. Troops remove life jackets prior to landing and leave them in the boat. Just before landing, troops put on packs, load and lock weapons, and assemble equipment to be carried ashore.

c. When the ramp is fully down, troops depart the boat quickly. If a dry ramp landing is not possible, lines, beach matting, or planks assist in crossing mud.



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APPENDIX C

LOAD PLANS

C-1. General

In a riverine area, watercraft transport troops, supplies, and equipment to an area of operations (AO) and provide continuous support within the AO. The success of the ground tactical operation depends on planning, preparing, and executing water movements rapidly and efficiently.

C-2. Planning Considerations

When planning for waterborne movements, commanders and staff officers require familiarity with the type and the characteristics of available watercraft. Considerations in determining the number of watercraft required to support a mission follow:

- a. Dimensions of the cargo compartment and the location and dimensions of the cargo door (or ramp).
- b. Allowable cargo load (ACL) of the type of watercraft used for the operation. The Navy river assault squadron (RAS) commander provides this information.
- c. Number of personnel, amount and configuration of equipment, and amount of supplies requiring transportation.

C-3. Determining Watercraft Requirements

After considering the foregoing factors and eliminating or replacing nontransportable items with transportable items, the planner uses the following methods to determine watercraft requirements:

- a. Weight method.
- b. Space method.
- c. Type of load method.

C-4. Weight Method

The basis for this method is the consideration that total weight transported is the determining factor. The weight method provides a means to estimate watercraft requirements rapidly. It is not accurate enough for computation of watercraft requirements when the watercraft carry major items of equipment, supplies, and

personnel in mixed loads. Example: Weight to be transported.

Personnel (178x240 lb)	42,720
Cargo	33,000
Assault boats (16x356 lb)	5,696

Total weight 81,416

Total weight	$= 81,416 \div 3.7$	or 4 armored troop carriers (ATC)
ACL	22,000	required.

C-5. Space Method

a. The space method is a convenient method for computing watercraft requirements for battalion waterborne operations. The number of spaces required for personnel, weapons, ammunition, supplies, and vehicles normally does not change from one operation to the next, or with every change in allowable cargo load. The majority of computations remain constant; therefore, use of the space method decreases overall planning time.

b. A space is the weight of a combat-equipped soldier and his proportionate share of handcarried supplies and equipment—about 240 pounds.

c. In converting weight to spaces, the planner considers only whole or half spaces. He carries fractions to the next higher half or whole space. *For example*, 8.1 equals 8.5; 8.6 equals 9.0.

d. The planner converts major items of equipment (heavy weapons, vehicles, or assault boats) into spaces by dividing the weight of each item by 240. He converts additional supplies not carried by the individual soldier into spaces by dividing their total weight by 240.

e. To determine the number of spaces a watercraft provides, the planner divides the ACL by 240. In converting ACL to spaces, he considers only whole spaces. He reduces fractions to the next lower whole space. *For example*, $22,000 \div 240 = 91.6 = 91$ spaces.

f. The maximum spaces available for personnel normally do not exceed 60 percent of the total. *For example*, 60 percent of 91 spaces equals 54.6. Reducing this to the next lower

whole number provides 54 spaces for personnel and 37 spaces for supplies and equipment.

C-6. Type of Load Method

a. The type of load method uses a prepared list of personnel, vehicles, equipment, and supplies for each particular type of watercraft. Planners develop sufficiently different loads to include all combinations of personnel, weapons, supplies, and equipment normally transported by watercraft. Preparation of different types of loads provides flexibility in planning waterborne operations.

b. Figures C-1 through C-9 depict typical types of loads. These figures show sample loads only and use the lightest weight equipment available. (Example: M3 baseplate is used instead of the heavier, more common M23A1 for the 81-mm mortar; and the rotator assembly only can be used for the 4.2-inch mortar if the watercraft has been adapted to replace the baseplate.) Many other combinations can be chosen. The weight shown as "available for other supplies and equipment" provides space for additional supplies and equipment designated by subordinate commanders.

