MCRP 7-20B.5
(Formerly MCRP 8-10B.6)

Marine Corps Water Survival



U.S. Marine Corps

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MARINE CORPS WATER SURVIVAL

1. Change all instances of MCRP 8-10B.6, *Marine Corps Water Survival*, to MCRP 7-20B.5, *Marine Corps Water Survival.*

2. Change PCN from 144 000069 00 to 144 000069 01.

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CHANGE 1 to MCRP 8-10B.6
Marine Corps Water Survival

1. This publication has been edited to ensure gender neutrality of all applicable and appropriate terms, except those terms governed by higher authority. No other content has been affected.

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BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

Robert S. Walsh

ROBERT S. WALSH
Lieutenant General, U.S. Marine Corps
Deputy Commandant for Combat Development and Integration

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FOREWORD

Marine Corps Reference Publication (MCRP) 8-10B.6, *Marine Corps Water Survival*, provides Marine Corps water survival techniques, procedures, and training standards. This publication also teaches Marines to cross water obstacles and perform water rescues correctly and safely.

This publication is the foundation for teaching Marines correct water survival techniques and procedures that are used throughout the Marine Corps Water Survival Program (MCWSPM). Once an individual or a unit has completed the MCWSPM, this publication can be used as a refresher course before water operations. This publication cancels Marine Corps Interim Publication (MCIP) 3-02.01, *Marine Corps Water Survival*.

Reviewed and approved this date.

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ROBERT S. WALSH
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Throughout history, water has posed special challenges to Marines and Sailors during times of both peace and war. Therefore, the inherent dangers associated with waterborne operations demand that Marines and Sailors receive proper water survival training. Combat units that are confident in their ability to work in and around water can use the water to their advantage in combat, and history is filled with examples of how the proper preparation or training for survival in water reduced or averted disaster.

On Thanksgiving eve, 23 November 1995, the USS *America* made its way through the Arabian Sea. Twenty-year-old, Marine Lance Corporal (LCpl) Zachary Mayo was unable to sleep and, wanting some fresh air, made his way onto an open-air platform near the aircraft hangar bay, which was three levels below the sleeping quarters. While he was on the platform, the ship veered suddenly, throwing LCpl Mayo through the platform's protective bars and into the sea, 30 feet below.

Frantic, LCpl Mayo called out in vain to the watchmen on the flight deck, which was 64 feet above him. It soon became clear to him that the USS *America* would keep its course into the Gulf of Oman until his absence was discovered at morning muster. The LCpl took a moment to consider his situation. Since land was at least 100 miles away, swimming was suicide; he would have to stay afloat until a search party found him.

Using the techniques he had learned during combat water survival training, LCpl Mayo made a flotation device out of his coveralls and tried to relax. Meanwhile, business continued as usual aboard the USS *America*. Since LCpl Mayo was on special assignment with the hazardous materials division, his absence went unnoticed until a petty officer asked several Sailors if they had seen their shipmate recently. By the time a roll call had been completed, LCpl Mayo had been adrift at sea for over 24 hours. Although three, fixed-wing Viking aircraft were deployed to search for LCpl Mayo, most people aboard the ship feared the worst.

After 34 hours at sea, LCpl Mayo was discovered by fishermen on a Pakistani fishing boat. LCpl Mayo's survival is a testament not only to his incredible physical courage, but also to the soundness of the lifesaving training and techniques he received during combat water survival training.

TABLE OF CONTENTS

Chapter 1. Survival in Open Water

Abandoning Ship 1-1
Jettisoning Equipment 1-1
Abandon Ship Technique 1-2
Surface Burning Oil Swim 1-5
Surviving With a Pack 1-6
Preparing Equipment 1-7
Tying Waterproof/Plastic Bags 1-8
Packing the Pack 1-8
Survival Strokes With the Pack 1-8
Gear Shed 1-12
Staying Afloat With a Life Preserver 1-13
Inherently Buoyant Life Preservers 1-13
Inflatable Life Preservers 1-13
Field Expedient Flotation Devices 1-15
Floating With an Inflated Blouse 1-21
Floating With Inflated Trousers 1-25
Avoiding Heat Loss in Cold Water 1-38
Individual Protection From the Cold 1-39
Group Protection From the Cold 1-40
Drownproofing Methods 1-41
T-Method 1-42
The Sweep 1-44
Survival Strokes 1-46
Crawl Stroke 1-46
Breast Stroke 1-48
Side Stroke 1-53
Elementary Backstroke 1-56

Chapter 2. Water Rescues

Reaching Rescue Techniques 2-1
Reach 2-1
Reach From a Deck 2-2
Arm Extension 2-2
Leg Extension 2-3

Wading Assist 2-3
Throw 2-3
Buddy Assist 2-5
Front Surface Approach 2-5
Rear Approach 2-5
Approach Strokes 2-5
Crawl Stroke Approach Stroke 2-5
Breast Stroke Approach Stroke 2-7
Level-Offs 2-9
Front Surface Approach 2-9
Single Armpit Level-Off 2-10
Double Armpit Level-Off 2-11
Rescue Techniques 2-12
Wrist Tow 2-12
Single Armpit Tow 2-13
Double Armpit Tow 2-13
Collar Tow 2-15
Cross-Chest Carry 2-15
Tired Swimmer's Assist 2-16
Defense Against a Drowning Victim 2-17
Blocks 2-17
Wrist-Grip Escape/Wrist-Grip Escape Alternative 2-18
Front Head-Hold Escape 2-18
Rear Head-Hold Escape 2-20
Administering First Aid/Rescue Breathing 2-21

Chapter 3. Treatment of Casualties and Avoidance of Dangerous Marine Life

Drowning 3-1
Symptoms 3-1
Treatment 3-1
Hypothermia 3-2
Symptoms 3-2
Survival Time 3-2
Treatment 3-3
Heat-Related Injuries 3-4
Burns 3-4
Common Medical Problems Associated with Sea Survival 3-5
Seasickness 3-5
Saltwater Sores 3-5
Blindness/Headache 3-5
Constipation 3-5
Sunburn and Dehydration 3-5

Dangerous Marine Life....3-6
Sharks and Barracudas....3-6
Sea Snakes....3-7
Poisonous Fish....3-7
Turtles and Moray Eels....3-7
Corals....3-7
Jellyfish, Portuguese Man-of-War, Anemones, and Others....3-7
Spiny Fish, Urchins, Stingrays, and Cone Shells....3-7

Chapter 4. Negotiating Water Obstacles

Tides....4-1
Surf....4-1
Plunging Waves....4-2
Spilling Waves....4-3
Surging Waves....4-3
Currents....4-3
Offshore Currents....4-3
Rip Currents....4-3
Littoral Currents....4-3
Back Bays....4-4
Rivers and Canals....4-4

Chapter 5. Fording Waterways

Selection of a Ford Site....5-1
Determine the Slope....5-1
Determine the Current Speed....5-3
Measure River Width....5-3
Calculate Downstream Drift....5-4
The Buddy System....5-5
Water Crossings....5-5
Care of Weapons....5-5
ISOMAT Raft....5-6
Poncho Raft....5-6
Construction of a Pack Raft....5-8
Single-Rope Bridge....5-9
High and Dry Crossings....5-12
Swift Current Crossings....5-13

Slow Current Crossings.....5-13
Removal 5-13

Appendix A. Knot Tying

Glossary

References and Related Publications

CHAPTER 1
SURVIVAL IN OPEN WATER

Water survival in any aquatic environment begins with the proper mindset. Any water- or air-based craft you board becomes a hazard when it causes you to deliberately or accidentally abandon it. With a survival mindset, learn about the craft you are embarking on by taking the following questions into consideration:

- How many life preservers and lifeboats/rafts are aboard?
- Where are the life preservers and lifeboats/rafts located?
- What type of unit survival equipment is aboard?
- Are individual survival kits issued to each person aboard?
- How much food, water, and medicine do the survival kits contain? When was the last time the contents were inspected for proper quantities and shelf life expiration?
- Is there sufficient survival equipment available for the number of personnel?
- How many other personnel are there aboard, and where are they located?
- What are the egress procedures for the ship, boat, watercraft, amphibious assault vehicle, or aircraft?

ABANDONING SHIP

When you embark on a Navy ship, you will receive instructions on how to abandon ship from Navy personnel. If given the order to abandon ship, report to your designated assembly area and put on a life preserver. DO NOT inflate the life preserver until you are clear of the ship. Torn life preservers will not inflate and inflated life preservers can block you, and those behind you, from exiting the ship. A flotation device that has been inflated may also burst if you jump from a significant height.

DO NOT remove your clothing, boots, or shoes before abandoning ship. Your trousers and blouse may be the only flotation devices available if your life preserver is faulty or becomes damaged, and your clothes can provide some insulation from the cold water. The soft cover is lightweight and prevents skin burns by protecting your head from direct sunlight.

Jettisoning Equipment

Equipment should be kept properly packed and waterproofed in case you have to abandon ship. When entering the water from a height of 15 feet (4.6 meters) or less and equipped with a proper flotation device or a waterproofed pack, you may maintain an essential, small survival kit. See Marine Corps Reference Publication (MCRP) 8-10B.7, *Survival*, for a detailed list of survival

items and applications. Entering the water from a height greater than 15 feet (4.6 meters) wearing your pack, gas mask, vest, or rifle could cause injury upon impact. Remember, if you are forced to abandon ship, your sole mission is to survive. Upon impact with the water, the helmet will "cup" air inside of it. The chin strap may also create a "hanging effect" as you submerge from the force of the fall. Therefore, you should remove your helmet and gas mask before abandoning ship.

Abandon Ship Technique

When abandoning ship, safety considerations must be observed. Use the following technique when abandoning ship without your combat gear (figure 1-1):

Place your hands on their opposite shoulders, forming a criss-cross pattern.

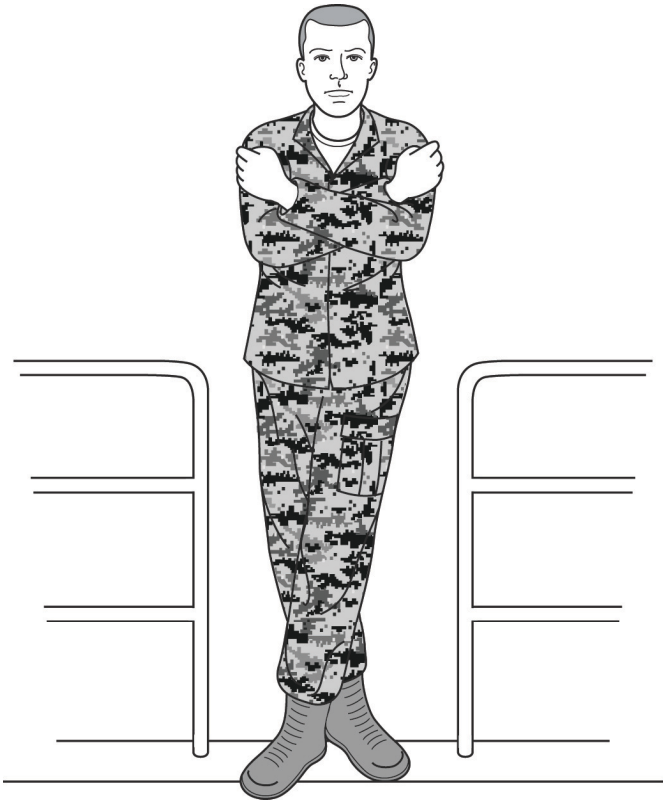


Figure 1-1

Step to the edge of the ship's deck. If you are not on the top level of the ship, look up to ensure there are no other personnel attempting to enter the water from higher levels and that there is no falling debris. Next, check the water below you for debris or survivors. If the water is clear, look straight ahead and prepare to jump. If the water is not clear, move to another location.

> ***Note:*** DO NOT hold your nose as you abandon ship. If you do hold your nose, the force of impact into the water could jar your arm and hand and cause you to break your nose.

Step off the side of the ship with a smooth, 30-inch stride. (figure 1-2)

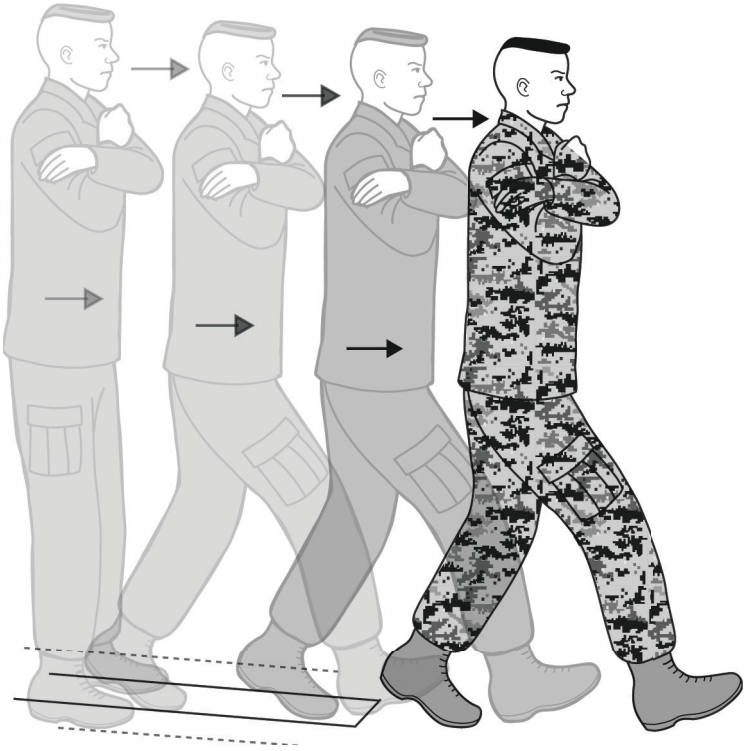


Figure 1-2

DO NOT DIVE OFF THE SHIP. DO NOT LOOK DOWN AT THE WATER. LOOK STRAIGHT AHEAD. Looking down at the water can render you unconscious or cause injuries upon impact.

Bring your trailing leg forward during the fall. Cross your trailing leg behind your leading leg. (figure 1-3)

Keep your head parallel to the water's surface until hitting the water.



Figure 1-3

Remain in the abandon ship position until your descent into the water has almost stopped.

Note: The weight imbalances in your body may cause you to be in a "J" shape under the water. (figure 1-4)



Figure 1-4

Once your downward motion has ceased, your feet may be parallel with the ocean bottom or you may be nearly inverted with your feet over your head. To counteract potential disorientation, you should pause briefly and allow the natural buoyancy of your torso to bring your body to a nearly upright position.

Floating debris can be hazardous. Therefore, you should swim upward, extending one arm (hand is shaped as a fist) upward to feel for obstructions. If you encounter debris, try to push it away or surface in a different location. (figure 1-5)



Figure 1-5

Swim away from the ship. DO NOT LOOK BACK AT THE SHIP. Looking back could slow your movement away from the area. Remember, your objective is to leave the area as quickly as possible because—

- Equipment and debris may be falling from or spilling out of the ship.
- Additional casualties can result if individuals abandoning the ship fall on top of swimmers already in the water.
- Swimmers close to the sinking ship may get pulled underneath the water by the suctioning effect of the ship as it goes under.

Surface Burning Oil Swim

After you have abandoned ship, rise to the surface using the techniques shown in figures 1-6 through 1-8. However, you must remember that fuel from sinking ships or downed aircraft will float on the surface of the water. Therefore, you must move clear of the floating fuel by swimming away from the ship or aircraft as soon as possible. Either swim upwind (into the wind) of the ship/aircraft or swim against the current. Either method allows you to move away from the fuel and the wind/current will push the fuel past you. To properly execute a surface burning oil swim—

Extend your arms overhead as far as possible.

Wave your arms back and forth vigorously to splash a hole while moving upward.



Figure 1-6

Splash as long as possible to push burning fuel away from the surfacing area.

Use your arms and hands to sweep away fuel and debris.

Kick your legs in a constant breast stroke kick.

Extend your arms (palms outward) forward on the surface, arms shoulder-width apart.

Pull your hands in and back toward the chest.

Stop your hands in front of your face and rotate them so that your palms face forward (roughly halfway out of the water).



Figure 1-7

Sweep your arms forward to a full extension at the shoulder width. This splashes debris, oil, or burning liquids aside. To reduce the chance of fatigue, use two short splashes to the front to extend the path.



Figure 1-8

Repeat the preceding step as necessary while swimming clear of the area.

SURVIVING WITH A PACK

If packed properly, your pack will float, and it is your key piece of equipment for staying afloat and overcoming water obstacles. If the pack's contents are properly waterproofed, it can support you (with a combat load) in the water. Buoyed up by a waterproofed pack, you will eventually emerge from the water with all your equipment (i.e., boots, helmet, flak jacket, weapon, survival items).

Your pack floats based on a scientific principle known as Archimedes' Principle. This principle states that an object submerged in a liquid is buoyed up by a force equal to the weight of the liquid displaced (pushed aside) by the object. If the weight of the displaced liquid is greater than the weight of the object, the object floats. If the weight of the displaced liquid is less than the weight of the object, the object sinks. For example, a machine gun sinks in the water, but it still weighs less in the water than it does on land. Even though a machine gun sinks, it is still buoyed

up by a force equal to the weight of the water it displaces. For this reason, you should not try to hold yourself or your equipment any higher out of the water than they would naturally float; doing so wastes both energy and body heat.

Preparing Equipment

Before packing your pack, you must prepare your gear/equipment. Tape or pad all sharp edges and equipment corners. Ideally, your gear/equipment is placed in plastic bags and the plastic bags are then placed inside the standard-issued, rubberized, waterproof bag. Waterproof bags are not completely water tight; henceforth, the added protection of first wrapping the gear/equipment in a plastic bag, then placing the plastic bag inside the waterproof bag. Large plastic bags (e.g., trash bags) work well for bulky equipment (e.g., sleeping bags, field jackets, shelter halves, gas masks). Small plastic bags work best for small items (e.g., shaving gear).

> ***Note:*** If a gas mask must be carried outside the pack, cover it with a waterproof bag.

You will need the following items, which are available through the supply system, to prepare your equipment for packing:

- Waterproof bags:
  - Pistol bag, plastic size #1 (8 by 18 inches).
  - Rifle bag, plastic size #2 (10 by 56 inches).
  - Machine gun bag, plastic size #3 (15 by 56 inches).
  - Multipurpose bag, cover, plastic size #4 (20 by 84 inches).
- Panama work vest (life preserver).
- Small plastic bag, self sealing (6 by 6 inches and 12 by 12 inches).
- Riggers tape, olive drab (2 1/2 inches).
- Waterproof clothing.

If the above supply items are not available, you can substitute them with garbage bags, shopping bags, re-sealable sandwich bags, and duct tape or rubber bands. The advantage of a rubber band is that it can be used to re-seal a bag after it has been opened. This gives easier access to commonly used items.

Tying Waterproof/Plastic Bags

Try to remove the excess air from the waterproof/plastic bag before securing the bag's opening. If filled with air, the bag can burst if pressed from the outside. Figure 1-9 illustrates the proper steps to tie a waterproof/plastic bag:

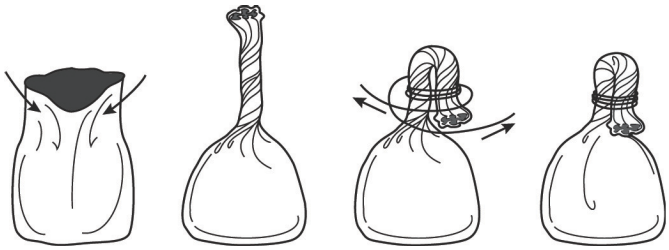


Figure 1-9

Packing the Pack

When waterproofing your gear, start with your mission essential equipment, such as maps and communications gear. Next, waterproof your weapon, and, finally, your personal items. Waterproof individual items separately. Line your combat pack with a large waterproof bag and insert the individually waterproofed bags in it. This is called compartmentalizing. Similar to the structure of a ship, if one compartment is breached, the rest will remain afloat. To avoid puncturing the bags, carefully handle sharp items such as tent poles or pegs. Place items in the pack so the most used items are easily accessible on top.

