

19 August 2005

Safety

Tactical Overwater Operations

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**\*This regulation supersedes USAREUR Regulation 385-4, 6 June 1991.**

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**Summary.** This regulation provides safety standards and procedures for tactical overwater operations.

**Applicability.** This regulation applies to units in the Army in Europe conducting tactical overwater operations or participating in USAREUR-sponsored tactical overwater training exercises.

**Supplementation.** Organizations will not supplement this regulation without USAREUR G1 (AEAGA-SA) approval.

**Forms.** AE and higher-level forms are available through the Army in Europe Publishing System (AEPUBS).

**Records Management.** Records created as a result of processes prescribed by this regulation must be identified, maintained, and disposed of according to AR 25-400-2. Record titles and descriptions are available on the Army Records Information Management System website at <https://www.arims.army.mil>.

**Suggested Improvements.** The proponent of this regulation is the USAREUR G1 (AEAGA-SA, DSN 370-8124). Users may suggest improvements to this regulation by sending DA Form 2028 to the USAREUR G1 (AEAGA-SA), Unit 29351, APO AE 09014-9351.

**Distribution.** D (AEPUBS).

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## **SECTION I INTRODUCTION**

### **1. PURPOSE**

This regulation provides safety standards for overwater operations (glossary) during wartime tactical and peacetime training operations.

### **2. REFERENCES**

Appendix A lists references.

### **3. EXPLANATION OF ABBREVIATIONS AND TERMS**

The glossary defines abbreviations and terms.

#### **4. PLANNING**

Planning is critical to the success of overwater operations. Commanders will have a written plan specific to the unit and operation before beginning tactical overwater operations.

- a. Commanders will use this regulation and FM 90-13 as the basis for developing overwater operation plans.
- b. When deployed to USAREUR major training areas (MTAs), MTA standards must be considered.
- c. Each operation in or over water will be evaluated by the commander of the crossing unit. This evaluation will be made to determine required safety measures based on the type of operation, existing or expected conditions, and applicable regulations and manuals.
- d. Commanders must remember that European rivers routinely exceed 1.5 meters water-current speed per second.

#### **5. MODIFYING SAFETY STANDARDS**

Commanders must make mission decisions based on the degree of safety standards used versus the tactical situation and the nature of the water being crossed. Risk analyses prepared by the safety staff and mission planners will help commanders in the decision-making process. Crossing area commanders (CACs) and unit commanders may modify safety standards. Commanders below the division or equivalent level may modify policy or standards in this regulation only after informing and receiving approval from the chain of command up to the division or equivalent level.

### **SECTION II RESPONSIBILITIES**

#### **6. COMMAND**

During the mission-planning and execution phases, commanders responsible for conducting overwater operations will—

- a. Review safety standards in this regulation.
- b. Ensure unit safety officers and noncommissioned officers (NCOs) are assigned safety-standard compliance duties.
- c. Ensure a written risk analysis is completed and countermeasures are begun before the mission is executed.
- d. Ensure unit water-crossing plans and mission safety guides are developed according to this regulation and established doctrine. Water-crossing operations and mission safety guides will be tailored to the unit's specific operations.
- e. Review the causes of previous accidents and develop countermeasures to prevent these accidents from recurring.
- f. Ensure every person is trained properly.

#### **7. STAFF**

Heads of staff offices at all levels will ensure safety standards in this regulation are referred to in operation plans that subordinate commands submit for review.

#### **8. COMMANDERS OF CROSSING UNITS**

a. Commanders of crossing units are responsible for every aspect of their unit's operation. The commander may designate a CAC to plan and control the overwater element of the operation. Designating a CAC allows the crossing unit commander to command all aspects of the unit's operations.

b. The crossing unit commander's responsibility for safety in operations is not reduced by designating a CAC. Safety remains the responsibility of the commander, who is the crossing area safety officer (CASO) for overwater operations. The CASO will—

- (1) Complete a risk analysis of planned operations.
- (2) Integrate accident-prevention measures into the watercrossing operation plans and pre-mission briefings.
- (3) Develop a safety guide that is unique to the unit's equipment and mission for use before mission execution.
- (4) Supervise safety operations (including control implementation and rescue operations).

(5) Perform the duties of the CAC (para 9) if one is not designated.

c. At fording sites, the commander of the crossing unit will ensure compliance with established operation and pre-mission standards (para 17).

d. When overwater operations are part of engineer-unit bridge training, the crossing unit commander will assume CAC duties (para 9).

## **9. CROSSING AREA COMMANDERS**

a. Battalion or equivalent and higher-level commanders will designate a CAC. The CAC will—

- (1) Appoint an assistant crossing area safety officer (ACASO) for each raft or bridge site.
- (2) Appoint emergency support personnel (ESP) (paras 13 and 18).
- (3) Control all aspects of the overwater operation.
- (4) Plan and integrate tactical concepts into the overwater operation.

b. When the results of the CASO risk analyses show a need for additional safety measures or when personal flotation devices (PFDs) other than type I are used, the CAC will provide and coordinate the use of—

- (1) One or more powered or nonpowered rescue boats with qualified operators.
- (2) A radio communications system between safety boats, construction sites, and amphibious vehicles.
- (3) The appropriate type of PFDs for local conditions and operations (para 15).
- (4) Other auxiliary equipment (including lengths of rope (lifelines) for anchoring at each shore).
- (5) Two certified lifeguards who have had refresher training within the past 12 months.