1.	Pers			11,040 lb
	Rifle plt	44		
	FO (81-mm mort)	1		
	Medic	1		
			
	.....	$46 \times 240 \text{ (lb)} =$	11,040 lb	
2.	Sup			3,265 lb
	Rations	$46 \text{ (pers)} \times 2 \text{ (days)} = 92 \text{ (rations)} \ 92 + 4 = 23 \text{ (cases)} \times 25 \text{ (lb)} =$	575 lb	
	Water	$46 \text{ (pers)} \times 2 \text{ (gal per day)} = 92 \text{ (gal)} \times 2 \text{ (days)} = 184 + 5 \text{ (gal can)} = 37$		
	.....	$\text{(cans)} \times 50 \text{ (lb)} =$	1,850 lb	
	MOGAS	$100 \text{ (gal)} + 5 \text{ (gal can)} = 20 \text{ (cans)} \times 42 \text{ (lb)} =$	840 lb	
3.	Ammo			580 lb
	Rifle 5.56-mm	$3 \text{ (cases)} \times 60 \text{ (lb)} =$	180 lb	
	90-mm rcl rifle	$2 \times 10 \text{ (rd)} \times 10 \text{ (lb)} =$	200 lb	
	Misc Ammo		200 lb	
4.	Assault boats	$4 \text{ (each)} \times 356 \text{ lb} =$	1,424 lb	1,424 lb
			Subtotal 16,319 lb	
5.	Available for other sup and equip			5,691 lb
			Total ACL	22,000 lb

Figure C-1. Example of type I load for ATC.

1.	Pers			12,480 lb
	Rifle plt	44		
	FO (81-mm mort)	1		
	Medic	1		
	81-mm mort sqd	6		
			
	.....	$52 \times 240 \text{ lb} =$	12,480 lb	
2.	Wpns			94 lb
	1 81-mm mort		94 lb	
3.	Sup			3,590 lb
	Rations	$52 \text{ (pers)} \times 2 \text{ (days)} = 104 \text{ (rations)} \ 104 + 4 = 26 \text{ (cases)} \times 25 \text{ lb} =$	650 lb	
	Water	$52 \text{ (pers)} \times 2 \text{ (gal per day)} = 104 \text{ (gal)} \times 2 \text{ (days)} = 208 \text{ (gal)} + 5 \text{ (gal)} = 42$		
	.....	$\text{(cans)} \times 50 \text{ (lb)} =$	2,100 lb	
	MOGAS	$100 \text{ (gal)} + 5 \text{ (gal can)} = 20 \text{ (cans)} \times 42 \text{ (lb)} =$	840 lb	
4.	Ammo			1,640 lb
	Rifle 5.56-mm	$3 \text{ (cases)} \times 60 \text{ (lb)} =$	180 lb	
	90-mm rcl rifle	$2 \times 10 \text{ (rd)} \times 10 \text{ (lb)} =$	200 lb	
	81-mm mort	$1 \times 80 \text{ (rd)} = 80 \text{ rd } 80 + 4 = 20 \text{ (cases)} \times 53 \text{ (lb)} =$	1,060 lb	
	Misc ammo		200 lb	
5.	Assault boats	$4 \text{ (each)} \times 356 \text{ (lb)} =$	1,424 lb	1,424 lb
			Subtotal 19,228 lb	
6.	Available for other sup and equip			2,772 lb
			Total ACL	22,000 lb

Figure C-2. Example of type II load for ATC.

1.	Pers			12,960 lb
	Rifle plt	42		
	FO (81-mm mort)	1		
	Medic	1		
	Engr	10		
		<hr/>		
		$54 \times 240 =$	12,960 lb	
2.	Sup			3,715 lb
	Rations	$54 (\text{pers}) \times 2 (\text{days}) = 108 \text{ rations } 108 + 4 = 27 (\text{cases}) \times 25 (\text{lb}) =$	675 lb	
	Water	$54 (\text{pers}) \times 2 (\text{gal per day}) = 108 (\text{gal}) \times 2 (\text{days}) = 216 + 5 (\text{gal can}) = 44$		
		$(\text{cans}) \times 50 (\text{lb}) =$	2,200 lb	
	MOGAS	$100 (\text{gal}) + 5 (\text{gal can}) = 20 (\text{cans}) \times 42 (\text{lb}) =$	840 lb	
3.	Ammo			680 lb
	Rifle 5.56-mm	$3 (\text{cases}) \times 60 (\text{lb}) =$	180 lb	
	90-mm rcl rifle	$2 \times 10 (\text{rd}) \times 10 (\text{lb}) =$	200 lb	
	Misc ammo		300 lb	
4.	Assault boats	$4 (\text{each}) \times 356 (\text{lb}) =$	1,424 lb	1,424 lb
			Subtotal 18,779 lb	
5.	Available for other sup and equip			3,766 lb
			Total ACL	<u>22,000 lb</u>

Figure C-3. Example of type III load for ATC.