Survival Strokes With the Pack

There are four survival strokes you can utilize to move in water using a waterproofed pack as a flotation device: on the pack, under the pack, pack on the side, and reverse pack travel.

On the Pack. Hug the pack to your chest, with the body horizontal in the water, face the direction of your travel. You can utilize any kick that propels you best; however, in this body position, the breast stroke kick is the most efficient. (figure 1-10)



Figure 1-10

Under the Pack. If you are more efficient or comfortable swimming on your back, hug the pack to your chest, keeping the body horizontal and face up, and utilize any kick that propels you best. The inverted breast stroke kick is the preferred kick. (figure 1-11)



Figure 1-11

Pack on the Side. If you are confident swimming on your side and want extra propulsion, you can hold the pack to your hip with your top arm, reaching out with your lead arm underwater, collapsing your elbow to pull against the water with your hand. The legs should utilize the scissors kick. (figure 1-12)



Figure 1-12

Reverse Pack Travel. If you find it difficult to propel yourself with your boots on, you may resort to simulating a backward stepping action with your legs. Hold the pack to your chest, turn your back toward the direction of travel, and continuously step backward, digging in the water with the toes of your boots. This is the least preferred method of travel with a pack, as you move extremely slow and have to repeatedly look behind you to check your heading. (figure 1-13)

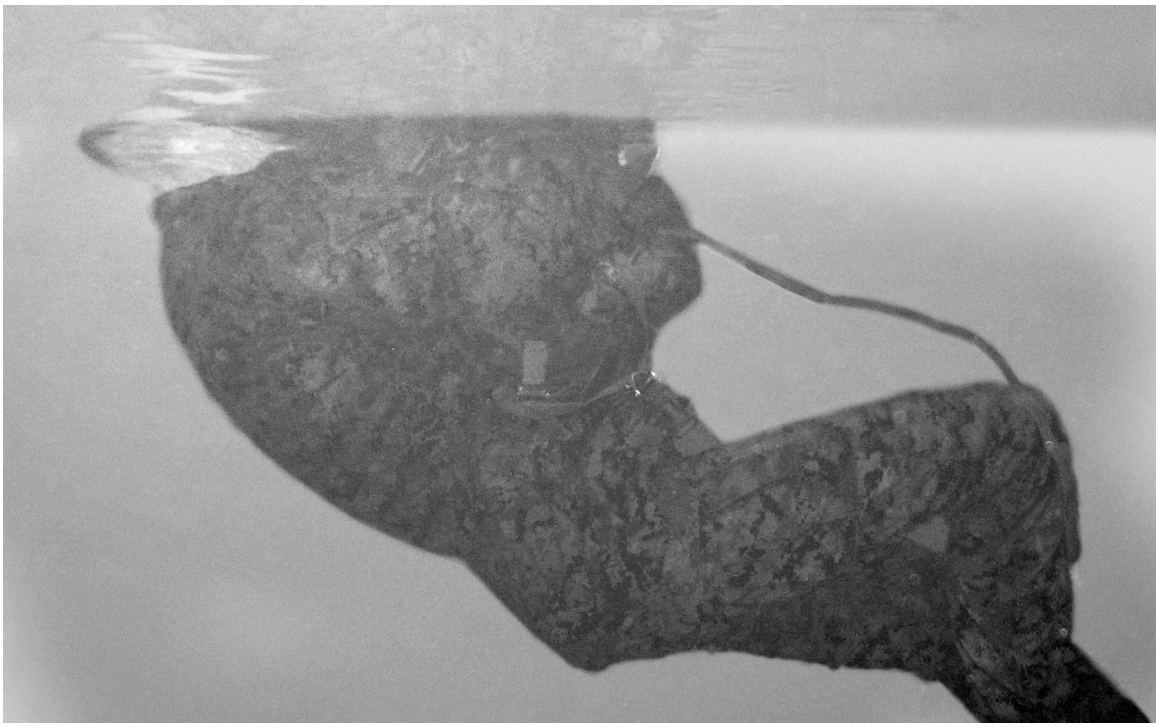


Figure 1-13

Gear Shed

If you find yourself in the water, it is important to remain calm to orientate and assess the situation. The first thing you'd want to do is to attempt to return to the surface by pushing down with your arms and by kicking hard with your legs. If you cannot re-surface, just relax and remain calm. The next step will be removing your helmet. Once your helmet is removed you will discard your rifle. The next step will be to remove either the flak jacket or the outer tactical vest or the modular tactical vest:

- Removing the outer tactical vest—
  - –Unsnap neck protection.
  - –Pull apart Velcro front flaps.
  - –Open flap and turn inside out, similar to removing a coat.
  - –Slide arms out of vest.
- Removing the modular tactical vest—
  - –Unsnap neck protection.
  - –Release both buckles on shoulders and pull the top of the vest forward releasing the Velcro.
  - –Take hands and hook the front lower sides of the vest with your thumbs.
  - –Push down and away from you and swim out of the vest.

How you personalized your gear will determine how you must shed your gear. Take into consideration that you might have on a life preserver. Make sure when attaching any other gear that you think about and rehearse shedding your flak jacket.

STAYING AFLOAT WITH A LIFE PRESERVER

The best form of flotation is to find any kind of floating object that will keep you and your equipment out of the water or minimize your exposure to the water. Life preservers are the best method, as they allow you to wear your clothes for heat retention and sunburn prevention. Marines use two basic classes of life preservers: inherently buoyant life preservers and inflatable life preservers.

Inherently Buoyant Life Preservers

Inherently buoyant life preservers are either vest-type (worn like a jacket) or yoke-type (worn around the neck). The life preserver's outer envelope is either a cotton or water-resistant material that encloses a removable fibrous glass or plastic foam filling.

In the Marine Corps, the most common type of inherently buoyant life preserver is the vest-type with collar, known as the kapok preserver. The kapok consists of collar straps, upper front chest straps, leg straps, and waist drawstrings that secure the preserver to you. The leg straps, which are fitted on both sides of the life preserver, ensure that the preserver remains around your chest while you are in the water. A chest strap is attached to the life preserver to facilitate lifting you out of the water. The strap can also be attached to other survivors or to lifeboats to reduce the fatigue that results from holding onto a floating/secured object by hand.

Inflatable Life Preservers

Marine Corps aircraft and amphibious assault vehicles have inflatable life preservers aboard. The inflatable life preserver issued to Marines is known as the life preserver personal (LPP). The LPP is capable of both oral inflation and carbon dioxide (CO2) cartridge inflation. The LPP consists of buoyancy chambers, CO2 inflator, and an oral inflation tube. The buoyancy chamber is deck gray in color and is made from a neoprene-coated nylon fabric.

Inflatable life preservers must be stored in a cool, dry place. Heat, moisture, and light cause deterioration of the life preserver material. Do not stow CO2 cylinders near steam lines or radiators. Heat can increase the pressure inside the cylinders causing them to explode. Avoid sharp edges in stowage. Sharp edges increase wear and tear on the life preservers and may also puncture inflatable buoyancy chambers.

CAUTION

Do not inflate the life preserver until you are clear of the aircraft, ship, or vehicle. Torn life preservers will not inflate and inflated life preservers can block you, and those behind you, from exiting the aircraft, ship, or vehicle.

To don and adjust the LPP (figures 1-14 through 1-17)—

Remove the LPP from its storage container.

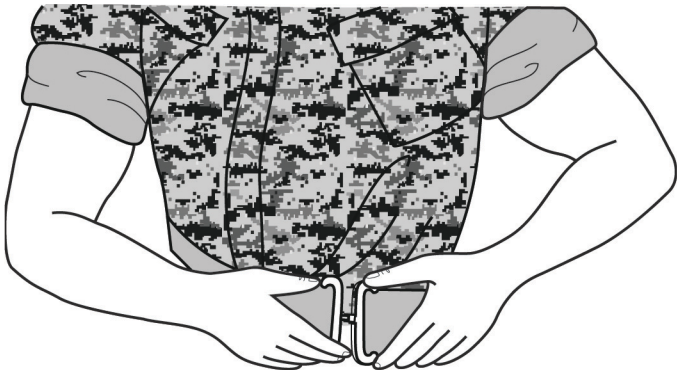


Figure 1-14

Fasten the belt fasteners in front with the pouch in the rear.

Adjust the belt to fit; secure any excess belt by mating the hook and pile tape.

Rotate the pouch to the front and re-adjust the belt if necessary.

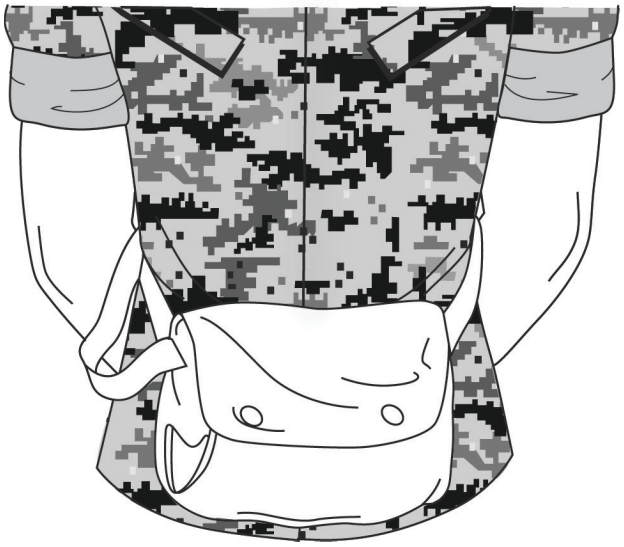


Figure 1-15

Open the snap fasteners on the pouch and unfold the life preserver.

Place the deflated life preserver over your head.

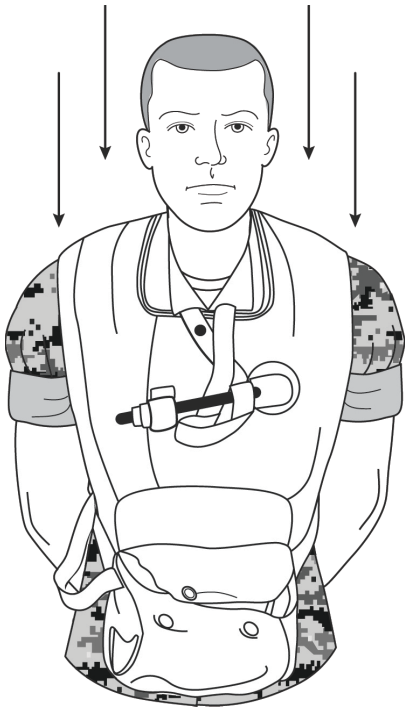


Figure 1-16

Place the storage container into the pouch after donning the life preserver.

Lift the lower end of the life preserver out of the pouch.

Inflate the life preserver by pulling on the lanyard attached to the CO2 inflation valve or by blowing on the end of the oral inflation valve.

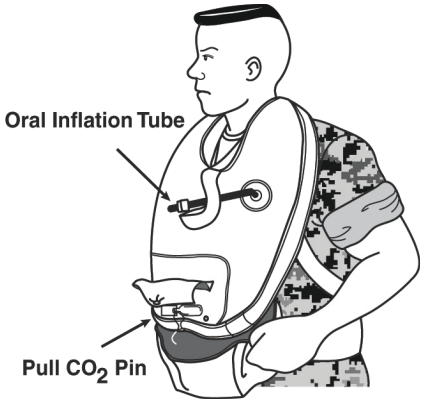


Figure 1-17

Field Expedient Flotation Devices

In the absence of a dedicated rescue/flotation device, you may improvise one using items from issued individual or organizational gear.

Waterproofed Pack. A waterproofed pack can support the weight of one to three Marines, keeping their heads out of the water. If used as an individual flotation device, hug the pack to your chest and place your chin on top to support your head out of the water. (figure 1-18) Two or three Marines can place one hand on top of the pack and form a wagon wheel around it. (figure 1-19)



Figure 1-18



Figure 1-19

Water Jug. A 5-gallon plastic water jug, even when filled partially with water, can support the weight of one to three Marines, keeping their heads out of the water. If used as an individual flotation device, grasp the water jug on opposite sides (or top/bottom) and place your chin on top to support your head out of the water. (figure 1-20)



Figure 1-20

Two or three Marines can place one hand on top of the jug and form a wagon wheel around it. (figure 1-21) An advantage of the water jug is the availability of fresh drinking water in a saltwater environment.



Figure 1-21

ISOMAT Raft. When rolled up, an ISOMAT raft can support the weight of a Marine. To keep your head out of the water, grasp the two ends of the roll and place your chin on top. (figure 1-22) Due to its light weight, a line can be attached to the mat to make it a field expedient rescue tube.

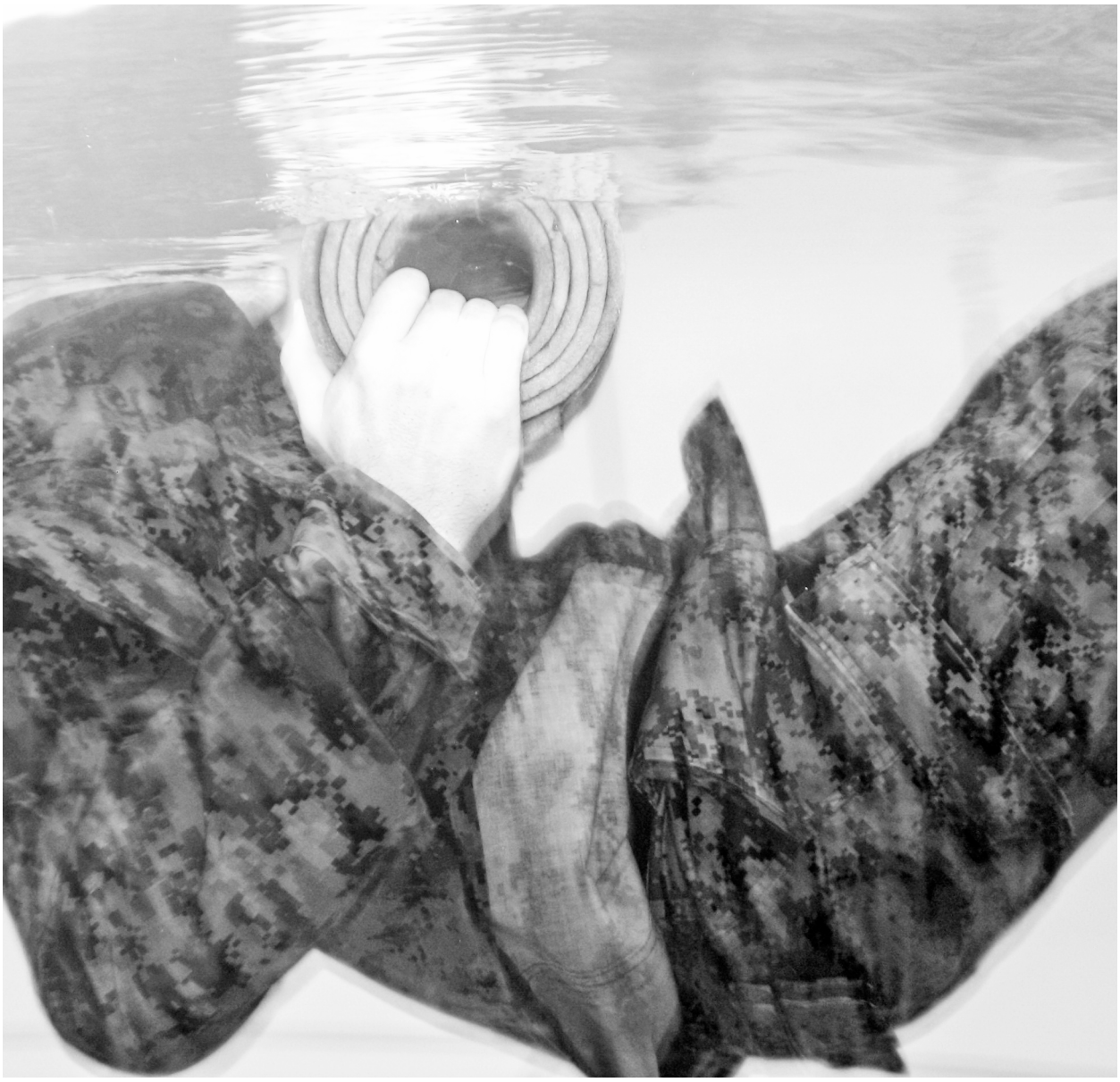


Figure 1-22

Floating With an Inflated Blouse

You can use your blouse as a temporary field expedient flotation device. The following preferred method allows you to keep your head out of the water (figure 1-23):

Keep the sleeves and the front of your blouse fully buttoned.

Pinch the blouse collar by the top two buttons in the front, and exhale air into the neck line.

You can maintain flotation with this technique by inhaling through the nose and exhaling through the mouth into the blouse. This allows you to maintain a relaxed breathing cycle.



Figure 1-23

An alternate method requires you to submerge your head—

Keep the sleeves buttoned and the top two front buttons unbuttoned.

Grasp the collars, press down with your thumbs where the rank insignia is normally pinned, and pull the collar down tight against your neck, creating a seal.

Hold your grasped fingers firmly against your chest. (figure 1-24)



Figure 1-24

Take a deep breath and bend forward no more than 45 degrees to prevent the air from escaping through the back of the blouse.

Turn your head toward either side and break the seal of your collar.

Bury your face as far in your armpit as possible and forcefully exhale a full lung of air into the blouse. (figure 1-25)



Figure 1-25

Immediately reseal the collar.

Tilt your head back and raise your elbows to allow air to create a floating cushion around the back of the neck. Cross your ankles and stop moving. (figure 1-26)



Figure 1-26

It is possible to float by a bubble of air trapped in the shoulders of your blouse. The air rises to the back and shoulders of the blouse and supports you at the water's surface. An inflated blouse is also a temporary flotation device used by weaker swimmers while trying to remove their trousers. There is a primary and an alternate way to create a bubble of trapped air in a blouse—

Primary Method:

Turn the collar inside the blouse to help create a seal.

Unbutton top button and pull collar around mouth and nose.

Take a deep breath and bend forward slightly at the waist. Exhale one-half to three-quarters of a breath into the blouse.

Grasp and twist the collar with one hand to create a seal, this prevents air from escaping out from the collar.

Use your free hand and feet to stroke and kick to the surface.

Gather and hold the blouse tightly at the collar and stomach level to prevent the blouse from losing air if it floats up too high.

Splash water on the blouse periodically to prevent the material from drying; dry material allows air to escape.

Repeat inflation as required.

Alternate Method:

Turn the collar inside the blouse to help create a seal.

Unbutton the second button from the top.

Take a deep breath and bend forward slightly at the waist.

Place your mouth and nose inside the hole created by the open button and exhale one-half to three-quarters of a breath into the blouse.

Grasp material at the unbutton portion and pull downward.

Use your free hand and feet to stroke and kick to the surface.

Splash water on the blouse periodically to prevent the material from drying; dry material allows air to escape.

Repeat inflation as required.