c. The CAC will plan overwater operations site pre-mission briefings based on CASO risk analyses and the safety guide. These briefings will be presented to unit personnel within the 24 hours before the overwater operation and will include at least the following:

- (1) Mission objectives.
- (2) Results of pre-mission risk analyses.
- (3) Control of spectators.
- (4) Emergency procedures, radio frequencies, and signals.
- (5) Loading and dismounting procedures.
- (6) Location and function of ESP.
- (7) Route to the nearest first-aid station or hospital. The CAC will provide a stripmap for each driver of a medical-evacuation vehicle.
- (8) Proper storage of equipment in boats and rafts.
- (9) Uniform requirements for the type of operation (for example, trousers unbloused, uniforms of weak swimmers and nonswimmers marked, the proper fit of appropriate PFDs). Appendix B lists emergency support and uniform standards.

d. The CAC will supervise safety operations (including control and implementation of rescue operations).

e. The appointment of ACASOs and ESP (a(1) and (2) above) does not reduce the commander's responsibility for safety during operations. The CAC will appoint ACASOs and ESP in time to allow for adequate planning.

f. The CAC or a designated representative will be present at major crossing sites during operations (except for fording sites). The CAC or representative will ensure compliance with established operation standards.

#### **10. ASSISTANT CROSSING AREA SAFETY OFFICERS**

ACASOs will be NCOs (staff sergeants or above) or commissioned officers appointed to help the CAC plan and execute the mission. ACASOs must be familiar with planned operations (for example, amphibious-vehicle operations; assault-boat, bridging, or rafting operations; fording). Depending on the type of operation, the ACASO will—

- a. Supervise and monitor site safety standards using CASO-developed guides.
- b. Supervise amphibious-vehicle rescue drills on land before the mission is executed.
- c. Help the CAC prepare the pre-mission safety briefing and be an assistant briefer as required.
- d. Brief rescue crews (ambulance drivers, lifeguards, medical personnel, and rescue-boat operators) on—
  - (1) Mission objectives.
  - (2) Results of pre-mission risk analyses.
  - (3) Location of trained engineer personnel, if applicable.
  - (4) Loading and dismounting procedures. Rehearsals may be required, depending on the experience level of participants.
  - (5) Proper storage of equipment in boats and rafts.
  - (6) Safety-boat manifests and locations during operations.

#### **11. UNIT NONCOMMISSIONED OFFICERS**

Unit NCOs will lead by example and demonstrate personal interest in Soldier safety by being aware of and enforcing overwater safety standards. Conducting the mission to standards is key to preventing overwater accidents. Enforcing overwater safety standards enhances mission accomplishment and requires leader interest, accountability, and direction.

#### **12. VEHICLE COMMANDERS**

Vehicle commanders will—

- a. Supplement crew briefings as required to ensure operators are aware of and understand established vehicle operating standards and emergency-exit procedures.
- b. Supervise crewmember vehicle loading and two pre-mission emergency egress drills on land before mission execution.

**NOTE:** The vehicle commander will ensure each vehicle crew conducts two exit drills on land before the water-crossing. For this training, the vehicle must be fully loaded (including every person who will be involved, individual weapons, and personally carried equipment).

- c. Check crew uniform standards (app B).

#### **13. EMERGENCY SUPPORT PERSONNEL**

ESP will be assigned duties related to their ESP functions only when mission risk analyses or the provisions of this regulation require their deployment. ESP include ambulance drivers, lifeguards, and medical personnel.

### **SECTION III SAFETY PROCEDURES**

#### **14. GENERAL**

Specific procedures for water operations are in the appendixes indicated below:

- a. Amphibious-vehicle swimming: appendix C.
- b. Assault-boat operations: appendix D.

- c. Bridging operations: appendix E.
- d. Rafting operations: appendix F.
- e. Shallow-water fording: appendix G.

## 15. PERSONAL FLOTATION DEVICES AND REQUIREMENTS

- a. The following are descriptions of types and specifications of PFDs:

**(1) U.S.-Manufactured Type I PFD.** U.S.-manufactured type I PFDs (national stock number (NSN) 4220-00-783-6609, NSN 4200-00-542-2110, NSN 4220-00-200-0538 (Navy Mil-L-850)) have at least 22 pounds of buoyancy and are designed to float a person in a vertical, slightly backward position in the water. This vest is not suitable for emergency exits from tracked vehicles.

**(2) German-Manufactured Type I PFD.** German-manufactured type I PFDs (NSN 4220-12-153-4945) exceed requirements for the U.S. type I PFDs, allow for free access through vehicle hatches, and allow for more freedom of movement than U.S. PFDs.

**(3) Type V PFD.** Type V PFDs (NSN 4220-00-555-9006) have at least 17.5 pounds of buoyancy. Type V PFDs are designed for training and work situations. These vests are suitable for use by vehicle commanders and drivers of tracked vehicles. The pads of type V PFDs are arranged to allow for freedom of movement. When type V PFDs are used, additional safety measures must be taken (para 9a(1) and (2)).

- b. Soldiers wearing helmets, load-bearing equipment (LBE), and protective masks must wear U.S. and German-equivalent type I PFDs. They are the recommended PFDs for use in the Army in Europe. Type V PFDs may be used if Soldiers are not wearing helmets, LBE, or protective masks.

- c. Soldiers participating in amphibious, assault-boat, bridging, or rafting operations will wear PFDs except as noted in appendix B.