1.	Pers			2,880 lb
	Rifle co HQ	6		
	FO team (4.2-in mort)	2		
	FO team (105-mm how)	3		
	Medic	1		
		<hr/>		
		$12 \times 240 =$	2,880 lb	
2.	Sup			1,490 lb
	Rations	$12 (\text{pers}) \times 2 (\text{days}) = 24 \text{ rations } 24 + 4 = 6 (\text{cases}) \times 25 (\text{lb}) =$	150 lb	
	Water	$12 (\text{pers}) \times 2 (\text{gal per day}) = 24 (\text{gal}) \times 2 (\text{days}) = 48 (\text{gal}) + 5 (\text{gal can}) =$		
		$10 (\text{cans}) \times 50 (\text{lb}) =$	500 lb	
	MOGAS	$100 (\text{gal}) + 5 (\text{gal can}) = 20 (\text{cans}) \times 42 (\text{lb}) =$	840 lb	
3.	Assault boats	$3 (\text{each}) \times 356 (\text{lb}) =$	1,068 lb	1,068 lb
			Subtotal 5,438 lb	
4.	Available for other sup and equip			16,562 lb
			Total ACL	<u>22,000 lb</u>

Figure C-4. Example of type IV load for ATC.

1.	Pers			6,720 lb
	Rifle co HQ	6		
	FO team (4.2-in mort)	2		
	FO team (105-mm how)	3		
	Medic	1		
	2 sqd 81-mm mort	12		
	81-mm mort FDC	4		
		<hr/>		
		$28 \times 240 \text{ lb} =$	6,720 lb	
2.	Wpns			188 lb
	2 81-mm mort		188 lb	
3.	Sup			2,340 lb
	Rations	$28 (\text{pers}) \times 2 (\text{days}) = 56 \text{ rations } 56 + 4 = 14 (\text{cases}) \times 25 (\text{lb}) =$	350 lb	
	Water	$28 (\text{pers}) \times 2 (\text{gal per day}) = 56 (\text{gal}) \times 2 (\text{days}) = 112 (\text{gal}) + 5 (\text{gal can}) =$		
		$23 (\text{cans}) \times 50 (\text{lb}) =$	1,150 lb	
	MOGAS	$100 (\text{gal}) + 5 (\text{gal can}) = 20 (\text{cans}) \times 42 (\text{lb}) =$	840 lb	
4.	Ammo			
	81-mm mort	$2 (\text{mort}) \times 80 (\text{rd}) = 160 \text{ rd } 160 + 4 = 40 (\text{case}) \times 53 (\text{lb}) =$	2,120 lb	
	Misc ammo		200 lb	
5.	Assault boats	$5 (\text{each}) \times 356 \text{ lb} =$	1,780 lb	1,780 lb
			Subtotal 13,340 lb	
6.	Available for other sup and equip			8,660 lb
			Total ACL	<u>22,000 lb</u>

Figure C-5. Example of type V load for ATC.

FM 31-75

1.	Pers				
	4.2-in mort plt	21 × 240 lb =	5,040 lb	5,040 lb	
2.	Wpns			1,280 lb	
	2 4.2-in mort		1,280 lb		
3.	Sup			1,965 lb	
	Rations	21 (pers) × 2 (days) = 42 rations 42 + 4 = 11 (cases) × 25 (lb) =	275 lb		
	Water	21 (pers) × 2 (gal per day) = 42 (gal) × 2 (days) = 84 (gal + 5 (gal cans) =			
		17 (cans) × 50 (lb) =	850 lb		
	MOGAS	100 (gal) + 5 (gal can) = 20 (cans) × 42 (lb) =	840 lb		
4.	Ammo			4,320 lb	
	4.2-in mort	100 (rd) + 2 = 50 (cases) × 82 (lb) =	4,100 lb		
	Misc ammo		420 lb		
5.	Assault boats	4 (each) × 356 (lb) =	1,424 lb	1,424 lb	
			Subtotal	14,029 lb	
6.	Available for other sup and equip			7,971 lb	
			Total ACL	22,000 lb	

Figure C-6. Example of type VI load for ATC.