Floating With Inflated Trousers

In warm water, trousers can be used as a primary expedient flotation device. However, in cold water, submerging your head to remove and inflate your trousers results in heat and energy losses that negate the benefit of using the trousers as a flotation device. Once your trousers are inflated, you float motionlessly as if wearing a life preserver. If needed, assume the heat escape lessening posture (HELP) position to slow heat loss. As trousers dry, air leaks out of the legs. To slow this process, occasionally splash water on the fabric. Reinflate trousers as needed.

Sling Method. The sling method works if you are a strong swimmer or naturally very buoyant. Take the following steps to inflate trousers using the sling method (figures 1-27 through 1-34):

Take a deep breath, bend over, and remove your boots.



Figure 1-27

Note: Retain your boots. Tie the boot laces together and suspend the boots from your blouse or hang them around your neck so that they rest on your chest.

Remove your trousers. Button or zip the trousers' fly closed. This allows you to control airflow.



Figure 1-28

Tie the bottoms of the trouser legs in a square knot. (See app. A for various knots.)



Figure 1-29

Ensure that the front (fly) of the trousers faces you.

Hold the trousers above the water's surface and behind your head. Grasp both sides of the waistband and open with both hands.



Figure 1-30

Kick strongly to stay on top of the water while slinging the trousers overhead in order to trap air into them.

Once the waistband is submerged in the water, air is trapped in the legs.

Hold and seal the waistband underwater.



Figure 1-31

Slip the inflated legs over your head. Hold the waistband in toward your chest, the fly facing your body. To prevent air from escaping from the trousers, seal the waistband by either folding it or twisting it.

Lie back and relax, resting the back of your neck against the knot.



Figure 1-32

Splash water on the trousers periodically to prevent the material from drying. Dry material allows air to escape.



Figure 1-33

To replenish air in the trousers, you will use a technique known as the scooping method. With one hand on the open waistband, extend the trousers in front of you just below the surface of the water and scoop air bubbles with your free hand into the open waistband until the trousers have sufficient air. Repeat as necessary.



Figure 1-34

Splash Method. The splash method is an alternative to the sling method. As with the sling method, you must kick strongly to remain at the surface. To inflate trousers using the splash method, perform the following (figures 1-35 through 1-42):

Take a deep breath, bend over, and remove your boots.Retain your boots.



Figure 1-35

Note: Retain your boots. Tie the boot laces together and suspend the boots from your blouse or hang them around your neck so that they rest on your chest.

Remove your trousers. Button or zip the trousers' fly closed. This allows you to control airflow.



Figure 1-36

Tie the bottoms of the trousers' legs in a square knot. (See app. A for various knots.)

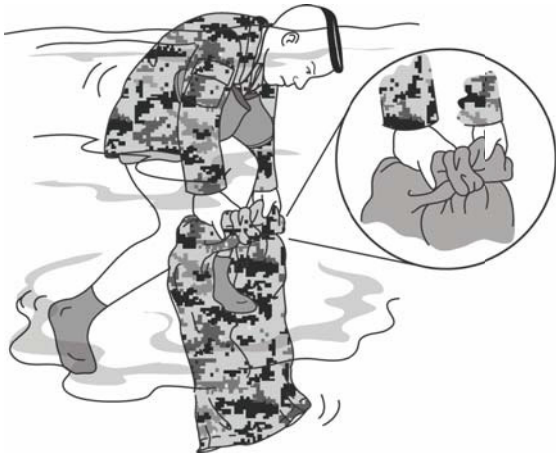


Figure 1-37

Ensure that the front (fly) of the trousers faces you.

Hold the trousers at the water's surface out in front of you by the waistband with the fly up.



Figure 1-38

Grasp the waistband at the surface with one hand. Insert your free hand into the waistband, palm down.

Flutter your hand rapidly to create bubbles. This sends a mixture of water and air bubbles into the trousers. The water passes through the fabric and the air remains trapped in the legs.



Figure 1-39

Hold and seal the waistband underwater.

Slip the inflated legs over your head. Hold the waistband in toward your chest, the fly facing your body. To prevent air from escaping from the trousers, seal the waistband by either folding it or twisting it.



Figure 1-40

Lie back and relax, resting the back of your neck against the knot.

Splash water on the trousers periodically to prevent the material from drying, dry material allows air to escape.



Figure 1-41

To replenish air in the trousers, you will use a technique known as the scooping method. With one hand on the open waistband, extend the trousers in front of you just below the surface of the water and scoop air bubbles with your free hand into the open waistband until the trousers have sufficient air. Repeat as necessary.



Figure 1-42

Blow Method. The blow method is an alternative to the sling method. Use the blow method if you are a weak swimmer. Take the following steps to inflate trousers using the blow method (figures 1-43 through 1-50):

Take a deep breath, bend over, and remove your boots.



Figure 1-43

Note: Retain your boots. Tie the boot laces together and suspend the boots from your blouse or hang them around your neck so that they rest on your chest.

Remove your trousers. Button or zip the trousers' fly closed. This allows you to control airflow.



Figure 1-44

Tie the bottoms of the trousers' legs in a square knot. (See app. A for various knots.)

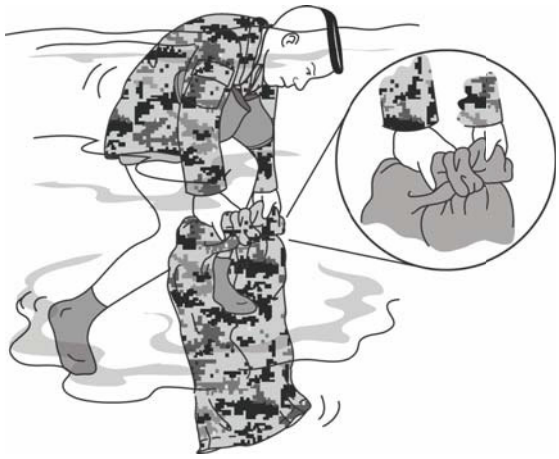


Figure 1-45

Ensure that the front (fly) of the trousers faces you.



Figure 1-46

Hold the trousers at the water's surface. Grasp both sides of the waistband and open with both hands.

Take a deep breath.

Drop 2 feet below the water's surface, pulling the waistband underwater.

Hold the waistband open with both hands and blow air into the trousers.



Figure 1-47

To fill the trousers with air, surface while keeping the waistband underwater, breathe in again, drop below the water's surface, and blow air into the trousers. Repeat these steps until the trousers are filled sufficiently. Once trousers are filled—

Hold the waistband underwater. Twist and pinch it off.

Slip the inflated legs over your head. Hold the waistband in toward your chest, the fly facing your body. To prevent air from escaping from the trousers, seal the waistband by either folding it or twisting it.

Lie back and relax, resting the back of your neck against the knot.



Figure 1-48

Splash water on the trousers periodically to prevent the material from drying. Dry material allows air to escape.



Figure 1-49

To replenish air in the trousers, you will use the scooping method. With one hand on the open waistband, extend the trousers in front of you just below the surface of the water and scoop air bubbles with your free hand into the open waistband until the trousers have sufficient air. Repeat as necessary.



Figure 1-50

AVOIDING HEAT LOSS IN COLD WATER

The rate of heat exchange in the water is about 25 times greater than it is in air of the same temperature. When you are immersed in cold water, hypothermia occurs rapidly due to the decreased insulating quality of wet clothing and as a result of water displacing the layer of still air that normally surrounds the body. You also lose about 50 percent of your body heat through your head; therefore, keep your head out of the water. Other areas of high heat loss are the neck, the armpits/sides, and the groin. (figure 1-51)

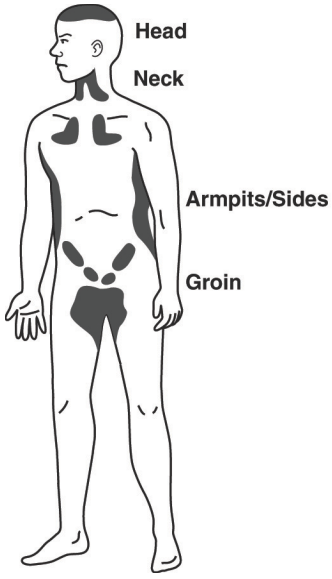


Figure 1-51

In cold water, DO NOT SWIM TO STAY WARM. Swimming, even with a slow and steady stroke, produces a lot of heat that is lost in the water. The heat loss can produce hypothermia that slows body functions and can result in serious injury or death. Remaining motionless conserves body heat three times longer than swimming. SWIM only if you have a flotation device and the shoreline is visible.

Individual Protection From the Cold

If you are equipped with a life preserver, assume the HELP position to slow heat loss and to protect major blood vessels near the body's surface. These areas lack insulating fat and are vulnerable to the chilling effects of cold water. Take the following steps to protect yourself from the cold (figure 1-52):

Tuck your chin down tightly to cover your throat.

Draw your legs up in a fetal position to protect the groin.

Place your arms across your chest, tucking your hands into your armpits.



Figure 1-52

Wear some type of head covering (e.g., stowed cover, towel, handkerchief) to lessen heat loss through the scalp if head covering is available.

Group Protection From the Cold

If three or more Marines are in the water and are equipped with life preservers, they should wedge tightly together and lock arms to form a circle known as a huddle position. This position protects vulnerable areas from heat loss. (figure 1-53)



Figure 1-53

A casualty who is suffering from the effects of the cold can be placed within the huddle to be surrounded by warmer water. If there are more than five Marines, they should make clusters of huddle positions. If in the water for a prolonged period, it is recommended that everyone be rotated inside the huddle to maintain or re-warm each person's internal core temperature. Contact with other swimmers provides survival advantages and—

- Creates a larger target for search and rescue aircraft.
- Provides additional warmth in cold water.
- Improves morale.
- Re-establishes the chain of command.
- Reduces shock and panic.
- Provides opportunities to administer first aid.
- Supports exhausted Marines.

DROWNPROOFING METHODS

An object that floats on the surface has positive buoyancy. An object that floats a few feet beneath the surface has neutral buoyancy. An object that sinks has negative buoyancy. Most people have positive buoyancy and will float at the water's surface. To test your buoyancy—

Stand in water that is at your chest level or deeper.

Take a full breath.

Bend forward slowly.

Relax and wait.

If you have positive buoyancy, you will slowly rise to the surface. If you have neutral buoyancy, you will float a few feet beneath the surface. If you have negative buoyancy, you will sink. Regardless of whether you naturally float or sink, you can remain at the surface for extended periods without a life preserver if you exercise the appropriate drownproofing methods, which are based on your buoyancy.

Drownproofing methods consist of the T-method and the sweep. With any drownproofing method, remember the memory aid **SAFE**:

Slow easy movements
Move slowly to conserve energy and minimize heat loss.
Apply natural buoyancy
Use natural buoyancy to support the body.
Full lung inflation
Fill the lungs with each breath. Do not hold air in the cheeks.
Extreme relaxation
Tight muscles are denser than relaxed ones and do not float as well.

T-Method

The T-method is a basic drownproofing method. This is the best survival technique if you have negative buoyancy. Take the following steps to perform the T-method (figures 1-54 and 1-55):

With your face out of the water, take a deep breath and submerge your face in the water while holding your breath.



Figure 1-54

Float with your body in a vertical position, arms extended from your side, and legs extended and joined.

Move your hands up to your armpits by tracing an imaginary line along your ribs.

Extend your arms outward (horizontal) to your sides, your body position resembles the letter "T."

Step out and forward with one leg and point your other leg to the rear, your knees should be slightly bent. Simultaneously, bring your arms down to your sides. Then bring your legs back together.



Figure 1-55

Complete the steps by exhaling most of your air and preparing to surface your face to obtain another breath of air. Hold your head out of the water. Tilt your head back slightly and breathe normally.

Once your breath is complete, move your hands up and down directly in front of your body. Do this two or three times to slow your descent into the water.

> ***Note:*** To avoid hyperventilating, hold your breath below the surface of the water for no more than 10 seconds.

The Sweep

The sweep works well if you have slight to excellent positive buoyancy. To execute the sweep (figures 1-56 and 1-57)—

Float face down in the water (bend 45 degrees at the waist, arms and legs dangling, head hanging down) and relax all muscles.



Figure 1-56

Spread your feet slowly to prepare for a single kick (one leg is forward and one leg is rearward).

Cross your arms in front of your chest, palms outboard with the back of each hand touching the opposite ear.

Exhale prior to raising your head for a breath.

Bring your legs together and sweep your arms down and out until the arms are fully extended out to the sides. This raises your face above the water and allows you to catch a breath of air.

With your air supply replenished, return your face to the water and relax while sweeping your arms in a downward motion in front of your body to prevent/slow your descent. Do not hold your breath for more than 10 seconds; more than 10 seconds enhances your chances of shallow water black out and subsequent drowning.



Figure 1-57

SURVIVAL STROKES

The crawl stroke, breast stroke, side stroke, and elementary backstroke are the most common survival strokes.

Crawl Stroke

The crawl stroke, sometimes called the front crawl or freestyle, while it provides speed, it is not a preferred survival stroke, as it is exhausting, and is difficult for beginners. To execute the crawl stroke (figures 1-58 through 1-61)—

Body Position:

Lie horizontal, on your stomach, in the water.

Look forward and downward at a 45 degree angle with the waterline between your eyebrows and hairline. Your head position is important as it assists in cutting a path through the water. If your head is too high in the water, your lower body sinks significantly, making your stroke less efficient. If your head is too low in the water, water washes over your shoulders and neck, creating unnecessary drag.

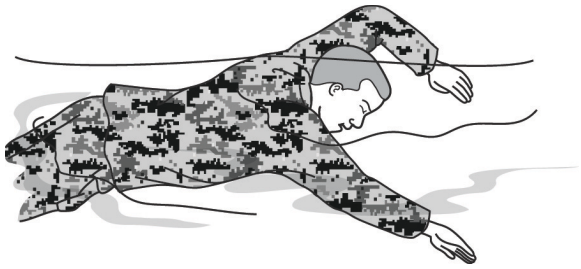


Figure 1-58

Arm Action:

Arm action occurs in three phases: catch, propulsion, and recovery.

Fully extend one arm forward of your body; this positions your hand to catch the water in preparation for the propulsion phase.

To catch the water, bend your wrist (with your palm pointing outboard) and make an "S" shape (or inverted "S" shape) with your hand, ensuring that your hand does not cross the center of your body. Your left hand makes an "S" shape and your right hand makes an inverted "S" shape with your hand finishing at shoulder level.

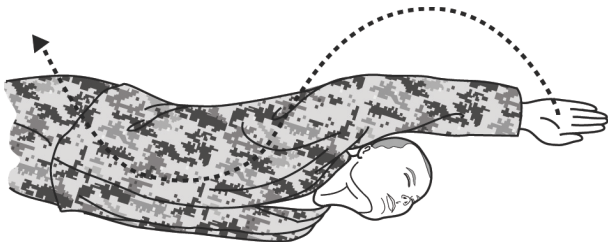


Figure 1-59

Push with your hands in a rearward fashion toward your feet until your arm is fully extended along your side, keeping your hands close to your body.

To begin the recovery phase, bend your arm at the elbow and raise your hand out of the water. Your hand will break the surface of the water and maintain a height of 2 to 3 inches above the water's surface.

With your hand and arm moving in a forward manner, bring your hand past your head until your arm is about three-quarters of the way extended. At this point, turn your hand with your palm outboard so as to allow your thumb and forefinger to enter the water first.

Once your hand enters the water, continue to push your arm forward until it is fully extended.

You are now prepared to catch the water again. These steps are performed in an alternating pattern: when one arm is catching and propelling, the other arm is recovering.

Leg Action:

Use a flutter kick to create the leg action for the crawl stroke. This kick is primarily used for keeping the lower body horizontal with the water's surface while providing minimal propulsion. The kick should be executed with the conservation of energy in mind. The flutter kick is an alternating leg action: one leg is kicking in a downward motion while the other leg is recovering to the surface to prepare for the next kick. The size of the kick ranges from 12 to 15 inches, depending on the swimmer's height.

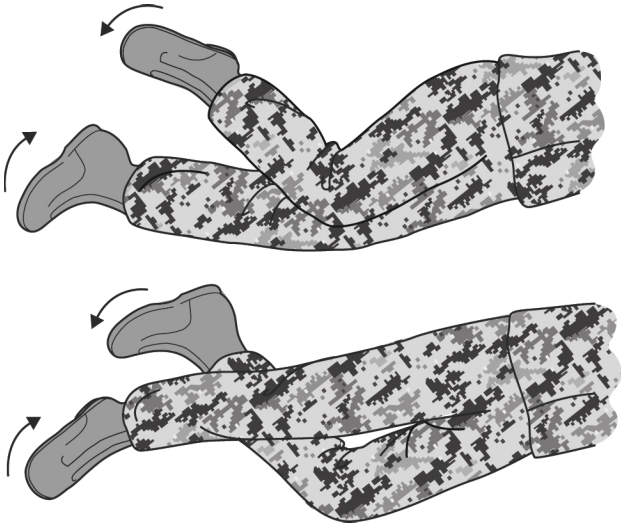


Figure 1-60

Maintain your legs in a semi-rigid manner.

Generate power for the kick from the hips.

Keep your toes pointed as you would on dry land flutter kicks; they trail behind your legs and act as "flippers."

Execute the propulsion phase of this kick with a downward thrust of your leg.

Execute the recovery phase by pushing your leg back to the surface. This phase is complete when your foot reaches the surface.

Breathing:

Breathe during the recovery phase of the arm action.

Roll your body and rotate your head to the side of your body where the arm recovery is occurring, this rolls the water away from your mouth. Keep your chin pushed back toward your shoulder.

Exhale while your face is still submerged and inhale when your face breaks the surface.

Breathe either bilaterally or rhythmically. To breathe rhythmically, breathe on the same side of your body every time your arm cycles. Bilateral breathing requires you to breathe every one and a half arm cycles. To breathe bilaterally, breathe when your right arm is recovering, your face goes back in the water, and the next time you breathe is when your left arm is starting its recovery three arm strokes later.

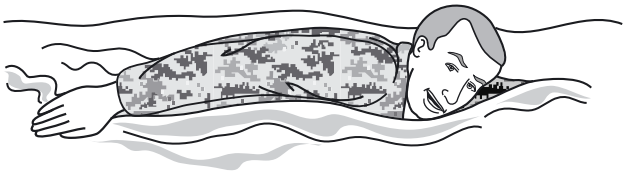


Figure 1-61

Bilateral breathing is the preferred method for breathing; it prevents the chance of hyperventilation and allows your body to maintain a lateral position in the direction you are swimming.

Coordination:

This stroke uses constant arm and leg action.

Breast Stroke

Use this stroke to swim underwater, through oil or debris, and in rough seas. If you are a good swimmer and not wearing combat gear, the breast stroke is the best stroke for long-range swimming because it provides good visibility and allows you to conserve your energy and maintain a reasonable speed. (figures 1-62 through 1-69)—

Body Position:

Lie prone in the water. Swim with your trunk and legs projecting back and down at an angle of 20 to 30 degrees.

Extend arms out in front (hands together [side by side]) and extend legs behind (toes pointed) to prevent drag.

Face downward, looking forward at a 45 degree angle to break the water and to prevent water from washing into the collar area causing drag.



Figure 1-62

Note: This is known as the glide.

Arm Action:

Turn your palms outward and bend your arms slightly.