- d. Maneuver units conducting water operations will provide a sufficient number of the appropriate type of PFD for use during overwater operations.

- e. The following operations require specific PFDs:

**(1) Amphibious-Vehicle Operations.** Unless superseded by operators manuals or specific requirements or restrictions imposed by HQDA, vehicle crewmembers will wear German or U.S. type I vests during “vehicle swimming” operations (glossary). If German type I vests are not available and U.S. type I vests are too large to allow for safe exits from vehicles, U.S. type V vests must be used. When type V vests are used, additional safety measures must be taken (app B). Personnel in vehicles will not wear LBE during swimming operations.

### **(2) Light-Infantry Operations.**

**(a) Assault-Boat Operations.** Because river waters in Europe are considered “rough,” personnel conducting assault-boat river crossing operations will wear type I PFDs.

**(b) Other Light Infantry Operations—Calm-Water Conditions (Lakes).** Either type I or V vests may be used during calm-water conditions. When type V vests are used, additional safety measures must be taken (para 9a(1) and (2)).

**(c) Beach Assaults.** When Soldiers are required to carry full packs and equipment for beach assaults, the Navy Mil-L-850 PFD may be used.

**(3) Engineer Operations.** Whenever possible, personnel engaged in constructing rafts or bridges (including bridge-erection personnel, boat crewmembers, and passengers) will wear type I PFDs. When operational requirements require the use of type V PFDs, additional safety or lifesaving measures must be taken (para 9a(1) and (2)).

- (a) Unless pre-mission risk analyses reveal a need, individual Soldiers crossing a water obstacle on a completed float bridge are not required to wear a PFD.

(b) Nonamphibious personnel being transported by vehicle during rafting and bridging operations must wear either type I or V vests. When type V vests are used, additional safety measures (para 9a(1) and (2)) must be taken.

## **16. UNIFORM STANDARDS AND PERSONAL-EQUIPMENT STORAGE REQUIREMENTS**

Appendix B lists uniform standards and personal-equipment storage requirements. Depending on the type of PFD used and operation conducted, certain personal equipment must be stored before overwater operations. Personal-equipment storage is required to ensure Soldiers will float if they are accidentally forced into the water.

## **17. PRE-MISSION STANDARDS**

The following tasks must be completed before deployment:

**a. Basic Water Survival Training.** Commanders will identify Soldiers who are weak swimmers or nonswimmers and arrange for swimming instruction. Every Soldier involved in overwater operations will receive basic water-survival training (AR 385-10 and AE Reg 350-1).

### **b. Marking and Pairing Weak Swimmers and Nonswimmers.**

(1) Soldiers who have been identified as weak swimmers or nonswimmers will have a white cloth armband affixed to the right sleeve of their outer garment.

(2) When possible, weak swimmers and nonswimmers will be placed near qualified swimmers.

**c. Pre-Mission Risk Analyses.** Operation unit safety officers will evaluate each operation that will take place in or over water. This evaluation (pre-mission risk analysis) will be used to determine required safety measures based on the type of operation, existing or expected conditions, the level of training, the availability of emergency rescue resources, and doctrine in Army regulations and operator manuals. Unit safety personnel will be trained to accomplish pre-mission risk analyses. Based on completed risk analyses, commanders may modify standards (depending on the risks) before mission execution (para 5).

## **18. USING EMERGENCY SUPPORT PERSONNEL**

**a. Certified Lifeguards.** When required for operations (app B), a certified lifeguard will be in each rescue boat.

**NOTE:** No facilities or methods are currently available in the Army in Europe for commanders to certify unit personnel as lifeguards. Commanders should consider this when developing training plans and conducting risk analyses. If enough personnel are not certified as lifeguards, the first colonel in the chain of command may authorize the use of qualified swimmers to augment the lifeguard requirements in this regulation.

**b. Medical-Support Personnel.** The first colonel in the chain of command may authorize the use of qualified combat lifesavers when emergency medical technicians (EMTs) or medical specialists (medics, personnel with military occupational specialties 91A or 91B) are not available. When used—

(1) Medical-support personnel involved in tactical overwater operations will be qualified to use resuscitation equipment.

(2) One EMT, combat lifesaver, or medical specialist will be in the safety boat with a resuscitator bag.

(3) One EMT, combat lifesaver, or medical specialist will be on the bank with an ambulance.

(4) An ambulance capable of carrying a standard litter internally and an assigned driver must be at the site. The ACASO will ensure that ambulance drivers have a stripmap and understand the best route to the nearest medical treatment facility.

(5) Medical-support personnel will function under the supervision and direction of the ACASO.

**NOTE:** Oncall air medical-evacuation support will be coordinated before operations by the commander of the training unit.

## **19. USING SAFETY BOATS AND AUXILIARY EQUIPMENT**

The following standards apply when safety boats are required during amphibious-vehicle crossing operations and when other than type I PFDs are used:

**a. Safety Boats for Amphibious Operations.** Appendix C provides amphibious-vehicle swimming standards.

**b. Safety Boats for Bridging and Rafting Operations.** Safety boats must be used according to requirements identified during pre-mission risk analyses. Appendix B lists specific safety-boat requirements for selected missions. When two boats are used, one boat will be positioned 100 meters upstream and one boat positioned will be 100 meters downstream. Safety boats will not be used for other than safety or emergency duty.