1.	Pers				
	4.2-in mort plt	10 × 240 lb =	2,400 lb	2,400 lb	
2.	Wpns			640 lb	
	1 4.2-in mort		640 lb		
3.	Sup			1,116 lb	
	Rations	10 (pers) × 2 (days) = 20 rations 20 + 4 = 5 (cases) × 25 (lb) =	125 lb		
	Water	10 (pers) × 2 (gal per day) = 20 (gal) × 2 (days) = 40 + 5 (gal can) = 8			
		(cans) × 50 (lb) =	200 lb		
	MOGAS	100 (gal) + 5 (gal can) = 20 (cans) × 42 (lb) =	840 lb		
4.	Ammo			11,162 lb	
	4.2-in mort	250 (rd) + 2 = 125 cases 125 × 82 (lb) =	10,250 lb		
	Misc ammo		200 lb		
5.	Assault boats	2 (each) × 356 (lb) =	712 lb		
			Subtotal	15,318 lb	
6.	Available for other sup and equip			6,682 lb	
			Total ACL	22,000 lb	

Figure C-7. Example of type VII load for ATC.

1.	Pers				
	Bn S4 and spt plt	4 × 240	960 lb	960 lb	
2.	Sup			20,950 lb	
	C1 I		5,000 lb		
	C1 II, IV, VI, VII, VIII,				
	IX, and X		1,000 lb		
	C1 III		250 lb		
	C1 V		14,700 lb		
			Subtotal	21,910 lb	
3.	Available for other sup and equip			80 lb	
			Total ACL	22,000 lb	

Figure C-8. Example of Type VIII load for ATC.

1.	Pers				
	105-mm how sec	9 × 240 =		2,160 lb	
2.	Wpns			5,236 lb	
	1 105-mm how (towed) ...				
3.	Ammo			1,020 lb	
	105-mm how	20 (rd) × 51 lb			
4.	Veh			13,580 lb	
	1 2½-ton trk WWN				
			Total	21,996 lb	
			Total ACL	22,000 lb	

Figure C-9. Example of type IX load for ATC.