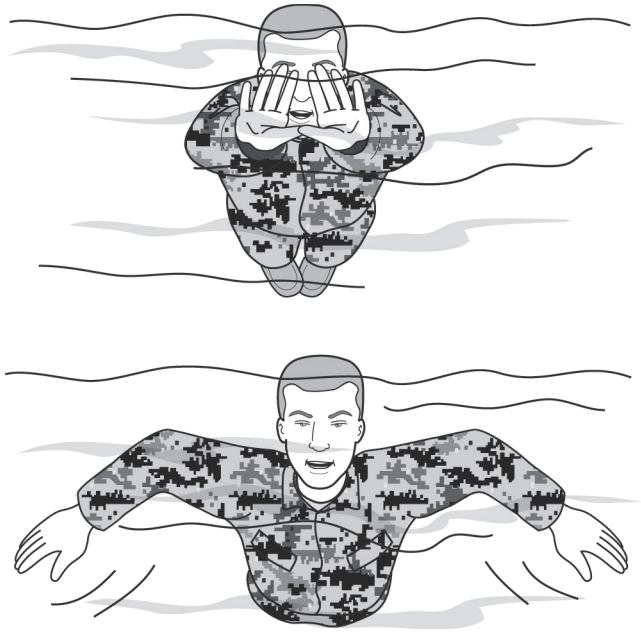


Figure 1-63

Sweep your arms sideward and slightly downward until your hands are opposite and slightly below your shoulders.

Keep the hands cupped for increased propulsion.

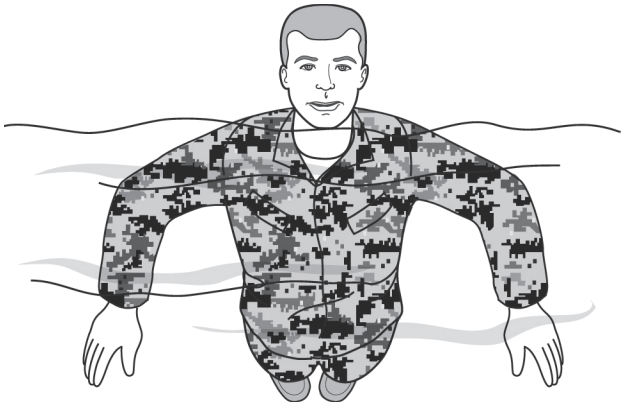


Figure 1-64

Rotate your head up, breathe once your mouth breaks the surface.



Figure 1-65

Bring your hands and arms up along your chest and thrust them forward until they are extended and ready to execute the next arm pull.



Figure 1-66

As the arms start their recovery into the glide, the head should rotate forward, resubmerging the face.



Figure 1-67

Leg Action:

Draw your heels toward your buttocks, establishing a 45-degree bend in the knees.

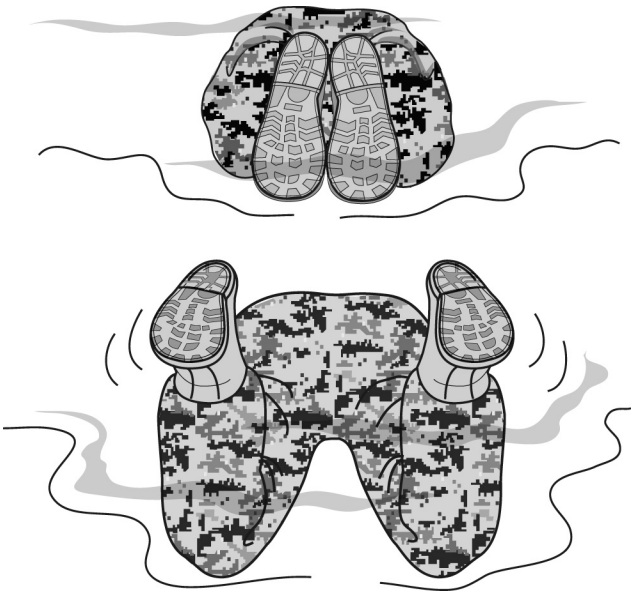


Figure 1-68

Thrust your legs outward and rearward, then squeeze them together. The whipping action of the feet aids forward propulsion.

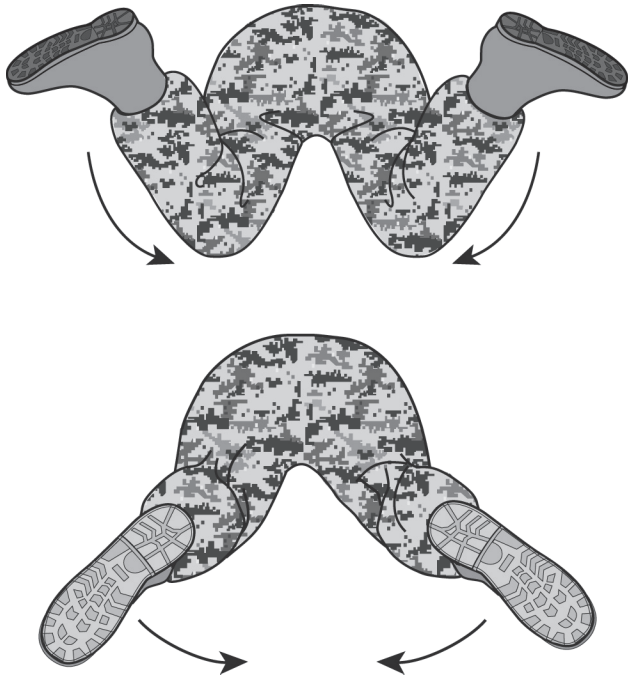


Figure 1-69

Note: This is known as the breast stroke kick.

Breathing:

Inhale during the arm pull and exhale through your mouth and nose during the finish of the breast stroke kick and glide.

Coordination:

Begin your arm pull. Near the finish of the pull, flex your knees and bring your heels toward your buttocks. The arm pull counteracts the resistance created by the knees.

As the arm pull is completed, thrust your hands forward, kick your legs outward and rearward, and squeeze them together.

Glide through the water for approximately 1 to 3 seconds or until your forward momentum decreases, then begin the next stroke.

Side Stroke

The side stroke is a survival stroke because you use both arms for buoyancy, with each arm creating a slight propulsion. The majority of your body's propulsion comes from your kick. (figures 1-70 through 1-76)—

Body Position:

Lie on your side with your lead (bottom) arm extended beyond (with a slight bend in your elbow) your head and in line with your body. Palm is down and your hand is submerged 6 to 8 inches.

Extend your trail (top) arm down the length of your body over your thigh.

Keep your legs straight and together, toes pointed rearward.

Keep your face out of the water; this allows for free breathing.

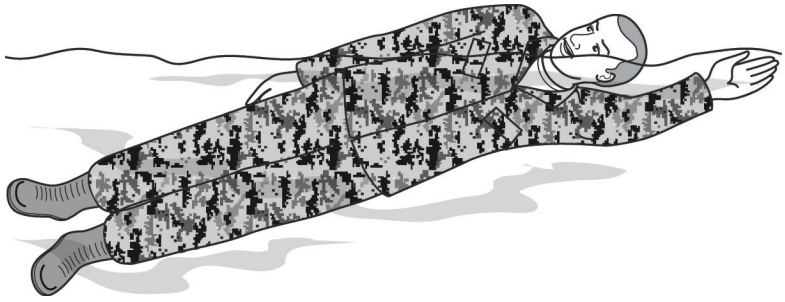


Figure 1-70

Note: This is known as the glide.

Arm Action:

With your lead arm, pull your arm downward, while flexing at the elbow, until it is straight down from your shoulder.

Rotate your shoulder and pull your elbow into your side. This should put your lead hand at shoulder level. At the same time, turn your palm toward your face and thrust forward to your original, extended position.

Draw your right hand upward in front of your chest to shoulder level. Rotate your palm toward your feet, then push it downward in front of your body toward your feet to catch the water.



Figure 1-71

Push your trail hand backward to its original position on top of your thigh. (Your trail hand starts forward and meets your lead hand at your chest/shoulder.)

While pulling the arms in propulsion phase, keep the hands cupped.

Leg Action:

To perform the scissor kick, the top leg always goes forward and the bottom leg always goes rearward. From the extended position, draw—or recover—your feet toward your buttocks until your legs are bent at a 45-degree angle at the knees and the hips are flexed at a 45-degree angle with the thighs.

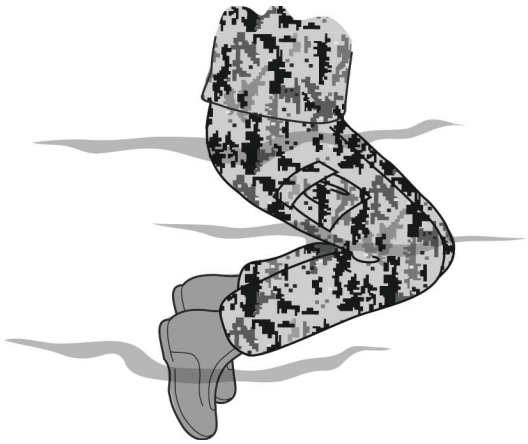


Figure 1-72

Once the legs have completed their recovery and while maintaining a 45-degree bend in the knees, extend the legs fully into a "V" shape in order to catch the water for the propulsion phase.

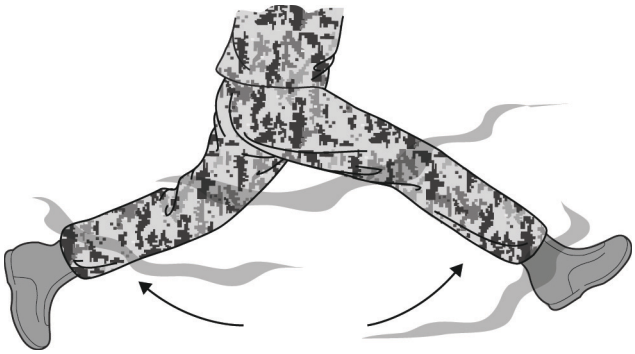


Figure 1-73

Once the legs are separated and extended forward and rearward to the "V" position, sweep the legs together until the feet are together.

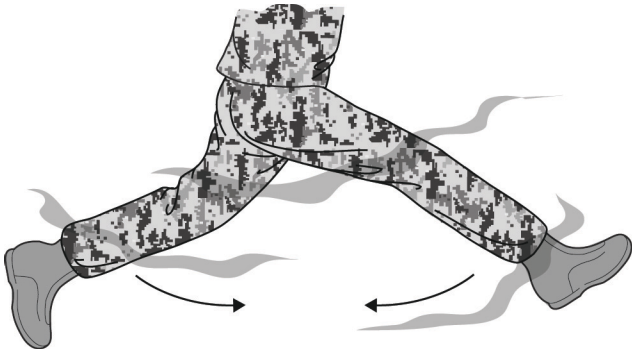


Figure 1-74

Note: You are now in the glide position.

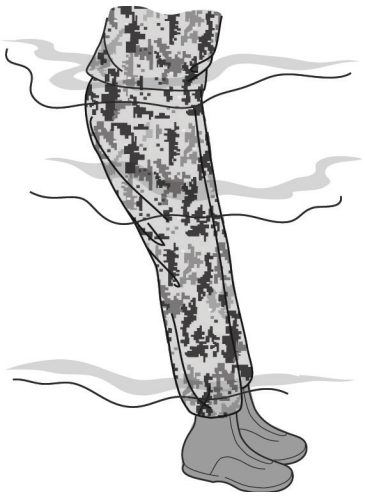


Figure 1-75

Breathing:

As long as your face remains clear of the water, it is a free breathing stroke. However, it is recommended that you exhale, then quickly inhale when the legs are sweeping back together in the scissor kick. This is when the body reaches its highest point in the water, thus clearing the face completely from the surface of the water, making it the optimum time to breathe.



Figure 1-76

Coordination:

Begin the stroke with the downward pull of your lead arm. At the same time, bring your trail arm upward and draw your knees up to begin the kick. Let the thrust of the lead arm, push of your trail arm, and the kick of your legs coincide in order to finish the glide position. Glide through the water for approximately 1 to 3 seconds or until your forward momentum decreases, then begin the next stroke.

Elementary Backstroke

The elementary backstroke is also an excellent survival stroke. It relieves the muscles that you use for other strokes, and it is the recommended stroke for weak swimmers or nonswimmers. To execute the elementary backstroke (figures 1-77 through 1-83)—

Body Position:

Start on your back.

Face up, chest up, and hips up, keeping an arch in your lower back with arms pressed to your sides and your legs extended and joined to prevent drag.



Figure 1-77

Arm Action:

Trace your hands up your sides to an area near your armpits then extend your arms out to the sides to form the letter "T" (palms facing feet), locking out the elbows.

> ***Note:*** Don't raise your arms above your head. This creates drag, changes your body position, and submerges the head.

Move your palms toward your thighs using a strong sweeping motion.

Keep the hands cupped through the sweeping motion.

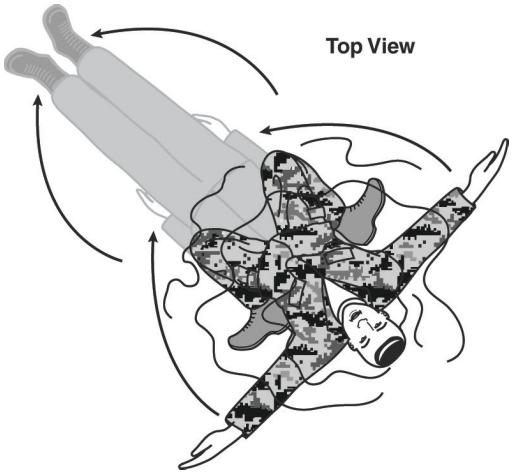


Figure 1-78

Leg Action:

Bend both legs at the knee (90 degree angle), slightly separating your knees and drawing your heels downward to a point under and outside your knees. The knees are spread as wide as the hips or slightly wider, depending on the body type of the swimmer.

Circle around in a whipping action, ending with legs in a glide position.

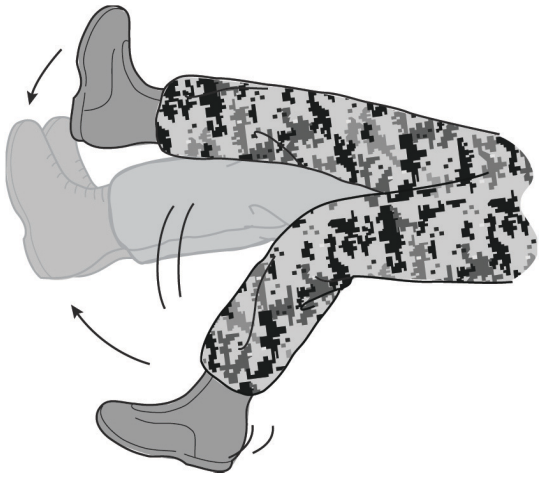


Figure 1-79

Breathing:

Breathe anytime during this stroke. However, it is recommended that you exhale then quickly inhale when your arms are sweeping back toward your sides and while your legs are sweeping back together. This is when the body reaches its highest point in the water, thus clearing the face completely from the surface of the water and making it the optimum time to breathe.



Figure 1-80

Coordination:

Begin the arm pull (recovery).

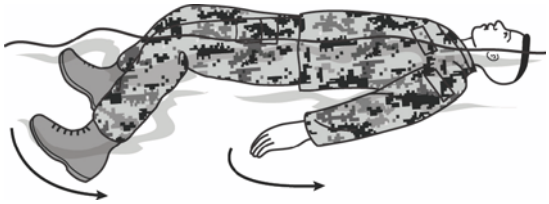


Figure 1-81

Near the finish of the pull, flex your knees to a 90-degree angle. The arm pull counteracts the resistance created by the knees.

Kick out your leg, and squeeze them together as the arm pull is completed (catch, power).

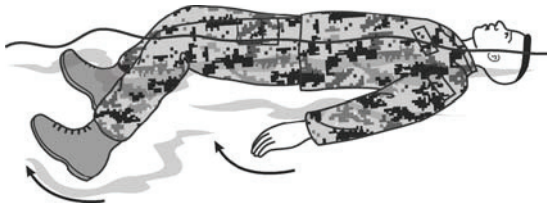


Figure 1-82

Glide through the water for 1 to 3 seconds or until your forward momentum decreases, then begin the next stroke as your momentum slows.

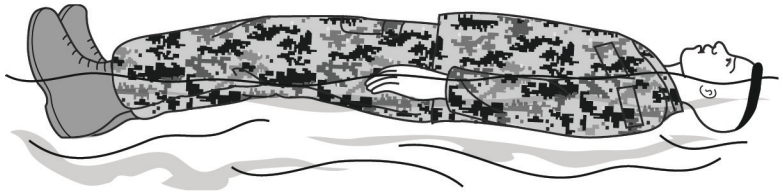


Figure 1-83

CHAPTER 2
WATER RESCUES

A drowning victim can panic and react with unexpected violence and can seize and inadvertently drown a rescuer. Therefore, if possible, a water rescue should be executed from a distance. Reaching, wading, or throwing methods are the preferred rescue techniques, However, if a victim is too far away to use these methods, a swimming rescue may be necessary. When possible, remove all combat gear before entering the water. Swim within 2 to 6 yards of the victim to maintain a margin of safety; this allows you to reassess the situation and reassure the victim. If the victim is unconscious, use the wrist tow method or cross-chest carry method to pull the person to safety. If the victim is struggling, use a rear approach and then execute either a single armpit level-off or a double armpit level-off before towing the victim to safety.

If the victim does begin to overpower you, there are techniques that allow you to defend yourself without having to abandon the rescue. These techniques include the block, the wrist-grip escape, the front head-hold escape, and the rear head-hold escape. These techniques allow you to separate yourself from the victim, reassess the situation, and then attempt the rescue again. Before every rescue, you should always apply the following "Cardinal Rule":

STOP. Stop what you are doing.

LOOK. Look around, see if there is someone trying to get your attention.

LISTEN. Listen for calls for help or for any unusual sounds indicating an emergency.

REACH. Try to reach out to the victim, without entering the water. Use an object between you and the victim. Do not make direct contact if possible.

THROW. If you cannot reach the victim without entering the water, throw a rescue/flotation device to him/her. A line attached to the device allows you to tow the victim back or to re-deploy the device.

GO. Enter the water only as a last resort, and only with a rescue/flotation device. Remove all gear that does not assist you in flotation. You, the rescuer, are number one in the water.

Note: In this chapter's illustrations, the rescuer is shown without a helmet.

REACHING RESCUE TECHNIQUES

Reach

From a safe position at the water's edge, reach out to the victim. Talk constantly to calm the victim. Retain partial contact with land or some solid support structure (e.g., pier, bridge). If the victim is

close but still beyond reach, extend an object (e.g., stick; pack; rifle with magazine removed, chamber empty, and muzzle pointing toward victim) that the victim can grasp. (figure 2-1) Pull the victim slowly to safety. Once the victim is close to shore, remove the victim from the water.

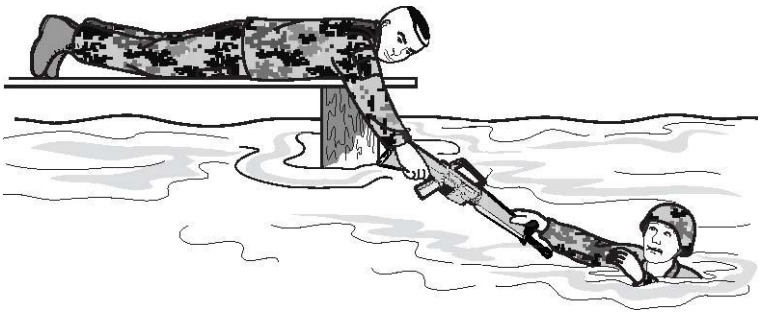


Figure 2-1

Note: You can also extend a foot to the victim if you can retain a secure grip on a solid support structure.