**c. Safety Boat-Crew and Equipment Requirements.** When used, each boat must be staffed with at least three people: a boat operator (who must be a qualified swimmer); an EMT, combat lifesaver, or medic; and a lifeguard. A radio operator may also be assigned to a safety-boat crew. Boat crews must be prepared for immediate deployment to rescue personnel or retrieve material and will not be assigned other duties. Boats will have the following safety equipment on board:

(1) An anchor appropriate to the boat. The anchor must be attached to the boat by a line long enough to allow the anchor to rest on the bottom of the river or lake (at least six times the water's depth).

(2) An axe or tool for cutting lines.

(3) Boathooks or liferings with a minimum of 50 feet of line attached securely to the boat. Any line used as a safety line or rope must be at least ½-inch thick.

(4) Operable lights and running lights.

(5) A marking buoy with line and anchor.

(6) Night vision devices for night operations for each person on board.

(7) Two paddles.

(8) A power megaphone.

(9) A radio linked into the operation communications net.

**NOTE:** The unit pre-mission risk analysis may show that a radio network is not necessary if the CASO or ACASO has a power megaphone that can be heard by everyone.

(10) A resuscitation bag.

(11) Stokes or folding litter.

## **20. ILLUMINATION FOR OVERWATER NIGHT OPERATIONS**

The extent of illumination at night during tactical overwater operations depends on the enemy situation and the type of crossing (deliberate, hasty, or retrograde). Pre-mission risk analyses will show greater hazards during night operations. Night overwater operations require the highest level of Soldier training and confidence. Trained Soldiers can accomplish tasks under blackout conditions. The following will be considered when illumination is used in training or under tactical combat conditions.

a. The use of flashlights with filters (or cones) and chemical lights to help with command and control.

b. During training, each Soldier working over water may be given a chemical-light personal marker, which will be attached to the PFD.

c. When operating under conditions of limited visibility, oncall lighting (lights from safety boats and headlights from prepositioned vehicles along the banks) may be used. Care must be taken with lighting from the banks to prevent blinding boat or raft operators.

**APPENDIX A  
REFERENCES**

**SECTION I  
PUBLICATIONS**

AR 25-400-2, The Army Records Information Management System (ARIMS)

AR 385-10, Army Safety Program

AR 385-40, Accident Reporting and Records

AR 611-75, Management of Army Divers

FM 5-34, Engineer Field Data

FM 21-60, Visual Signals

FM 90-13, River-Crossing Operations

Training Circular 5-210, Military Float Bridging Equipment

AE Regulation 10-5, HQ USAREUR/7A and Select Commands

AE Regulation 350-1, Training in the Army in Europe

AE Regulation 385-40, Accident Reporting and Records

AE Pamphlet 385-15, Leader's Operational Accident-Prevention Guide

**SECTION II  
FORMS**

DA Form 285, U.S. Army Accident Report

DA Form 2028, Recommended Changes to Publications and Blank Forms

**APPENDIX B  
EMERGENCY SUPPORT AND UNIFORM STANDARDS**

The glossary defines abbreviations used in this appendix.

Type of Operation	Type of PFD	Life-guards	Safety Boat	Medic/ EMT/ Combat Lifesaver	Ambulance and Driver	Coordinate Air MEDEVAC	Uniform (note 1)	Equipment/ Weapons
Shallow-water fording	opt (note 2)	1	opt	none	none	opt	Full	No restrictions.
Vehicle amphibious operations (vehicle commander and driver)	German type I or U.S. type V	2	1	2	yes	yes	Minimum as determined by commander. Helmet on.	Store LBE, overshoes, protective masks (in case), and weapons.
Vehicle amphibious operations (other crewmembers in or on vehicle)	German type I or U.S. type V	2	1	2	yes	yes	Minimum as determined by commander. Helmet on.	Store LBE, overshoes, and packs. Carry weapons at port arms.
Assault-boat operations (rough rivers)	I	1	1	2	yes	yes	Wear LBE. Protective mask in its case. Helmet on.	Store overshoes and packs. Store or carry weapons at port arms.
Assault-boat operations (calm lakes)	V	1	1	2	yes	yes	Minimum as determined by commander. Helmet on.	Store LBE, packs, and protective masks (in case). Store or carry weapons at port arms.
Bridge- or raft-construction operations by combat engineers	I	opt	opt	opt	opt	opt	Wear LBE. Protective mask in its case. Helmet on.	Store overshoes, packs, and weapons during construction.
Bridge- or raft-construction operations by combat engineers	V	1	2 (bridges) 1 (rafts)	2	yes	yes	Minimum as determined by commander. Helmet on.	Store LBE, overshoes, packs, protective masks (in case), and weapons.
Soldiers crossing aluminum footbridge	opt	opt	opt	opt	opt	opt	Full	No restrictions.
Soldiers crossing bridges or rafts on foot before vehicle test (note 3)	I	opt	opt	opt	opt	opt	Full	No restrictions.
Soldiers crossing bridges or rafts on foot after vehicle test (note 3)	V	1	2	2	yes	yes	Minimum as determined by commander. Helmet on.	No restrictions.
Crew in or on vehicles crossing on bridges or rafts participating in vehicle test (note 3)	V	1	1	2	yes	yes	Minimum as determined by commander. Helmet on.	Store LBE, packs, and protective masks (in case). Store or carry weapons at port arms.
Crew in or on vehicles crossing on bridges or rafts after vehicle test	opt	opt	opt	opt	opt	opt	Full	No restrictions.