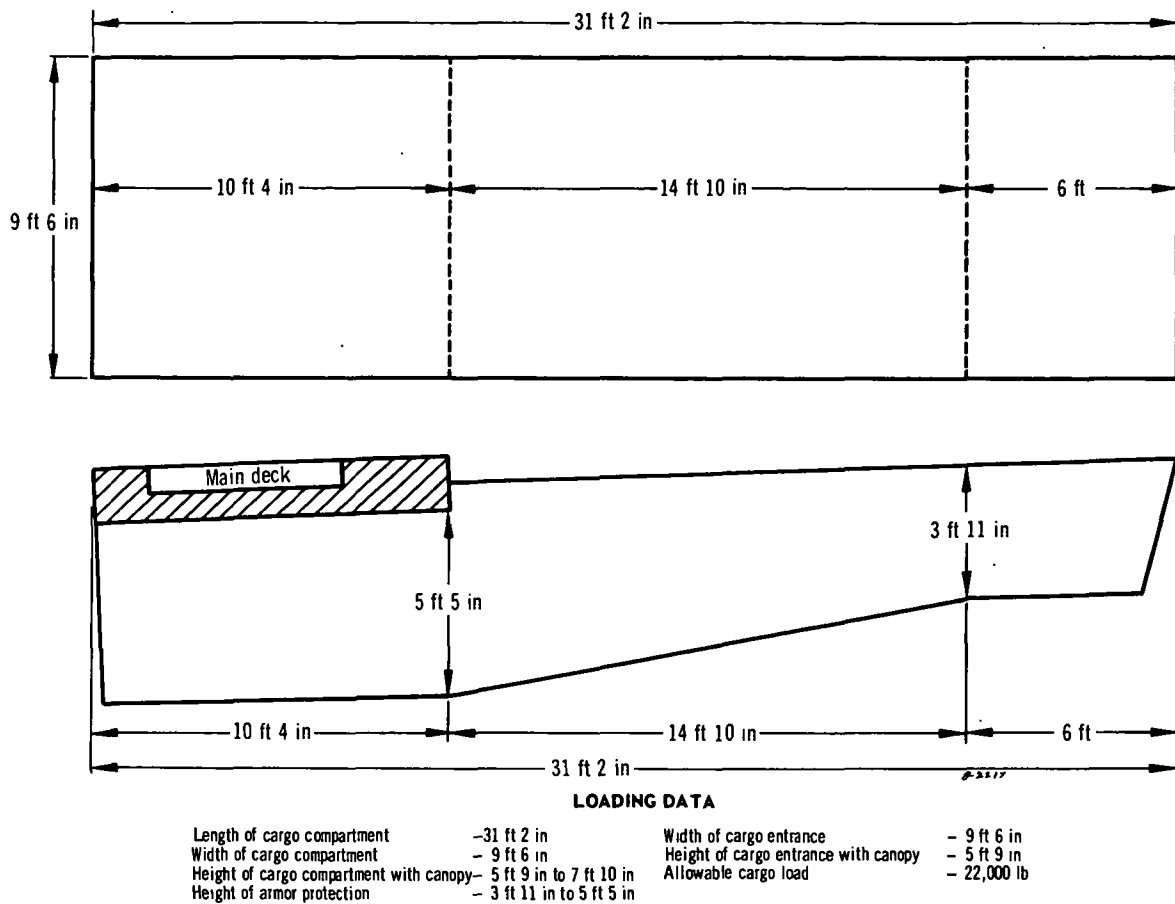


Figure C-10. Loading data for ATC (schematic).

c. The length of some waterborne operations requires the serving of hot meals in the AO. ATC transport mess teams, equipment, and rations to the AO. Mess teams may prepare meals en route or after the troops debark.

d. The height of the armor protection on ATC limits cargo heights to that of the armor. However, when the cargo does not require armor protection, removal of the canopy permits equipment or supplies to extend higher than the height of the armor plate. The load is within the weight limitations in either case. Figure C-10 shows loading data and a diagram of an ATC.

C-7. Water Movement Forms

The planner uses the following water movement forms in planning, preparing, figures show and conducting waterborne operations to insure timely and coordinated effort by all forces involved.

a. *Water Movement Table.* The Army battalion commander and the Navy RAS commander jointly prepare this table. Based on the landing plan, this table provides movement data for the operation. It is usually an appendix to the water movement plan annex. Figure C-11 illustrates a partly completed water movement table.

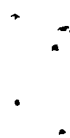
b. *Watercraft Loading Table.* Army commanders prepare this table to specify the personnel, equipment, and vehicles loaded on each watercraft. The watercraft loading table need list only the type of load number and weight. When ATC transport cargo and personnel plus types of loads, the cargo and equipment are listed by item and weight. The watercraft loading table usually is an appendix to the water movement plan annex. The Navy commander normally receives a copy for information. Figure C-12 illustrates a sample table.

Serial or movement unit	Army unit	Naval unit	Number/type watercraft	Chalk number	Loading area/station or aite	Loading time	Departure time	Rendezvous area	Start point time	Release point time	Landing area/site	Landing time	Initial objective	Remarks
1	Co A 2 sqd hv mort plat 1 S4 cbt tns ATC (CPT Smith)	RAS-7 (LTJG Brown)	4/ATC 1/ATC 1/ATC	1-4 5 6	A/2, 4, 6, 8 C/3 D/1	0440 0410	0450	Z	0500	0850	B/1, 2, 3, 4 A/3 -	0900 -	WHITE - -	Firing pos vic LS-3 Remain afloat
2	Co B 2 sqd hv mort plat	RAS-7	4/ATC 1/ATC	7-10 11	A/1, 3, 5, 7 C/4	0440	0455	X	0505	0855	A/1, 2, 3, 4 A/3	0900	RED	Firing pos vic LS-3

Figure C-11. Example of water movement table (partly completed).

Appendix _____					Headquarters _____		
To _____					Date _____		
Serial or movement unit	Naval unit	Watercraft		Ground unit	Watercraft loaded with	Loading area/site and time	Remarks
		Chalk number	Hull number				

Figure C-12. Typical watercraft loading table format.



GLOSSARY

Section I. DEFINITIONS

Afloat base—A concentration of naval barracks ships, supporting ships, and watercraft for use as a mobile base by both ground and naval forces during a riverine campaign. The base includes the surrounding land and water areas required for close-in security.