Reach From a Deck

A reach from deck rescue can be executed by either a swimmer or a nonswimmer, and it can be used on an active or a passive victim. Be sure to reassure the victim during the rescue. To execute reach from a deck—

Lie prone on the deck with your body firmly anchored. To anchor your body, lie flat, spread legs apart, and extend one arm behind you with your palm down and on the deck.

Keep as much of your weight on the deck as possible and extend your free hand to the victim.

Grasp the victim's wrist from above, with your thumb and index finger facing you. The victim should never be allowed to grab you and put your life at risk. Therefore, never reach across the victim to grab his/her wrist, always grab the wrist that is the closest to you.

Keep your arm straight and locked out and pull the victim to the side of the deck. Never pull the victim into you, always pull the victim into the side.

Arm Extension

An arm extension rescue can be used if you cannot reach the victim using the reach from a deck rescue technique and you must enter the water. An arm extension rescue technique is used for a victim who is either active or passive. Once you determine that a reach from a deck rescue technique is not viable—

Reassure the victim and quickly ease into the water while holding onto the deck with one hand.

Grasp the victim's wrist from above, your thumb and index finger facing you. The victim should never be allowed to grab you and put your life at risk. Therefore, never reach across the victim to grab his/her wrist, always grab the wrist that is the closest to you.

Keep your arm straight and locked out and pull the victim to your side. Never pull the victim into you, always pull the victim into the side.

Leg Extension

If the victim is beyond the reach of your arm, ensure that you have a firm grip on the deck, extend a leg to the victim and allow hi/her to grab it, and slowly bring the victim in closer until you can grab the victim's wrist that is holding onto your leg. Once you have a firm grasp on the victim's wrist, use the steps in the arm extension to pull the victim to safety. The leg extension rescue can only be used to rescue an active victim because the victim must be able to grab the rescuer's leg.

Wading Assist

Do not wade into water that is deeper than your chest. Talk constantly to calm the victim. If possible, do not touch the victim directly. Extend an object (e.g., stick; pack; rifle with magazine removed, chamber empty, and muzzle pointing toward victim) that the victim can grasp. Once the victim grasps the object, pull the victim slowly to safety. (figure 2-2)



Figure 2-2

Throw

If the victim is not within reach, use an expedient line to throw a lifesaving device to the victim. A lifesaving device can be any weighted item that floats (e.g., a canteen that is one-fourth full of water). The lifesaving device must be secured to the end of the rope so that the rope will feed out from its coil when tossed. Talk constantly to calm the victim. Once the victim grasps the line or the lifesaving device, pull the victim toward you at a steady pace that keeps the victim's head above the water's surface. DO NOT pull so strongly that you break the victim's grip on the line. To prepare and use an expedient line and lifesaving device (figures 2-3 and 2-4)—

Tie a bowline at one end of the rope. (Appendix A illustrates various types of knots.)

Unfasten the lid of a canteen.

Place the bowline around the neck of the canteen.

Refasten the lid so the canteen hangs from the bowline loop.

Place one end of the rope under the ball of your forward foot to secure it. Either tie a knot at the end of the rope or tie an object at the end of the rope to create a block. Stand with your weight on the end of the rope. DO NOT tie the rope around your ankle.

Coil 20 to 30 yards of the rope and hold it in a nonthrowing hand.



Figure 2-3

Place the canteen in your throwing hand.

Use an underhand throw to pitch the canteen and rope a short distance over the victim's head. Keep your nonthrowing hand open so the coil can unfold freely. The rope should trail across the victim's outstretched arms.

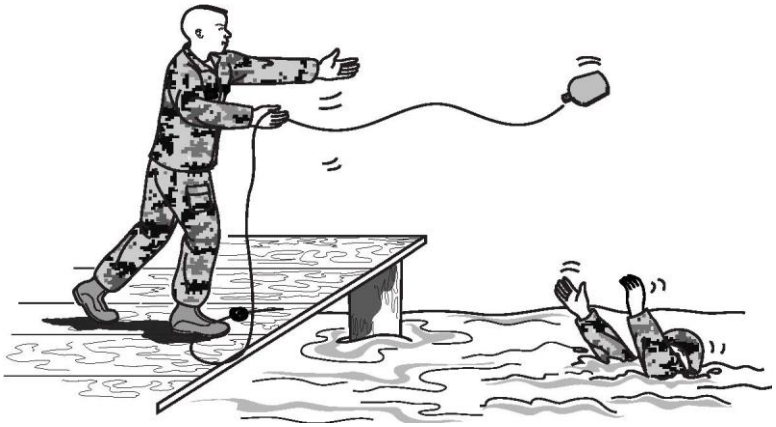


Figure 2-4

Retrieve the rope if the throw is inaccurate or the victim fails to grasp it. Recoil the rope as it is retrieved.

Move the coil to your nonthrowing hand and throw again.

BUDDY ASSIST

Properly approaching the victim is as important as any other aspect of a rescue. Knowing the appropriate and safest method needed to approach a victim is critical in ensuring your safety and the victim's survival. Determining the victim's physical state (i.e., distressed swimmer, victim that is active and drowning, or victim that is passive and drowning) is crucial and will determine which type of approach you will execute.

Front Surface Approach

The front surface approach is typically performed when the victim is passive. You must remember that approaching the victim from the front is dangerous because a distressed swimmer or victim that is active can lunge toward you.

Rear Approach

If the victim is active, you must remember that his/her response can change rapidly. Therefore, approaching the victim from the front could be extremely dangerous. The victim could easily grab you and take you under the water during a state of panic. Therefore, use a rear approach when possible. When approaching a victim from the rear, reassure the victim until you get to within 2 to 6 yards of the victim; at that point, stop talking to the victim in order to maintain an element of surprise.

APPROACH STROKES

Before approaching a victim, you must evaluate the victim:

- Is the victim a distressed swimmer?
- Is the victim active and drowning?
- Is the victim passive and drowning?

Select your approach stroke based on your evaluation. Remember, the safety of the rescuer is paramount. Do not endanger yourself in an attempt to reach a drowning victim.

Crawl Stroke Approach Stroke

The crawl stroke (freestyle) is the fastest approach stroke. This stroke is used when the victim is passive and/or unconscious in the water. That is, the victim is face down, submerged or near the surface of the water, is not breathing, or is not moving. If any of these conditions exist, there is an obvious need to reach the victim as quickly as possible.

Execution of the crawl stroke approach stroke is the same as the crawl stroke except that your head remains above the water's surface to allow for free breathing and maintaining eye contact with the victim. Maintaining eye contact is critical. If the victim becomes submerged, you will have a better chance of locating him/her if you know the victim's last location. Your distance from the victim will determine if your head remains out of the water the entire time you are executing

the stroke. If you are 54 yards or less from the victim, you should maintain eye contact by keeping your head raised until you reach the victim. If you must swim more than 54 yards to reach the victim, make eye contact with the victim, place your face back in the water for four or five strokes, then raise your head again to regain eye contact with the victim (repeat these steps until you reach the victim). To execute the crawl stroke approach stroke (figures 2-5 through 2-7)—

Body Position:

The position of your body is horizontal to diagonal and influenced by the position of the head. This



Figure 2-5

allows you to maintain eye contact with the victim.

Arm Action:

While one arm is forward of your head to catch the water for the propulsion phase, extend your other arm alongside your body in what is known as the recovery phase. The recovery phase ends when your arm is extended forward of your head to begin the propulsion phase. In the propulsion phase, your arms are approximately shoulder-width apart and the pulling action is slightly wider and deeper to

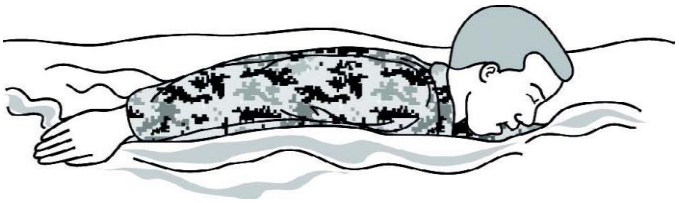


Figure 2-6

compensate for your raised head.

Leg Action:

Kick one leg in a downward motion while your other leg is recovering to the surface to prepare for the next kick (this is known as a flutter kick). This kick is used for propulsion and maintaining the lower body as horizontal to the water's surface as possible. When your head is raised, your knees are slightly bent in order to keep your feet near the surface.

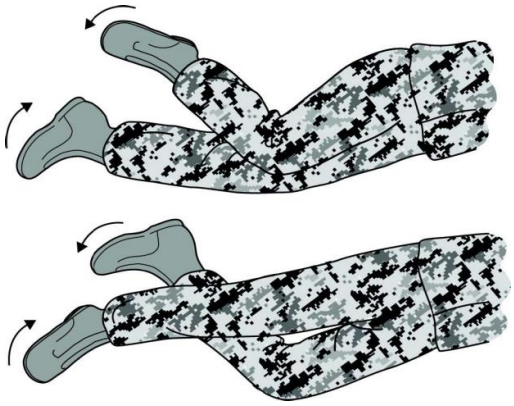


Figure 2-7

Breathing:

If your face is above the water, breathe as needed (free breathing).

If traveling in excess of 54 yards to reach the victim, rotate your head to the right or left during the recovery phase. Inhale when your face is out of the water or wait until your head is out of the water and facing forward while regaining sight of the victim.

Coordination:

This stroke uses constant arm and leg movement.

Breast Stroke Approach Stroke

The breast stroke approach stroke is used when a swimmer is distressed or a victim is active and drowning. This stroke is also used when the victim has a suspected spinal injury because it minimizes the wake created around the victim, minimizes the movement of the victim's head and neck, and helps prevent further injury.

If a victim is at a distance greater than 54 yards and if the swimmer is in distress or the victim is active and drowning in open water (e.g., ocean, lake), you should use the crawl stroke approach stroke to rapidly approach the victim, stopping approximately 6 to 8 feet from the victim in a ready position to provide a margin of safety, reassess the situation, and reassure the victim.

Execution of the breast stroke approach stroke is the same as the breast stroke with a few minor deviations (figures 2-8 and 2-9)—

Body Position:

The position of your body is horizontal to diagonal and influenced by the position of the head. This allows you to maintain eye contact with the victim. It also allows you to communicate with the victim in order reassure him/her as you approach.

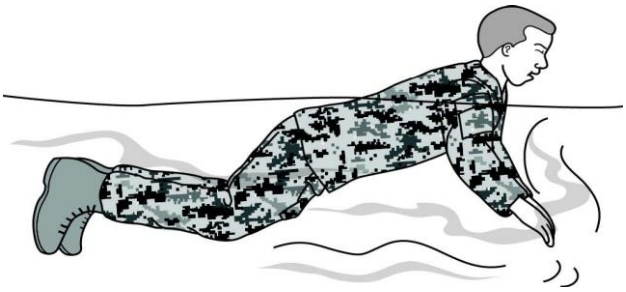


Figure 2-8

Arm Action:

Execute the arm action for the breast stroke, except that your arm pull is wider and deeper, which allows your head to remain above the water's surface.

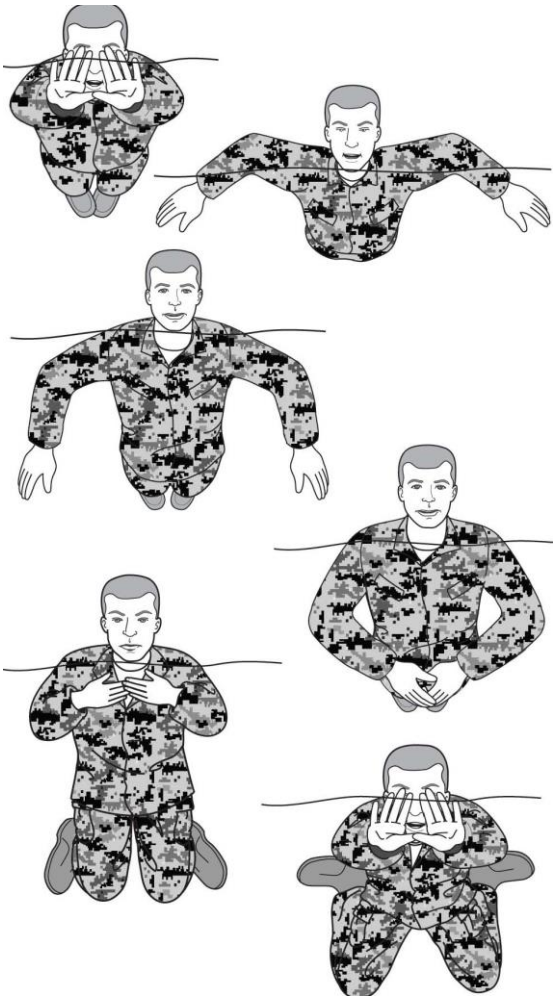


Figure 2-9

Leg Action:

Execute the leg action for the breast stroke, except that your legs open wider during the propulsion phase of the stroke.

Breathing:

Keep your face above the water and breathe as needed (free breathing).

Coordination:

Coordination is the same as the breast stroke, except that there is no glide period. You constantly stroke until you reach the victim.

LEVEL-OFFS

A properly performed level-off positions the victim's face up and parallel to the water's surface. There are three types of level-offs: front surface approach, single armpit level-off, and the double armpit level-off. The single armpit level-off and the double armpit level-off are done by performing a rear approach, which is the preferred approach when a victim is active.

Front Surface Approach

The front surface approach is performed when the victim is passive. Approaching a victim from the front may place you in danger because a distressed swimmer or a victim who is active may lunge toward you. To execute a front surface approach—

Stop 6 to 8 feet from the victim to reassess the situation and reassure the victim.

Determine which arm to use in order to rotate the victim into a face-up position (your right hand on the victim's right wrist or your left hand on the victim's left wrist).

Move into position and prepare to grasp the victim.

Turn sideways and move toward the front of the victim.

Once in position, reach forward and grab the victim's wrist. Your thumb is on the inside of the victim's wrist, as if you were checking his/her pulse with your thumb. Your remaining fingers wrap around the victim's wrist.

Lean back immediately and execute a powerful scissor kick or inverted scissor kick and perform short, vigorous pulls with your free arm.

As the victim begins to move forward in the water, kick, pull, and twist outboard on the victim's wrist. The momentum created from the kick and the pulling and twisting action of the victim's wrist will rotate the victim into a face-up and horizontal position in the water.

Extend and lock out your towing arm down the length of your body and execute a wrist tow to move the victim to safety.

Single Armpit Level-Off

To execute a single armpit level-off—

Approach the victim.

Stop 6 to 8 feet from the victim to reassess the situation, reassure the victim, and maintain your margin of safety.

Approach the victim slowly and grab his/her armpit with your hand (your right hand to victim's right armpit or your left hand to victim's left armpit). Position yourself sideways to the victim and place your elbow in the center of his/her back. (figure 2-10)



Figure 2-10

Pull with your hand that is in the victim's armpit while pushing with your elbow that is in the victim's back to place the victim horizontal on the water's surface (face up). To assist in placing the victim horizontally, use your free arm to execute short, vigorous pulls and use your legs to execute a scissor kick or inverted scissor kick. (figure 2-11)

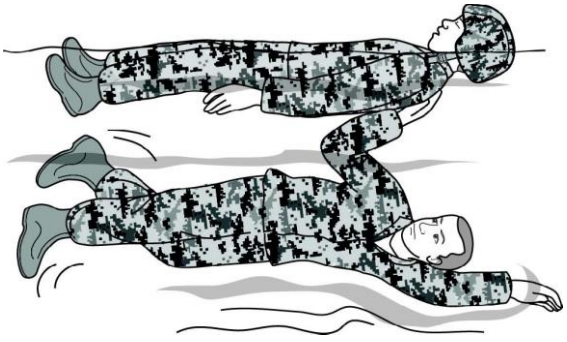


Figure 2-11

Once the victim is horizontal and on the water's surface, begin forward momentum by extending your towing arm to a fully locked-out position and executing a single armpit tow. (figure 2-12)



Figure 2-12

Double Armpit Level-Off

To execute a double armpit level-off—

Approach the victim.

Stop 6 to 8 feet from the victim to reassess the situation, reassure the victim, and maintain your margin of safety.

Approach the victim slowly and grab his/her armpits with both your hands. Place your elbows on his/her back. (figure 2-13)



Figure 2-13

Pull with your hands that are in the victim's armpits while pushing with your elbows that are in the victim's back and use an inverted breast stroke kick to place the victim horizontal on the water's surface (face up). (figure 2-14)



Figure 2-14

Once the victim is horizontal and on the water's surface, begin rearward momentum by slowly extending your arms into a fully locked-out position and executing a double armpit tow and inverted breast stroke kick. (figure 2-15)

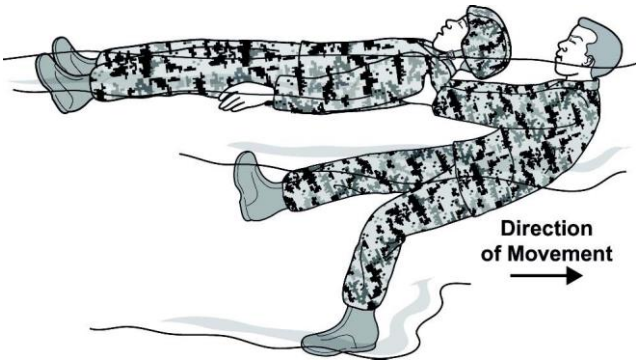


Figure 2-15

RESCUE TECHNIQUES

Wrist Tow

Use the wrist tow method to rescue a victim who is floating face down. DO NOT use the wrist tow on a struggling victim. If time allows, remove your helmet and gear before attempting the rescue. Swim toward the victim using a modified breast stroke. Swim within 6 to 8 feet of the victim to maintain a margin of safety, this allows you to reassess the situation and reassure the victim. The following steps show proper front surface approach, wrist tow procedures (figure 2-16):

Approach the victim from the front and grasp the underside of the victim's left wrist with your left hand or the right wrist with your right hand. Ensure that your thumb is on the underside of victim's wrist.

Lean back, pulling and kicking strongly to move the victim into a horizontal position.

Twist the victim's wrist to rotate the victim into a face-up position.

Swim toward safety using the lifesaving stroke.



Figure 2-16

Note: The lifesaving stroke is a modified side stroke where the top arm is used to tow or carry a victim to safety and a scissor kick or an inverted scissor kick is used for propulsion.

Keep a firm grip on the victim's wrist.

Keep your towing arm fully extended and along your side. This keeps the victim in the water column and prevents drag.

Ensure the victim's head does not go under water during the recovery.

Single Armpit Tow

You perform the single armpit tow after a victim has been properly leveled-off. The single armpit tow uses the lifesaving stroke. If time allows, remove your helmet and gear before attempting the rescue. To execute the single armpit tow (figure 2-17)—

Place one hand (top arm) in the victim's armpit. Your towing arm should be straight and along your side.



Figure 2-17

Use your lead arm (bottom arm) to execute short, vigorous pulls.

Execute a scissor or inverted scissor kick in a continuous and vigorous manner.

Use either free breathing or explosive breathing during the tow. During free breathing, keep your head above the water's surface and continuously reassure the victim. During explosive breathing, put your head under the water to plane off your body's angle and reduce drag. Execute approximately two strokes, then lift your head up to breath and reassure the victim. Return your head back underwater for the next few strokes.