**NOTES:** 1. During training, weak swimmers and nonswimmers will be identified and marked by affixing a white cloth armband to the right sleeve of their outer garment.  
2. The use of additional support equipment is optional (opt) based on the risk analysis.  
3. On completion of bridge construction, engineers will test the bridge or raft. The testing will be done by driving vehicles of varying weight classes across the bridge to ensure stability and safety. Vehicles used for this testing will be up to the maximum class expected to use the bridge. After a bridge has been tested, Soldiers will not be required to dismount vehicles when crossing a bridge. In addition, Soldiers may cross bridges and rafts on foot without PFDs after structures have been tested.

**APPENDIX C**  
**AMPHIBIOUS-VEHICLE SWIMMING**

**C-1. PRE-MISSION RISK ANALYSIS**

a. The crossing area safety officer, assistant crossing area safety officer, and mission planners will conduct a pre-mission risk analysis based on existing water conditions, the type of vehicles being used, and the state of training of vehicle crews. Risk analyses will include the following factors:

- (1) Bank height, slope, and stability.
- (2) Bottom conditions.
- (3) Existing crossing sites (location and condition).
- (4) Water depth, speed, and width.

b. Results of the risk analysis will be used as the basis for pre-mission staff and Soldier briefings.

c. Vehicle and track commanders will ensure—

- (1) Fuel tanks are filled before operations.
- (2) Pivot-steer mechanisms are operational when installed.
- (3) Bilge pumps are operational.
- (4) Air-intake ports, engine-cover shields, equipment modifications (for M2 and M3 vehicles), gaskets, inspection plates, plugs, seals, and other stock and auxiliary equipment designed for vehicle swimming are installed.
- (5) Soldier uniform standards in appendix B are met.
- (6) Vehicle loading and direct redistribution of cargo during predip operations are done to ensure the vehicle is level and crossings are made at required waterlines.
- (7) Additional crew briefings are given as required to ensure operators understand established vehicle operating standards and emergency-exit procedures.
- (8) Two crew emergency-exit drills are done before predip operations.
- (9) White cloth armbands are affixed to the right sleeve of weak swimmers and nonswimmers.

**C-2. EMERGENCY SUPPORT PERSONNEL AND EQUIPMENT REQUIREMENTS**

**a. Safety Boats.**

(1) At least one power-driven safety boat is required on site during amphibious operations. If the water area is too small to permit the safe operation of powerboats, nonpowered boats may be used.

(2) Commanders will ensure the power and size of safety boats are appropriate to site conditions. Commanders will designate more than one safety boat for each site when any of the following applies:

- (a) The current exceeds 1.5 meters per second and the current prevents navigation upstream.
- (b) More than one workparty is used at several locations or a single workparty is spread over 1 kilometer or more.
- (c) Waterways are crowded or busy.

**b. Personal Flotation Vehicle Amphibious Device.** Each Soldier participating in vehicle amphibious operations will wear a personal flotation device (PFD). The type of PFD worn will depend on the mission (para 15).

**c. Medical Support.**

- (1) At least one certified lifeguard will be in each safety boat.
- (2) One ambulance with a driver will be on site.
- (3) Two emergency medical technicians (EMTs) will be on site.
  - (a) One EMT will be in a safety boat.
  - (b) One EMT will be with the ambulance.
- (4) Air medical evacuation will be on standby alert.

**C-3. VEHICLE PREDIP AND TEST OPERATIONS**

Units will predip amphibious vehicles within 24 hours before actual vehicle-swimming operations.

**C-4. MINIMUM AMPHIBIOUS VEHICLE CREW**

Only a driver and vehicle commander may ride inside the vehicle. The rest of the crew will ride on top of the vehicle. Vehicle occupants will not wear seatbelts.

**C-5. SWIMMING PROCEDURES**

- a. Each amphibious vehicle will be checked as required by appropriate vehicle technical manuals to ensure it is operational before entering the water. Vehicle drivers will visually inspect equipment to ensure no water leaks exist and to verify load distribution and bilge-pump operation. Chalk should be used to check seals (including the ramp door).
- b. Before entering the water, a towline will be connected from a like, ground-based vehicle to the vehicle to be dipped. The connected towline will be long enough and strong enough to pull the vehicle out of the water if a problem develops.
- c. Vehicle hatches will be open as the vehicle enters the water. Ramps and ramp doors will remain closed until the vehicle is completely out of the water. Ramps and doors will be opened only on order of the vehicle commander.
- d. An empty 5-gallon watercan painted a bright color (such as yellow or orange) will be attached to the towing device of the vehicle. When swimming M113-series vehicles, the line will be attached to the handle of the rear door. The attaching rope must be long enough to allow the can to surface if the vehicle should sink. This will help divers locate submerged vehicles and attach recovery cables.
- e. Unit commanders will station competent Soldiers at water exit points and provide flags or other easily discernible devices to direct vehicles to the exact exit point. Vehicles approaching from the wrong angle will be waved off and instructed to make another approach.
- f. When the water current causes a drift, vehicles will leave the water at a slight angle. Drivers will approach exits with the vehicle facing downstream. This is so that when the first track strikes the bank, the water will carry the rear of the vehicle downstream. This gives better traction on the bank and allows the vehicle to exit at a 90-degree angle.

**C-6. EMERGENCY SUPPORT AND UNIFORM STANDARDS**

Appendix B provides emergency support and uniform standards.

**C-7. SINKING VEHICLE EMERGENCY ACTIONS**

If a vehicle sinks, the crossing area commander will—

- a. Direct and coordinate rescue, first aid, and medical evacuation operations.
- b. Mark the last known position of those lost or presumed drowned.
- c. Attempt to recover missing equipment.

