

Chapter 1.

River Crossing Concepts

METHODS OF CROSSING RIVERS

River crossing operations have always been an integral part of land warfare. From Alexander the Great's crossing of the Hydaspes River in 326 BC, to modern times, an army's ability to cross significant water obstacles has often led to the success, or failure, of that army. The lethality of modern weapons and the capabilities of larger enemy formations have mandated that US forces adapt an AirLand Battle doctrine which relies heavily upon our ability to maneuver. The ability of the US Army to cross rivers quickly and efficiently is critical to the success of this doctrine. Field Manual (FM) 90-13 prescribes three types of river crossing operations: the hasty, deliberate, and retrograde crossing. A basic understanding of each of these crossing methods is essential to a commander's ability to employ his available river crossing assets.

Hasty

A hasty crossing is a decentralized operation using organic, existing, or expedient crossing means. This type of river crossing is conducted as a continuation of the attack and results in little or no loss of momentum by the attacking force. Because of this, the hasty river crossing is the preferred method of negotiating water obstacles. The hasty crossing can normally be accomplished in situations where the enemy's defending forces are weak, or confused, and in cases where the river does not constitute a

severe obstacle. The methods available for conducting a hasty crossing include the use of—

- Existing bridges or civilian ferries
- Armored vehicle launched bridges (AVLBs)
- Amphibious vehicles
- Ford sites
- Organic rafting/bridging equipment

Where these crossing means are available in sufficient quantities to quickly cross the bulk of the advancing forces, a hasty river crossing should be strongly considered as a feasible method of crossing the water obstacle.

Deliberate

In situations where the hasty river crossing is infeasible, or when a hasty crossing has failed, the deliberate method must be executed. A deliberate crossing is not usually conducted from the march, but requires a buildup of firepower and river crossing equipment. Inherent in the conduct of such a crossing is the need for detailed planning and centralized control. The deliberate crossing is a three-phased operation consisting of an assault phase, a rafting phase, and a bridging phase. The methods available for conducting a deliberate crossing may include all of the means provided in a hasty crossing, as well as the addition of Corps rafting and bridging assets. The selection of crossing

sites is an essential part of the employment of these assets.

Retrograde

Unlike the hasty and deliberate methods of crossing rivers, the retrograde crossing is a defensive operation. The retrograde crossing is conducted in situations where the enemy's advances threaten to overwhelm the friendly forces. In such cases, the retrograde crossing is conducted with the intention of protecting the retrograding force and establishing a viable defense along the exit bank of the river. Retrograde crossings present a high risk to the retrograding force and are characterized by—

- Enemy control of the maneuver initiative
- Detailed planning
- Centralized control
- A delaying action against the enemy's advance, as an attempt to trade space for time at the crossing sites.

Ideally, the retrograde crossing is conducted in a way which will force the enemy to conduct a deliberate river crossing. The commander must consider all available crossing means in planning this type of river crossing operation.

SELECTION OF CROSSING SITES

Crossing site selection is a critical step in the execution of a river crossing operation. This

selection must be based upon a detailed reconnaissance of the river and a keen understanding of the overall tactical plan. Crossing sites are generally characterized as either assault, rafting, or bridging sites. Since it is unlikely that any one site will have all of the desired characteristics, every available site must be carefully analyzed. Ultimately, the sites which best support the tactical plan should be selected.

Assault

In the assault phase of a deliberate river crossing the commander attempts to cross sufficient combat power to secure the far shore of the river. The commander designates initial far shore objectives which must be seized to accomplish this task. The assault forces may cross the river by fording, swimming amphibians, or by using AVLBs, assault boats, or army aircraft. With the exception of the latter, each of these crossing means requires the selection of a suitable assault crossing site. All assault sites should be located in a position where—

- Enemy forces are weak.
- There is dominant terrain on the friendly shore from which the assault can be supported by overmatching fires.
- There is concealment from enemy observation.
- There are adequate routes to the river, as well as routes away from the river, towards the initial objectives.
- The current velocity of the river is slow (0 to 5 feet per second (FPS) is desirable).