Double Armpit Tow

The double armpit tow is performed after a victim has been properly leveled-off. If time allows, remove your helmet and gear before attempting the rescue. To execute the double armpit tow (figures 2-18 and 2-19)—

Place both hands in the victim's armpits.

Extend both arms fully along your body. You are on your back, and your face is clear of the water.



Figure 2-18

Use free breathing.

Reassure the victim at all times.

Use the inverted breast stroke kick (it is the only kick that can be used due to your body position) to tow the victim to safety. (The inverted breast stroke kick is the same kick used in the elementary backstroke.) Your kick must be continuous and vigorous in order to keep the victim's face above the water.



Figure 2-19

Collar Tow

The collar tow is performed after a victim has been properly leveled-off. If time allows, remove your helmet and gear before attempting the rescue. To perform a collar tow using the victim's blouse (figure 2-20)—

Maintain control of the victim by grasping his/her armpit with one hand and then with your free hand grasp either the victim's combat gear or the blouse between his/her shoulder blades. If grasping the blouse, grasp the material with your palm up, then turn your hand over to tighten the material.

Release the victim's armpit once control is established and execute the lifesaving stroke to tow the victim to safety.



Figure 2-20

Cross-Chest Carry

Use the cross-chest carry to take a victim to safety if the victim is struggling or when moving through heavy surf. If time allows, remove your helmet and gear before attempting the rescue. Talk constantly to calm the victim. Swim toward the victim using a breast stroke approach stroke. Swim within 6 to 8 feet of the victim to maintain a margin of safety, this allows you to reassess the situation and reassure the victim. The following steps illustrate proper cross-chest carry procedures (figure 2-21):

CAUTION

The cross-chest carry causes fatigue even if you are in excellent physical condition and an excellent swimmer.

Use a level-off technique to place the victim in a horizontal, face-up position.

Retain a grip on the victim with one hand. Reach over the victim with your free hand to encircle the victim's chest. Place your free hand on the victim's opposite rib cage, just below his/her armpit.

Release your grip once you have a secure hold on the victim's chest.

Swim toward safety using the lifesaving stroke while keeping a firm grip on the victim's chest and your hip on his/her back.

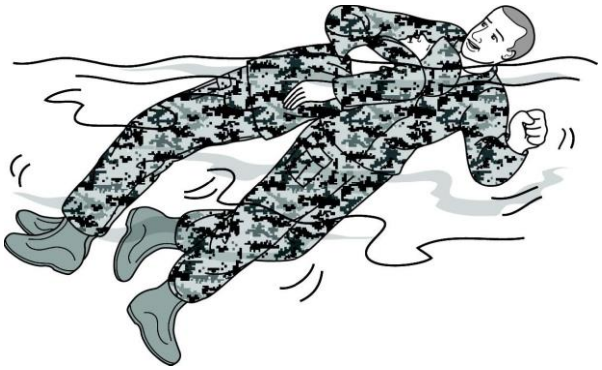


Figure 2-21

This procedure brings the victim's face and shoulders clear of the water, and typically the victim stops struggling. Sometimes, however, the victim will struggle during the swim to safety. If this happens, either tighten your grip on the victim or defend yourself with one of the techniques discussed in this chapter.

Tired Swimmer's Assist

If time allows, remove your helmet and gear before attempting the rescue. You must maintain the 6 to 8 foot margin of safety from the victim at all times while you are getting into position to perform the tired swimmer's assist. Once behind the victim, you extend one arm, hand straight. Place your straight hand underneath the victim's opposite armpit. Maintain a 45-degree angle away from the victim, your arm is locked out. Assist the victim in propulsion until both of you reach safety. (figure 2-22)



Figure 2-22

DEFENSE AGAINST A DROWNING VICTIM

DO NOT sacrifice your life in an attempt to save the victim. A struggling drowning victim poses great danger to anyone nearby. Driven by panic, the victim can grab you with great strength in an effort to climb out of the water. This can result in death for both you and the victim. The following techniques can be used to defend against a drowning victim, but the best defense against attack by the victim is to stay out of reach.

Blocks

The one-hand block prevents the victim from grabbing you if you have approached from the front. If the victim lunges toward you, react as follows (figure 2-23):

Place one or both open hands against the victim's upper chest being careful to avoid the victim's face, neck, and abdomen.

Lean backwards and submerge rapidly, keeping your blocking arm(s) extended.



Figure 2-23

Swim underwater and away from the victim and return quickly to the surface.

Stop 6 to 8 feet from the victim to reassess the situation.

Determine an appropriate course of action.

The two-hand block is executed in the same manner, but two palms are placed on the victim's chest, with fingers pointing outboard, away from the victim's neck and face.

Wrist-Grip Escape/Wrist-Grip Escape Alternative

The wrist-grip escape is used when a victim grabs your arm or wrist. Submerge the victim quickly by reaching across with your free hand, pushing down on the victim's shoulder to submerge him/her, and kicking to propel yourself upward (figure 2-24).

While keeping the victim submerged with your hand on his/her shoulder, give three hard jerking pulls with your trapped hand in an attempt to break free from the victim's grasp. Once free, swim clear of the victim and reassess the victim's condition.



Figure 2-24

If the wrist-grip escape is unsuccessful in freeing your hand, use the wrist-grip escape alternative: use your free hand to grab your trapped fist, rotate thumbs up, apply bone-on-bone contact with the victim's arm, pry your hand out of his/her grasp, and quickly swim away from the victim.

Front Head-Hold Escape

The front head-hold escape allows you to escape when you are facing a victim who is gripping you around your head and neck. To execute the front-head hold escape (figures 2-25 through 2-27)—

Take a quick breath and tuck your chin into your shoulder to protect your throat.



Figure 2-25

Clap your hands above your head three times to submerge instantly. This drags the victim below the water, lifts his/her arms from around your neck, and, typically, the victim releases his/her grasp in order to get back to the surface. If the victim doesn't release his/her grasp, apply pressure to the victim's brachial pressure points (located inside of the upper arm, above the elbow).



Figure 2-26

Thrust the victim's arms up and away from you.

Keep your chin tucked to protect your throat, and swim underwater away from the victim and return quickly to the surface at the ready position.

Stop 6 to 8 feet from the victim to reassess the situation.

Determine an appropriate course of action.



Figure 2-27

Rear Head-Hold Escape

The rear head-hold escape allows you to escape when a victim is gripping your head and neck from the rear. To execute the rear head-hold escape (figures 2-28 through 2-31)—

Take a quick breath and tuck your chin down, turn your head to either side, and raise your shoulders to protect your throat.



Figure 2-28

Take a strong stroke, clap your hands above your head three times, and submerge instantly. This drags the victim below the water and, typically, the victim releases his /her grasp in order to get back to the surface. If the victim doesn't release his/her grasp, apply pressure to the victim's brachial pressure points (located inside of the upper arm, above the elbow).



Figure 2-29

Thrust the victim's arms up and away.

Twist your head and shoulders until free.



Figure 2-30

Swim underwater away from the victim and return quickly to the surface.

Stop 6 to 8 feet from the victim to assess the situation.

Determine an appropriate course of action.



Figure 2-31

ADMINISTERING FIRST AID/RESCUE BREATHING

To administer first aid/rescue breathing, remove the unconscious victim from the water when possible and stop any bleeding. First, open the airway and check for breathing. If the victim is not breathing, give two breaths of air. Check for a pulse. If there is a pulse but the victim is not

breathing, continue rescue breathing. If there is no pulse, start cardiopulmonary resuscitation (CPR). For detailed information on administering CPR and rescue breathing, refer to MCRP 3-40A.9, *First Aid*. Next, protect any wounds from exposure, and treat for shock.

WARNING

If the victim has no pulse and is not breathing, administer CPR immediately. If the victim does have a pulse but is not breathing, give rescue breathing only. If the victim has a pulse and is breathing, do not give CPR—CPR could prove fatal.

CHAPTER 3
TREATMENT OF CASUALTIES AND AVOIDANCE OF DANGEROUS MARINE LIFE

To survive in the water, you will face many challenges other than just being able to swim. For example, injuries and/or fatigue can lead to drowning and exposure to the elements can lead to hypothermia or heat injuries and may require medical attention. Finally, your presence in the water may be seen as a threat to or food source for a variety of marine life and you may be attacked. This chapter advises you on how to minimize these risks in order to stay alive.

DROWNING

Drowning is suffocation by a liquid. A drowning victim inhales water into the lungs or the throat closes by reflex so that little or no water can enter the windpipe. In either case, a victim can no longer breathe.

Symptoms

One symptom of drowning is that the victim may call for help and has an expression of dread or panic. Typically, a victim that is active and drowning may not call for help because the victim is trying to conserve his/her air and will not speak.

Another symptom of drowning is when the victim thrashes at the water's surface. If the victim stops or grows calmer, the victim has likely been overcome by fatigue, hypothermia, or a lack of air. At this stage, the victim usually has 20 to 60 seconds before going under the water's surface.

Treatment

If the victim is not breathing, begin rescue breathing. Place the victim on his/her back, tilt the head back to open airway, pinch the nose, and give two full breaths. If the victim does not inhale during the first two breaths, reposition his/her head and attempt two more breaths. Check for a pulse. If a pulse is present, but the victim is still not breathing, continue rescue breathing. If a pulse is not present, begin CPR. See MCRP 3-40A.9 for rescue breathing and CPR details.

WARNING

If the victim has no pulse and is not breathing, administer CPR immediately. If the victim does have a pulse but is not breathing, give rescue breathing only. If the victim has a pulse and is breathing, DO NOT give CPR—CPR could prove fatal. Continue first aid until medical help arrives.

A victim who is not breathing and has no pulse may appear dead. DO NOT decide that death has occurred. Continue with the prescribed treatment. A corpsman or medical officer should decide whether the victim can or cannot be revived.

HYPOTHERMIA

Hypothermia is the abnormal lowering of the body's internal (or core) temperature to 95 degrees or below. It occurs when the body loses heat faster than it produces heat. A hypothermia victim loses the ability to move quickly, becomes mentally sluggish, slips into semiconsciousness, lapses into a coma, and dies when internal body temperatures drop too low.

The chilling effects of cold air, wind, or water can produce hypothermia. Water poses the greatest threat because it transfers heat 25 times faster than air. Depending on the water's temperature, a victim can succumb to hypothermia within a few minutes. The body's sudden contact with cold water can also set off a body reaction known as the mammalian diving reflex. This reflex can greatly increase survival time (especially for women and children) in or under cold water. The mammalian diving reflex shuts off blood circulation, except for the flow between the heart, lungs, and brain. The small amount of oxygen left in the blood and lungs is saved for the body's vital organs. This reflex has allowed people to survive being under cold water for an extended period of time. Therefore, a cold water drowning victim should be treated as if still alive even though the victim is not breathing, has no pulse, and may appear dead. DO NOT decide that death has occurred. Continue with the prescribed treatment. Victims of hypothermia can appear to be dead when they are not. A corpsman or medical officer should decide whether the victim can or cannot be revived.

Symptoms

Once the body's core temperature drops below 95 degrees, the victim will show one or more of the following symptoms:

- Violent and uncontrollable shivering as the body tries to warm itself.
- Slow or slurred speech.
- Disorientation or poor coordination.
- Loss of skin color.
- Blue and pinched lips.
- A slowing or stopping of shivering that progresses into a rigid torso and limbs.

Survival Time

A hypothermia victim's survival depends on the water's temperature and the time spent in the water. A small body build cools faster than a large build. Children cool faster than adults.

To increase your chance of survival in the water, utilize the HELP position described in figure 1-52. Extra clothing and remaining motionless in the water can also increase your survival time.

Treatment

A hypothermia victim must be warmed to prevent further heat loss; therefore, treatment should begin as soon as possible. Consciousness of the victim determines the treatment that should be pursued. See MCRP 3-40A.9 for specific treatment information. The following treatment procedures are recommended:

- If the victim is conscious, give the victim warm fluids. Give candy or sweetened foods to a victim who is able to eat.
- If the victim is unconscious, place the victim on his/her back with the head tilted back to ensure an open airway.
- DO NOT massage the victim. Massage can break blood vessels and create swelling, internal pressure, and blocked blood circulation.
- DO NOT give alcohol to the victim. Alcohol lowers the victim's body temperature.
- Shock is a possibility, treat accordingly.
- Seek medical help immediately.

If you are able to remove the victim from the water, apply the following steps when possible:

- Get the victim into shelter.
- Remove the victim's wet clothing.
- Put the victim in dry clothing.
- Place the victim in a sleeping bag if one is available. It may be necessary to place another Marine in the sleeping bag with the victim.
- Place as much insulation as possible between the victim and the ground.
- Use hot water bottles, electric blankets, or blankets heated in an oven or by a campfire to warm the victim's neck, groin, and the sides of the chest.

CAUTION

DO NOT apply heat to extremities.

WARNING

If the victim has no pulse and is not breathing, administer CPR immediately. If the victim does have a pulse but is not breathing, give rescue breathing only. If the victim has a pulse and is breathing, DO NOT give CPR—CPR could prove fatal. Continue first aid until medical help arrives. Check for a pulse for at least 45 seconds.

HEAT-RELATED INJURIES

Heat-related injuries include heat cramps, heat exhaustion, and/or heat stroke. They can occur when a Marine—

- Is exposed to extreme heat, such as from the sun or a combination of high air temperatures and water temperatures.
- Does not wear proper clothing or gets overexposed to the sun.
- Becomes dehydrated.

With heat cramps, muscles may cramp in the arms, legs, and/or stomach. The victim may sweat excessively. To treat, create improvised shade for the victim and have him/her drink water.

With heat exhaustion, the victim sweats heavily; presents pale, moist, cool skin; and complains of a headache, weakness, dizziness, and/or loss of appetite. A victim may also experience heat cramps, nausea, vomiting, an urge to defecate, chills, rapid breathing, confusion, and a tingling sensation in the hands or feet. To treat, pour water over the victim and fan him/her to speed up the coolant effect of evaporation, have the victim drink water, and attempt to provide shade.

With heat stroke, the victim stops sweating, which results in red, hot, dry skin. The victim may first experience headaches, dizziness, nausea, fast pulse, respiration, and/or seizures and mental confusion. The victim can become unconscious and die if not treated quickly. To treat, create improvised shade for the victim. Have him/her drink water and elevate both legs if possible.

BURNS

Apply a field dressing (or the cleanest material available) to the burn. Give sips of water to a casualty who is conscious and not nauseated. When treating burn casualties—

- DO NOT remove clothing stuck to the burns.
- DO NOT break any blisters.
- DO NOT apply grease or ointments to the burns.

For electrical burns, check for both an entry and exit burn from the passage of electricity through the body. An exit burn may appear on any area of the body, not necessarily opposite the entry burn.

For burns caused by wet or dry chemicals, flush the burns with large amounts of water and cover with a dry dressing.

For burns caused by white phosphorus, flush the area with water, then cover with a wet material, dressing, or mud to exclude air and keep the white phosphorus particles from burning. For laser burns, apply a field dressing.

COMMON MEDICAL PROBLEMS ASSOCIATED WITH SEA SURVIVAL

Seasickness

Seasickness is the nausea and vomiting caused by the bobbing motion created by the wave action of a flotation device. Seasickness can result in—

- Dehydration and exhaustion.
- A loss of the will to survive.
- Others becoming seasick.
- Unclean conditions.

To treat seasickness—

- Wash both the victim and the flotation device to remove the sight and odor of vomit.
- Keep the victim from eating food until the nausea is gone.
- Have the victim lie down and rest.
- Give the victim seasickness pills if available. If the victim is unable to take them orally, the pills should be inserted rectally for absorption by the body.

Saltwater Sores

Saltwater sores occur when skin that has abrasions or is cut is exposed to saltwater. The sores may form scabs and pus. Do not open or drain. Flush the sores with freshwater, if available, and allow to dry. Apply antiseptic, if available.

Blindness/Headache

Irritants or the effects of the sun's rays reflecting off the water can cause temporary blindness or headaches. If flames, smoke, or other irritants get in your eyes, flush the eyes immediately with saltwater, then with freshwater, if available. Apply an ointment, if available. Bandage both eyes for 18 to 24 hours or longer if the damage is severe. If glare from the sky and water causes your eyes to become bloodshot and inflamed, bandage the eyes lightly. Try to prevent this problem by wearing sunglasses or goggles with a sunglass insert.

Constipation

This condition is a common problem associated with dehydration. For constipation, do not take a laxative if it is available; this causes further dehydration. Drink water.

Sunburn and Dehydration

The sun's rays reflect at all angles off the waves of the water; therefore, sunburn and dehydration are serious problems in sea survival. Try to prevent sunburn by—

- Erecting an improvised canopy, with available floating materials, to provide shade.
- Wearing your soft cover or using a cloth, such as a handkerchief, to cover your head.

- Covering your skin with sunscreen or lip balm from your first aid kit. Your lips, nostrils, eyelids, the backs of your ears, and the skin under your chin sunburns easily. If enough sunscreen cream is available, all exposed skin should be covered.

Dehydration is caused by the loss of the body's vital fluids. Dehydration in saltwater may result from a combination of factors such as a lack of water, the effects of saltwater on skin tissue, sunburn, vomiting from seasickness, and other causes. Sleep and rest and reduced water and food intake are the best ways of enduring periods of exposure. The following measures will delay the effects of dehydration; therefore, they should be avoided:

- Drinking saltwater.
- Drinking urine.
- Drinking alcohol.
- Smoking.
- Eating when water is not available.

DANGEROUS MARINE LIFE

You may see many types of marine life around you, and some are more dangerous than others. Generally, sharks are your greatest danger, followed by barracudas; however, most marine life will not deliberately attack a human. The most common injuries from marine life are wounds from bites, stings, or punctures. With the exception of sharks and barracudas, most injuries are a result of either trying to catch game or from contact abrasion with marine life. To treat an injury that results from a dangerous marine animal bite—

- Pack the wound with gauze and then apply a pressure bandage, if available.
- Treat for shock.
- Obtain medical attention as soon as possible.

For a more detailed information on the treatment of casualties and dangerous marine life, see MCRP 8-10B.7 and MCRP 3-40A.9

Sharks and Barracudas

Only about 20 percent of all shark species are known to attack people. Sharks have an acute sense of smell, and the smell of blood in the water will draw them to their prey. They are also very sensitive to any abnormal vibrations in the water; therefore, the sound caused by a struggling swimmer or underwater explosions will attract them.

Barracudas are bold and inquisitive fish. They have been known to attack people who are wearing shiny objects. Barracudas may charge at lights or shiny objects at night.

A group of swimmers can maintain a 360 degree watch while in the water. Therefore, to protect yourself from sharks and barracudas, stay with other swimmers. The group members can either

frighten away or fight off sharks or barracudas better than one person can. Keep all your clothing on, including footwear. Historically, sharks attack unclothed individuals in groups first, mainly their feet. Clothing also protects you against abrasions from a shark's tough skin should the shark brush up against you. Avoid urinating heavily; let urine dissipate between discharges. If you must defecate, do so in small amounts and toss it as far away from the group as possible. Do the same if you must vomit.

If attacked, the use of firearms by swim sentries should be used with extreme caution because of the risk of injury to other swimmers. If unarmed or unable to make an improvised weapon, kick and strike the shark. Avoid using your bare hands to strike the shark; injury can result to your hands due to a shark's tough skin. Target areas on a shark are the gills, eyes, and underbelly. Blows to the snout are also not recommended because a shark will tilt its head up and thrust its jaws forward when biting.

Sea Snakes

Sea snakes are venomous and sometimes found in mid-ocean. They are unlikely to bite unless provoked. Your best protective measure is to avoid them.