Area of operations—That portion of an area of conflict necessary for military operations, either offensive or defensive, pursuant to an assigned mission and for the administration incident to such military operations.

Assault boats—Watercraft or amphibious vehicles employed for landing troops and equipment in the conduct of riverine operations. The term "assault boats" includes inflatable boat, small (IBS); boat, landing, inflatable, assault craft; boat, reconnaissance, pneumatic; assault boat, plastic; swimmer support boat; and fire team assault boat.

Combat base—A temporary emplacement in an area of operations (AO) established by a brigade or battalion, consisting of essential command and control, fire support, and combat service support elements of the unit. Supporting naval elements and attachments needed to accomplish the assigned mission are included in the base.

Killing zone—The portion of an ambush site where fires are concentrated to isolate, trap, and destroy the target.

Patrol base—Temporary emplacement or location established by a company from which it conducts extensive patrolling, reconnaissance, raid, or other operations.

River operations—Refers only to specific tasks conducted on or directed primarily at waterways—water patrol, transport, and combat support—as part of the overall riverine operations.

Riverine area—An inland or coastal area comprising both land and water, characterized by limited land lines of communications, with extensive water surface and/or inland waterways that provide natural routes for surface transportation and communications.

Riverine assault force (RAF)—The naval ele-

ments assigned to a riverine force. It is composed of one or more river assault squadrons, barracks ships, repair ships, logistic support ships, and various other support craft.

Riverine force—The force organized or assembled to conduct riverine operations, composed of land, naval, and air, when available; and ground forces operating from afloat or land bases and responsive to the ground force commander.

Riverine operations—Refers only to specific tasks conducted on or directed primarily at waterways—water patrol, transport, and combat support—as part of the overall riverine operations.

Riverine warfare—All military activities designed to achieve and/or maintain territorial control of a riverine area by destroying enemy forces and restricting or eliminating their activities. The basic nature of riverine warfare is sustained ground combat in a land environment dominated by water.

Tactical area of responsibility (TAOR)—A defined area of land for which responsibility is specifically assigned to the commander of the area as a measure for control of assigned forces and coordination of support. This responsibility includes, but is not limited to, the following specific functions:

1. Defense of key installations.
2. Conduct of operations, including reaction operations, necessary to secure the area against enemy regular (main), regional, or village militia forces.
3. Support of internal defense and internal development programs.
4. Civil-military operations, including military civic action, as required or directed.

Waterborne operations—Operations in which combat forces and their combat support and combat service support elements move about the battlefield in watercraft under the control of a ground force commander to engage in ground combat.

Section II. ABBREVIATIONS

The following abbreviations are listed because many of them are peculiar to riverine operations. Some may be found in AR 310-50, but are included herein for the convenience of the user.

ACC	area coordination center	MEDEVAC	medical evacuation (air ambulance)
ANGLICO	air and naval gunfire liaison company	MRF	mobile riverine force
AO	area of operations	NGFSPTR	naval gunfire spotter
APB	self-propelled barracks ship		
AR/	armored reconnaissance airborne assault vehicle	NGLO	naval gunfire liaison officer
ARL	landing craft repair ship	PRB	patrol boat river
ASPB	assault support patrol boat	RAS	riverine assault squadron
ATC	armored troop carrier	RIVDIV	riverine division
CAS	close air support		
CCB	command and control boat	RP	release point
COMSEC	communications security	RSOP	reconnaissance, selection, and occupation of position
		RST	river survey team
DME	distance measuring equipment	SCP	survey control point
EAM	electronic accounting machine	SEAL	sea-air-land
EOD	explosive ordnance disposal	SFCP	shore fire control party
FAC	forward air controller	SLAR	side loading aerial radar
FCL	fire coordination line	TACP	tactical air control party
FSB	fire support base	TAOR	tactical area of responsibility
FSE	fire support element	TE	task element
LCM	landing craft mechanized	TU	task unit
LOC	lines of communications	UDT	underwater demolitions team
LSE	landing signal enlisted	VR	visual reconnaissance
LSO	landing signal officer	YOG	military yard tankers
LZ	landing zone		

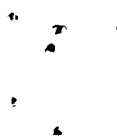
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