- d. Impound recovered equipment and place it under guard.
- e. Notify authorities of navigation hazards.
- f. Try to mark the last known position of submerged equipment.
- g. Ask the supporting engineer unit S3 for a military diving team to recover submerged or lost equipment.
- h. When available and if possible, set out pollution-control devices.
- i. Tell guards to ensure control-panel switches and levers are not touched or moved until after the accident investigation.
- j. If a drowning has occurred (class A accident), evacuate the victim through medical channels and ensure the accident site is secured. The crossing area commander will open the accident site to the accident-investigation board when the board arrives (AR 385-40 and AE Reg 385-40).
- k. Send the vehicle to the appropriate support maintenance unit after the accident-investigation board releases the vehicle.
- l. Complete DA Form 285 (AR 385-40) if a nonfatal accident occurs and the estimated cost of the damage is more than \$2,000.

**APPENDIX D**  
**ASSAULT-BOAT OPERATIONS**

**D-1.** The crossing area safety officer with the assistant crossing area safety officer and mission planners will conduct pre-mission risk analyses of onsite conditions.

**D-2.** Trained personnel will supervise overwater assault-boat operations as follows:

- a. Soldiers will remove and store protective masks, load-bearing equipment, and rubber overshoes. Weapons must be stored or carried at port arms.
- b. Emergency support equipment that meets identified risks will be used (app B).
- c. Nonmotorized assault boats must have three trained engineer personnel aboard. Nonmotorized assault boats will not be used when water currents exceed 1.5 meters per second.
- d. Motorized assault boats must have at least two trained engineer personnel aboard.
- e. Assault boats will not be operated upstream within 1 kilometer of float bridges. Loose lines will not trail in the water.
- f. Assault boats will not be used for whitewater rafting exercises.

## **APPENDIX E BRIDGING OPERATIONS**

### **E-1. PRE-MISSION RISK ANALYSIS**

The crossing area safety officer, assistant crossing area safety officer, and mission planners will conduct a pre-mission risk analysis based on existing water conditions, the type of vehicles being used, and the state of training of vehicle crews. Risk analyses will include the following factors:

- a. Bridge capacities are listed in technical manuals. Caution or risk crossings (defined in FM 90-13) will not be made during training.
- b. Weak swimmers and nonswimmers will be identified and marked (para 17b).
- c. Emergency support equipment must meet identified risks (app B).
- d. The construction of standard military bridges (Bailey bridge, M4T6, M4T6 dry span with or without trestle assembly, medium girder bridge) and nonstandard bridges (timber trestle) over water more than 1.5 meters deep requires an additional safety analysis.
- e. An alert driver must be sitting in the cab of a prime-mover vehicle parked on a launching ramp or when preparing to launch or retrieve bridging equipment or boats.
- f. Soldiers involved in bridge construction will—
  - (1) Wear the appropriate personal flotation device (PFD) before working over water (app B).
  - (2) Have weapons slung diagonally across their backs if weapons are not stacked on site, otherwise stored, or needed for onsite security.
- g. When conditions warrant and the pre-mission risk analysis reveals a need, safety ropes will be in place on shores as follows:
  - (1) Two firmly strung, sturdy grab ropes will be placed across the downstream side of the bridge site. One rope will be strung immediately under the construction site and one farther downstream, 3 to 5 meters from the first rope.
  - (2) One safety rope will be placed 10 to 15 meters downstream. A Soldier in a raft will patrol this rope. The Soldier must be a good swimmer, wear a PFD, and be secured to a safety line by a harness and snaplink. The Soldier should leave individual LBE and his or her weapon on shore.

### **E-2. PROCEDURES**

#### **a. Bridge Testing.**

- (1) After completing bridge construction, engineer personnel will test the bridge by driving vehicles of varying weight classes across the completed structure.
- (2) Soldiers will dismount from vehicles used for bridge testing (excluding vehicle commanders and drivers).
- (3) If necessary to cross or be on the bridge before bridge testing, Soldiers will wear type I or V PFDs.
- (4) After successful testing, Soldiers do not have to dismount from vehicles or wear PFDs unless a need to do so was identified during the pre-mission risk analysis.

#### **b. Driving on Bridges.**

- (1) A caution crossing will be made when the vehicle classification exceeds 25 percent of the allowed weight. A vehicle conducting a caution crossing must stay on the centerline, keep a 50-meter distance from other vehicles, not exceed 13 kilometers per hour (8 miles per hour), not stop, not accelerate, and not shift gears on the bridge.

(2) Risk-crossing procedures will be used only in emergencies. A vehicle conducting a risk crossing must stay on the centerline, must be the only vehicle on the bridge, must not exceed 5 kilometers per hour (3 miles per hour), must not stop, must not accelerate, and must not shift gears on the bridge. The vehicle class number must not exceed the published risk class for the type of bridge being crossed. After the crossing and before another vehicle is permitted on the bridge, the engineer officer will inspect the entire bridge for damage.

(3) Pre-mission briefings will stress the importance of the following:

(a) Drivers will obey the bridge officer or noncommissioned officer in charge.

(b) Drivers will use the vehicle's lowest gear. Vehicles with four-wheel drive must have four wheels engaged while crossing. Vehicles must maintain a smooth, steady speed and leave the exit area after crossing to clear the bridge for other vehicles.