Poisonous Fish

Many reef fish are toxic and can kill you if eaten. Generally, poisons are present in all parts of the fish, but especially concentrated in the liver, intestines, and eggs.

Turtles and Moray Eels

Turtles and moray eels normally inflict minor bite wounds. Treat this type of injury by cleaning the wound.

Corals

Coral, dead or alive, can inflict painful cuts. Clean all coral cuts thoroughly. DO NOT use iodine to disinfect any coral cuts. Some coral polyps feed on iodine and may grow inside the flesh.

Jellyfish, Portuguese Man-of-War, Anemones, and Others

This group of marine animals inflicts injury by stinging their victims with their tentacles. Contact with their tentacles produces burning pain, a rash, and small hemorrhages on the skin. Shock, muscular cramping, nausea, vomiting, and respiratory distress may also occur. Gently remove the clinging tentacles with a towel and wash or treat the area. Use diluted ammonia or alcohol and talcum powder to treat the injury, if available.

Spiny Fish, Urchins, Stingrays, and Cone Shells

These animals inject their venom by puncturing the skin with their spines. General signs and symptoms include swelling, nausea, vomiting, generalized cramps, diarrhea, muscular paralysis, and shock. Deaths are rare. Treatment consists of soaking wounds in hot water, if available, to deactivate heat-sensitive toxins.

CHAPTER 4
NEGOTIATING WATER OBSTACLES

Marines face water obstacles in saltwater, freshwater, and brackish water (where freshwater and saltwater meet). These water environments differ considerably and pose distinct problems for Marine tactical units and swimmers. Saltwater obstacles include tides, surfs, and currents. Brackish water obstacles include back bays. Freshwater obstacles include rivers and canals.

TIDES

Tides are periodic changes in the surface levels of oceans, bays, gulfs, inlets, and rivers. The Moon's and Sun's gravitational pulls cause tides. Depending on the situation, tides can either help or hinder Marines in their endeavors to conduct amphibious or riverine operations. Tides can provide sufficient depths to allow for the passage of landing craft or boats over reefs, trees, and other underwater obstructions. On the other hand, tides can render a river fording site unusable to tactical vehicles. Direction, level of change, and amount of change determine tidal nomenclature.

Tides that show change in direction are flood tides and ebb tides. Rising tides are known as flood tides. Falling tides are known as ebb tides.

Tides that show extreme levels of change are high tides and low tides. High tide is the period when water is at its greatest depth. Low tide is the period when water is at its most shallow depth.

Tides that show the least and most amount of change are neap tides and spring tides, respectively. Neap tides have the least amount of change in water levels between high and low tide. Neap tides occur at the half moon, when the Sun and the Moon are aligned at a 90-degree angle with the Earth. In this position, the Sun's and Moon's gravitational pulls offset each other. Spring tides have the highest floods and lowest ebbs. Spring tides occur at or shortly after the new moon or full moon when the Sun, Moon, and Earth are approximately in line. In this position, the Sun's and Moon's gravitational pulls are combined.

SURF

Waves break upon entering shallow water and create surf. The offshore area where waves break is the surf zone, which can present many hazards. Breaking waves often trap air bubbles and create a foamy appearance. Bubbles lower the water's density and decrease buoyancy. Move through foamy surf as quickly as possible. The type of wave determines your survival technique.

Wave action moves you toward shore. Lie on your back or side with your head pointing in the direction of the beach and your feet pointing into the waves. (figure 4-1)

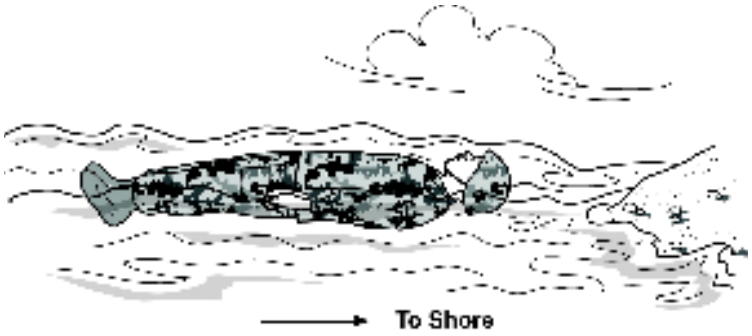


Figure 4-1

Before entering the surf zone, rotate onto your stomach. As one wave approaches the beach, another drains away; relax and do not swim against the draining water. When a new wave is within about 3 yards, start swimming toward shore. Continue to swim until the wave lifts you and moves you toward the beach. Once the wave loses forward momentum, relax and repeat the cycle. If nearing rocks, turn your body and approach feet first to reduce the chance of striking your head and arms.

Plunging Waves

A plunging wave is a breaker whose crest curls forward and falls ahead of its base. Because of its power and underwater turbulence, a plunging wave poses the greatest surf threat. If caught in a plunging wave, you can be pulled underwater and pitched about violently. This can cause you to panic, which can increase your chance of drowning. Perform the following steps to escape a plunging wave (figure 4-2):

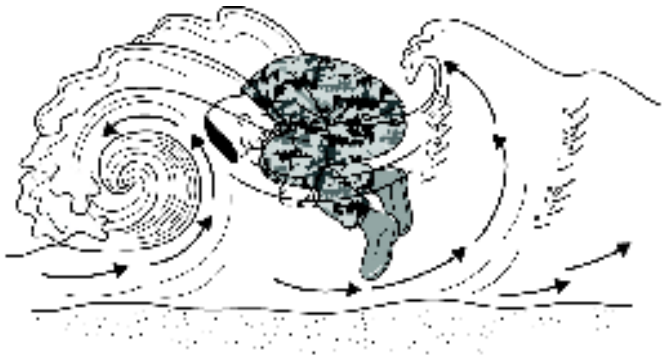


Figure 4-2

Tuck into a ball with your head against your knees and your forearms locked around your legs, just below the knees.

Relax in this position until the turbulence subsides and you float to the surface. This can take 30 seconds or more.

Swim toward shore.

Note: If threatened by another plunging wave, dive underwater into the wave.

Spilling Waves

A spilling wave does not break. Instead, its crest slides forward without curling. A spilling wave creates less turbulence and poses less of a threat than a plunging wave. If caught in a spilling wave, relax and let the wave carry you to shore.

Surging Waves

A surging wave occurs on a beach with a steep underwater gradient. It never really breaks, but the crest rises while the base slides up the beach with great force and speed. Once the wave reaches its highest point on the beach, it rushes back as quickly as it surged forward. If you are standing on the bottom when a surging wave advances or retreats, the wave can knock you off your feet and pull you into the surf zone. Do not try to stand or walk on the bottom. Swim toward the beach as soon as possible.

CURRENTS

Offshore Currents

An offshore current occurs outside the surf zone. Typically, it occurs at bay entrances, in island channels, and between islands and the mainland. An offshore current flows parallel to or away from shore. If the offshore current is created by tides, its current strength and direction vary at different times of the day.

If caught in an offshore current, you may be carried in a direction you do not want to go. DO NOT try to swim directly to safety. If the current is moving directly away from the shore, relax and wait until the current dies out or turns toward land. Once the current subsides, use any survival stroke to swim toward shore. If the current is moving parallel to shore, use any stroke to move at an angle across the current and toward shore.

Rip Currents

A rip current occurs when waves pile water against the shore faster than the water can drain. The water flows rapidly along the beach until it is deflected seaward by a bottom obstruction. Then the rip current flows through the surf zone and into open water at a speed of up to 2 knots. This action can cut deep trenches in the sand. A rip current dies out once it reaches open water (usually within a few hundred yards of the shore).

A rip current can pull you out to the open sea. If caught in a rip current, DO NOT try to swim against the current. A rip current moves faster than most people swim, and it is impossible to swim to shore once caught in it. Relax and stay afloat until the current runs out. Once the current subsides, use a survival stroke to move parallel to the shore until you are out of the current, then begin swimming toward shore.

Littoral Currents

A littoral current occurs when a wave breaks against a beach at an angle. This current flows parallel to the shoreline and does not pose a great threat. If caught in a littoral current, use a survival stroke that keeps you horizontal on the surface to swim across it at an oblique angle.

BACK BAYS

Once on the beach, you will probably encounter one or more rows of low hills called dunes. Behind the dunes, you may encounter a low-lying stretch of ground thickly covered with scrub trees and bushes. This area gives way to wetlands known as back bays. Back bays consist of muddy islands that are almost submerged during flood tides and separated by channels of brackish water of varying depths. Channel bottoms usually contain soft mud. Back bays pose major obstacles to vehicular traffic.

Infantry can cross back bays, but only with great effort. If crossing back bays by foot, consult detailed navigation charts and use the following guidelines to plan your route:

- Avoid water less than waist deep; walking in shallow water or soft mud is extremely tiring.
- Avoid back bay islands; these low-lying islands are usually too muddy to support foot traffic.
- Seek out deep water; floating with a pack is less tiring than walking through shallow water or soft mud.
- Seek out sand, shell, gravel, or stone bottoms; these firmer bottoms generally ease travel and help conserve energy.

RIVERS AND CANALS

A river is a large, natural stream of water that empties into a larger body of water. The slope of the riverbed and the volume of water in the river determine its current.

Canals resemble small rivers or streams in their width and depth, but usually lack any significant current. Climbing out of these waterways can be difficult if the canal is flanked by steep banks.

CHAPTER 5
FORDING WATERWAYS

A ford is any site in a river, stream, or canal where the water is shallow enough for troops or vehicles to cross without using flotation devices. Canal bottoms are usually too soft to support fording vehicles and wading infantry frequently stumble.

WARNING

Fords are dangerous. Cross as quickly as possible.

The tactical situation dictates the location of the fording site. Seek fords that are protected from enemy observation and that allow for adequate supporting fires. A night fording takes at least one and a half times as long as a daylight fording.

Note: In this chapter, the term "river" refers to rivers, streams, and canals.

SELECTION OF A FORD SITE

Table 5-1. Desirable Fording Characteristics.

Characteristics	Comments
Concealment	The ford hides personnel and vehicle movement from enemy observation.
Accessibility	The ford should have low banks with gentle gradients. This allows a free flow of traffic at both the entrance and the exit.
Slow current	The ford's current should not exceed 1.5 meters per second if possible.
Firm footing	The ford's bottom, entry, and exit composition should be firm enough to support traffic. Do not drive a vehicle over any bottom composition that a 2-inch diameter stick can be pressed into more than 1 or 2 inches.
Gently sloped channels	The ford's entry and exit points should be gently sloped. If possible, locate a portion of the stream where the channel is not actively shifting.
Depth	The fording depth is less than or equal to the least capable vehicle.

Determine the Slope

Units move into and out of water faster and more quietly if entry and exit points are not steep or muddy. Slope is the amount of change in ground horizontal distance (run) and in vertical elevation (rise) from one point to another. Slope is usually expressed as a percentage. You can use a clinometer, map, or line of sight and pace to measure the percentage of a slope.

Clinometer. A clinometer measures percentage of a slope. It is a component of the M9 armored combat excavator and organic to many Marine engineer units. However, engineers are also taught (and often use) field expedient methods to determine slopes and gradients.

Map. A map measures the horizontal distance along a desired path. Determine the difference in elevation between the path's starting and ending points. From a map's scale, you can determine the distance between two points. From a map's elevation lines, you can determine the difference in height between the same two points. Both figures must be in the same unit of measure (e.g., feet, meters). Divide the elevation (rise) by the distance (run) and multiply by 100. (figure 5-1)

Rise = 165 - 120 = 45 meters

Run = 200 meters

$$\text{\% Slope} = \frac{45}{200} \times 100 = 22.5\%$$

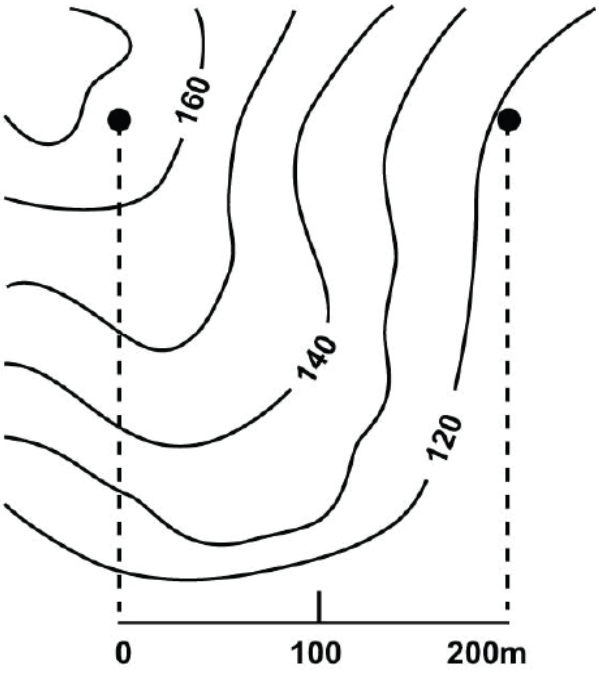


Figure 5-1

Line of Sight and Pace. To determine line of site and pace, stand at the bottom of the slope, keep your eyes level, pick a spot on the slope, then pace the distance. The number of paces multiplied by a standard measure of 0.75 meter determines the run. The eye-level height (usually 1.5 to 1.7 meters) determines the rise. Repeat this procedure until you have covered the entire distance you want to measure for each spot (vertical and horizontal). Add the vertical distances to provide total rise and the horizontal distances to provide total run.

Determine the Current Speed

Current speed increases as channels narrow. It may be necessary to locate a wider ford location to obtain a slower stream current. The following steps are used to calculate the speed of the current (figure 5-2):

Determine points A and B along a channel. Then measure the distance between those two points.

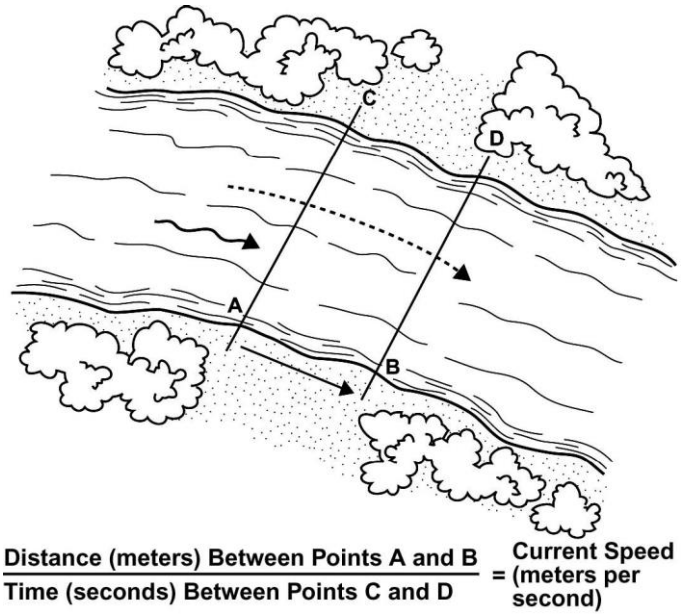


Figure 5-2

Sight directly across the water from points A and B to locate points C and D.

Throw a floating object (e.g., a stick) upstream from points A and C. Observe the object as it floats toward points B and D.

Subtract to find the time it takes for the object to float from start to finish.

Do not attempt to swim across currents that are moving faster than 1.5 meters per second. Equivalents of this speed include—

- Quick-time march rate of 120 counts per minute with one, 30-inch step at each count.
- 5 feet per second.
- 3.5 miles per hour.
- 5.5 kilometers per hour.

Measure River Width

A river's width can be estimated from the width of its symbol on a scaled topographic map. If this is not possible, use the following compass techniques (figure 5-3):

Stand at the water line (A).

Shoot an azimuth to a point on the opposite bank (B).

Move upstream or downstream until you are at a point (C) where you can shoot an azimuth 45 degrees larger or smaller than the original azimuth.

Measure the distance between points A and C. The distance calculated equals the river's width.

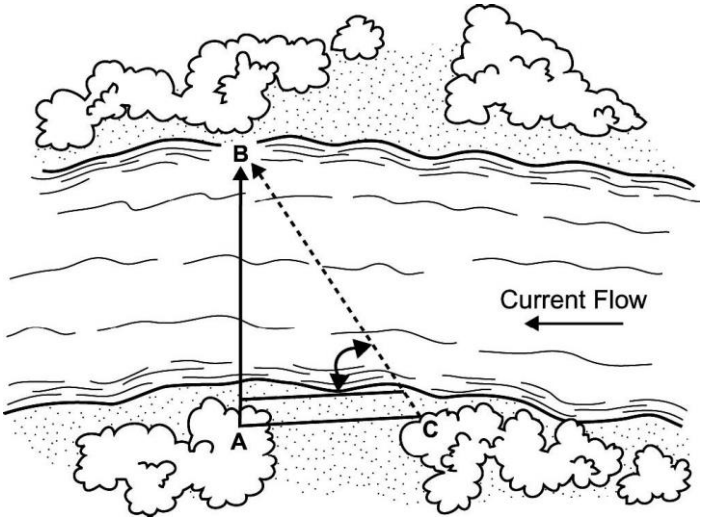
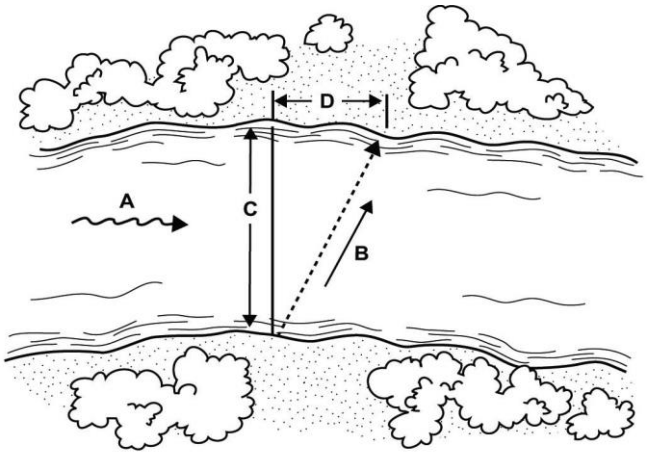


Figure 5-3

Calculate Downstream Drift

A river's current causes personnel and equipment to drift downstream. If personnel and equipment are aimed straight across the river, they will sideslip downstream as they move across the current to the other shore. Therefore, personnel and equipment crossings must compensate for the effects of a river's current and entries are usually made upstream of the desired exit point. Use the formula below to calculate downstream drift. (figure 5-4)



$$\frac{\text{Current Speed (A)}}{\text{Crossing Speed (B)}} \times \text{River Width (C)} = \text{Downstream Drift (D)}$$

Figure 5-4

Note: The crossing speed for a swimmer across a river may vary but is generally limited to 1 meter per second. All measurements must be in the same unit of measure (e.g., meters, feet).

THE BUDDY SYSTEM

Whenever a Marine unit must enter into or operate on the water, a "buddy system" is employed in which every Marine is paired with a swimming partner. The buddy system matches an experienced swimmer with a weak swimmer. The experienced swimmer assists and encourages the weaker swimmer and bolsters confidence during night crossings. If a unit has an odd number of Marines, place the extra person with another pair to form a three-person team.

WATER CROSSING

Care of Weapons

Marine infantry weapons and munitions are designed to be able to operate after immersion. However, protect your weapons from moisture whenever possible.

A gas-operated weapon can malfunction if water travels down the barrel and enters the gas tube. To protect the gas tube—

Close the weapon's bolt before entering the water.

Seal the muzzle with a condom, balloon, plastic spoon wrapper, or other form of waterproof material.