Additional characteristics for the use of specific crossing means include –

AVLBs:

- Narrow gap (57 feet for unprepared abutments)
- Firm banks on both shores
- Uphill grade of 28 percent or less
- Downhill grade of 19 percent or less
- Transverse grade of 11 percent or less

Ford Sites:

See Table 1 on page 3.

Swimming Sites and Assault Boat Sites:

- Minimum exposure to enemy direct fire weapons
- Covered and concealed access to the river
- Gently sloping, firm banks which permit rapid entry and exit at multiple points along the river
- Narrow point along the river
- Bank slopes of 30 percent or less

When selecting these sites it must be understood that vehicles and boats will drift downstream while attempting to negotiate the water obstacle. Generally, the degree of drift is based upon the swim speed of the vehicle and the current velocity of the river. More specifically—

For M113s: (APC)

Downstream drift (in feet)
= $\frac{\text{current}}{5.3}$ (FPS) x river width (in feet)

For M2/M3s: (BIFV)

Downstream drift (in feet)
= $\frac{\text{current}}{6.6}$ (FPS) x river width (in feet)

For assault boats:

Downstream drift (in feet)
= $\frac{\text{current}}{5.0}$ (FPS) x river width (in feet)

Rafting

In the rafting phase of a river crossing operation, the commander reinforces assault forces with armored vehicles and antiarmor weapons. Ribbon rafts are heavily relied upon to accomplish this task. The M4T6 and Class 60 rafts, as well as light tactical rafts (LTRs), may also be used when sufficient ribbon assets are unavailable. All raft sites should—

- Be positioned downstream of proposed bridge sites.
- Be placed in locations which provide the fastest access to the initial far shore objectives.
- Have well established road networks leading to them on the near shore and acceptable routes of egress on the far shore.
- Have firm banks on both shores with slopes of 0 to 20 percent where possible.
- Be located on a narrow point along the river which is free of sandbars or other obstacles which might impede rafting operations.

- Be placed in locations where the current velocity of the river is slow. Currents of 0 to 5 FPS are desired. Currents greater than 10 FPS are considered to be unacceptable.
- Provide depth of water greater than the draft of the floating raft to be used at that site. See Table 2.

Bridging

As a river crossing operation progresses, the crossing force commander will use floating bridges to cross the bulk of the advancing force. Ribbon equipment will be used extensively in this role. The M4T6 and Class 60 bridges may be constructed along proposed main supply routes (MSRs) to provide lines of communications for the advancing forces. All bridge sites should —

- Be located upstream of raft sites.
- Be constructed at sites with well established road networks on both sides of the river.
- Have firm banks with slopes of to 10 percent where possible. If banks are not firm, units may use the Access/Egress Roadway System (AERS). See Appendix F.
- Be located along a narrow portion of the river and in a position where currents are no greater than 10 FPS (0 to 5 FPS is preferred).
- Provide depth of water greater than the draft of the floating bridge to be used at that site. See Table 3 on page 4.

Table 1. Ford site restrictions

Type of traffic	Maximum water depth	Minimum width of ford	Maximum bank slopes
Foot	39"	39"	100%
Light armored vehicles	39"	14"	50%
Medium/heavy armored vehicles	42"	14"	50%

Note. The riverbed must be able to support the traffic which is being forded. The maximum bank slopes are based upon banks which are firm and dry.

Table 2. Draft of floating rafts

Type of raft	Required water depth for loaded raft
Ribbon	24"
M4T6	29"
Class 60	29"
LTR	22"

Note. This table applies when the bridge erection boat, shallow draft (BEB-SD) is used to propel the raft. The draft of the older 27-foot bridge erection boat (BEB) is 40 inches. When using outboard motors to propel LTRs, 24 inches of water is required.

The need for adequate assembly sites must also be considered when establishing a bridge site. The size and number of assembly sites vary with the type and length of the bridge to be built and with the method of construction that is used. Subsequent chapters provide additional guidance regarding launch and assembly sites for specific types of floating bridges.

Table 3. Draft of floating bridges

Type of bridge	Required water depth
Ribbon	24"
M4T6	40" *
Class 60	40" *
* This value is based upon the required water depth for the first bay of bridge.	