(c) Vehicles must have hatches and windows locked open and must travel with gun tubes in a position that allows the most escape routes (for example, tanks will have the gun tube locked to the rear).

(d) Ground guides will be used when the centerline of bridges is not clearly marked. Ground guides will be instructed on proper guiding procedures (for example, walking to the front, not running, using appropriate arm signals, not positioning themselves between the vehicle being guided and another vehicle or object).

**c. General Safety Considerations.**

(1) Towing of boats or improvised floating equipment is dangerous and should be attempted only during recovery or emergency operations.

(2) Boats will always carry an anchor and marker buoy.

(3) People working with bridge material or bridge-erection equipment will wear workgloves.

(4) During electrical storms, water operations will end and Soldiers will dismount from equipment.

## **APPENDIX F RAFTING OPERATIONS**

### **F-1. PRE-MISSION RISK ANALYSIS**

The crossing area safety officer, assistant crossing area safety officer, and mission planners will conduct a pre-mission risk analysis based on existing water conditions, the type of vehicles being used, and the state of training of vehicle crews. Risk analyses will include the following factors:

**a. Obstacles Near Raft Sites.** Rafting operations should not take place within 1 kilometer of anchor cables, float bridges, piers, or other obstacles.

**b. Raft Capacity.** Capacity is prescribed by technical manuals for the raft being used. Caution or risk crossings are command options during wartime; caution or risk crossings will not be conducted during training.

**c. Water Current and Wave Height.** Raft loads must be reduced in fast (5 feet per second or faster) or rough water.

### **F-2. MINIMUM ESSENTIAL EMERGENCY SUPPORT PERSONNEL AND EQUIPMENT**

Paragraph 9 and appendix B list minimum essential emergency support personnel and equipment. Commanders will use additional emergency support when the pre-mission risk analysis reveals the need. Examples of additional emergency support include the following:

a. Positioning safety boats midstream and downstream of the rafting site.

b. Ensuring Soldiers crossing on rafts or on foot before vehicle tests are wearing type I personnel flotation devices (PFDs). Vehicle commanders and drivers will be issued type V PFDs when risk analyses indicate that the wear of type I PFDs could hinder emergency exit from vehicles.

### **F-3. OTHER STANDARDS TO CONSIDER DURING RISK ANALYSES**

During raft-loading operations, wheeled and tracked vehicles will be occupied by only the vehicle commander and driver. Before vehicles are driven onto rafts—

a. Vehicle passengers and other crewmembers will dismount from the vehicle. Passengers and crewmembers may proceed on rafts only after all vehicles have been driven and parked on the rafts.

b. Tracked-vehicle hatches and wheeled-vehicle windows will be open.

c. Driver and vehicle commander seatbelts will not be worn.

### **F-4. RAFT LOADING AND UNLOADING STANDARDS**

a. Drivers will follow the directions given by the raft commander and ground guide.

b. Drivers will use the lowest possible gear. Vehicles with four-wheel drive must have all wheels engaged while rolling on and off rafts. Vehicles will load and unload from rafts slowly and steadily. Vehicles will stop against the chock blocks. When the load is in position on the raft, chocks will be placed by the raft crew. For a single vehicle, chocks will be placed at the front and the rear of the vehicle. For vehicles with trailers, only the prime mover will be chocked. If two or more vehicles are being ferried on the raft, chocks will be placed in front of and behind each vehicle.

c. Vehicle engines will be left on with the brakes set.

d. When unloading, the vehicle will move forward slowly on the signal from the raft commander or ground guide and exit at a slow, steady pace. Each vehicle will leave the exit area after crossing to clear the raft.

### **F-5. GENERAL SAFETY PROCEDURES**

Commanders will ensure—

a. Lines to anchor lines, bridge-erection boats, and shorelines are in good condition and are at least  $\frac{3}{4}$  of an inch thick.

b. Lines are neatly coiled and stowed when not in use.

c. Loose lines are not allowed to trail in the water. The anchor must be ready to cast immediately in case of emergency.

d. Pontoons are bailed and dry.

e. Motors are idled fast enough to keep the raft steady and to prevent stalling.

f. Rafts are headed into the current during the crossing. The first raft crossing will be to test raft stability. Loads on test vehicles will be limited to 25 percent of the maximum gross weight allowed for the raft. Detected faulty equipment will be repaired before continuing crossing operations.

g. The following additional precautions are taken when operating rafts in fast water:

(1) Bridge-erection boats will be used and lines will be pulled taut with block and tackle or other mechanical means.

(2) Allowance will be made for reduced freeboard because of waves.

h. Caution is taken in debris-laden water. Rafting in debris-laden water is extremely dangerous; floating brush, ice, logs, and trees may puncture and sink pontoons or foul propellers and impellers. Raft commanders will—

(1) Steer rafts to avoid debris.

(2) Station additional personnel with boathooks or axes on all rafts in debris-laden water to keep debris from the raft.

(3) Ensure outboard-motor operators are prepared to stop motors and change shearpins if the propellers become fouled.

(4) Ensure Soldiers are ready to cast anchors in case of motor failure.

i. An alert driver is sitting in the cab of a prime-mover vehicle parked on a launching ramp or when preparing to launch or retrieve rafting equipment or boats.

j. Every Soldier involved in raft construction is wearing a PFD before working over water.

**APPENDIX G  
SHALLOW-WATER FORDING**

**G-1. GENERAL**

This appendix addresses wading by people and combat vehicles. Soldiers with full combat gear normally have no difficulty fording waters that are 1 meter (39 inches) deep, at least 1 meter (39 inches) wide, and have a 100-percent slope for approach.