Tie or melt the protective cover to create a watertight seal.

When the muzzle's protective cover is no longer needed, remove it. Open the bolt and inspect the barrel. If the tactical situation permits, swab excess moisture from the barrel. Test fire automatic weapons, if possible. Field strip and clean weapons as soon as possible. If time does not allow for a complete inspection, rinse inaccessible areas with small amounts of diesel fuel, then dry.

ISOMAT Raft

Construction of an ISOMAT raft is time consuming. This type of raft should not be employed as part of an attack, but used for logistical purposes (e.g., evacuating stretcher cases, transporting supplies). Use the following steps to build an ISOMAT raft (figure 5-5):

Wrap ISOMAT sleeping pads around sturdy sticks.

Use parachute cord and square knots to tie the pads securely in place and to lash stick ends together in a rectangle.

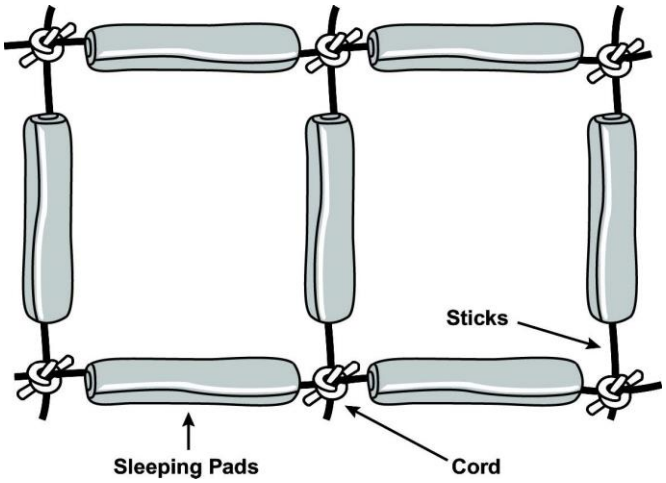


Figure 5-5

Note: The ISOMAT raft pictured can support several hundred pounds. However, the cargo will get wet if not properly waterproofed.

Poncho Raft

A poncho raft can support two Marines and their equipment and is well suited for long crossings. Use the following steps to build a poncho raft (figures 5-6 through 5-11):

Inspect two ponchos and ensure they are serviceable.

Lay one poncho flat on the ground, with the hood side up.

Cinch the hood tightly to form a gooseneck or tie in a knot.

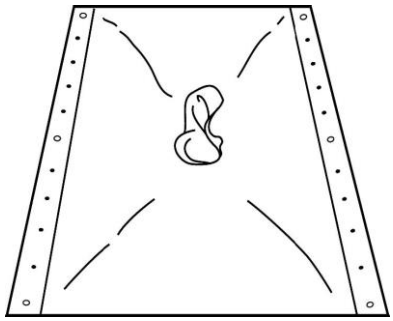


Figure 5-6

Place the second poncho over the equipment, rubber side up, and hood facing down.

Snap the edges of the two ponchos together.

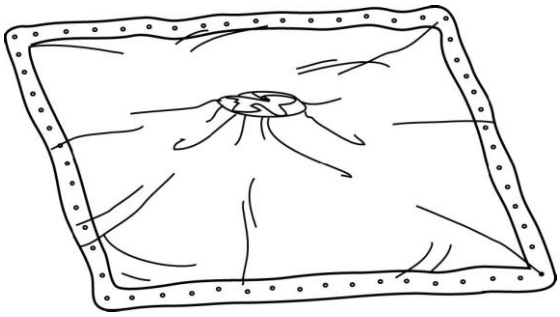


Figure 5-7

Pad sharp edges of equipment and place the equipment in the center of the poncho.

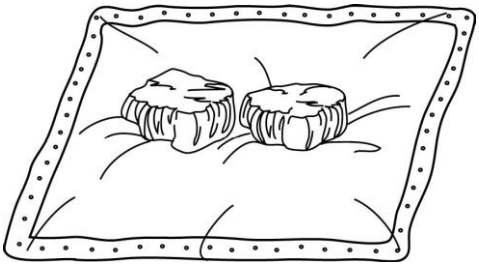


Figure 5-8

Roll the edges toward the equipment.

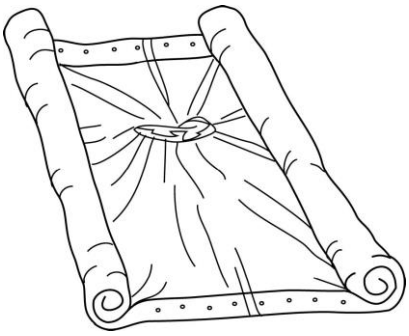


Figure 5-9

Roll the edges into pigtails and tie them off.

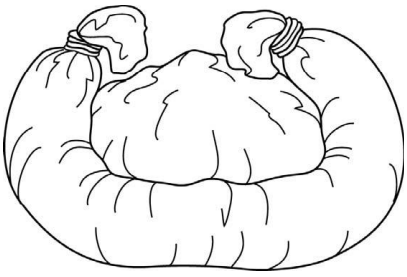


Figure 5-10

Pull the pigtails together over the top and lash them securely.

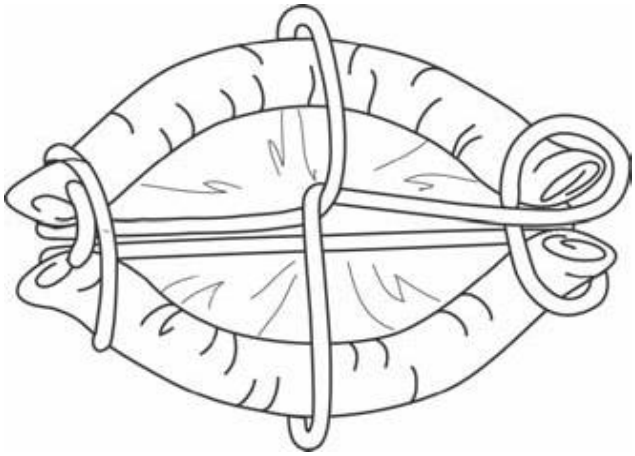


Figure 5-11

Protect the raft from brush punctures while placing it in the water. Swim across the water obstacle while security elements are covering the far shore. (figure 5-12)



Figure 5-12

Construction of a Pack Raft

You will need two waterproofed packs and two M16A2 service rifles. The following steps are required to construct a pack raft (figure 5-13):

Place two packs side-by-side with the shoulder straps on the deck. The tops of the packs are opposite of each other.

Loosen the main compartment straps on both packs.

Insert one rifle on each end between the straps and the packs with muzzles opposite each other. The rifles serve as one means to secure the packs together. Place the front sight post under the top flap.

Tighten the straps so that the rifles and packs are secure.

Take the excess strap on the inner side of each pack and secure it to the opposite pack to better secure the two packs together.

Take the excess straps on the outer sides of the packs and use those straps as safety lashing for the rifles.

Tuck the excess straps and check to make sure the rifles and packs are secure.

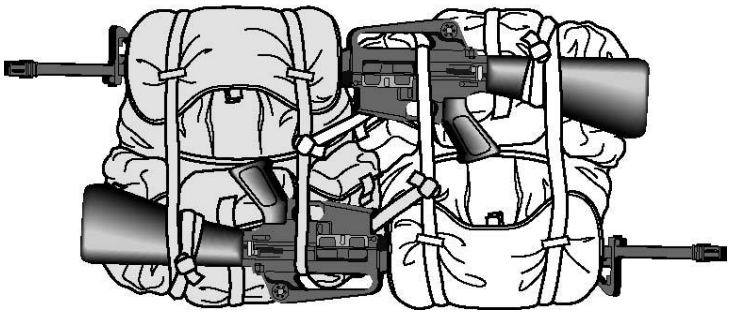


Figure 5-13

Single-Rope Bridge

A single-rope bridge offers a temporary and quick way to cross small rivers. It also provides extra security while crossing swift waters. At night, it prevents straggling and guides units precisely from one side of the river to the other side. If crossing a river at night, plan for at least one, single-rope bridge.

If your unit is crossing a river with swift currents or water depths above 4 feet, the unit is carrying sufficient rope to span the crossing site, and the tactical situation permits, secure the rope on near and far banks to provide a handhold for crossing Marines. This reduces the time required for the entire unit to cross and provides a degree of comfort/confidence for poor swimmers. Use a squad-sized bridge team to construct a single-rope bridge. Station several strong swimmers at the water's edge to help anyone who has trouble crossing.

Nylon rope is normally coiled in 120 foot lengths. It is 0.6 inches in diameter and has a breaking strength of about 3,840 pounds. Over time, a nylon rope can stretch to as much as one-third more than its original length and stretching weakens the rope. If the rope is stretched, discard the rope or use it for light tasks. To prolong the life of a nylon rope, do not step on it or drag it on the ground. Pad the rope in places where it contacts rocks or sharp corners. Do not leave the rope knotted or stretched longer than necessary. Dry the rope as soon as possible. Single-rope bridge construction is as follows (figures 5-14 through 5-17):

Tie a sling rope around your waist using a square knot and two separate half hitches. See appendix A for detailed information on knots.

Attach a locking steel carabiner to the sling rope.

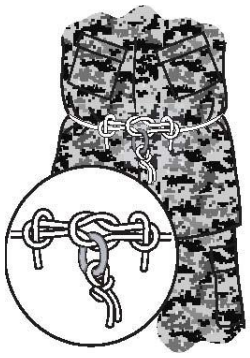


Figure 5-14

Tie a bowline knot in the running end of the bridge rope and attach it to the carabiner.

Temporarily secure the other end of the rope to a tree on the near shore.

Enter and cross the water.

Note: Carry only your weapon and ammunition.

Exit the water on the opposite shore.

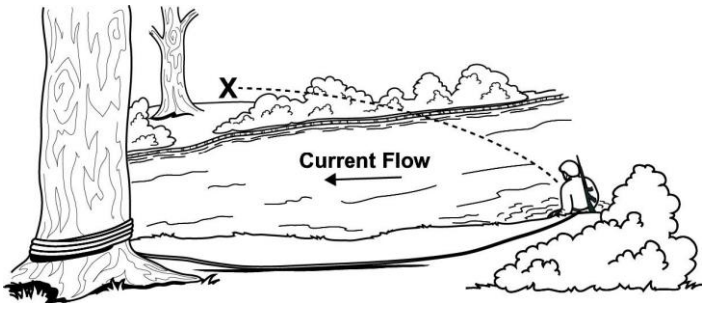


Figure 5-15

Prepare your weapon for use. Unhook the bridge rope from the carabiner at your waist and tie the bridge rope to a sturdy tree using a round turn and two half hitches.

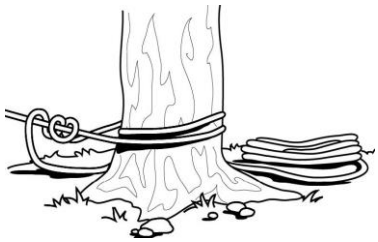


Figure 5-16

Conduct a box reconnaissance of the opposite shore.

On the near shore, have another Marine prepare to tighten the rope. That Marine should place a transport tightening system in the bridge rope by tying a double butterfly knot and placing two carabiners in the butterfly. See appendix A for detailed information on knots.

The Marine should pass the running end of the bridge rope around the downstream side of the near shore anchor point and through the two carabiners.

Pull the butterfly knot approximately one-third of the distance across the river.

Secure the bridge rope to an anchor point using a round turn and two half-hitches.

On the near shore, the Marine helping you should pull the slack out of the bridge rope until the butterfly knot is back on the near side. The bridge rope is then tied off against itself using two half hitches with a quick release in the last half hitch.

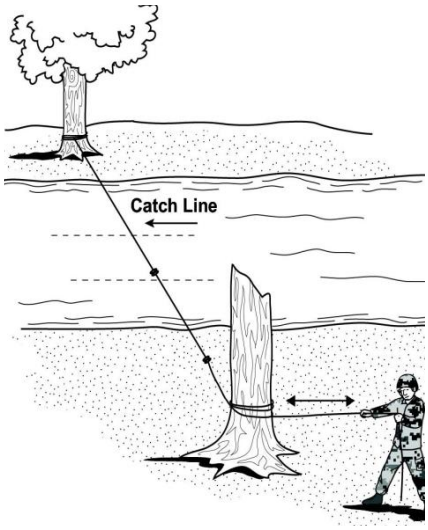


Figure 5-17

Note: The single-rope bridge must be as tight as possible so it will not sag when used.

If you lose your footing and fall into the water, swim with the current to the closest shore. Swimming against the current is dangerous and quickly causes fatigue.

High and Dry Crossings

If the single-rope bridge is high enough, suspend yourself below the single-rope bridge and above the water. Use the following steps to suspend yourself from a single-rope bridge and then pull yourself across the water:

Tie a sling rope around your waist using a bowline. Ensure that the knot is tight.

Attach a carabiner through the bowline's loop. The carabiner's gate faces up. (figure 5-18)



Figure 5-18

Secure your helmet chin strap.

Face the single-rope bridge with your left shoulder toward the far shore.

Grasp the bridge rope in both hands.

Swing your body beneath the single-rope bridge with your head toward the far shore. Cross your ankles above the bridge rope.

Arch back until the carabiner contacts the bridge rope. Connect the carabiner to the bridge rope. Allow the carabiner to bear your body's weight.

Pull yourself across the single-rope bridge, hand-over-hand, to the far shore. (figure 5-19)



Figure 5-19

Swift Current Crossings

A single-rope bridge prevents being knocked down and swept away by a swift current. Use the following steps to move through a swift current:

Tie one end of a sling rope around your waist using a bowline.

Tie the running end of the sling rope in another bowline, and attach a carabiner to the bowline's loop.

Step up to the bridge. Face upstream.

Hook the carabiner to the single-rope bridge.

Walk sideways into the river while grasping the bridge rope in both hands.

Use the single-rope bridge for balance and remain standing, if possible.

Continue to move sideways through the river to the far shore.

Slow Current Crossings

If you face little or no current, it is not necessary to hook up to a bridge rope with a carabiner. Lie on your back in the water beneath the single-rope bridge. Support your body weight with your waterproof pack. Use the bridge rope and pull yourself hand over hand across the river.

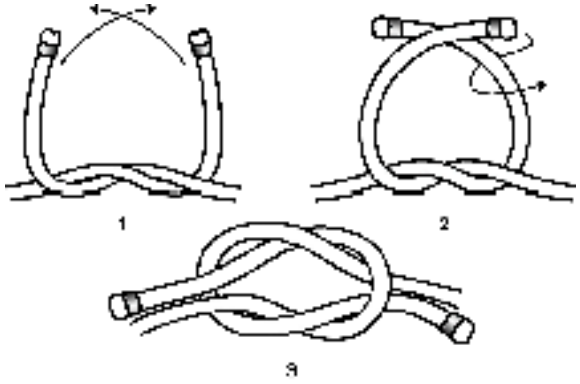
Removal

If you are the last Marine waiting to cross, pull on the standing end of the rope to release the knot, then tie the rope around your waist using a bowline. The Marines on the far shore will pull you through the water.

APPENDIX A
KNOT TYING

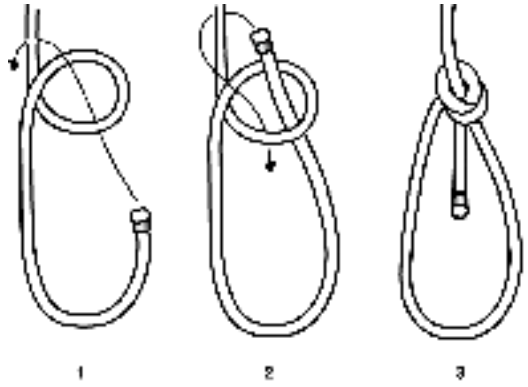
Square Knot

The square knot is used to secure two ropes of equal diameter together so they form one continuous rope that will not slip.



Bowline

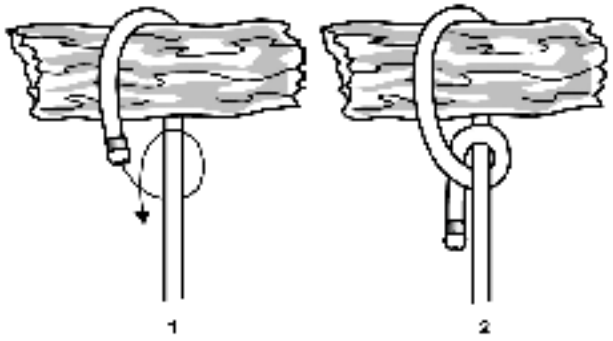
The bowline forms a loop that will not tighten or slip under strain. It is easily untied.



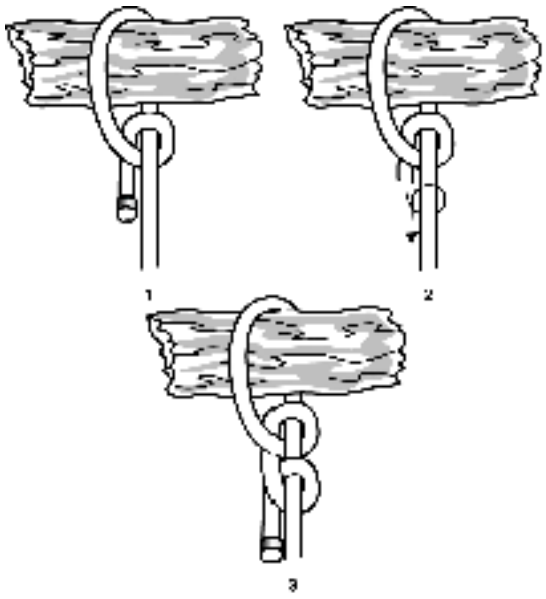
Hitches

Hitches are used to dress (prepare) knots and secure loose ends.

Half Hitch.The half hitch is used to tie a rope to a tree or to a larger rope. It will hold against a steady pull, but is not a secure hitch. It is frequently used to secure the free end of a rope.



Two Half Hitches. Two half hitches can be used to secure the running end of a rope.

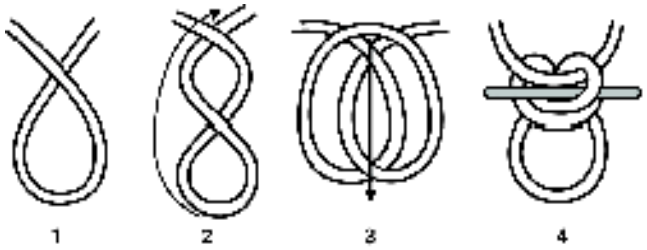


Round Turn and Two Half Hitches. A round turn and two half hitches can be used to fasten a rope to a tree. This hitch does not jam.



Butterfly Knot

The butterfly knot is used for anchor lines. Tied properly, it will not tighten on itself to the point that it cannot be easily untied. The butterfly knot can be used to pull a rope bridge taut. This knot can be used to tighten a fixed rope when mechanical means are not available. It will not jam if a stick is placed between the two upper loops.



GLOSSARY

CPR ..... cardiopulmonary resuscitation
CO2 ..... carbon dioxide
HELP ..... heat escape lessening posture
LCpl ..... lance corporal
LPP ..... life preserver personal
MCRP ..... Marine Corps reference publication
MCWSPM ..... Marine Corps Water Survival Program

REFERENCES AND RELATED PUBLICATIONS

Marine Corps Reference Publications (MCRPs)

3-10A.3	Marine Rifle Squad
3-40A.9	First Aid
8-10B-4	Marine Physical Readiness Training for Combat
8-10B.7	Survival

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