**G-2. VEHICLE CAPABILITIES**

Military combat vehicles can ford shallow rivers that have slow currents and stable beds. Most vehicles are equipped with kits to increase fording-depth capabilities. Currents of less than 1.5 meters per second are preferred. Most rivers in Europe routinely exceed 1.5 meters per second. Vehicle technical manuals list specific depth capabilities and required adaptations for specific vehicles. Table G-1 provides general vehicle fording capabilities.

<b>Vehicle type</b>	<b>Depth (inches/meters)</b>	<b>Slope for approach (percent)</b>	<b>Minimum width (feet/meters)</b>
Truck	30/0.75	33	14/4.5
Tracked	39/1	50	14/4.5

**G-3. EMERGENCY SUPPORT REQUIREMENTS**

Emergency support equipment that meets identified risks will be used (app B).

**G-4. PREENTRY PROCEDURES**

Commanders will ensure thorough reconnaissance was made of prospective fording sites before conducting fording operations. After completing preentry checks, onsite safety officers and noncommissioned officers will conduct a pre-mission risk analysis and recommend additional loss-prevention measures to the crossing area or unit commander. The following fording site characteristics will be checked:

- a. Slope and composition of entry and exit areas and bottoms.
- b. Water depths and currents.

**G-5. DISMOUNTED OPERATIONS**

Water current and temperature are critical considerations when conducting dismounted operations. Commanders will consider alternatives to foot crossings if the current exceeds an estimated 3.5 meters (11 feet) per second or when the water or air temperature is less than 45 degrees Fahrenheit. Hypothermia casualties may result when water temperature is less than 45 degrees Fahrenheit. An anchorline must be installed over the water-crossing area and Soldiers will be attached to the line with snaplinks. Unit leaders will begin hypothermia prevention as soon as possible after Soldiers come out of the water.

**G-6. MOUNTED OPERATIONS**

- a. Fording entry and exit points will be clearly marked.
- b. The occupancy of vehicles will not exceed specifications in vehicle technical manuals.
- c. Vehicle occupants will not wear seatbelts during fording.
- d. While exiting, operators will dry vehicle brake linings by applying light brake pressure. Commanders will ensure Soldiers are aware of decreased braking capability during the pre-mission risk analysis briefing.

## GLOSSARY

### SECTION I ABBREVIATIONS

ACASO	assistant crossing area safety officer
AR	Army regulation
CAC	crossing area commander
CASO	crossing area safety officer
EMT	emergency medical technician
ESP	emergency support personnel
FM	field manual
HQDA	Headquarters, Department of the Army
LBE	load-bearing equipment
MEDEVAC	medical evacuation
MTA	major training area
NCO	noncommissioned officer
NSN	national stock number
opt	optional
PFD	personal flotation device
S3	operations and training officer
U.S.	United States
USAREUR	United States Army, Europe

### SECTION II TERMS

#### **calm water conditions**

Water conditions where the water current speed is less than 1.5 meters per second.

#### **caution crossing**

A crossing of vehicles with a classification exceeding the capacity of the bridge by 25 percent when done under strict traffic control. Caution class numbers of standard fixed or floating bridges are in FM 5-34, Training Circular 5-210, and appropriate training circulars.

#### **certified lifeguard**

Active duty Army personnel who have completed American Red Cross lifeguard, combat lifesaver, or instructor training.

#### **combat lifesaver**

A Soldier who has successfully completed the Army Combat Lifesaver Course or has completed Army Combat Lifesaver Course refresher training within the last 12 months.

#### **freeboard**

The distance between the waterline and the upper edge of the side of the raft.

#### **military diving team**

A team of military divers qualified and managed under AR 611-75 or other appropriate military service diver-qualification regulations.

#### **pre-mission risk analysis**

The act of thinking through a mission before execution. This process includes the following:

- Risk identification: Thinking through the mission and determining what is risky and what is not.
- Risk evaluation and quantification: Determining the amount of risk in various phases of an operation. A chart that assigns numbers to various degrees of risk may be developed to assist in the quantification process.
- Risk reduction: Identifying actions to eliminate, reduce, or control the identified risk.

- Risk decision-making: Deciding which risks are acceptable and which are not by comparing training benefits to potential accident losses.
- Risk-control options: Developing procedures to reduce risk to controlled and acceptable levels that still allow the mission to be accomplished.

**qualified swimmer**

A Soldier who can meet at least 70 percent of the swimming and water survival requirements identified by the unit commander during individual mission-essential task list analysis or testing. Qualified swimmers are Soldiers who can accomplish the following tasks while wearing battle dress uniform without boots in calm water that is at least 6 feet deep:

- Swim 25 yards using any type or combination of strokes.
- Remain on the surface for 5 minutes by floating or using any type or combination of strokes.

**risk crossing**

An emergency river crossing on standard prefabricated fixed or floating bridges.

**rough water conditions**

Water conditions where the water current speed exceeds 1.5 meters per second.

**tactical overwater operations**

Amphibious-vehicle swimming, assault-boat operations, bridging, rafting, and shallow-water fording.

**vehicle swimming**

Propelling amphibious vehicles across water by floating, not fording.

**weak swimmer or nonswimmer**

A Soldier who cannot meet at least 70 percent of the swimming and water-survival requirements identified by the commander during individual mission-essential task list analysis or testing.